



ADVERTISEMENT FOR BIDS

SPECIAL PROVISIONS

BIDDERS DOCUMENTS

TRACS/Proj. No.:

000 MA TOL T061901C TOL-0(200)T
CITY OF TOLLESON
(VAN BUREN AT 96TH AVE, TOLLESON)

Contracts and Specifications Group
205 S. 17TH Ave., 2nd Floor, M/D 121F
Phoenix, Arizona 85007-3217

ARIZONA DEPARTMENT OF TRANSPORTATION

ADVERTISEMENT FOR BIDS

BID OPENING: FRIDAY, NOVEMBER 06, 2026, AT 11:00 A.M. (M.S.T.)

TRACS NO	T061901C
PROJECT NO	TOL-0(200)T
TERMINI	CITY OF TOLLESON
LOCATION	VAN BUREN AT 96 TH AVE, TOLLESON

ROUTE NO.	MILEPOST	DISTRICT	ITEM NO.
	to		
N/A	N/A	CENTRAL	103672

The amount programmed for this contract is \$6,024,592.00. The location and description of the proposed work are as follows:

The proposed project is located in Maricopa County within the City of Tolleson along Van Buren Street, from the northeast corner of the Van Buren St/96th Ave intersection south to the parcel owned by Tolleson High School. The work includes the construction of a pedestrian bridge across Van Buren Street, elevators, stairs, DMS signs, signing and marking, minor pedestrian ramp modifications, and other related work.

The time allowed for the completion of the work included in this contract will be 440 calendar days.

The Arizona Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to §§ 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.

Contract documents, and other project documents, if applicable, are available as electronic files, at no charge, from the Department's website through the ADOT Contracts and Specifications Group (<https://azdot.gov/business/contracts-and-specifications/current-advertisements>).

Documents will be available within one week following the advertisement for bids.

To submit a valid bid, the bidder must (1) have prequalification from the Department as necessary for the project, and (2) be included on the project Plansholder List as a Prime.

The Application for Contractor Prequalification may be obtained from the Contracts and Specifications website.

This project requires electronic bidding. If a request for approval to bid as a Prime Contractor is received less than five working days prior to bid opening, the Department cannot guarantee the request will be acted on.

This contract is subject to the provisions of Arizona Revised Statutes Section 42-5075 -- Prime contracting classification; exemptions; definitions.

No award will be made to any contractor who is not a duly licensed contractor in accordance with Arizona Revised Statutes 32-1101 through 32-1170.03.

All labor employed on this project shall be paid in accordance with the minimum wage rates shown in the General Wage Decision. These rates have been determined in accordance with the requirements of the law and issued by the Secretary of Labor for this project. The wage scale is on file in Contracts and Specifications Section and copies may be obtained at all reasonable times.

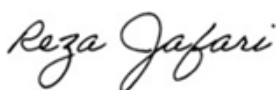
Persons that require a reasonable accommodation based on language or disability should contact ADOT's Contracts and Specifications Office by phone (602) 712-7221. Requests should be made as early as possible to ensure the State has an opportunity to address the accommodation.

Las personas que requieran asistencia (dentro de lo razonable) ya sea por el idioma o discapacidad deben ponerse en contacto con ADOT (602) 712-7221.

The bidder shall provide an electronic proposal guaranty payable to the Arizona Department of Transportation for 10 percent of the amount of the bid.

Prior to the bid opening date, any questions pertaining to the project documents shall be submitted to the Department in a written format through the Bid Express (Bidx) website at <https://www.bidx.com/az/lettings>. Questions shall be submitted through the Questions and Answers (Q&A) link located within the corresponding letting date and project proposal number links. The Department may not answer all questions, and any decision on whether a question is answered will be within the sole discretion of the Department. Any questions received less than three working days prior to the bid opening date may not be answered.

The Engineering Specialist assigned to this project is: Mohammed Patwary, MPatwary@azdot.gov, any correspondence with the Engineering Specialist is subject to posting onto Bidx through the project's Q&A link. Answers to questions will not be given verbally, but will be posted exclusively to the Bidx website.



for/Brahama Singh, PE,
Group Manager,
Contracts & Specifications

Project Advertised on: 09/17/2026.

SPECIAL PROVISIONS

FOR

ARIZONA PROJECT

0000 MA TOL T0619 01C

TOL-0(200)T

CITY OF TOLLESON

VAN BUREN AT 96TH AVE, TOLLESON

PEDESTRIAN BRIDGE, ELEVATOR & STAIRS

PROPOSED WORK:

The proposed project is located in Maricopa County within the City of Tolleson along Van Buren Street, from the northeast corner of the Van Buren St/96th Ave intersection south to the parcel owned by Tolleson High School. The work includes the construction of a pedestrian bridge across Van Buren Street, elevators, stairs, DMS signs, signing and marking, minor pedestrian ramp modifications, and other related work.

PROFESSIONAL ENGINEERS SEALS

These Special Provisions represent the combined efforts of the following organizations:

- (1) Kimley-Horn and Associates, Inc.
- (2) 4Line Studio

A representative of each organization has affixed their seal below, which attests that portions of these Special Provisions were prepared under their direction.



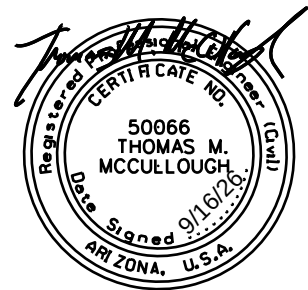
Kimley-Horn and
Associates
(Civil)



Kimley-Horn and
Associates
(Drainage)



Kimley-Horn and
Associates
(Traffic)



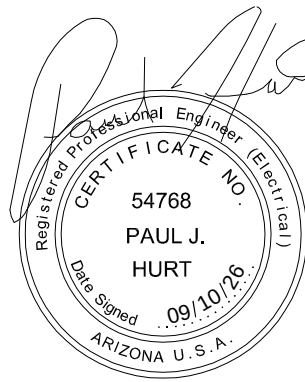
Kimley-Horn and
Associates
(ITS)



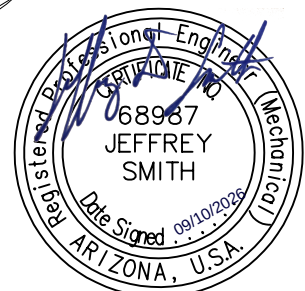
4Line Studio
(Architect)



Kimley-Horn and
Associates
(Lighting)



Kimley-Horn and
Associates
(Electrical)



EXPIRES 06-30-2028

Kimley-Horn and
Associates
(Mechanical)

(SPC00FA, 03/19/26)

SPECIFICATIONS:

The work embraced herein shall be performed in accordance with the requirements of the following separate documents:

Arizona Department of Transportation, Standard Specifications for Road and Bridge Construction, Edition of 2021,

Arizona Department of Transportation, Roadway Engineering Group, Construction Standard Drawings, listed in the project plans, and available on the Department's website,

Arizona Department of Transportation, Traffic Engineering Group, Manual of Approved Signs, available on the Department's website,

Arizona Department of Transportation, Traffic Engineering Group, Temporary Traffic Control Design Guidelines, dated April, 2025, available on the Department's website,

Manual on Uniform Traffic Control Devices for Streets and Highways, 2023 edition and Arizona Supplement to the 2023 edition, dated January, 2026,

The Proposal Pamphlet which includes the following documents:

These Special Provisions,

Appendix A – Drilled Shaft Slump Loss Test

Required Contract Provisions Federal-Aid Construction Contracts (Form FHWA 1273 Revised October 23, 2023),

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246), July 1, 1978, Revised November 3, 1980 and Revised April 15, 1981,

Title VI / Non-Discrimination Assurances,

Appendix A

Appendix E,

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246), July 1, 1978, Revised November 3, 1980 and Revised April 15, 1981,

Equal Employment Opportunity Compliance Reports, 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 January 1, 2005, Revised August 1, 2005, and Revised March 1, 2015,

Wage Determination Decision,

Bidding Schedule,

Proposal,

Surety (Bid) Bond, 12-1303,

Certification With Regard to the Performance of Previous Contracts or Subcontracts Subject to the Equal Opportunity Clause and the Filing of Required Reports, Federal Aid Projects, April, 1969, Rev. July, 2003,

Certification With Respect to the Receipt of Addenda,

Participation in Boycott of Israel Certification Form,

Forced Labor of Ethnic Uyghurs Ban Certification Form, Rev. November 2022.

BID SUBMISSION:

In submitting a bid, the bidder shall completely execute the following documents:

Proposal,

Bidding Schedule,

Surety (Bid) Bond, 12-1303,

Certification With Regard to the Performance of Previous Contracts or Subcontracts Subject to the Equal Opportunity Clause and the Filing of Required Reports, Federal Aid Projects, April, 1969, Rev. July, 2003,

Certification With Respect to the Receipt of Addenda,

Participation in Boycott of Israel Certification Form, and

Forced Labor of Ethnic Uyghurs Ban Certification Form, Rev. November 2022.

PROPOSAL GUARANTY:

Each bidder is advised to satisfy itself as to the character and the amount of the proposal guaranty required in the Advertisement for Bids.

CONTRACT DOCUMENTS:

The bidder to whom an award is made will be required to execute a Performance Bond and a Payment Bond, each in 100 percent of the amount of the bid, an Insurance Certificate and the Contract Agreement.

A copy of these documents is not included in the Proposal Pamphlet; however, each bidder shall satisfy itself as to the requirements of each document.

The documents, approved by the Department of Transportation, Highways Division, are identified as follows:

Statutory Performance Bond, 12-1301, September, 1992

Statutory Payment Bond, 12-1302, September, 1992

Contract Agreement, 12-0912, August, 2000

Certificate of Insurance, 12-0100, June, 1998

A copy of each document may be obtained by making a request to Contracts & Specifications.

MATERIAL AND SITE INFORMATION:

Projects requiring materials, excavation, or site investigation may have additional information available concerning the material investigations of the project site and adjacent projects. This information, when available and applicable, may be examined in the Office of the Bridge Group-Geotechnical Services, located at 205 S. 17th Avenue, Phoenix, AZ 85007-3212. The contractor may contact Bridge Group at (602) 712-7481 to schedule an appointment to examine the information. This information will not be attached to the contract documents.

(EPRISENGL, 12/19/24)

DISADVANTAGED BUSINESS ENTERPRISES:

1.0 Policy:

The Arizona Department of Transportation (hereinafter the Department) has established a Disadvantaged Business Enterprise (DBE) program in accordance with the regulations of the U.S. Department of Transportation (USDOT), 49 Code of Federal Regulation Part 26 (49 CFR Part 26). The Department has received Federal financial assistance from the U.S. Department of Transportation and as a condition of receiving this assistance, the Department has signed an assurance that it will comply with 49 CFR Part 26.

It is the policy of the Department to ensure that DBEs (hereinafter DBE or DBE firm), as defined in Part 26, have an equal opportunity to receive and participate in USDOT-assisted contracts. It is also the policy of the Department:

- (1) To ensure nondiscrimination in the award and administration of USDOT-assisted contracts;
- (2) To create a level playing field on which DBEs can compete fairly for USDOT-assisted contracts;
- (3) To ensure that the DBE program is narrowly tailored in accordance with applicable law;
- (4) To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are counted as DBEs;
- (5) To help remove barriers to the participation of DBEs in USDOT-assisted contracts,
- (6) To assist in the development of firms that can compete successfully in the market place outside the DBE program; and
- (7) To promote the use of DBEs in all types of federally-assisted contracts and procurement activities.

It is also the policy of the Department to facilitate and encourage participation of Small Business Concerns (SBCs), as defined herein, in USDOT-assisted contracts. The Department encourages contractors to take reasonable steps to eliminate obstacles to SBCs' participation and to utilize SBCs in performing contracts.

2.0 Assurances of Non-Discrimination:

The contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, sex or national origin in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 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 State deems appropriate, which may include, but are not limited to:

- (A) Withholding monthly progress payments;
- (B) Assessing sanctions; and/or
- (C) Disqualifying the contractor from future bidding as non-responsible.

The contractor, subrecipient, or subcontractor shall ensure that all subcontract agreements contain this non-discrimination assurance.

3.0 Definitions:

- (A) **Commercially Useful Function (CUF):** Commercially Useful Function is defined in 49 CFR Part 26.55. That definition is incorporated herein by reference.
- (B) **Disadvantaged Business Enterprise (DBE):** A DBE, as defined in 49 CFR Part 26.5, is a for-profit small business concern which meets both of the following requirements:
- (1) Is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged; and,
 - (2) Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.
- (C) **Joint Check:** a two-party check between a subcontractor, DBE and/or non-DBE, a prime contractor and the regular dealer of material supplies.
- (D) **Joint Venture:** an association of a DBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.
- (E) **NAICS Code:** The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the US business economy.
- (F) **Non-DBE:** any firm that is not a DBE.
- (G) **Race Conscious:** a measure or program is one that is focused specifically on assisting only DBEs, including women-owned DBEs.
- (H) **Race Neutral:** a measure or program is one that is, or can be, used to assist all small businesses. For the purposes of this part, race-neutral includes gender-neutrality.
- (I) **Small Business Concern:** a business that meets all of the following conditions:
- (1) Operates as a for-profit business
 - (2) Operates a place of business primarily within the U.S., or makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials, or labor;
 - (3) Is independently owned and operated;

- (4) Is not dominant in its field on a national basis; and
- (5) Does not have annual gross receipts that exceed the Small Business Administration size standards average annual income criteria for its primary North American Industry Classification System (NAICS) code.

(J) Socially and Economically Disadvantaged Individuals: Socially and Economically Disadvantaged Individuals is defined in 49 CFR Part 26.5. That definition is directly incorporated here.

- (1) Any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who has been subjected to racial or ethnic prejudice or cultural bias within American society because of his or her identity as a member of a group and without regard to his or her individual qualities. The social disadvantage must stem from circumstance beyond the individual's control.
- (2) Any individual who is found to be a socially and economically disadvantaged individual on a case-by-case basis. An individual must demonstrate that he or she has held himself or herself out, as a member of a designated group.
- (3) Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
 - (i) "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;
 - (ii) "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - (iii) "Native Americans," which includes persons who are enrolled members of a federally or State recognized Indian tribe, Alaskan Natives or Native Hawaiians;
 - (iv) "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Republic of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Tuvalu, Nauru, Federated States of Micronesia, or Hong Kong;

- (v) "Subcontinent Asian Americans," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
 - (vi) Women;
 - (vii) Any additional groups whose members are designated as socially and economically disadvantaged by the Small Business Administration (SBA), at such time as the SBA designation becomes effective.
- (4) Being born in a particular country does not, standing alone, mean that a person is necessarily a member of one of the groups listed in this definition.

4.0 Working with DBEs:

The Department works with DBEs and assists them in their efforts to participate in the highway construction program. All bidders should contact the Department's Business Engagement and Compliance Office (BECO) by phone, through email, or at the address shown below, for assistance in their efforts to use DBEs in the highway construction program of the Department. BECO contact information is as follows:

Arizona Department of Transportation
Business Engagement and Compliance Office
1801 W. Jefferson Street, Ste. 101, Mail Drop 154A
Phoenix, AZ 85007
Phone (602) 712-7761
FAX (602) 712-8429
Email: contractorcompliance@azdot.gov
Website: www.azdot.gov/business/business-engagement-and-compliance

4.01 Business Development Program:

The Department has established the Business Development Program as an initiative to encourage and develop disadvantaged businesses in the highway construction industry. The Department is committed to providing new, emerging, developmental and transitional DBEs with general and firm-specific training and technical assistance. The Department intends for this assistance to aid DBEs to become competitive within the heavy highway and construction industry market places. In particular, the Department's DBE Supportive Services Program (DBE/SS) is designed to work in collaboration with stakeholder organizations (including departments and agencies of State and Federal Governments, small business organizations, tribal governments, profit and nonprofit corporations) to help DBEs to successfully compete for highway construction projects and become self-sufficient. The program provides educational opportunities for DBEs regarding current market conditions, Federal regulatory compliance, and best business practices. These efforts are reinforced with one-on-one business counseling for DBEs certified in areas

that directly support Federal-aid highway projects, small group workshops, conferences, business expositions, regular in-person training opportunities, and regular virtual training opportunities. For guidance regarding this program, refer to the Business Development Program Guidelines available on the BECO website at <https://azdot.gov/business/business-engagement-and-compliance/dbe-supportive-services/business-development-program/disadvantaged-business-enterprise-dbe-program/dbe>.

The Business Development Program is intended to increase legitimate DBE activities. The program operates in conformity with the Federal DBE rules and regulations. The Department's DBE/SS participants may not circumvent the Federal DBE rules or regulations.

5.0 Applicability:

The Department has established an overall annual goal for DBE participation on Federal-aid contracts. The Department intends for the goal to be met with a combination of race conscious efforts and race neutral efforts. Race conscious participation occurs where the contractor uses a percentage of DBEs, as defined herein, to meet the contract-specified goal. Race neutral efforts are those that are, or can be, used to assist all small businesses or increase opportunities for all small businesses. The regulation, 49 CFR 26, describes race neutral participation as when a DBE wins a prime contract through customary competitive procurement procedures or is awarded a subcontract on a prime contract that does not carry a DBE contract goal.

The provisions are applicable to all bidders including DBE bidders.

6.0 Certification and Registration:

6.01 DBE Certification:

Certification as a DBE shall be predicated on:

- (A) The completion and execution of an application for certification as a "Disadvantaged Business Enterprise".
- (B) The submission of documents pertaining to the firm(s) as stated in the application(s), including but not limited to a statement of social disadvantage and a personal financial statement.
- (C) The submission of any additional information which the Department or the applicable Arizona Unified Certification (UCP) agency may require to determine the firm's eligibility to participate in the DBE program.
- (D) The information obtained during the on-site visits to the offices of the firm and to active job-sites.

Applications for certification may be filed online with the Department or the applicable UCP agency at any time through the Arizona Unified Transportation Registration and Certification System (AZ UTRACS) website at <https://utracs.azdot.gov/Home/>.

DBE firms and firms seeking DBE certification shall cooperate fully with requests for information relevant to the certification process. Failure or refusal to provide such information is a ground for denial or removal of certification.

The Department is a member of the AZ Unified Certification Program (AZUCP). Only DBE firms that are certified by the AZUCP are eligible for credit on Department projects. A list of DBE firms certified by AZUCP is available on the internet at <https://utracs.azdot.gov/Home/>. The list will indicate contact information and specialty for each DBE firm, and may be sorted in a variety of ways. However, the Department does not guarantee the accuracy and/or completeness of this information, nor does the Department represent that any licenses or registrations are appropriate for the work to be done.

The Department's certification of a DBE is not a representation of qualifications and/or abilities only that the firm has met the criteria for DBE certification as outlined in 49 CFR Part 26. The contractor bears all risks of ensuring that DBE firms selected by the contractor are able to perform the work.

6.02 SBC Registration:

To comply with 49 CFR Part 26.39, the Department's DBE Program incorporates contracting requirements to facilitate participation by Small Business Concerns (SBCs) in federally assisted contracts. SBCs are for-profit businesses registered to do business in Arizona that meet the Small Business Administration (SBA) size standards for average annual revenue criteria for its primary North American Industry Classification System (NAICS) code.

While the SBC component of the DBE program does not require utilization goals on projects, the Department encourages contractors to utilize small businesses that are registered in AZ UTRACS on their contracts, in addition to DBEs meeting the certification requirement. The contractor may use the AZ UTRACS website to search for certified DBEs and registered SBCs that can be used on the contract. However, SBCs that are not DBEs will not be counted toward DBE participation.

SBCs can register online at the AZ UTRACS website at <https://utracs.azdot.gov/Home/>. The Department's registration of SBCs is not a representation of qualifications and/or abilities. The contractor bears all risks of ensuring that SBC firms selected by the contractor are able to perform the work.

7.0 DBE Financial Institutions:

The Department thoroughly investigates the full extent of services offered by financial institutions owned and controlled by socially and economically disadvantaged individuals

in its service area and makes reasonable efforts to use these institutions. The Department encourages prime contractors to use such institutions on USDOT assisted contracts. However, use of DBE financial institutions will not be counted toward DBE participation.

The Department encourages prime contractors to research the Federal Reserve Board website at www.federalreserve.gov to identify minority-owned banks in Arizona derived from the Consolidated Reports of Condition and Income filed quarterly by banks (FFIEC 031 and 041) and from other information on the Board's National Information Center database.

8.0 Time is of the Essence:

TIME IS OF THE ESSENCE IN RESPECT TO THE DBE PROVISIONS.

9.0 Computation of Time:

In computing any period of time described in this DBE special provision, such as calendar days, the day from which the period begins to run is not counted. When the last day of the period is a Saturday, Sunday, or Federal or State holiday, the period extends to the next day that is not a Saturday, Sunday, or Federal or State holiday. When the Department's offices are closed for all or part of the last day, the period extends to the next day on which the Department's offices are open.

10.0 Contractor and Subcontractor Requirements:

10.01 General:

The contractor shall establish a DBE program that will ensure nondiscrimination in the award and administration of contracts and subcontracts.

Agreements between the bidder and a DBE in which the DBE promises not to provide subcontracting quotations to other bidders are prohibited.

10.02 DBE Liaison:

The contractor shall designate a DBE Liaison responsible for the administration of the contractor's DBE program. The name of the designated DBE Liaison shall be included in the DBE Intended Participation Affidavit Summary.

11.0 Bidders/Proposers List and AZ UTRACS Registration Requirement:

Under 49 CFR Part 26.11, DOTs are required to collect certain information from all contractors and subcontractors who seek to work on federally-assisted contracts in order to set overall and contract DBE goals. The Department collects this information through a Bidders/Proposers List when firms register their companies on the Arizona Unified Transportation Registration and Certification System (AZ UTRACS) web portal at <https://utracs.azdot.gov/Home/> a centralized database for companies that seek to do

business with the Department. This information will be maintained as confidential to the extent allowed by Federal and State law.

All prime contractors, subcontractors, and DBEs, shall: 1) register in AZ UTRACS, and 2) maintain their profile with current and accurate firm information. Bidders may verify that their firm and each subcontractor is registered using the AZ UTRACS website.

Bidders may obtain additional information at the AZ UTRACS website or by contacting BECO.

Bidders shall create the Bidders/Proposers List in the AZ UTRACS by selecting all subcontractors, service providers, manufacturers and suppliers that expressed interest or submitted bids, proposals or quotes for this contract. The Bidders/Proposers List form must be complete and must include the names for all subcontractors, service providers, manufacturers and suppliers regardless of the bidders' intentions to use those firms on the project.

All bidders must complete the Bidders/Proposers List online at AZ UTRACS whether they are the apparent low bidder or not. A confirmation email will be generated by the system. The bidders shall submit to BECO a copy of the email confirmation no later than 4:00 p.m. on the fifth calendar day following the bid opening. Faxed copies are acceptable.

FAILURE TO SUBMIT THE REQUIRED BIDDERS/PROPOSERS LIST CONFIRMATION EMAIL TO BECO BY THE STATED TIME AND IN THE MANNER HEREIN SPECIFIED SHALL BE CAUSE FOR THE BIDDER BEING DEEMED INELIGIBLE FOR AWARD OF THE CONTRACT.

12.0 DBE Goals:

The Department has not established contract goals for DBE participation in this contract. Contractors are still encouraged to employ reasonable means to obtain DBE participation. Contractors must retain records in accordance with these DBE specifications. The contractor is notified that this record keeping is important to the Department so that it can track DBE participation where only race neutral efforts are employed.

13.0 Payment Reporting:

The contractor shall report on a monthly basis indicating the amounts paid to all subcontractors, of all tiers, working on the project. Reporting shall be in accordance with Subsection 109.06(B)(5) of the specifications.

14.0 Crediting DBE Participation:

14.01 General Requirements:

To count toward DBE participation, the DBE firm must be certified in each NAICS code applicable to the kind of work the firm will perform on the contract. NAICS for each DBE

can be found on the AZ UTRACS under the Firm Directory. General descriptions of all NAICS codes can be found at www.naics.com.

The entire amount of a contract that is performed by the DBE's own forces, including the cost of supplies and materials purchased by the DBE for the work on the contract and equipment leased by the DBE will be credited toward DBE participation. Supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate will not be credited toward DBE participation.

The contractor bears the responsibility to determine whether the DBE possesses the proper contractor's license(s) to perform the work.

The Department's certification is not a representation of a DBE's qualifications and/or abilities. The contractor bears all risks that the DBE may not be able to perform its work for any reason.

A DBE may participate as a prime contractor, subcontractor, joint venture partner with either a prime contractor or a subcontractor, or as a vendor of materials or supplies. A DBE joint venture partner shall be responsible for a clearly defined portion of the work to be performed, in addition to meeting the requirements for ownership and control.

The dollar amount of work to be accomplished by DBEs, including partial amount of a lump sum or other similar item, shall be on the basis of agreements such as: subcontract, purchase order, hourly rate, and rate per ton.

With the exception of bond premiums, all work must be attributed to specific bid items. Where work applies to several items, the DBE contracting arrangement must specify unit price and amount attributable to each bid item. DBE credit for any individual item of work performed by the DBE shall be the lesser of the amount to be paid to the DBE or the prime contractor's bid price. If the amount bid by the DBE on any item exceeds the prime contractor's bid amount, the prime contractor may not obtain credit by attributing the excess to other items.

Where more than one DBE is engaged to perform parts of an item (for example, supply and installation), the total amount payable to the DBEs will not be considered in excess of the prime contractor's bid amount for that item.

Bond premiums may be stated separately, so long as the arrangement between the prime contractor and the DBE provides for separate payment not to exceed the price charged by the bonding company.

DBE credit may be obtained only for specific work done for the project, supply of equipment specifically for physical work on the project, or supply of materials to be incorporated in the work. DBE credit will not be allowed for costs such as overhead items, capital expenditures (for example, purchase of equipment), and office items.

If a DBE performs part of an item (for example, installation of materials purchased by a Non-DBE), the DBE credit shall not exceed the lesser of (1) the DBE's contract or (2) the prime contractor's bid for the item, less a reasonable deduction for the portion performed by the Non-DBE.

When a DBE performs as a partner in a joint venture, only that portion of the total dollar value of the contract which is clearly and distinctly performed by the DBE's own forces can be credited.

The contractor may credit second-tier subcontracts issued to DBEs by non-DBE subcontractors. Any second-tier subcontract to a DBE must meet the requirements of a first-tier DBE subcontract.

A prime contractor may credit the entire amount of that portion of a construction contract that is performed by the DBE's own forces. The cost of supplies and materials obtained by the DBE for the work of the contract can be included so long as that cost is reasonable. Leased equipment may also be included. No credit is permitted for supplies purchased or equipment leased from the prime contractor or its affiliate(s).

When a DBE subcontracts a part of the work of its contract to another firm, the value of the subcontract may be credited towards DBE participation only if the DBE's subcontractor is itself a DBE and performs the work with its own forces. Work that a DBE subcontracts to a non-DBE firm does not count towards DBE participation.

A prime contractor may credit the entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a USDOT-assisted contract, provided the fees are reasonable and not excessive as compared with fees customarily allowed for similar services.

14.02 Effect of Loss of DBE Eligibility:

If a DBE or a DBE prime contractor is deemed ineligible, decertified, or suspended by the Department in accordance with 49 CFR Part 26.87 and 49 CFR Part 26.88, the following provisions shall apply:

- (A) If a DBE firm loses its DBE eligibility because the DBE firm was acquired by a non-DBE firm, no work performed by the DBE firm after the Decision Date will be counted toward DBE participation.
- (B) If a subcontract, contract, or supplier arrangement has been executed before the Decision Date, work performed by the DBE firm will be counted toward DBE participation.
- (C) If neither paragraph (A) nor paragraph (B) above applies, the work performed by the DBE firm after the Decision Date will be counted toward DBE participation.

- (D) If the contractor extends or adds work to the DBE firm's subcontract, that work will not be counted towards DBE participation unless the contractor has obtained prior approval from the Department for DBE credit. Any requests to extend or add work to the DBE firm's subcontract to count towards DBE participation shall be submitted using the request form, made available on BECO's website at <https://azdot.gov/business/business-engagement-and-compliance/dbe-contract-compliance/contract-specs-and-forms>, to extend Decertified DBE contract for DBE credit.
- (E) The Department will consent to such DBE credit only if the added work is within the foreseeable range of added work, given the circumstances of the original DBE contract.
- (F) For the purposes of this subsection, "Decision Date" means the date the Department notifies the DBE that it has become ineligible, decertified, or suspended under 49 CFR Part 26.87(c)(4), (g).

14.03 Notifying the Contractor of DBE Certification Status:

Each DBE contract of any tier shall require any DBE subcontractor or supplier that is either decertified or certified during the term of the contract to immediately notify the contractor and all parties to the DBE contract in writing, with the date of decertification or certification. The contractor shall require that this provision be incorporated in any contract of any tier in which a DBE is a participant.

14.04 Police Officers:

DBE credit will not be permitted for procuring DPS officers. For projects on which officers from other agencies are supplied, DBE credit will be given only for the broker fees charged, and will not include amounts paid to the officers. The broker fees must be reasonable.

14.05 Commercially Useful Function:

A prime contractor can credit expenditures to a DBE subcontractor only if the DBE performs a commercially useful function (CUF) on the contract.

In conformity with 49 CFR Part 26.55(c), a DBE performs a CUF when it is responsible for execution of the work of a contract and carries out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself that it uses on the project. To determine whether a DBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.

A DBE will not be considered to perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, the Department will examine similar transactions, particularly those in which DBEs do not participate.

If a DBE does not perform or exercise responsibility for at least 30 percent 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 within normal industry practice for the type of work involved, the Department will presume that the DBE is not performing a commercially useful function.

When a DBE is presumed not to be performing a commercially useful function as provided above, the DBE may present evidence to rebut this presumption. The Department will determine if the firm is performing a CUF given the type of work involved and normal industry practices.

The Department will notify the contractor, in writing, if it determines that the contractor's DBE subcontractor is not performing a CUF. The contractor will be notified within seven calendar days of the Department's decision.

Decisions on CUF may be appealed to the State Engineer. The appeal must be in writing and personally delivered or sent by certified mail, return receipt requested, to the State Engineer. The appeal must be received by the State Engineer no later than seven calendar days after the decision of BECO. BECO's decision remains in effect unless and until the State Engineer reverses or modifies BECO's decision. The State Engineer will promptly consider any appeals under this subsection and notify the contractor of the State Engineer's findings and decisions. Decisions on CUF matters are not appealable to USDOT.

The Department will conduct project site visits on the contract to confirm that DBEs are performing a CUF. The contractor shall cooperate during the site visits and the Department's staff will make every effort not to disrupt work on the project.

14.06 Trucking:

In conformity with 49 CFR Part 26.55(d), the Department will use the following factors in determining whether a DBE trucking company is performing a commercially useful function. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract.

The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract on every day that credit is to be given for trucking.

The contractor will receive credit for the total value of transportation services provided by the DBE using trucks it owns, insures and operates, and 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 DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks with drivers from a non-DBE is entitled to credit for the total value of the transportation services provided by non-DBE leased trucks with drivers not to exceed the value of transportation services on the contract provided by DBE-owned trucks or leased trucks with DBE employee drivers. Additional participation by non-DBE owned trucks with drivers receives credit only for the fee or commission paid to the DBE as a result of the lease agreement.

Example: DBE Firm X uses two of its own trucks on contract. It leases two trucks from DBE Firm Y and six trucks from non-DBE firm Z. DBE credit would be awarded for the total value of transportation services provided by Firm X and Firm Y, and may also be awarded for the total value of transportation services provided by four of the six trucks provided by Firm Z. In all, full credit would be allowed for the participation of eight trucks. DBE credit could be awarded only for the fees or commissions pertaining to the remaining trucks Firm X receives as a result of the lease with Firm Z.

The DBE may lease trucks without drivers from a non-DBE truck leasing company. If the DBE leases trucks from a non-DBE leasing company and uses its own employees as drivers, it is entitled to credit for the total value of these hauling services.

Example: DBE Firm X uses two of its own trucks on a contract. It leases three additional trucks from non-DBE Firm Z. Firm X uses its own employees to drive the trucks leased from Firm Z. DBE credit would be awarded for the total value of the transportation services provided by all five trucks.

For purposes of this section, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE. DBE participation will be allowed only for those lease costs related to the time each truck is devoted to the project.

DBE credit for supplying paving grade asphalt and other asphalt products will only be permitted for standard industry hauling costs, and only if the DBE is owner or lessee of the equipment and trucks. Leases for trucks must be long term (extending for a fixed time period and not related to time for contract performance) and must include all attendant responsibilities such as insurance, titling, hazardous waste requirements, and payment of drivers.

14.07 Materials and Supplies:

In conformity with 49 CFR Part 26.55(e), the Department will credit expenditures with DBEs for material and supplies towards DBE participation as follows:

(A) If the materials or supplies are obtained from a DBE manufacturer, 100 percent of the cost of the materials or supplies is credited.

- (1) A DBE manufacturer is defined as: a firm that owns, or leases, and operates a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract, and of the general character described by the specifications.
- (2) Manufacturing includes blending or modifying raw materials or assembling components to create the product to meet contract specifications. When a DBE makes minor modifications to the materials, supplies, articles, or equipment, the DBE is not a manufacturer. Minor modifications are additional changes to a manufactured product that are small in scope and add minimal value to the final product.

(B) If the materials or supplies are purchased from a DBE regular dealer, 60 percent of the cost of the materials or supplies, (including transportation costs), is credited.

- (1) A DBE regular dealer is defined as: a firm that owns, or leases, and operates, or maintains a store or 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 sufficient quantities, and regularly sold or leased to the public in the usual course of business.
 - (a) To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
 - (b) Items kept and regularly sold by the DBE are of the "general character" when they share the same material characteristics and application as the items specified by the contract.
- (2) A firm may be a DBE regular dealer in such bulk items as petroleum products, steel, concrete or concrete products, stone or asphalt without owning and operating a place of business, as provided above, if the person both owns and operates distribution equipment used to deliver the products. Any supplementing of regular dealers' own distribution equipment must be by a long-term operating lease, and not on an ad-hoc or contract-by-contract basis.

- (3) A DBE supplier performs a CUF as a regular dealer and receives credit for 60 percent of the cost of materials or supplies, including transportation cost, when all, or at least 51 percent of, the items under a purchase order or subcontract are provided from the DBE's inventory, and when necessary, any minor quantities delivered from and by other sources are of the general character as those provided from the DBE's inventory.
 - (4) A DBE supplier of items that are not typically stocked due to their unique characteristics (e.g., limited shelf life or items ordered to specification) should be considered in the same manner as a regular dealer of bulk items as described above. If the DBE supplier of these items does not own or lease distribution equipment, as described above, it is not a regular dealer.
 - (5) Packagers, brokers, manufacturers' representatives, or other persons who arrange, facilitate or expedite transactions are not regular dealers within the meaning of this paragraph and the paragraph above.
- (C) If the materials or supplies are purchased from a DBE distributor that neither maintains sufficient inventory nor uses its own distribution equipment for the products in question, 40 percent of the cost of materials or supplies (including transportation costs) count for credit.
- (1) A DBE distributor is defined as: an established business that engages in the regular sale or lease of the items specified by the contract. A DBE distributor assumes responsibility for the items it purchases once they leave the point of origin (e.g., a manufacturer's facility), making it liable for any loss or damage not covered by the carrier's insurance.
 - (2) A DBE distributor performs a CUF when it demonstrates ownership of the items in question and assumes all risk for loss or damage during transportation, evidenced by the terms of the purchase order or a bill of lading (BOL) from a third party, indicating Free on Board (FOB) at the point of origin or similar terms that transfer responsibility of the items in question to the DBE distributor.
 - (3) If paragraph (1) and paragraph (2), above, are met, DBE distributors may receive 40 percent for drop-shipped items.
 - (4) Terms that transfer liability to the distributor at the delivery destination (e.g., FOB destination), or deliveries made or arranged by the manufacturer or another seller do not satisfy this requirement.
- (D) With respect to materials or supplies purchased from a DBE which is neither a manufacturer, a regular dealer, nor a distributor, the following standards shall apply:

- (1) The Department will credit the entire amount of the fees or commissions charged by the DBE for: (1) assistance in the procurement of the materials and supplies, or (2) fees or transportation charges for the delivery of materials or supplies required on a job site, toward DBE participation.
 - (2) The Department will only credit the fees or commissions charged by the DBE if the Department determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 - (3) The cost of the materials and supplies themselves may not be counted toward DBE participation.
- (E) The Department will credit expenditures with DBEs for material and supplies (e.g. whether a firm is acting as a regular dealer, distributor or a transaction facilitator) towards DBE participation on a contract-by-contract basis.
- (F) The fact that a DBE firm qualifies under a classification (manufacturer, regular dealer, distributor or supplier) for one contract does not mean it will qualify for the same classification on another contract.
- (G) The bidder shall be responsible for verifying whether a DBE qualifies as a DBE manufacturer, regular dealer, distributor or supplier.
- (1) For each DBE firm listed as a regular dealer or distributor, the bidder must assess a DBE firm's eligibility for 60 or 40 percent credit, respectively, of the cost of materials and supplies based on its demonstrated capacity and intent to perform as a regular dealer or distributor.
 - (2) To receive credit toward DBE participation, the bidder shall use and submit the form made available on BECO's website at <https://azdot.gov/business/business-engagement-and-compliance/dbe-contract-compliance/contract-specs-and-forms>, to affirm the DBE firm's capacity and intent to perform as a regular dealer or distributor.

15.0 Joint Checks:

15.01 Requirements:

A DBE subcontractor and a material supplier (or equipment supplier) may request permission for the use of joint checks for payments from the prime contractor to the DBE subcontractor and the supplier. Joint checks may be issued only if all the conditions in this subsection are met.

- (A) The DBE subcontractor must be independent from the prime contractor and

the supplier, and must perform a commercially useful function. The DBE subcontractor must be responsible for negotiating the price of the material, determining quality and quantity, ordering the materials, installing (where applicable), and paying for the material. The DBE subcontractor may not be utilized as an extra participant in a transaction, contract, or project in order to obtain the appearance of DBE participation.

- (B) The use of joint checks will be allowed only if the prime contractor, DBE subcontractor, and material supplier establish that the use of joint checks in similar transactions is a commonly recognized business practice in the industry, particularly with respect to similar transactions in which DBE's do not participate.
- (C) A material or supply contract may not bear an excessive ratio relative to the DBE subcontractor's normal capacity.
- (D) There may not be any exclusive arrangement between one prime and one DBE in the use of joint checks that may bring into question whether the DBE is independent of the prime contractor.
- (E) Any arrangement for joint checks must be in writing, and for a specific term (for example, one year, or a specified number of months) that does not exceed a reasonable time to establish a suitable credit line with the supplier.
- (F) The prime contractor may act solely as the payer of the joint check, and may not have responsibility for establishing the terms of the agreement between the DBE subcontractor and the supplier.
- (G) The DBE must be responsible for receiving the check from the prime contractor and delivering the check to the supplier.
- (H) The prime contractor cannot require the DBE subcontractor to use a specific supplier, and the prime contractor may not participate in the negotiation of unit prices between the DBE subcontractor and the supplier.

15.02 Procedure and Compliance:

- (A) The Business Engagement and Compliance Office must approve the agreement for the use of joint checks in writing before any joint checks are issued. The prime contractor shall submit a DBE joint check request form, available from the BECO website, along with the joint check agreement, to BECO through email within seven calendar days from the time the subcontract is executed.
- (B) After obtaining authorization for the use of joint checks, the prime contractor, the DBE, and the supplier must retain documentation to allow for efficient monitoring of the agreement.

- (C) Copies of canceled checks must be submitted, with the payment information for the period in which the joint check was issued, electronically through email to BECO, and made available for review at the time of the onsite CUF review. The prime contractor, DBE, and supplier each have an independent duty to report to the Department in the case of any change from the approved joint check arrangement.
- (D) Any failure to comply will be considered by the Department to be a material breach of this contract and will subject the prime contractor, DBE, and supplier to contract remedies and, in the case of serious violations, a potential for termination of the contract, reduction or loss of prequalification, debarment, or other remedies which may prevent future participation by the offending party.

16.0 Certification of Final DBE Payments:

DBE participation on the contract is measured by actual payments made to the DBEs. The contractor shall submit the "Certification of Final DBE Payments" form for each DBE firm working on the contract. This form shall be signed by the contractor and the relevant DBE, and submitted to the Engineer no later than 30 days after the DBE completes its work.

The contractor will not be released from the obligations of the contract until the "Certification of Final DBE Payments" forms are received and deemed acceptable by the Engineer and BECO.

17.0 False, Fraudulent, or Dishonest Conduct:

In addition to any other remedies or actions, the Department will bring to the attention of the USDOT any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take steps such as referral to the Department of Justice for criminal prosecution, referral to the USDOT Inspector General for possible initiation of suspension and debarment proceedings against the offending parties or application of "Program Fraud and Civil Penalties" rules provided in 49 CFR Part 31.

(TITLE VI, 08/19/21)

STANDARD TITLE VI SPECIFIC ASSURANCES:

The Arizona Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 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.

GENERAL REQUIREMENTS:

Local Agencies Standards:

The plans and these Special Provisions reference certain Standard Details promulgated by a local agency or agencies. Any local agency's Standard Specifications referenced on the standard details shall not be used unless they are so designated by these Special Provisions.

All Portland cement concrete and aggregate base shall conform to ADOT Standard Specifications. Whenever reference is made to structural concrete and aggregate base in the local agency's specifications, the reference shall be construed to mean Class S concrete and Class 2 aggregate base, respectively.

When not included in the project documents, copies of the latest Standard Specifications and Details for each local agency will be available on the local agency's website.

Use of Prohibited Products:

The contractor shall not commit any of the following actions:

- (1) Deliver, install, or include any prohibited product under this contract.
- (2) Propose to deliver, install, or include any prohibited product under this contract.
- (3) Enter into a new contract to procure or obtain any prohibited product.

For the purpose of this Section, "Prohibited Product" is defined as any telecommunication or video surveillance equipment, systems, or services produced by:

- (1) Huawei Technologies Company.
- (2) ZTE Corporation.
- (3) Hytera Communications Corporation.
- (4) Hangzhou Hikivision Digital Technology Company.
- (5) Dahua Technology Company.
- (6) Any subsidiary or affiliate of the entities mentioned in this Section.

The contractor shall identify the known subsidiaries and affiliates of the aforementioned from the following Website:

https://umd.service-now.com/itsupport?id=kb_article_view&sysparm_article=KB0014132&sys_kb_id=28015b70dbe0e3849382f1a51d96193f

BLM Material Sources:

If the contractor elects to pursue the use of material sources on BLM land under Title 30 Code of Federal Regulations, it is at the contractor's sole risk, and the Department bears no responsibility for any delays or costs associated with the request to use material sources on BLM Land.

The Department will not request or pursue any "free-use permit" under Title 23 Code of Federal Regulations or any other arrangement with BLM on this project.

No extension in contract time or compensation will be granted for any attempt by the contractor to utilize BLM land.

Transition of Select AASHTO Standard Test Method to Arizona Test Method Equivalent:

Whenever reference is made in the specifications to an AASHTO Test Method, the reference shall be construed to mean it's equivalent Arizona Test Method as listed in the table below.

TEST METHOD TRANSITION TABLE	
AASHTO Standard	Equivalent Arizona Test Method
R 66	103
R 97	104
R 90	105
T 11, T 27	201
T 85	210
T 84	211
T 335	212
T 99	225
	226
T 224	227
T 191	230
T 272	232
T 310	235
T 288, T 289	236
T 176	242
T 99	245
T 272	246
T 304 Method A	247
T 24	317
T 329	406
R 68, T 245	410
T 355	412

T 166	415
R 47	416
T 209	417
T 287	421
T 269	424
T 308	427
	428

Environmental Mitigation Measures:

The contractor's commitments are identified in the Environmental, Permits, Issues, and Commitments (EPIC) Plan Sheet 1F. The contractor shall follow the requirements specified in the EPIC plan sheet 1F, Subsection 104.16 of the specifications and these Special Provisions.

In addition, the contractor shall pay attention to the project specific environmental commitments that are specified in Section 10 of the EPIC Plan Sheet 1F.

The project mitigation measures are not subject to change without written approval from ADOT Environmental Planning. The contractor shall follow all the requirements of the permits specified herein and comply with the project specifications.

(101DEFN, 04/21/22)

SECTION 101 DEFINITIONS AND TERMS:

101.02 Definitions:

Acceptance: of the Standard Specifications is hereby deleted:

Characteristic: of the Standard Specifications is revised to read:

A measurable or an observable property of a material, product, or item of construction.

City, County, Township, or Town: of the Standard Specifications is hereby deleted:

Contract Bonds (Performance Bond and Payment Bond): the title and text of the Standard Specifications is revised to read:

Contract Bonds:

Surety Bonds that include Performance Bond and Payment Bond.

Highway, Street, or Road: of the Standard Specifications is revised to read:

A general term denoting a public way for purposes of travel, vehicular, pedestrian or by other means, including the entire area within the right-of-way.

Roadbed: of the Standard Specifications is revised to read:

The graded portion of a highway, prepared as a foundation for the pavement structure and shoulders.

Roadside Development: of the Standard Specifications is revised to read:

Activities which provide for the preservation of landscape materials and features; the rehabilitation and protection against erosion of all areas disturbed by construction through seeding, sodding, mulching and the placing of other ground covers; or such planting and other improvements as may increase the effectiveness and enhance the appearance of the highway.

State: of the Standard Specifications is revised to read:

The State of Arizona, acting through its authorized representatives.

(102BID, 03/19/26)

SECTION 102 BIDDING REQUIREMENTS AND CONDITIONS: of the Standard Specifications is revised to read:

102.01 Contract Documents:

(A) General:

The Contract Documents, including but not limited to, Advertisement for Bids, Project Plans, and Proposal Pamphlets will be available in electronic format, on the ADOT Contracts and Specifications Group website. Any interested party may access the advertised Contract Documents.

(B) Advertisements for Bids:

The advertisement for bids may contain the following information:

- Programmed Amount,
- Project number and name of highway,
- Route number and mileposts,
- Date and time of opening of bids,
- Location of the project,
- General description of work,
- Specified contract time for completion of contract work,
- Statement of proposal requirements,

- Manner in which project plans and specifications may be obtained,
- Type and amount of proposal guaranty.

(C) Proposal Pamphlet:

The Proposal Pamphlet will include the location and general description of the contemplated construction, an approximate estimate of the quantities and types of work to be performed and/or materials to be furnished, a schedule of bid items for which unit prices are invited, the specified time for completion, any applicable Special Provisions or supplemental requirements, and all necessary bidding documents.

102.02 Prerequisites for Bidding:

(A) General:

To submit a valid bid, the bidder shall:

- (1) Have prequalification from the Department as necessary for the project, in accordance with Subsection 102.02(B) of the specifications; and
- (2) Be included on the project Plansholder List as a Prime in accordance with Subsection 102.02(C) of the specifications.

(B) Prequalification of Bidders:

Prior to submitting a bid, the bidder will (unless waived by the Department) be required to be prequalified with the Department to bid on the project. The submission of Prequalification information and determination of Prequalification shall be in accordance with the requirements of the Rules for Prequalification of Contractors as approved and adopted by the Department.

(C) Plansholder List:

It is the bidder's responsibility to ensure that their firm is on the Plansholder List as a Prime prior to submitting a bid.

Firms may register electronically requesting placement on the project Plansholder List as a Prime contractor as follows:

- (1) Go to the ADOT Contracts and Specifications Group Website;
- (2) Select "Current Advertisements";
- (3) Identify the project of interest;
- (4) Click on the "Register" icon;
- (5) Select the "Bidder" radio button;

- (6) Complete all required fields;
- (7) Click “Save”. This submits the request to the Department; and
- (8) If all required information is provided, the “ADOT C&S Advertisement Registration Confirmation” Screen will appear. An email will also be sent to the email address provided acknowledging the receipt of the request.

Requests to be included on the Plansholder List as a Prime will be evaluated by the Department to determine whether the bidder is prequalified for the project. The Department cannot guarantee that requests to be on the Plansholder List will be considered if the request is submitted less than five working days prior to the bid opening. The Department will send an email to the email address provided notifying the contractor of the results of their request.

The Department’s email will state whether the request was approved or denied. More information regarding the Department’s decision may be obtained by contacting the ADOT Contracts and Specifications Group.

If an individual from a firm submits a duplicate request to be placed on the Plansholder List, the request will be denied. The Department will register the contact person listed on the duplicate request to receive email notices of updates to the project. The Department will send an email to the email address provided notifying the contractor of the results of their request.

(D) Registration for Notifications:

Subcontractors, Vendor and other interested parties may electronically register to receive email notifications regarding updates or changes to specific advertised contracts.

To register:

- (1) Go to the ADOT Contracts and Specifications Group Website;
- (2) Select “Current Advertisements”;
- (3) Identify the project of interest;
- (4) Click on the “Register” icon;
- (5) Select the “Other” radio button, as applicable;
- (6) Select the “Yes” in response to the prompt “Are you interested in registering to be notified about any changes made to this advertisement?”;
- (7) Complete all required fields;

- (8) Click "Save". This submits the request to the Department; and
- (9) If all required information is provided, the "ADOT C&S Advertisement Registration Confirmation" Screen will appear and a confirmation email will be sent to the email address provided.

All registered parties will receive notifications when changes are made to the associated contract advertisement.

102.03 Suspension from Bidding:

The Department may suspend any person and any subsidiary or affiliate of any person from further bidding to the Department and from being a subcontractor or a supplier or otherwise participating in the work:

- (A) If that person or any officer, director, employee or agent of that person is convicted, in this State, or any other jurisdiction, of a crime involving any of the following elements or actions:
 - (1) Entering into any contract, combination, conspiracy or other unlawful act in restraint of trade or commerce;
 - (2) Knowingly and willfully falsifying, concealing, or covering up a material fact by trick, scheme, or device;
 - (3) Making false, fictitious, or fraudulent statements or representations;
 - (4) Making or using a false writing or document knowing it to contain a false, fictitious, or fraudulent statement or entry;
 - (5) Misrepresentation or false statement on any application for bonding;
 - (6) Misrepresentation or false statement on any application for prequalification;
- (B) If the Department makes a finding of any of the above or finds that the contractor is not a Responsible Bidder or a Responsible Contractor; or
- (C) If the Department determines that a contractor, subcontractor, or supplier has repeatedly or willfully failed to comply with federal or state immigration laws.

Under this subsection, a person means any individual, partnership, joint venture, corporation, association, or other entity formed for the purpose of doing business as a contractor, subcontractor, or supplier.

102.04 Availability of Documents:

The following documents, if applicable, will be available in electronic format on the ADOT Contracts and Specifications Group website:

- A. Project Plans.
- B. Advertisement for Bids.
- C. Proposal Pamphlet.
- D. Cross Sections.
- E. Earthwork Report.
- F. Other Available Reports.
- G. Existing Ground Digital Terrain Model (DTM).
- H. Design Ground Digital Terrain Model (DTM).
- I. Survey Control Sheet.

The project plans, proposal pamphlet, cross sections, earthwork report, survey control sheet, and any applicable reports are provided in PDF format. The Department makes no representation or warranties as to the compatibility, usability, or readability of the PDF documents with any system, software, hardware, or application package other than that on which the files were originally saved. The contractor bears the sole risk of any modifications, manipulations, or alterations to the plans, proposal pamphlet, and any applicable reports.

The existing ground DTM and the design DTM, if applicable, are provided in either DTM or DGN files for informational purposes only. The DTMs are not part of the contract documents. The contractor's use of the information in the DTMs is at the contractor's sole risk. The Department makes no representation or warranties as to the compatibility, usability, or readability of the DTMs with any system, software, hardware, or application package other than that on which the files were originally prepared. The version of Microstation used to save the DTMs is indicated at <https://azdot.gov/business/engineering-and-construction/computer-aided-design-and-drafting-cadd>.

The Department is providing the available electronic project documents to bidders for informational purposes in conjunction with work or services to be provided to the Department under the contract. Any use of the electronic files for any purposes other than for this project is prohibited.

102.05 Plansholder Eligibility:

The Department reserves the right to disqualify a prequalified contractor from being a Plansholder for any of the following reasons:

- (A) Lack of competency or adequate machinery, plant and other equipment, as revealed by the financial statement and experience questionnaires required under Subsection 102.02 of the specifications.

- (B) Incomplete work which, in the judgment of the Department, might hinder or prevent the prompt completion of additional work if awarded.
- (C) Failure to pay, or settle satisfactorily, all bills due for work on other contracts.
- (D) Failure to comply with any qualification regulations of the Department.
- (E) Default under previous contracts.
- (F) Unsatisfactory performance on previous work.
- (G) Entering into any contract, combination, conspiracy, or other unlawful act in restraint of trade or commerce.
- (H) Knowingly and willfully falsifying, concealing, or covering up a material fact by trick, scheme, or device.
- (I) Making false, fictitious, or fraudulent statements or representations.
- (J) Making or using a false writing or document knowing it to contain a false, fictitious, or fraudulent statement or entry.
- (K) Misrepresentation or false statement on any application for bonding.
- (L) Misrepresentation or false statement on any application for prequalification.
- (M) Lack of sufficient ability or integrity to complete the contract.

102.06 Interpretation of Quantities in Bidding Schedule:

The quantities appearing in the bidding schedule, except as provided elsewhere, are approximate only and are prepared for the comparison of bids. Payment to the contractor will be made only for the actual quantities of work performed and accepted or materials furnished in accordance with the requirements of the contract. The scheduled quantities of work to be done and materials to be furnished may each be increased, decreased, or omitted as hereinafter provided in Subsection 104.02 of the specifications.

102.07 Examination of Plans, Specifications and Site of Work:

The bidder shall examine the site of the proposed work and the contract before submitting a Proposal. If no site investigation is performed, the bidder is responsible for all site conditions that should have been discovered had a reasonable site investigation been performed. The submission of a Proposal will be considered conclusive evidence that the bidder is satisfied with the conditions to be encountered in performing the work and as to the requirements of the proposed contract.

The bidder shall take no advantage of any apparent error or omission in the plans, bid schedule items, estimated quantities, specifications, or other contract documents. In the

event the bidder discovers such an error or omission, the bidder shall immediately notify the Department. The Department will then make such corrections and interpretations as may be deemed necessary.

Any request for explanation of the meaning or interpretations of the contract shall be submitted in adequate time to allow a reply to reach all bidders before submission of their Bid Proposal. If the Department determines interpretations or explanations are warranted, the response will be issued, if necessary, through an addendum to the contract documents, and will be made available to all prospective bidders before the time set for opening of Proposals.

The Department will not be bound by any statement or representation concerning conditions or description of the work unless they are included in the contract. Oral explanations, interpretations, or instructions given before the opening of the bids by Department employees or agents are not binding.

102.08 Preparation of Proposal:

(A) General:

The bidder shall prepare and submit its proposal using Department-approved bid preparation software.

Proposals shall be prepared and submitted in accordance with the requirements of Subsection 102.08(B) of the specifications.

The bidder shall submit its proposal using the electronic bid process described herein.

(B) Electronic Submittal:

(1) General:

In order to submit a bid electronically, a firm shall have obtained a bidder identification number from the Department, at the office of ADOT Contracts and Specifications Group, 205 South 17th Avenue, Maildrop 121F, Phoenix, AZ 85007, phone (602) 712-7221.

In addition, bidders shall subscribe to Info Tech, Inc., doing business as Infotech's Bid Express® service at www.bidx.com, an online bidding service, and obtain an online Digital ID. Bid Express can be reached at www.bidx.com, phone (888)-352-2439 and/or customer.support@bidx.com. The bidder shall also download and install a copy of the AASHTOWare Project Bids Bid Component from the internet at the Bid Express website. The version of the software currently used by ADOT can then be located by selecting the ADOT tab and the "AASHTOWare Project Bids" link under Downloads.

In order to obtain a Digital ID, bidders shall name at least one authorized signatory, as approved by the Department to commit the firm to the terms and conditions specified in the Proposal and the contract documents.

The bidder shall download the electronic copy of the project EBSX file, listed as an AASHTOWare Project Bids Data File on the Bid Express website. The file includes a schedule of items folder containing the bid schedule, a miscellaneous data folder containing the proposal and attachments, contractor authorization folder containing bidders's contact information, and a bid bond folder. The bidder shall review the proposal and complete the bidding schedule, as specified herein, and the attachments.

The bidder shall include with its bid an email address and recipient name as its contact information for the purpose of receiving the notice of award or other notices related to the bidding. The Department will send the notice of award, executed contract and other notices to the requested email address and recipient name.

It is the contractor's responsibility to provide the updated contact information to the Department if there are any changes to the above requested email address or recipient name prior to the award of the contract.

The bidder shall specify a unit price for each pay item for which a quantity is given in the bidding schedule. The software will automatically produce the extended amount, as the product of the quantity given and the specified unit price.

The bidder shall also download all addenda files issued and update the project file accordingly. The bidder shall be responsible for the successful submission of its electronic bid prior to the time specified for submission of bids. The bidder agrees that the Department bears no liability resulting from the bidder's failure to successfully submit an electronic bid.

(2) Procedure for Missing Bids:

If a bidder believes that its electronically submitted bid should have been read at the bid opening but was not read, the bidder shall notify the Department at CSGroup@azdot.gov of the apparent irregularity and provide its bid receipt for the bid in question no later than three hours after the time specified for submission of bids.

Upon proper notification of a missing bid by a bidder, the Department will notify all bidders that a missing bid has been reported. The Department will begin an investigation to determine the status of the bid, and will review all electronic bids received from Bid Express service.

The Department will direct Infotech to review their records and determine whether the missing bid was submitted. Infotech will make a determination about receipt of the bidder's missing bid.

If requested by the Department, Infotech will attempt to retrieve a copy of the encrypted bid from the bidder's computer.

The Department will partner with Infotech and implement best practices to configure the Bid Express service to decrypt the bid.

If the Department determines that a bid cannot be recovered, the Department will notify all bidders of its determination.

If a missing bid is recovered, the Department will determine the validity of the bid, and may recommend award of the contract to the bidder submitting the missing bid if appropriate. The Department will notify all bidders.

102.09 Non-Collusion Certification:

By submission of its bid electronically, the bidder makes the certification stated in the following paragraph, binding as if it had been signed by the bidder.

The bidder certifies that, pursuant to Subsection 112(c) of Title 23, United States Code and Title 44, Chapter 10, Article 1 of the A.R.S, neither it nor anyone associated with the company, firm, corporation, or individual has, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the submitted bid.

102.10 Irregular Proposals:

- (A) Proposals may be considered irregular and may be rejected for any of the following reasons:
 - (1) If there is a submission of any kind which may tend to make the proposal incomplete, indefinite or ambiguous as to its meaning.
 - (2) If the bid is mathematically unbalanced.
 - (3) If the bid is materially unbalanced.
- (B) Proposals will be considered irregular and will be rejected for any of the following reasons:
 - (1) If the bidder or surety fails to provide a proposal guaranty as specified in Subsection 102.11 of the specifications.
 - (2) If the bidding schedule does not contain a unit price for each pay item listed.
 - (3) If the bidder fails to meet the required goal for Disadvantaged Business Enterprises (DBE) established in the Special Provisions or show good faith effort as determined by the Department.

102.11 Proposal Guaranty:

The bidder shall provide an electronic proposal guaranty payable to the Arizona Department of Transportation for 10 percent of the amount of the bid.

The surety (bid) bond shall be executed by the bidder and a surety company or companies holding a certificate of authority to transact surety business in this State issued by the Director of the Department of Insurance. The agent for the surety shall be licensed to act as an insurance agent in Arizona.

Bidders shall provide an electronic proposal guaranty as described herein.

Two companies have established web-based surety processing procedures with Bid Express: Surety 2000 (<https://surety2000.com/>) and Sure Path Network (<http://web.insurevision.com/>). Bidders may contact these companies for additional information and requirements on electronic proposal guaranty.

102.12 Withdrawal of Proposals:

(A) General:

A bidder may withdraw its electronic submittal at a minimum 30 minutes prior to the time specified for bid opening in writing to the Contracts and Specifications Manager through the Contract and Specifications Group email at CSGroup@azdot.gov-----

(B) Conditional Withdrawal:

When proposals for more than one contract are to be publicly read on any one date, a bidder may request in the event it is the apparent low bidder on a given contract or contracts, that one or more subsequent bids be withdrawn.

The bidder shall submit a written request for conditional withdrawal to the Contracts and Specifications Group Manager via email at CSGroup@azdot.gov a minimum of 30 minutes prior to the specified bid opening time.

102.13 Combination or Conditional Proposals:

At the Department's discretion, proposals may be issued for projects either separately or in combination. Bidders may submit bids for the combination or for individual units within the combination, as allowed in the proposal. The Department reserves the right to award contracts based on separate or combination bids, whichever is most advantageous to the state. Only combination bids specifically authorized in the Department's proposal will be considered.

102.14 Public Opening of Proposals:

Proposals will be opened and read aloud at the time indicated in the advertisement for bid.

Bidders, their authorized agents and other interested parties may attend the bid opening while they are read aloud. After the completion of the bid opening, the as-read bid results will then be made available through the ADOT Contracts and Specifications Group website.

102.15 Licensing:

It is the responsibility of the bidder to determine whether it has the appropriate contracting licenses to perform the work. For all projects except Federal-aid funded projects, the bidder shall have the proper licenses at the time of bid opening. The successful bidder's failure to meet with the necessary license requirements at the time of bid opening will result in the rejection of the bid.

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 from the State Registrar of Contractors, in accordance with A.R.S. 32 1101 et seq. before award can be made, and no later than 60 days after the date bids are opened. The bidder's failure to get the necessary licenses within 60 days after the bid opening date will result in rejection of the bid.

Licensing information is available from:
Arizona Registrar of Contractors
1700 W. Washington St. Suite 105
Phoenix, AZ 85007-2812
Phone: (602) 542-1525
Email: Webmaster@azroc.gov
www.roc.az.gov

102.16 Boycott of Israel:

All bidders are required to certify in their bid proposal on the "Participation in Boycott of Israel Certification" form either:

- (A) The bidder does not participate in, and agrees not to participate in during the term of the contract, a boycott of Israel in accordance with ARS 35-393.01; or
- (B) The bidder does participate in a boycott of Israel as defined in ARS 35-393.01.

The Department will not recommend award of the contract unless the bidder makes the certification described in subparagraph (A) of this Subsection.

102.17 Forced Labor of Ethnic Uyghurs Ban:

All bidders are required to certify in their bid proposal on the "Forced Labor of Ethnic Uyghurs Ban Certification Form" either:

- (A) The bidder does not use the Forced labor of Ethnic Uyghurs as described in A.R.S. 35-394; or
- (B) The bidder does use the Forced labor of Ethnic Uyghurs as described in A.R.S. 35-394.

The Department will not recommend award of the contract if the bidder makes the certification described in subparagraph (B) of this Subsection, unless the bidder uses an exempt contractor.

For the purposes of this subsection, a contractor is defined as an exempt contractor if it is a sole proprietorship; has fewer than 10 employees; and/or is a non-profit organization.

(102NOBID, 09/19/12)

SECTION 102 BIDDING REQUIREMENTS AND CONDITIONS:

102.03 **Suspension from Bidding:** of the Standard Specifications is modified to add:

The signature of the bid proposal by a bidder constitutes the bidder's certification, under penalty of perjury under the laws of the United States, that the bidder, or any person associated therewith in the capacity of owner, partner, director, officer, principal investor, project director, manager, auditor, or any position involving the administration of federal funds, has not been, or is not currently, under suspension, debarment, voluntary exclusion or been determined ineligible by any federal agency within the past three years. Signature of the bid proposal also certifies, under penalty of perjury under the laws of the United States, that the bidder does not have a proposed debarment pending. In addition, signature of the bid proposal certifies that the bidder has not been indicted, convicted, or had a civil judgment rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Any exceptions to the above paragraph shall be noted and fully described on a separate sheet and attached to the bid proposal.

(102LOBY, 01/21/21)

SECTION 102 BIDDING REQUIREMENTS AND CONDITIONS:

102.09 **Non-Collusion Certification:** of the Standard Specifications is modified to add:

(A) Lobbying:

The bidder certifies, by signing and submitting this bid or proposal, to the best of its knowledge and belief, that:

- (1) No Federally appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal 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 any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract grant, loan, or cooperative agreement.

- (2) If any funds other than Federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions. Copies of Form-LLL, "Disclosure Form to Report Lobbying", are available at ADOT Contracts and Specifications Group, 205 South 17th Avenue, Room 121F, Phoenix, AZ 85007.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The bidder also agrees, by submitting the bid or proposal, that it shall require that the language of this certification be included in all subcontracts and lower tier subcontracts which exceed \$100,000 and that all such subcontractors and lower tier subcontractors shall certify and disclose accordingly.

The Department will keep the prime contractors' certifications on file as part of their original bid proposals. Each prime contractor shall keep individual certifications from all subcontractors and lower tier subcontractors on file. Certifications shall be retained for three years following completion and acceptance of any given project.

Disclosure forms for the prime contractor shall be submitted to the Engineer at the pre-construction conference. Disclosure forms for subcontractors and lower tier subcontractors shall be submitted to the Engineer by the prime contractor along with the submittal of each subcontract or lower tier subcontract, as required under Subsection 108.01, when said subcontracts exceed \$100,000.00. During the performance of the contract the prime contractor and any affected subcontractors shall file revised disclosure forms at the end of each

calendar year quarter in which events occur that materially affect the accuracy of any previously filed disclosure form. Disclosure forms will be submitted by the Engineer to the Federal Highway Administration for further processing.

(103AWARD, 09/17/20)

SECTION 103 - AWARD AND EXECUTION OF CONTRACT:

103.04 Award of Contract: of the Standard Specifications is modified to add:

The Department will make the award to the lowest responsible bidder who has the proper licenses.

When a contract is funded, either wholly or in part, by federal funds, an award of contract may be made contingent upon the successful bidder obtaining an appropriate license in accordance with the requirements of Subsection 102.16 of the specifications. The license must be obtained within 60 calendar days following opening of bid proposals. No adjustment in proposed bid prices or damages for delay will be allowed as a result of any delay caused by the lack of an appropriate license.

Failure to acquire the necessary licensing within the specified period of time shall result in either award to the next lowest responsible bidder, or re-advertisement of the contract, as may be in the best interests of the Department.

(104TPDDC, 08/21/25)

SECTION 104 SCOPE OF WORK:

104.04 Maintenance of Traffic: of the Standard Specifications is modified to add:

Prior to construction, alterations to contract phasing, detours, and Maintenance and Protection of Traffic plans shall be reviewed by the Engineer at the preconstruction conference or a pre-activity meeting based on the contractor's preliminary schedule and proposed contract phasing.

SECTION 104 SCOPE OF WORK:

104.04 Maintenance of Traffic: of the Standard Specifications is modified to add:

The project traffic control shall be constructed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition with Revisions 1 and 2 and the Arizona Supplement to the 2009 Edition, the Arizona Department of Transportation Temporary

Traffic Control Design Guidelines (TTCDG) 2019 and the project plans and Specifications. The contractor shall establish the traffic control necessary to provide a safe and efficient work zone without unduly delaying traffic. Alterations and modifications to the traffic control concepts included in the project plans and specifications will be considered if they conform to the references listed above.

Changes or revision to the Traffic Control Plan (TCP) and specifications must be submitted and approved in writing by the Engineer in advance of implementation.

All signs in conflict with the construction signs shall be removed or covered in place, as directed by the Engineer. The contractor shall store and reinstall items which have been removed or relocated in a manner approved by the Engineer at no additional cost to the Department.

The temporary removal or covering of existing signs shall be in accordance with Section 701-3.11 and 701-5.10 of the specifications.

Traffic control devices shall not be permitted to remain stockpiled on the shoulder until the next closure.

The contractor shall be required to check on all traffic control barricades, signs, and variable message boards twice daily and maintain as needed per the specifications.

At all times, the contractor shall conduct the construction activities to safeguard pedestrians and vehicular access in the vicinity of the project.

Business Driveways and Access Requirements:

The Sonic Drive – in is open 24-hours. At least one access to this establishment shall be always maintained during construction. Any closure of the Sonic driveway, the contractor shall provide the Engineer with a detailed construction schedule with driveway closure included to provide to the City at the start of the project.

Other Businesses and residential access: The contractor shall maintain at least one access to adjacent businesses, alleys, and parking lots during their hours of operation. Access to adjacent private driveways shall be provided during all non-working hours. Where a property has more than one point of access, no more than one access may be restricted or closed at a time.

The contractor shall coordinate through the Engineer to inform all property and business operators that may be affected by any restrictions at least 72 hours in advance as a result of construction activities of the scope of work, duration of construction activities, and the possible interference with their day to day activities. Any business or residential access restrictions shall be coordinated in writing through the Engineer with the affected businesses or residents at least one week in advance of the restriction.

The contractor shall coordinate with the Engineer to make a good faith effort to make personal contact with affected property owners or business operators. If primary access

cannot be maintained, the contractor shall provide an alternative that will be pre-determined with the business prior to instituting the closure or restriction. If the property owner or business operator cannot be contacted, then the Engineer shall be the sole judge for the approval of any closures or restrictions.

The contractor shall include temporary "Business Access" signs for affected businesses.

No separate measurement or payment will be made for providing alternatives to maintaining access or maintaining accesses, the cost being considered as included in the price of the contract items.

Protection of Pedestrians:

Pedestrian Access in Work Zones:

This work shall consist of providing a Temporary Access Control Plan. This plan shall consist of identifying a Temporary Pedestrian Accessible Route (TPAR) and features needed to assist pedestrians, bicycles and non-motorized vehicles with safe movement within and around the construction zone. This work shall be done in accordance with contract provisions and the following requirements:

The contractor shall develop and provide for a continuous Temporary Pedestrian Accessible Route (TPAR) for this project. The TPAR shall clearly address all non-motorized users in the construction zone. The contractor shall submit this plan to the Engineer for acceptance at the pre-construction meeting.

Pedestrian Access (A): The TPAR must have a minimum width of 48 inches (4 feet) and guide pedestrians around the work zone by using devices such as signage, barricades and temporary curb ramps. The contractor may provide an alternate route that is accessible within two (2) blocks (approximately 850 feet) offset of the closed construction area provided it is within the ADOT right of way. To the maximum extent feasible, the TPAR shall be provided on the same side of the street as the disrupted route. Where TPARs are exposed to adjacent construction, excavation drop-offs, traffic or other hazards, they shall be protected with pedestrian barricade or channelizing device(s). All TPARs must have a smooth, level, slip resistant surface and shall meet applicable requirements of the Public Right-of-Way Accessibility Guidelines (PROWAG).

Pedestrian Access (B): The contractor shall schedule and coordinate replacement of the pedestrian access to accommodate the needs of businesses and residences. Existing sidewalks shall be left in-place until such time that it is required to remove them to accommodate new construction. Pedestrian access may be provided to businesses without alternate public entrances. The contractor must provide a continuous TPAR for all areas disrupted by construction throughout all phases of construction.

Pedestrian Access (C): For technical provisions on TPAR, the contractor is directed to Chapter 6D of the 2009 MUTCD and the Guidelines for Accessible Public Rights-of-Way at <http://www.access-board.gov/prowac/draft.htm>.

Traffic control devices must allow for an accessible route through the project. Pedestrian barricades and channelizing devices used for TPAR shall be continuous, stable and non-flexible and shall consist of a wall, fence or enclosure(s). The base of any traffic control device shall be continuous raised barrier of no more than 6 inches in height and must allow for drainage. The purpose of this barrier is to provide a continuous wayfinding device for the visually impaired; therefore, the barrier shall not have any points that might catch a person who is using a cane for a guide. The devices shall provide a continuous surface or upper rail at a minimum of 3 feet above the ground or walkway surface. Support members shall not protrude into the path. Whenever possible, the TPAR shall only utilize in-place street crossings. TPAR must be regularly inspected and updated depending on project staging.

No pedestrian curb ramp or blended transition work shall occur concurrently at adjacent intersections. The contractor will stage work so that work only occurs on one side of the street and at every other intersection, unless otherwise directed by the Engineer.

The contractor shall be responsible for maintaining the TPAR within this project. The contractor shall furnish the name, address and phone number of at least one individual responsible for the placement and maintenance of the TPARs. This individual shall be "on call" 24 hours per day, seven days per week during the times any devices furnished and installed by the contractor are in place. The required information shall be submitted to the Engineer at the pre-construction meeting. The contractor shall be expected to answer calls immediately and begin corrective measures needed within one hour. If the contractor is negligent in correcting the deficiency within one hour of notification, the contractor shall be subject to a monetary deduction at the rate of \$55.00 per hour when only one residence or location is affected and at a rate of \$55.00 per hour in all other cases that the Engineer determines the contractor has not complied.

Only one side of the street may be disrupted at a time for pedestrian curb ramp, driveway or sidewalk construction.

Rope, tape or plastic chain strung between devices is prohibited since these are not detectable for the disabled using a cane.

No measurement will be made of the various items that constitute Temporary Pedestrian Access Control Plan or identifying the need for a TPAR, but all such work shall be construed to be included in the traffic control items which will include all costs of installing, maintaining, removing and relocating the individual devices.

(E) Schedules for Daily Traffic Control Activities:

The contractor shall provide a schedule of daily activities and corresponding traffic control schemes. The information shall be provided in advance of or during the weekly construction meeting in accordance with the requirements of Subsection 108.03 and 108.12 of the specifications and shall specify the limits of the work activities and related traffic control plan by location, direction, and time.

All lane closures will be subject to the following:

- All work requiring a lane closure shall have an approved TCP.
- All proposed lane closures shall be submitted to the Engineer at least seven calendar days in advance of the closure, unless otherwise approved by the Engineer.
- Any exceptions must be approved by the Engineer.
- Any work requiring a full lane closure of Van Buren Street shall be performed during weekends. Contractor shall coordinate with the Engineer and Engineer shall coordinate and confirm with the City for any night time work completed between 9:00 pm and 6:00 am and shall be approved in writing by the City and the Engineer.
- No lane closures will be allowed during holidays or Special Events as defined below.

Holidays:

- The contractor shall not schedule a closure to begin prior to a Special Event/holiday so that the restriction would be in place through the stated Special Event/holiday.
- Special events/holidays are from 12:00 PM of the last working day prior to the holiday or major event until 6:00 AM of the first working day following the Special Event/holiday. When holiday falls on Tuesday, the Monday before the Special Event/holiday is considered part of the Special Event/holiday. When the Special Event/holiday falls on a Thursday, the Friday following the Special Event/holiday is considered part of the Special Event/holiday.
- The restricted Special Events/holidays are:

Special Event/Holiday (Title)	Start Day (12:00 Noon)	End Date (6:00 AM)
Christmas Day/New Year's Day	December 24, 2026	January 4, 2027
Civil Rights Day	January 15, 2027	January 18, 2027
Presidents Day	February 12, 2027	February 16, 2027
Founders Day	April 8, 2027	April 12, 2027
Memorial Day	May 28, 2027	June 1, 2027
Juneteenth	June 17, 2027	June 21, 2027

Independence Day	July 2, 2027	July 5, 2027
Labor Day	September 3, 2027	September 7, 2027
Columbus Day	October 8, 2027	October 12, 2027
Veterans Day	November 10, 2027	November 12, 2027
Thanksgiving Day	November 24, 2027	November 29, 2027
Christmas Day/New Year's Day	December 23, 2027	January 3, 2028
Civil Rights Day	January 14, 2028	January 17, 2028
Presidents Day	February 18, 2028	February 22, 2028

(104APA, 02/26/99)

SECTION 104 SCOPE OF WORK:

104.04 Maintenance of Traffic: of the Standard Specifications is modified to add:

In order to eliminate the possibility of causing or exacerbating air quality violations resulting from construction activities, any traffic control plans which include temporary traffic detours involving local adjacent streets or alternate routes must be approved by the Engineer.

104.08 Prevention of Air and Noise Pollution: of the Standard Specifications is modified to add:

In the event that the Governor declares an air pollution emergency, pursuant to ARS § 49-465.B., which restricts work schedules for all employees of the state and its political subdivisions, the Engineer will direct the contractor suspend all work activities until further notice. The contractor shall discontinue all current work activities as soon as possible, but not later than four hours after notification by the Engineer. The contractor will be compensated for labor costs incurred through the end of the work shift in which the notification occurs. No payment adjustments will be made for equipment or overhead costs resulting from the suspension of work. An extension of the time allowable under the contract will be granted in accordance with Subsection 108.08 of these specifications. In the event that any local air quality authority declares an air pollution advisory, the cooperation of the contractor is requested in complying with the actions recommended by the local authority to the maximum extent possible.

(104DUST, 11/01/95)

SECTION 104 SCOPE OF WORK:

104.08 Prevention of Air and Noise Pollution: of the Standard Specifications is modified to add:

For work performed within Maricopa County, the contractor will be required to prepare a comprehensive fugitive dust control plan, in accordance with the guidelines established in Rule 310 of Maricopa County Regulation III, Control of Air Contaminants. The contractor may contact Maricopa County, Division of Air Pollution Control, to purchase a copy of the guidelines. The contractor shall complete and submit the control plan with the permit application, and obtain approval prior to construction or any other activities which may produce dust pollutants.

Some of the measures which the contractor may use to control or minimize fugitive dust include: increased use of water or chemical dust suppressants, cease work temporarily during high winds, reducing vehicle speeds and number of trips, maintaining freeboard of three inches or more in hauling, and covering or stabilizing stockpiles. The contractor shall be required to cover haul trucks with tarps or other suitable enclosures.

No separate payment will be made for preparation and implementation of the fugitive dust control plan, the costs being considered as included in the price of contract items.

(104MTBRN, 06/04/96)

SECTION 104 SCOPE OF WORK:

104.08 Prevention of Air and Noise Pollution: the first paragraph of the Standard Specifications is modified to add:

Burning of trash, debris, plant material, wood, or any other waste materials will not be allowed. The contractor shall dispose of such materials in accordance with the requirements of Subsection 107.11.

(104STORM, 11/01/95)

SECTION 104 SCOPE OF WORK:

104.11 Damage by Storm, Flood or Earthquake: Item (D), Idled Equipment and Remobilization, of the Standard Specifications is hereby deleted.

104.11 **Damage by Storm, Flood or Earthquake:** Items (E) and (F) of the Standard Specifications are revised to read:

(D) Payment for Repair Work:

The State will pay the cost of the repair work as determined in Subsection 109.04.

(E) Termination of Contract:

If the Department elects to terminate the contract, the termination and the determination of the total compensation payable to the contractor shall be governed by the provisions of Subsection 108.11, Termination of Contract for Convenience of the Department.

(104ENVIR, 06/17/21)

SECTION 104 SCOPE OF WORK:

104.12 **Environmental Analysis:** the fifth and sixth paragraphs of the Standard Specifications are revised to read:

If the contractor elects to do an environmental analysis and use any site, source, or access for the reasons listed above, they choose to do so at their own risk. It is the contractor's responsibility to exercise due diligence when selecting these sites and areas. The contractor shall bear all costs associated with the use of proposed sites, sources, and accesses.

The contractor shall promptly advise the Engineer that it is preparing the environmental analysis and shall submit to the Engineer for review and consultation. The Department will review the submittal and send it to the appropriate agencies and/or jurisdictions for consultation or return it to the contractor for revision. The contractor shall allow a minimum of 60 calendar days after submittal, or subsequent resubmittals, to the Department for the Department to review the environmental analysis and to consult with the appropriate jurisdictions and/or agencies. At the end of the review period, the Engineer will notify the contractor whether or not the environmental analysis is acceptable.

If the approval of the environmental analysis causes a delay to a controlling activity of the project due to the Department's actions in the aforementioned review process, the contractor may seek, and the Engineer may grant, an extension of time in accordance with the terms of Subsection 108.08 of the specifications. The time extension shall not exceed 30 working days for a working-day contract, or 45 calendar days for a calendar-day project. The time extension will not be considered unless the contractor can show evidence of the delay resulting due to the Department's actions in the review process. A time extension request will not be considered or granted for any other reason. No time extension will be granted for a fixed completion date contract.

104.12 Environmental Analysis: the items (G) and (O) of the seventh paragraph of the Standard Specifications is revised to read:

- (G) The archaeological survey of the proposed source prepared by a person who meets the Secretary of the Interior's Professional Qualification Standards (48 FR 44716) and possesses a current permit for archaeological survey issued by the Arizona State Museum (ASM). The survey shall be prepared in a State Historic Preservation Office (SHPO) standardized format. The survey shall identify all historic properties within the area of potential effect (APE), as defined by the National Historic Preservation Act (36 CFR 800.4). This includes the materials source, processing area, and the haul road. Additionally, the survey report shall identify the effects of the proposed source on any historic properties within the APE, and recommend measures to avoid, minimize, or mitigate those effects. The survey report shall be prepared by the contractor in accordance with SHPO and ASM formatting style for the Historic Preservation Specialist's initial review. After the initial review, the Department will consult with the landowner, SHPO, and Tribes for a minimum of 35 days for the final approval of the survey report.
- (O) A description of the impact on federally or state protected or other agency-specific special status wildlife and plants and their habitat, as defined in ADOT's consultant biological procedures on the Department's website. Compliance with the Arizona Native Plant Law shall be coordinated through the Arizona Commission of Agriculture and Horticulture.

104.12 Environmental Analysis: the eighth paragraph of the Standard Specifications is revised to read:

Guidance and forms for preparing the environmental analysis are available on the Department's website through the Environmental Planning Group, or by calling Environmental Planning Group at 602-712-7767.

(104VEPC, 03/20/25)

SECTION 104 SCOPE OF WORK:

104.13 Value Engineering Proposals by the Contractor: the third paragraph of the Standard Specifications is revised to read:

Any cost savings generated to the contract as a result of VEP offered by the contractor and approved by the Department will be shared between the contractor and the Department, with the contractor receiving 60 percent and the Department receiving 40 percent, as specified in Subsection 104.13(D) of the specifications.

104.13(C) Conditions: of the Standard Specifications is modified to add:

- (13) The contractor may submit a previously approved VEP from another project.

104.13(D) Acceptance, Rejection and Payment: the seventh paragraph of the Standard Specifications is revised to read:

- (6) The executed supplemental agreement shall provide that the contractor be paid 60 percent of the net savings amount as reflected by the difference between the cost of the revised work and the cost of the related construction required by the original contract computed at contract bid prices. The net savings will take into account the contractor's cost of developing the VEP and implementing the change, and reducing this amount by the Department's cost for investigating and evaluating the VEP, including any ascertainable collateral costs to the Department. Such collateral costs may include increased costs for maintenance, operation, related work items, additional work items, or elements of related or additional work items.

(104ENVST, 09/19/24)

SECTION 104 SCOPE OF WORK:

104.16 Environmental Standard Work: of the Standard Specifications is hereby modified as follows:

- (E) **The Biology Program:** of the Standard Specifications is modified to add:

BIO-2: Migratory Bird Treaty Act (MBTA)

BIO-2A: MBTA – General Requirements:

If construction occurs during the breeding season (breeding season start date March 1 and breeding season end date August 31), the contractor shall employ a qualified biologist to conduct a migratory bird nest survey of all affected vegetation within the work area no sooner than 10 days prior to clearing and grubbing. Vegetation removal may proceed if the survey determines that no active bird nests are present. If active nests are found the contractor shall notify the Engineer and avoid and protect the nests. The Engineer will further direct how to avoid and protect nests. If active nests are found in the project work area, the contractor shall not begin work until it is so directed by the Engineer. In the event of a suspension of work the contractor shall refer to the provisions of Subsection 104.02 of the specifications. During the non-breeding season (non-breeding

season start date September 1 through non-breeding season end date February 28), vegetation removal is not subject to this restriction.

If active bird nests are found during the nest survey and avoidance is not possible, as determined by the Engineer, the contractor shall employ a wildlife rehabilitator who, in coordination with the Department Environmental Planning Biologist and relevant programmatic agreements, will apply for a project specific US Fish and Wildlife Service Migratory Bird Treaty Act Special Purpose – Relocation Permit. The wildlife rehabilitator shall be permitted by the US Fish and Wildlife Service and licensed by the Arizona Game and Fish Department. Relocation of any eggs or nestlings from active nests shall be performed by the wildlife rehabilitator.

No later than 10 working days after the completion of each relocation effort, the contractor shall submit a written report containing the following information to the Engineer:

- (1) Project name, location and ADOT project number;
- (2) Point of contact;
- (3) Date(s) of relocations;
- (4) Location of the areas birds where moved from and where they were moved to;
- (5) An explanation of why the birds were relocated;
- (6) The number of birds relocated; and
- (7) Name of rehabilitator, AZGFD rehabilitator license and USFWS permit information.

The contractor shall control noxious and invasive plant species throughout the duration of the project in accordance with the requirements of these special provisions.

(105TPDDC, 08/21/25)

SECTION 105 CONTROL OF WORK:

105.18 Opening Sections of Project to Traffic: of the Standard Specifications is modified to add:

Damage to the project resulting from a third-party shall be reported to the Engineer. Damages to permanent project features, determined by the Engineer as eligible for

payment in accordance with the requirements of Subsection 104.04 of the specifications, will be paid for in accordance with Subsection 109.04 of the specifications.

(106DMAT, 12/18/25)

SECTION 106 CONTROL OF MATERIALS:

106.15 Blank: of the Standard Specifications is revised to read:

106.15 Domestic Materials and Products:

Steel and iron materials and products used on this project shall comply with the current "Buy America" requirements of 23 CFR 635.410.

All manufacturing processes to produce steel and iron products used on this project shall occur in the United States. Raw materials used in manufacturing the steel and iron products may be foreign or domestic. Steel or iron not meeting these requirements may be used in products on this project provided that the invoiced cost to the contractor for such steel products incorporated into the work does not exceed either 0.1 percent of the total (final) contract cost or \$2,500 whichever is greater.

Any process which involves the application of a coating to iron or steel shall occur in the United States. These processes include epoxy coating, galvanizing, painting, or any other coating which protects or enhances the value of covered material.

The requirements specified herein shall only apply to steel and iron products permanently incorporated into the project. "Buy America" provisions do not apply to temporary steel items, such as sheet piling, temporary bridges, steel scaffolding and falsework, or to materials which remain in place at the contractor's convenience.

The contractor shall furnish the Engineer with Certificates of Compliance, conforming to the requirements of Subsection 106.05, which state that steel or iron products incorporated in the project meet the requirements specified. Certificates of Compliance shall also certify that all manufacturing processes to produce steel or iron products, and any application of a coating to iron or steel, occurred in the United States.

Convict-produced materials may not be used unless the materials were produced prior to July 1, 1991 at a prison facility specifically producing convict-made materials for Federal-aid construction projects.

(106CMATLS, 12/18/25)

SECTION 106 CONTROL OF MATERIALS: of the Standard Specifications is modified to add:

106.17 Construction Materials:

A construction material shall comply with the requirements of Build America, Buy America (BABA) Act specified in Title IX, Subtitle A, Part 1, Sections 70901 and 70911-70917 (Pub. L. No. 117-58 §§ 70901; §§ 70911-70917) 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. Fiber optic cable (including drop cable);
5. Optical fiber;
6. Lumber;
7. Engineered wood; or
8. 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.

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.

If the total cost of construction materials incorporated in the project is no more than 5% of the original contract amount or \$1,000,000, whichever is lesser, the requirements specified herein will not apply for such construction materials.

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

(106MAPR, 12/18/25)

SECTION 106 CONTROL OF MATERIALS: of the Standard Specifications is modified to add:

106.18 Manufactured Products:

Manufactured products used on all projects shall comply with the current “Buy America” requirements of 23 CFR 635.410.

A “manufactured product” is defined as an article, material, or supply that has been processed into a specific form and shape, or combined with other articles, materials, or supplies to create a product with different properties than the individual article, material, or supply. Items manufactured through a combination of two or more materials, or at least one listed construction material and a material not listed, shall be classified as manufactured products.

An item classified as iron or steel product in accordance with the requirements specified in Subsection 106.15 of the specifications or excluded materials such as cement and cementitious materials; bituminous materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives is not considered a manufactured product. However, manufactured product may include components that are iron or steel products or excluded materials.

Mixtures of excluded materials delivered to a work site without final form for incorporation into a project are not considered manufactured products.

Precast concrete products, components of precast concrete products that consist wholly or predominantly of iron or steel or a combination of both, will be considered iron and steel product and shall meet the requirements specified in Subsection 106.15 of the specifications.

The intelligent transportation systems and other electronic hardware systems that are installed in the highway right of way or other real property, the cabinets or other enclosures of such systems that consist wholly or predominantly of iron or steel or a combination of both will be considered iron and steel product and shall meet the requirements specified in Subsection 106.15 of the specifications.

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 manufactured products incorporated in the project meet the requirements specified herein. Certificates of Compliance shall also certify that all manufactured products used in the project are manufactured in the United States.

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

(107LPAINS, 08/02/19)

SECTION 107 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC:

107.14 Insurance: of the Standard Specifications is modified to add:

City of Tolleson shall be named as an additional insured on the certificate of insurance.

(107UINSLMTS, 02/20/25)

SECTION 107 LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC:

107.14 Insurance: the sixth paragraph of the Standard Specifications is revised to read:

Without limiting any liabilities or any other obligations of the contractor, the contractor shall provide and maintain, if commercially available, the minimum insurance coverage listed below until all obligations under this contract are satisfied:

- (A) General Liability insurance with a minimum combined single limit of \$1,000,000 each occurrence applicable to all premises and operations, and a minimum general aggregate limit of \$2,000,000. The policy shall include coverage for bodily injury, broad form property damage (including completed operations), personal injury (including coverage for contractual and employee acts), blanket contractual, independent contractors, products and completed operations. Further, the policy shall include coverage for the hazards commonly referred to as XCU (explosion, collapse and underground). The products and completed operations coverage shall extend for one year past acceptance, cancellation or termination of the work. The policy shall contain a severability of interests provision.
- (B) Comprehensive Automobile Liability insurance with a combined single limit for bodily injury and property of not less than \$1,000,000 each occurrence with respect to contractor's owned, hired, or non-owned vehicles, assigned to or used in performance of the work.

- (C) Workers' Compensation insurance to cover obligations imposed by Federal and State statutes having jurisdiction of its employees engaged in the performance of the work, and Employers' Liability insurance with a minimum limit of \$1,000,000. Evidence of qualified self-insured status will suffice for this subsection.

(107UTIL, 04/17/25)

SECTION 107 LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC:

107.15 Contractor's Responsibility for Utility Property and Services: of the Standard Specifications is modified to add:

Copies of existing ADOT permits, subject to availability, may be obtained from the ADOT Area Permit Supervisor as listed below:

CENTRAL DISTRICT

(602) 712-7522 2140 W. Hilton Avenue
(602) 712-6954 Phoenix, AZ 85009

The following utility companies have facilities in the area but are not anticipated to be in conflict:

Company Name	Contact Person	Phone Number	Email
Lumen Technologies	Kevin Wagner	(815) 245-9640	kwagner@terratechllc.net
COX Communications	Mike Nadeau	(480) 341-8222	mike.nadeau@cox.com
Southwest Gas	Valerie Gallardo-Weller	(602) 484-5342	Valerie.gallardo-weller@swgas.com
SRP	Henry Soliz	(602) 236-0890	henry.soliz@srpnet.com

Lumen Technologies:

The contractor shall coordinate with the Engineer to request that a Lumen representative be invited to the Preconstruction Partnering and Weekly Construction Meetings.

The contractor shall notify Lumen 14 calendar days prior to any construction work near Lumen facilities as shown on the project plans.

Southwest Gas:

The contractor shall verify that utilities are not in conflict prior to construction. If conflicts are found, the contractor shall provide written notification to Southwest Gas. Southwest Gas requires a 16-week lead time from the date of written notification, and payment must be received prior to construction.

Abandoned steel gas lines may be present within project limits. If encountered, the contractor shall contact Southwest Gas and request the removal of the abandoned line. Abandoned steel gas lines must only be removed by a Southwest Gas NESHAP certified contractor. The costs associated with such removal will be the responsibility of the developer.

SRP:

The contractor shall notify Jerry Crawford (602) 809-3931 a minimum of 72 business hours before starting any construction near SRP facilities as shown on the project plans. The contractor shall have a copy of the issued construction license on the job site while working near SRP irrigation facilities.

The following entities have adjustments or other work which are part of this project. The contractor shall perform the work in accordance with the specifications on the plans and specified herein:

City of Tolleson:

Company	Existing Station	Conflict(s)	Conflict Resolution
City of Tolleson	Van Buren St STA 14+50 Lt	Existing lighting electrical junction box in conflict with proposed sidewalk	The existing junction box will be removed and relocated. Contractor shall coordinate with City on relocation.
City of Tolleson	Van Buren St STA 14+85 Lt	(2)-Existing backflow preventers in conflict with proposed elevator and sidewalk	The existing backflow preventers will be removed and relocated to the east in accordance with the project plans.

Company	Existing Station	Conflict(s)	Conflict Resolution
City of Tolleson	Van Buren St STA 14+85 Lt	Existing water meter in conflict with proposed elevator and sidewalk	The existing water meter will be removed and relocated to the east in accordance with the project plans.
City of Tolleson	Van Buren St STA 14+85 Lt	Existing irrigation controller in conflict with proposed elevator and sidewalk	The existing irrigation controller will be removed and relocated. Contractor shall coordinate with City on relocation.

Company	Existing Station	Conflict(s)	Conflict Resolution
City of Tolleson	Van Buren St STA 14+60 Rt	Existing light pole in conflict with proposed pedestrian bridge	The existing light pole will be removed and relocated. Contractor shall coordinate with City on relocation.

The contractor shall coordinate with the Engineer to request that a representative from the City of Tolleson be invited to the Preconstruction Partnering and Weekly Construction Meetings.

The contractor is responsible for contacting the City of Tolleson prior to construction around City facilities.

The contractor shall coordinate with the City of Tolleson for all shutdowns and service interruptions.

Water meter relocation and requirements shall be covered by bid items 8080627, 8080028, and 8080633, included in the project specifications.

The project has a network of underground power lines. All work at or in close proximity to said lines shall be performed in accordance with all Federal, State, and local laws and regulations, including but not limited to:

- (1) Arizona law regarding "Underground Facilities" (A.R.S. 40-360.21, .22, .24, .26 and .28).
- (2) Arizona law regarding "High Voltage Power Lines and Safety Restrictions" (A.R.S. 40-360.41-.45).
- (3) The Occupational Safety and Health Administration.
- (4) The National Electric Safety Code

There is no railroad within ½ mile of the project limits.

It shall be the contractor's responsibility to determine the exact location of the utilities prior to any construction operations and to notify the above-mentioned utility companies at least two working days prior to commencing any work on the project.

107.15(F) Sewage Discharge Damage Assessments: of the Standard Specifications is revised to read:

The Department will assess sanctions in accordance with the Table 107.15-1 below for each 24-hour period, or portion thereof, for each unplanned breakage that occurs in an active sanitary sewer line as a result of the contractor's operation. The rate of these sanctions is based on the type and quantity of effluent discharged as determined by the Engineer.

These sanctions do not relieve the contractor from any of its responsibilities under the contract, including any liquidated damages that may be assessed under Subsection 108.09 of the specifications for late completion of the project.

The sanctions specified in this subsection will be independent of any penalties imposed by others.

The contractor acknowledges that Regulatory agencies may assess or impose civil or criminal penalties on the contractor resulting from sewer discharges.

The Department will not be responsible for any civil or criminal penalties, fines, damages, or other charges imposed on the contractor by any regulatory agency or court for sewage discharges that are a result, directly or indirectly, of the contractor's work performed under this contract.

TABLE 107.15-1 SANCTIONS (EACH 24-HOUR PERIOD, OR PORTION THEREOF)		
Volume of Discharge	Raw Sewage or Industrial Wastewater	Treated Effluent
Less than 10,000 gallons	\$5,000	\$1,000
10,000 to 99,999 gallons	\$10,000	\$2,000
100,000 to 1 million gallons	\$25,000	\$3,000
Greater than 1 million gallons	\$40,000	\$5,000

These sanctions will be assessed for each 24-hour period, or portion thereof, until the contractor has completed all of the following tasks:

- (1) Stopped the discharge;
- (2) Repaired the damaged pipe;
- (3) Restored normal service; and
- (4) Fully cleaned and disinfected the site to the satisfaction of the Engineer.

Upon completion of tasks (1), (2), and (3) above, and prior to completion of Task (4), the sanctions for the current 24-hour period will be at the rate shown in Table 107.15-1. However, for each subsequent 24-hour period, the assessment will be 1/2 of the rate shown in Table 107.15-1.

The sanctions will continue at the reduced rate until the site has been fully cleaned and disinfected to the satisfaction of the Engineer.

As an example, the amounts assessed each 24-hour period for an unplanned discharge of 20,000 gallons of raw sewage, in which the contractor completes tasks (1), (2), and (3)

within the second 24-hour period but does not complete full cleanup until the third 24-hour period, will be as follows:

First 24-hour period:	\$10,000
Second 24-hour period:	\$10,000
Third 24-hour period:	\$5,000

For this example, the total sanction will be \$25,000 (\$10,000 + \$10,000 + \$5,000).

(108SUBLT, 10/20/22)

SECTION 108 PROSECUTION AND PROGRESS:

108.01 Subletting of Contract: the thirteenth paragraph of the Standard Specifications is revised to read:

If a subcontractor, of any tier, begins work on the contract prior to the contractor submitting the required documentation and receiving consent from the Engineer, the Department will retain \$1,000 from monies due or becoming due the contractor. The money retained will be for each subcontractor, of any tier, that starts work without the consent of the Engineer. These sanctions will be in addition to all other retention or liquidated damages provided for elsewhere in the contract.

108.02 Start of work: the second paragraph of the standard specification is revised to read

The contractor shall not begin any construction work until March 15, 2027. Contract time will be charged commencing on that date.

The contractor shall use the time prior to March 15, 2027, start date to procure long lead items such as the Elevator, electrical, and structural items. No contract time will be charged during this period. No time extension will be granted to the contractor for waiting on procured items.

(108PRCN, 08/19/21)

SECTION 108 PROSECUTION AND PROGRESS:

108.03 Preconstruction Conference: the second paragraph of the Standard Specifications is revised to read:

At the preconstruction conference the contractor shall submit a progress schedule showing the order in which the contractor proposes to carry out the work, the dates on which the contractor and its subcontractors will start the work, including procurement of materials, equipment, etc.; the ordering of articles of special manufacture; the furnishing of drawings, plans and other data required under Subsection 105.03 of the specifications for the review and approval of the Engineer; the inspection of structural steel fabrication; and the contemplated dates for the completion.

108.04 Prosecution and Progress: the third paragraph of the Standard Specifications is revised to read:

At a mutually convenient location and time, the contractor shall meet weekly with the Engineer to discuss construction activities; however, a meeting may be waived if mutually agreed to, due to weather conditions, work progress, or for other reasons. At the meetings, the contractor shall provide the Engineer with a detailed, written schedule of construction activities and phases of work for the current week, forthcoming three week period as well as the construction activities which were performed during the previous week. This schedule shall detail the anticipated start dates and anticipated completion dates of work activities. The weekly schedule should reflect, at a minimum, all activities from the most recently updated project schedule. For work which was completed during the previous week, this schedule shall detail the actual start and completion dates of work activities as well as indicate the status of major ongoing activities. Upon the second occurrence of the contractor failing to provide an accurate schedule as describe herein and after written notification by the Engineer of the first occurrence, the Department will deduct \$500 from the contractor's progress payment per each occurrence thereafter. Minutes of the weekly meetings will be kept by the Engineer and a copy given to the contractor for review and acceptance.

(108TIME, 10/15/20)

SECTION 108 PROSECUTION AND PROGRESS:

108.08 Determination and Extension of Contract Time: the first paragraph of the Standard Specifications is revised to read:

The time allowed for the completion of the work included in the contract will be 440 calendar days and will be known as the "Contract Time."

(108RSLD, 06/19/25)

SECTION 108 PROSECUTION AND PROGRESS:

108.09 Failure to Complete the Work on Time: the Schedule of Liquidated Damages table of the Standard Specifications is revised to read:

SCHEDULE OF LIQUIDATED DAMAGES			
Original Contract Amount		Liquidated Damages Per Day	
From More Than:	To and Including:	Calendar Day or Fixed Date:	Working Day:
\$ 0	\$ 500,000	\$ 300	\$ 1,000
\$ 500,000	\$ 1,000,000	\$ 850	\$ 1,700
\$ 1,000,000	\$ 2,000,000	\$ 1,250	\$ 2,650
\$ 2,000,000	\$ 5,000,000	\$ 2,100	\$ 3,800
\$ 5,000,000	\$ 10,000,000	\$ 3,300	\$ 6,850
\$ 10,000,000	\$ 30,000,000	\$ 7,300	\$ 10,550
\$ 30,000,000	\$ 60,000,000	\$ 9,350	\$ 17,750
\$ 60,000,000	\$ 90,000,000	\$ 19,900	\$ 27,850
\$ 90,000,000	-----	\$ 27,450	\$ 38,400

(108SCHLVL1, 08/19/21)

SECTION 108 PROSECUTION AND PROGRESS: of the Standard Specifications is modified to add:

108.12 Schedules:

(A) Definitions:

Activity:

A discrete, identifiable task or event that contributes to completing the project and can be used to schedule and monitor the work.

Activity ID:

A unique alphanumeric identification code permanently assigned to an activity.

Baseline Schedule:

A Critical Path Method (CPM) schedule illustrating the contractor's committed plan to complete the work within the contract time and used to compare the progress of the work.

Constraint:

A limitation placed on a scheduled activity that affects the start or end date of an activity.

Critical Path:

The longest continuous chain of activities which establishes the minimum overall project duration.

Critical Path Method (CPM):

A network-based planning technique that uses activity durations and relationships to calculate a schedule for the project.

Data Date:

The date from which a schedule is calculated, where all activities occurring earlier than the data date are complete and all activities occurring on or after the data date are planned.

Duration:

The estimated time required to complete an activity as recorded on the Project Schedule.

Float Suppression/Sequestering:

The process of utilizing zero free float techniques that allows an activity to start as late as possible by using all available free float of that activity, by the utilization of overly generous activity durations, or by using overly restrictive calendar non-working periods.

Free Float:

The amount of time an activity may be delayed without delaying the early start date of its successors.

Longest Path:

The longest continuous path of activities through a project, which controls project early completion.

Look-Ahead Schedule:

A computer-generated schedule that shows the previous week's work and the work planned for the current and next three weeks.

Milestone:

An activity, with no duration, that is typically used to represent the beginning, end, interim stages and significant events of the project, or contractually required dates.

Monthly Progress Schedule:

A monthly update to the approved baseline schedule.

Narrative:

A written report explaining the Project Schedule in detail.

Predecessor:

An activity that affects the start or finish date of another activity with a logically tied relationship.

Preliminary Schedule:

A CPM schedule that shows the Baseline Schedule for the first 60 calendar days of contract time and, the work breakdown structure and milestones for the entire contract.

Project Schedule:

A logic-based critical path for all work leading up to and including substantial completion or final acceptance that is used for tracking the performance of the work. The term "Project Schedule" will refer to one or more of the following:

- (a) Baseline Schedule,
- (b) Monthly Schedule, or
- (c) Recovery Schedule.

Record Schedule:

A CPM schedule that shows the actual start and finish date of each activity, durations, and all changes.

Recovery Schedule:

A CPM schedule that shows the activity changes to recover the time lost due to incompletion of the work within the contract time as specified in the Monthly Progress Schedule.

Scheduler:

An individual, who creates, maintains and revises the Project Schedule using applicable software.

Successor:

An activity whose start or finish date is affected by the logically tied relationship with another activity.

Time Impact Analysis (TIA):

A forward-looking, prospective schedule analysis developed to demonstrate the impact of a change to the current schedule on its longest path.

Total Float (Float):

The cumulative duration of time an activity may be delayed without delaying the contract time or a contractual milestone.

Work Breakdown Structure (WBS):

A framework for organizing and ordering the work activities into hierarchical groups.

(B) General:

The contractor shall prepare, furnish, and use the Project Schedule to plan, monitor, and report the progress of the work. The schedule shall demonstrate a detailed plan to complete the work in accordance with the contract time and be used in communication to coordinate activities among all affected parties.

The contractor shall provide a Scheduler to create and maintain all schedules, updates, Narratives, reports, and TIA related to this project. The Scheduler shall be proficient in CPM schedule development, analysis of resources applicable to the required detail of the Project Schedule, and shall be able to perform the required tasks using the specified software.

The Scheduler shall be present at all schedule meetings, in person or via teleconference, and made available for discussion or meetings when requested by the Engineer. The contractor project management personnel, subcontractors, and suppliers shall actively communicate with the Scheduler to develop and maintain accurate updates of progress and schedule revisions throughout the duration of the contract.

The Department's review and comment on a schedule for compliance with this specification does not do the following:

- (1) Imply or constitute approval of particular construction methods or relieve the contractor of its responsibility to provide sufficient materials, equipment, and labor to complete the project in accordance with the contract;
- (2) Attest to the validity of assumptions, activities, relationships, sequences, resource allocations, or other aspects of the schedule;

- (3) Imply the contractor is entitled to a Supplemental Agreement extending the contract time or adjusting the contract price;
- (4) Relieve the contractor from compliance with the requirements of the contract or result in the approval of a deviation, exception to or other variation from the contract. Failure to include an element of work required by the contract in the schedule does not release or relieve the contractor from responsibility to perform such work.

In preparing, developing and updating the Project Schedule the contractor shall not utilize:

- (1) Float suppression techniques in the schedule, including interim dates imposed by the contractor other than project milestone(s);
- (2) The inclusion of activities or constraints in a path or chain leading to a project milestone which are unrelated to the work as specified in the contract;
- (3) Activity durations or sequences determined by the Department to be unreasonable in whole or in part.

The contractor shall not use preferential sequencing, whereby activities that could be performed concurrently and are established in the Project Schedule as sequential simply to consume float. The contractor shall not indicate artificial activity durations by inflating activities in the schedule to consume float and influence the Critical Path. Sequestering of float is cause for rejection of the contractor's schedule submittal. If float sequestering is identified, the contractor shall revise the schedule appropriately.

Total Float is a commodity available to both the Department and the contractor for sequential use until depleted and not for the exclusive use or financial benefit of either party. A schedule showing an early completion date shall show the time between the scheduled completion date(s) and the required contract completion deadline(s) as Total Float.

The Department will not be liable to the contractor for delays by any party when the contractor completes the work prior to expiration of contract time.

If a delay in performing the work is caused by the Department, the contractor shall immediately notify the Department in writing that a revision to the contract is necessary in accordance with Subsection 104.02 and Subsection 104.03 of the specifications. The contractor shall include a description of the cause of delay, the projected amount of Total Float to be used, and the revised Monthly Progress Schedule showing the use of the Total Float in the Monthly Progress submittal. The contractor shall work cooperatively with the Department, other contractors, and third parties to identify and implement, to the maximum extent possible, no-cost measures to recover all schedule delays, regardless of the cause of the delays.

The contractor shall coordinate with the Department, local governmental entities, utility companies, railroad companies, and any third party entities when developing and maintaining the Project Schedule. The contractor shall coordinate its planning and scheduling efforts as required to address conflicts and comments received from adjacent projects and other entities.

(C) BLANK:

(D) Baseline Schedule:

The contractor shall submit a Baseline Schedule before or at the Preconstruction Conference for the Engineer's review and approval.

The Baseline Schedule shall be in the following format:

- i. Project ID: The schedule project ID shall match the filename format in Subsection 108.12(K) of the specifications. The project name shall be the route number followed by the project description.
- ii. Activity ID: Each activity shall be assigned a unique identification number. Activity ID numbers shall not be changed or reassigned for the duration of the contract. Within each group of the WBS, activity ID's shall be numbered sequentially in increments of 10 in the order of their start date or by finish date of a finish milestone. Milestone activities shall begin with "M". Use 10 characters or less.
- iii. Activity Name: Each activity shall be defined with a unique name that contains the description of work. Each name shall at a minimum consist of a verb or work function (i.e. remove, excavate, form, install), an object (i.e. curb, pipe, footing) and a location (i.e. street, station, bridge number). For example, "Install Barrier Dtl C – S1 120+25 Lt". The activity quantity may be included after location.

The contractor shall create an activity name using the following:

- a) Use 50 characters or less;
- b) Use "S1, S2, ..." for stage naming if applicable;
- c) Do not use all capital letters;
- d) Keep names readable, but use abbreviations as needed. Do not use periods when abbreviating. All abbreviations shall be consistent; and
- e) Location is not required if object name is specific, such as "CMP #201".

The contractor shall provide a list of abbreviations and acronyms. The work related to each activity shall be limited to one stage, one area, one traffic control phase, and one responsible party of the contract.

- iv. Activity Code: Activities shall be assigned with project activity codes that will be used to classify, categorize and organize activities for reporting. Only use project level activity codes and not global or enterprise codes. At a minimum, all activities shall have an activity code for responsible party, stages, and phases. Additional activity codes shall be added if requested by the Department.
- v. Milestones: The contractor shall separately identify each project milestone, conforming to the scheduling requirements set forth in the contract.
- vi. Constraints: The contractor shall not use date constraints to logically begin or complete a project activity unless specific calendar dates are shown in the contract. Specific contract dates may only be applied as a constraint to a milestone activity and input as either a "Start on or After" or "Finish on or Before" date. No other constraint types shall be allowed.
- vii. Duration: Activity duration shall not exceed 20 calendar days unless approved by the Engineer. Activity durations shall be at least one calendar day. Durations shall represent the anticipated productivity rates that factor in all limitations to the productivity. Long lead activities such as procurement and Level of Effort activities may exceed 20 calendar days.
- viii. Relationships: All activities shall have at least one predecessor and one successor except for the project start and project end milestones. Negative lags or negative floats shall not be allowed. Predecessors and successors shall not be linked to the same activity with different relationship types. The start of an activity shall have a Start-to-Start or Finish-to-Start relationship with preceding activities. The completion of an activity shall have a Finish-to-Start or Finish-to-Finish relationship with succeeding activities. Do not use Start-to-Finish relationships. Do not use Finish-to-Start relationships with a lag or overlap.
- ix. If applicable, the schedule shall include but not be limited to all activities below:
 - 1. Mobilization/Demobilization;
 - 2. Right of Way Acquisition;
 - 3. Submittal development;

4. Submittal review and acceptance;
 5. Submittal and approval of material samples and mix designs;
 6. Submittal and approval of shop drawings;
 7. Long lead items, material and equipment procurement;
 8. Procurement of permits;
 9. Environmental commitments and mitigation activities;
 10. Equipment and plant setup;
 11. Fabrication of special items;
 12. Erection and removal of falsework and shoring;
 13. Utility and railroad relocations;
 14. Cure times for concrete;
 15. Cure times for pavement before striping;
 16. Landscape and seeding establishment periods;
 17. Test periods;
 18. Major traffic stage changes;
 19. Substantial completion;
 20. Punchlist completion; and
 21. Final cleanup;
- x. The schedule shall be in detail to allow day-to-day monitoring and review of the contractor's operations. It shall show the order and interdependence of activities and the sequence of work.
 - xi. The contractor shall detail the Critical Path activities and logic ties in the schedule to show the work sequencing. The contractor shall use the CPM software to determine the controlling activities in the critical path. The critical activities shall be prominently distinguished on all reports by the use of color or pattern.
 - xii. The contractor shall provide the number of activities to assure adequate project planning and allow for monitoring and evaluation of work progress.

- xiii. The contractor shall provide activities as necessary to depict third-party work related to the contract. Third-party work activities may include but is not limited to railroads, utilities, real estate, and government agencies.
- xiv. Seasonal, winter shutdown, traffic, special event, environmental, or other contract restrictions shall be considered and included in the schedule for all work. These restrictions shall be addressed with project calendars and shown as non-work days for each major work type. Global calendars shall not be used. Examples of major work types are earthwork, concrete paving, structures, asphalt, drainage, landscaping, etc. The contractor shall include project calendar for curing time if applicable.
- xv. The duration for each activity shall include the anticipated production rate and the time for anticipated weather stoppages. The contractor shall not reserve random non-work days in a project calendar to account for weather stoppages.
- xvi. The schedule shall have a Data Date of the start date shown in the Notice of Award letter.
- xvii. When processing the schedule in the software, the contractor shall use the following options:
 - 1. When scheduling progressed activities use Retained Logic;
 - 2. Calculate start-to-start lag from Early Start;
 - 3. Define critical activities as Longest Path;
 - 4. Compute Total Float as $\text{Finish Float} = \text{Late Finish} - \text{Early Finish}$; and
 - 5. Calendar for scheduling relationship lag as predecessor activity calendar.
- xviii. The bar chart schedule plot shall be accompanied by a schedule report of the network with a tabulation of the following data for each activity:
 - 1. Activity ID;
 - 2. Activity name;
 - 3. Original duration;
 - 4. Early start date;

5. Early finish date;
6. Late start date;
7. Late finish date;
8. Predecessors;
9. Successors;
10. Free float;
11. Total float;
12. Primary constraint date;
13. Calendar; and
14. Responsibility for activity - e.g., prime contractor, subcontractor, supplier, etc.

(E) BLANK:

(F) BLANK:

(G) Recovery Schedule:

If the Project Schedule indicates a late completion of the work by 28 or more calendar days, the contractor shall prepare a Recovery Schedule which demonstrates how the contractor intends to reschedule the activities to regain compliance with the contract.

Within ten working days of receipt of the Engineer's written direction, the contractor shall submit the Recovery Schedule to the Engineer. The contractor shall not be required to prepare a Recovery Schedule if the contractor requests and demonstrates, in writing, entitlement to extension of a completion deadline due to a Department caused delay, and the Engineer concurs that a Recovery Schedule is not required at that time. If the Engineer disputes the contractor's entitlement to a completion deadline adjustment, the contractor shall, within five working days, submit a Recovery Schedule that does not include a completion deadline adjustment.

Within five working days after a rejection by the Engineer of the Recovery Schedule, the contractor shall resubmit a revised Recovery Schedule incorporating the Department's comments. When the Engineer accepts the contractor's Recovery Schedule, the contractor shall, within five working days after the Engineer's acceptance, incorporate such schedule in the Project Schedule, deliver the same to the Department, and proceed in accordance with the approved Recovery Schedule.

All acceleration costs required to bring the contract work back into compliance with project milestones and the contract time due to a contractor caused delay shall be borne solely by the contractor. Whenever a Recovery Schedule is required, the contractor shall provide the following information:

- i. Transmittal letter;
- ii. Bar chart schedule plot;
- iii. Electronic copy of the file used for the proposed Recovery Schedule; and
- iv. Narrative describing all proposed changes to the Project Schedule in detail, with justification for the changes, including the following:
 1. Changes to activity original durations;
 2. Changes to activity relationships and schedule logic;
 3. Cause of schedule slippage and actions taken to recover schedule within the shortest reasonable time (e.g., hiring of additional labor, use of additional construction equipment, and expediting of deliveries);
 4. Float consumption;
 5. Identification of activities that have been added, deleted, or modified; and
 6. Changes to the Project Schedule's Critical Path.

(H) Revisions to Contract:

If the contractor receives a request for extra work from the Department or submits a contract change request in accordance with Subsection 104.02 of the specifications asserting that an event, situation, or change affects a Critical Path of the Project Schedule, the contractor shall prepare and submit a TIA showing the cumulative effect of the change on the completion or fixed milestone date along with a written report describing the time impact in a form satisfactory to the Department complying to Subsection 104.03 of the specifications.

Each TIA shall include a fragmentary network (fragnet) demonstrating the following information:

- i. How the contractor proposes to incorporate a time extension provided for in a Supplemental Agreement;
- ii. The impact to the Project Schedule;

- iii. The sequence of new and/or existing activity revisions that are proposed to be added to the Project Schedule that is in effect when the change or delay is encountered;
- iv. The proposed method for incorporating the delay and its impact to the Project Schedule; and
- v. The computation of two finish dates. The first finish date shall be computed without consideration of impacts by the proposed revision. The second finish date shall be computed with consideration of impacts by the proposed revision.

If a proposed change in planned work results in altering the Critical Path or extending the schedule completion date, the contractor shall submit a Revised Schedule and a TIA within 15 calendar days of the proposed change.

(I) Record Schedule:

The contractor shall prepare a Record Schedule that includes actual start and actual finish dates for all activities. The Record Schedule, once approved, serves as the final update of the Project Schedule. The contractor shall include a written certification with the Record Schedule submittal signed by the Project Manager of the contractor in accordance with the following:

“To the best of my knowledge, the enclosed final update of the project Schedule reflects the actual start and completion dates of the activities for the project contained herein.”

The contractor shall submit the Record Schedule to the Engineer for review. Final acceptance will not be issued until the Record Schedule has been approved.

(J) Schedule Meetings and Three Week Look Ahead Schedule:

a. Baseline Schedule Presentation Meeting:

At a time agreeable to the Engineer, the contractor shall conduct a Baseline Schedule presentation meeting within seven calendar days after submitting the proposed Baseline Schedule. The purpose of this meeting is for the contractor to present and explain the contractor's schedule and construction phasing plan. At a minimum, the following is to be covered at the joint review of the schedule:

- (a) WBS;
- (b) Sequence of work - step through the schedule activity by activity;
- (c) Construction phasing including traffic control phasing and changes;
- (d) Resources to include number of construction personnel and production rates used; and

(e) Critical Path review.

b. Weekly Project Meeting and Look-Ahead Schedule:

At the weekly project meetings, the contractor shall provide the Engineer with a detailed, Look-Ahead Schedule. The Look-Ahead Schedule is a computer generated bar chart schedule plot that shows the previous week's work and the work planned for the current and next three weeks. The contractor shall base the Look-Ahead Schedule on the Project Schedule and provide a greater breakdown of the Project Schedule activities for the purpose of materials inspection and testing. The Look-Ahead Schedule shall clearly note and explain all departures from the Project Schedule. The contractor shall reference the Project Schedule activity ID numbers, WBS, and define subsequent specific daily operations for all work activities scheduled to be performed during the four-week period. The contractor shall identify work being performed by Disadvantaged Business Enterprise (DBE) firms as separate activities. At least one day before the weekly construction activity meetings, the contractor shall submit weekly Look-Ahead Schedules to the Engineer.

(K) Submittals:

Two 11 x 17 inch hard copies and one pdf copy of each schedule in color listed herein shall be provided to the Engineer. The contractor shall furnish to the Engineer for project use an electronic copy of the schedule. The electronic copy shall be Primavera P6 .xml file format prepared in Primavera software.

The filename of schedules shall be submitted in the following format:

SCHEDULE FILENAME FORMAT	
Preliminary Schedule	TTTTT-YYMM-PSVV
Baseline Schedule	TTTTT-YYMM-BSVV
Monthly Progress Schedule #1	TTTTT-YYMM-MPS01VV
Monthly Progress Schedule #2	TTTTT-YYMM-MPS02VV
Recovery Schedule	TTTTT-YYMM-RCYSVV
TIA Schedule	TTTTT-YYMM-TIASVV
Record Schedule	TTTTT-YYMM-RCDSVV
3 Week Lookahead Schedule	TTTTT-YYMM-LASVV
Schedule Narrative	TTTTT-YYMM-NARVV
Note:	
(1) TTTTT: First 5 digits of project TRACS number.	
(2) YYMM: Current 2 digit year and month.	
(3) VV: 2 digit version number (01, 02, etc.).	

All bar chart schedule plots shall be in color and have a size and scale acceptable to the Engineer. Include a title block and a legend on each page. The plot layout shall include a schedule activity table with corresponding bar chart. The activity table shall be grouped

by the WBS and include the activity ID, activity name, duration, start date, finish date, and total float. All activities in the bar chart shall be plotted on their start and finish dates. Show relationship lines and data date line. The bar chart shall be time-scaled in two-line format with a date interval set to year/month and type set to calendar.

The contractor shall provide two 8.5 x 11 inch hard copies of the narrative and monthly report with an electronic pdf copy.

The contractor shall provide a schedule log file generated by the software in a .txt file format with all schedule submittals. The log file shall have the same filename as the schedule file. The contractor shall review the log file prior to submittal to verify that the electronic schedule is in compliance with this specification.

(L) Software:

The automated system software shall be Primavera P6.

(109RRBB, 04/18/24)

SECTION 109 MEASUREMENT AND PAYMENT:

109.04(D)(3) Equipment: the first paragraph of the Standard Specifications is revised to read:

Equipment which the Engineer considers necessary for the performance of work will be eligible for payment at the established rates only during the hours that it is operated except as otherwise allowed elsewhere in these specifications. Equipment hours will be recorded to the nearest one-half hour. For the use of equipment owned by the contractor and approved by the Engineer, the contractor will be paid the rental rates, as modified herein, outlined in the Rental Rate Blue Book® (RRBB) for Construction Equipment which is updated by EquipmentWatch™, a division of Fusable, 3200 Rice Mine Road NE, Tuscaloosa, Alabama 35406, phone (888) 307-1713. All rate determinations will be based on the RRBB quarterly rate revisions that are applicable at the time equipment is being used.

(109FAEU, 08/15/24)

SECTION 109 MEASUREMENT AND PAYMENT:

109.04(D)(3)(a) Rental Rates (Without Operators): the equation of the first paragraph of the Standard Specifications is revised to read:

The hourly equipment rental rate (HERR) will be determined by the following formula:

$$\text{HERR} = F \times \left[\frac{1.15 \times R}{176} \right] + \text{HOC}$$

Where: F= Adjustment Factor to R is 0.933

R= Current RRBB Monthly Rate

HOC= Hourly Operating Cost

(109WFADF, 05/15/25)

SECTION 109 MEASUREMENT AND PAYMENT:

109.04(D)(6) Statements: the title and text of the Standard Specifications is revised to read:

109.04(D)(6) Forms:

The contractor shall prepare the Weekly Force Account Detail form for each week of force account activity. The Weekly Force Account Detail form is a standardized, fillable form made available by the Department on the ADOT Construction Group's website.

The form shall detail the labor, equipment, and material charges utilized to accomplish the force account work along with all supporting documentation. The contractor shall furnish copies of original receipts (paid invoice cost) for materials, rental equipment cost, including freight and transportation charges, copies of rental rate blue book equipment sheets and certified payrolls.

If materials used on the force account work are not specifically purchased for such work but are taken from the contractor's stock, then instead of invoices, the forms shall contain or be accompanied by an affidavit of the contractor certifying that such materials were taken from stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the contractor.

Force account work shall be tracked daily; however, the contractor shall compile no more than one full week's worth of daily records into a Weekly Force Account Detail form. Each reporting period runs from Saturday through Friday. The contractor shall submit the form within 30 calendar days of the respective week's force account performance. The completed form shall be submitted to the Engineer for review and approval. The Engineer will review the form and supporting documentation against the ADOT Inspector's Daily Force Account Reports, and will verify that the form is timely, complete, and accurate. Payment will not be made until the contractor has furnished applicable forms,

detailing the costs of the force account work, including but not limited to the following information:

- (a) Labor: name, classification, date, daily hours, hourly rate and fringe rate, and certified payrolls for each foreman and laborer.
- (b) Equipment: dates, equipment number, description, operator name, hours used, approved stand-by hours, monthly rental rate, hourly operating cost and rental rate blue book sheets for each unit of equipment.
- (c) Rental Equipment (Third Party): invoice, dates used, vendor name, description of equipment, operator name, hours used, invoice rate, hourly operating cost and rental rate blue book sheets for each rental equipment.
- (d) Materials: invoice, date used, supplier name, description, quantity, unit of measure and unit cost.
- (e) Transportation: freight and express charges on materials, FOB jobsite.

(109FASUB, 05/21/26)

SECTION 109 MEASUREMENT AND PAYMENT:

109.04(D)(7) Force Account Work by Subcontractors: the first paragraph of the Standard Specifications is revised to read:

When force account work is determined by the Engineer to require specialized labor or equipment not normally utilized by the contractor, and such force account work is performed by subcontractors, the contractor will be allowed a supplemental markup of 5 percent of the subcontractor's costs plus the applicable tax and bond as specified in Subsection 109.04(D).

(109RET, 10/20/22)

SECTION 109 MEASUREMENT AND PAYMENT:

109.06(B)(3) Partial Payment: of the Standard Specifications is modified to add:

Notwithstanding any provision of Arizona Revised Statutes Section 28-6924, the parties may not agree otherwise.

109.06(B)(4) Final Payment: of the Standard Specifications is modified to add:

Notwithstanding any provision of Arizona Revised Statutes Section 28-6924, the parties may not agree otherwise.

109.06 Partial Payments and Retention: of the Standard Specifications is modified to add:

(C) Payroll Submittals:

The contractor shall submit payrolls electronically through the internet to the Department's web-based certified payroll tracking system. This requirement shall also apply to every lower-tier subcontractor that is required to provide certified payroll reports.

If, by the 15th of the month, the contractor has not submitted its payrolls for all work performed during the preceding month, the Engineer will provide a written notification of the discrepancies to the contractor. For each payroll document that the contractor fails to submit within 10 days after the written notification, the Department will retain \$2,500.00 from the progress payment for the current month. The contractor shall submit each complete and correct payroll within 90 days of the date of notification. If the payroll is complete and correct within the 90-day time frame, the Department will release the \$2,500.00 on the next monthly estimate. For each payroll that is not acceptable until after the 90-day time frame, the Department will only release \$2,000.00 of the \$2,500.00 retained. The Department will retain \$500.00 as sanctions. Such \$500.00 retentions will not relieve the contractor of its responsibility to provide each required payroll, complete and correct, as specified above. These sanctions shall be in addition to all other retention or liquidated damages provided for elsewhere in the contract.

(109SUBPAY, 10/20/22)

SECTION 109 MEASUREMENT AND PAYMENT:

109.06(B)(5) Payment Reporting and Sanctions: the eighth paragraph of the Standard Specifications is revised to read:

For each month that the contractor fails to submit timely and complete payment information the Department will retain \$5,000 as sanctions from the monies due to the contractor. After 90 consecutive days of non-reporting, the sanctions will increase to \$10,000 for each subsequent month which the contractor fails to report until the information is provided. These sanctions will be in addition to all other retention or liquidated damages provided for elsewhere in the contract.

109.06(B)(8) Non-compliance: of the Standard Specifications is revised to read:

Failure to make prompt partial payment, or prompt final payment including any retention, within the time frames established above, will result in remedies, as the Department deems appropriate, which may include but are not limited to:

- (a) Sanctions. These sanctions will be in addition to all other retention or liquidated damages provided for elsewhere in the contract:
 - (i) The Department will withhold two times the dollar amount not paid to each subcontractor;
 - (ii) If full payment is made within 30 days of the Department's payment to the contractor, the amount withheld by the Department will be released; and
 - (iii) If full payment is made after 30 days of the Department's payment to the contractor, the Department will release 75 percent of the funds withheld. The Department will retain the remaining 25 percent of the monies withheld as sanctions.
- (b) Additional Remedies. If the contractor fails to make prompt payment for three consecutive months, or any four months over the course of one project, or if the contractor fails to make prompt payment on two or more projects within 24 months, the Department may, in addition, invoke the following remedies:
 - (i) Withhold monthly progress payments until the issue is resolved and full payment has been made to all subcontractors, subject to the sanctions described in paragraph (a) above;
 - (ii) Terminate the contract for default in accordance with Subsection 108.10 of the specifications; and/or
 - (iii) Disqualify the contractor from future bidding, temporarily or permanently, depending on the number and severity of violations.

In determining whether the sanctions will be assessed, the extent of the sanctions, or additional remedies assessed, the State Construction Engineer will consider whether there have been other violations on this or other contracts, whether the failure to make prompt payment was due to circumstances beyond the contractor's control, and other circumstances. The contractor may, within 15 calendar days of receipt of the decision of the State Construction Engineer, escalate the decision to the State Engineer. If the contractor does not escalate the decision of the State Construction Engineer, in writing to the State Engineer, within 15 calendar days of receipt of the decision, the contractor will be deemed to have accepted the decision and there will be no further remedy for the contractor. If the contractor escalates the decision to the State Engineer, and the contractor does not agree with the State Engineer's decision, the contractor may initiate litigation, arbitration or mediation pursuant to Subsection 105.21(D) and (E) of the specifications.

(109FUEL, 02/10/12)

SECTION 109 MEASUREMENT AND PAYMENT: of the Standard Specifications is modified to add:

109.12 Fuel Cost Adjustment:

(A) General:

The Department will adjust monthly progress payments up or down as appropriate for cost fluctuations in diesel fuel as determined in accordance with these special provisions.

A fuel cost adjustment will be made when fluctuations in the price of diesel fuel, in excess of 15 percent, occur throughout this contract. The Department will not provide such adjustments for fluctuations in the price of diesel fuel of 15 percent or less.

No adjustments will be made for fluctuations in the price of fuels other than diesel.

(B) Measurement:

The base index price of fuel will be determined by the Department from the selling prices of diesel fuel published by OPIS (Oil Price Information Service). The base index price to be used will be the price for Diesel fuel No. 2, Ultra Low Sulfur, PAD 5, City of Phoenix Rack. The reported average value for the Phoenix area will be used.

The base index price for each month will be the arithmetic average of the selling price for diesel fuel, as specified above, shown in the last four reports received prior to the last Wednesday of the month.

This price will be effective as of the last Wednesday of each month, and will be posted on the Department's website, at <http://www.azdot.gov/Highways/cns/bitmat.asp>, on or shortly after the last Wednesday of the month.

This price may also be obtained from Contracts and Specifications Services at (602) 712-7221.

This price will be deemed to be the "initial cost" (IC) for diesel fuel on projects for which bids are opened during the following month.

The current index price for diesel fuel in subsequent months will be the base index price, determined as specified above, for the current month. For example; an adjustment for diesel fuel used in May, if applicable, will be based on the "current price" (CP) for May as posted on the last Wednesday of May. The amount of adjustment per gallon will be the net difference between the "initial cost," adjusted by 15 percent, and the current index price. The monthly adjustment will be determined by the Engineer and included in the payment estimate as a fuel adjustment. For fluctuations in excess of 15 percent, fuel cost

adjustments will only be made for current price index increases greater than 1.15 times the "initial cost" or for decreases less than 0.85 times the "initial cost." No calculation will be made for fluctuations in the current index price of 15 percent or less when compared to the "initial cost."

The number of gallons of diesel fuel used per month will be considered to equal 1.5 percent of the dollar amount of work reported by the contractor for each month. Such dollar amount will not include incentives earned by the contractor for pavement smoothness, thickness, or strength for Portland cement concrete pavements; for pavement smoothness or quality lots for asphaltic concrete pavements; for any other revenue derived from quality incentives; or for revenue accrued in the previous month for bituminous material cost fluctuations or diesel fuel price adjustments.

A monthly adjustment, if applicable, will be made on this quantity, as shown below:

$$S = \frac{0.015(Q)}{IC} \times (CP - AC)$$

Where; S = Monetary amount of the adjustment (plus or minus) in dollars
Q = Dollar amount of work completed for the month
CP = Current index price in dollars per gallon
AC = Adjusted "initial cost" (1.15 or 0.85 times IC) in dollars per gallon
IC = "Initial cost" as determined above, dollars per gallon

If adjustments are made in the contract quantities, the contractor shall accept any fuel adjustment as full compensation for increases or decreases in the price of fuel regardless of the amounts of overrun or underrun.

The value calculated above (plus or minus) will be adjusted to include sales tax and other taxes as applicable.

No additional compensation will be made for any additional charges, costs, expenses, etc., which the contractor may have incurred since the time of bidding and which may be the result of any fluctuation in the base index price of diesel fuel.

No adjustments will be made for work performed after Substantial Completion, as defined in Subsection 105.19, has been achieved.

(C) Payment:

Price adjustments will be shown on the monthly progress estimate, but will not be included in the total cost of work for determination of progress or for extension of contract time.

(201MTBRN, 10/18/10)

SECTION 201 CLEARING AND GRUBBING:

201-3.02 Removal and Disposal of Materials: the third paragraph of the Standard Specifications is revised to read:

Burning of trash, debris, plant material, wood, or any other waste materials will not be allowed.

(201PAY, 07/15/21)

SECTION 201 CLEARING AND GRUBBING:

201-5 Basis of Payment: of the Standard Specifications is modified to add:

When clearing and grubbing is not included as a contract pay item, full compensation for any clearing and grubbing necessary to perform the construction operations designated on the project plans or specified in the Special Provisions shall be considered as included in the price of contract item.

SECTION 202 REMOVAL OF STRUCTURES AND OBSTRUCTIONS: the first paragraph of the Standard Specifications is hereby deleted:

202-3.01 General: of the Standard Specifications is modified to add:

Items designated to be salvaged and reused in new construction shall be stored at a location secured by the contractor.

202-3.03 (B) Bituminous Pavement: of the Standard Specifications is modified to add:

Upon removal, the existing asphaltic concrete shall become the property of the contractor and dispose of offsite.

ITEM 2020113 REMOVE AND SALVAGE (SIGN):

Description:

The work under this item shall include the furnishing of all materials, personnel, and equipment necessary to remove and salvage existing signs or object markers within the project limits as shown on the project plans or directed by the Engineer. Foundation removal, if required, will also be included in this work.

Construction Requirements:

The contractor shall be responsible for removing the identified existing signs, and if necessary the sign foundation. This includes, but is not limited to, the nuts, washers, bolts or claps, posts and foundations.

The work shall include the filling and compacting of all holes left by removals of foundations.

All signs and signpost are to be salvaged and delivered to the following address: 9601 W. Jefferson St, Tolleson, Arizona..

The Contractor shall inform the following City personnel before transporting salvaged material or equipment: Diego Padilla, (480) 258-1016, diego.padilla@tolleson.az.gov.

Prior to the delivery of any material or equipment, the contractor shall make arrangements for the City to inspect all items. Any material or equipment not salvageable, as determined by the City, shall be disposed of by the contractor at his expense.

Method of Measurement:

Removal of Signs shall be measured per each sign removed and/or salvaged with the project.

Basis of Payment:

The accepted quantities of Removal of Signs, measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place.

No additional payment will be paid for removal and proper disposal of sign bases and/or the delivery of salvaged materials to the City of Tolleson, the cost being considered included in this item.

ITEM 2020053 – REMOVE (WATER SERVICE LINE)

ITEM 2020054 – REMOVE (BACKFLOW PREVENTER):

ITEM 2020156 – REMOVE (WATER METER BOX AND COVER):

Description:

The work under these items shall consist of removing existing water meters, boxes, covers, backflow preventers, and water service lines at the locations designated on the project plans and in accordance with the details shown herein.

Construction Requirements:

The contractor shall coordinate with the Engineer to arrange for the removal of existing

water meters, boxes, covers, backflow preventers, and water service lines. The contractor shall remove and dispose of the water meter box, cover, backflow preventors, and water service line.

The contractor shall not remove any existing water meter boxes, covers, backflow preventers, and water service lines until the proposed existing water meters, boxes, covers, backflow preventers, and water service lines have been installed.

The contractor shall coordinate water service shutdowns with the Engineer a minimum of 48 hours in advance of the required shut down. The contractor shall also coordinate with the Engineer and City of Tolleson for setting of the meter at the new meter box location.

Method of Measurement:

The removal of existing water meter boxes, covers, backflow preventers, and water service lines will be measured by each location shown on the project plans and specified herein.

Basis of Payment:

The removal of existing water meter boxes, covers, backflow preventers, and water service lines will be measured as provided above and will be paid for at the contract unit price each, which price shall be full compensation for the work, complete in place, including excavation, backfill, and removal of existing waterline and pipe fittings.

ITEM 2020057 – REMOVE AND SALVAGE (EXISTING PEDESTRIAN CROSSING POST & PEDESTRIAN PUSH BUTTON):

Description:

The work under this item shall consist of removing and salvaging existing pedestrian crossing post and pedestrian push button assemblies, including sign panels, posts and foundations, cabinets, cables, object markers, and milepost markers, filling all voids, restoring any disturbed ground, within the project limits that are identified to be removed on the plans and as specified herein. The work item shall include all materials, equipment, and labor necessary to remove sign assembly and salvage the signs, sign posts, foundations, identified on the project plans.

Construction Requirements:

The contractor shall not disturb any other items not specifically indicated on the project plans or specified herein to be removed unless otherwise directed by the Engineer. Any items, which are not identified to be removed but which, are damaged, as a result of the construction shall be replaced by the contractor at no additional cost to the Department.

Prior to the delivery of any material or equipment, the Contractor shall make arrangements for the Engineer to inspect all items. Any material or equipment not

salvageable, as determined by the Engineer, shall be disposed of by the Contractor at his expense.

The Contractor shall transport all salvaged material or equipment to the following address: 9601 W. Jefferson St, Tolleson, Arizona.

The Contractor shall inform the following City personnel before transporting salvaged material or equipment: Diego Padilla, (480) 258-1016, diego.padilla@tolleson.az.gov.

Holes, cavities, and depressions resulting from the removal of signs, except in areas to be excavated, shall be backfilled with suitable material and compacted.

Method of Measurement:

Remove And Salvage (Existing Pedestrian Crossing Post & PPB) will be measured for each pedestrian crossing post and pedestrian push button removed, complete in place.

Basis of Payment:

The accepted quantities of Remove And Salvage (Existing Pedestrian Crossing Post & PPB), measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including all materials, equipment, and labor necessary to remove all signs and salvage signs, including excavation, backfill, hauling, and disposal.

ITEM 2020060 – REMOVE AND SALVAGE (EXISTING RECTANGULAR RAPID FLASHING BEACON EQUIPMENT & POLE):

Description:

The work under this item shall consist of removing and salvaging existing rapid flashing beacon and pole assemblies, including sign panels, posts and foundations, cabinets, cables, and object markers, filling all voids, restoring any disturbed ground, within the project limits that are identified to be removed on the plans and as specified herein.

Construction Requirements:

The contractor shall not disturb any other items not specifically indicated on the project plans or specified herein to be removed unless otherwise directed by the Engineer. Any items, which are not identified to be removed but which, are damaged, as a result of the construction shall be replaced by the contractor at no additional cost to the City.

Prior to the delivery of any material or equipment, the Contractor shall make arrangements for the City of Tolleson to inspect all items. Any material or equipment not salvageable, as determined by the City of Tolleson, shall be disposed of by the Contractor at his expense.

The Contractor shall transport all salvaged material or equipment to the following address:
9601 W. Jefferson St.

The Contractor shall inform the following City personnel before transporting salvaged material or equipment: Diego Padilla, (480) 258-1016, diego.padilla@tolleson.az.gov.

Holes, cavities, and depressions resulting from the removal of signs, except in areas to be excavated, shall be backfilled with suitable material and compacted.

Method of Measurement:

Remove And Salvage (Existing RRFB Equipment & Pole) will be measured for each rapid flashing beacon and pole assembly removed, complete in place. This includes sign panel(s), posts, foundations, cabinets, cables, object markers, and backfilling of cavities left by the foundation removal. The work item shall include all materials, equipment, and labor necessary to remove sign assembly and salvage the signs, sign posts, foundations, identified on the project plans.

Basis of Payment:

The accepted quantities of Remove And Salvage (Existing RRFB Equipment & Pole) measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including all materials, equipment, and labor necessary to remove all signs and salvage signs, including excavation, backfill, hauling, and disposal

ITEM 2020065 – REMOVAL OF TREES

Description:

The work under this item shall include removing and disposing of the existing trees, tree roots and tree stumps from the project area, at the locations shown on the project plans, in accordance with the requirements specified herein.

Construction Requirements:

Removal of trees shall be in accordance with Subsection 201-3.02 of the specifications.

All tree removal personnel shall have a minimum of one-year experience in large tree removal and shall be supervised at all times by a foreman with a minimum of two years' experience. Background information on all personnel associated with this task, along with references that will verify experience, shall be submitted to the Engineer at the pre-construction meeting.

The contractor shall remove trees in sections by performing cutting operations from the top down, utilizing cranes or boom trucks as needed, to control the fall of large pieces of trunk, branches and any tree debris.

The contractor shall cut trees flush with existing grades. All stumps shall be ground to a minimum of three feet below existing grade including the removal of all roots that are at that same elevation below existing grade.

Cavities resulting from the removal of stumps and roots shall be backfilled with material approved by the Engineer. The material shall be compacted to a density of not less than 95 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

The contractor shall coordinate with the Engineer no less than two weeks prior to this work, to tag all trees designated for removal.

Upon removal, trees shall become property of the contractor.

All tree materials resulting from removal shall be removed from the jobsite during the same workday period. No debris larger than 1 square inch shall remain after the removal process is completed.

Method of Measurement:

Removal of trees will be measured per each.

Basis of Payment:

The accepted quantities of removal of trees, measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including excavation and subsequent backfill, and disposing of the trees, and as shown on the project plans and specified herein.

ITEM 2020169 REMOVE (CONCRETE VALLEY GUTTER & APRON):

Description:

The work under this item shall consist of the removal and disposal of concrete valley gutter at the locations indicated on the Project Plans.

Construction Requirements:

Work under this item shall conform to Section 202-3.04 of the Standard Specifications.

Method of Measurement:

Remove (Concrete Valley Gutter & Apron) will be measured by each square foot of valley concrete valley gutter removed.

Basis of Payment:

The accepted quantities of Remove (Concrete Valley Gutter & Apron), measured as provided above, will be paid for at the contract unit price per square foot of concrete valley gutter removed, which price shall be full compensation for the work, complete in place.

The price shall include all excavation and subsequent backfill incidental to the removals.

ITEM 2020400 – REMOVE AND RELOCATE (STREET LIGHT POLE AND MAST ARM):

Description:

The work under this item shall consist of removing existing light pole, mast arm, and luminaire and installing them on a new foundation at the locations designated on the plans and in accordance with the details shown on the plans and as specified herein.

Materials:

Street Light Foundation shall conform to the applicable City of Tolleson Standard Detail for street lighting foundations as shown on the plans.

Concrete shall be Class S and shall conform to the requirements of Sections 601 and 1006 of the ADOT Standard Specifications.

Reinforcing steel and wire mesh shall conform to the requirements of Sections 605 and 1003 of the ADOT Standard Specifications.

Anchor bolts shall be galvanized steel, sized and spaced in accordance with the approved pole shop drawings and City of Tolleson Standard Details. Anchor bolts shall include nuts and washers and shall be installed using an approved template to ensure proper alignment.

Conduits stubbed into the foundation shall conform to project electrical specifications. A grounding electrode conductor and ground rod shall be installed where shown on the plans and in accordance with NEC Article 250.

Construction Requirements:

Existing poles, mast arms and luminaires shall be inspected for damage before installing on the new foundation. If poles, mast arms, or luminaires are damaged, the contractor shall notify the Engineer. Poles shall be installed level and square with mast arm perpendicular to travel lanes. The contractor shall demolish the existing foundation 2' below grade after pole is removed, cap conduit hole and backfill and compact with soil that matches the surroundings.

Street light pole foundations shall be constructed in accordance with the applicable City of Tolleson Standard Details and the project plans.

The tops of all foundations shall be flush with the abutting or adjacent sidewalk or future back of sidewalk. If no sidewalk is present, the top of foundation shall match the top of adjacent curb elevation or finished grade as shown on the plans.

Prior to drilling or excavation for pole foundations, the Contractor shall pothole the proposed pole locations to verify the location and depth of existing utilities. The Contractor shall verify clearance to all adjacent underground and overhead utilities prior to drilling at no additional cost to the Department.

Anchor bolts shall be set plumb, level, and oriented correctly with respect to roadway alignment. A template shall be used to maintain proper bolt spacing and projection. Bolt threads shall be protected during concrete placement.

Concrete shall be placed monolithically and consolidated to eliminate voids. The exposed top surface shall be finished smooth and free of honeycombing. Curing shall comply with Section 601 of the ADOT Standard Specifications.

After curing, excess excavation shall be backfilled with approved material and compacted to match adjacent conditions. Surface restoration shall match surrounding improvements.

Method of Measurement:

Remove and Relocate (Street Light Pole And Mast Arm) will be measured as a unit for each pole removed and reinstalled on a new foundation.

Basis of Payment:

The accepted quantities of Remove and Relocate (Street Light Pole And Mast Arm) measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including hauling, storage, excavation, new foundation, backfill, compaction, surface restoration, and all labor, equipment, and incidentals necessary to complete the work, complete in place.

(203STRBKFL, 10/21/21)

SECTION 203 EARTHWORK:

203-5.03(B)(1) Structure Backfill: the first paragraph of the Standard Specifications is revised to read:

Structure backfill material shall be selected from excavation or from a source selected by the contractor. It shall not contain frozen lumps, chunks of clay, or other objectionable material. Backfill material shall not contain salvaged asphaltic concrete materials. Backfill material to be used for metal piles or similar items of metal shall have a value of resistivity

not less than 2,000 ohm-centimeters or the value shown on the plans. Backfill material shall have a pH value between 6.0 and 10.0, inclusive, when placed against metal installations, except aluminum. Backfill material shall have a pH value between 6.0 and 9.0, inclusive, when placed against aluminum installations. Backfill material shall have a pH value between 6.0 and 12.0, inclusive, when placed against installations other than metal. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

ITEM 4040156 – SLURRY SEAL

Description:

The work under this item shall consist of furnishing all materials and placing slurry seal on pavement surfaces at the locations shown on the Project Plans and in accordance with these Special Provisions.

The slurry seal shall be Type II.

Materials:

Asphalt emulsion, aggregate, mineral filler, water, and additives shall conform to the requirements of Section 336 of the MAG Uniform Standard Specifications for Public Works Construction (Latest Edition).

Mix design shall conform to MAG Section 336.

The Contractor shall submit a mix design in accordance with MAG Section 336, including supporting test data, for review and acceptance prior to placement. No slurry seal shall be placed until the mix design has been accepted.

The mixture shall meet the performance requirements of MAG Section 336.

All materials shall be compatible and capable of producing a homogeneous slurry seal mixture.

Construction Requirements:

Slurry seal shall be constructed in accordance with the requirements of MAG Section 336 and the Project Plans.

Surface preparation, mixing, proportioning, application, joints, and curing shall conform to MAG requirements.

The slurry seal mixture shall be homogeneous and of proper consistency to provide a uniform surface free of streaking, segregation, excess moisture, or premature breaking.

Type II slurry seal shall typically be applied at a rate of 14 to 18 pounds per square yard based on dry aggregate weight, with final application rate adjusted as directed by the Engineer to achieve complete coverage.

Slurry seal shall be placed only when weather and surface conditions are suitable in accordance with MAG requirements.

Method of Measurement:

Slurry seal will be measured for payment by the square yard of surface area covered and accepted.

No separate measurement will be made for overlaps, joints, or irregular areas.

Basis of Payment:

The accepted quantities of slurry seal, measured as provided above, will be paid for at the contract unit price per square yard, which price shall be full compensation for the work, complete in place, including furnishing all materials, mix design, surface preparation, labor, equipment, traffic control, testing, and incidentals.

No separate measurement or payment will be made for surface cleaning, preparation, application adjustments, or any other work necessary to complete the slurry seal, the cost being considered as included in the contract unit price.

(501PIPE, 01/20/22)

SECTION 501 PIPE CULVERTS AND STORM DRAINS:

501-3.02(A)(1) GENERAL: the last paragraph of the Standard Specifications is revised to read:

Bedding material for all metal pipe shall have a value of resistivity not less than 2,000 ohm-centimeters unless otherwise specified or approved by the Engineer. Bedding material shall have a pH value between 6.0 and 10.0, inclusive, for all metal pipe installations except aluminum. Bedding material for aluminum pipe installations shall have a pH value between 6.0 and 9.0, inclusive. Bedding material shall have a pH value between 6.0 and 12.0, inclusive, for all concrete or plastic pipe installations. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

ITEM 5011008 – PIPE, REINFORCED CONCRETE, CLASS III, 15”

Description:

The work under this item shall consist of constructing 15” storm drain pipe as shown on the project plans and in accordance to the project details and as specified herein.

Materials:

Storm drain pipe shall conform to the requirements of Subsection 501-2 of the specifications.

Construction Requirements:

Storm drain pipe shall conform to the requirements of Subsection 501-3 of the specifications.

Method of Measurement:

Storm drain pipe will be measured for payment as a unit per linear foot.

Basis of Payment:

The accepted quantities of storm drain pipe, measured as provided above, will be paid for at the contract unit price per linear foot, which price shall be full compensation for the work, complete in place, including storm drain pipe, excavation, backfill, concrete pipe collar, tee connections, and connection to existing catch basin.

Add the following to Section 501-5 Basis of Payment

The connection to the existing catch basin, the concrete pipe collar per ADOT Standard Detail C-13.80, and the 15" x 15" x 15" Tee as shown on the Project Plans shall be included in the cost of the 15" Storm Drain. No separate payment will be made.

ITEM 5030366 – CATCH BASIN, TYPE E, (MAG DET. 534-1 & 534-2) (COMBO INLET)

ITEM 5030371 – CATCH BASIN, TYPE F, (MAG DET. 535)

Description:

The work under this item shall consist of constructing concrete catch basins as shown on the project plans and in accordance with the project plans, MAG standard details, and these Special Provisions.

Materials:

Concrete, reinforcing steel, masonry mortar, and structural steel shall conform to the requirements of Subsection 503-2 of the specifications unless modified by MAG Standard Details or the project plans.

Construction Requirements:

Catch basins shall be constructed in accordance with the requirements of MAG Standard Details and in accordance with the project plans.

Method of Measurement:

Concrete catch basins will be measured for payment as a unit for each catch basin constructed.

Basis of Payment:

The accepted quantities of catch basins, measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for all labor, materials, excavation, dewatering, backfill, compaction, pipe connections, reinforcing steel, and all incidentals necessary to complete the work, complete in place.

No additional measurement or payment will be made for removal of unsuitable material below the required depth or for furnishing and placing replacement material, the cost of which shall be considered included in the contract unit price.

(601PCC, 09/21/23)

SECTION 601 CONCRETE STRUCTURES:

601-3.03(C) Pumping Concrete: of the Standard Specifications is revised to read:

Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be of suitable type and shall have adequate capacity for the work. The concrete shall not flow either over or through any piping, fittings or equipment which is fabricated of aluminum or aluminum alloys. The operation of the pump shall be such that a

continuous stream of concrete without air pockets is produced. Excessive segregation due to high velocity discharge of the concrete will not be permitted. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there is no contamination of the concrete or segregation of the ingredients. Standby equipment shall be readily available to replace initial pumping equipment should breakdown occur.

(604STHSF, 02/19/26)

SECTION 604 STEEL STRUCTURES:

604-2.03 High-Strength Bolts, Nuts and Washers: the first and the second paragraphs of the Standard Specifications are revised to read:

High Strength Bolts shall conform to ASTM F3125 Grade A325 except as may be modified herein.

The maximum hardness for ASTM F3125 Grade A325 bolts shall be 33 HRC for diameters 1 inch and smaller, and 30 HRC for diameters greater than 1 inch.

604-3.02 Fabrication: the second paragraph of the Standard Specifications is revised to read:

The structural steel fabrication plant shall be certified under the AISC Quality Certification program to the standard and supplement requirements for the type of work being performed. The following categories are defined under the AISC Quality Certification program:

Certified Bridge Fabricator – Simple (SBR)

Certified Bridge Fabricator – Intermediate (IBR)

Certified Bridge Fabricator – Advanced (ABR)

(605STRF, 8/21/25)

SECTION 605 STEEL REINFORCEMENT:

605-3.01 General: the sixth paragraph of the Standard Specifications is revised to read:

Reinforcement shall be accurately fabricated and placed as shown on the plans and shall be firmly held in place by wire ties at all intersections and splices with 16 gauge or heavier tie wires and with precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, or other approved supports at the spacing necessary to maintain the

specified clearance of the reinforcement forcing steel. The use of pebbles, broken stone, concrete masonry blocks, brick, metal pipe, or wood blocks will not be permitted for the purpose of spacing or support.

The contractor has the option to submit a request detailing the use of contract or buried bars, including supporting drawings, for review and approval by the Engineer.

For reinforcement spacing is greater than or equal to 12 inches in either the longitudinal or transverse directions, the reinforcement shall be tied at a minimum every alternate intersection.

Where reinforcement spacing is less than 12 inches in either the longitudinal or transverse directions, the reinforcement shall be tied at a minimum, every third intersection.

The contractor may submit a request detailing an alternative tying plan for review and approval by the Engineer.

(609DRSFD, 09/19/24)

SECTION 609 DRILLED SHAFT FOUNDATIONS: of the Standard Specifications is revised to read:

609-1 Description:

609-1.01 General:

The work under this section shall include furnishing all materials and constructing reinforced concrete shafts formed within a drilled excavation. Each drilled shaft foundation shall consist of a shaft section with or without casing left in place, with or without a rock socket or a belled footing. The drilled shaft foundation shall be constructed in accordance with the details and dimensions shown on the plans, and the requirements specified herein.

609-1.02 Certification:

The contractor shall be responsible to review all available geotechnical investigation reports, and its signature on the proposal form shall certify that the firm performing the drilled shaft operations, whether the prime contractor or a subcontractor, has completed this review. The geotechnical investigation reports are available on the ADOT Contracts and Specifications Group website, under Current Advertisements.

609-1.03 Installation Plan:

The contractor shall provide to the Engineer for review and approval a detailed installation plan containing the following information:

- (A) List of proposed equipment to be used including cranes, drills, augers, bailing buckets, final cleaning equipment, desanding equipment, slurry pumps, sampling equipment, tremies or concrete pumps, casing, etc.
- (B) Details of overall construction operation sequence and the sequence of shaft construction in bents or groups.
- (C) Details of shaft excavation methods, including equipment and procedures for checking the dimensions and alignment of each shaft excavation.
- (D) When slurry is selected for borehole stabilization, the contractor shall submit Safety Data Sheets, quality control procedures, and disposal details.
- (E) Details of methods to clean the shaft excavation.
- (F) Details of reinforcement placement, including support and centralization methods, lifting equipment, and staging location for tied steel reinforcement cages prior to placement.
- (G) Details of concrete mix designs and mitigation of possible loss of slump during placement, including slump loss test results in accordance with the requirements shown in Appendix A.
- (H) Details of concrete placement, including concrete volumetric charts, and the elapsed time for slump loss (as defined in Subsection 609-3.07(A) and determined by the slump loss test). The concrete placement duration (as defined in Subsection 609-3.07(A)) shall be submitted for each drilled shaft diameter.
- (I) Details of casing dimensions, material and splice details.
- (J) List of work experience in previous similar projects.
- (K) Other information shown on the plans or as requested by the Engineer.
- (L) Emergency horizontal construction joint method if unforeseen stoppage of work or interruption in concrete delivery occurs.
- (M) Details of any special access or setup requirements needed to position the drill equipment to advance excavations.

The contractor's installation plan shall be developed with input from subcontractors, material suppliers, and all others with drilled shaft responsibility. The installation plan shall also identify which portion of the drill shaft construction the contractor and each of the subcontractors will be performing. The documentation required above shall be submitted to the Engineer at least four weeks before work on shafts is to begin. The Engineer will review the initial submittal within 10 working days, and subsequent submittals, as necessary, within five working days. A drilled shaft preconstruction meeting will be

scheduled following the final approval of the installation plan and prior to commencement of drilling activity. All parties named in the installation plan shall be represented at the preconstruction meeting. No drilled shaft work shall be performed until the contractor's final submittal has been approved by the Engineer and the preconstruction meeting concluded. Such approval will not relieve the contractor of responsibility for results obtained by use of the installation plan, or any of its other responsibilities under the contract. The contractor shall be responsible to submit a modified installation plan each time a change is made to facilitate construction.

Unless otherwise specified in the Special Provisions, foundations of 4 feet or less in diameter and 30 feet or less in length utilized in light pole and sign post foundations shall be exempt from the requirement to perform integrity testing.

609-2 Materials:

609-2.01 Concrete:

Concrete shall conform to the requirements of Section 1006 of the specifications, with the following additions or modifications:

(A) Cement:

Where concrete is placed in drilled shaft excavations containing slurry or water, the cementitious material content of the concrete shall be between 660 and 750 pounds per cubic yard.

(B) Aggregate:

Maximum nominal aggregate size shall be limited to 1/5 of minimum clear bar spacing (vertical and horizontal), not to exceed 3/4 inch nominal for drilled shafts constructed with a wet method or with temporary casing (excluding collar-only casings), and 1 inch nominal for drilled shafts constructed with a dry method.

(C) Air-Entraining Admixtures:

Air entrainment requirements detailed in Section 1006 shall be utilized in drilled shaft foundations.

(D) Slump:

Unless otherwise specified, or as directed by the Engineer, the concrete slump for the concrete placement duration (as defined in Subsection 609-3.07(A)) shall be 4 to 7 inches for dry, uncased excavations and 7 to 10 inches for all other excavations.

The proposed concrete mix designs may use various admixtures to delay the concrete's initial set time and/or to reduce slump loss.

609-2.02 Reinforcing Steel:

Reinforcing steel shall conform to the requirements of Section 1003. Welded splices will not be allowed except as shown on the plans.

609-2.03 Casing:

Casing shall be steel and may be of unit or sectional construction. The casing shall be of sufficient strength to withstand handling and driving stresses, to withstand the pressure of concrete and the surrounding earth and to prevent seepage of water. Steel shall conform to the requirements of AASHTO M270 (ASTM A709), Grade A36, unless otherwise specified.

Should telescoped casing be used, the contractor shall not allow concrete to overfill any interior casing. Spillage must be removed from the annulus, or the shaft shall be declared deficient.

Temporary casing shall be clean, inside and out, prior to placement in the excavation. All casing shall be handled so as to limit distortion to within 2 percent of the diameter. No side shear capacity will be allowed where temporary casing installed becomes permanent. If approved by the Engineer and if conditions permit, temporary casings may be corrugated and non-watertight.

The contractor shall be responsible to compensate for loss of frictional capacity in the cased zone if temporary casing is abandoned in the shaft. Such modifications shall be approved by the Engineer, and shall be at no additional cost to the Department.

609-3 Construction Requirements:

609-3.01 General:

The methods and equipment used shall be appropriate for the intended purpose and materials encountered. The allowable methods are the dry method, wet method, temporary casing method, or permanent casing method, as defined by the 2017 LRFD Bridge Construction Specifications 4th Edition, Section 5. The most suitable of the listed methods for the conditions recorded in the geotechnical investigation report, or a combination of these methods, shall be used, subject to approval of the Engineer, to produce sound and durable concrete drilled shaft foundations. The permanent casing method shall be used only when required by the plans or authorized by the Engineer.

If at any time during the construction of the drilled shafts the Engineer determines that the equipment, materials, employees, or procedures are such that defects in the work may occur, the Engineer may stop the work until appropriate changes are made by the contractor. In no case shall the contractor be relieved of its responsibility for constructing acceptable drilled shaft foundations.

609-3.02 Confirmation Shafts:

Unless otherwise specified in the Special Provisions, the contractor shall construct a confirmation shaft to determine the adequacy of the contractor's equipment, materials, employees, and procedures for completion of the drilled shaft foundations in accordance with the requirements of the plans, specifications, and installation plan. Confirmation shafts may also be waived if approved in writing by the Engineer.

Unless otherwise approved by the Engineer, the confirmation shaft shall be the first drilled shaft foundation to be developed. The Engineer will specify the location of the confirmation shaft, unless shown on the plans. The confirmation shaft holes shall be completed in the same manner as other production shafts. The contractor shall revise its methods and equipment as necessary at any time during the construction of the confirmation shaft hole to satisfactorily complete the excavation. When the contractor fails to satisfactorily demonstrate the adequacy of its methods, procedures, or equipment; or when unforeseen conditions require revision, such as the need for slurry; the installation plan shall be revised and the adjacent shaft shall be designated as the confirmation shaft for the revised installation plan, as approved by the Engineer.

When shown on the plans or when directed by the Engineer in writing, the reaming of bells or development of rock sockets at specified confirmation shaft holes shall be required to establish feasibility in specific soil strata.

609-3.03 Excavation:

The contractor shall perform all excavation required for the shafts, rock sockets, or belled footings, through any material encountered, to the dimensions and elevations shown on the plans or as directed by the Engineer. Unless otherwise shown on the plans, the maximum deviation from plumb shall be not more than 1.5 percent. The maximum permissible variation of the design center axis for both the borehole and rebar cage at the top shall be 5 percent of the shaft diameter, not to exceed 3 inches from its project plan location. The contractor shall determine plumbness by plumb lines in dry excavations and by Kelly bar position readings at 10-foot intervals in wet excavations, or as approved by the Engineer. The contractor shall provide the Engineer with the plumbness readings for each borehole to verify the plumbness requirements prior to concrete placement in the borehole. When bells or rock sockets are required, they shall be excavated so as to form a bearing area of the size and shape shown on the plans.

If suitable material is not encountered at the design tip elevation shown on the plans, the bottom of any excavated hole shall be lowered, at the direction of the Engineer. When the contractor is directed by the Engineer to excavate past the design tip elevation, the contractor shall be compensated for any additional excavation in accordance with the requirements of Subsection 109.04 of the specifications. The limits of additional excavation will be determined by the Engineer.

When the contractor accidentally excavates beyond the design tip elevation, the criteria are as follows:

- (A) If suitable material was encountered due to over excavation, the contractor shall not be compensated for the additional excavation.
- (B) If unsuitable material was encountered due to over excavation, the Engineer will direct the contractor to excavate past the unsuitable material; the contractor shall be compensated for the additional excavation in accordance with the requirements of Subsection 109.04 of the specifications.

The reinforcing steel cage and concrete shall not be placed in the shaft until the final excavated hole elevation has been established and the Engineer has approved the completed excavation. Modifications to the reinforcing steel cage shall be in accordance with the requirements of Subsection 609-3.06 of the specifications.

If caving conditions are encountered, no further drilling will be allowed until a construction method is employed that will prevent excessive caving and which is acceptable to the Engineer. If casing is proposed, the shell shall be clean and shall extend to the top of the drilled shaft excavation. The inside diameter of the casing shall not be less than the specified size of the shaft unless approved by the Engineer. The outside diameter of the shaft shall not exceed plan dimension by more than 6 inches unless use of telescoping casing or surface casing is allowed by the installation plan.

Adjacent shafts, unless separated by a minimum of four shaft diameters measured center to center, shall not be excavated until the concrete in the first shaft has been in place for a minimum of 48 hours.

Temporary surface casings may be used to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation, if approved by the Engineer. Where temporary casing is used to stabilize excavations that include rock sockets, the temporary casing shall be 6 to 12 inches larger than the rock socket diameter and centered on the rock socket.

If the Engineer determines that the amount of caving is within acceptable limits and the contractor elects to drill under the same methods and procedures, the excavation shall be filled with concrete at no additional cost to the Department, regardless of the extent. Any excavation beyond the dimensions shown on the plans where casings are not used shall be filled with concrete at no additional cost to the Department.

If the use of drilling slurry is to be employed, either with or without the use of casing, the contractor shall use a method of construction which will allow completion of the drilled shaft in a continuous manner without any mixing of concrete and drilling slurry.

Material excavated from shafts and bells and not incorporated elsewhere on the project shall be disposed of by the contractor.

When the plans indicate drilled shafts are to be constructed within embankments, the embankments shall be constructed prior to drilling, except when approved otherwise by the Engineer.

After the completion of the drilled shaft excavation and prior to the placement of the reinforcing steel cage and concrete, all loose material shall be machine cleaned from the shaft. A flight auger or other equipment, as approved by the Engineer, shall be used for cleaning dry excavations where slurry or ground water is not present. Where slurry or ground water is present, the excavation shall be cleaned with a clean-out bucket or similar type of equipment, as approved by the Engineer.

After final removal of all loose material from the bottom of the excavated drill shaft hole, and prior to any concrete placement, the final shaft depths shall be measured with a weighted tape or other methods approved by the Engineer.

For all drilled shaft excavations in soils, the maximum depth of any sediment, loose, and/or disturbed material at any location at the base of the excavated hole shall not exceed 2 inches.

For wet or dry drilled shaft excavations in rock, the maximum depth of any sediment, loose and/or disturbed material at any location at the base of the excavated hole shall not exceed 1/2 inch for 50 percent of the excavated hole base area.

All open excavations shall be covered at the end of each shift in a manner approved by the Engineer.

609-3.04 Drilling Slurry:

(A) General Requirements:

The contractor is responsible to select, formulate, and implement the use of slurry to facilitate drilled shaft construction. Quality control procedures of the slurry implementation shall be detailed in the contractor's submitted installation plan. Only commercially prepared mineral slurries or polymer slurries shall be employed when slurry is used in the drilling process. Mineral slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. For all slurries the percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. During construction, the level of the slurry in the shaft excavation shall be maintained at a level of 5 feet or more above the highest expected piezometric pressure head along the depth of the shaft. Unless otherwise approved in advance by the Engineer, slurry shall be injected into the excavation immediately upon encountering ground water. No further excavation shall be completed until slurry has been introduced into the shaft. In the event of a sudden significant loss of slurry to the hole, the construction of that foundation shall be stopped until either a method to stop slurry loss or an alternative construction procedure has been approved by the Engineer.

The slurry shall be premixed thoroughly with clean, fresh water. Adequate time, as prescribed by the slurry manufacturer, shall be allotted for hydration prior to introduction into the shaft excavation. Slurry tanks of adequate capacity shall be required for slurry

circulation, storage, and treatment. No excavated slurry pits shall be allowed instead of slurry tanks. No mixing of slurry shall be allowed in the drilled shaft excavation. Mineral slurry shall not stand for more than four hours in the excavation without agitation. If this is not possible, excavation sidewalls shall be cleaned to remove filter cake. Mineral slurry density shall be increased by adding barite only when sodium bentonite is the mineral.

Desanding equipment shall be provided by the contractor as necessary to control mineral slurry sand content. Desanding will not be required for setting casing. The contractor shall take all steps necessary to prevent the slurry from "setting up" in the shaft. Such methods may include agitation, circulation and/or adjusting the properties of the slurry. The contractor shall dispose of all mineral slurry off site at an approved disposal site.

(B) Slurry Inspection and Testing:

Quality control procedures for utilization of slurry shall be detailed in the contractor's submitted installation plan. The contractor shall have suitable apparatus available at the site capable of obtaining slurry samples at any depth within the drilled shaft excavation.

609-3.05 Integrity Testing:

(A) General:

Each drilled shaft foundation completed, unless otherwise noted on the project plans, shall be inspected by means of a cross-hole sonic logging (CSL) survey and a gamma-gamma logging (GGL) survey. The drilled shaft contractor shall furnish and install 2-inch (inside diameter) Schedule 80 PVC pipes for the surveys. The minimum number of PVC-pipe inspection tubes shall be equal to the diameter of the drilled shaft, measured in feet, and rounded-up to the next whole integer, but not less than four, or as specified in the plans. The inspection tubes shall be approximately evenly spaced around the inside circumference of the reinforcing steel cage, or as shown on the project plans. To account for any reinforcing cage stabilizing bars installed by the contractor, the maximum clearance from the reinforcing cage's stirrups to the test tube shall be no more than the size of the vertical reinforcement plus 1 inch. The pipes shall be joined to provide a clean, watertight, and unobstructed opening as specified in Subsection 609-3.05(B) of the specifications. If any damage to the tubes occurs during the installation they shall be repaired or replaced at no additional cost to the Department. If testing cannot be performed because of blockage of the tubes, the contractor shall core drill or otherwise determine the extent of any potential anomalies in the concrete, as approved by the Engineer, at no additional cost to the Department.

CSL and GGL testing shall be performed by a qualified subcontractor selected by the contractor and approved by the Engineer. The subcontractor shall provide the equipment meeting the minimum requirements listed herein, and shall have at least one year experience in CSL survey and GGL survey evaluation. The subcontractor performing the GGL shall provide proof that it is licensed to possess and use radioactive material in accordance with the Arizona Radiation Regulatory Agency. Recorded measurements shall be interpreted and the required reports shall be prepared and sealed by a licensed

professional engineer, registered in the State of Arizona, with at least three years of experience in CSL survey and GGL survey evaluation. Resumes of proposed personnel shall be submitted to the Engineer for approval at least four weeks prior to commencement of work.

CSL tests shall be completed within two to four days after concrete placement and GGL tests shall be completed within two to seven days of concrete placement.

The CSL survey and the GGL survey requirements shall be as specified in Subsection 609-3.05(B) of the specifications. Inspection reports containing the acquired raw data, and evaluation reports, shall be provided as specified in Subsection 609-3.05(B) of the specifications. All reports shall be provided to the Engineer within three working days of test completion.

If the testing indicates the presence of anomalies, as defined herein, or the Engineer determines that construction defects may have occurred, the contractor shall conduct remedial testing and make repairs, as specified in Subsection 609-3.05(B)(6) of the specifications, at no additional cost to the Department.

Concrete volumetric charts shall be completed for each drilled shaft. A copy shall be delivered to the Engineer with the submittal of the inspection reports of the associated drilled shaft.

After the inspection of a shaft has been completed and the shaft accepted, all holes and test pipes in the shaft shall be filled with an approved grout.

(B) Testing Requirements:

(1) General:

The inspection tubes shall have a round, regular, internal diameter free of defects or obstructions, including at any pipe joints, in order to permit the free, unobstructed passage of source and receiver probes from top to bottom. The tubes shall be watertight and free from corrosion, with clean internal and external faces, to ensure passage of the probes and to ensure a good bond between the concrete and the tubes. Standard glue-on PVC couplings shall be used. No compression, rubber, or clamp fittings will be allowed. Care shall be taken during reinforcement installation operations to not damage the tubes or break the fasteners of the tubes. Before placement of concrete, pipes shall be checked to ensure they are free from blockages, bends, crimps or other impediments to the free passage of the testing probes.

Each pipe shall be fitted with a watertight shoe on the bottom and a removable cap on the top. The bottom cap of each tube shall be adequately secured such that it can withstand the hydrostatic pressure for the full depth of the shaft without water leakage. The pipes shall be securely attached to the reinforcement cage in a straight line, and in a regular, symmetrical pattern. The tubes shall be adequately secured to the reinforcing cage such that the tubes stay in position during placement of the rebar cage and concrete

placement. At a minimum, the tubes shall be securely fastened to the inside of the reinforcing cage at least every 10 feet vertically. The tubes shall be as near to vertical and parallel as possible. The tubes shall extend from 1 inch above the bottom of the reinforcement cage to at least 4 feet above the shaft top, or approximately 2 feet above the top of the rebar cage if above the ground. Under no circumstance shall the tubes be allowed to rest on the bottom of the excavated hole. If the shaft top is below the ground surface, the tubes shall extend at least 2 feet above the ground surface. Joints shall not be allowed in the section(s) of tubes above ground. Any joints required to achieve full length tubes below ground shall be made watertight.

The tube tops shall be bare clean pipe with no pipe joints, level cut, and capped to keep debris out of the tubes. If the rebar cage extends above the top of the tubes, the circular or spiral tie-raps shall temporarily be cleared away from 1 foot below the tube top to approximately 3 feet above. After placement of the reinforcement cage, the tubes shall be filled with clean water as soon as possible, immediately before or within 1 hour after concrete placement. Care shall be exercised in the removal of caps or plugs from the pipes after installation so as to not apply excess torque, hammering, or other stresses which could break the bond between the tubes and the concrete.

Before the start of testing, the contractor shall:

- (a) Run a 1.5 inch diameter 6 foot long rigid cylinder through the complete length of each access tube to check for tube blockage.
- (b) Clean the top of the shaft. The shaft top shall serve as the reference zero depth for all cross-hole sonic and gamma-gamma testing. Therefore, the shaft top must be level and, if mud covered, be cleaned before testing.
- (c) Provide proper access to the shafts so that the testing subcontractor can park their logging equipment within 2 to 3 feet of each access tube.
- (d) Provide any special safety equipment required.
- (e) Make sure the access tubes extend to at least 4 feet from the top of the concrete, and are capped and filled with water all the way to the top.
- (f) Make sure each access tube is bare (no pipe joints), clean (grind edges and concrete residue), level cut, and capped.
- (g) Provide an independent and stable source of 110 Volt, 1000-Watt power.
- (h) Using a permanent pen marker, mark each access tube with the shaft designation and tube number. For example, Pier 2 Shaft 3 Tube 4 shall be denoted as P2S3 T4. By definition, Tube 1 is the northernmost tube, with other tubes referenced in a clockwise direction from Tube 1.

The contractor shall also provide documentation that the testing equipment has been calibrated and is functioning properly.

Changes from the design conditions such as: test tube lengths, shaft diameter and the as-drilled tip elevation shall be noted in the report.

(2) Requirements for CSL Tests:

The minimum equipment requirements for CSL shall be as follows:

- (a) The ultrasonic source and receiver probes shall be capable of producing records with good signal amplitude and energy through uniform, good quality concrete. The probes shall be of a diameter and have cabling such that they descend freely through the 2 inch internal diameter Schedule 80 PVC pipe for the full depth of the shafts shown on the plans. Probes shall allow a generated or detected pulse within 6 inches of the bottom of the access tubes. The transmitter probe shall generate an ultrasonic pulse frequency not to exceed 40,000 Hz for drilled shafts 8 feet in diameter or less. For drilled shafts greater than 8 feet in diameter, the frequency to be used shall be determined by the manufacturer's equipment calibration guidelines and shall be approved by the Engineer prior to testing. The weight of each probe shall in all cases be sufficient to allow it to sink under its own weight in the access tubes. The probe housing shall be waterproof to at least 1.5 times the maximum depth of the testing. The receiver probe shall be of a similar size and compatible design to the transmitter probe, and be used to detect the arrival of the ultrasonic pulse generated by the transmitter probe.
- (b) The depth of the probes shall be recordable with a measurement wheel or other suitable measuring device.
- (c) The CSL equipment shall include a microprocessor-based system for analog to digital conversion and recording of data, for display of individual records, and for analysis of receiver responses and printing of logs.
- (d) The CSL system shall have an appropriate filter for amplification of data and cable systems.
- (e) Synchronized triggering of the recording system with the ultrasonic pulse shall be a feature of the CSL system.
- (f) The system shall be able to indicate zero depth at the shaft top and not at the bottom of access tubes. In addition, the system shall be able to log both from the top of the shaft to the bottom as well as from the bottom to the top.

(3) Testing Procedure Requirements for CSL Tests:

The minimum testing procedure requirements for CSL logging shall be as follows:

(a) Preparation of the tubes for CSL Tests:

All inspection tubes shall be filled with water prior to testing. During testing, the water level in any tube shall not drop below the top of the tube that is being tested.

(b) CSL Procedure:

Information on the shaft bottom and top elevations, tube lengths and position, along with construction dates, shall be provided by the contractor to the CSL logging subcontractor prior to the logging being performed.

All possible tube pairs shall be tested. The tests shall be carried out with the source and receiver probes in the same horizontal plane unless test results indicate potential defects, in which case the questionable zone shall be further evaluated with angled tests (source and receiver vertically offset in the tubes).

The electronic circuit shall be thoroughly checked. The choice of time base will be such that the "zero signal" and first arrival time are 2 to 3 divisions apart on the horizontal axis. Amplitude shall be such that the signal fills 2/3 to 3/4 of the screen vertically.

Once the slack is taken up out of the cables to provide accurate depth measurements of the logs, the probes shall be pulled simultaneously and uniformly from the bottom of the tubes over the depth wheel or other measuring device. All slack shall be taken out of the cables before the analyzer is switched on. The rate of ascent shall be the rate recommended by the equipment manufacturer. The cross-hole sonic measurements shall be taken at 2-inch intervals or less from the bottom to top of shaft.

(c) Anomaly Identification:

Anomalies in a drilled shaft shall be determined by evaluating the pulse arrival times and amplitude/energy signals. Zones where the measured sonic velocity reduction is 10 percent greater than the local mean measured sonic velocity within a 5-foot interval above and below the suspected anomalous zone shall be reported to the Engineer. In situations where a 5-foot interval is not available above and/or below the suspected anomalous zone, the local mean sonic velocity shall be measured to the top of the shaft or the bottom of the inspection tubes. Further investigations to evaluate the extent of such anomalies may be required by the Engineer, and shall be in accordance with the requirements specified in Subsection 609-3.05(C) of the specifications.

(d) CSL Results:

A report showing the results of the completed CSL survey shall be submitted to the Engineer for each drilled shaft foundation within three working days of completion of testing. The Engineer will review the report within three working days of the contractor's submittal. The report shall include:

- (i) Dates of shaft construction; shaft diameters; shaft lengths; shaft tip elevations; shaft cutoff elevations; type and size of drilling

equipment; type of slurry if used; description of concrete mix; concrete placement method; shaft layout with shaft numbers.

- (ii) Dates of logging; brief description of the testing equipment; identification of shaft logged; location of obstructions in PVC tubes; location of PVC couplers; calibration date, data and plot; summary of any unusual occurrences during testing; description and explanation of adjustments made to instrumentation or data (if any); identification of anomalies using the criteria described herein; delineation of affected tubes; vertical location and extent of anomalies; and estimated percentage of anomalous cross-sectional area.
- (iii) The cross-hole sonic logs expressing the results in terms of velocity and pulse amplitude/energy versus depth. The cross-hole sonic logs shall be presented for each tube pair with all anomalous zones indicated on the logs.
- (iv) Analyses of the initial pulse arrival time versus depth, velocity versus depth, and pulse amplitude/energy versus depth.
- (v) Appropriate discussion of the results in the text of the report shall be included.
- (vi) Tomography of anomalous zones.

(4) Requirements for GGL Tests:

The minimum equipment requirements for GGL shall be as follows:

- (a) The gamma-gamma probe shall consist of a rigid cylinder containing a gamma particle emitting source and a gamma particle detector. The probe shall be suspended by a cable of sufficient design and length that it is safely capable of raising and lowering the gamma-gamma probe within a 2-inch internal diameter Schedule 80 PVC inspection pipe to the desired test depths.
- (b) The cables affixed to the probe shall be of sufficient strength and durability to raise and lower the probe safely and at a controlled rate of speed. A winch mechanism shall be such that it does not damage the cables or compromise data collected in the test. A means of determining and recording probe depth shall be provided.
- (c) The gamma particle emitting source shall be Cesium-137 in a sealed source form.

- (d) The gamma-gamma probe detector shall consist of a proven method of gamma detection, such as Geiger Mueller or scintillation-based counters.
- (e) The detector shall be connected to a readout device that is capable of displaying or recording counts, densities, and sampling duration or probe speed.
- (f) The gamma-gamma probe shall possess a minimum density precision of 1.0 pounds per cubic foot.
- (g) The gamma-gamma probe shall have a minimum radius of detection of 4.0 inches in concrete with density between 140 and 160 pounds per cubic foot. The probe shall have the capability of varying the radius of detection up to 7 inches in concrete with density between 140 and 160 pounds per cubic foot. The radius of detection is defined as one half of the center to center distance between the source and the detector. The actual radius of detection used in the test shall be subject to the approval by the Engineer.
- (h) Prior to using GGL, the contractor shall provide the Engineer with the calibration of the gamma-gamma probe and readout unit to correlate count rate and concrete density. The calibration shall not be more than one year old, and shall be performed using the same source and detector combination as that proposed for the GGL testing on the project. Furthermore, the calibration shall have been conducted in an environment (e.g., water-filled, Schedule 80 PVC pipes) similar to the shafts being tested for the project. GGL shall not be performed until the Engineer has approved the calibration records. Upon approval, the contractor shall perform the gamma-gamma tests exactly in the manner as the calibration of the probe and readout unit was performed.

(5) Testing Procedure Requirements for GGL Tests:

The minimum testing procedure requirements for GGL shall be as follows:

(a) Preparation of GGL Access Tubes:

A GGL survey may be performed by an experienced subcontractor using inspection tubes completely filled with water only if the gamma-gamma probe has been calibrated in concrete calibration samples that contained inspection tubes filled with water, and the radius of detection and density precision calibration have been performed under water and found to be within the prescribed limits. In the event of gamma-gamma testing in water filled tubes, the water level during testing in any tube shall not drop below the top of the tube.

(b) GGL Procedure:

Information on the shaft bottom and top elevations, tube lengths and position, along with construction dates shall be provided by the contractor to the GGL subcontractor prior to the logging being performed.

The test shall be started by lowering the probe to the bottom of the access tube. When extracting the probe, the readings shall be taken at depth intervals not exceeding 1.5 inches and within the density precision of 1.0 pounds per cubic foot. The probe shall be extracted at a rate of between 8 to 10 feet per minute, and recorded.

To evaluate the repeatability of the GGL tests, the contractor shall perform one repeat log for each shaft in which GGL tests have been performed. After all the tubes in a given shaft have been GGL tested, the repeat log shall be performed in the first tube that was tested.

(c) GGL Data Analysis:

The following steps shall be used in the analysis of the GGL data:

- (i) Apply the approved calibration parameters from the concrete calibration samples to the raw count readings and obtain bulk concrete densities. Verify that the data set contains no logging errors, duplicated data or skipped data points.
- (ii) Determine the arithmetic mean of a set of bulk densities and record it on each log. A set shall consist of data collected from a single inspection pipe, using the same equipment, within the same time period. Data that shall not be included in the calculation of the mean density are: (1) repetitive data points collected at a single depth, (2) data collected at the top of the drilled shaft where the reading(s) were influenced by the gamma detector component exiting the shaft concrete, (3) data collected in the access tube above the top of the drilled shaft, (4) data affected by the anomalous zones of concrete, and (5) data that cause the population distribution to be statistically non-normal.
- (iii) In the event that a known difference in the steel reinforcement layout (e.g., splices using overlapping bars) exists in a segment of a drilled shaft that affects the apparent mean, a separate mean shall be generated and utilized as the mean for that portion of the data.
- (iv) Subtract the mean from each data point in the set to obtain a data set that reflects the variation from the mean.

- (v) Repeat the above steps for all inspection tubes contained within an individual shaft and plot and present that data as (1) a single plot from all tubes, and (2) an individual plot for each tube.

(d) GGL Standard Deviation Analysis:

The following steps shall be used in the standard deviation analysis of the GGL data:

- (i) Determine the standard deviation (SD) of a compilation of bulk densities. A compilation shall consist of data collected from the test drilled shaft using the same equipment, within the same time period. Data that shall not be included in the calculation of the mean density are: (1) repetitive data points collected at a single depth, (2) data collected at the top of the drilled shaft where the reading(s) were influenced by the gamma detector component exiting the shaft concrete, (3) data collected in the access tube above the top of the drilled shaft, (4) data affected by the anomalous zones of concrete, and (5) data that cause the population distribution to be statistically non-normal.
- (ii) The SD value that is used in step 3 shall be between 2.5 and 3.75 pounds per cubic foot. If the calculated value is below 2.5 pounds per cubic foot, then 2.5 pounds per cubic foot shall be used in step 3. If the calculated value is above 3.75 pounds per cubic foot, then 3.75 pounds per cubic foot shall be used in step 3.
- (iii) Multiply the value obtained for SD from the above step by -2.0 and -3.0 to obtain values of "Minus Two Standard Deviations" (-2SD) and "Minus Three Standard Deviations" (-3SD), respectively.

(e) Anomaly Identification:

Anomalies in a drilled shaft shall be determined by evaluating the data points developed by the above processes to the -3SD deviation criterion as follows:

- (i) In a single inspection tube over any 0.5 foot or greater depth interval, all of the density readings have a value less than the determined value for -3SD.
- (ii) In the same inspection tube identified anomalous by the above step, any data point that falls below the value for -3SD within a 1 foot vertical extent immediately above or below, then that depth shall be considered as anomalous in addition to the depth identified in the previous step.
- (iii) In all inspection tubes adjacent to inspection tubes already identified as anomalous, if at least one data point within 2 feet

vertically above or below the adjacent tube anomaly falls below the value for the $-3SD$, then the depth in that tube at which the anomaly is found is also anomalous, in addition to the depths identified in the previous two steps.

For the 3 steps above, if the data point falls within an interval of 1-foot or 2 feet from the top or bottom; the interval above shall be to the top of the shaft and the interval below shall be to the bottom of the test tubes.

(f) GGL Results:

A report showing the results of the completed GGL survey shall be submitted to the Engineer for each drilled shaft foundation within three working days of completion of testing. The Engineer shall review the reports within three working days of the contractor's submittal. The report shall include:

- (i) Dates of shaft construction; shaft diameters; shaft lengths; shaft tip elevations; shaft cutoff elevations; type and size of drilling equipment; type of slurry if used; description of concrete mix; concrete placement method; shaft layout with shaft numbers.
- (ii) Dates of logging; brief description of the testing equipment; identification number of shafts logged; location of obstructions in PVC tubes; location of PVC couplers; calibration date, data and plot; summary of any unusual occurrences during testing; description and explanation of adjustments made to instrumentation or data (if any); identification of anomalies using the criteria described herein; delineation of affected tubes; vertical location and extent of anomalies; and estimated percentage of anomalous cross-sectional area.
- (iii) Plots of each individual tube with the data points and the values of $-2SD$ and $-3SD$. The plots shall indicate these points and values at all depths. Utilize symbols or line formats that permit lines corresponding to $-2SD$ and $-3SD$ to be distinguishable from data points.
- (iv) Appropriate discussion of the results in the text of the report shall be included.

In all inspection tubes adjacent to inspection tubes already identified as anomalous, if at least one data point within 2 feet vertically above or below the adjacent tube anomaly falls below the value for the $-3SD$, then the depth in that tube at which the anomaly is found is also anomalous, in addition to the depths identified in the previous two steps.

(C) Procedures in Case of Anomaly Detection:

If the testing indicates the presence of anomalous zones, as identified by either the CSL or GGL tests in the drilled shaft foundation, the contractor shall conduct three-dimensional tomographic surveys based on CSL results of the anomalies, at no additional cost to the Department. The results of the tomographic surveys shall be presented in the form of concrete velocity images in two-dimensions (2-D) between each pair of tubes, and in three-dimensions (3-D) for the anomalous zone.

After reviewing the results of the CSL, GGL, and the tomographic surveys, the Engineer will make an assessment of the possibility of defects, considering the impact on design and serviceability. The Engineer will either determine that no further action is required and the drilled shaft is accepted, or that further action by the contractor is required.

If the Engineer determines that further action is required to identify any possible defects in the anomalous zones, the Engineer will direct the contractor to proceed with an excavation investigation if the location of the anomaly can be reached using hand or mechanical excavation. If the Engineer determines that due to the location of the anomalies an excavation investigation is not feasible, the Engineer will direct the contractor to proceed with a concrete coring investigation or other investigative methods.

The selected investigation shall conform to the following requirements:

(1) Excavation Investigation:

The contractor shall submit an excavation investigation plan to the Engineer for review and approval in order to determine if any defects exist in the anomalous zones. The excavation investigation plan shall include equipment and methods to be used for excavation and concrete removal, the location of the excavation in the vicinity of the designated testing tubes, and provisions for replacement of earthen materials disturbed by excavation. If needed, the excavation investigation plan shall also include a shoring or confined space plan.

The excavation shall extend to a depth of 1-foot below the identified anomaly. After excavation and exposure of the anomaly, all visually deleterious or questionable material shall be removed. Mechanical tools shall be used to remove all inclusions or compromised concrete until competent concrete is encountered.

If the surface of the drilled shafts shows competent concrete, a small section in the center of the identified anomaly shall be removed to a minimum depth of one inch to demonstrate that the concrete surface is consistent with the concrete one inch into the drilled shaft surface.

If the visual inspection is inconclusive, a minimum 3 inch inside diameter core sample shall be obtained from the anomalous zone for either an additional visual inspection or a cylinder strength test. The depth of the core sample shall not exceed 10 feet below the

top of the drill shaft. The core shall extend to 12 inches beyond the anomalous zones or as directed by the Engineer.

If the visual inspection or the results of the compressive strength testing indicate the concrete is not acceptable, all of the unacceptable concrete shall be removed and replaced to the limits determined by the Engineer.

(2) Concrete Coring Investigation:

The contractor shall submit a concrete coring investigation plan to the Engineer for review and approval in order to determine if any defects exist in the anomalous zones. The concrete coring investigation plan shall include the following information:

- (a) Whether the contractor or a subcontractor will be performing the coring.
- (b) The contractor or the subcontractor's relative experience in successfully coring concrete drilled shafts on a minimum of 3 projects.
- (c) The concrete coring method and equipment to be used to drill and remove cores from the drilled shaft concrete.

A hole with a minimum size N-series core shall be advanced from the top of the shaft down to 12 inches below the anomaly. Anomalies detected at depth of less than 25 feet the contractor may elect to use common coring methods. For anomalies detected at depths below 25 feet, a wire-line coring method will be required starting from the top of the shaft to the location of the anomaly as described herein. Care should be taken when coring in order to use the core to assess the quality or compressive strength of the concrete. Cores shall be logged and labeled for use in assessing the required repairs.

Coring shall not begin until the concrete coring investigation plan has been approved by the Engineer.

The number, locations, diameter and depth of the core holes and lengths of individual core runs will be determined by the Engineer. The coring procedure shall avoid damage to the reinforcing steel.

(D) Procedures Post Anomaly Investigation:

After the contractor has performed the work in accordance with the approved investigation plan, and the results indicate that no defects exist in the anomalous zones, the contractor will be compensated for all the work performed under the approved investigation plan in accordance with the requirements specified in Subsection 104.02 of the specifications.

If the Engineer determines that defects exist in the anomalous zones, the contractor shall repair the defects per the requirements of Subsection 609-3.05(E) of the specifications.

(E) Procedures in Case of Defects:

A defect includes any voids, discontinuity, deficient concrete strength, inclusion or crack within the drilled shaft concrete that, in the opinion of the Engineer, requires further investigation, whether or not it is subsequently determined to represent an inadequate or unsafe condition for the completed drilled shaft.

Should the Engineer determine that the anomalous zones reveal defects; the contractor shall submit a plan to repair, replace, or supplement the defective work in a format conforming to the template example forms and mitigation plans found in FHWA-NHI 18-024 Drilled Shafts: Construction Procedures and Design Methods, Geotechnical Engineering Circular No. 10; Appendix F, Drilled Shaft Acceptance: Example Forms and Mitigation Plans and in a manner approved by the Engineer. After review and acceptance by the Engineer, the contractor shall perform the work specified in the approved plan at no additional cost to the Department. The work described herein shall be performed by a contractor or subcontractor that has performed a similar procedure on a minimum of 3 projects.

609-3.06 Reinforcing Steel, Cage, Construction, and Placement:

The reinforcing steel cage for the drilled shaft, consisting of longitudinal bars and spiral hooping or lateral ties shall be completely assembled and placed into the shaft as a unit. All reinforcing steel intersections shall be tied as specified herein. The reinforcing steel unit shall be placed in the shaft no sooner than two hours prior to the start of concreting operations, and shall be placed in accordance with the details shown on the plans.

If approved by the Engineer, bundling of vertical or horizontal reinforcing steel may be allowed if necessary to maintain a minimum bar spacing equal to five times the maximum nominal aggregate size of the concrete. Bundling of spiral reinforcing will not be allowed. A maximum of three bars may be bundled. Bundled vertical or horizontal steel shall be spaced uniformly. The contractor shall also make the necessary modifications, in accordance with the appropriate ACI specifications, to the splicing and tying details for the reinforcing steel, and submit these to the Engineer for approval along with the contractor's request for bundling of steel.

The reinforcing cage shall be adequately supported and anchored from the top to prevent movement from the required location during and for four hours after completion of concrete placement. If temporary casing is used, the reinforcing cage shall be supported prior to removing casing, and for four hours following removal of the casing. The rebar cage shall be kept plumb. The rebar cage shall not rest directly on the bottom of the excavation.

The minimum number of spacers shall be equal to the diameter of the drilled shaft, measured in feet, and rounded-up to the next whole integer, but not less than four. The spacers shall be approximately even spaced along the outside circumference of the reinforcing steel cage. Spacers shall be placed at a maximum vertical spacing of 15 feet. For all drilled shafts, unless otherwise shown on the plans for pedestrian bridges or light

pole and sign post foundations, the spacers shall provide for a minimum of 6 inches of concrete cover between the reinforcing steel and the excavation wall. Only smooth plastic roller spacers, with a minimum width of 1-1/2 inches approved by the Engineer will be allowed. Rollers shall be installed per the manufacturer's recommendations. In no case shall "dobies", other rectangular "blocks" or bent rebar tied to the reinforcing steel be used in the excavations.

If the shaft is lengthened by 24 inches or less under any circumstances, the reinforcement and test tubes shall not be extended.

If the shaft is lengthened by more than 24 inches per the direction of the Engineer, the reinforcement and test tubes shall be extended. The Engineer will provide details for the additional reinforcing. Such additional reinforcing will be paid for in accordance with the requirements of Subsection 109.04 of the specifications.

If the shaft is lengthened by more than 24 inches due to over-excavation, the reinforcement and test tubes shall be extended at no additional cost to the Department. The contractor shall submit details for the additional reinforcing to the Engineer for review and approval.

The contractor shall submit a written request to the Engineer for approval of any variation from the splices for reinforcing steel specified in the contract documents.

All reinforcing cages shall be fabricated and supported to avoid damage during the lifting and placing. Any temporary bracing and supports shall be removed prior to final placement. Equipment used for lifting reinforcing cages shall have adequate capacity and boom length to lift the cage clear of the ground. Reinforcing cages shall not be dragged while being moved. Reinforcing cages shall be placed with splices in the lowest possible position within the excavation.

609-3.07 Concrete Placement:

(A) General:

The contractor shall begin placement of concrete within 24 hours after the completion of the drilled shaft excavation. All concrete shall be placed in accordance with Section 601 of the specifications and as specified herein. If slurry excavation is used, concrete shall be placed the same day the excavation is completed.

Prior to concrete placement, the contractor shall make all necessary arrangements to assure the uninterrupted delivery of concrete so that all drilled shaft foundations will be constructed without cold joints.

The Elapsed time for slump loss refers to the duration between the initial mixing of concrete and the point at which the concrete's workability reaches the minimum slump requirements per Subsection 609-2.01(D).

The concrete placement duration refers to an estimate of the entire duration required to fill the drill shaft with concrete. The concrete placement duration shall begin at the initial mixing of the concrete and extend through to the completion of placement of the concrete in the drilled shaft, including removal of any temporary casing that may cause the concrete to flow into the space previously occupied by the casing and transit time.

The concrete placement duration, shall not exceed the elapsed time. If the concrete placement duration exceeds the elapsed time, the Engineer shall be promptly notified and the placement of the drill shaft shall continue to completion. Appropriate measures shall be taken to rectify the situation if needed. The Engineer may determine the need for further action or remedial work. Remedial measures and any additional work required shall be at no additional cost to the Department.

Tremie downpipes and pump pipes shall be made of steel; no aluminum shall be allowed. The inside diameter of the tremie pipe shall be at least 10 inches for all drilled shafts 4 feet or greater in diameter. The inside diameter of the pump pipe shall be at least 5 inches.

(B) Placement in Dry Excavations:

For placement in dry excavations, concrete may be placed by free fall except in fragile, non-cohesive soils where bottom scour is likely to occur, or where other caving conditions exist. The contractor shall prevent concrete from striking either the reinforcing cage or excavation side walls during free fall. Where free fall cannot be used, concrete shall be placed through a suitable clean downpipe.

Concrete vibration for the full height of the shaft is not necessary to achieve proper consolidation of the concrete. However, the shafts shall be vibrated in the top 10 feet. If temporary casing is used, the vibration shall occur after the casing has been removed.

To be considered a dry shaft, the maximum depth of water in the bottom of a drilled shaft excavation at the time of concrete placement shall be no more than 3 inches.

(C) Placement under Slurry or Water:

Concrete shall be placed by tremie methods or by pumping. Care shall be taken to ensure that all the fluid and suspended solids are expelled from the excavation during concrete placement. If concrete is placed by pumping, it shall be in accordance with the requirements of Subsection 601-3.03(C) of the specifications.

The contractor's installation plan shall demonstrate the procedures used to determine when the tremie pipe is to be raised during concrete placement. The procedure shall assure that the opening of the tremie pipe will be deeper than 5 feet below the surface of the concrete at all times for shaft diameters less than 6 feet, and deeper than 10 feet below the surface of the concrete for shaft diameters 6 feet and larger. A rapid raising or lowering of the tremie will not be permitted.

In order to prevent contamination of concrete placed initially, the lower end of the pump or tremie pipe shall be provided with either a valve, sealable cap, or a plug ("pig"). The discharge end shall be placed at the bottom of the excavation prior to commencement of concrete placement. If a plug is used, it shall be inserted at the top after the pipe has been set in place. Concrete shall then be placed by pushing the plug ahead, separating the concrete from the drilling fluid. Only when the tremie pipe is completely filled shall the open end be lifted off the bottom. The concrete flow that comes to the top of the shaft shall be displaced out of the shaft excavation in a continuous flow until clean, fresh concrete is expelled.

Slurry ejected during concrete placement may be reused provided that it is screened to remove gravel chips or other granular materials, and providing the slurry meets acceptance criteria. Slurry to be discarded shall be disposed of in a manner approved by the Engineer.

Concrete placed under slurry or water shall not be vibrated, except that the top 5 feet of the shaft shall be vibrated after the slurry or water and contaminated concrete have been totally expelled from the shaft. If temporary casing is used, the vibration shall occur after the casing has been removed.

609-3.08 Casing Removal:

During removal of any casing, a sufficient head of not less than 10 feet of fluid concrete in the tremie pipe shall be maintained above the level of concrete in the shaft (outside the tremie pipe), except at the top of the shaft. All contaminated concrete shall be removed from the shaft. Temporary casings shall be removed while the concrete slump is a minimum of 4 inches. The contractor shall maintain a minimum 5-foot head of concrete for shaft diameters of less than 6 feet, and a minimum 10-foot head of concrete for shaft diameters 6 feet or greater, in the casing as it is being removed. Movement of the casing by exerting upward pressure and tapping to facilitate extraction, or extraction with a vibratory hammer will be permitted. Casing extraction shall be at a slow, uniform rate with the force in-line with the shaft axis. The removal method shall prevent the intrusion of water, grout, and soil into the excavation, displacement of the reinforcing steel, and lifting of the concrete.

Due care shall be exercised to prevent upward movement of the shaft concrete and reinforcing steel during casing extraction. Upward movement beyond 1 inch, excluding movement due solely to tension on the top anchoring system, may indicate serious concrete separation or necking problems at the bottom of the casing. The contractor shall be responsible for corrective action which may include leaving the casing in place and compensating for the loss of frictional capacity in the resulting cased zone.

609-4 Method of Measurement:

Drilled shafts will be measured to the nearest linear foot from the top elevation of the shaft to the top elevation of the rock socket stratum, if required, or to the actual bottom of the shaft, as shown on the plans, or as determined in the field by the Engineer.

Rock sockets, when specified, will be measured to the nearest linear foot from the top elevation of the rock socket stratum to the actual bottom of the shaft, as shown on the plans, or as determined in the field by the Engineer.

Bell sections will be measured by the unit for each type of foundation constructed.

609-5 Basis of Payment:

The accepted quantities of drilled shafts and rock sockets, measured as provided above, will be paid for at the contract unit price per lineal foot for the diameter designated in the bidding schedule, complete in place. Price shall include excavation and disposal of spoils; drilling slurry; metal casing; steel reinforcing; Portland cement concrete; any needed forming, curing and finishing; exposing of concrete and the subsequent repair of foundations; furnishing all materials, equipment, and labor for splicing of reinforcing steel; all labor, conduit, and equipment for CSL and GGL; and all required testing and test reports.

No additional payment will be made for metal casing that is to remain in place.

No additional payment will be made for confirmation shafts, as the costs are considered to be included in the cost of constructing the drilled shaft foundation.

Payment for belled sections will be at the contract unit price for each type of foundation constructed, including excavation and concrete beyond the diameter of the shaft.

Obstructions will be defined as either material or objects of excessive dimension, which were not recorded in the geotechnical and foundation report, either in the text or boring logs. Payment for obstructions will be made in accordance with the provisions of Subsection 109.04 of the specifications.

(610PNT, 8/21/25)

SECTION 610 PAINTING:

610-3.02 (A)(2) Steam Cleaning: the first paragraph of the Standard Specifications is revised to read:

All dirt, grease, loose chalky paint, and other foreign material which has accumulated on previously painted surfaces shall be removed with a steam cleaning apparatus prior to all other phases of cleaning. It is not intended that sound paint be removed by this process. After steam cleaning, any paint which has become loose, curled, lifted, or loses its bond to the preceding coat or coats shall be removed to sound paint or metal surface by the contractor at no additional cost to the Department.

610-3.02 (A)(3) Hand Cleaning: of the Standard Specification is revised to read:

Manual or powered wire brushes, hand scraping tools, power grinders, or sandpaper shall be used to remove all dirt, loose rust, mill scale, and paint which is not firmly bonded to the surfaces.

610-3.05 (A)(1) General: the second paragraph of the Standard Specifications is revised to read:

All paints used shall be appropriately chosen from among the types described in Subsection 1002-2 of the specifications and shall conform to the requirements given therein.

610-3.05 (B) Concrete Surfaces: the first paragraph of the Standard Specifications is revised to read:

When painting is specified on the plans or in the special provisions, paint conforming to the requirements of Subsection 1002-2.03 of the specifications, shall be applied to the exposed concrete surfaces tabulated below, except that sidewalks, appurtenant curbs, down drains, and bridge deck surfaces shall be excluded.

(701LUMPSUM, 03/20/25)

SECTION 701 MAINTENANCE AND PROTECTION OF TRAFFIC:

701-1 Description: the first paragraph of the Standard Specifications is revised to read:

The work under this section shall consist of providing flagging services and pilot trucks, and furnishing, installing, maintaining, moving and removing barricades, warning signs, lights, signals, cones, temporary pavement markings and other traffic control devices to provide safe and efficient passage through and/or around the work and to protect workers in or adjacent to the work zone. The work shall be done in accordance with the requirements of Part 6 of the Manual on Uniform Traffic Control Devices (MUTCD) and the associated Arizona Department of Transportation supplement. When referred to herein, these documents will be referred to as MUTCD and associated ADOT Supplement.

701-1 Description: the third paragraph of the Standard Specifications is revised to read:

Any traffic control plan included in the project plans shall govern unless an alternate plan, acceptable to the Engineer, is submitted by the contractor. If no traffic control plan is provided or if the contractor desires to deviate from the provisions for maintaining traffic as described in this section, it shall submit to the Engineer for the approval of a proposed sequence of operations and a compatible method of maintaining traffic.

701-3.01 General: of the Standard Specifications is modified to add:

At the preconstruction conference the contractor shall submit a log of all existing signs within the limits of the construction zone. The Department will verify the accuracy of the sign log. Throughout the duration of this project, all existing traffic signs shall be maintained by the contractor in accordance with Subsection 701-3.11 of the specifications.

The contractor shall coordinate all traffic control work on this project with any adjoining or overlapping projects during the construction activities. This may include barricade placement necessary to provide a uniform traffic progress.

701-4.01 General: the first paragraph of the Standard Specifications is revised to read:

The Department will reimburse the contractor for the work of maintaining and protecting traffic on a lump sum basis except for the following Elements of Work:

- 1) Changeable Message Boards
- 2) Temporary Impact Attenuation Devices
- 3) Temporary Concrete Barrier
- 4) Specialty Signs
- 5) Law Enforcement Officers
- 6) DPS Officers
- 7) Civilian Flaggers
- 8) Pilot Vehicles
- 9) Truck-Mounted and Trailer-Mounted Attenuators

No additional measurement for payment to the contractor will be made for any Elements of Work other than those listed above.

701-4.01 General: the first sentence of the third paragraph of the Standard Specifications is revised to read:

Elements of Work except those reimbursed under the lump sum item will be measured for payment as follows:

701-4.03(E) Limitation of Measurement: the second paragraph of the Standard Specifications is revised to read:

For all items except those reimbursed under the lump sum item, measurement will be made after the initial installation and once weekly thereafter for items in continuous use and at any other times changes are made in the use of traffic control elements listed under Subsection 701-4.01(B) of the specifications. The contractor shall notify the Engineer when any changes are made in the use or location of traffic control elements.

701-4.04 Measurement of Work Elements: Sub-paragraphs (D), (G), (H), (J), (K), (L), and (N) of the Standard Specifications are hereby deleted.

701-5 Basis of Payment for Elements of Work (Complete-in-Place): of the Standard Specifications is modified to add:

All elements of work necessary for the work of maintaining and protecting traffic, excluding Elements of Work listed in Subsection 701-4.01 of the specifications, shall be reimbursed as a single, complete item of work, which price shall be considered full compensation for the work, complete in place, including furnishing, removing, setting up, relocating, taking down, maintaining, and storing the devices.

Lump sum traffic control will be paid according to the schedule shown in Table 701-5 of the specifications.

Table 701-5 Payment Schedule for Lump Sum Traffic Control	
Percent of Total Contract Amount Earned (Excluding Mobilization and Traffic Control)	Allowable Percent of Lump Sum Price for Maintenance and Protection of Traffic
5	20
25	40
50	60
75	80
90*	100
*Or substantial completion	

If the Engineer determines that the final contract amount earned will fall between 75 and 100 percent of the original contract amount, lump sum traffic control will be compensated at 100 percent once final acceptance is achieved.

In the event the Department revises the contract in accordance with Subsection 104.02 of the specifications due to a significant change in the character of work, and the revisions impact the Maintenance and Protection of Traffic, the lump sum price for Maintenance and Protection of Traffic will be adjusted as part of the contract revision under the relevant supplemental agreements.

No adjustments to the lump sum price for Maintenance and Protection of Traffic will be made for suspension of work for seasonal restrictions.

Revisions in the phasing of construction or maintenance of traffic control operations, requested by the contractor, may require traffic control to be installed in accordance with standards and/or designs other than those included in the plans. Such revisions or modifications to the traffic control plans shown in the contract shall be submitted by the contractor for approval by the Engineer. No additional payment will be made for the revised plans requested by the contractor.

701-5.03 Temporary Preformed Markings for Pavement: of the Standard Specifications is hereby deleted.

701-5.05 Obliterate Pavement Marking: of the Standard Specifications is hereby deleted.

701-5.06 Temporary Pavement Markers and Chip Seal Pavement Markers: of the Standard Specifications is hereby deleted.

701-5.07 Obliterate Pavement Markers: of the Standard Specifications is hereby deleted.

701-5.08 Temporary Delineators: of the Standard Specifications is hereby deleted.

701-5.10 Temporary Removal or Covering of Signs: of the Standard Specifications is hereby deleted.

701-6.01 Quantity Variances: of the Standard Specifications is revised to read:

Payment for variances in quantities of items listed in Subsection 701-4.01 of the specifications shall be in accordance with Subsection 104.02 of the specifications, except that, for decreases in quantities, Temporary Concrete Barrier (In-Use) will be considered as a major item.

701-6.03 Channelization Devices: of the Standard Specifications is hereby deleted.

701-6.04 Temporary Signs: of the Standard Specifications is hereby deleted.

701-6.06 Flashing-Arrow Panels, and Changeable Message Boards: the title and text of the Standard Specifications are revised to read:

701-6.06 Changeable Message Boards:

The accepted quantities of changeable message boards, measured as provided above, will be paid for at the unit bid price per day, which price shall be full compensation for the work, complete, including any grading and furnishing, operating, maintaining, and relocating the boards on the work site.

(701FLGSV, 03/20/25)

SECTION 701 MAINTENANCE AND PROTECTION OF TRAFFIC:

701-3.13 Flagging Services: of the Standard Specifications is revised to read:

Flagging services shall consist of 1) Department of Public Safety (DPS) officers with agency vehicles, 2) local enforcement officers with agency vehicles, 3) local enforcement officers without agency vehicles, and 4) civilian flaggers. Local enforcement officers and DPS officers include those who meet the requirements of a Peace Officer under ARS Title

38, generally including anyone certified by the Arizona Peace Officer and Training Board. If available, DPS officers shall be used on Interstate Highways and Urban Freeways. Local enforcement officers will include uniformed officers from local police, tribal police, sheriff departments, or any other agencies that meet the requirements of a Peace Officer under ARS Title 38, generally including anyone certified by the Arizona Peace Officer and Training Board. An agency vehicle is defined as an agency-issued vehicle that meets the requirements of ARS Title 28. If local enforcement officers do not have access to an agency vehicle, a personal vehicle may be used, but it shall have a make and model similar in appearance of an agency vehicle, and shall be equipped with front and rear-facing red and blue lights. The personal vehicle, when applicable, shall be presented to the Engineer for acceptability prior to its use on the project by local enforcement officers. Approval of the personal vehicle will be at the sole discretion of the Engineer.

The contractor shall be responsible to procure DPS officers, local enforcement officers, and civilian flaggers. The Engineer will determine the types and the number of hours of flaggers as needed based on the project needs. Quantities shown on the traffic control plans and/or bidding schedule are approximate only and prepared for bidding purposes. When procuring DPS officers and local enforcement officers, the contractor shall contact the relevant agency at least two days, excluding weekends and holidays, before flagging services will be required. Such contact must be made between the hours of 7:00 A.M. and 5:00 P.M. (M.S.T.).

In the event that local enforcement officers or DPS officers are temporarily unable to provide flagging services, the contractor shall ensure that traffic control is maintained and all personnel are protected, either by providing civilian flaggers or through other means as approved by the Engineer. No adjustments to the contract will be allowed for any delays resulting from the unavailability of local enforcement officers or DPS officers.

Local enforcement and DPS officers shall not work more than 12 consecutive hour work shift without the permission of the State Construction Engineer unless an emergency situation exists which, in the opinion of the Engineer, requires that the officer remain in the capacity of a flagger.

The contractor shall furnish verification to the Engineer that all civilian flaggers have completed a recognized training and certification program. Flaggers certified by the American Traffic Safety Services Association (A.T.S.S.A.) or by the National Safety Council will be acceptable. Certification through other programs offering flagger training may be allowed upon by the State Construction Engineer's approval. Flagger certification must be current and updated at least once every four years.

701-6.07 Pilot Services, and Flagging Services: of the Standard Specifications is revised to read:

The accepted quantities of pilot vehicles, measured as provided above, will be paid for at the unit bid price for pilot vehicles with driver, which price shall be full compensation for the work, complete in place including, but not limited to, furnishing and maintaining the

vehicle and furnishing the driver. Any hour worked after the eight hour regular time will be considered straight-time and will not be paid as overtime pay.

The accepted quantities of flagging services provided by the local enforcement officers (with agency vehicle), DPS officers, and civilian flaggers, measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work, complete in place, including the agency vehicle. Any hour worked after the eight hour regular time will be considered straight-time and will not be paid as overtime pay.

The accepted quantities of flagging services provided by the local enforcement officers without an agency vehicle, measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work complete in place. Any hour worked after the eight hour regular time will be considered straight-time and will not be paid as overtime pay. No measurement or payment will be paid for the vehicle, regardless of the type of vehicle is an agency vehicle or not, the cost being considered as included in the price of the contract item.

In addition, the Department has estimated an additional two hours of travel time per officer per day in the quantities shown in the bid schedule. However, if more than two hours of travel time per day is required, such additional hours will be compensated in accordance with the requirements of Subsection 104.02 of the specifications if approved by the State Construction Engineer. Travel time is considered to be supplementary to the hours worked by the officer during a work shift.

(704TPMF, 5/21/26)

SECTION 704 THERMOPLASTIC PAVEMENT MARKINGS:

704-1 Description: of the Standard Specifications is revised to read:

(A) General:

The work under this section shall consist of cleaning and preparing pavement surfaces and furnishing and applying either white or yellow thermoplastic reflectorized pavement markings using extrusion or ribbon dispensing devices of the required shape and thickness to the prepared pavement surface at the locations and in accordance with the details shown on the project plans, the manufacturer's specifications, and the requirements of these specifications.

(B) Profile Thermoplastic Pavement Markings:

When constrained by pavement thickness, width, condition, or structural section, profile thermoplastic pavement markings may be used as centerline and edge line rumble stripes by applying yellow and white thermoplastic lines with bumps at specified widths, thicknesses, and configurations. The thermoplastic formulations used for profile

thermoplastic rumble stripes shall be specifically designed as extruded profile thermoplastic reflectorized marking systems.

704-2.02(A) General: of the Standard Specifications is revised to read:

The thermoplastic composition shall conform to the following requirements:

Component	Percent by Weight		Profile Thermoplastic	
	White	Yellow	White	Yellow
Binder (Min.) (Note 1)	20	20	20	20
Titanium dioxide (Min.)	10	1.75	10	--
Yellow Lead- Free Pigment (Min.)	----	1.5	---	5
Reflective glass inter-mix beads (Min.) (Note 1)	20/ M 247 T 1 & 20/ M 247 T 3	20/ M 247 T 1 & 20/ M 247 T 3	30	40
Calcium carbonate or equivalent filler (Max.)	30	36.75	31	41
Note: As described in 704 - 2. 05 (C), for precertification purposes, thermoplastic material will be tested for binder content and glass bead content according to ASTM D4797.				

704-2.02(C) Filler: of the Standard Specifications is revised to read:

The filler shall be a white calcium carbonate or equivalent filler.

704-2.03(C) Retroreflectance: of the Standard Specifications is revised to read:

Profile thermoplastic material used as rumble stripes shall have a minimum retroreflectance value of 200 millicandelas using 30-meter geometry with an 88.76° entrance angle and 1.05° observation angle as measured by ASTM E1710. standard method 30 days after application to the roadway surface.

704-2.03(F) Impact Resistance: of the Standard Specifications is modified to add:

For profile thermoplastic marking as rumble stripes, the impact resistance requires a minimum of 10-inch based on specifications. The test involves applying heat (425 degrees F for 240 mins) to samples and testing via ASTM D-256 method A (un-notched).

704-2.03(H) Abrasion Resistance: the second paragraph of the Standard Specifications is revised to read:

The maximum loss of thermoplastic material shall be from 0.4 to 0.5 grams.

704-2.03(M) Flash Point: of the Standard Specifications is revised to read:

The thermoplastic material shall have a flash point not less than 475 degrees F, or manufacturer's specification, when tested in accordance with the requirements of ASTM D92.

704-2.03(O) Primer-Sealer: of the Standard Specifications is modified to add:

Material provided for profile thermoplastic marking used as rumble stripes and/or re-striping shall not require the application of separate primer sealer on AR- ACFC surfaces prior to application of the thermoplastic material. The material shall be fully compatible for use on an AR-ACFC surface which is less than 60 days old.

It is the responsibility of the contractor and/or the Engineer to determine if the substrate where the installation will occur warrants the need of a primer.

704-2.04 Physical Requirements for Glass Beads: the first paragraph of the Standard Specifications is revised to read:

Inter-mix and drop-on reflective glass beads shall conform to the requirements of Subsection 708- 2. 02 of the specifications and manufacturer's requirements, except as noted herein.

(705PVMRK, 09/21/23)

SECTION 705 PREFORMED PLASTIC PAVEMENT MARKING: the title and text of the Standard Specifications are revised to read:

SECTION 705 PREFORMED POLYMER PAVEMENT MARKING:

705-1 Description:

(A) General:

The work under this section shall consist of furnishing all materials, preparing the pavement surface and applying preformed reflectorized pavement marking tape, or preformed thermoplastic longitudinal edge lines, skip lines, stop lines, yield lines cross walks, legends and symbols to the pavement in accordance with the details shown on the project plans and the requirements of the specifications.

All markings shall be reflectorized with glass beads or other retroreflective particles uniformly distributed throughout the entire cross section and bonded to the top surface of the material. All markings shall comply with the retroreflectance requirements of Subsection 705-2.05 of the specifications. When glass beads are used to reflectorize markings, the glass bead properties shall also comply with Subsection 705-2.06 of the specifications.

Certificates of Compliance conforming to the requirements of Subsection 106.05 of the specifications shall be submitted.

Preformed pavement marking tape or preformed thermoplastic longitudinal edge lines, skip lines, stop lines, yield lines, cross walks, legends, and symbols shall be limited to the following applications unless otherwise specified in the contract documents:

A list of approved manufacturers and distributors of Type I, II, III, and IV preformed pavement marking materials is shown on the Department's Approved Product Lists (APL). The most recent version is available on the Department's website from the ADOT Research Center, through its Product Evaluation Program.

(B) Preformed Pavement Markings - Type I (Permanent):

Type I shall be a general purpose high durability retroreflective, pliant, polymer layer for preformed long line and short line striping, symbols, and legends to be used for final permanent pavement markings. Type I shall be capable of performing as specified herein when subjected to high traffic volumes and severe wear conditions such as repeated shear action from crossover or encroachment on edge and channelization lines, starting, stopping, and turning movements.

(C) Preformed Pavement Markings - Type II (Temporary – Removable):

Type II shall be a removable preformed retroreflective pavement marking capable of performing as temporary pavement markings for long line and short line striping, symbols, and legends for the duration of a normal construction season. It shall be a nonmetallic mixture of durable materials and shall be capable of being removed intact or in large pieces either manually or with a recommended roll up device. Type II shall be used on finished pavement surfaces where traffic control or channelization through the construction zone is temporary requiring removal prior to final pavement markings.

(D) Preformed Pavement Markings - Type III (Temporary – Nonremovable):

Type III shall be a nonremovable preformed retroreflective layer on a conformable metallic backing capable of performing as temporary long line pavement markings for the duration of a normal construction season. Type III shall be used in construction zones where removal is unnecessary due to placement of future paving courses or where pavement will be removed, obliterated or abandoned at the completion of the project.

(E) Preformed Thermoplastic Pavement Markings - Type IV (Permanent):

Type IV shall be a high durability, retroreflective, pliant, preformed thermoplastic product to be used for final permanent symbols, legends, and short line (transverse) stripes. Type

IV shall be capable of performing as specified herein when subjected to high traffic volumes and severe wear conditions.

705-2 Materials:

705-2.01 Preformed Pavement Markings - Type I (Permanent):

(A) General:

Type I preformed pavement marking material shall consist of a prefabricated white or yellow layer of specified thickness and width that shall be capable of being affixed to Portland Cement Concrete or non-bleeding bituminous pavements per the manufacturer's requirements, either on the pavement surface or, when specified on the plans, inlaid into a cutout groove. The preformed polymer layer shall be weather resistant and through normal traffic wear shall show no appreciable fading, lifting, loss of skid resistance, or shrinkage or significant tearing, roll back, or other signs of poor adhesion throughout the useful life of the marking.

The polymer layer without adhesive shall be a minimum of 0.065 inch thick. The polymer layer as supplied shall be of good appearance, free of cracks and discolorations, and the edges shall be clean-cut and well-defined. The polymer layer shall have a precoated, factory-applied pressure sensitive adhesive backing. A surface preparation primer shall also be applied if recommended by the manufacturer. Whether the adhesive is precoated or supplied separately, the adhesive shall allow the polymer layer to be repositioned on the pavement surface to which it is applied before permanently fixing it in its final position with a downward pressure.

When an Oreo type contrast pavement marking material is to be used as shown on the plans, the entire length of the pavement marking shall have 2 inch-wide borders on each side across the width of the reflective base pavement marking (white, yellow or other color). These borders shall be non-reflective and black in color. The contrast pavement marking material, including the borders, shall conform to the requirements for durability, skid resistance, thickness, and adhesion specified in Subsection 705-2.01(C) of the specifications.

When a Lead-lag type contrast pavement marking material is to be used as shown on the plans, Lead-lag pavement markings shall be used only on Portland Cement Concrete pavement surfaces, or as directed by the Engineer.

All white and yellow Type I pavement markings shall be warranted by the manufacturer to retain color and adherence to the pavement, and to retain a minimum retroreflectance of 100 millicandelas/m²/lux for a minimum of two years for symbols, legends, and transverse pavement markings, and six years for longitudinal pavement markings. The warranty period shall begin after all pavement markings are installed and accepted by the Department. Failure to meet the specified retroreflectance on at least 90 percent of the longitudinal pavement marking in any 1000-foot segment, or 90 percent of a legend, symbol, or transverse pavement marking shall be considered a complete failure of that

marking. The warranty shall state that the manufacturer will provide new material to replace defective Type I markings at no additional cost to the Department. The warranty shall also state that the replacement material shall conform to these specifications. The contractor shall submit a copy of the manufacturer's warranty to the Engineer along with the certificate of compliance required in Subsection 705-1(A) of the specifications.

(B) Composition Requirements:

The preformed pavement marking material shall consist of the following components:

Minimum Percent by Weight	
Resins and Plasticizers	20
Reflective Glass Beads*	20*
*Applicable only when glass beads are used to reflectorize Type I markings.	

(C) Physical Requirements:

(1) Color:

The pigments shall be selected and blended to provide a white or yellow marking layer which conforms to standard highway colors, when tested according to ASTM D6628, throughout the expected life of the layer.

(2) Bend Test:

The polymer layer shall be sufficiently flexible so that at a temperature of 78 to 82 degrees F an unmounted piece of material (without adhesive and paper backing), 3 by 6 inches in size, may be bent over a 1 inch mandrel until the end faces are parallel and 1 inch apart without showing any fracture lines in the uppermost surface.

(3) Tensile Strength:

The polymer layer (without adhesive or paper backing) shall have a minimum tensile strength of 40 pounds per square inch when a specimen 6 inches long by 1 inch wide is tested in accordance with the requirements of ASTM D638. The rate of pull of the test shall be 0.25 of an inch per minute. The test shall be conducted at a temperature between 70 and 80 degrees F. The elongation shall be no greater than 75 percent.

(4) Pull Test:

A 6-inch long by 1-inch wide section of the polymer layer (without adhesive and paper backing) shall support a dead load weight of 4 pounds for not less than five minutes at a temperature between 70 and 80 degrees F.

(5) Abrasion Resistance:

The polymer layer shall have a maximum loss in weight of 0.25 grams in 500 revolutions when abraded according to ASTM D4060.

(6) Skid Resistance:

The surface of the material shall provide a minimum resistance value of 45 British Pendulum Number (BPN) when tested according to ASTM E303.

705-2.02 Preformed Pavement Markings - Type II (Temporary - Removable):

Type II preformed pavement markings shall be a nonmetallic mixture of conformable materials and pigments intended for marking applications where removability is required. The marking material shall be white or yellow retroreflective layer conforming to standard highway colors.

The markings shall be precoated with a pressure sensitive adhesive capable of adhering to roadway surfaces under climatic and traffic conditions normally encountered in the construction work zone when applied in accordance with the manufacturer's instructions and without the use of heat, solvents or other additional adhesives. Newly applied markings shall be capable of being immediately exposed to traffic without pickup or distortion by vehicles. The markings shall be weather resistant and through normal traffic wear shall show no appreciable fading, lifting, shrinkage, tearing, and loss of skid resistance, roll back or other signs of poor adhesion throughout the useful life of the marking.

Temporary pavement markings shall be removable from asphalt and concrete pavement intact or in large sections by following the manufacturer's instructions. It shall be removable, either manually or with a rollup device, at pavement temperatures above 40 degrees F without the use of heat, solvents, grinding or sand blasting. Visible adhesive residue remaining after removal of temporary pavement markings shall be easily removable without damaging or scarring the pavement surface and without the use of solvents or grinding.

Pavement marking material without adhesive shall be a minimum of 0.045 inches thick. When supplied, the material shall be of good appearance, free from cracks, and edges shall be true, straight, and unbroken.

705-2.03 Preformed Pavement Markings - Type III (Temporary – Nonremovable):

Type III preformed pavement markings shall be a retroreflective layer on a conformable metallic backing intended for marking applications where removal is not a requirement. The marking material shall be white or yellow conforming to standard highway colors.

The markings shall be precoated with a pressure sensitive adhesive capable of adhering to roadway surfaces under climatic and traffic conditions normally encountered in the construction work zone when applied in accordance with the manufacturer's instructions and without the use of heat, solvents or other additional adhesives. Newly applied markings shall be capable of being immediately exposed to traffic without pickup or distortion by vehicles. The markings shall be weather resistant and through normal traffic wear shall show no appreciable fading, lifting, shrinkage, tearing, loss of skid resistance, roll back or other signs of poor adhesion throughout the useful life of the marking.

705-2.04 Preformed Thermoplastic Pavement Markings - Type IV (Permanent):

(A) General:

Preformed thermoplastic pavement markings shall be a resilient white, yellow, or other color thermoplastic material, composed of an ester-modified resin in conjunction with pigments, binders and glass beads that have been factory-produced as a finished product. The markings shall be resistant to the detrimental effects of motor fuels, lubricants, hydraulic fluids, and antifreeze. Preformed thermoplastic pavement markings shall be weather resistant and, through normal traffic wear, shall show no appreciable fading, lifting, or shrinkage or significant tearing, roll back, loss of skid resistance, or other signs of poor adhesion throughout the useful life of the marking.

The markings shall be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The marking shall have resealing characteristics, such that it is capable of fusing with itself or previously applied, worn thermoplastic pavement markings when heated with a common propane torch. The material shall not be brittle and must be sufficiently cohesive and flexible for one person to carry without danger of fracturing the material prior to application. Surface preparation primer shall also be applied if recommended by the manufacturer.

The material shall be supplied at a minimum thickness of 0.090 inches (90 mils). Symbols, legends, and short lines shall be capable of being affixed to bituminous and Portland cement concrete pavements by the use of the heat of a common propane torch. Any preheating requirements shall also be met by the use of the heat of a common propane torch and as recommended by the manufacturer.

Type IV preformed thermoplastic markings shall be suitable for use for one year after the date of manufacture when stored in accordance with the manufacturer's recommendation. Type IV marking materials supplied to the jobsite shall clearly display the date of manufacture, and shall be applied within one year of this date.

(B) Composition Requirements:

The preformed thermoplastic pavement marking material shall consist of the following components:

Component	Percent by Weight	
	White	Yellow
Binder (Min.)	18	18
Titanium dioxide (Min.)	10	-----
Yellow Lead-Free Pigment (Min.)	-----	1.5
Reflective glass intermix beads	30 – 45	30 – 45

(C) Physical Requirements:

(1) Color:

The pigments shall be selected and blended to provide a white or yellow preformed marking that conforms to standard highway colors, when tested according ASTM D6628, throughout the expected life of the preformed marking.

(2) Bend Test:

The preformed thermoplastic shall have flexibility at 50 degrees F such that when a specimen, measuring 6 inches long by 1 inch wide, is bent through an arc of 90 degrees at a uniform rate in 10 seconds (9 degrees per second) over a 1 inch mandrel, no cracking occurs in the test specimen. The specimen shall be conditioned prior to testing at 50 ± 2 degrees F for a minimum of four hours. At least two specimens tested shall meet the flexibility requirements at 50 degrees F for a passing result.

(3) Tensile Strength:

The preformed thermoplastic material shall have a minimum tensile strength of 150 pounds per square inch when tested in accordance with the requirements of ASTM D638. The rate of pull of the test shall be 10 to 12 inches per minute. The test shall be conducted at a temperature between 70 and 80 degrees F. The elongation shall be no greater than 20 percent.

(4) Bond Test:

The material shall exhibit a bond strength to Portland Cement Concrete pavement equal to or exceeding 180 pounds per square inch when tested at 73 ± 3 degrees F in accordance with the ASTM D4796.

(5) Abrasion Resistance:

The plastic film shall have a maximum loss in weight of 0.25 grams in 500 revolutions when abraded according to ASTM D4060.

(6) Skid Resistance:

The surface of the material shall provide a minimum resistance value of 45 BPN when tested according to ASTM E303.

(7) Impact Resistance:

When tested in accordance with ASTM D256, Method A, a 1 inch by 1 inch by 6 inch sample shall not break when an impact energy of at least 1.0 joule is applied. The test specimen shall be prepared in accordance with ASTM D4960 and shall not be notched.

705-2.05 Retroreflectance:

All white and yellow pavement marking materials shall have the following minimum retroreflectance values when measured by the Department, using an LTL-X Delta Retrometer or similar device, within 30 days after application to the roadway surface:

Table 1	
Long Line Markings	Retroreflectance (millicandelas/m²/lux)
White	500
Yellow	300

Table 2	
Symbols, Legends, Short Lines	Retroreflectance (millicandelas/m²/lux)
White	350
Yellow	200

For sections determined to be deficient in retroreflectivity, the pavement markings shall be removed in a manner approved by the Engineer, and new markings shall be re-applied in accordance with the manufacturer's recommendations. For long lines, the limits of reapplication shall start from the location of a passing test, across the failure area(s), to the next passing test location. The minimum length of reapplication shall be 0.4 miles. For symbols, legends and short lines, the entire defective unit shall be reappplied.

705-2.06 Glass Bead Properties:

(A) General Requirements:

When glass beads are used to achieve retroreflectivity, the beads shall be manufactured from glass of a composition designed to be highly resistant to traffic wear and to the effects of weathering.

(B) Physical Requirements:

(1) Roundness:

The roundness of the glass beads shall be determined in accordance with the requirements of ASTM D1155. A minimum of 75 percent of the beads shall be waterwhite true spheres free from imperfections of all types including air inclusions, film, scratches, clusters, and surface scoring.

(2) Refractive Index:

The glass beads used with the preformed pavement marking material shall have a minimum refractive index of 1.50 when tested by a liquid immersion method (Becke Line Method or equivalent, as specified in ASTM C1648) at a temperature of 25 ± 5 °C.

(3) Gradation:

The gradation of the glass beads shall conform to AASHTO M 247 Type 1 and Type 3.

(4) Heavy Metal Concentration:

Heavy metal concentration in glass beads shall be as specified in the following table, when tested by an independent laboratory, approved by the Engineer, using EPA Method 3052 and EPA Method 6010B. A Certificate of Analysis conforming to Subsection 106.05 of the specifications shall be furnished to the Engineer prior to use.

Heavy Metal	Concentration
Arsenic	< 75 ppm
Antimony	< 75 ppm
Lead	< 100 ppm

705-3 Construction Requirements:

The contractor shall install preformed pavement markings at the locations shown on the project plans, as specified in the Special Provisions, or as directed by the Engineer. Preformed marking tape shall be applied manually or with the tape applicators approved by the tape manufacturer. All markings shall be applied in accordance with the manufacturer's recommendations and as specified herein. Preformed pavement markings shall not be applied over other markings or old paint unless specified in the project plans, directed by the Engineer, or allowed by the manufacturer and approved by the Engineer prior to application.

Preformed pavement markings shall be applied to surfaces that are free of moisture and thoroughly cleaned of loose, foreign or other material that may adversely affect bonding. The contractor shall remove all dirt, dust, grease, oil or other detrimental material from

the road surface. The method of cleaning the surface is subject to approval by the Engineer and shall include sweeping and the use of high pressure air spray.

When preformed markings are to be applied to new Portland Cement Concrete pavement, any curing compound present shall be removed by means of a high pressure water jet or sandblasting, followed by sweeping and high pressure air spray. The curing compound shall be removed at least 2 inches beyond the entire perimeter of each marking to be installed. In addition, a manufacturer approved primer-sealer shall be applied to both old and new Portland cement concrete pavement prior to application of preformed markings. The primer-sealer shall be applied at the manufacturer's recommended application rates prior to placing the preformed marking. The primer-sealer shall be allowed to set up for the manufacturer's specified cure or evaporation time, and shall be free of solvent and water when the preformed marking is applied.

Preformed pavement markings shall be applied immediately after the surface has been prepared or as soon as possible after placement and completion of new pavement. When Type I, II, or III markings are used, the road surface temperature, at the time of application, shall not be less than 60 degrees F and rising and the pavement surface shall be absolutely dry. For Type III temporary markings, the weather conditions noted above may be waived, at the Engineer's discretion, to obtain a traffic stripe prior to allowing traffic to traverse the roadway. Type II markings shall not be installed within 24 hours of any rainfall. In addition, if the possibility of rain is anticipated, as predicted by the National Weather Service, during the time required by the Engineer for installation of Type II markings, the contractor shall apply primer-sealer prior to application of the marking, regardless of the type or age of pavement surface. Type IV markings shall be applied in accordance with the manufacturer's recommendations for minimum temperature.

Despite the specified or recommended minimum surface temperature and surface condition, the Engineer may, at any time, require that the work cease or that the work day be reduced in the event that weather conditions, either existing or expected, are anticipated to have an adverse effect upon the preformed pavement marking.

The contractor shall use butt splices only and shall not overlap the marking material. All markings shall be thoroughly tamped with approved mechanical tampers.

For preformed thermoplastic pavement markings requiring heat application on asphaltic concrete surfaces, the materials shall be applied using the propane torch method recommended by the manufacturer.

The contractor shall immediately correct all misalignments when so ordered by the Engineer. The misaligned portions shall be removed and reinstalled in accordance with these specifications. All areas marked with preformed pavement markings shall be ready for traffic immediately after application.

Type II or Type III temporary pavement markings shall be maintained and replaced when necessary by the contractor until they are covered with the next overlay course or are removed because they are no longer applicable. The temporary pavement markings shall be removed immediately when no longer needed for traffic control or when the temporary pavement markings will be in conflict with the succeeding traffic pattern. This removal includes the removal of pronounced markings caused by the adhesive across lanes, transitions or tapers. Removable temporary marking material shall not be burned or ground off. Preformed pavement markings shall be removed by methods recommended by the manufacturer and approved by the Engineer. Residual adhesive, ghosting, shadows or pavement scarring which might cause confusion during darkness or adverse weather conditions shall be removed immediately by the contractor when so ordered by the Engineer.

When Type I permanent pavement markings for final symbols, legends, and short lines are specified, Type I or Type IV pavement markings may be used, at the option of the contractor.

For the contrast pavement markings, the lead (white) reflective pavement markings shall be placed in 10-foot sections followed by 10-foot lag (non-reflective black) pavement markings. Lead-lag pavement markings shall be aligned longitudinally. Maximum gaps between the white and black reflective pavement markings shall not exceed 1 inch. All raised pavement markers should be placed midway between two white skip lines. Lead-lag pavement markings may be used only on the main line for lane line markings.

When the plans require Type I preformed long line or short line pavement markings to be placed in a groove, the contractor shall construct the sawcut groove in accordance with the requirements of the special provisions.

The application of preformed pavement markings shall be in accordance with the recommendations of the manufacturer of the material and these specifications. After application the pavement markings shall be immediately ready for exposure to traffic.

705-4 Method of Measurement:

Measurement of preformed pavement marking long lines and short lines will be made by the linear foot along the centerline of the pavement line and will be based on a 4-inch wide stripe. Measurement for pavement lines with a plan width greater or less than the basic 4 inches will be made by the following method:

$$\frac{\text{Plan Width of Striping (inches)} \times \text{Linear Feet}}{4 \text{ (inches)}}$$

If Oreo type contrast pavement markings are used, the Plan Width of Striping (inches) will be the width of the reflective base pavement marking (white, yellow or other color) plus the 2 inch-wide borders on each side across the width of the reflective base pavement

marking. Measurement for Oreo type pavement markings will be based on the combined width of the black and white markings.

Preformed pavement marking symbols, such as diamonds; single, double, or triple arrows; or freeway arrows, will be measured by each unit applied, regardless of configuration. Each pavement symbol, as shown on the plans, will be considered a unit.

Preformed pavement marking legends, defined as a complete letter grouping such as "SCHOOL," "XING," "STOP," "RR," or "ONLY", will be measured by each unit applied. Each pavement legend, as shown on the plans, will be considered a unit.

Preformed pavement route-to-route freeway legends, defined as complete number and directional letter groupings, will be measured by each unit applied. Each complete route-to-route freeway legend, as shown on the plans, will be considered a unit.

Removal of curing compound from new Portland cement concrete pavement and the application of primer-sealer shall each be measured by the linear foot for striping lines regardless of width, or unit each for symbols and legends, and in accordance with the items of work established in the bid schedule.

705-5 Basis of Payment:

The accepted quantities of preformed pavement markings, measured as provided above, will be paid for at the contract unit price for the type specified in the bidding schedule, which price shall be full compensation for the item, complete in place, including necessary pavement cleaning, primer, removal of Type II temporary markings, and maintaining Types II and III temporary markings in construction work zones.

No additional payment will be made for placement of Type I long line and short line pavement markings in sawcut grooves, the costs being considered as included in the contract price for the marking. Measurement and payment for sawcut grooves shall be in accordance with the special provisions.

Payment will be made for Type I and Type IV permanent pavement symbols, legends and short lines at the contract unit price, regardless of whether Type I or Type IV pavement markings are used.

The accepted quantities for removal of curing compound from new Portland cement concrete pavement and the application of primer-sealer, measured as provided above, will be paid for at the respective contract unit prices, under the items of work established in the bid schedule.

When Type II or III temporary preformed pavement markings are required for maintaining traffic through a construction work zone and are approved for use by the Engineer, but are not listed as pay items in the bidding schedule, they will be paid for in accordance with the provisions of Subsection 109.04 of the specifications.

Additional payment will be made for replacement of Type II or Type III temporary preformed pavement markings when the contractor is required by the Engineer to install marking materials on distressed pavements or during adverse weather conditions and subsequent failure occurs. Distressed pavement conditions are defined as alligator cracking, bleeding, or spalling of bituminous pavements and spalling of PCC pavements. Adverse weather conditions are defined as any occurrence where application is required at pavement temperatures less than 60 degrees F or when precipitation occurs within 24 hours before or after application. The Department will pay for the replacement, where failures occur, at the contract unit price for the initial occurrence.

In the event a second failure occurs when markings have been reapplied on distressed pavements or under weather conditions described above, the Engineer shall determine if conditions require primer, alternate methods of marking, or reapplication of preformed markings. Preformed markings will be paid for at the contract unit price. Primers or other methods of markings deemed necessary by the Engineer to remedy second failures will be paid for in accordance with the provisions of Subsection 109.04 of the specifications.

(708 PTVCT, 07/17/25)

SECTION 708 WATERBORNE PAVEMENT MARKINGS:

708-2.01(D) Quantitative Requirements of Mixed Paints: the viscosity row of the Table 708-1 of the Standard Specifications is revised to read:

Table 708-1		
	White	Yellow
Viscosity: Krebs Units at $77 \pm 1^\circ$ F, ASTM D562	70 - 95	70 - 95

ITEM 7320050 – ELECTRICAL CONDUIT (2") (PVC)
ITEM 7320060 – ELECTRICAL CONDUIT (2 ½") (PVC)
ITEM 7320290 – ELECTRICAL CONDUIT
ITEM 7320291 – ELECTRICAL CONDUIT (2-2") (PVC) (TRENCHED)
ITEM 7320292 – ELECTRICAL CONDUIT (2-2") (RIGID METAL)
ITEM 7320298 – ELECTRICAL CONDUIT (2-1" INNERDUCT)

Description:

The work under these items shall consist of furnishing and installing conduit, including attaching rigid metal conduit to bridge structures, innerduct, and trenching in accordance with the details shown on the plans and in accordance with these specifications.

Materials:

Unless otherwise shown on the plans, conduit bends, fittings, expansion couplings, sweeps, and other accessories shall be of the same material as the conduit.

Conduit elbows for new or future fiber optic cable shall have a minimum radius of 36 inches. Other conduit elbows shall have a minimum radius of 24 inches.

Polyvinyl Chloride (PVC) conduit shall conform to Subsection 732-2.02 of the specifications. Intermediate Metal Conduit (IMC) is not allowed for ITS applications.

Conduit runs which enter pole and cabinet foundations shall consist of PVC.

(A) PVC Conduit:

PVC conduit and materials shall be in accordance with Subsection 732-2.02, of the specifications.

Should the contractor choose to substitute HDPE conduit in place of the installation of direct buried PVC conduit, the HDPE conduit must meet the specifications for HDPE conduit listed below, and the contractor shall provide original data sheets or a Certification of Compliance letter from the HDPE conduit manufacturer to the Engineer stating that the product meets these Special Provisions and obtain the written approval from the Engineer prior to procuring and installing the HDPE conduit. Direct buried HDPE conduit shall be paid at the unit bid price of direct buried PVC conduit.

Unless otherwise shown on the project plans; bends, conduit fittings, expansion joints, 36-inch sweeps and other conduit accessories not specifically mentioned shall be manufactured from a material similar to the connecting conduit.

(B) HDPE Conduit:

HDPE conduit shall have a minimum rating of SDR 11. It shall have a cell classification of PE334470C (for black conduit) and PE334470E (for colored conduit) per ASTM 3350: Standard Specification for Polyethylene Pipe and Fittings Materials.

The polyethylene base resin shall meet the density requirement and melt index properties described herein. The density shall not be less than 0.940 and not more than 0.955 g/CM³ in accordance with ASTM D 1505: Standard Test Method for Density of Plastics by the Density-Gradient Technique. The range for the melt index shall be between 0.05 to 0.5g/10 minutes in accordance with ASTM D 1238: Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer. The HDPE conduit shall have a minimum Flexural Modulus, of 80,000 psi, per ASTM D 790 and a minimum tensile strength at yield of 3,000 psi, per ASTM D-638.

Additives to the base resin shall be included to provide heat stabilization, oxidation prevention and ultraviolet (UV) protection. It shall utilize carbon black in the range of 2 to 3 percent for long term protection against UV degradation. The minimum protection period shall be one year from date of manufacture in unprotected, outdoor storage in accordance with ASTM D 1603: Standard Test Method for Carbon Black in Olefin Plastics.

HDPE conduit and fittings shall comply with ASTM D 2241 and ASTM-F2160-01.

The contractor shall provide the Engineer with manufacturer's certification of analysis and compliance showing that HDPE conduit meets these specifications.

(C) Rigid Metal Conduit:

Rigid metal conduit and materials shall be in accordance with Section 732-2.02, of the ADOT Standard Specifications

(D) Innerduct:

When called for in the project plans, innerduct shall be corrugated HDPE. The number of innerducts per conduit and sizes shall be as called for in the project plans. Innerduct color shall be orange from the factory unless otherwise specified. The innerduct shall be furnished in one continuous length with no factory installed splices or couplings, and of lengths sufficient to complete runs between pull boxes without splicing.

(E) Conduit Warning Tape:

Conduit warning tape shall be a minimum four-mil composite reinforced thermoplastic, with a minimum width of 3 inches and minimum length of 5 feet. Warning tape shall be highly resistant to alkalis, acids, and other destructive agents found in the soil.

Warning tape shall have a continuous printed message warning of the location of underground conduits. The message shall be in permanent ink specifically formulated for prolonged underground use and shall bear the words, "CAUTION - ELECTRIC LINE BURIED BELOW" or "CAUTION – COMMUNICATION CABLE BURIED BELOW" in black letters on a red (electric) or orange (communications) background. Where both electric and communications lines are in a single trench, both tapes, as described above, shall be provided.

(F) Pull Tape:

Pull tape shall be constructed of fiber and shall be low-stretch and moisture-resistant. The tape shall have nominal pull strength of 2,500 pounds. The tape shall include distance markings at intervals not to exceed two feet.

Construction Requirements:

Construction Requirements shall conform to Section 732, unless otherwise specified on the project plans, or the specifications. No conduit trenches shall be left open after the work shift. All conduit trenches shall be compacted and backfilled prior to leaving the construction site.

(A) Conduit Routing and Underground Obstructions:

Conduit runs shown on the plans are depicted to indicate the intended path from point to point. The actual pathway shall be staked prior to any excavation and shall be modified as necessary, as approved and directed by the Engineer, to avoid obstacles and obstructions that will prevent ease of installation, obstacles and future maintenance or conformance with appropriate codes and specifications. Final conduit locations shall be documented and submitted to the Engineer in the form of an as-built drawing.

(B) Conduit Size:

Changes in the size of the conduit shall, prior to construction, be submitted to the Engineer for approval. All changes in conduit size shall be documented by the contractor in the form of an as-built drawing.

(C) Conduit Bend Radius and Deflection:

Except for factory bends, conduit bends shall have a radius of not less than that specified in the NEC. Conduit shall be bent without crimping or flattening, using the longest radius practicable. Communications conduits shall not deflect more than one inch per foot (1:12) vertically or horizontally. This is equivalent to a minimum radius of 6 feet.

If the 1:12 rule cannot be achieved, standard factory-made elbows of 11 1/4, 22 1/2, 30 or 45 degrees, with a minimum radius of 24 inches shall be used. 90-degree cumulative turns shall be made of individual elbows with a minimum radius of 36 inches.

(D) Conduit Ends and Connections:

New runs of HDPE conduit shall be continuous from pull box to pull box, unless otherwise shown on the project plans. HDPE conduit shall not be joined to PVC conduit in the length of the run. At pull boxes and/or cabinets where new HDPE is required to transition into new or existing PVC elbows, the contractor shall submit for approval a manufacturer recommended coupling.

When joining segments of HDPE conduit, the contractor shall utilize non-corrosive, sit-tight, water-tight couplings. Heat fusion, electrofusion fittings and mechanical connections shall be permitted if the HDPE conduit and joining device manufactures recommendations are observed and the internal diameter of the HDPE conduit is not reduced. Extrusion welding and hot gas welding to join HDPE conduits is not permitted.

Upon completion of joining HDPE conduit sections and setting the pull boxes, the contractor shall clean the HDPE conduit with compressed air. The contractor shall demonstrate by pulling a cleaning mandrel or ball mandrel, correctly sized for the conduit (80 percent of the HDPE inside diameter), that the conduit was not deformed during installation. If the mandrel passes through the HDPE the contractor shall install the pull tape in accordance with Section 732 of the specifications. If the mandrel encounters a deformity in the HDPE conduit, the contractor shall replace the entire segment of HDPE between pull boxes with new HDPE at no cost to the Department.

(E) Conduit Expansion Fittings:

Expansion fittings shall be installed in conduit runs which cross an expansion joint in a structure. Approved expansion fittings shall be as shown in the ITS Standard Drawings or project plans. Conduit encased in a structural member shall be installed in accordance with the National Electrical Code, or as approved by the Engineer.

A minimum of three feet shall separate any expansion coupling on any conduit from the pipe sleeve the conduit enters. Expansion couplings shall be staggered to keep the conduit entering the pipe sleeve as straight as possible.

Where bonding is not continuous, expansion fittings shall be provided with a bonding jumper of #6 AWG conductor. Allow enough slack conductor to accommodate the range of expansion supported by the expansion coupling.

Where it is not possible to use expansion fittings, sleeves of sufficient size shall be installed to provide a minimum 1/2 inch clearance between the conduit and the inside wall of the sleeve. The sleeve shall be discontinuous at the expansion joints.

(F) Conduit Depth:

Conduits shall be at a minimum cover depth of 30 inches, or as indicated in the project plans. Backfill compaction shall be in accordance with Subsection 203-5.03 (B) (4) of the specifications.

When conduit in protected and open areas cannot be installed at the minimum depths, it shall be encased in Class B concrete, as defined in Section 1006 of the specifications.

(G) Conduit in Trenches:

Open trenching shall be backfilled, compacted and regraded to meet pre-disturbance condition within a day following the installation of the conduit.

The contractor shall place detectable warning tape in trenches in which new PVC and HDPE is placed by trench methods. Warning tape is not required in conduit segments where trenchless methods (e.g., direction drill and bore) are used for installation. Warning tape shall be buried at a depth of 6 to 8 inches below the finished grade, unless otherwise noted on the plans.

Immediately after conduits are installed, they shall be sealed to prevent the intrusion of water, mud, gravel, vermin, etc. The conduits shall be sealed after mandrelling, tracer wire and/or pull tape, cable and/or fiber, installation. Taping the ends of the conduit shall not be allowed.

All unoccupied conduits on which work is performed shall be sealed with a water-tight, corrosion-proof, removable, reusable, and vermin resistant conduit plug or cap. Prior to use, the conduit plug, or cap shall be submitted to the Engineer for approval.

Occupied conduits on which work is performed shall be sealed with a conduit cap, as approved by the Engineer. The conduit cap must be water-tight, corrosion-proof, removable, and vermin resistant.

All unoccupied innerduct on which work is performed extending beyond the end of the capped conduit shall be sealed with a water-tight, corrosion-proof, removable, reusable, and vermin resistant innerduct plug or cap. Prior to use, the innerduct plug or cap shall be submitted to the Engineer for approval.

Occupied innerduct on which work is performed extending beyond the end of the capped conduit shall be sealed with an innerduct cap, as approved by the Engineer. The innerduct cap must be water-tight, corrosion-proof, removable, and vermin resistant.

A three inch "Y" shall be cut into the face of the curb directly over conduit located under rolled or vertical curbs.

The contractor shall place warning tape in all trenches in which new PVC or trenched HDPE conduit is placed. Warning tape is not required in conduit segments where trenchless methods are used for installation. All warning tape shall be buried at a depth of six to eight inches below the finished grade.

(H) Conduit by Trenchless Methods:

Conduit under existing pavement, curbs and gutters, sidewalks, concrete flatwork, textured or decorative surfaces, and at other specified locations, shall be installed by Horizontal Directional Boring (HDB) or Horizontal Directional Drilling (HDD) methods. Use of either method is allowed, subject to approval of the Engineer.

Conduit installation in areas where trenching would typically be allowed may be installed by trenchless method, if preapproved by the Engineer as a means of facilitating installation or mitigating potential damage to existing surface and subsurface elements.

The proposed bore profile shall be submitted to the Engineer, after the contractor has completed the necessary potholing, and approved prior to beginning the operation at each location.

Directional boring/drilling shall be used to install all conduits along a prescribed path from the surface with minimal impact to the surrounding area. Installation shall be performed in accordance with industry standards and as directed by the Engineer.

The contractor's installation process shall utilize the "walkover" locating system, or other Engineer approved equivalent, for determining the installation profile. The installation equipment shall register the depth, angle, rotation and directional data. At the surface, equipment shall be used to gather the data and relay the information to the equipment operator.

Excavation and backfill of excavated pits shall be in accordance with the requirements of Subsection 203-5.03 (B) (4) of the specifications.

When enlargement of an installation hole is necessary, the hole shall be at least 25 percent larger than the conduit to be installed, unless otherwise specified by the Engineer. Pulling equipment such as grips, pulling eyes, and other attachment hardware external to the conduit will be permitted as long as a wooden dowel is placed inside the conduit to prevent it from collapsing at the point of attachment when pull tension is at its peak. A swivel shall be used with all pulling hardware when pulling back the conduit into the installation path. Drilling fluid shall be pumped down the hole to provide lubrication for the conduit as it is pulled in. The pulling tension for installing conduit into the installation path shall not exceed 75 percent of the conduit manufacturer's tensile strength rating in order to prevent the conduit from "necking down" or deforming.

All final installation profiles shall be submitted to the Engineer.

(I) Rigid Metal Conduit and Bridge Attachments

Conduit either within an open bridge cell, attached to a pier, or attached to structures shall be rigid metal conduit (RMC). The contractor shall attach rigid metal conduit on the bridge structure per the details in the Plans.

Contractor shall install expansion couplings when crossing expansion joints, junction boxes as necessary to limit the total number of conduit bends between pull points to under 360 degrees and provide 45-degree conduit bend fitting when necessary. Expansion couplings, junction boxes, and 45-degree conduit bend fitting shall be installed per the details in the Plans.

Where required for aesthetic reasons RMC shall be painted to match the color of the existing bridge structure. Painting may require pre-treatment of the RMC and will be done at the direction of the Engineer.

Method of Measurement:

Conduit, when paid for as a separate pay item, will be measured by the linear foot for each diameter size, regardless of method of installation as follows:

- (1) From center to center of pull boxes.
- (2) From edge of foundation to center of pull box.
- (3) From edge to edge of foundation.
- (4) From end of conduit to center of pull box or foundation.
- (5) From end to end of conduit when no pull boxes are used.

No measurement will be made for conduit that is below ground in vertical conduit stub-ups and field equipment cabinets.

Restoring existing surface, landscaping, and all other materials and necessary hardware to complete the installation of conduit will be considered included in the conduit installation.

Rigid metal or HDPE electrical conduit used to cross bridge structures shall include the cost for all conduit, couplings, expansion fittings, hangers, struts, anchor bolts, removing and reinstalling chain link fence, labor and expenses of x-raying and core drilling concrete structures, attaching conduit to structures, painting conduit to match the structure color, and all other materials and necessary hardware to complete the installation of conduit will be considered included in the conduit installation.

The accepted measurement for 7320290 - Electrical Conduit will be measured as a lump sum for the complete electrical and communication conduit system installed, approved, and accepted by the Engineer.

Basis of Payment:

The accepted quantities of conduit, measured as provided above, will be paid for at the contract unit price per linear foot, which price shall be full compensation for the work, complete in place, including warning tape, excavation, backfill, detectable pull tape, connectors, fittings, horizontal directional drilling, horizontal directional boring, removal of spoil, compaction of trenches and directional drilling/boring pits, restoration of the surface to existing condition, including concrete, pavement, decomposed granite and other landscaping items where appropriate, repair of irrigation facilities, locating of existing conduit when new is to be intercepted with existing, and all incidentals necessary to complete the work.

Accepted quantities of 7320290 - Electrical conduit will be made at the contract lump sum price, which price shall be full compensation for furnishing all labor, materials, equipment, and all work necessary to provide a complete conduit system, complete in place.

No measurement or direct payment will be made for furnishing or installing pull tape, the cost being considered as included in the cost of the contract items.

ITEM 7320450 – PULL BOX (NO. 7) (COA STD DTL A1710)

Description:

The work under this item shall consist of furnishing and installing No. 7 pull boxes at the locations shown on the plans.

Materials:

All pull boxes and lids shall conform to the applicable City of Avondale standard detail A1710, project plans and these Special Provisions.

Pull box lids shall bear the words "CITY OF TOLLESON FIBER OPTICS" unless otherwise specified on the project plans and these Special Provisions.

Markings shall be clearly defined and shall be placed parallel to the long side of the cover. Letters shall be a minimum of 1 inch in height.

All pull boxes shall have a locking mechanism approved by the Engineer.

No. 7 pull boxes shall be a precast, polymer concrete, fiberglass reinforced, pull box, conforming to City of Avondale standard detail A1710. A certificate of compliance, in accordance with Subsection 106.05 of the specifications shall be supplied for structural capabilities and materials used in manufacture. Concrete pull boxes and lids shall not be used. The contractor shall submit test results to certify that the pull box sidewalls and lids remain intact when subjected to the loading conditions specified.

No. 7 pull boxes shall be 24 inches in depth and consist of a single-piece box unit. Stacked units shall not be used unless otherwise specified on the project plans or in these Special Provisions. No. 7 pull boxes shall have 6-inch by 12-inch preformed knockouts located in the short ends of the box.

Chipped, cracked or otherwise damaged pull boxes and lids will not be accepted.

Construction Requirements:

The contractor shall restore the surrounding surface conditions back to their original state, including concreted areas.

The compaction around the box shall not damage the pull box. The contractor shall replace pull boxes damaged by compaction at no additional cost to the Department.

Method of Measurement:

New No. 7 pull boxes will be measured as a unit for each pull box furnished and installed.

Basis of Payment:

The accepted quantities for No. 7 pull boxes, measured as provided above, will be paid for at the contract unit price each, which price shall be full compensation for the work, complete in place, including excavation, backfill, compaction and surface restoration.

ITEM 7340101 – CONTROL CABINET (DMS)

ITEM 9240136 – MISCELLANEOUS WORK (DMS, 24'-3" X 5'-4"):

Description:

The work under this item shall consist of furnishing and installing full-color, front-access, Dynamic Message Signs (DMS, 24'-3" X 5'-4") as shown on the plans and in compliance with these Special Provisions.

Materials:

The DMS shall be a fully-programmable, electronic, full-matrix, full-color, LED-based front-access dynamic message sign (DMS). The DMS shall be a complete assembly and include the sign housing, operational software, sign controller unit (SCU), communication unit, controller cabinet, power supplies, grounding and surge protection, and all other hardware associated with a complete installation as described herein.

All materials and products supplied by the contractor for the DMS assembly including DMS, mounting hardware, cabinet, and foundations shall comply with ASTM or AASHTO specifications.

The contractor shall furnish and install a Daktronics Galaxy® Series Model VT6x-144x720-10-RGB-SF.

Sign Control, Monitoring, and Programming:

A single computer will be used to program, monitor, and control the DMS using the same version of sign control programming software. The signs and control computer will communicate using standard Ethernet TCP/IP standards. Software will be provided for installation on a City supplied computer. Sign control software will conform to the Sign Control Software section of this specification.

Software:

The DMS supplier shall provide a DMS software system shall that contains the following software components described herein:

- Communication Software
- Control Software
- Character Set Software
- Message Capabilities

Sign Controller Unit:

The DMS Supplier shall provide a sign controller unit (SCU) to receive sign control commands from both the City workstation and a local on-site laptop (portable maintenance computer). Supplier shall program the SCU to transmit responses, as requested, to the City workstation and to control sign operation, message displays, and maintenance polls and statuses.

The SCU shall meet the following general requirements:

The SCU shall perform all communication, control, and feedback functions. No intermediate sign controller shall be used between the local sign controller and the City workstation.

The SCU shall be installed in a ground mounted cabinet in close proximity to the DMS sign structure.

Center-to-Field (C2F) and Local Communications between the SCU and the sign shall conform to the following:

Communication:	Ethernet (Cat 5e or Cat 6) or Fiber, TCP/I
Communication error:	Supervision of sign to center error: Blank-out
Supervision:	Watchdog function must be implemented to avoid corrupted image message, provide supervision of every single LED, supervision of internal and external communication, supervision of door contacts to report open doors, and other monitoring as required by the sign type
Reporting:	All errors shall be logged and reported to the ADOT TOC

The sign controller shall be programmed to receive NTCIP-compliant sign control commands from the City workstation or laptop computer, transmit NTCIP-compliant responses as requested to the central controller or laptop computer, monitor sign and

message status and control sign operation and message displays via the graphics processor.

The sign controller shall utilize the latest NTCIP version (current version: 03.04).

The sign controller must contain enough memory for storing changeable and permanent messages and graphics for controller operation with the ability to store 25 images.

The sign controller must contain DMS-specific control firmware (embedded software) that monitors all external and internal sensors, communication inputs, and controls the display modules, as directed by external control software (central control computer or laptop).

The controller shall have power-up and auto-restart capabilities with a programmable default message (including a blank message) when recovering from a power off condition.

A hardware watchdog circuit shall be utilized to provide automatic reset to the controller.

A controller user interface via a RS232 or Ethernet port shall be provided for a laptop computer to perform the following local functions, at a minimum:

- Navigate the controller's menu subsystem.

- Display/pixel diagnostics.

- Activate messages stored in memory.

- Enter message to be displayed and activate that message

- Configure display parameters.

- Configure communications port settings and NTCIP options.

- Provide a subsystem to log and report errors and failures, including data transmission errors, receipt of invalid data, communication failure recoveries, alternating current power failures, power recoveries, pixel status reads, fan status where applicable, temperature status, power supply status, and information on the operational status of the temperature, photocell.

The sign controller unit (SCU) shall meet the following minimum operational requirements:

- The SCU shall prevent unauthorized users from accessing the sign controller or changing displayed messages without permissions. Protects access to the sign controller using security authentication or login when accessing the sign locally via a laptop computer or a local control panel(s).

- The SCU shall include software compatible with the existing software and hardware at the City workstation. The software must, at a minimum, provide

password protection to restrict access to the program and the sign control functions and be capable of fully controlling all programmable functions of the DMS.

The SCU shall have the ability to play volatile messages.

The SCU shall monitor all external and internal sensors and communications inputs and control the display modules through the graphic processor as directed by external control software.

The SCU shall switch between operating modes (Local/Central) requiring no software or hardware modifications.

Under local control, the SCU shall inhibit communications from the City workstation and implement communications to the sign in place of the central communications.

While in local control, the SCU shall 'listen' for a 'Central Override' command which will cause the sign controller to go into a central override mode and allow communications between the sign controller and the TOC.

The SCU shall provide VGA/LVDS/TTL, Dual LAN, USB2.0 and Audio I/O interfaces required by the Plans and Specifications and the following:

The SCU shall contain a minimum of one (1) RS232 communications port.

The SCU shall contain a minimum of two (2) Ethernet (Dual 10/100 Mbps) ports with RJ45 connector.

The SCU shall provide a HDMI compact audio/video interface.

The SCU shall provide the ability to connect to external modems or other communications equipment as may be specified in the Plans (fiber optic modems)

The SCU shall provide for Wi-Fi connectivity.

A DMS manufacturer's warranty shall be provided for a period of 5 years starting upon successful completion of the stand-alone test and shall be in accordance with Section 106.13.

The DMS sign shall include manufacturer-supplied power and control cables between the DMS and sign controller, and a manufacturer-supplied control cabinet including the following accessories:

Sign Controller
Pullout Drawer

EIA Equipment Rack
Ventilation System
Cabinet lighting
Main power supply and distribution system
Photo Sensor Control

The contractor shall furnish and install UV-rated flexible metal conduit between the DMS support structure and the DMS sign case. The contractor shall furnish and install one 8 AWG green bond conductor between the DMS case and control cabinet conforming to Subsection 732-2.01 of the specifications. Wiring and grounding shall conform to Subsection 732-3.03 of the specifications.

The contractor shall submit shop drawings for each DMS installation conforming to the requirements in the DMS sign structure bid item.

Construction Requirements:

The Engineer shall be present at the time of installation.

The contractor shall install the control cabinets on foundations. The contractor shall furnish and install silicone caulking or other approved sealant around the base of the cabinet to form a watertight and dust-proof seal.

The contractor shall mount communication equipment such as the Ethernet switch, switch power supply, and patch and splice module on the DIN rail shelf leaving space for air circulation between devices. The contractor shall integrate the communication equipment and DMS sign controller with the City's network.

The contractor shall install the control and power cables between the DMS and the sign controller in accordance with the DMS supplier's recommended routing and installation methods. The power cables shall be terminated by the contractor and the control cables shall be left disconnected.

The contractor shall arrange, coordinate, and provide, under the cost of this item, for a DMS supplier's field technician to be on-site to field-commission the sign, and initial set-up and testing. The DMS supplier's field technician will terminate and connect the control cables between the DMS and the sign controller during the stand-alone test.

Removable caps shall be placed on unused conduits within the cabinet.

The contractor shall record on the plans the vertical clearance above the highest point of pavement and the lowest component of the DMS sign, mounting hardware and/or catwalk element.

If the DMS will not be in operation within 14 calendar days of installation, the contractor shall install a Department-furnished 36-inch by 36-inch static sign facing traffic with the message "SIGN UNDER TEST". The sign shall be mounted on the vertical member of the DMS support structure with contractor-furnished steel strap or banding. Mounting of

the sign by drilling into the support structure is not allowed. The contractor shall remove the sign and mounting hardware upon final acceptance. The sign shall be returned to the Engineer, after removal. Sign mounting hardware shall become the property of the contractor.

Testing Requirements:

(A) Stand-Alone Test:

After the contractor has successfully energized all DMS assemblies on the project, the DMS Supplier Testing will be performed by the DMS supplier's field technician. The DMS supplier's field technician will terminate and connect the control cables between the DMS and the sign controller and test functionality of the DMS system.

The contractor shall schedule the stand-alone test with the Engineer and the DMS supplier at least 4 weeks prior to the desired test date. The contractor shall provide the DMS supplier the DMS serial numbers, cabinet serial numbers, and installed locations and mileposts. All DMS assemblies within the project shall be ready for DMS Supplier Testing so the contractor's DMS supplier may sequentially perform testing on all DMS assemblies within the project. The contractor shall work with the DMS supplier's field technician to troubleshoot and make repairs to the DMS system. The contractor shall provide traffic control and a bucket truck with an operator for use by the DMS supplier's field technician during testing. Traffic control will be measured and paid for under their respective traffic control items.

The DMS supplier shall use their standard test form and submit a complete and organized set of forms in electronic PDF format to the Engineer.

(B) System Acceptance Test (SAT):

Upon successful completion of the subsystem test, the SAT shall be started. The SAT shall consist of a 30-day period of operation without failure of DMS equipment. GPS data shall be submitted and approved prior to beginning the SAT for the periods specified in the ITS Record Documentation item.

The purpose of the SAT is to demonstrate that the total system, consisting of hardware, software, communications, materials, and construction, is properly installed, is free from defects and identified problems, exhibits stable and reliable performance, and complies with contract documents.

During the SAT, the contractor shall ensure that equipment is maintained in operable condition. The Engineer shall be provided with access to equipment during the SAT for purposes of verifying operation. The contractor shall identify, isolate, diagnose and troubleshoot system problems and inconsistencies. The contractor, in conjunction with the Engineer, shall formulate possible solutions and shall implement corrections required in contractor-supplied equipment. The contractor shall provide test equipment and labor needed to test, isolate, and correct equipment deficiencies found during the SAT. Key

contractor technical personnel familiar with the design and construction of each system component shall be available on site within 48 hours of notification of a problem.

During the SAT, the contractor shall record test failures on the System Acceptance Test Failure Log provided under "ITS Test Forms" at <https://azdot.gov/business/engineering-and-construction/its-references> and immediately submit the form to the Engineer. After the repair has been completed, an updated form shall be submitted to the Engineer. Documentation errors, omissions, and changes occurring prior to, and during, the SAT shall be corrected and resubmitted before the SAT is completed.

The 30-day SAT is part of the project contract time.

(1) SAT Minor Failure

In the event of a minor failure during the SAT, the test clock shall stop until the system is repaired. At the completion of the repair, the testing shall recommence with 24 hours added to the remaining test time of the system. The following constitute minor failures:

- Failure of contractor-furnished equipment.

- Failure of an entire communications circuit.

- Failure to communicate to an individual DMS

(2) SAT Major Failure

In the event of a major failure during the SAT, the test clock shall stop until the system is repaired. At the completion of the repair, the testing shall recommence with the test clock reset to day zero. The following constitute major failures:

- Failure of contractor-furnished equipment, if determined that failures were caused by faulty installation by the contractor.

- Failure of an entire communications circuit for more than 15 minutes within a 24-hour period.

- Failure to communicate to an individual DMS.

- Failure to correct an issue adversely impacting public safety within 4 hours of being notified by the Engineer.

Method of Measurement:

Control Cabinet (DMS) and Miscellaneous Work (DMS, 24'-3" X 5'-4") will be measured per each.

Basis of Payment:

The accepted quantities of Control Cabinet (DMS) and Miscellaneous Work (DMS, 24'-3" X 5'-4"), measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place and successfully tested.

This work includes the cost of the DMS sign, SCU, control cabinet, shipping, equipment, labor, furnishing and installing the ground bond conductor, installing cabling between the DMS and the sign controller, support from the DMS Supplier's field technician, flexible conduit between sign housing and DMS support structure, bucket truck, connection of electrical service in the control cabinet, static sign mounting, sign hardware and sign removal, and other components and work necessary to provide a complete and functional DMS system.

The DMS support structure, support structure foundations, mounting hardware, control cabinet foundation, traffic control, and DMS communications equipment including ethernet switches will be paid for under their respective bid item numbers.

ITEM 7360104 – LUMINAIRE (INTERIOR LIGHTING):

ITEM 7360105 – LUMINAIRE (ELEVATOR WALL PACKS):

ITEM 7360114 – LUMINAIRE (STAIR LIGHTING):

Description:

This work shall consist of furnishing and installing interior and exterior luminaires, luminaire fittings, drivers, lamps, lenses, mounting hardware, supports, controls interface components, and all incidentals required for a complete lighting system in accordance with the Contract Plans, NFPA 70 (NEC), IES standards, UL listing requirements, and Section 737 of the ADOT Standard Specifications.

Materials:

General Listing Requirements:

All luminaires shall be listed and labeled by a qualified electrical testing laboratory. Luminaires shall comply with UL 1598 and be marked in accordance with UL CCN HYXT. LED luminaires shall comply with UL CCN IFAO or IFAM as applicable. Incandescent luminaires shall comply with UL CCN IEZX or IEZR as applicable.

Environmental Ratings:

Luminaires shall be rated as suitable for dry, damp, or wet locations as indicated on the plans. Exterior enclosures shall be UL 50E Type 3R, 4X, or IEC IP ratings as required. Luminaires installed in air-handling spaces shall comply with UL 2043.

Electrical Characteristics:

Nominal operating voltage shall be 120V, 240V, or 277V AC as shown on the plans. Frequency shall be 60 Hz. Drivers shall be dimmable from 100% to 0% unless otherwise noted. EMI filters shall be factory installed where required.

LED Performance Requirements:

Minimum efficacy: 80 lumens per watt unless otherwise noted. Rated life: minimum 50,000 hours to L70. CCT shall be 3000K, 3500K, 4000K, or as specified on plans. Chromaticity binning within 3-step MacAdam ellipse. CRI shall be minimum 80 unless otherwise noted.

Optical Requirements:

Lenses shall be tempered glass or UV-stabilized acrylic, minimum 0.125-inch thickness. Distribution types shall be I, II, III, IV, or V for exterior luminaires as indicated. BUG ratings shall comply with local dark-sky requirements where applicable.

Mounting and Construction:

Luminaires weighing more than 50 lb (ceiling) or 25 lb (wall) shall be independently supported. Housings shall be corrosion resistant with high-build polyurethane finish. Stainless steel hardware shall be provided for exterior installations. Relamping labels shall identify lamp type, wattage, and base.

Seismic Requirements:

Component Response Modification Factor (R_p) shall be 1.5 unless otherwise indicated. Component Overstrength Factor (Ω_o) shall be 1.5 for luminaires and 2.5 for suspended components in accordance with ASCE 7.

Submittals:

Submit product data, photometric reports, IES files, cut sheets, mounting details, and listing certifications. Provide shop drawings for non-standard luminaires within 90 days of NTP. Submit warranty documentation and O&M manuals prior to substantial completion.

Construction Requirements:

Install luminaires plumb, level, and securely fastened. Maintain required NEC 110.26 working clearances. Terminate conductors per manufacturer torque specifications. Bond and ground luminaires per NEC Article 250. Adjust aiming angles as required to achieve uniform illumination. Clean lenses and housings prior to final acceptance.

Luminaire (Stair Lighting) shall be mounted to 3 ½" 14 NTP hole cluster plate over an electrical junction box where mounted to the building structure and directly to pole with ½" 14 NTP hole where mounted on pole.

Testing and Commissioning:

Verify operation of all luminaires and controls. Perform functional testing for dimming and control systems. Provide commissioning documentation and as-built drawings reflecting installed equipment.

Warranty:

Provide manufacturer's 5-year warranty for all luminaire assemblies beginning at substantial completion.

Method of Measurement:

Luminaires will be measured as a unit for each luminaire installed.

Basis of Payment:

Accepted quantities of luminaires will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all luminaires, drivers, lenses, supports, mounting hardware, wiring connections, aiming, testing, documentation, and incidentals necessary to complete the work, complete in place.

ITEM 7360235 - LOAD CENTER CABINET (400A SES AND METER MAIN):

Description:

The work under these items shall consist of transporting and installing 400A Service entrance sectional panel with meter and main breaker and furnishing as shown on the project plans and as specified herein.

Materials:

400A 480V 3-Phase Panel With Meter and Main

The panelboard shall be rated 400A at 480V, 3-phase, 4-wire, and equipped with a factory-installed 400A main breaker. The panel shall provide a space for a 3-phase 480V meter socket and a main breaker. The main breaker shall be fully rated for 35,000 AIC (Ampere Interrupting Capacity) minimum. Series-rated combinations are not permitted. Panelboard bus bars shall be copper and fully rated for the panel amperage. The enclosure shall be NEMA 1 for indoor use as noted in the plans. The panel shall be UL listed and labeled for service entrance use where applicable.

Construction Requirements:

The contractor shall be responsible for coordinating transportation, installation, and furnishing with the supplier/fabricator. The panel shall be installed vertically, plumb, and level on a suitable wall or mounting surface in the exact location shown on the plans. The contractor shall ensure all working clearances comply with NEC 110.26 including a 3-foot clearance in front of the panel. Conduit entries shall be clean, properly supported, and sealed to protect against debris and moisture. Circuit conductors shall be terminated in accordance with manufacturer torque requirements. The panel shall be bonded and grounded in accordance with NEC Article 250 and per the plans. Each branch circuit shall

be clearly identified on a typed panel schedule affixed inside the panel door. Upon completion, the contractor shall submit as-built documentation and a finalized panel schedule reflecting all connected circuits.

Method of Measurement:

Load Center Cabinet (400A SES Meter Main) will be measured as a unit for each panel furnished and installed.

Basis of Payment:

The accepted quantities of Load Center Cabinet (400A SES Meter Main) measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including hauling, storage, furnishing, and testing.

ITEM 7370309 – REMOVE AND RELOCATE (STOP SIGN):

Description:

The work under this item shall consist of removing an existing stop sign assembly, including sign panel and post, and reinstalling it at a new location on a new foundation as designated on the plans and in accordance with the details shown on the plans and as specified herein.

Materials:

Sign posts and foundations shall conform to the applicable City of Tolleson Standard Details for traffic sign installations as shown on the plans.

Concrete for foundations shall be Class S and shall conform to the requirements of Sections 601 and 1006 of the ADOT Standard Specifications.

Reinforcing steel shall conform to the requirements of Sections 605 and 1003 of the ADOT Standard Specifications, if required by the applicable standard detail.

Sign panels shall be existing panels removed from their current location. If damage is identified, the Contractor shall notify the Engineer for direction.

Anchor bolts, if applicable, shall be galvanized steel and installed in accordance with the applicable standard details.

Construction Requirements:

Existing sign panels and posts shall be inspected for damage prior to relocation. If any components are damaged, the Contractor shall notify the Engineer prior to installation.

The Contractor shall remove the existing sign assembly and carefully transport and store components to prevent damage.

The existing foundation shall be removed to a minimum of 2 feet below grade. The remaining void shall be backfilled and compacted with material matching the surrounding conditions.

New sign foundations shall be constructed in accordance with the applicable City of Tolleson Standard Details and the project plans.

The post shall be installed plumb and oriented such that the sign panel faces the proper direction of traffic as shown on the plans. Mounting height and lateral offset shall conform to the applicable standards.

Concrete shall be placed monolithically and consolidated to eliminate voids. The exposed surface shall be finished smooth and free of defects. Curing shall comply with Section 601 of the ADOT Standard Specifications.

After installation, disturbed areas shall be restored to match adjacent conditions.

Method of Measurement:

Remove and Relocate (Stop Sign) will be measured as a unit for each sign assembly removed and reinstalled at a new location.

Basis of Payment:

The accepted quantities of Remove and Relocate (Stop Sign), measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including removal, hauling, storage, new foundation, excavation, backfill, compaction, surface restoration, and all labor, equipment, and incidentals necessary to complete the work.

ITEM 7370412 – ELECTRICAL SYSTEM (COMMUNICATIONS SYSTEM):

Description:

This work shall consist of furnishing and installing communications raceways, equipment room fittings, racks, patch panels, cross-connect frames, grounding and bonding systems, labeling, supports, and accessories necessary to provide a complete communications infrastructure in accordance with the Contract Plans, NEC Article 800, BICSI standards, TIA standards, and Section 737.

Materials:

Communications Raceways:

Provide UL-listed Type OFR (Optical Fiber Raceway) and Type CR (Communications Raceway) systems as applicable. Plenum-rated systems shall comply with UL 224. Minimum raceway size shall be 3/4-inch for copper and 1-inch for fiber unless otherwise shown. Raceways shall include all fittings, couplings, bushings, innerducts, and supports.

Cable Supports and Positioning Devices:

Provide UL-listed J-hooks, straps, cable ties, clamps, and mounting hardware. Hooks shall be spaced no more than 5 feet on center and sized for 25% future capacity.

Equipment Room Fittings:

Provide 19-inch racks, patch panels, cross-connect frames, equipment cabinets, backboards (3/4-inch fire-retardant plywood), and primary/secondary bonding busbars (PBB/SBB).

Grounding and Bonding:

Provide Telecommunications Bonding Backbone (TBB), Telecommunications Bonding Conductor (TBC), Telecommunications Equipment Bonding Conductors (TEBC), and Unit Bonding Conductors (UBC) per BICSI N3 and NEC Article 250. Bond all metallic raceways, trays, racks, and cabinets to the nearest busbar.

Identification and Labeling:

Label all racks, panels, backbone cables, horizontal cables, junction boxes, and enclosures in accordance with TIA-606. Provide underground warning tape labeled 'COMMUNICATIONS'. All labeling shall be black letters on white field unless otherwise noted.

Construction Requirements:

Install raceways in accordance with NEC Article 800 and manufacturer instructions. Complete raceway installation prior to cable installation.

Maintain maximum pathway length of 75 feet between pull points unless otherwise approved. Provide a minimum cover of 24 inches for underground conduit unless otherwise shown. Support raceways independently of ceiling grid systems. Install bonding conductors in the shortest practical route without splices and support at intervals not exceeding 36 inches. Install equipment racks plumb and level. Provide required NEC 110.26 working clearances. Bond PBB to electrical service intersystem bonding termination device per NEC 250.94. Provide firestopping at all penetrations of rated assemblies.

Testing and Quality Control:

Verify torque of all bolted electrical and bonding connections.
Measure resistance between PBB and service intersystem bonding point; maximum acceptable resistance is 100 milliohms.
Verify conduit continuity and mandrel all empty conduits prior to acceptance.
Correct deficiencies prior to final acceptance.

Method of Measurement:

ELECTRICAL SYSTEM (COMMUNICATION SYSTEM): will be measured as a lump sum for the complete communication system installed, tested, and accepted by the Engineer.

Basis of Payment:

Accepted quantities of ELECTRICAL SYSTEM (COMMUNICATION SYSTEM) will be made at the contract lump sum price, which price shall be full compensation for furnishing all materials, labor, equipment, raceways, racks, busbars, bonding, labeling, testing, documentation, and incidentals necessary to complete the work, complete in place.

ITEM 7370414 – ELECTRICAL SYSTEM (SECURITY SYSTEM PROVISIONS)

Description:

The work under this item shall consist of furnishing and installing rigid metal conduit (RMC) and junction boxes to provide raceway provisions for a future security system. The work shall include all conduit, fittings, pull strings, junction boxes, and accessories required to form a complete continuous pathway system between termination points as shown on the project plans.

All work shall be performed in accordance with the project plans, the applicable requirements of Section 737 of the Standard Specifications, and the National Electrical Code (NEC).

This item includes only conduit and junction boxes with pull strings. No conductors, devices, or security equipment shall be installed under this item.

Materials:

1. Conduit:

- All conduit shall be Rigid Metal Conduit (RMC), hot-dip galvanized steel, conforming to UL 6 and ANSI C80.1.
- Conduit shall be new, free of dents, rust, or other damage, and shall have a smooth galvanized interior suitable for future conductor pulls.
- All joints shall be threaded and fitted with approved threaded couplings.
- Each conduit run shall include a continuous nylon pull string rated for a minimum tensile strength of 200 lb.
- Conduit shall be equipped with bushings or insulated throat connectors at all terminations to protect future conductors.
- Expansion fittings shall be provided at structural expansion joints or where required by the plans.

2. Junction Boxes:

- Boxes shall be NEMA 3R or NEMA 4X, as shown on the plans and appropriate for the installation environment.
- Boxes shall be constructed of cast aluminum, galvanized steel, or stainless steel and shall be UL-listed.
- Each external box shall include a gasketed, hinged, and lockable cover secured with stainless-steel hardware.
- Box dimensions shall comply with NEC 314.28 for conduit fill and bending space.

3. Miscellaneous Materials:

- Conduit terminations shall include bonding bushings or grounding locknuts as required by NEC 250.96.
- All exposed conduit and fittings shall be field-painted to match adjacent surfaces when required by the plans.
- Open ends shall be sealed with temporary threaded plugs until future cabling installation.

Construction Requirements:

1. Installation:

- Install conduit and boxes in the exact locations shown on the plans or as directed by the Engineer.

- Conduit shall be installed **plumb, level, and parallel** to adjacent surfaces and securely supported at intervals not exceeding **10 feet** or per **NEC 344.30**, whichever is more stringent.
- Minimum bend radius shall comply with **NEC Chapter 9, Table 2**.
- **Underground RMC** shall have a minimum cover of **24 inches**, measured to the top of the conduit.
- Conduit within concrete structures shall be installed prior to placement and securely tied to reinforcing steel to prevent movement.
- Conduit entering boxes shall be neatly aligned and terminated with insulated bushings.

2. **Junction Boxes:**

- Install boxes **flush with finished grade** unless otherwise shown.
- Boxes shall rest on **6 inches of compacted crushed aggregate** or be surface-mounted on structures as detailed.
- Box lids shall be oriented so labeling is legible from the primary approach side.
- Bond each metallic box and conduit system to the equipment grounding conductor.

3. **Pull Strings:**

- Provide a continuous pull string between all termination points with 12 inches of slack in each box.
- Pull strings shall be tied off inside each box to prevent displacement.

4. **Sealing and Protection:**

- After installation, all conduit ends shall be capped or plugged to prevent entry of moisture and debris.
- Where conduit penetrates waterproof surfaces, seal with non-shrink grout or approved sealant.
- The Contractor shall maintain the integrity of installed conduits until final acceptance.

5. **Testing and Verification:**

- Upon completion, verify conduit continuity and freedom from obstruction by pulling a mandrel of appropriate size through each conduit run.
- Submit a continuity and mandrel test certification to the Engineer for approval prior to acceptance.

Method of Measurement:

Electrical System (Security System Provisions) will be measured as lump sum for each complete conduit and junction-box system installed, tested, and accepted by the Engineer.

Basis of Payment:

The accepted quantities of Electrical System (Security System Provisions) measured as provided above will be paid for at the contract lump sum total, which price shall be full compensation for furnishing and installing all rigid metal conduit, junction boxes, fittings, pull strings, bushings, expansion couplings, excavation, backfill, seals, testing, and record documentation necessary to complete the work, complete in place.

ITEM 7370416 – ELECTRICAL SYSTEM (FIRE ALARM SYSTEM):

Description:

The work under this item shall consist of furnishing, installing, programming, testing, commissioning, and placing into service a complete, fully operational fire detection and alarm system in accordance with the project plans, NFPA 70, NFPA 72, UL 864, and all applicable authorities having jurisdiction.

The fire alarm system shall include, but not be limited to: fire-alarm control unit (FACU), remote annunciators, auxiliary power supplies, manual fire-alarm boxes, heat detectors, smoke detectors (including duct and multi-criteria types), carbon monoxide detectors, sprinkler waterflow alarm-initiating devices, supervisory devices, audible and visual notification appliances, supervised control modules, digital alarm communicator transmitter (DACT) or radio alarm transmitter (RAT), passive graphic maps, fire-alarm cabling, and all associated wiring, terminations, labeling, programming, documentation, and training.

Materials:

All equipment shall be new, UL-listed, and labeled for the intended application. The fire-alarm control unit shall be addressable, multiplexed, and listed under UL CCN UOJZ in accordance with UL 864 and NFPA 72. Remote annunciators shall be compatible with the FACU and provide acknowledge, silence, reset, and test functions. Initiating devices shall include manual pull stations, heat detectors, smoke detectors, duct smoke detectors, carbon monoxide detectors, and sprinkler supervisory devices as shown on the plans. Notification appliances shall include horns, strobes, and horn/strobe combinations listed under UL 464 and UL 1638. Fire-alarm cables shall be FPL, FPLR, or FPLP as required and installed in accordance with NEC Article 760.

Construction Requirements:

All installation shall comply with NFPA 70, NFPA 72, and all local codes. Equipment shall be installed plumb, level, and securely mounted. All wiring shall be properly supported and protected in approved raceways. Grounding and bonding shall comply with NEC Article 250. All penetrations of rated assemblies shall be sealed in accordance with approved firestopping requirements.

The Contractor shall provide complete shop drawings including floor plans, riser diagrams, sequence of operations, battery calculations, voltage-drop calculations, and device address lists. The system shall be fully programmed and tested by NICET-certified technicians. A complete operational test of 100 percent of devices shall be performed. The Contractor shall coordinate inspection with the Authority Having Jurisdiction and provide training and record documentation to the Owner.

Method of Measurement:

Electrical System (Fire Alarm System) will be measured as a lump sum for the complete system installed, programmed, tested, approved, and accepted by the Engineer.

Basis of Payment:

Accepted quantities of Electrical System (Fire Alarm System) will be made at the contract lump sum price, which price shall be full compensation for furnishing all labor, materials, equipment, programming, testing, commissioning, training, documentation, permits, approvals, and all work necessary to provide a complete and fully operational fire detection and alarm system, complete in place.

ITEM 7370420 – ELECTRICAL SYSTEM (LIGHTING CONTROLS):

Description:

This work shall consist of furnishing and installing an indoor wall-mounted lighting control cabinet complete with a time clock, lighting contactors, and all internal wiring, labeling, and accessories required for a fully functional system. The cabinet shall control designated lighting circuits automatically per the project plans and applicable provisions of Section 737 of the Standard Specifications. All work shall be performed in accordance with the National Electrical Code and manufacturer's installation instructions.

Materials:

The lighting control cabinet shall be NEMA 1, wall-mounted, constructed of code-gauge steel with a powder-coated finish, and equipped with a hinged, lockable door. The cabinet shall include an internal steel back panel with DIN rail, terminal blocks, and a grounding bar. A digital astronomic time clock shall be provided, UL listed, 365-day programmable,

and capable of manual override and daylight-savings adjustment. Lighting contactors shall be electrically held, UL listed, and rated for the system voltage and connected load. Internal control wiring shall be stranded copper, type THHN/THWN-2, neatly bundled and labeled. All components shall be UL listed for their intended use.

Construction Requirements:

The cabinet shall be mounted securely to the wall using stainless-steel anchors or approved hardware, installed plumb and level at an accessible working height. Conduits shall enter the cabinet through manufacturer-provided knockouts or hubs, and all terminations shall be made per torque specifications. The system shall be grounded in accordance with NEC Article 250. After installation, the contractor shall program the time clock and verify operation of all contactors and lighting circuits in both automatic and manual modes. All components and wiring shall be clearly labeled to match the plans, and a laminated schematic diagram shall be affixed to the inside of the cabinet door.

Method of Measurement:

Electrical System (Lighting Controls) will be measured as a lump sum for the complete system installed, tested, and accepted by the Engineer.

Basis of Payment:

Accepted quantities of Electrical System (Lighting Controls) will be made at the contract lump sum price, which price shall be full compensation for furnishing and installing the NEMA 1 wall-mounted control cabinet, time clock, contactors, wiring, labeling, testing, and all other materials and labor necessary to complete the work in place.

ITEM 7370421 – ELECTRICAL SYSTEM (INVERTER BATTERY BACKUP SYSTEM)

Description:

The work under this item shall consist of furnishing and installing an inverter-based battery backup power system to provide uninterrupted power to designated lighting or control circuits, as shown on the project plans and in accordance with the latest requirements of the National Electrical Code (NEC), IEEE, UL, and ADOT Standard Specifications Section 737. The system shall include the inverter, battery bank, enclosure, and all associated wiring, controls, and accessories for a complete and operational installation.

Materials:

Inverter Unit:

- Pure sine-wave output, rated for continuous duty.

- Input voltage: 480 V or 208 V 3-phase as indicated on plans.
- Output voltage: 120/208 V or 120 V single-phase as required for connected load.
- Minimum power rating: 10 kVA unless otherwise shown.
- Output frequency: 60 Hz $\pm$ 0.5 Hz.
- Efficiency: $\geq$ 94 % at full load.
- UL 1778 or UL 924 listed and FCC-compliant for electromagnetic interference.
- Integral automatic transfer switch (ATS) with < 10 ms transfer time.
- Built-in charger capable of recharging batteries to 90 % capacity within 8 hours.
- LCD display for status, voltage, load percentage, and battery condition.

Battery Bank:

- Maintenance-free, valve-regulated lead-acid (VRLA) or lithium-iron-phosphate (LiFePO_4) type, compatible with the inverter manufacturer's charging profile.
- Battery capacity sized to sustain the connected load for a minimum of 90 minutes at full load, unless otherwise specified.
- Batteries to be supplied with UL listed rack or cabinet enclosure rated NEMA 1 (indoor) or NEMA 3R (outdoor) as shown on the plans.
- Battery interconnect cables furnished by manufacturer with color-coded, insulated terminals.

Enclosure and Accessories:

- NEMA 1 for indoor installations.
- Lockable doors with gasketed seals and hinged panels for maintenance access.
- Louvers or fans as required to maintain manufacturer-recommended operating temperature.
- System shall include all control wiring, grounding lugs, fuses, breakers, surge protection devices, and labeling per NEC 110.22 and 250.

Identification and Documentation:

Each system shall bear a permanent nameplate identifying manufacturer, model, serial number, input/output ratings, and date of manufacture.

Contractor shall furnish submittals including shop drawings, product data, battery sizing calculations, and system wiring diagrams for review and approval prior to installation.

Construction Requirements:

The inverter battery backup system shall be installed at the locations shown on the project drawings in accordance with manufacturer's instructions and applicable codes.

Mounting:

- Mount inverter cabinet vertically on a rigid wall or unistrut frame, plumb and level, with sufficient clearance for maintenance and ventilation as recommended by the manufacturer.
- Anchor battery cabinet to a level housekeeping pad extending 3 inches beyond the cabinet perimeter, or as indicated on the plans.

Electrical Connections:

- Line and load conduits shall be connected using listed fittings; penetrations shall be sealed to prevent moisture and dust intrusion.
- All conductors shall be copper, sized in accordance with NEC 310 and manufacturer requirements, and terminated per manufacturer torque specifications.
- Equipment grounding conductors shall be bonded to the inverter frame and building grounding electrode system per NEC 250.
- Neutral-to-ground bonding for separately derived systems shall comply with NEC 250.30.

Startup and Testing:

- Verify battery polarity and connection torque prior to energization.
- Conduct functional test to confirm proper transfer from utility to inverter power and back, verifying no interruption exceeding 10 milliseconds.
- Measure and record output voltage, load, and battery voltage at full load and at completion of recharge cycle.
- Provide manufacturer-certified startup and commissioning report to the Engineer.

Labeling:

- Provide engraved laminated phenolic labels for "INVERTER BATTERY BACKUP SYSTEM," "UTILITY INPUT," "OUTPUT LOAD," and "BATTERY DISCONNECT."
- Affix signage warning of stored energy hazard and required PPE per OSHA 1910.147.

Training:

Provide up to two (2) hours of on-site training to City maintenance staff covering system operation, maintenance, and troubleshooting procedures.

Method of Measurement:

Electrical System (Inverter Battery Backup System) will be measured as a unit for each complete system installed, tested, and accepted by the Engineer.

Basis of Payment:

The accepted quantities of Electrical System (Inverter Battery Backup System) measured as provided above will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all materials, labor, equipment, wiring, enclosures, battery modules, installation, testing, training, and documentation necessary to complete the work, complete in place.

ITEM 7370423 – ELECTRICAL SYSTEM (DISCONNECT SWITCH):

Description:

The work under this item shall consist of furnishing and installing a 30A, 60A, and 100A fused disconnect switch in accordance with the project plans and applicable code requirements. The disconnect shall provide a means of manual disconnection of electrical systems.

Materials:

The disconnect switch shall be rated for 60A or 100A at 480V and 30A at 208V. The enclosure shall be NEMA 1 for indoor locations and NEMA 3R for outdoor locations per the plans. The unit shall include an external operating handle with padlock provisions in the "OFF" position. All components shall be UL listed for the application.

Quantity of disconnects:

- (2) – 60A 35A FUSED 480V NEMA 1
- (2) – 30A 30A FUSED 120V NEMA 1
- (2) – 60A NON FUSED 208V NEMA 3R
- (1) - 60AF 50A FUSED 208V NEMA 3R
- (1) - 60AF 60A FUSED 208V NEMA 3R
- (1) – 100A 70A FUSED 480V NEMA 1

Construction Requirements:

The disconnect shall be installed in the location shown on the plans, mounted securely on a vertical surface or structural support. All conduits shall be connected using approved watertight fittings where applicable and sealed to prevent moisture ingress. The line and load conductors shall be terminated according to manufacturer specifications and torqued appropriately. The disconnect shall be bonded and grounded in compliance with NEC

Article 250 and the plans. Labeling shall indicate the circuit or equipment served and voltage rating. Upon installation, the unit shall be tested for functionality and left in the "OFF" position until directed by the Engineer to energize the transformer.

Method of Measurement:

Electrical System (Fused Disconnect Switch) will be measured as a unit for each disconnect installed.

Basis of Payment:

The accepted quantities of Electrical System (Fused Disconnect Switch) measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including hauling, storage, and testing.

ITEM 7370424 – ELECTRICAL SYSTEM (400A 480V 3-PHASE PANEL):

ITEM 7370425 – ELECTRICAL SYSTEM (200A 480V 3-PHASE PANEL):

ITEM 7370426 – ELECTRICAL SYSTEM (200A 120/208V 3-PHASE PANEL):

Description:

The work under this item shall consist of furnishing and installing 3-phase, 4-wire distribution panelboards with a main circuit breakers, as shown on the project drawings and in accordance with the NEC and section 737.

Materials:

A. 400A 480V 3-Phase Panel

The panelboard shall be rated 400A at 480V, 3-phase, 4-wire, and equipped with a factory-installed 400A main breaker. The panel shall provide space for a minimum of 24 branch circuit breakers. All breakers, including the main and branch breakers, shall be fully rated for 35,000 AIC (Ampere Interrupting Capacity) minimum. Series-rated combinations are not permitted. Panelboard bus bars shall be copper and fully rated for the panel amperage. The enclosure shall be NEMA 1 for indoor as noted in the plans. The panel shall be UL listed and labeled for service entrance use where applicable.

B. 200A 480V 3-Phase Panel

The panelboard shall be rated 200A at 480V, 3-phase, 4-wire, and equipped with a factory-installed 200A main breaker. The panel shall provide space for a minimum of 24 branch circuit breakers. All breakers, including the main and branch breakers, shall be

fully rated for 10,000 AIC (Ampere Interrupting Capacity) minimum. Series-rated combinations are not permitted. Panelboard bus bars shall be copper and fully rated for the panel amperage. The enclosure shall be NEMA 1 for indoor as noted in the plans. The panel shall be UL listed and labeled for service entrance use where applicable.

C. 200A 120/208V 3-Phase Panel

The panelboard shall be rated 200A at 120/208V, 3-phase, 4-wire, and equipped with a factory-installed 200A main breaker. The panel shall provide space for a minimum of 42 branch circuit breakers. All breakers, including the main and branch breakers, shall be fully rated for 10,000 AIC (Ampere Interrupting Capacity) minimum. Series-rated combinations are not permitted. Panelboard bus bars shall be copper and fully rated for the panel amperage. The enclosure shall be NEMA 1 for indoor as noted in the plans. The panel shall be UL listed and labeled for service entrance use where applicable.

D. 200A 120/208V 3-Phase Panel

The panelboard shall be rated 200A at 120/208V, 3-phase, 4-wire, and equipped with a factory-installed 100A main breaker. The panel shall provide space for a minimum of 42 branch circuit breakers. All breakers, including the main and branch breakers, shall be fully rated for 10,000 AIC (Ampere Interrupting Capacity) minimum. Series-rated combinations are not permitted. Panelboard bus bars shall be copper and fully rated for the panel amperage. The enclosure shall be NEMA 1 for indoor as noted in the plans. The panel shall be UL listed and labeled for service entrance use where applicable.

E.

Construction Requirements:

The panel shall be installed vertically, plumb, and level on a suitable wall or mounting surface in the exact location shown on the plans. The contractor shall ensure all working clearances comply with NEC 110.26 including a 3-foot clearance in front of the panel. Conduit entries shall be clean, properly supported, and sealed to protect against debris and moisture. Circuit conductors shall be terminated in accordance with manufacturer torque requirements. The panel shall be bonded and grounded in accordance with NEC Article 250 and per the plans. Each branch circuit shall be clearly identified on a typed panel schedule affixed inside the panel door. Upon completion, the contractor shall submit as-built documentation and a finalized panel schedule reflecting all connected circuits.

Method of Measurement:

Electrical System (400A 480V 3-Phase Panel), Electrical System (200A 480V 3-Phase Panel), and Electrical System (200A 120/208V 3-Phase Panel) will be measured as a unit for each panel installed.

Basis of Payment:

The accepted quantities of Electrical System (400A 480V 3-Phase Panel), Electrical System (200A 480V 3-Phase Panel), and Electrical System (200A 120/208V 3-Phase Panel) measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including hauling, storage, and testing.

ITEM 7370430 – TRANSFORMER (75KVA 480-120/208V)

ITEM 7370431 – TRANSFORMER (30KVA 480-120/208V)

Description:

The work under these items shall consist of furnishing all equipment, materials and labor necessary to install 45kva and 75kva 480-120/208V transformer in accordance with the project plans, the applicable requirements of Section 737 of the Standard Specifications and as specified herein.

Materials:

All transformers shall conform to paragraphs 2.1.3 and 2.1.5 in Section 2 of NEMA Standards Publication TS-1 1988 and to other applicable standards of NEMA (i.e., NEMA ST 120), UL (i.e., UL-506), EIA, and ANSI. The contractor shall comply with all national, state, and local laws, ordinances, and codes in effect at the time that the work is performed.

All transformers shall operate on a primary voltage of 480 VAC and a secondary voltage of 120/208 VAC three phase, 60 $\pm$ 0.5 Hz, grounded neutral, unless required otherwise on the project plans.

All transformer cabinet assemblies of the same type shall be identical and totally interchangeable. All transformer cabinet assemblies shall include the following components:

Transformer Cabinet:

Cabinets shall be designed for mounting on a concrete foundation using anchor bolts of size and placement as shown in the plans and per the manufacturers requirements.

The cabinets shall meet or exceed the requirements of NEMA 1 rating and shall be UL listed.

The cabinet and door shall be constructed from 5052-H32 sheet aluminum alloy with a thickness of 0.125 inches. All welds shall be neatly formed and free of cracks, blow holes and other irregularities. All inside and outside edges of the cabinet shall be free of burrs. The cabinet shall be designed with a sloped top to prevent the accumulation of water on its top surface.

Transformer:

All transformer overall dimensions, physical outline, and mounting hole dimensions shall be as shown on the Plans. All transformers shall be three phase, dry type units. The transformer primary voltage shall be 480 VAC and the secondary voltage shall be as required by the plans (i.e., 120/208 VAC). The weight of the transformer shall not exceed 1200 pounds. The transformer shall be labeled either "step-up" or "step-down" and the incoming (primary winding) and outgoing (secondary winding) voltages shall be clearly identified on the exterior.

The transformer shall be provided within a NEMA 1 enclosed. Prior to painting, the transformer enclosure shall be cleaned and degreased.

Standards:

Transformers shall be constructed and rated in accordance with applicable UL, CSA, NEMA, ANSI, IEEE and OSHA standards and shall meet NEC requirements.

Cores:

All cores shall be fabricated with high grade electrical steel. The core volume shall allow operation at 10 percent above rated primary voltage at no load without exceeding the temperature rise of the unit. All laminations and cores shall be core plated or annealed, free of burrs and properly assembled to reduce noise and ensure efficient operation of the transformer.

Coils:

Coil conductors shall be continuous with terminations brazed or welded without auxiliary flux material. The entire core and coil assembly shall be impregnated with varnish and cured to reduce hotspots and seal out moisture. Coils shall be protected with an outer layer of glass tape or similar quality insulation. Coils shall incorporate an electrostatic shield located between primary and secondary windings.

Construction Requirements:

The transformer shall be installed at the exact location shown on the construction drawings, with coordination among all trades to prevent conflicts with other systems. Mount the transformer on a level, code-compliant concrete housekeeping pad that extends at least 3 inches beyond all sides of the unit or on a structurally rated wall support as applicable. Maintain minimum clearances of 36 inches in front for working space, 12 inches above, and 6 inches at the sides and rear, or greater if required by the manufacturer, ensuring no obstruction of ventilation openings. Primary and secondary conduits shall be installed separately and routed to avoid interference with airflow, entering the enclosure only at approved knockouts or per manufacturer guidance, and sealed to prevent moisture and debris ingress. The equipment grounding conductor shall be connected to the designated ground lug or bus, and the transformer enclosure shall be bonded to the building grounding system in accordance with NEC Article 250. Where the transformer is a separately derived system, the neutral-to-ground bond and grounding electrode conductor shall be installed per the plans. The contractor shall coordinate the routing of secondary conductors and panel locations, ensuring adequate working clearances are maintained. Upon installation, all connections shall be torqued to manufacturer specifications, identification labels applied as required, and the area left clean and ready for inspection.

Method of Measurement:

Transformer (45kva 480-120/208V) and Transformer (75kva 480-120/208V) will be measured as a unit for each transformer installed.

Basis of Payment:

The accepted quantities of Transformer (45kva 480-120/208V) and Transformer (75kva 480-120/208V) measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including hauling, storage, and testing.

ITEM 7370410 – ELECTRICAL SYSTEM (PED BRIDGE LIGHTING DMX CONTROL): ITEM 7370455 – MISCELLANEOUS ELECTRICAL (PED BRIDGE LIGHTING):

Description:

The work under these items shall consist of furnishing all labor, materials, tools, and equipment to furnish, install and program aesthetic lighting fixtures and devices including but not limited to flexible linear pedestrian path lighting, wall-wash bridge lighting, low

voltage drivers, junction boxes, and DMX communication system as indicated on the Project Plans.

Materials:

Materials shall consist of complete luminaire assemblies and DMX communication devices with features, leader cables, options, and accessories as indicated on the plans.

The following luminaires and communication system components shall be provided at the locations shown on the plans. No substitutions will be allowed unless approved in writing by the Engineer.

Flexible Linear Pedestrian Path Lighting:

Kelvix Edurawave narrow DMX Pixel Model No. ENN-TX-RGBW3-24-E67-1-30

Wall-Wash Bridge Lighting:

Lumenpulse Lumenfacade Max Model No. LFM-CH-UL-120_277-48-10W-MRGBWP-WW-CL-LF-DMX/RDM-VRBO-WMCH18-XD-BRZ-NA

Junction Boxes:

Junction boxes shall be NEMA 3R rated and sized per the plans. Junctions boxes shall be sized per NEC requirements unless otherwise specified.

DMX Communication System:

Complete DMX communication system including all required equipment to allow full color changing shows to DMX controlled lighting shown on the Contract Plans.

Provide the following DMX Communication System at the locations shown on the Contract Plans.

- Pharos Lighting DMX Controller Model No: DMXC-PL1-MV-DIN-S
- Pharos Lighting Control interface Model NO: CM-PTS5-POE-IW-BB
- Lumenpulse Cbox Model No: CBX-DS-208-DMX/RDM-BRZ-CRC-UL
- DMX Decoder Model No: DMXD-5C-8A-UNV
- Low Voltage Power Supply (200W 208V-24V)

DMX Communication system shall include a central hub for sending control signals to the lighting fixtures. The controller shall be a software-based application running on a computer. The controller shall provide a user interface for programming and adjusting various parameters of the lighting fixtures, such as intensity, color, movement, and effects. The central control hub shall be able to connect into city communication for remote operation.

DMX Communication system shall include the manufacturer recommended number of days for programing and commissioning. Contractor to coordinate with commissioning team and City on desired preprogrammed visual lighting effects and interface setup. This includes but not limited to preselected colors pallets, dimming controls, and Overrides.

Construction Requirements:

The Contractor shall provide and install flexible linear pedestrian path lighting, wall-wash bridge lighting fixtures as specified on the plans. Location and specific beam angle are indicated on plans.

Manufacturer's recommended practices

1. Explicitly follow all manufacturer's printed or verbal recommended installation procedures and instructions for all materials furnished under this contract, unless otherwise directed or by the Engineer.
2. If the manufacturer's recommended installation procedures or instructions differ from those shown on the Contract Plans or specified herein, submit a request for information to the Engineer that details out the discrepancy and request direction prior to proceeding with the Work.

Flexible linear pedestrian path lighting:

Luminaires shall be installed along the diagonal top cords of bridge structure, mounted in a flexible channel. Leader cable shall be installed from light to the junction box in top side cord of bridge as show in the plans. Connect leader cable to junction box using waterproof wire grips sized for cable.

Contractor to clean all luminaires prior to completing the project. Housings shall be cleaned with a detergent and lenses cleaned with a manufacturer approved cleaner to provide the maximum lumen output possible. No additional lengths of LED strip lights shall be permitted to be outside of mounting channels. All ends of the strip lights shall have anti-vandal straps mounted over the channel and LED strip per the plans.

Shop Drawings: Within one hundred and ten days of receiving Notice to Proceed (NTP), provide shop drawings that indicate dimensions and components for each luminaire not standard product of manufacturer.

Wall-Wash Bridge Lighting:

Wall-wash fixtures shall be mounted on manufacturers' arms mounted on the bridge to protrude light fixtures out 18" with 3' spacing between each light fixture end per the plans. Contractor to submit shop drawings and receive engineer approval prior to ordering metal channels.

Luminaires shall be connected to each other with 10-foot LFJC-UL-120_277-10FT-XC3P3D-90D-BK jumper cables. Cabel shall be attached externally to luminaire mounting arms and side of bridge. Fixtures at the beginning of fixture run shall have a 10-foot LFLC-CR/CH-UL-120_277-10FT-XC3P3D-90D-BK leader cable from the connection point on the fixture to the adjacent junction box shown in the plans. A weatherproof wire grip shall be used where the leader cable penetrates the junction box. Conductors shall be connected in the adjacent to fixture junction box to create a complete system. Circuit information shall match what is shown in the plans.

Luminaires shall be adjusted vertically and horizontally to create a straight even line facing upward at the side of the bridge.

Contractor to clean all luminaires prior to completing the project. Housings shall be cleaned with a detergent and lenses cleaned with a manufacturer approved cleaner to provide the maximum lumen output possible.

Shop Drawings: Within ninety days of receiving Notice to Proceed (NTP), provide shop drawings that indicate dimensions and components for each luminaire not standard product of manufacturer.

DMX Communication System:

DMX control system hub (Pharos controller and interface) shall be installed in an air-conditioned communication cabinet per the plans and manufacturer recommendation. The DMX hub shall be mounted in the center of the communication cabinet horizontally upright.

Communication cabinet dimensions and requirements shall be per the plans. Contractor to submit shop drawings for cabinet layout prior to construction. Cabinet to be located in air conditioned room in south side electrical room.

Shop Drawings: Within ninety days of receiving Notice to Proceed (NTP), provide shop drawings that indicate dimensions and components for each luminaire not standard product of manufacturer.

Electrical Subcontractors Commissioning Responsibilities:

The electrical Subcontractors, or the Contractor if there are no electrical Subcontractors, are required to execute the commissioning responsibilities, including, but not limited to, the following:

- a. Attend the commissioning scoping meeting and other meetings necessary to facilitate the commissioning process.
- b. Providing the completion schedule for the pre-functional checklists and the startup of the electrical equipment and systems.
- c. Furnishing the procedures to be executed as part of initial checkout and other input for the Startup Plans, and executed (filled in and signed) initial checkout, startup, and pre-functional checklists.
- d. Furnish detailed testing procedures and the operation and control of the equipment to be commissioned to the Engineer.
- e. Using the manufacturers startup procedures and pre-functional checklists, develop initial checkout and full Startup Plans for electrical equipment and systems to be commissioned.
 - i. Submit the initial checkout and full Startup Plans to the Engineer for review and approval prior to startup of the equipment or system.
- f. Prepare functional performance test procedures.

- ii. Review the test procedures to ensure their feasibility, safety, and protection of equipment; and furnish in writing the necessary alarm limits to be used during the tests.
- g. Furnishing the electrical testing equipment required to perform the commissioning procedures.
- h. Executing the tasks listed on the approved pre-functional checklists and performing the startup tests.
 - i. Provide skilled technicians to execute the starting of equipment.
 - ii. Ensure that the technicians are available and present during agreed upon schedules, and for a sufficient time to complete the necessary tests, adjustments, and problem solving.
- i. Perform the functional performance tests and execute seasonal or deferred functional performance testing, witnessed by the Engineer.
 - i. Provide skilled technicians to perform the functional performance testing.
- j. Correct any deficiencies, meaning differences between the specified and observed performance as interpreted by the Engineer, in the tested equipment and systems; and retest the equipment and systems after corrections have been made.

Electrical Equipment Supplier's Commissioning Responsibilities:

The electrical Suppliers and vendors are required to execute the commissioning responsibilities assigned to them, including, but not limited to, the following:

- a. Furnishing requested Submittal data, including detailed startup procedures, and specifying specific responsibilities of the City of Tolleson required for maintaining the equipment warranties in force.
- b. Furnishing assistance during equipment testing.
- c. Furnishing information requested by the Contractor regarding the sequences of operation and testing procedures for equipment.
- d. Reviewing and approving test procedures for equipment installed by factory representatives.

System Startup

- k. A Prior to system startup, complete the electrical systems and sub-systems so the systems and sub-systems are fully functional, and meet the performance and design requirements of the Contract Documents.
- l. Address current punch list items before performing functional testing.
- m. Complete air and water testing and balancing, and remedy discrepancies and problems discovered, before performing functional testing of air-related or water-related electrical systems.

Initial Checkout Process and Startup:

- n. The electrical Subcontractors are responsible for following the startup and initial checkout procedures for electrical equipment and systems provided under this Contract.
- o. During initial checkout process and startup, execute and document the electrical-related portions of the pre-functional checklists for commissioned equipment and systems.
- p. Perform and clearly document completed startup and system operational checkout procedures and submit a copy to the Engineer.

Functional Testing:

- q. Perform the startup and checkout activities for the sweep or scheduled lighting controls, power quality, communications systems, public address/paging, and other pertinent systems within the Contract Documents.
- r. Begin functional testing of each electrical equipment item or system when the equipment item or system is completed.
- s. At the discretion of the Engineer, functional testing may proceed prior to completion of the system or sub-systems.
- t. Beginning testing of a system before it is completed does not relieve the Contractor from fully completing the system, or executing pre-functional checklists, as early as possible.

Closeout Activity

The Engineer is responsible for overseeing and approving the content and adequacy of the training provided to City of Tolleson's personnel for commissioned electrical equipment and systems.

- u. The electrical Subcontractors are responsible for performing the following training-related functions after the functional testing is complete, unless otherwise approved by the Engineer in writing:
- v. For each major piece of equipment, engage an appropriate expert and qualified trainer to furnish the instruction for City of Tolleson's operating staff and demonstrate the equipment as specified.
- w. The trainer may be the startup technician for the piece of equipment, the installing Subcontractor, or a trade or manufacturer's representative.
- x. The trainer must possess practical operating expertise and in-depth knowledge of the specific piece of equipment's modes of operation.
- y. More than 1 trainer may be required to demonstrate or furnish training for a piece of equipment.
 - 1. At least 2 weeks before the training and demonstration are scheduled to occur, submit an outline describing the training to be furnished.
 - 2. For each electrical system, subsystem, or piece of equipment to be commissioned, provide the Engineer's designated personnel with a comprehensive orientation and a training session, or training

sessions, designed to furnish an understanding of the systems and their operation and maintenance.

3. Begin the training with classroom sessions, if necessary, followed by hands-on training on each piece of equipment or system designed to illustrate the equipment's or system's various modes of operation, including startup, shutdown, fire or smoke alarm, power failure, and similar modes.

Demonstration:

4. Fully explain and demonstrate the operation, function, and overrides of local packaged controls not controlled by the central control system to City of Tolleson's designated personnel.
5. During the demonstration, if the system fails to perform in accordance with the requirements of the Operation and Maintenance Manual or the sequence of operations, repair or adjust the system as necessary, and repeat the demonstration.

Training of City of Tolleson's Personnel:

Classroom Sessions:

6. Design training sessions to follow the Table of Contents of the Operation and Maintenance Manuals for the subject equipment, and whenever possible illustrate the use of the Operation and Maintenance Manuals for reference.
7. Use the format and training agenda included in ASHRAE Guideline 1.1 2008.
8. Use overhead projections, slides, video/audio-taped material, as appropriate, in classroom sessions.
9. Refer to the printed installation, operation, and maintenance instruction material included in the Operation and Maintenance Manual for the equipment or system.
10. Review the written operation and maintenance instructions, emphasizing safe and proper operating requirements, preventative maintenance, special tools needed, and spare parts inventory suggestions.
11. Teach students the startup, shutdown, seasonal changeover, and emergency procedures as applicable, and operation of the equipment or system in all possible modes.
12. Discuss relevant health and safety issues and concerns.
13. Discuss warranties and guarantees.
14. Describe common troubleshooting problems and solutions.

15. Discuss peculiarities of the equipment installation or operation.
16. Discuss the explanatory information included in the Operation and Maintenance Manuals, and the location of plans and manuals in the facility.

Hands-On Training

17. Furnish hands-on training that includes startup and operation in all modes, including, but not limited to, manual operation, shutdown, and emergency operation procedures, if any.
18. Furnish hands-on maintenance training for each piece of equipment.

Record Documentation

19. During construction, prepare and maintain as-built red-line drawings on Contract Plans, and prepare final computer-generated as-built drawings to be used as coordination drawings.
20. Update the as-built drawings after completion of the commissioning activities, excluding the deferred functional testing.
21. Submit the final computer-generated as-built drawings showing the commissioned electrical equipment and systems to the Engineer.

Maintenance

Operation and Maintenance Manuals:

22. Prepare Operation and Maintenance Manuals in accordance with the requirements specified in the Contract Documents.
23. The electrical Subcontractors and equipment suppliers are responsible for compiling and preparing documentation for the electrical equipment and systems provided under this Contract for inclusion in the Operation and Maintenance Manuals.
24. Submit a copy of the Operation and Maintenance Manuals and submittals for the electrical equipment and systems to be commissioned, as specified in the Contract Documents, to the Commissioning Authority for review.
25. The electrical Subcontractors are responsible for clarifying and updating the original sequences of operation furnished to as-built conditions.

Electrical lighting contractor shall provide the City a 2-year duration renewable up to a total of 10-year maintenance agreement. Electrical lighting contractor to negotiate terms and conditions of agreement prior to substantial completion.

Warranty:

All luminaire assemblies and associated communication devices shall be provided with a manufacturer 5-year warranty beginning at the date of substantial completion.

Method Of Measurement:

The accepted quantities for Miscellaneous Electrical (Ped Bridge Lighting) shall be measured per lump sum, which includes Flexible linear pedestrian path lighting, Wall-wash Bridge, and all necessary cabling, lenses, brackets, and installation in accordance with the specifications identified with this document and on the plans.

The accepted quantities for Electrical System (Ped Bridge Lighting DMX Control) shall be measured per lump sum, which includes installing DMX Communications System, and all necessary cabling, brackets, and installation in accordance with the specifications identified with this document and on the plans.

Basis of Payment:

The accepted quantities for Miscellaneous Electrical (Ped Bridge Lighting) measured as provided above, shall be paid for at the contract lump sum, which price shall be full compensation for the work, complete in place.

The accepted quantities for Electrical System (Ped Bridge Lighting DMX Control) measured as provided above, shall be paid for at the contract unit lump sum, which price shall be full compensation for the work, complete in place. No separate payment shall be made for equipment warranties nor commissioning.

ITEM 7370652 - FIBER OPTIC EQUIPMENT (CELLULAR MODEM):

Description:

The work under this item consists of the installation of Modem Assemblies at the locations identified on the plans.

Materials:

The modem assembly shall include the following:

Manufacturer	Model Number
Cradlepoint Modem	R1900
Panorama Antenna	LG-IN2607

All materials provided shall be from new un-depreciated stock. Refurbished materials shall not be used. All materials provided shall be currently supported by the manufacturer and not scheduled for end-of-life.

The contractor shall confirm the current model numbers with the Engineer prior to procuring the equipment.

Construction Requirements:

The contractor shall furnish the required mounting hardware to install the modem assembly as shown on the plans. The contractor shall supply all connectors, cabling, and incidental hardware required to install the power and communication cabling from the modem assembly.

Method of Measurement:

Electrical System (Modem Assembly) will be measured as each for each modem assembly furnished and installed.

Basis of Payment:

The accepted quantity of Electrical System (Modem Assembly), measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work, complete in place and successfully tested.

No separate payment will be made for modems, antennas, power supplies, and associated equipment including, but not limited to, mounting hardware, power supplies, communications cabling, and miscellaneous materials required to provide a complete and operational modem assembly.

ITEM 8030104 – DECOMPOSED GRANITE (2" THICK)

Description:

The work under this item shall consist of furnishing, placing, grading, compacting, and maintaining decomposed granite at the locations shown on the Project Plans, complete in place.

Materials:

Decomposed granite shall conform to the requirements of MAG Standard Specifications Section 430 – Landscaping, except as modified herein.

Decomposed granite shall be native, desert decomposed granite of the size and color specified on the Project Plans. Material shall be free from coatings, clay, caliche, organic matter, and other deleterious substances.

Each type of decomposed granite shall be obtained from a single source unless otherwise approved by the Engineer. The Contractor shall submit the proposed material source, color, and gradation for approval.

The Contractor shall submit:

- Certificates of Compliance for decomposed granite and pre-emergent herbicide prior to delivery
- Gradation report demonstrating compliance with specified requirements a minimum of 15 working days prior to placement

Certificates of Compliance shall include supplier name, source location, date of purchase, product description, and quantity.

The Contractor shall provide a one-ton sample of each type of decomposed granite, placed on-site at the specified thickness, for review and approval prior to installation.

Construction Requirements:

Construction shall conform to MAG Section 430, except as modified herein.

Subgrade shall be examined, verified for proper elevation, and prepared prior to placement. Subgrade shall be fine graded, cleared of vegetation and debris greater than 1 inch in size, and compacted to a minimum of 85 percent of maximum dry density in accordance with Arizona Test Methods 230 or 235.

Existing weeds and grasses shall be removed by mechanical or chemical means. Areas designated for decomposed granite shall be maintained vegetation-free for a minimum of 40 working days prior to placement.

All herbicides and weed control products shall be submitted for approval prior to application. The Contractor shall provide manufacturer data and application rates.

Pre-emergent herbicide shall be applied in accordance with the manufacturer's recommendations and shall be equivalent to Surflan, Gallery, Dacthal, or an approved equal. A total of three applications shall be provided:

- One application prior to decomposed granite placement
- One application after placement and compaction
- One application within 30 days prior to the end of the maintenance period

The Engineer shall be notified prior to all herbicide applications.

Decomposed granite shall be placed to a compacted thickness of 2 inches. Material shall be moisture conditioned, spread, graded, and compacted to produce a firm, stable, and uniform surface acceptable to the Engineer.

Placement and grading operations shall ensure uniform compaction of the surface. Equipment and methods shall be subject to approval by the Engineer.

After placement and compaction, the decomposed granite shall be water settled to remove surface fines and produce a uniform finish. Water settling shall be performed by applying water to achieve full depth saturation of the material, or as approved by the Engineer.

Finished decomposed granite surfaces shall be graded to match adjacent improvements and shall be maintained smooth and free of ruts, depressions, vegetation, and debris during construction.

Unless otherwise specified, final grade shall be 1 inch below adjacent hardscape surfaces.

Method of Measurement:

Decomposed Granite (2" Thick) will be measured by the square yard based on the area constructed within the limits shown on the Project Plans or as directed by the Engineer.

Basis of Payment:

The accepted quantities of Decomposed Granite (2" Thick), measured as provided above, will be paid for at the contract unit price per square yard.

Payment shall be full compensation for all work specified herein and in MAG Section 430, including subgrade preparation, vegetation removal, herbicide application, furnishing and placing decomposed granite, compaction, water settling, maintenance during

construction, and all labor, materials, equipment, and incidentals necessary to complete the work.

No additional payment will be made for work incidental to this item.

ITEM 8080627 – RECONSTRUCT WATER SERVICE

ITEM 8080028 – BACKFLOW PREVENTION UNIT (MAG 611-1):

ITEM 8080633 – WATER METER (FOR 1" SERVICE):

Description:

The work under these items consists of installing new water meter, box, cover, backflow preventor and reconstruction of the customer water service line at the locations designated on the project plans and in accordance with the details shown on the project plans and as specified herein.

Materials:

Materials for the reconstruction of existing customer water service lines and new backflow preventers shall conform with the requirements of the City of Tolleson supplement to the MAG Standard Specifications MAG Standard Detail 611-1, and the MAG Standard Specifications Section 610.

Materials for water meters shall conform to the requirements of the City of Tolleson supplement to the MAG Standard Specifications and the City of Phoenix Standard Detail P-1342.

Construction Requirements:

The contractor shall coordinate with the City of Tolleson to arrange for the removal of the existing water meter and installation of the new meter at the locations shown on the project plans. The contractor shall remove and dispose of the water meter box and cover, and provide a new box, cover, and necessary fittings for the City to connect the water meter at the new location.

The contractor shall install the water meter box, cover, tapping saddle, water service line and all necessary fittings in accordance with the requirements of City of Tolleson Supplement to the MAG Standard Specifications, the Phoenix Standard Detail P-1342, the MAG Standard Specifications and in accordance with the project plans.

The contractor shall coordinate water service shutdowns with the City of Tolleson, through the Engineer, and the water user a minimum of 48 hours in advance of the required shutdown. The contractor shall also coordinate with the City of Tolleson, through the Engineer, for setting of the meter at the new meter box locations.

Method of Measurement:

Water meter (for 1" service) and backflow prevention unit will be measured as a unit for each backflow preventor, water meter box, cover, tapping saddle, and water service line furnished and installed.

Basis of Payment:

The accepted quantities water meter (for 1" service) and backflow prevention unit, measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including coordination with the City of Tolleson and fees imposed by the City.

ITEM 9080101 – CONCRETE CURB AND GUTTER, TYPE A (MAG DET. 220-1):

ITEM 9080108 – CONCRETE SINGLE CURB (MAG DET. 222)(TYPE A)(H=6"):

ITEM 9080241 – CONCRETE SIDEWALK (MAG DET. 230):

ITEM 9080297 – CONCRETE SIDEWALK RAMP (MAG DET. 237-1):

Description:

The work under this section shall consist of furnishing all materials and constructing Portland cement concrete curb, curb and gutter, sidewalk, and sidewalk ramps, and driveways at the locations and in accordance with the details as shown on the Project Plans and these Special Provisions.

Materials:

(A) Concrete

Concrete for sidewalk and curb, gutter, and single curb not adjacent to driveways or sidewalk ramps shall be Class B concrete conforming to the requirements of Section 1006.

Concrete for sidewalk ramps, driveways, and curb and gutter adjacent to sidewalk ramps and driveways shall be Class S concrete conforming to the requirements of Section 1006.

(B) Expansion Joint Filler

Expansion joint filler shall be 1/2 inch bituminous or nonbituminous performed strips conforming to the requirements of Subsection 1011-6.

(C) Concrete Curing Compound

Curing compound shall be liquid membrane-forming compound conforming to the requirements of Subsection 1006-2.05.

(D) Detectable Warning Strip

Detectable warning strips shall consist of a pre-fabricated mat with truncated domes aligned in a square grid matrix on a flat substrate, or other pre-fabricated materials meeting the requirements of the Standard Drawings. Detectable warning strips shall contrast visually with the sidewalk ramp, and shall conform to the current requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Detectable warning strips shall be pre-fabricated from durable material approved by the Department. All detectable warning strips installed within the project limits shall be the same type, unless shown otherwise on plans or approved by the Engineer.

Pre-fabricated detectable warning strips approved for use are shown on the Department's Approved Products List (APL). The most current version of the APL is available on the internet from the ADOT Research Center, through the Product Evaluation Program. Pre-fabricated detectable warning strips not listed on the APL may be considered for use in accordance with the requirements of Subsection 106.14.

Construction Requirements:

Concrete curb, curb and gutter, driveway, sidewalk ramp, or sidewalk shall be constructed in accordance with the requirements of the details indicated on the project plans and as specified herein.

The subgrade shall be constructed in reasonably close conformity to the lines and grades established or shown on the project plans.

Prior to placing concrete curb, curb and gutter, driveway, sidewalk ramp, or sidewalk, the material on which they are to be placed shall be compacted to a depth of at least 6 inches to a density of not less than 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual as directed and approved by the Engineer.

All soft or unsuitable material shall be removed to a depth of not less than 6 inches below subgrade and replaced with material approved by the Engineer.

Single curb, curb and gutter, and sidewalk shall be constructed either by the use of conventional fixed forms or by slip-form curb and sidewalk placing machines.

Weather and temperature limitations for the placement of concrete shall be in accordance with the requirements of Subsection 1006-5.

Forms shall be maintained at all times in good condition as to accuracy of shape, strength, rigidity and smoothness of surface. The depth of face forms for concrete curbs shall be equal to the full face height of the curb.

All other forms shall be set to form the full depth of all edges not formed by adjacent concrete. Unsatisfactory forms shall not be used.

Forms shall be set in reasonably close conformity to the dimensions, lines and grades shown on the project plans or established by the Engineer and be securely staked in

position. Clamps, spreaders, and braces shall be used where required to ensure rigid forms.

When the roadway section slopes away from the gutter, the slope of the gutter shall be formed to match the roadway cross slope.

The subgrade and forms shall be watered immediately before placing concrete. Concrete shall be placed in the forms and thoroughly consolidated. The concrete shall be consolidated by means of approved mechanical vibrators or by tamping or spading by hand. The fresh concrete shall be struck off so the surface will be at the proper elevation when the concrete is consolidated. Concrete shall be thoroughly worked so that the coarse aggregate is below the surface. The surface shall then be finished to grade and cross-section with a float, troweled smooth and then given a final fine brush finish.

The exposed edges shall be tooled to a 1/4 inch radius unless a larger radius is indicated on the plans. When concrete placed in curb has set sufficiently so that it will not slump, the front face form shall be removed. The gutter, front face, and top of curb shall be troweled smooth and then given a final fine brush finish with brush strokes parallel to the lines of curb and gutter. The exposed edges shall be tooled to a 1/4 inch radius.

Expansion joints shall be constructed at tangent points of curb returns, at structures, and at a maximum of 60 foot intervals. Expansion joints shall be constructed between sidewalks and driveways, between sidewalks and abutting structures, around poles, posts, boxes, and other fixtures that protrude through the sidewalk. Expansion joints shall match as nearly as possible to the joints in the adjacent pavement or existing concrete curb and sidewalk. Joint filler shall be placed vertically and extend full depth beginning 3/16 inch below the surface of the concrete being placed. During the placing and tamping of concrete, the filler shall be restrained in its proper position.

Edges of the concrete at expansion joints shall be tooled to a 1/4 inch radius.

Contraction joints (weakened-plane joints) shall be constructed at a maximum of 15 foot intervals in curb and gutter and sidewalks and shall coincide with contraction joints in adjacent pavement or existing concrete curb and sidewalk. A contraction joint shall be constructed along the center of driveway entrances 20 feet wide or greater.

Longitudinal contraction joints shall be constructed in the center of sidewalk having a width greater than 7 feet. Contraction joints shall either be formed or sawed. Formed contraction joints shall be constructed by parting the large aggregates in the fresh concrete with a straightedge to a depth of 2 inches. The final joint finishing shall be accomplished with a jointer tool having a radius of 1/4 inch leaving a finished joint depth of a minimum of 3/4 inch. Sawed joints shall be sawed to a depth of 2 inches or one-third the thickness of the concrete, whichever is greater.

Scoring lines, where required, shall have a minimum depth of 1/4 inch and a radius of 1/8 inch. Where longitudinal scoring lines are required, they shall be parallel to, or concentric with, the lines of the work.

Forms shall be thoroughly cleaned each time they are used and shall be coated with a light oil as required to prevent the concrete from adhering to them.

If slip-form equipment is used to construct curb and gutter and sidewalk, such equipment shall be designed specifically for the work. The results shall be equal to or better than that produced by the use of fixed forms. If the results are not satisfactory to the Engineer, the use of the equipment shall be discontinued. All applicable requirements of construction by use of fixed forms shall apply to the use of slip-form equipment.

The slip-form equipment shall be controlled as to line and grade by means of automatic sensing and control devices such that the machine automatically senses and follows either a taut guide line or other reference, performing any necessary corrective maneuvers in order to establish the correct grade and alignment. The contractor shall set the guide line from survey marks.

Immediately following the required finishing operations, one or more applications of curing compound shall be applied to all exposed surfaces.

The curing compound shall be applied at the rate of not less than 1 gallon per 150 square feet of surface area, and in such manner as to entirely cover and seal all exposed surfaces of concrete with a uniform film.

The surface of concrete sidewalk shall be tested with a 10-foot straightedge. Any deviation in excess of 1/4 inch shall be corrected at no additional expense to the Department.

The face, top, back, and flow line of the curb and gutter shall be tested with a 10-foot straightedge or curve template, longitudinally along the surface.

Any deviation in excess of 1/4 inch shall be corrected at no additional expense to the Department.

No vehicular traffic will be allowed on driveways until the concrete has reached at least 60 percent of the required 28-day strength.

Before acceptance of the work, all curb and gutter and sidewalk shall be cleaned of all discolorations resulting from the contractor's operations, including, but not limited to, dirt, stains, bitumens, and equipment tire marks. Cleaning may be by abrasive blast methods or by other methods approved by the Engineer.

The top surface of detectable warning strips, exclusive of the truncated domes, shall be within $\pm 1/16$ inch of the sidewalk ramp surface in accordance with the requirements of the ADAAG. Detectable warning strips shall be installed in accordance with manufacturer's instructions and current industry practice. In case of discrepancy the manufacturer's instructions shall govern.

Method of Measurement:

Concrete single curb and curb and gutter will be measured by the linear foot along the flow line. Lengths of depressed curb and depressed curb and gutter at driveway and sidewalk ramp locations will be included in the measurement. Lengths of curb transition and termini, and curb and gutter transition and termini will be included in the measurement. Lengths occupied by catch basins will be excluded from the measurement. No measurement will be made for ramp curb.

Concrete sidewalks and driveways will be measured by the square foot of area constructed. Areas occupied by catch basins will be excluded from the measurement.

Concrete sidewalk ramps, of the type shown on the plans, will be measured either as a unit by square foot, as listed in the bidding schedule, of sidewalk ramp constructed, including detectable warning strip.

No separate measurement or payment will be made for excavation, embankment, or the grading of drainage ditches, the cost is considered included in the cost of these items.

Basis of Payment:

The accepted quantities of concrete single curb, curb and gutter, sidewalk, and driveway, measured as provided above, will be paid for at the contract unit price per linear foot or square foot, which price shall be full compensation for the work, complete in place, including furnishing and placing embankment material, excavating, removing unstable material, backfilling and compacting.

The accepted quantities of sidewalk ramps, measured as provided above, will be paid for at the contract unit price each, or per square foot, which price shall be full compensation for the work, complete in place, including furnishing and placing embankment material, excavating, removing unsuitable material, backfilling and compacting, surface finishing, and furnishing and installing the detectable warning strip.

No separate measurement or payment will be made for the ramp curb along the back edge or side of sidewalk ramps, nor for the detectable warning strip, the costs being considered as included in the price of contract items.

ITEM 9080135 – CONCRETE VALLEY GUTTER (MAG DET. 240):

Description:

The work under this item shall consist of constructing concrete valley gutters as shown on the project plans and in accordance with the project details and as specified herein.

Materials:

Concrete shall conform to the requirements of Section 1006 of the specifications for Class S concrete.

Reinforcing steel shall conform to the requirements of Section 605 of the specifications.

Construction Requirements:

Concrete valley gutters shall be constructed in accordance with the requirements of MAG Standard Details and in accordance with the project plans.

Method of Measurement:

Concrete valley gutters will be measured per square foot.

Basis of Payment:

The accepted quantities of concrete valley gutters, measured as provided above, will be paid for at the contract unit price per square foot, which price shall be full compensation for the work, complete in place, including forming, placement of concrete, aprons, construction joints, reinforcing steel, and subgrade preparation.

(913BKPRT, 02/18/21)

SECTION 913 BANK PROTECTION: of the Standard Specifications is revised to read:

913-1 Description:

The work under this section shall consist of furnishing all materials and constructing bank protection in accordance with the details shown on the plans and the requirements of the specifications.

Bank protection shall be dumped riprap, grouted riprap, wire tied riprap, riprap in wire baskets or gabions, soil-cement, and other types of bank protection and shall be constructed at the locations and as shown on the plans.

913-2 Materials:

913-2.01 Riprap Bank Protection:

(A) Rock:

Rock shall be sound and durable, free from clay or shale seams, cracks or other structural defects.

The bulk (SSD) specific gravity of the rock shall be a minimum of 2.4 as determined in accordance with the requirements of Arizona Test Method 210.

Rock used to construct dumped riprap shall be angular in shape. Rock used to construct other types of bank protection may be rounded stones or boulders. Rock shall have a least dimension not less than one-third of its greatest dimension and a gradation in reasonable conformity with that shown herein for the various types of bank protection. Control of the gradation will be by visual inspection.

When a source of rock is designated by the Department, it shall be the contractor's responsibility to negotiate for the material, obtain the right-of-way, and pay all royalties and damages.

The acceptability of the rock will be determined by the Engineer by visual inspection and/or testing. If testing is required, suitable samples of rock shall be taken in the presence of the Engineer at least 25 days in advance of its expected use. The approval of some rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from that quarry.

During construction of the bank protection, the contractor shall provide two samples of rock for the intended use. The amount of each sample for dumped riprap and riprap (slope mattress) shall be at least five tons. The amount of each sample for grouted riprap, wire tied riprap, gabions, and rail bank protection shall be at least 500 pounds. One sample shall be provided at the construction site and may be a part of the finished bank protection. The other sample shall be provided at the quarry. These samples will be used as a frequent reference for judging the gradation of the rock supplied. Any difference of opinion between the Engineer and the contractor shall be resolved by checking the gradation of two random samples of the rock.

Material that is deemed unacceptable by the Engineer shall be replaced with acceptable material at no additional cost to the Department.

(1) Grouted Riprap:

Gradation of the rock for grouted riprap shall be as specified in the Special Provisions or as shown on the plans.

(2) Wire Tied Riprap:

Rock for wire tied riprap shall be well graded with at least 95 percent exceeding the least dimension of the wire mesh opening. The maximum size rock, measured normal to the mat, shall not exceed the mat thickness.

(3) Dumped Riprap:

Gradation of the rock for dumped riprap shall be as shown on the plans or as specified in the Special Provisions.

All equipment, sorting sites, and labor needed to check gradation shall be provided by the contractor at no additional cost to the Department.

(4) Gabions:

Rock for gabions shall be well graded, varying in size from 4 to 8 inches.

(5) Riprap (Slope Mattress):

Rock for slope mattress shall be well graded with 70 percent exceeding three inches. The maximum dimension of a single rock shall not exceed the least dimension of the gabion.

(6) Rail Bank Protection:

Rail bank protection rock shall be well graded, varying in size from 4 to 12 inches.

(B) Metal Items:

(1) Wire Fabric:

Welded wire fabric shall be galvanized and shall conform to the requirements of AASHTO M 336, except that the minimum weight of the zinc coating shall be 0.15 ounces per square foot of actual surface.

Woven wire fabric shall be galvanized and shall conform to the requirements of ASTM A116, except that the minimum weight of the zinc coating shall conform to the requirements of ASTM A641, Class 3.

Wire fabric shall be of the diameter, spacing, pattern, and dimensions shown on the plans. The selvage on each sheet of mesh shall be galvanized steel wire with a minimum diameter 25 percent larger than that used in the body of the mesh.

Certificates of Compliance conforming to the requirements of Subsection 106.05 of the specifications shall be submitted to the Engineer.

(2) Miscellaneous Fittings and Hardware:

Miscellaneous fittings and hardware shall be of the type and size provided by the manufacturer of the major item to which they apply and shall be galvanized in accordance with the requirements of AASHTO M 232.

Certificates of Compliance conforming to the requirements of Subsection 106.05 of the specifications shall be submitted to the Engineer.

(3) Tie Wires:

Tie wires shall be of good commercial quality and the size shall be as shown on the plans, except that the minimum weight of the zinc coating shall conform to the requirements of

ASTM A641, Class 3. The contractor may use approved wire fasteners on gabions, slope mattresses, or wire fabric in lieu of tie wires.

Certificates of Compliance conforming to the requirements of Subsection 106.05 of the specifications shall be submitted to the Engineer.

(4) Steel Cable:

Steel cable shall be zinc-coated steel structural wire rope conforming to the requirements of ASTM A475, seven-wire strand, Class A, for the diameter shown on the plans.

Certificates of Compliance conforming to the requirements of Subsection 106.05 of the specifications shall be submitted to the Engineer.

(5) Railroad Rail:

Railroad rails may be new or used. If used rails are furnished, they shall be free from rust and equal to at least 95 percent of the original section.

(6) Soil Anchor Stakes:

Soil anchor stakes shall be made of steel and of the length shown on the plans. When not specified to be railroad rails, the following items may be used: crane rails with a weight of at least 40 pounds per linear foot, 2-inch diameter steel pipe conforming to the requirements of ASTM A53, or 3-inch by 3-inch by 3/8-inch structural steel angles conforming to the requirements of ASTM A36. Used rails, pipes or angles may be used provided the material is not rusted or damaged to the extent that the strength of the item is reduced to less than 90 percent of a new item of the same type and size.

Certificates of Compliance conforming to the requirements of Subsection 106.05 of the specifications shall be submitted to the Engineer.

(C) Bedding Material:

Bedding material shall consist of granular material having a maximum dimension of 2 inches and shall be free of clay or organic material.

(D) Grout:

Grout shall consist of Portland cement, aggregate, and water. It may also contain supplementary cementitious material. Portland cement, aggregate, water, and supplementary cementitious material shall conform to the requirements of Section 1006 of the specifications. Chemical admixtures may be used and shall conform to the requirements of Subsection 1006-2.04 of the specifications, except no admixtures containing chlorides or nitrates shall be used. Air-entraining admixtures, conforming to the requirements of Subsections 1006-2.04 and 1006-3.01(E) of the specifications, shall be required for grout placed at elevations of 3000 feet or above.

The grout shall meet the requirements shown in table 1:

Table 1			
Minimum Cementitious Material Content: Lbs per CY (See Note 1)	Maximum Water/Cementitious Material Ratio (w/cm): Lb./Lb.	Slump: Inches (See Note 2)	Air Content: Percent (See Note 3)
850	0.60	9 ± 2	0 – 8
Notes: (1) A maximum of 25 percent of the cementitious material, by weight, may consist of an approved Class F fly ash, conforming to the requirements of ASTM C618. (2) The slump shall be in the appropriate range to permit gravity flow into the interstices with limited spading and brooming. The consistency of the grout shall be as approved by the Engineer. (3) For placement of grout at elevations of 3000 feet or above, the air content shall be a minimum of 4 percent and a maximum of 8 percent.			

The mix shall consist of fine aggregate; however, the contractor may use No. 8 coarse aggregate in the grout. If No. 8 coarse aggregate is used, the volume shall be a maximum of 35 percent of the total aggregate volume.

For plant-mixed grout, the proportioning, mixing, and placing shall be in accordance with the applicable requirements in Section 1006 of the specifications.

For on-site mixing, grout that has been mixed more than one hour shall not be used.

Retempering of grout will not be permitted.

(E) Bank Protection Fabric:

Fabric shall be supplied in accordance with and conform to the material requirements of Subsections 1014-1 and 1014-5 of the specifications, respectively. Special attention shall be given to the required survivability of the fabric.

The identification, packaging, handling, and storage of the geotextile fabric shall be in accordance with ASTM D4873. Fabric rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged to provide product identification sufficient to determine the product type, manufacturer, quantity, lot number, roll number, date of manufacture, shipping date, and the project number and name to which it is assigned. Rolls shall be

stored on-site or at another storage location in a manner which protects them from the elements. If stored outdoors, rolls shall be elevated and protected with a waterproof, light colored, opaque cover. At no time, shall the fabric be exposed to sunlight for a period exceeding 14 days.

(F) Sacked Concrete:

Sacked concrete shall be utility concrete conforming to the requirements of Section 922 of the specifications, except that the minimum cement content shall be 376 pounds per cubic yard; the slump shall be from 3 to 5 inches; and the aggregate shall conform to the gradation requirements shown in table 2 when tested in accordance with the requirements of Arizona Test Method 201:

Table 2	
Sieve Size	Percent Passing
2 inch	100
1/4 inch	45 - 89
No. 200	0 -12

Sacks for sacked concrete riprap shall be made of at least AASHTO M 182, Class 3, burlap and shall be approximately 19-1/2 by 36 inches measured inside the seams when the sack is laid flat, with an approximate capacity of 1-1/4 cubic feet. Sound, reclaimed sacks may be used.

913-2.02 Soil-Cement Bank Protection:

(A) Hydraulic Cement, Fly Ash, and Water:

Hydraulic cement, fly ash, and water shall conform to the requirements of Subsection 1006-2 of the specifications.

(B) Soil-Aggregate:

The source of soil-aggregate materials shall be the responsibility of the contractor. The contractor shall be solely responsible for the construction of the stockpile(s), including monitoring for quality and uniformity of the material placed therein. The soil-aggregate used in the soil-cement mixture shall consist of stones, gravel or other approved inert material of similar characteristics, and shall be clean and free from vegetable matter and other deleterious substances. Soil-cement aggregate shall conform to the gradation requirements shown in table 3 when tested in accordance with Arizona Test Method 201:

Table 3	
Soil-Cement Aggregate	
Sieve Size	Percent Passing
1-1/2 in	98 - 100
No. 4	60 - 90
No. 200	5 - 15

Class 2 ABC may be used in-lieu of aggregate meeting the requirements of the table 3. The contractor may submit a request to use alternate material to the Engineer for review and approval.

The Plasticity Index shall be a maximum of seven when tested in accordance with the requirements of AASHTO T 90.

Clay lumps larger than 1 inch shall be removed.

When soil-aggregates are stored on the ground, the sites for the stockpiles shall be clear of all vegetation and level. The bottom six inch layer of aggregate stored on the ground shall not be disturbed or used.

The debris or waste material resulting from the clearing and preparing of the site shall be disposed of in accordance with Subsection 201-3.02 of the specifications.

(C) Mix Design Requirements for Soil-Cement Bank Protection:

Utilizing soil-aggregate, cementitious material, and water, a mix design conforming to the requirements specified herein shall be formulated and submitted by the contractor to the Engineer for approval prior to incorporating any of the material into the work.

The amount of cement shall be determined by laboratory testing by the contractor in accordance with Arizona Test Method 220. For mix design purposes only, the cement content of the soil-cement mixture shall be determined as the cement content which yields a seven day compressive strength of 1250 psi for the soil-cement mixture.

The percent of cement to be used in the mix shall be calculated to be the weight of cement divided by the total weight of the dry compacted soil-cement.

Included in the mix design data shall be the grade of cement, brand of fly ash, and the source of aggregate. A new mix design shall be submitted for approval any time the contractor requests a change in soil-aggregate source from that given in the approved mix designs.

913-3 Construction Requirements:

913-3.01 Riprap Bank Protection:

Areas on which bank protection is to be constructed shall be cleared, grubbed, and excavated or backfilled in accordance with the requirements of the appropriate sections of Division II to produce a ground surface in reasonable conformance with the lines and grades shown on the plans or established by the Engineer.

Placement through water will not be permitted unless otherwise approved by the Engineer.

Areas which are excavated for installation of rail bank protection shall be backfilled to original ground or to the lines and grades shown on the plans.

(A) Bank Protection Fabric:

When fabric is required, it shall be placed in the manner and at the locations shown on the plans. The surface to receive the fabric shall be free of obstructions, depressions and debris. The fabric shall be loosely laid and not placed in a stretched condition.

The strips shall be placed to provide a minimum 24 inches of overlap for each joint. On horizontal joints, the uphill strip shall overlap the downhill strip. On vertical joints, the upstream strip shall overlap the downstream strip. The fabric shall be protected at all times during construction from extensive exposure to sunlight.

When the maximum size of the rock to be placed on fabric exceeds 18 inches, the fabric shall be protected during the placement of the rock by a layer of bedding material. The bedding material shall be spread uniformly on the fabric to a depth of 4 inches and shall be free of mounds, dips or windrows. Compaction of the bedding material will not be required.

Rock shall be carefully placed on the bedding material and fabric in such a manner as not to damage the fabric. If, in the opinion of the Engineer, the fabric is damaged or displaced to the extent that it cannot function as intended, the contractor shall remove the rock, regrade the area if necessary, and replace the fabric.

(B) Dumped Riprap:

The rock shall be placed to its specified thickness in one operation and in a manner which will produce a reasonably well graded mass with a minimum amount of voids and with the larger rock evenly distributed throughout the mass.

No method of placing the rock that will cause segregation will be allowed. Hand placing or rearranging of individual rock may be necessary to obtain the specified results.

(C) Wire Tied Riprap:

After installation of the lower portion of the wire mesh, rock shall be placed in accordance with the requirements of Subsection 913-3.01(B) of the specifications.

After placement of the rock, the upper portion of the wire mesh shall be placed, laced, and tied in accordance with the details shown on the plans.

(D) Grouted Riprap:

Rock for grouted riprap shall be placed in accordance with the requirements of Subsection 913-3.01(B). The stones shall be thoroughly moistened and any excess of fines shall be sluiced to the underside of the stone blanket before grouting.

The grout may be delivered to the place of final deposit by any means that will ensure uniformity and prevent segregation of the grout. If penetration of grout is not obtained by gravity flow into the interstices, the grout shall be spaded or rodded to completely fill the voids in the stone blanket. Pressure grouting shall not unseat the stones, and during placing by this method, the grout shall be spaded or rodded into the voids.

Penetration of the grout shall be to the depth specified on the plans. When a rough surface is specified, stones shall be brushed until 25 to 50 percent of the depth of the maximum size stone is exposed. For a smooth surface, grout shall fill the interstices to within 1/2 inch of the surface.

Grout shall not be placed when the descending air temperature falls below 40 degrees Fahrenheit nor until the ascending air temperature rises above 35 degrees Fahrenheit. Temperatures shall be taken in the shade away from artificial heat.

Curing of the grout shall be in accordance with the requirements of Subsection 912-3.09 of the specifications.

The contractor may use shotcrete conforming to the requirements of Section 912 of the specifications in lieu of grout.

(E) Slope Mattress Riprap:

The mattress bed shall be excavated to the width, line and grade as shown on the plans. The mattress shall be founded on this bed and laid to the lines and dimensions required.

Excavation for toe or cut-off walls shall be made to the neat lines of the wall.

Mattresses shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular units of the specified sizes. Mattresses are to be of single unit construction, the base, ends and sides either to be woven into a single unit or one edge of these members connected to the base section of the unit in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

All perimeter edges of the mattresses are to be securely selvaged or bound so that the joints formed by tying the selvages have at least the same strength as the body of the mesh.

Mattresses shall be placed to conform to the details shown on the plans. Stones shall be placed in close contact within the unit so that maximum fill is obtained. The units may be filled by machine with sufficient hand work to accomplish the requirements of this specification.

Broken concrete shall not be used in slope mattresses.

Before the mattress units are filled, the longitudinal and lateral edge surfaces of adjoining units shall be tightly connected by means of wire ties placed every four inches or by a

spiral tie having a complete loop every four inches. The lid edges of each unit shall be connected in a similar manner to adjacent units. The slope mattress shall be anchored as shown on the plans. Each anchor stake shall be fastened to the cover mesh with a tie wire.

(F) Gabions:

The gabion bed shall be excavated to the width, line and grade as shown on the plans. The gabions shall be founded on this bed and laid to the lines and dimensions required.

Excavation for toe or cut-off walls shall be made to the neat lines of the wall.

Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular units of the specified sizes. Gabions are to be of single unit construction, the base, ends and sides either to be woven into a single unit or one edge of these members connected to the base section of the unit in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

Where the length of the gabion exceeds its horizontal width, the gabion is to be equally divided by diaphragms, of the same mesh type as the body of the gabions, into cells whose length does not exceed the horizontal width. The gabion shall be furnished with the necessary diaphragms secured in proper position on the base section in such a manner that no additional tying at this juncture will be necessary.

All perimeter edges of gabions are to be securely selvaged or bound so that the joints formed by tying the selvages have at least the same strength as the body of the mesh.

Gabions shall be placed to conform to the details shown on the plans. Stones shall be placed in close contact in the unit so that maximum fill is obtained. The units may be filled by machine with sufficient hand work to accomplish requirements of this specification.

The exposed face or faces shall be hand-placed using selected stones to prevent bulging of the gabion cell and to improve appearance. Each cell shall be filled in three lifts.

Two connecting tie wires shall be placed as shown on the plans between each lift in each cell.

Care shall be taken to protect the vertical panels and diaphragms from being bent during filling operations.

The last lift of stones in each cell shall be level with the top of the gabion in order to properly close the lid and provide an even surface for the next course.

All gabion units shall be tied together each to its neighbor along all contacting edges in order to form a continuous connecting structure.

Empty gabions stacked on filled gabions shall be laced to the filled gabion at the front, side and back.

(G) Sacked Concrete Riprap:

The sacks shall be filled with concrete, loosely packed so as to leave room for folding or tying at the top. Approximately one cubic foot of concrete shall be placed in each sack. Immediately after filling, the sacks shall be placed according to the details shown on the plans and lightly trampled to cause them to conform with the earth face and to adjacent sacks in place.

The first two courses shall provide a foundation of double thickness. The first foundation course shall consist of a double row of stretchers laid level and adjacent to each other in a neatly trimmed trench. The trench shall be cut back into the slope a sufficient distance to enable proper subsequent placement of the riprap. The second foundation course shall consist of a row of headers placed directly above the double row of stretchers. The third and remaining courses shall consist of a double row of stretchers and shall be placed in such a manner that joints in succeeding courses are staggered.

All dirt and debris shall be removed from the top of the sacks before the next course is laid thereon. Stretchers shall be placed so that the folded ends will not be adjacent. Headers shall be placed with the folds toward the earth face. Not more than four vertical courses of sacks shall be placed in any tier until initial set has taken place in the first course of any such tier.

When there will not be proper bearing or bond for the concrete because of delays in placing succeeding layers of sacks, a small trench shall be excavated back of the row of sacks already in place, and the trench shall be filled with fresh concrete before the next layer of sacks is laid. The size of the trench and the concrete used for this purpose shall be approved by the Engineer. The Engineer may require header courses at any level to provide additional stability to the riprap.

Sacked concrete riprap shall be cured by being covered with a blanket of wet earth or by being sprinkled with a fine spray of water every two hours during the daytime for a period of four days.

(H) Rail Bank Protection:

Excavation, where required for rock fill, shall be performed in reasonably close conformity to the lines and grades established or shown on the plans.

Rails shall be driven at the locations and to the minimum penetrations shown on the plans. Driving equipment shall be capable of developing sufficient energy to drive the rails to the specified minimum penetration and be approved by the Engineer.

If hard material is encountered during driving before minimum penetration is reached and it has been demonstrated to the satisfaction of the Engineer that additional attempts at

driving would result in damage to the rails, the Engineer may order additional work to be performed, such as jetting or drilling, in order that minimum penetration may be obtained or the Engineer may order the minimum penetration to be reduced as required by the conditions encountered.

Wire fabric shall be securely fastened to the rails, placed in the trenches and laid on the slopes. The rock backfill shall then be carefully placed so as not to displace the wire fabric or rails. The wire fabric shall entirely enclose the rock backfill.

The completed rock fill shall be backfilled as necessary and the waste material disposed of as directed by the Engineer.

913-3.02 Soil-Cement Bank Protection:

Soil-cement bank protection construction shall include excavating, backfilling, and grading the wash bed and banks to the lines, grades and cross sections shown on the plans or established by the Engineer; furnishing and mixing aggregate, cement, fly ash and water; and spreading, compacting, and curing the mixture.

The contractor shall investigate for ground water as soon as possible. If there is a need for dewatering, the contractor shall provide to the Engineer for review a comprehensive dewatering plan a minimum of two weeks before construction starts. The dewatering plan shall address any water quality requirements of the Corps of Engineers permit and ADEQ certification. Dewatering activities shall not begin until the Engineer has approved the plan.

The dewatering shall comply with all laws and permit requirements.

If changes to the approved dewatering plan are required, the contractor shall submit a revised plan to the Engineer for approval.

For soil-cement bank protection, the contractor shall be responsible for quality control as necessary to meet the requirements established herein. The contractor shall monitor the complete mix during construction of soil-cement, including the amounts of cement and fly ash used.

(A) Required Contractor Submittals:

Two weeks prior to the start of the soil-cement bank protection construction, the contractor shall submit in writing to the Engineer for approval, the following items:

- (1) The type of spreading and compaction equipment to be used.
- (2) The number and type of watering equipment to be used.
- (3) The method used to keep surfaces continuously moist until subsequent layers of soil-cement are placed.

- (4) The method used to cure permanently exposed surfaces.
- (5) The proposed source of soil-aggregate.
- (6) The proposed source(s) of Portland cement and fly ash (if used).
- (7) The approximate length of soil-cement bank protection or area of soil-cement to be placed each day prior to starting placement and compaction operations, on a daily basis.
- (8) The soil-cement mix design.

Such submittals shall not relieve the contractor of the responsibility for achieving the desired result of constructing sound soil-cement, free from defects, according to the specifications and plans, or as directed by the Engineer. Changes in the source(s) of cement or fly ash will not be permitted without the prior approval of the Engineer.

(B) Preparation of Subgrade:

Before placement of the soil-cement, the area to be treated shall be graded and shaped to the lines and grades as shown on the plans. The subgrade shall be compacted to a minimum of 95 percent of the maximum dry density determined in accordance with Arizona Test Method 225. The subgrade shall be compacted at a moisture content within two percentage points of the optimum moisture content determined in accordance with Arizona Test Method 225.

When the embankment material is composed predominantly of rock such that these compaction control procedures will not indicate the density achieved, the Engineer will determine the amount of compaction required and the adequacy of equipment used in obtaining the required compaction. Immediately prior to placement of the soil-cement mixture, the subgrade within the lines and grades of the plans shall be moistened and any soft or yielding subgrade shall be corrected and made stable before construction proceeds in accordance with requirements of Subsection 203-5.03(A) of the specifications. Any additional subgrade reparations required outside of the lines and grades shown on the plans, as determined by the Engineer, shall be repaired by the contractor and paid for by Force Account.

(C) Mixing Plant:

Aggregate and cementitious materials for the soil-cement shall be proportioned and mixed in a central mixing plant. The mixing plant shall be either of the batch-mixing type using revolving blade, rotary drum mixers, or of the continuous mixing type using a stationary twin shaft pug mill mixer. The aggregate, fly ash, and cement shall be proportioned by weight. The mixing plant shall be designed, coordinated, and operated to produce a soil-cement mixture of the proportions specified within required tolerances.

If the soil-cement temperatures measured at the mixer are 85 degrees Fahrenheit or less, the placing and compaction shall be completed within 1-1/2 hours of the batch time. If

soil-cement temperatures measured at the mixer are greater than 85 degrees Fahrenheit but less than 96 degrees Fahrenheit, placing and compaction shall be completed within 1 hour of the batch time. If soil-cement temperatures are 96 degrees Fahrenheit or greater when measured at the mixer, the contractor shall take immediate steps to lower the batch plant mix temperature to 95 degrees Fahrenheit or below, and follow the above time limits as mix temperature dictates, prior to further placement and compaction of soil-cement materials.

The water shall be proportioned by weight or volume and there shall be means by which the Engineer may readily verify the amount of water utilized per batch or the rate of water flow utilized for continuous mixing.

(1) Measuring Devices:

The mixing plant shall record the quantity of the material, shall have a digital readout, and shall provide daily printed record such that the total discharged quantity per hour and the cumulative total quantity are displayed.

Measuring devices shall be calibrated and approved by the Engineer.

Each weight measuring device shall be calibrated to an accuracy of 0.2 percent and shall be inspected and calibrated as often as the Engineer deems necessary to assure their accuracy.

Each volume measuring device shall be calibrated to an accuracy of ± 1.5 percent and shall be inspected and calibrated as often as the Engineer deems necessary to assure their accuracy.

(2) Batch Mixing:

The mixer shall be equipped with a sufficient number of paddles of a type and arrangement to produce a uniformly mixed batch. The mixer shall be equipped with a timing device which will indicate, by a definite audible or visual signal, the expiration of the mixing period. The device shall be accurate to within two seconds. The allowable tolerance for weight batching of aggregates and cementitious material shall be two percent and 0.5 percent, respectively, for each batch.

The batch mixing plants shall provide sampling facilities which are satisfactory to the Engineer and which allow representative samples of the soil-aggregate mixture prior to the addition of water and cementitious material to be obtained easily and safely. Samples of the soil-aggregate will be taken at this point to determine conformance to the gradation and plasticity requirements listed in Subsection 913-2.02(B) of the specifications.

(3) Continuous Mixing:

Aggregates shall be drawn from the storage facility by a feeder or feeders which will continuously supply the correct amount of soil-aggregate in proportion to the cementitious material.

A control system shall be provided that will automatically close down the plant when material in any storage facility approaches the strike off capacity of the feed gate. The plant will not be permitted to operate unless this automatic control system is in good working condition. The feeder for the soil-aggregate shall be mechanically or electrically driven.

Continuous mix plants shall provide sampling facilities which are satisfactory to the Engineer and which allow representative samples of the soil-aggregate mixture prior to the addition of water and cementitious material to be obtained easily and safely. Samples of the soil-aggregate will be taken at this point to determine conformance to the gradation and plasticity requirements listed in Subsection 913-2.02(B) of the specifications.

(4) Blending of Cement and Fly Ash:

The blending procedure shall be sufficient to provide a uniform, thorough, and consistent blend of cement and fly ash. The blending method and operation shall be approved by the Engineer prior to the commencement of soil-cement production. During blending of the cementitious materials, the percent of fly ash content shall not vary by more than ± 0.5 percent of the content approved by the Engineer.

Weight measuring devices are required at both the cement and fly ash feeds. At the direction of the Engineer, an additional measuring device may also be required when the cement and fly ash are pre-blended at the site. In the production of the soil-cement mixture, the percent of cementitious material shall not vary by more than ± 0.5 percent of the contents approved by the Engineer.

Silos and feeders shall be equipped and operated so as to provide uniform rates of feed and prevent caking. The charge in the batch mixer or rate of feed to the continuous mixer shall not exceed that which will permit complete mixing of all the mix material. Provisions shall be made to allow for ready sampling of the cementitious materials.

(D) Transporting, Spreading, and Compaction:

The soil-cement mixture shall be transported from the mixing plant to the construction site in clean hauling equipment vehicles outfitted with suitable covers to protect the mixture in unfavorable weather.

Spreading of the soil-cement mixture shall be accomplished using equipment that will produce uniform layers of the width and thickness necessary to provide for adequate compaction in conformance with the required dimensions shown on the plans for completed soil-cement layers. Where the soil-cement is to be placed in confined areas, the lifts may be spread by other methods as approved by the Engineer.

The layers of soil-cement shall not exceed 12 inches after compaction, or be less than four inches thick after compaction, unless the contractor can demonstrate the ability to place thicker layers with the equipment being utilized in the control strip. If potholing is performed to allow testing of each lift, the recompacted material used to repair the pothole

shall also be tested and meet the requirements of this specification. Each successive layer shall be placed as soon as practicable after the preceding layer is completed, and approved by the Engineer. The maximum depth of compacted soil-cement that shall be placed per day in each location is four feet, unless approved by the Engineer.

Prior to spreading new material on a previously compacted lift which has cured for more than 1-1/2 hours, or if the surface has dried due to temperature and/or wind effects, scarification of the lift shall be performed parallel with the direction of placement using equipment approved by the Engineer. The scarification shall be performed to a depth of at least two inches, spaced between 18 and 24 inches. The Engineer may waive requirements for scarification if compaction is performed by means which provide an appropriate surface for bonding with the subsequent layer.

All construction equipment, including water spray trucks, shall be restricted from entering scarified surface areas during the interim between spreading and compaction operations.

If the surface cannot be scarified, the surface shall have cement grout slurry applied to ensure a proper bonding between lifts. The cement slurry shall have a water/cement ratio between 0.70 and 0.80 and be approved for use by the Engineer prior to placement of any additional soil-cement mixture.

All soil-cement surfaces that will be in contact with succeeding layers of soil-cement shall be kept continuously moist by fog spraying until placement of the subsequent layer, provided that the contractor will not be required to keep such surfaces continuously moist for a period longer than seven days. Mixing and placing shall not proceed when the soil-aggregate or the area on which the soil-cement is to be placed is frozen. Soil-cement shall be mixed and placed when the air is at least 40 degrees Fahrenheit and rising.

(E) Monitoring Moisture Content in the Field:

Control of water content by the contractor in the field shall be accomplished in two ways:

- (1) The moisture-density relationship for the soil-cement mixture shall be determined in accordance with Arizona Test Method 221 on a routine basis, or when any significant gradation shift or rock content change occurs.
- (2) The actual moisture content of the mixture at the time of compaction, or shortly thereafter, shall be determined in accordance with Arizona Test Method 235 to determine if the optimum moisture content as determined by Arizona Test Method 221 is being maintained. The water content in the soil-cement mixture is to be continuously monitored, and the mixing water shall be adjusted at the plant as necessary to achieve the compressive strength and compaction requirements specified herein.

(F) Quality Control Compaction Testing:

Soil-cement shall be uniformly compacted to a minimum of 98 percent of the maximum dry density determined in accordance with Arizona Test Method 221. A running average of five consecutive in place density tests shall not be less than 100 percent of maximum density as monitored by nuclear density tests in accordance with Arizona Test Method 235. Compaction shall be performed within 2 percentage points of the optimum moisture content as determined in accordance with Arizona Test Method 221. Quality control density and moisture tests shall be performed in accordance with Arizona Test Method 235 at a minimum frequency as specified in table 4:

Table 4	
Quality Control Minimum Requirements for Compaction	
Moisture/Density	1 test / 500 sy/lift

(G) Control Strips:

A control strip shall be constructed at the beginning of work on the soil-cement to be compacted. The control strip construction shall be required to establish equipment and procedures required to attain densities for the specified course.

Each control strip, constructed to acceptable density and surface tolerances shall remain in place and become a section of the completed embankment. Once control strip is complete and accepted, production may begin on the same shift for the remainder of project.

Unacceptable control strips shall be corrected or removed and replaced at the contractor's expense. A control strip shall have an area of approximately 100 square yards and shall be of the same depth specified for the construction of the course which it represents.

The materials used in the construction of the control strip shall conform to the specification requirements. They shall be furnished from the same source and shall be of the same type used in the remainder of the course represented by the control strip. The underlying surface upon which a control strip is to be constructed shall have prior approval of the Engineer.

The equipment used in the construction of the control strip shall be approved by the Engineer and shall be of the same type and weight to be used on the remainder of the course represented by the control strip.

Compaction of control strips shall commence immediately after the course has been placed to the specified thickness, and shall be continuous and uniform over the entire surface. Compaction of the control strip shall be continued until no discernable increase in density can be obtained by additional compaction effort.

Upon completion of the compaction, the mean density of the control strip will be determined by averaging the results of ten nuclear density tests taken at randomly selected sites within the control strip.

If the mean density of the control strip is less than 100 percent of the density of laboratory compacted specimens as determined by testing procedures appropriate for the material being placed, the Engineer may order the construction of another control strip.

A new control strip may also be ordered by the Engineer or requested by the contractor when:

- (1) A change in the material or mix design is made.
- (2) A control strip density is not representative of the material being placed.

(H) Power Tampers and Small Vibratory Rollers:

Small vibratory rollers which are capable of operating within 6 inches of a vertical face shall be used for compaction adjacent to the guide banks, next to the utilities and drainage conduit; at transitions to constructed levee protection, and at other areas where larger vibratory rollers cannot maneuver. The amount of rolling and tamping required shall be whatever is necessary for the particular equipment to provide the same degree of compaction as would be attained with larger self-propelled vibratory rollers. Standby replacement equipment shall be available within 1 hour if needed.

(I) Finishing/Trimming:

After compaction, the soil-cement shall be further shaped, if necessary, to the required lines, grades, and cross-sections and rolled to a reasonably smooth surface. Shaping of the face of the soil-cement bank protection shall be conducted daily at the completion of each day's production.

The exposed face of the soil-cement bank protection shall be trimmed to a neat line as shown on the plans. The resulting soil-cement bank protection width shall not be less than 8 feet after trimming unless specified on the plans.

(J) Curing:

Whenever the atmospheric temperatures are expected to drop below 30 degree Fahrenheit, the soil-cement shall be protected from freezing for seven days, after its construction by a covering of straw, earth, or other suitable material approved by the Engineer.

Temporarily exposed surfaces shall be kept moist as previously set forth. Care must be exercised to ensure that no curing material other than water is applied to the soil-cement surface that will be in contact with succeeding layers.

Permanently exposed surfaces shall be kept in a moist condition for seven days, or they may be covered with bituminous curing material, subject to the Engineer's approval. Any damage to the protective covering within seven days shall be repaired to the satisfaction of the Engineer at no additional cost to the Department.

Regardless of the curing material used, the permanently exposed surfaces shall be kept moist until the protective cover is applied. Such protective cover is to be applied as soon as practicable, with a maximum time limit of 24 hours between the finishing of the surface and the application of the protective cover or membrane.

(K) Backfill:

Backfill shall not be placed against the soil-cement until the contractor has achieved the compaction requirement.

(L) Maintenance:

The contractor shall maintain and protect the soil-cement in good condition until all work is completed and accepted. Maintenance shall include immediate repairs of any defects that may occur. This work shall be done at no cost to the Department and repeated as often as necessary. Faulty work shall be replaced for the full depth of the layer. The contractor shall take all necessary precautions to avoid damage to the completed soil-cement by equipment, and to avoid the deposition of raw earth or foreign materials between layers of soil-cement. Where ramps are constructed over soil-cement layers which are not to grade, all foreign materials and the uppermost one inch of the previously placed soil-cement mixture must be removed prior to continuation of the soil-cement construction.

(M) Construction Joints:

Construction joints are to be provided at the end of each day's work or when work is to be halted for 90 minutes or more. The joints shall be trimmed to a 15 degree minimum skew, transverse construction joint shall be formed by cutting back into the completed work to form a vertical face to the full depth of the previous lift. Before resuming placement of new material, the joints shall be roughened and loose material shall be removed by power broom.

(N) Acceptance of Soil-Cement:

The Engineer will cast, transport, cure, and test specimens in accordance with Arizona Test Method 241 for each 1,500 cubic yards of soil cement placed. Three cylinders will be tested at seven days. The average compressive strength of the three cylinders shall achieve a minimum compressive strength of 750 psi.

Any early strength testing for the purpose of correlating seven day strength results to provide an early indicator of potentially low strength material shall be the responsibility of the contractor.

913-4 Method of Measurement:

Riprap, except gabions and sacked concrete, will be measured by the cubic yard of protection constructed by computing the surface area measured parallel to the protection surface and the total thickness of the riprap measured normal to the protection surface.

Riprap (gabions) will be measured by the cubic yard by computing the volume of the rock-filled wire baskets used.

Riprap (sacked concrete) will be measured by the cubic yard of concrete placed in the completed work. The measurement will be based on mixer volumes.

Rail bank protection will be measured by the linear foot. Measurement will be made from top of rail to top of rail (longest rail where rails of two or more lengths are used) and the distance measured will be from end rail to end rail.

Where two parallel rows of vertical rails are used, the measurement for payment will be the average of the distance along the two rows. Rail bank protection will be measured along the bank protection control line from end rail to end rail.

Soil-cement will be measured per cubic yard of soil-cement furnished and placed per the specified lines, grades, and cross-sections shown on the plans.

913-5 Basis of Payment:

The accepted quantities of riprap and rail bank protection, measured as provided above, will be paid for at the contract unit price per cubic yard or linear foot, which price shall be full compensation for the work, complete in place, including excavation; preparing the ground area; furnishing and installing the rock, filter fabric, bedding material, metal items, concrete, sacks and grout; and backfilling as required.

Materials, labor and equipment necessary to perform additional work such as jetting or drilling, as specified under Subsection 913-3.01(H) of the specifications, will be paid for in accordance with the provisions of Subsection 109.04 of the specifications.

The accepted quantities of soil-cement, measured as provided above, will be paid for at the contract unit price per cubic yard of soil-cement bank protection. Such payment shall constitute full reimbursement for all work necessary to complete the soil-cement bank protection including:

- (1) Surface Preparation;
- (2) Providing and Stockpiling Soil-Aggregate;
- (3) Cementitious Material, Watering, Mixing;
- (4) Placing;
- (5) Compacting;
- (6) Shaping and Finishing;
- (7) Curing;
- (8) Quality Control Testing; and

(9) Other Incidental Operations.

Any waste and non-compacted soil-cement material not used on the final soil-cement bank protection will not be measured for payment.

Excavation and backfill associated with the soil-cement construction will be measured and paid under the Structural Excavation and Structure Backfill items respectively.

Construction of Gabion Mattress associated with the soil-cement work will be measured and paid under the Riprap (Gabion Mattress) item.

Payment for additional excavation, where determined by the Engineer to remove unsuitable material, per the requirements of Subsection 203-5.03(A) of the specifications, will be made in accordance with the provisions of Subsection 109.04 of the specifications.

Payment for Dewatering will be made on a Force Account basis in accordance with the requirements of Subsection 109.04 of the specifications.

(923OJTNGL, 06/18/26)

SECTION 923 BLANK: the title and text of the Standard Specifications is revised to read:

SECTION 923 ON-THE-JOB TRAINING WITHOUT GOALS:

923-1 Description:

The contractor may provide On-The-Job training (OJT) aimed at moving minorities, women, and disadvantaged trainees into journeymen in various types of construction trades or job classifications in accordance with 23 CFR Part 230, Part 230.111 and Part 230, Appendix B.

It is the intention of these Special Provisions that training be provided in the construction classifications/crafts rather than for office support positions. Some off-site training is permissible as long as the training is an integral part of an approved training program and does not comprise of a significant part of the overall training.

923-1.01 General:

Training and upgrading of minorities and women toward journeyman status is the primary objective of these Special Provisions. Accordingly, the contractor shall make every effort to enroll minority, women, and disadvantaged trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that it has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with these Special Provisions. This training commitment is not intended, and

shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. Trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. The ratio of apprentices and OJT Trainees to journeymen shall not be greater than permitted by the terms of the approved training program being utilized.

No employee shall be employed as a trainee in a classification in which they have successfully completed a training course leading to journeyman status, or in which they have been employed as a journeyman. The contractor shall satisfy this requirement by including appropriate questions in the employment application or by other suitable means. The contractor shall maintain documentation that shows the employee's work and training history.

923-1.02 Definitions:

Banking-Carryover Hours:

OJT hours completed by a trainee are eligible to be credited to a future project. Banked-Carryover hours will only be credited when the same trainee that completed the excess hours is used on the future project.

Classification/Craft:

Type of occupational category, trade, or job being done by a trainee on a federal-aid funded highway construction project.

Disadvantaged Persons:

A person who meets one of the following:

- (1) Receives, or is a member of a family and/or household, which receives cash payments under a Federal, State, or local income-based public assistance program;
- (2) Is a member of a family and/or household that receives (or has been determined within the 6-month period prior to registration for the program involved to be eligible to receive) Food Stamps/EBT card under the Food Stamp Act of 1977;
- (3) Is a foster child on behalf of whom State or local government payments are made;
- (4) Does not have a high school diploma or GED; or

- (5) Is from a family whose total annual household income is below the federal poverty limits.

Journeyman:

A person who is capable of performing all the duties within a given job classification or craft.

OJT Trainee:

A person who is:

- (1) A minority, woman, or disadvantaged individual enrolled in an approved training program; or
- (2) Any other individual enrolled in an approved training program, whose training hours are, approved by the Department, and can be credited as OJT hours.

Small Business and Workforce Development (SBWD):

SBWD is responsible for oversight of the OJT program, which targets under-represented segments of the U.S. workforce, including minorities, women and disadvantaged individuals. SBWD assesses OJT hour goals on contracts and monitors them to ensure that trainees receive the required number of training hours.

923-1.03 Computation of Time:

In computing any period of time described in this OJT special provision, the day from which the period begins to run is not counted, and when the last day of the period is a Saturday, Sunday or Federal or State holiday, the period extends to the next day that is not a Saturday, Sunday, or Federal or State holiday. In circumstances where the Department's offices are closed for all or part of the last day, the period extends to the next day on which Department's offices are open.

923-1.04 OJT Training Programs:

The minimum length and type of training for each classification will be established in the training program selected by the contractor and approved by the Department and FHWA. The Department and FHWA will approve a program if it is reasonably calculated to meet equal employment opportunity obligations and qualifies the average trainee for journeyman status in the classification concerned by the end of the training period as defined in the training program.

The Department recognizes the following OJT Training programs:

- (A) OJT Programs approved by FHWA or the Department of Labor (DOL) prior to the start of the trainee commencing work.

- (B) Registered union or other approved apprenticeship programs registered with the Bureau of Apprenticeship, U.S. DOL, Employment and Training Administration, Bureau of Apprenticeship and Training or the Arizona Apprenticeship Office, Arizona Department of Economic Security programs recognized by the Bureau.

Approval of a training program other than those specified above to be used for the contract must be approved by the Department or FHWA prior to the trainee commencing work on the classification covered by the program. Contractors intending to submit a training program for approval prior to the start of a contract must submit the program as soon as possible after notification of contract award as approval of a training program may take up to four weeks. Several FHWA approved training program templates for specified classifications are available on the SBWD website.

The contractor shall furnish each trainee with a copy of the Training Program the trainee is enrolled in, and other documentation related to the training program. The contractor shall provide training that develops the skills outlined in the training program. Multiple OJT training programs can be used on the project.

All training programs shall be administered in a manner consistent with the equal employment obligations of federal-aid highway construction contracts. The Department reserves the right to request documentation that the contractor's training program fulfills these obligations.

The trainee will be paid the appropriate trainee Davis-Bacon wage rates for training classifications/crafts on federally-funded projects. The contractor shall compensate trainees not less than the rate outlined in the approved training program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination.

The contractor shall provide for the maintenance of records and furnish/submit required information and reports documenting its performance under these Special Provisions. Such records shall be available at reasonable times and places for inspection or review by the Department and FHWA.

923-1.05 OJT Liaison:

The contractor shall designate an OJT Liaison who shall be responsible for monitoring and administering the contractor's OJT Program and monitoring the trainees' progress. The OJT Liaison may have other responsibilities for the contractor. The OJT Liaison shall serve as the point of contact for the Department regarding information, documentation, and conflict resolution relating to the contractor's OJT program.

923-2 Online Resources:

OJT System Website:
<https://adot.dbesystem.com>

SBWD Website:

<https://azdot.gov/business/small-business-and-workforce-development>

923-3 Requirements:

923-3.01 Documentation:

Documentation related to OJT training can be found on the Department's SBWD website. The contractor shall complete and submit the following information to the Department:

(A) OJT Enrollment and Progression:

(1) OJT Enrollment:

OJT Enrollment information shall be submitted through the Department's online OJT System by the contractor at least 5 days prior to a trainee's start date. OJT Enrollment information shall be completed and includes the trainee's name and address, employment status, gender and ethnicity, training program (s), and classification/craft.

SBWD will review the OJT Enrollment information within 5 days, and if approved, hours will be retroactively credited to the date the OJT Enrollment information is received by SBWD.

To receive OJT credit, apprentice's current apprentice certificate or proof of registration from a union or approved apprenticeship program shall be uploaded into LCPtracker by the contractor within 5 days of the apprentice's start date, in addition to completing the OJT enrollment information in the online OJT System.

If the Arizona Apprenticeship Office Representative's signature is missing from the apprentice certificate, the contractor shall also upload the apprentice's US Department of Labor, Office of Apprenticeship Certificate to LCPtracker. The contractor shall not receive training credit or reimbursement until the certificate is uploaded.

(2) Progression of Training and Change of Status:

Progression of Training-Level Up and Change of Status shall be submitted through the Department's online OJT System each time a trainee advances, progresses to another training level or milestone in his/her training program, or has a change of job classification. Hours will be retroactively credited to the date the information is received.

Hours that exceed the maximum indicated in the program for a certain level will not be credited. Once a level is completed, the trainee should be moved to the next level towards journeymen status.

923-3.02 Training Program Completion:

Once the trainee completes the required number of levels and hours of training for the same classification or craft, or completes an approved training program, the trainee is

considered to have completed the training program it is enrolled under. The contractor shall not receive OJT credit for hours exceeding the maximum number of training hours required for completion of the selected training program.

Once a trainee completes a specific training level for a classification or craft, the contractor shall not be permitted to submit that trainee for enrollment or reimbursement at that same level within the same classification or craft, however the same trainee can be enrolled in a different classification or craft.

The contractor shall provide documentation showing the type and length of training satisfactorily completed to each trainee and the Department upon successful completion of a training program.

For an apprenticeship program, the Apprenticeship office will issue a certificate of completion in said craft, a DOL certificate, and a journeyman's card.

923-3.03 Banking-Carryover Hours:

At the completion of the project, the contractor may submit a Banking-Carryover Hours request in the Department's online OJT System, to carryover training hours for a specific trainee on the project to be used on a future project. Banked hours that are carried over to a project may lower the required number of training hours the contractor is required to complete on that project. The trainee shall be placed on a subsequent project with the intent that the trainee is progressing towards completion of a training program. Banked hours cannot be transferred to other trainees. No additional payment will be paid for banked hours carried over to other projects.

923-3.04 OJT Project Completion and Banked Hours Request:

OJT Completion and Banked Hours documentation shall be submitted within 60 days of completion of training. Any hours to be banked shall be shown on the documentation.

923-4 Method of Measurement:

OJT training hours will be measured by the hour to the nearest half hour.

Measurement of hours will be made as the OJT trainee completes hours on the project. Hours are considered complete if the trainee performs hours on the project, is OJT enrolled, and provides required training by the program.

No measurement for payment will be made for trainee hours in which OJT enrollment information has not been received and approved by the Department.

923-5 Basis of Payment:

The accepted quantities of hours, measured as provided above, will be paid for at a unit price of \$3 per hour for training provided to trainee/apprentice in accordance with an approved training program.

Payment for offsite training may only be made when the contractor does one or more of the following and the trainees are concurrently employed on a federal-aid project;

- (A) Contributes to the cost of the training,
- (B) Provides the instruction to the trainee
- (C) Pays the trainee's wages during the offsite training period.

923-6 Monitoring:

(A) Monthly Reporting:

Contractors shall report monthly hours for each trainee in the online OJT System by the 15th of the month following the month of training hours completed.

(B) Site Visits:

The Department may conduct periodic monitoring site visits to the worksite to review OJT Program compliance, during working hours on the project. The Department will notify the OJT liaison at least 24 hours prior to a site visit if the OJT Liaison is required to be at the site visit. The site reviews may include, among other activities, interview of trainees, the contractor, and its employees. The contractor shall cooperate in the review and make its employees available. The contractor's OJT Liaison shall be reasonably available to meet with Department staff as well as be available to respond to periodic emails and phone calls from the Department to check on the progress of OJT Trainees. The Department will make efforts to ensure minimal disruption to the work and coordinate site visit times with other Department divisions, as applicable (for example, Davis-Bacon interviews).

ITEM 9240015 – FORCE ACCOUNT WORK (PROVIDE ELECTRICAL SERVICES):

Description:

The work under this item shall consist of coordination and paying all necessary fees for permit, hook up to the local utility company to install a complete functioning electrical service to power the traffic signals, street lighting and FMS infrastructure as shown on the project plans.

Materials:

All materials shall conform to the requirements of SRP. The Contractor shall contact SRP representative, Jerry Crawford at (602) 809-3931 to coordinate material requirements.

Construction Requirements:

All work shall conform to the requirements of SRP. The Contractor shall contact SRP representative, Jerry Crawford at (602) 809-3931 to coordinate power service and construction requirements.

The Contractor shall provide to the Engineer, for review and approval, copies of all agreements between the utility company and the contractor. The Contractor may proceed with those agreements after Engineer approval. If the Contractor proceeds before or without Engineer approval, the Engineer may withhold reimbursement to the Contractor.

Upon billing, the Contractor shall pay the cost for the electrical service hook-up installations and any monthly payment.

Measurement and Payment:

Provide utility service will be measured and paid for in accordance with the requirements of Subsection 109.04 of the specifications.

The Department will reimburse the Contractor for all direct expenses billed to the Contractor by the utility companies. Payment for the billing invoices will be the actual cost as shown on the invoice(s) submitted by the Contractor plus a five percent mark-up, as follows:

$$\text{Sub-total} = \text{Invoice} \times 1.05$$

Also, an amount equal to 65 percent of the Sub-total, as determined above, multiplied by the applicable sales tax rate will be added to the Sub-total. Finally, an amount equal to 0.50 percent of the Sub-total will be added for the Performance and Payment Bond. The total contractor payment (TCP) will be as follows:

$$\text{TCP} = (\text{Sub-total}) + (0.65 \times \text{Sub-total} \times \text{sales tax rate}) + (0.005 \times \text{Sub-total}).$$

Such payment shall be full compensation for each utility service, complete in place as specified herein

ITEM 9240038 – MISCELLANEOUS WORK (FULLY GROUTED CONCRETE MASONRY UNIT):

Description:

The work under this item shall consist of construction of fully grouted concrete masonry units at the locations and in accordance with the details as shown on the Project Plans and these Special Provisions.

Materials:

Design masonry assemblage strength shall be a minimum of 2000 psi.

Net area compressive strength of concrete masonry units shall be a minimum of 2000 psi.

Concrete masonry units shall be medium-weight units conforming to ASTM C90.

Grout shall conform to ASTM C476. The additions of admixtures in the field is not permitted. Grout shall attain a minimum 28-day compressive strength of 2000 psi. Mortar shall be Type S conforming to ASTM C270 and with proportions per Table SC-1 of TMS 602.

Reinforcement shall be deformed bars conforming to ASTM A615, Grade 60 and shall have fabrication tolerances in accordance with ACI 315. Reinforcing steel that is to be welded shall conform to ASTM A706, Grade 60.

Reinforcement that is indicated to be bent or hooked shall be shop fabricated.

Construction Requirements:

All masonry construction shall be in accordance with the TMS 402 "Building Code Requirements for Masonry Structures" and TMS 602 "Specification for Masonry Structures."

The contractor shall submit shop drawings for review prior to installation. Shop drawings shall include reinforcing size and placement, lengths, quantities, sizes, and test report documentation related to the appropriate ASTM standards.

Concrete masonry units shall be laid in running bond, typical unless noted otherwise. Vertical alignment of cells shall maintain a continuous clear, unobstructed cell not less than 3" square. Minimum depth of horizontal bond beam channel below top of unit shall be 1½", and channel shall be 3" wide minimum. All units shall be free of dust and dirt at the time of laying.

All grout shall be mechanically vibrated. Grout pours shall be stopped 1½" below the top of a course to form a key at poured joints.

Cleanouts shall be provided if grout pour exceeds 5'-0" in height. If cleanouts are provided, grout pour maximum height shall equal 10'-0", in lifts not to exceed 6'-0".

Vertical reinforcement size and spacing shall be as shown on the project plans and in the masonry retaining wall schedule with one bar minimum at all corners, intersections, wall ends, beam bearing, jambs, and each side of control joints. Tie reinforcement at 8'-0" vertically with single wire loop tie. Unless noted otherwise, lap splices shall be per lap splice schedule shown on the project plans.

Steel anchors into masonry shall conform to the details shown on the project plans. J-bolts are not acceptable.

Place pipes and conduits passing horizontally through masonry in steel sleeves.

Aluminum conduits, pipes, and accessories shall not be embedded in masonry grout or mortar, unless effectively coated or covered to prevent aluminum-cement chemical reaction or electrolytic reaction between aluminum and steel.

Horizontal joint and horizontal bond beam reinforcing shall be discontinuous through all control joints except those at steel bearing elevations and floor and roof connections.

Method of Measurement:

Miscellaneous Work (Fully Grouted Concrete Masonry Unit) will be measured per square foot.

Basis of Payment:

The accepted quantities of Miscellaneous Work (Fully Grouted Concrete Masonry Unit), measured as provided above, will be paid for at the contract unit price per square foot, which price shall be full compensation for the work, complete in place, including furnishing, placement, and finish of masonry, reinforcement, grout, and joints and as shown on the project plans and specified herein.

ITEM 9240050 – MISCELLANEOUS WORK (STEEL TRUSS BRIDGE):

Description:

The work under this item shall consist of furnishing, designing, engineering, fabricating, transporting, delivering, erecting, and completing a prefabricated steel truss bridge superstructure, complete in place, in accordance with the project plans, ADOT Standard Specifications, and these Special Provisions.

The steel bridge superstructure shall include, but not be limited to, the following components:

- Steel Truss
- Stay-in-Place Deck Forms
- Cast-in-Place Concrete Deck Slab
- Bearings
- Anchor Bolts
- Expansion Joints/Accommodation for Bridge Movement
- Railings and handrails
- All connection hardware, attachments, and appurtenances

General Features of Design:

Span:

Bridge Length = 117'-0" measured from out-to-out as shown on the Project Plans.

Width:

The minimum bridge deck slab width, and minimum dimension from the inside to inside of main truss members, shall be 10'-0".

Bridge System Type:

The bridge superstructure shall be a "Through Truss" of the type and general configuration indicated on the Project Plans.

The truss configuration shall include a single diagonal per panel (one-diagonal-per-bay system). The end vertical members shall be plumb. Interior vertical members may be either plumb or perpendicular to the chord members, as determined by the bridge manufacturer's design, subject to approval by the Engineer.

Ends of tubular steel members shall be sealed or capped to prevent moisture intrusion.

The prefabricated truss manufacturer may modify member sizes and connection details as required to satisfy structural design requirements; however, the overall geometry, structural system type, and architectural appearance shown on the Project Plans shall be maintained unless otherwise approved by the Engineer.

Geometry:

- 1) The bridge shall be cambered to account for the dead weight of:
 - a) Steel truss and all steel attachments;
 - b) Cast-in-place concrete deck slab;
 - c) Stay-in-place formwork;
 - d) Railings and handrails;
 - e) Aesthetic features, including lettering, panels, and architectural elements;
 - f) Lighting systems, supports, conduit, and associated electrical appurtenances;

- g) Dynamic message signs (DMS), supports, conduit, and associated hardware; and
- h) All other permanent items supported by or attached to the bridge.
- 2) Camber shall be designed such that the final bridge profile, under dead load, conforms to the grades and elevations shown on the Project Plans.
- 3) The contractor shall verify all geometry, dimensions, and elevations shown on the Project Plans prior to the prefabricated truss bridge manufacturer commencing design or fabrication.
- 4) The contractor shall coordinate with the prefabricated truss bridge manufacturer to confirm that all plan dimensions, profile grades, bearing seat elevations, and anchor bolt layouts are consistent with the manufacturer's design.
- 5) Any discrepancies between the Project Plans and the prefabricated truss bridge manufacturer's design requirements shall be identified and submitted to the Engineer for resolution prior to fabrication. No fabrication shall proceed until discrepancies have been resolved.
- 6) The Contractor shall be responsible for ensuring compatibility between the bridge superstructure geometry and the constructed substructure, including verification of bearing locations, elevations, and alignment.
- 7) Field fit adjustments required due to the Contractor's failure to verify geometry or coordinate between components shall be performed at no additional cost to the Department.

Materials:

All structural steel shall be new (unused) material and shall meet Charpy V-Notch values indicated in the AASHTO LRFD Bridge Design Specifications as applicable.

Main structural truss members (top and bottom chords, verticals, and diagonals) shall be either high strength, cold-formed welded, or seamless, square or rectangular structural tubing, conforming to ASTM A500, Grade C. Structural plates and other shapes shall conform to ASTM A709 (Grade 50) unless noted otherwise.

High-strength bolts, nuts and washers shall conform to the requirements of ASTM F3125/F3125M, Grade A325. Anchor bolts shall conform to ASTM F1554, Grade 105. Bolts and hardware shall be galvanized in accordance with ASTM F2329.

Steel Reinforced Elastomeric Bearing Pads shall conform to the requirements of Section 1013-2.04 of the Standard Specifications and shall satisfy the material properties indicated on the plans.

Structural Concrete shall be Portland Cement Class "S" Concrete and shall be in accordance with Section 1006 of the Standard Specifications.

Reinforcing Steel shall be in accordance with Section 605 and Section 1003 of the Standard Specifications.

Design and Construction Requirements:

The design of the steel truss bridge, stay-in-place formwork, concrete deck slab, railings, expansion joints, bearings, and anchor bolts are the responsibility of the prefabricated truss manufacturer. The design of all components of the prefabricated steel truss bridge shall be sealed by a professional engineer licensed in the State of Arizona.

The contractor shall submit to the Engineer, an original or copy of either a Certificate of Compliance or a Certificate of Analysis prior to the use of any materials or manufactured assemblies in accordance with the Standard Specifications. The Certificate of Compliance shall conform to the requirements of Section 106.05 of the Standard Specifications.

The contractor shall coordinate the construction of the abutments with the prefabricated truss manufacturer to verify the substructure dimensions, elevations, and anchor bolt locations/requirements.

The prefabricated steel truss bridge components shall be designed in accordance with the following criteria:

Truss:

The design, fabrication, and installation of the truss shall be in conformance with the following:

- LRFD Guide Specifications for the Design of Pedestrian Bridges, 2nd Edition, 2009 with 2015 Interim Revisions.
- AASHTO LRFD Bridge Design Specifications, 8th Edition, 2009.
- ADOT Bridge Design Guidelines.

The prefabricated truss manufacturer shall be currently certified by the American Institute of Steel Construction (AISC) and have the personnel, organization, experience,

capability, and commitment to produce fabricated structural steel for Major Steel Bridges as set forth in the AISC Certification Program.

Pedestrian live load = 90 psf over the entire path width.

The composite concrete deck slab, railings, deck joint assemblies, and supporting members shall be designed for all code required loads and load combinations.

The design shall be performed using the Load and Resistance Factor Design (LRFD) methodology unless noted otherwise in the ADOT Bridge Design Guidelines.

Welded tubular connections shall be designed in accordance with the current editions of the Structural Welding Code-Steel ANSI/AWS D1.1 and the Bridge Welding Code ANSI/AWS D1.5.

The bridge abutments and foundations have been designed for a total factored reaction equal to 250,000 pounds per abutment. If the prefabricated bridge manufacturer's design results in total factored reactions greater than 250,000 pounds per abutment, the bridge manufacturer shall design the abutments and foundations accordingly at no additional cost to ADOT.

Limit live load deflection of main truss members to a value less than the span length/600. Dynamic deflection response shall be controlled by applying the vibration criteria in the AASHTO Guide Standard for Pedestrian Bridges.

Provide 3/8" structural steel thickness unless indicated otherwise.

Minimum thickness of closed structural tube members shall be 1/4 inch.

Metal Railing:

The design, fabrication, and installation of the railing shall satisfy the design loading and geometrical requirements of the AASHTO LRFD Bridge Design Specifications, Article 13.8, Special Provisions, and Project Plans.

Metal Handrails:

Handrails shall conform to the requirements of the Public Rights-of- Way Accessibility Guidelines (PROWAG) Section R409, except as modified herein. Provide a continuous circular diameter tubing or pipe handrail along each side of the bridge as indicated on the Project Plans. Handrails shall be provided with a minimum 1½" knuckle space between

the handrail and the metal railing. The handrails shall be secure and not allowed to rotate within their fittings.

Bearing Devices:

The design, fabrication, and installation of bearing devices shall satisfy all design loads and criteria in accordance with the design specifications, except where superseded by the ADOT Bridge Design Guidelines, Section 14. Bearings shall be steel reinforced elastomeric bearing pads unless an alternate bearing device type is approved by the engineer. All steel plates and bars shall conform to ASTM A36.

Anchor Bolts:

The design, fabrication, and installation of anchor bolts shall satisfy all design loads and criteria in accordance with the design specifications, except where superseded by the ADOT Bridge Design Guidelines. Factored dead, live, vehicle, wind, pedestrian, thermal and seismic loads shall be clearly indicated on the prefabricated bridge shop drawings. Anchor bolts shall be ASTM F1554, Grade 105, and shall be compatible with the bearing devices provided.

Deck Joint Assembly:

The prefabricated truss manufacturer shall provide design and details to accommodate bridge movement. Submit the design and details of the deck joint assembly to the engineer for approval. Details of the proposed system shall be coordinated with the contractor to verify that the deck joint assembly is compatible with the construction of the abutment backwalls and deck slab as indicated in the Project Plans.

Concrete Deck Slab:

The design of the deck slab shall satisfy all design loads and criteria in accordance with the design specifications, except where superseded by the ADOT Bridge Design Guidelines. The deck slab shall be composite and constructed with ADOT Class 'S' concrete having a minimum 28-day compressive strength of 4,500 psi. Use shear studs attached to the floorbeams which extend beyond the center of the deck slab.

The deck slab shall be placed after the steel truss bridge has been erected at its final location.

Verify all elevations based on the design thickness of the deck slab.

Stay-In-Place Metal Deck Forms:

The concrete deck slab shall be constructed utilizing 20 gage minimum galvanized stay-in-place (SIP) deck forms and shall be installed per the manufacturer's recommendations. The SIP manufacturer shall be a member of the Steel Deck Institute. The deck slab forms shall be designed to carry the dead weight of the wet concrete plus a 50 pound per square foot construction live load. Submit the design of the SIP forms to the Engineer for approval.

Placing Concrete:

Do not place concrete until all formwork, installation of items to be embedded, and preparation of surfaces involved in the placement have been approved by the Engineer. All surfaces of forms and embedded materials shall be free from curing compound, dried mortar from previous placements, or other foreign substances prior to concrete placement. Structural concrete shall be in accordance with Section 601 of the Standard Specifications.

Finishing Bridge Deck:

The bridge deck slab shall be textured to a medium broom finish.

Coordination of Embedded Systems and Attachments:

The Contractor shall coordinate all conduits, handholes, junction boxes, and other electrical or communication components located within truss members, including top chords, bottom chords, verticals, and diagonals.

All required openings, access points, and internal routing shall be incorporated into the fabrication of the structural members. These features shall be accounted for in member design, detailing, and fabrication.

The Contractor shall coordinate all attachments to the structure, including but not limited to fencing, barriers, and appurtenances at bridge ends and along the structure. All mounting hardware, connection details, and attachment locations shall be designed and detailed as part of the work.

Field drilling, cutting, or modification of structural members to accommodate conduits, boxes, or attachments will not be permitted without written approval of the Engineer.

Shop and Working Drawings:

Submit shop drawings and working drawings for approval in accordance with the Standard Specifications. Do not fabricate any component of the truss bridge prior to receiving approval. Working drawings shall not be from standard forms requiring blank spaces to be populated unless all extraneous information has been deleted and standard forms provide an exact description of the work.

Submittals:

1. Detailed shop drawings indicating all member sizes, connection details, general notes, and materials.
2. Indicate Charpy v-notch requirements.
3. Design calculations for truss bridge, bridge deck slab, railings, anchor bolts, expansion joints, and bearings including bearing loads.
4. Geometry verification indicating that the dimensions, elevations, and layout of the truss are consistent with the substructure shown or provide detailed information documenting proposed changes. Provide verification of anchor bolt layout.
5. Erection drawings including positions and size of cranes.
6. Drawings for temporary works if required.
7. Documentation for AISC Bridge Fabricator Certification.

Shop and working drawings shall have cross-referenced details and sheet numbers.

Shop drawings shall show all conduits, handholes, junction boxes, access openings, and appurtenances located within or attached to structural members.

The contractor shall coordinate all such components with the structural steel design and fabrication. All openings, penetrations, connection hardware, and attachments shall be fully detailed and incorporated into the shop drawings.

Welding:

Welding and fabrication of the prefabricated steel truss bridge shall conform to the provisions of ANSI/AWS D1.1 "Structural Welding Code", latest edition.

Submit a Quality Control Plan including personnel, qualifications, certifications, and written practice.

Welders shall be properly accredited operators, each of whom shall submit certification of satisfactorily passing AWS standard qualification tests for all positions with unlimited thickness of base metal, having a minimum of 6 months experience in welding tubular structures and have demonstrated the ability to make uniform sound welds of the type required.

Nondestructive weld testing shall be performed by a qualified ASNT Level II Technician or higher certification. All welds shall be 100% visually inspected. Ten percent (10%) of all fillet and partial penetration welds shall be magnetic particle tested.

Complete Joint Penetration Joint welds shall be 100% Magnetic Particle tested in accordance with ASTM E709. Base material certifications shall be supplied by material suppliers. Inspection results shall be available upon request. For Complete Penetration Butt welds of tubular members, the backing material shall be fabricated in the tube prior to installation to be continuous around the full perimeter of the tube, including corners.

Fillet weld details shall be in accordance with AWS D1.1, Section 3.9. Fillet welds which intersect the radius of a tube shall be built up to obtain the full throat thickness. The maximum root openings of fillet welds shall not exceed 3/16 inch in conformance with AWS D1.1, Section 5.22.

Magnetic Particle Testing shall be performed on 100% of all attachment welds to the bottom truss chord.

Finishing:

Prepare and paint all structural steel components in accordance with Section 610 of the Standard Specifications.

Finish color(s) will be provided by the City of Tolleson. The Contractor shall submit a finish color mockup for review and approval by the Engineer prior to application.

Method of Measurement:

Prefabricated Steel Truss Bridge will be measured for payment by the lump sum as a single complete unit of work.

Basis of Payment:

The accepted quantities of Prefabricated Steel Truss Bridge, measured as provided above, will be paid for at the contract lump sum price, which price shall be full compensation for the work, complete in place, including steel truss, metal railing, bridge aesthetics, metal handrail, bearing devices, anchor bolts, deck joint assembly, stay-in-place metal deck forms, concrete bridge deck, shop and working drawing preparation, and welding as described and specified herein and indicated on the Project Plans.

ITEM 9240051 – MISCELLANEOUS WORK (AESTHETIC TOLLESON LETTERING):

Description:

The work included under this item shall consist of furnishing and installing aesthetic lettering on the steel truss bridge in conformance with the requirements and details shown on the Project Plans, ADOT's Standard Specifications for Road and Bridge Construction (Standard Specifications), and these Special Provisions. The aesthetic lettering includes the following elements:

- 1" Round Bar
- Aesthetic Letters

Materials:

Aesthetic letters shall be 10 gauge steel plate conforming to ASTM A1011.

Round bar shall be steel conforming to ASTM A36.

Construction Requirements:

The Contractor shall coordinate the layout, attachment locations, and connection details of the aesthetic lettering with the steel truss bridge design and fabrication. All attachments shall be incorporated into the truss shop drawings and shall not conflict with structural members, conduits, or other embedded systems.

Shop and Working Drawings:

Submit shop drawings and working drawings for approval in accordance with the Standard Specifications. Working drawings shall not be from standard forms requiring blank spaces to be populated unless all extraneous information has been deleted and standard forms provide an exact description of the work.

Welding:

Welding and fabrication shall conform to the provisions of ANSI/AWS D1.1 "Structural Welding Code", latest edition.

Finishing:

Prepare and paint all structural steel components in accordance with Section 610 of the Standard Specifications.

Finish color(s) will be provided by the City of Tolleson. The Contractor shall submit a finish color mockup for review and approval by the Engineer prior to application.

Method of Measurement:

Aesthetic Lettering will be measured for payment by the lump sum as a single complete unit of work.

Basis of Payment:

The accepted quantities of Aesthetic Lettering, measured as provided above, will be paid for at the contract lump sum price, which price shall be full compensation for the work, complete in place, including aesthetic letters, round bar, fabrication, paint, shop and working drawing preparation, and welding as described and specified herein and indicated on the Project Plans.

ITEM 9240052 – MISCELLANEOUS WORK (LANDSCAPE AND IRRIGATION RESTORATION):

Description:

The work under this item shall consist of furnishing all materials, labor, and equipment necessary to restore the existing landscape and irrigation in areas that are disturbed by construction. Decomposed granite installation for disturbed areas is included in this bid item. Contractor will provide new decomposed granite to match existing within the restoration area. Work in this bid item includes any sprinkler irrigation restoration associated with the disturbed areas, includes relocations as noted on the project plans and as directed by the Engineer.

Materials:

Any disturbed existing irrigation system will require that the Contractor re-construct the

irrigation system using the emitters, sprinklers, valves, piping, fittings, controllers, wiring, and other components, of sizes and types to match existing equipment and as called for in the contract documents.

All replacement or repair materials will match the existing materials that have been damaged. Irrigation materials and components will be from the same manufacturer as originally installed. Emitters and sprinklers will have the same volume output as original. PVC pipe may be from a different manufacturer, but the grade will be as originally installed. All mainline fittings will be Schedule 80, all lateral fittings will be Schedule 40.

Turf Restoration area will receive 'Midiron Hybrid Bermuda' sod or approved equal and will be inspected and approved by the Engineer at the site upon delivery. If installation occurs between October 15th to April 15th, turf restoration areas will receive 'Premium Rye Grass' seed. Sod will be nursery grown, strongly rooted, 2 years old, and free of weeds, undesirable plants and other material which will be detrimental or will hinder the proper development of the sod.

Landscape materials and decomposed granite will be replaced to match existing conditions. Contractor will walk the site with the Engineer to inspect Landscape and Irrigation Restoration areas prior to construction activities.

Construction Requirements:

Contractor will verify exact limits of disturbance with the Engineer in areas specified on the Project Plans as Landscape and Irrigation Restoration Areas. All work will be in accordance with these Special Provisions and ADOT Standard Specifications.

Contractor will identify and coordinate limits of disturbance areas where appropriate with the Engineer prior to beginning construction activities. Contractor will contact the Engineer for review and approval of all Landscape and Irrigation Restoration materials prior to installation.

The work will also consist of reconstructing, rerouting, modifying, or repairing the existing irrigation system in areas specified in on the Project Plans. The Contractor will be required to repair and/or replace all disturbed or damaged irrigation components, returning their operation to 100 percent within 24 hours following initial disturbance of the irrigation components. The existing irrigation that will be impacted may include drip irrigation as well as the sprinkler irrigation system for the turf areas. The work will include furnishing and installing the various irrigation sleeves, piping, drip emitters, gate valves, electric control valves, wiring, and valve boxes, including required excavation and backfill at the specified in locations shown on the Project Plans or as directed by the Engineer.

All work will be in accordance with the details shown on the Project Plans, or as directed by the Engineer and the requirements of these Special Provisions. The existing irrigation components will be protected and maintained in their current condition where feasible or repaired, replaced, extended and reconnected in areas including, but not limited to, those areas that are disturbed during the construction, areas shown on the Project Plans or as directed by the Engineer. The Contractor will be required to maintain water to all existing landscape throughout the duration of the contract using repairs, reconnections,

replacements or rerouting of the system as approved by City Representatives. The Contractor will ensure that the entire existing and new irrigation systems within the project limits are operational and functional and will test and receive approval from the Engineer prior to proceeding with other related work. The Engineer will inspect and give approval prior to backfilling.

The system will be constructed to grades and conform to areas and locations as shown on the Project Plans and as directed by the Engineer.

Protection of Existing Vegetation: The work will include the protection of all existing plant material. Contractor will take great care to protect in place all existing plant material. Contractor will replace in like kind and size existing plant material removed, damaged, or destroyed at no cost to the City and to the satisfaction of the Engineer. The Contractor will identify, and the Engineer will review existing plant materials within the disturbance areas. Salvage and relocate or replace all plant material in conflict with the construction as designated in Landscape and Irrigation Restoration Areas in like kind and size per the direction of the Engineer.

Identify, protect, and maintain existing vegetation within areas outside of the limits of disturbance during the Contract from the Notice-To-Proceed to Final Acceptance. Perform the Work of this Section in accordance with the standards of the Tree Care Industry Association (TCIA) and the National Association of Landscape Professionals (NALP). Do not perform work within areas outside of the limits of disturbance unless approved by the Engineer. Do not store materials outside of the limits of disturbance. Do not permit vehicle parking, foot traffic, or other activity not approved in writing by the Engineer within areas outside of the limits of disturbance. Provide labor and new and undamaged materials that constitute "Best Practice" to meet the letter and intent of this Contract. Follow the safety requirements of ANSI Z133.1.

Verification of Conditions: Prior to the start of construction, Contractor will conduct onsite inspections of plants and vegetation with the Engineer and identify and inventory the plants and vegetation that are to remain in place during this area tour. Field measure and stake project improvements as needed for establishing the location and limits of disturbance.

Construction within Protected Areas:

Demolition and Construction Activities: Contractor will perform demolition and construction activities in a manner that minimizes damage to plants. Use hand tools where necessary. Make minimal use of construction equipment in areas outside of the limits of disturbance. Use such equipment in these areas only when approved by the Engineer. Notify the Engineer 72 hours prior to the use of the equipment within the protected areas.

Provide bridging materials, such as protective planking, in protected areas where construction equipment operates. When utilities must be installed within protected areas, bore under the protected areas whenever possible instead of digging open trenches through them.

Excavating around Trees and Shrubs: When work that may impact existing plants occurs, plan the work to assure minimal disturbance to the plants, follow good horticultural practices, and direct pruning and wound treatment in accordance with this Section.

Protecting Root Systems: Contractor will protect root systems from damage due to runoff or spillage of noxious materials in solution during storage or construction activities. Protect root systems from flooding or soil erosion. Provide a minimum of two layers of untreated burlap as a covering over exposed root face areas. Do not disturb or excavate protected root zone areas unless specifically authorized to do so by the Engineer. Where trenching for utilities is required within protected areas, excavate under or over roots by hand digging under the authority of the Engineer. If large roots are encountered, or if a condition potentially fatal to the plant is observed, notify the Engineer prior to continuing or commencing work. Do not cut main lateral roots or taproots, those 2-1/2 inches in diameter or greater; however, smaller roots that interfere with the installation of new work may be cut. Cut smaller roots with sharp pruning instruments, but do not break or chop roots. Excavate root systems by hand in areas where new construction is required within protected areas. Use a narrow-tine spading fork to expose roots. Cut exposed roots back from the new construction. Do not permit exposed roots to dry out before permanent backfills is placed. Provide temporary earth cover, or pack the roots with peat moss, and wrap the roots with burlap. Water and maintain the roots in a moist condition and temporarily support and protect them from damage until they are permanently relocated and covered with backfill. Provide imported topsoil backfill to cover exposed roots in soil cuts. Do not overload root zones by placing backfill above the existing grade.

Protecting, Restoring, or Modifying Irrigation System: The work under this item will consist of testing, reconstructing, or modifying the existing irrigation systems that are damaged by the construction or as specified in on the Project Plans for modification. Prior to construction activities, the Contractor will stake areas that are designated to be disturbed. The Contractor, along with the Engineer, will meet with the maintenance representative, owner, or owner's representative, for each area within the project that is designated to be disturbed to determine where the existing and functioning irrigation system is located and how it is operated. The Contractor will be required to repair and or replace all disturbed or damaged irrigation components to 100 percent operational. The Contractor will ensure that all reconnections (water and power) have been tested and approved by the Engineer prior to back filling. Prior to final acceptance and during the maintenance period specified, the contractor and the Engineer will meet again with the designated representative to engage each and every irrigation system that has been disturbed or that is adjacent to this project. The Contractor will ensure that each system has been returned to a fully operational and functional system and that all deficiencies have been corrected. All work will comply with the Project Plans and the Special Provisions.

The underground location of the irrigation facilities is unknown. The Contractor will take care to minimize disturbance to these areas.

All construction will be coordinated to ensure that the existing irrigation system and its associated electrical controls are fully functional within 24 hours of modifications. Work activities that require more than 24 hours of outage will be coordinated with the Engineer

for approval and alternate irrigation methods such as truck watering or temporary “rain or rent” systems will be required as directed by the Engineer. The cost of alternate irrigation methods necessary due to extended irrigation system outages will be at the Contractor’s expense, at no cost to the Department.

All work will be in accordance with the details shown on the Project Plans, or as directed by the Engineer and the requirements of these Specifications. All work will be inspected and approved by the Engineer prior to backfilling and will comply with all the requirements of Section 808 Water Distribution as specified in the most recent edition of the ADOT Standard Specifications for Road and Bridge Construction.

Repair/Restoration: The Contractor will restore all landscape areas and other surface improvements that were to remain in place, but that have been damaged by the Contractor’s actions or omissions. Restore landscape areas as nearly as possible to the original condition.

Repairing Damaged Plants: Where damage to vegetation has occurred, Contractor will prune plants in accordance with Tree Care Industry Association (TCIA) standards to remove branches from the work area and where needed to maintain the health of the plant. Remove material in a manner that yields minimal impact and is approved by the Engineer.

Replacing Damaged Plants: The Contractor will remove plants that were identified by the Engineer to remain in place, but that are damaged during the course of the work to an extent that they cannot be repaired, and will replace the damaged plants with new plants of the same type and value. Remove and replace damaged plants as directed by the Engineer. Base the value of plants that are to be replaced on the criteria found in the Council of Tree and Landscape Appraisers’ “Guide for Plant Appraisal”, as evaluated by the Engineer. The contractor will remove and replace damaged plants at no additional cost to the Department. Plants will be replaced at the following sizes or as directed by the Engineer:

<u>Existing Plant Material Size</u>	<u>Replacement Size</u>
Trees:	
2” Caliper	24” Box
4” Caliper	36” Box
6” Caliper	54” Box
All Existing Shrubs	5 Gallon

Clean up the ground areas under plants remaining in place as directed by the Engineer. Wash off foliage that becomes soiled, or when directed to do so by the Engineer. Remove materials that fall or flow into protected areas. Provide protective barriers as needed or as directed by the Engineer to prevent materials from falling or flowing into protected areas.

Waste Management: Contractor will gather and dispose of spoils and vegetative waste, including dead and damaged plants and the trimmings accumulated from the operations to clear and remove existing vegetation. Dispose of spoils and vegetative waste off-site in conformance with the regulations imposed by the local authorities, and in an area

approved for such disposal by the local authorities.

Maintenance of Vegetation: Contractor will care for and maintain existing vegetation within protected areas as indicated on the Project Plans. Provide water and labor as needed for plant health, growth, and for washing down soiled foliage. Provide fertilizer, deep root fertilization, pesticides, anti-desiccants, and other materials and labor as needed to maintain the existing plants in a healthy and growing condition. Provide plant maintenance for the duration of the Contract, until Final Acceptance.

Record Drawings: The Contractor will keep and maintain separate record drawings ("field redlined record drawings"), corrected shop drawings, or other drawings necessary for the Engineer to show the landscape and irrigation work as constructed. These field redlined record drawings will be kept on the worksite and they will be maintained clear, accurate and current as changes occur that may differ with the bid set construction documents and addenda. All landscape and irrigation related elements buried or backfilled will be recorded in the "field redlined record drawings" prior to burial and backfilling occurs. The Contractor will submit the updated field redlined record drawings with monthly pay estimates to the Engineer. Complete field redlined record drawings that the Contractor maintains will be submitted to the Engineer in a format that will allow the Engineer to create the formal record drawings. The Contractor will submit the field redlined record drawings to the Engineer prior to the end of each construction phase. No extra measurement or direct payment will be made for this work; the cost being considered included in the price of the contract items.

Measurement:

Landscape and Irrigation Restoration will be measured by lump sum and will include all work necessary to restore project areas as designated on the Project Plans and as directed by the Engineer.

Payment:

The accepted quantities of Landscape and Irrigation Restoration, measured as provided above, will be paid for at the contract unit price per lump sum, which price will be full compensation for the work, complete in place, including all costs, materials, equipment, labor, and operations necessary for the furnishing and full restoration of all plant materials, decomposed granite, turf grass, drip and sprinkler irrigation, and other miscellaneous items to the satisfaction of the Engineer.

ITEM 9240055 – MISCELLANEOUS WORK (WALL AND ROOF FINISHES):

Description:

The work under these items shall consist of furnishing, fabricating and installing the wall and roof finishes with the details shown on the plans and the requirements of these specifications. The work also includes testing and the coordination with the contractor required to ensure code-compliant installations per manufacturer's recommendations

Materials:

A. Metal Fabrications

Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide shop drawings for metal ladders and elevator pit sump covers. Provide welding certificates

Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes. Steel plates, shapes, and bars to be per ASTM A36/A36M

Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

Post-Installed anchors to be torque-controlled expansion anchors. For interior locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated. For exterior locations and all stainless steel locations: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

For galvanized repair paint provide high-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

For elevator pit ladders, comply with ASME A17.1/CSA B44.

Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Miscellaneous Rough Carpentry

For lumber - DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated. Factory mark each piece of lumber with grade stamp of grading agency. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

For wood-preserved-treated materials contractor to provide materials treated per AWWA U1; use category UC3b. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements

for untreated material. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

Treat items indicated on Drawings, and the following:

1. Wood nailers, blocking, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood blocking and similar concealed members in contact with masonry or concrete.

For fire-retardant-treated materials, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency. Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test. Treatment shall not promote corrosion of metal fasteners. Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

Provide miscellaneous lumber indicated and lumber for support or attachment of other construction including blocking and nailers. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

Construction or No. 2 grade lumber of the following species:

1. Western woods; WCLIB or WWPA.

For plywood backing panels provide DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

Contractor to provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

Nails, brads, and staples to comply with ASTM F1667.

Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC308 as appropriate for the substrate.

Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

C. Self Adhered Sheet Waterproofing

Provide modified bituminous sheet waterproofing with a Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side with the following physical properties:

1. Tensile Strength, Membrane: 325 psi minimum; ASTM D412, Die C, modified.
2. Ultimate Elongation: 300 percent minimum; ASTM D412, Die C, modified.
3. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970/D1970M.
4. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C836/C836M.
5. Puncture Resistance: 50 lbf minimum; ASTM E154/E154M.
6. Water Absorption: 0.1 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D570.
7. Water Vapor Permeance: 0.05 perm maximum; ASTM E96/E96M, Water Method.
8. Hydrostatic-Head Resistance: 230 feet minimum; ASTM D5385.
9. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

Furnish accessory materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing. Furnish liquid-type accessory materials that comply with VOC limits of authorities having jurisdiction.

Furnish liquid primer recommended for substrate by sheet waterproofing material manufacturer.

Furnish liquid membrane that is elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

Furnish substrate patching membrane that is low-viscosity, two-component, modified asphalt coating.

Furnish protection course, asphaltic per ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:

1. Thickness: Nominal 1/8 inch.
2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for protection course type.

D. Water-Drainage Exterior Insulation and Finish System

Basis-of-Design Product: Provide Tremco Construction Products Group; Dryvit Outsulation Plus MD or approved comparable product from one of the following:

1. Senergy; a SIKA brand.
2. Sto Corp.
3. Total Wall, Inc.

EIFS performance to comply with ASTM E2568 and with the following:

1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
2. Impact Performance: ASTM E2568, High impact resistance.
3. Drainage Efficiency: 90 percent average minimum when tested in accordance with ASTM E2273.

For Water-Resistive Barrier Coating contractor to provide: EIFS manufacturer's standard formulation and accessories for use as water-resistive barrier coating; compatible with substrate.

For Water-Resistance contractor to provide: Comply with physical and performance criteria of ASTM E2570/E2570M.

For Flexible-Membrane Flashing contractor to provide: Cold-applied, self-adhering, self-healing, rubberized-asphalt, and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

For Insulation Adhesive contractor to provide: EIFS manufacturer's standard formulation designed for indicated use; specifically formulated to be applied to back side of insulation in a manner that creates open vertical channels designed to serve as an integral part of the water-drainage system of the EIFS-clad drainage-wall assembly; compatible with substrate; and complying with one of the following:

For Job-mixed formulation of portland cement complying with ASTM C150/C150M, Type I, and polymer-based adhesive specified for base coat.

For Factory-blended dry formulation of portland cement, dry polymer admixture, and fillers specified for base coat.

For Molded, (Expanded) Rigid Cellular Polystyrene Board Insulation: Comply with ASTM E2430/E2430M, unless otherwise noted, and the following:

1. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, in accordance with ASTM E84.
2. Dimensions: Provide insulation boards of not more than 24 by 48 inches, with thickness indicated on Drawings.

For Reinforcing Mesh contractor to provide: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. in accordance with ASTM E2098/E2098M and the following:

For Reinforcing Mesh for EIFS, General contractor to provide: Not less than weight required to comply with impact-performance level specified in "Performance Requirements" Article.

For Strip-Reinforcing Mesh, detail-reinforcing mesh, and corner-reinforcing mesh contractor to provide: Not less than As recommended by EIFS manufacturer.

For Base Coat contractor to provide: EIFS manufacturer's standard mixture complying with one of the following:

Job-mixed formulation of portland cement complying with ASTM C150/C150M, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with portland cement.

Factory-blended dry formulation of portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.

Factory-mixed noncementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.

For Finish Coat contractor to provide: EIFS manufacturer's standard acrylic-based coating complying with the following:

1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
2. Colors: As selected by Architect from manufacturer's full range.
3. Textures: As selected by Architect from manufacturer's full range.
4. Water: Potable.

For Trim Accessories contractor to provide: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D1784, manufacturer's standard cell class for use intended, and ASTM C1063.

For Casing Bead contractor to provide: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.

For Weep Screed/Track contractor to provide: Prefabricated, one-piece type for attachment behind insulation with perforated face leg extended to form a drip and weep holes in track bottom, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg; designed to drain incidental moisture that gets into wall construction to the exterior at terminations of EIFS with drainage.

For Expansion Joint contractor to provide: Closed-cell polyethylene backer rod and elastomeric sealant 3/4-inch-minimum.

E. Coated Foam Roofing

Coated foamed roofing to withstand exposure to weather without failure due to defective manufacture, installation, or other defects in construction. Membrane roofing to remain watertight. Provide polyurethane foam, coatings, substrate board, and accessory materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

Provide coated foamed roofing with the fire-test-response characteristics indicated, as determined by testing identical systems in accordance with test methods below for deck type and slopes indicated by a qualified testing and inspecting agency that is acceptable to authorities having jurisdiction.

1. Class A roof covering in accordance with ASTM E108.
2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
3. Flame-Spread Index: 75 or less.

Design roofing system to resist the wind-uplift pressures indicated on the Drawings when tested in accordance with FM 4474, UL 580, or UL 1897.

Provide polyurethane foam that is Rigid, cellular polyurethane; complying with ASTM C1029, Type III; spray applied, with fire retardants as required, and acceptable to coating manufacturer and have In-Place Density: 3.0 lb/cu. ft.; ASTM D1622/D1622M.

Provide Liquid acrylic elastomeric emulsion coating system specifically formulated for coating spray-applied polyurethane foam roofing. Top coat color to be white. Vapor Permeance to be a minimum 5.0 perms at 20 mils thick in accordance with ASTM E96/E96M, Desiccant Method, Procedure A.

Provide preformed roof insulation boards manufactured or approved by foam roofing system manufacturer.

Provide polyisocyanurate Board Insulation per ASTM C1289, Type II, Class 2, Grade 2 or 3, felt or glass-fiber mat facer on both major surfaces with compressive strength of 20 psi min and 1-1/2" thick.

Provide factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

Provide accessory materials recommended in writing by roofing manufacturer for intended use.

Provide ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained by No. 40 sieve, color to be buff white.

F. Sheet Metal Flashing and Trim

Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight. Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" requirements for dimensions and profiles shown unless more stringent requirements are indicated. Manufacture and install roof edge flashings and copings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure. Allow for thermal movements from ambient and surface temperature changes. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

For metallic-coated steel sheet provide Zinc-coated (galvanized) steel sheet complying with minimum ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792/A792M, Class AZ50 coating designation; structural quality. Pre painted by the coil-coating process to comply with ASTM A755/A755M.

1. Surface: Smooth, flat.
2. Exposed Coil-Coated Finish:
3. Two-Coat Fluoropolymer: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
4. Color: As selected by Architect from manufacturer's full range.

5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

For sheet underlayment provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970/D1970M.
2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F or lower; ASTM D1970/D1970M.

Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.

Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.

Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

G. Joint Sealants

Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T and NT.

Butyl-Rubber-Based Joint Sealants: ASTM C1311.

Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

Sealant Backing Material: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

H. Exterior Painting

For primers contractor to provide Water-Based, Galvanized-Metal Primer: Corrosion-resistant, pigmented, acrylic primer.

For finish coat contractor to provide exterior, Water-Based, Light Industrial Coating, Semigloss: Corrosion-resistant, water-based, pigmented, emulsion coating. Gloss of 35 to 70 units at 60 degrees when tested in accordance with ASTM D523.

I. Graffiti-Resistant Coatings

Non-Sacrificial Graffiti-Resistant Coating: Permanent, gloss-free, nearly invisible, non-yellowing, breathable, coating for interior and exterior unpainted surfaces that allows the easy removal of graffiti from surfaces without staining or loss in coating.

Construction Requirements :

A. Metal Fabrications

Qualify procedures and personnel in accordance with AWS D1.1/D1.1M

Contractor to preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Form exposed work with accurate angles and surfaces and straight edges. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

Contractor to form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

Contractor to fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction. Fabricate units from slotted channel framing where indicated. Furnish inserts for units installed after concrete is placed. Stripe paint corners, crevices, bolts, welds, and sharp edges.

Contractor to fabricate steel ladders per the following requirements:

1. Space siderails 18 inches apart unless otherwise indicated.
2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
3. Rungs: 3/4-inch-diameter, steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
6. Support each ladder with welded or bolted steel brackets.
7. Prime ladders, including brackets and fasteners, with primer specified in Section 09 91 23 "Interior Painting."

Contractor to provide elevator pit sump cover. Fabricate from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 1 inch in least dimension. Provide steel angle supports unless otherwise indicated.

Contractor to finish metal fabrications after assembly. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and

masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

Contractor to field weld as required per the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

Secure ladders to adjacent construction with the clip angles attached to the stringer.

Install brackets as required for securing of ladders welded or bolted to structural steel or built into masonry or concrete.

Install tops of elevator sump pit cover plates and frames flush with finished surface. Adjust as required to avoid lippage that could present a tripping hazard.

Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified

Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

B. Miscellaneous Rough Carpentry

For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to

ASTM D 5664. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site. For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber. Use inorganic boron for items that are continuously protected from liquid water. Use copper naphthenate for items not continuously protected from liquid water.

Contractor to install wood blocking and nailers where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Self Adhered Sheet Waterproofing

Provide product data for each product. Include construction details, material descriptions, and tested physical and performance properties of waterproofing including manufacturer's written instructions for evaluating, preparing, and treating substrate. Include qualification data for installer to confirm the entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate. Do not apply waterproofing in rain, fog, or mist. Maintain adequate ventilation during preparation and application of waterproofing materials.

Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

Obtain waterproofing materials and protection course from single source from single manufacturer.

Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263.

Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete. Remove fins, ridges, mortar, and other projections. Fill form tie holes, honeycomb, aggregate pockets, holes, and other voids. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks in accordance with ASTM D4258. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate. Corners: Prepare, prime, and treat inside and outside corners in accordance with manufacturer's instructions. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows: At plaza-deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.

Install modified bituminous sheets according to waterproofing manufacturer's written instructions. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight

installation. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F. Apply sheets from low to high points of decks to ensure that laps shed water. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints. Seal edges of sheet waterproofing terminations with mastic. Install sheet waterproofing and accessory materials to tie into adjacent waterproofing. Roll waterproofing membrane to firmly adhere to substrate. Roll seams and terminations. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions. Immediately install protection course with butted joints over waterproofing membrane.

Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.

Flood test each deck area for leaks, in accordance with recommendations in ASTM D5957, after completing waterproofing but before placing overlying construction. Install temporary containment assemblies, plug or dam drains, and flood with potable water.

Flood Testing:

1. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and a maximum depth of 4 inches. Maintain 2 inches of clearance from top of sheet flashings.
2. Flood each area for 24 hours.
3. Testing agency is to observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing.
4. After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight.
5. Cost of retesting is Contractor's responsibility.
6. Testing agency is to prepare survey report indicating locations of initial leaks, if any, and final survey report.

Waterproofing will be considered defective if it does not pass tests and inspections.

Do not permit foot or vehicular traffic on unprotected membrane. Protect waterproofing from damage and wear during remainder of construction period. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

D. Water-Drainage Exterior Insulation and Finish System

Provide product data for each EIFS component, trim, and accessory, including water-resistive barrier coatings. Provide samples for each type of finish-coat color and texture indicated. Include similar Samples of exposed accessories involving color selection. 24-inch-square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work. Include a typical control joint filled with sealant of color selected

Provide manufacturer certificate signed by EIFS manufacturer certifying EIFS complies with requirements, substrates to which EIFS is indicated to be attached are acceptable to EIFS manufacturer and Accessory products installed with EIFS, including joint sealants, flashing, water-resistive barrier coatings, and trim, whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer.

Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements. Proceed with installation of adhesives or coatings only when ambient temperatures have remained, or are forecast to remain, above 40 deg F for a minimum of 24 hours before, during, and after application. Do not apply EIFS adhesives or coatings during rainfall.

Manufacturer agrees to repair or replace components of EIFS-clad drainage-wall assemblies that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

1. Bond integrity and weathertightness.

2. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering. Warranty coverage includes the following components of EIFS-clad drainage-wall assemblies:

1. EIFS finish, including base coats, finish coats, and reinforcing mesh.
2. Insulation installed as part of EIFS.
3. Insulation adhesive.
4. EIFS accessories, including trim components and flashing.
5. Water-resistive barrier coatings.
6. EIFS drainage components.

Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.

Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation. Comply with ASTM C1397, ASTM E2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

Contractor to apply water-resistive barrier coating over masonry to provide a water-resistive barrier. Apply flexible-membrane flashing over water-resistive barrier coating, applied and lapped to shed water; seal at openings, penetrations, and terminations. Prime substrates with flashing primer if required and install flashing.

Apply trim accessories at perimeter of EIFS, at expansion joints, and elsewhere as indicated. Coordinate with installation of insulation.

1. Weep Screed/Track: Use at bottom termination edges, at window and door heads of water-drainage EIFS unless otherwise indicated.
2. Expansion Joint: Use where indicated on Drawings.
3. Casing Bead: Use at other locations.

Contractor to adhesively attach insulation to substrate in compliance with ASTM C1397 and the following:

1. Apply adhesive to insulation by notched-trowel method, with notches oriented vertically to produce drainage channels that remain functional after the insulation is adhered to substrate.
2. Press and slide insulation into place. Apply pressure over entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
3. Allow adhered insulation to remain undisturbed for not less than 24 hours, before beginning rasping and sanding insulation or applying base coat and reinforcing mesh.
4. Apply insulation over substrates in courses with long edges of boards oriented horizontally.
5. Begin first course of insulation from a level base line and work upward.
6. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
7. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints, so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of door openings.
8. Adhesive Attachment: Offset joints of insulation not less than 6 inches from horizontal and 4 inches from vertical joints in sheathing.
9. Interlock ends at internal and external corners.
10. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
11. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
12. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch. Prevent airborne dispersal and immediately collect insulation raspings or sandings.
13. Interrupt insulation for expansion joints where indicated.
14. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
15. Before installing insulation and before applying field-applied reinforcing mesh, fully wrap board edges. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front and back face unless otherwise indicated on Drawings.
16. Treat exposed edges of insulation as follows:

- a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
- b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
- c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.
- d. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and water-resistive barrier coating.

Contractor to install expansion joints where required by EIFS manufacturer and at expansion joints in substrate behind EIFS, where EIFS adjoins dissimilar substrate, materials, and construction and where wall height or building shape changes.

Contractor to install base coat to full coverage to exposed insulation with not less than 1/16-inch dry-coat thickness. Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C1397. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible. Where indicated or required, apply second base coat and second layer of reinforcing mesh, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C1397 in same manner as first application. Do not apply until first base coat has cured. Apply strip-reinforcing mesh around openings, extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip-reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch-wide, strip-reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners. Embed strip-reinforcing mesh in base coat before applying first layer of reinforcing mesh. Where indicated, apply second base coat in same manner and thickness as first application, except without reinforcing mesh. Do not apply until first base coat has cured.

Contractor to install finish coat to full-thickness coverage over dry base coat, maintaining a wet edge at all times for uniform appearance, to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

E. Coated Foam Roofing

Contractor to provide product data to include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties. For coated foamed roofing, prepared on Samples of size indicated below:

1. Samples, 24 by 24 inches, on rigid backing, showing polyurethane foam of thickness required and stepped coatings in colors required to illustrate buildup of coated foamed roofing.
2. Include Samples of accessories to verify color and finish selected.

A qualified coated-foamed-roofing installer who is approved, authorized, or licensed by coating manufacturer for installation of coating manufacturer's product over polyurethane foam. Engage an installer who participates in and who has fulfilled requirements of the SPFA program for company accreditation as "SPFA PCP Accredited Company Roofing," with individual applicator certification for personnel assigned to work on Project.

Manufacturer agrees to repair or replace coated foamed roofing that does not comply with requirements or that does not remain watertight within specified warranty period. Warranty period shall be 20 years from date of substantial completion.

Verify that related work is complete. Do not install coated foamed roofing until roof openings, curbs, and parapets, if any, are complete and roof drains, vents, and other roof penetrations are in place. Examine substrates, areas, and conditions under which coated foamed roofing will be applied, with Installer present, for compliance with requirements. Proceed with installation only after unsatisfactory conditions have been corrected and substrates are dry.

Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

Install insulation with joints staggered not less than 24 inches in adjacent rows and offset not less than 12 inches from previous layer. Trim insulation neatly to fit around penetrations and projections, and to fit tightly to intersecting sloping roof decks. Make joints between adjacent insulation boards not more than 1/4 inch in width. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches. Trim insulation, so that water flow is unrestricted. Fill gaps exceeding 1/4 inch with insulation. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations. Secure insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

Clean and prepare substrate in accordance with coated foamed roofing manufacturer's written instructions. Provide clean, dust-free, dew-free, and dry substrate for coated foamed roofing application.

Remove grease, oil, form-release agents, curing compounds, and other contaminants from substrate.

Cover and mask adjoining surfaces not receiving coated foamed roofing to prevent overspray or spillage affecting other construction. Temporarily close off roof drains, removing roof-drain plugs when not doing coated foamed roofing work or when rain is

forecast. Remove masking after polyurethane foam application; cover and re-mask adjoining surfaces before coating polyurethane foam.

Mix and apply polyurethane foam in accordance with ASTM D5469/D5469M and coated foamed roofing manufacturer's written instructions. Fill irregularities and depressions to prevent ponding water. Apply the required full thickness of polyurethane foam in any specific area on same day. Apply only the area of polyurethane foam that can be covered with required base coating on same day or within 24 hours. Apply polyurethane foam to avoid overspray beyond immediate area of work. Apply polyurethane foam in lift thicknesses of not less than 1/2 inch and not more than 1-1/2 inches. Uniformly apply total thickness of polyurethane foam indicated, but not less than 1 inch, to a surface tolerance of plus 1/4 inch and no minus. Vary thickness uniformly and fill low spots to achieve minimum 1/4-inch-per-foot slope to drain unless otherwise indicated. Apply polyurethane foam to roof penetrations, terminations, and vertical surfaces as indicated. Unless otherwise indicated, extend polyurethane foam at least 4 inches above elevation of adjacent roof field. Provide finished surface of polyurethane foam within the following range of surface textures as defined by ASTM D5469/D5469M (Smooth To Orange Peel). Remove and replace polyurethane foam not complying with surface-texture limitations. Remove defective thickness and prepare and reapply polyurethane foam with acceptable, uniform results

Allow polyurethane foam substrate to cure for a minimum of two hours before coating, and apply coating system to polyurethane foam no later than 24 hours after applying the foam. Remove dust, dirt, water, and other contaminants before applying coating system. Apply coating system to polyurethane foam by spray, roller, or other suitable application method in accordance with coating manufacturer's written instructions. Apply base coat and one or more topcoats to obtain a uniform, seamless membrane free of blisters and pinholes. Apply each coat at right angles to preceding coat, using contrasting color tints for successive coats. Apply topcoat(s) after removing dust, dirt, water, and other contaminants from base coat. Apply coating system to a minimum dry film thickness recommended in writing by coated foamed roofing manufacturer. Apply coating system at wall terminations and other vertical surfaces to extend vertically beyond polyurethane foam by a minimum of 4 inches. Apply mineral granules over wet topcoat, using pressure equipment at the rate of 0.5 lb/sq. ft. Remove excess granules after topcoat has cured.

Correct deficiencies in, or remove, foam or coatings that do not comply with requirements; fill and repair substrates and reapply materials.

Cure coatings in accordance with manufacturer's written instructions, taking care to prevent contamination and damage during application stages and curing. Do not permit traffic on uncured coatings. Protect coated foamed roofing from damage and wear during remainder of construction period. Clean overspray and spillage from adjacent

construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

F. Sheet Metal Flashing and Trim

Provide product data for each type of product. Provide shop drawings for all sheet metal flashing and trim including plans, elevations, sections, and attachment details. Provide manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish. Provide actual sample of finished products for each type of exposed finish for sheet metal and other metal accessories.

Provide certificate for each type of coping that is ANSI/SPRI/FM 4435/ES-1 tested

For copings that are ANSI/SPRI/FM 4435/ES-1 tested, shop is to be listed as able to fabricate required details as tested and approved.

Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 ft. on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified. Form metal for thermal expansion of exposed flashing and trim. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints. Use lapped expansion joints only where indicated on Drawings. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention

Data Sheet 1-49 for application, but not less than thickness of metal being secured. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength. Do not use graphite pencils to mark metal surfaces.

Hanging Gutters:

1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
2. Fabricate in minimum 96-inch-long sections.
3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
4. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
5. Gutter Profile: Style K in accordance with cited sheet metal standard.
6. Expansion Joints: Butt type with cover plate.
7. Gutters with Girth up to 15 Inches (380 mm): Fabricate from the following materials: Galvanized Steel: 0.022 inch thick.

Downspouts: Fabricate rectangular downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Fabricate from the following materials: Galvanized Steel: 0.022 inch thick.

Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials: Galvanized Steel: 0.028 inch thick.

Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes built-in overflows. Fabricate from the following materials: Galvanized Steel: 0.028 inch thick.

Copings: Fabricate in minimum 96-inch-long, but not exceeding 12 ft.-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate. Fabricate from the following materials: Galvanized Steel: 0.040 inch thick.

Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics

required unless otherwise indicated on Drawings. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Install continuous cleats with fasteners spaced not more than 12 inches o.c. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks. Do not field cut sheet metal flashing and trim by torch. Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 ft. with no joints within 24 inches of corner or intersection. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints. Use lapped expansion joints only where indicated on Drawings. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation. Seal joints as required for watertight construction. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not Install sealant-type joints at temperatures below 40 deg F.

Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

Hanging Gutters:

Join sections with joints sealed with sealant.

1. Provide for thermal expansion.
2. Attach gutters at eave or fascia to firmly anchor them in position.
3. Provide end closures and seal watertight with sealant.
4. Slope to downspouts.
5. Fasten gutter spacers to front and back of gutter.
6. Anchor and loosely lock back edge of gutter to continuous cleat.
7. Anchor gutter with straps spaced not more than 24 inches apart to roof deck unless otherwise indicated, and loosely lock to front gutter bead.

Downspouts:

1. Join sections with 1-1/2-inch telescoping joints
2. Provide hangers with fasteners designed to hold downspouts securely to walls.
3. Locate hangers at top and bottom and at approximately 60 inches o.c.
4. Provide elbows at base of downspout to direct water away from building.
5. Connect downspouts to underground drainage system.

Parapet Scuppers:

1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
2. Loosely lock front edge of scupper with conductor head.
3. Seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper discharge.

Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 ft. on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.

Maintain sheet metal flashing and trim in clean condition during construction.

Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

G. Joint Sealants

Provide product data for each product type including manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

Install per manufacturer's recommendations.

Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Exterior insulation and finish systems.

Remove laitance and form-release agents from concrete. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following: Metal.

Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability. Do not leave gaps between ends of sealant backings. Do not stretch, twist, puncture, or tear sealant backings. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

Install sealants using proven techniques that comply with the following and at the same time backings are installed: Place sealants so they directly contact and fully wet joint substrates. Completely fill recesses in each joint configuration. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealant from surfaces adjacent to joints. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

JOINT-SEALANT SCHEDULE

Joint-Sealant Application (JS-1): Exterior joints in horizontal traffic surfaces.

Joint Locations:

Isolation and contraction joints in cast-in-place concrete slabs.

Other joints as indicated on Drawings.

Joint Sealant: Urethane, M, P, 25, T, NT.

Joint-Sealant Application (JS-2): Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

Joint Locations:

Control and expansion joints in unit masonry.

Control and expansion joints in exterior insulation and finish systems.

Perimeter joints between materials listed above and frames of doors, windows, and louvers.

Control and expansion joints in ceilings and other overhead surfaces.

Other joints as indicated on Drawings.

Joint Sealant: Silicone, nonstaining, S, NS, 100/50, NT.

Joint-Sealant Application (JS-3): Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

Joint Locations:

Control joints on exposed interior surfaces of exterior walls.

Perimeter joints between interior wall surfaces and frames of interior doors.

Other joints as indicated on Drawings.

Joint Sealant: Acrylic latex.

Joint-Sealant Application (JS-4): Concealed mastics.

Joint Locations:

Aluminum thresholds.

Sill plates.

Other joints as indicated on Drawings.

Joint Sealant: Butyl-rubber based.

H. Exterior Painting

Provide product data for each type of product include preparation requirements and application instructions including VOC content. Provide sample for each topcoat product on 8 inch square sample board.

Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.

Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility,

with finishes and primers. Proceed with coating application only after unsatisfactory conditions have been corrected. Application of coating indicates acceptance of surfaces and conditions.

Comply with manufacturer's written instructions applicable to substrates and paint systems indicated. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this Section.

Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

Apply paints in accordance with manufacturer's written instructions. Use applicators and techniques suited for paint and substrate indicated. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames. Primers specified in the exterior painting schedules may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.

Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and

storm drain systems, and ground. Dispose of contaminants in accordance with requirements of authorities having jurisdiction. Allow empty paint cans to dry before disposal. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

EXTERIOR PAINTING SCHEDULE

Galvanized-Metal Substrates:

Water-Based, Light Industrial Coating System:

Prime Coat: Water-based, galvanized-metal primer.

Intermediate Coat: Matching topcoat.

Topcoat: Exterior, water-based, light industrial coating, semigloss.

I. Graffiti-Resistant Coatings

Provide product data for each type of product including manufacturer's printed statement of VOC content and manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat. Provide qualifications data for applicator.

Prepare mockups of each required graffiti-resistant coating on each type of substrate required to demonstrate aesthetic effects and to set quality standards for materials and execution. Locate mockups on masonry sample panels. Size: 10 sq. ft. each.

Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied in accordance with manufacturers' written instructions and warranty requirements:

1. Concrete surfaces and mortar have cured for not less than 28 days.
2. Building has been closed in for not less than 30 days before treating wall assemblies.
3. Ambient temperature is above 40 deg F and below 100 deg F and will remain so for 24 hours.
4. Substrate is not frozen and substrate-surface temperature is above 40 deg F and below 100 deg F.
5. Rain or snow is not predicted within 24 hours or if rain is predicted within 8 hours after application.
6. Not less than 24 hours have passed since surfaces were last wet.

7. Windy conditions do not exist that might cause graffiti-resistant coating to be blown onto vegetation or surfaces not intended to be treated.

Manufacturer's standard form in which manufacturer agree(s) to repair or replace materials that peel, crack, or discolor or have other defects due to faulty materials and workmanship within specified warranty period.

Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work. Verify that surfaces are clean and dry in accordance with graffiti-resistant coating manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of graffiti-resistant coating. Verify that required repairs are complete, cured, and dry before applying graffiti-resistant coating. Test pH level in accordance with silane- or siloxane-based graffiti-resistant coating manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals. Proceed with installation only after unsatisfactory conditions have been corrected.

Allow cementitious materials to age before application of graffiti-resistant coating, in accordance with graffiti-resistant coating manufacturer's written instructions. Cleaning: Before application of graffiti-resistant coating, clean substrate of substances that could impair penetration or performance of product in accordance with graffiti-resistant coating manufacturer's written instructions and as follows:

1. Concrete-Based Substrates: Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of graffiti-resistant coatings on concrete masonry unit substrate.
2. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of graffiti-resistant coating. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of graffiti-resistant coating being deposited on surfaces. Cover live vegetation.

Engage a factory-authorized service representative to inspect the substrate before application of graffiti-resistant coating and to instruct Applicator on the product and application method to be used.

Apply graffiti-resistant coating on surfaces to be treated using 15 psi pressure spray with a fan-type spray nozzle to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm

wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

Immediately clean graffiti-resistant coating from adjoining surfaces and surfaces soiled or damaged by graffiti-resistant coating application, in accordance with manufacturer's written cleaning instructions, as work progresses. Correct damage to work of other trades caused by graffiti-resistant coating application, as approved by Architect.

Method of Measurement:

Wall and roof finishes will be measured by a lump sum, complete in place.

Basis of Payment:

The accepted quantities for wall and roof finishes, measured as provided above, will be paid for at the contract as a lump sum, which price shall be full compensation for the work complete in place.

ITEM 9240117 – MISCELLANEOUS WORK (1 ½" X 20 GA COMPOSITE STEEL FLOOR DECK):

ITEM 9240118 – MISCELLANEOUS WORK (1 ½" X 20 GA STEEL ROOF DECK):

Description:

The work under this item shall consist of furnishing and installing steel roof deck or composite steel floor deck, as applicable, in accordance with the Project Plans, details, and these Special Provisions.

Materials:

Steel deck shall conform to the Steel Deck Institute (SDI) Specifications, latest edition.

Steel roof deck and composite steel floor deck shall be ASTM A653, Grade 50, structural steel.

Minimum properties of steel roof deck shall be as follows:

- 1 ½" x 20 ga (Type B): IP = 0.197 in⁴ / ft
- IN = 0.217 in⁴ / ft
- SP = 0.224 in³ / ft
- SN = 0.229 in³ / ft

Minimum properties of composite steel floor deck shall be as follows:

- 1 ½" x 18 ga: IP = 0.277 in⁴ / ft
- IN = 0.290 in⁴ / ft
- SP = 0.306 in³ / ft

- $SN = 0.318 \text{ in}^3 / \text{ft}$

Steel roof deck shall conform to ASTM A653 Grade 50, structural steel grade with a minimum yield strength of 50 ksi.

Steel floor deck shall conform to ASTM A653 grade 50, structural steel grade with a minimum yield strength of 50 ksi.

Construction Requirements:

Steel deck shall be continuous over three or more spans, except where steel layout does not permit.

All composite steel floor deck shall have deformations adequate to provide a bond with the concrete.

Galvanize steel roof deck and composite steel floor deck in accordance with ASTM A653, G60.

Steel roof deck is part of the main lateral load resisting system. Structural diaphragm action shall be provided by the steel roof deck. Deck diaphragm attachment requirements indicated below shall be increased as required for the specified uplift loading indicated or as required by roof system manufacturer to conform to system requirements. The deck and its attachments to the structure shall be capable of resisting the horizontal shear force listed below or as indicated on the drawings, with a minimum safety factor as prescribed in the steel deck institute diaphragm design manual. Minimum attachment of the steel roof deck shall be as listed below or as indicated on the drawings, whichever is more stringent:

- 3/4" weld pattern at supports, with 1 1/4" x 3/8" arc seam weld at supports adjacent to sidelap and 5/8" visible diameter arc spot welds at interior flutes, pneumatic punch sidelaps at 24" on-center.
- 1 1/2" x 20 ga: minimum diaphragm shear capacity = 630 plf (9' max span)

Connect roof deck to supports around perimeter of edges, openings, and penetrations with 5/8" visible diameter arc spot welds at 12" on-center.

Steel deck manufacturer shall furnish complete shop drawings depicting deck placement, sheet metal closures, sheet metal accessories, and deck connection requirements.

The roof deck areas require varying slopes, including possible warping of the deck. Steel deck fabricator shall provide proper fit and welding of all deck.

Composite floor deck at non-composite systems (having no shear connectors) shall be welded to structural steel supports with 3/4" weld pattern with 1 1/4" x 3/8" arc seam weld at supports adjacent to sidelap and 5/8" visible diameter arc spot welds at interior flutes. Connect composite steel floor deck to supports around perimeter of edges, openings, and

penetrations with 5/8" visible diameter arc spot welds at interior flutes. Connect composite steel floor deck to supports around perimeter of edges, openings, and penetrations with 5/8" visible diameter arc spot welds at 12" on-center, unless a more stringent connection is noted on the drawings.

All single span floor deck conditions must be shored. Shores shall be left in place until the concrete attains 75% of the specified compressive strength.

All steel deck and mechanical fasteners shall have current ICC or IAPMO evaluation reports. All welding shall be in accordance with AWS D1.3.

Do not suspend any item from any steel deck. All hangers for conduit, piping, fixtures, or any other items, shall be hung directly from structural steel work or supplementary members acceptable to the Engineer. All hanging load locations and details shall be submitted for review.

Furnish and install miscellaneous deck support angles at columns and similar conditions.

Provide sump pans at all roof drains and reinforce as required.

Steel deck shall be lapped over supports with a minimum lap length of 2 inches at all non-composite floor and roof decks.

Method of Measurement:

Steel deck will be measured per square foot.

Basis of Payment:

The accepted quantities of steel deck, measured as provided above, will be paid for at the contract unit price per square foot, which price shall be full compensation for the work, complete in place, including steel members, fabrication, paint, shop and working drawing preparation, welding, furnishing, and installation.

ITEM 9240127 – MISCELLANEOUS WORK (STEEL STAIRS):

Description:

The work included under this item shall consist of fabricating, erecting, and installing steel stairs and fiber reinforced concrete landings in conformance with the requirements and details shown on the Project Plans, ADOT's Standard Specifications for Road and Bridge Construction (Standard Specifications), and these Special Provisions. The steel stairs include the following elements:

- Steel HSS members
- Steel angles
- Steel channels

- Steel plates
- Steel anchor rods
- Concrete foundations
- Fiber reinforced concrete tread pans
- Fiber reinforced concrete landing pans

Materials:

(A) Steel

Structural steel shall be in accordance with Section 604 of the Standard Specifications.

Steel HSS shall conform to ASTM A500, Grade C.

Steel channels and angles shall conform to ASTM A36.

Steel plates shall conform to ASTM A36.

Steel anchor rods shall conform to ASTM F1554, Grade 36.

Steel tread pans and landing pans shall conform to ASTM A1011.

(B) Fiber Reinforced Concrete

Fiber reinforced concrete shall be in accordance with Section 1006 of the specifications.

Fiber reinforcement shall be in accordance with Subsection 1006-2.04 of the specifications.

Fiber reinforcement shall conform to ASTM C1116, Type III.

Fiber reinforcement shall conform to the following:

Specific Gravity	0.9
Modulus of Elasticity	500 ksi – 800 ksi
Tensile Strength	70 ksi – 110 ksi
Length	0.5" – 2.0"
Dosage	Verify with manufacturer, 1.5 lb/CY min.

Construction Requirements:

Structural steel shall be constructed in accordance with Section 604-3 of the Standard Specifications.

Method of Measurement:

The accepted quantities for Miscellaneous Work (Steel Stairs) shall be measured per unit each, which includes all necessary steel members, connections, concrete, and miscellaneous attachments in accordance with the specifications identified with this document and on the plans.

Basis of Payment:

The accepted quantities of Miscellaneous Work (Steel Stairs), measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work, complete in place, including steel members, fabrication, paint, shop and working drawing preparation, and welding as described and specified herein and indicated on the Project Plans.

ITEM 9240119 – MISCELLANEOUS WORK (INDOOR FAN COIL UNIT, DUCTED CONCEALED, 36 MBH)

ITEM 9240120 – MISCELLANEOUS WORK (INDOOR FAN COIL UNIT, DUCTLESS, 24 MBH)

ITEM 9240121 – MISCELLANEOUS WORK (OUTDOOR HEAT PUMP, SINGLE ZONE, 36 MBH)

ITEM 9240146 – MISCELLANEOUS WORK (REFRIGERANT LINESET, WITH CLOSED CELL FOAM INSULATION)

ITEM 9240147 – MISCELLANEOUS WORK (CONDENSATE DRAIN, 3/4-INCH TYPE L COPPER)

ITEM 9240173 – MISCELLANEOUS WORK (OUTDOOR HEAT PUMP, MULTI ZONE, 36 MBH)

Description:

The work under these items shall consist of furnishing all labor, materials, tools, and equipment necessary to furnish and install HVAC split systems which include indoor fan coil units and outdoor heat pump style condensing units, refrigerant lineset with closed cell foam insulation, and condensate piping as indicated on the Project Plans.

Materials:

Materials shall consist of complete indoor ducted concealed and ductless units, outdoor heat pump single zone and multi zone condensing units, and accessories as indicated on the plans. The following system components shall be provided at the locations shown on the plans. No substitutions will be allowed unless approved in writing by the Engineer.

Indoor concealed ceiling-mounted units for ducting shall be factory-assembled complete units with components, piping, wiring, and controls required for mating to ductwork,

pipng, power, and controls field connections. Cabinets shall be constructed of galvanized or painted steel with manufacturer's standard internal insulation to provide thermal resistance and prevent condensation, and shall include duct connections consisting of extended collars or flanges or designated exterior cabinet surfaces designed for attaching field-installed ductwork. Mounting provisions shall be manufacturer-designed for field installation, and internal access shall be provided by removable panels or hinged doors of adequate size for inspection, cleaning, service, and replacement.

DX coil assemblies shall include coil casings of aluminum, galvanized, or stainless steel, aluminum fins mechanically bonded to copper tubes of diameter and thickness required by performance, and electronic modulating expansion valves with linear or proportional characteristics. Unit internal tubing shall be copper with brazed joints and insulated to prevent condensation. Field piping connections shall be manufacturer standard. Units shall be factory charged with dehydrated air or nitrogen and factory pressure tested to verify no leaks.

Drain assemblies shall consist of non-ferrous pans sloped to a low point drain connection. Condensate removal shall be by unit-mounted pump or integral lifting mechanism capable of lifting drain water above the top of the cabinet. Field piping connections shall be non-ferrous.

Fan and motor assemblies shall be direct-drive arrangements consisting of single or multiple fans connected to a common motor shaft and driven by a single motor. Components shall be non-ferrous or corrosion-resistant finished ferrous materials. Fan wheels shall be statically and dynamically balanced. Motors shall be brushless DC or electronically commutated with permanently lubricated bearings and integral protection against thermal, overload, and voltage fluctuations. Units shall provide multiple or variable speed settings with a minimum 50 percent range and include integral vibration isolation.

Filter assemblies shall provide access from bottom, side, or rear to allow installation and replacement without removing ductwork or requiring tools. Filters shall meet ASHRAE 52.2 MERV 8 efficiency and consist of replaceable antimicrobial media or washable manufacturer standard filters.

Unit controls shall include metal enclosures suitable for indoor locations, factory-installed configurable digital controllers, and sensors including unit inlet air temperature, coil entering refrigerant temperature, and coil leaving refrigerant temperature. Units shall provide network communication capability. Wiring shall be manufacturer standard, labeled, and coordinated with unit-mounted diagrams.

Unit electrical systems shall include metal enclosures, single-point power connections, factory-mounted disconnecting means, control transformers, labeled wiring, and metal raceways for line voltage conductors.

Indoor exposed wall-mounted units shall be factory-assembled with painted or coated steel cabinets or plastic enclosures with architectural finishes. Units shall include insulated DX coils, copper tubing, factory pressure testing, gravity condensate drainage

or pumps where required, direct-drive fans, washable antimicrobial filters, discharge grilles, accessories such as condensate pumps, and factory-installed controls and electrical systems compliant with NFPA 70.

Outdoor air-source heat pump units shall be factory-assembled and tested units designed for systems with either all heating or all cooling demands and not simultaneous operation. Systems may consist of single or multiple modules forming a single refrigeration circuit and all units shall be from the same product generation. Cabinets shall be galvanized steel with corrosion-resistant coating and removable access panels.

Compressors shall be hermetically sealed scroll type with inverter drive and minimum turndown to 15 percent capacity, with integral protections for refrigerant pressure, oil level, oil temperature, overload, voltage, phase conditions, and short cycling. Units shall include oil management systems, crankcase heaters, and vibration isolation.

Condenser coils shall be plate fin or aluminum microchannel type. Fan assemblies shall be direct-drive propeller type with corrosion-resistant construction, OSHA-compliant guards, variable speed motors, and vibration isolation. Units shall include controls, sensors, wiring, electrical enclosures, disconnects, copper piping, insulation, factory charge, and pressure testing.

Condensate drain piping shall consist of copper tubing per ASTM standards with appropriate fittings and lead-free solder. Refrigerant piping shall consist of copper tubing, fittings, brazing materials, and flexible connectors rated for system pressures.

Insulation shall be closed-cell elastomeric material meeting ASTM requirements, with acceptable manufacturers including Aeroflex USA, Armacell LLC, and K-Flex USA. Adhesives shall be compatible, solvent-based, and meet temperature and fire performance requirements.

Construction Requirements:

The Contractor shall examine all substrates, products, and rough-in conditions prior to installation and shall not proceed until unsatisfactory conditions are corrected. Equipment shall be installed level and plumb, supported properly, and installed in accordance with manufacturer recommendations and governing codes.

Indoor units shall be installed with proper supports, concealed piping where ceilings exist, and neat exposed installations where required. Outdoor units shall be installed on concrete pads, anchored, and grouted. Piping shall be installed in accordance with ASHRAE 15, routed efficiently, supported properly, and protected from damage. Insulation shall be continuous and sealed to prevent condensation.

Field quality control shall include inspection, testing, and adjustment of all HVAC equipment, systems, and associated components to verify proper installation and operation in accordance with the Contract Documents and manufacturer requirements. A factory-authorized service representative shall be engaged to inspect, test, and adjust all

components, assemblies, and equipment installations, including all mechanical, electrical, and control connections, and shall assist in all required testing procedures.

Testing and inspections shall include, but not be limited to, performing a complete refrigerant system leak test following installation. Systems shall be charged and tested for leaks, and any detected leaks shall be repaired and the system retested until no leaks are present. Following energization of electrical systems, an operational test shall be performed to verify proper motor rotation, equipment startup, and overall system performance.

Controls and safety devices shall be tested and adjusted to confirm proper operation, including verification of all sensors, safeties, and control sequences. Any damaged, defective, or malfunctioning components, controls, or equipment shall be removed and replaced, and the system shall be retested to confirm compliance with specified requirements.

All deficiencies identified during testing and inspection shall be corrected to the satisfaction of the Engineer. Upon completion of testing, the Contractor shall prepare and submit comprehensive test and inspection reports documenting all procedures performed, results obtained, corrective actions taken, and final system performance.

Startup Service

Startup service shall be performed by a factory-authorized service representative experienced with the specified equipment. The service representative shall verify that all equipment has been installed in accordance with the Contract Documents and the manufacturer's written instructions prior to initiating startup procedures. Startup activities shall include inspection of all mechanical, electrical, and control connections; verification of proper refrigerant charge; confirmation that piping systems have been properly evacuated, leak tested, and insulated; and verification that all components are properly supported and secured.

The service representative shall perform complete startup and commissioning checks in accordance with the manufacturer's written procedures. These checks shall include energizing equipment, verifying proper motor rotation, confirming proper airflow and refrigerant flow, and ensuring that all system components operate within the manufacturer's recommended operating ranges. Controls and sequences of operation shall be tested and verified for proper functionality, including communication between indoor and outdoor units and response of all sensors and safety devices.

Any deficiencies identified during startup shall be corrected prior to final acceptance. Equipment shall not be placed into service until all startup procedures have been successfully completed and verified. The Contractor shall coordinate startup activities with other trades as required to ensure proper system operation.

Demonstration

Following completion of startup and acceptance of the system, the Contractor shall provide training for the Owner's maintenance personnel. Training shall be conducted by a qualified representative and shall include instruction on system operation, adjustment of controls, routine maintenance procedures, troubleshooting of common issues, and identification of system components. Training shall also include review of manufacturer's operation and maintenance manuals, recommended maintenance schedules, and safety procedures.

The Contractor shall ensure that training is sufficient to allow the Owner's personnel to operate and maintain the system in a safe and efficient manner. Documentation of training, including attendance and topics covered, shall be provided to the Owner.

Method Of Measurement:

The accepted quantities for indoor fan coil units and outdoor heat pumps shall be measured per unit each, which includes all necessary brackets, controls, and installation in accordance with the specifications identified herein and on the plans.

The accepted quantities for refrigerant piping with closed cell insulation and condensate piping shall be measured per linear foot, which includes all necessary brackets, supports, and installation in accordance with the specifications identified herein and on the plans.

Basis Of Payment:

The accepted quantities of indoor fan coil units, outdoor heat pump units, refrigerant piping, and condensate piping, measured as provided above, will be paid for at the contract unit price specified in the bidding schedule, complete in place, which price shall include all labor, materials, tools, equipment, and incidentals necessary to complete the work.

ITEM 9240056 – MISCELLANEOUS WORK (DUCTWORK, GALVANIZED STEEL)

ITEM 9240135 – MISCELLANEOUS WORK (FIRE DAMPER, 2 HR, 30"x10")

ITEM 9240176 – MISCELLANEOUS WORK (FIRE DAMPER, 2 HR, 54"x8")

ITEM 9240171 – MISCELLANEOUS WORK (ELEVATOR SUMP PUMP)

ITEM 9240149 – MISCELLANEOUS WORK (PUMP DISCHARGE DRAIN, 2" SCH 40 PVC)

Description:

The work under these items shall consist of furnishing all labor, materials, tools, and equipment to furnish, install fire dampers, ductwork, sump pump and discharge piping serving elevator shaft as indicated on the Project Plans.

Materials:

Materials shall consist of complete fire dampers, ductwork, sump pump, and piping installation, and accessories as indicated on the plans. The following system components

shall be provided at the locations shown on the plans. No substitutions will be allowed unless approved in writing by the Engineer.

Single-wall rectangular ducts and fittings shall comply with SMACNA's HVAC Duct Construction Standards - Metal and Flexible based on indicated static-pressure class unless otherwise indicated. Ducts shall be constructed of galvanized sheet steel unless otherwise indicated. For ducts exposed to weather, ducts shall be constructed of Type 304 or Type 316 stainless steel indicated by manufacturer to be suitable for outdoor installation. Transverse joints shall be fabricated in accordance with SMACNA Figure 2-1 based on pressure class, sealing, materials, and support intervals. Longitudinal seams shall comply with SMACNA Figure 2-2. Elbows, transitions, offsets, and branch connections shall comply with SMACNA Chapter 4.

Sheet metal materials shall comply with SMACNA standards and ASTM A653/A653M. Galvanized coating shall be G60. Surfaces exposed to view shall be mill phosphatized. Reinforcement shapes and plates shall comply with ASTM A36/A36M and be galvanized. Tie rods shall be galvanized steel sized per duct length requirements.

Sealants and gaskets shall have flame spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested in accordance with UL 723. Tape sealing systems, joint sealants, and flange sealants shall meet specified performance including pressure, temperature, and compatibility. Flange gaskets shall consist of butyl rubber, neoprene, or EPDM.

Hangers and supports shall comply with SMACNA requirements. Hanger rods shall be galvanized steel. Steel cables shall comply with ASTM A603. Attachments shall include screws, rivets, or fasteners compatible with duct materials. Trapeze and riser supports shall be galvanized steel.

Fire dampers shall comply with NFPA 90A and NFPA 90B and shall be UL 555 listed. Dampers shall be static or dynamic type rated for pressure and velocity. Fire rating shall match assembly rating. Frames, blades, sleeves, and fusible links shall comply with UL listing.

Flange connectors shall be galvanized steel, factory fabricated, and match duct construction. Turning vanes shall be galvanized steel, fabricated and installed in accordance with SMACNA Figures 4-3 and 4-4. Duct access doors shall comply with SMACNA requirements and include insulated panels, hinges, latches, and gaskets.

Flexible duct connectors shall meet ASTM E84 fire performance requirements and ASHRAE 62.1 for airstream surfaces. Materials shall be flame-retardant fabric with neoprene coating and suitable for specified temperature range.

Submersible sump pumps shall be factory-assembled centrifugal pumps with cast iron casings, stainless steel shafts, mechanical seals, hermetically sealed motors, float controls, alarms, and BAS interface capability.

Construction Requirements:

Duct installation shall comply with SMACNA standards and project drawings. Ducts shall be installed in maximum practical lengths with minimal joints and fittings, aligned with building geometry, and installed with proper clearances. Openings shall be sealed with sheet metal flanges.

Duct sealing shall comply with SMACNA seal classes including Seal Class C for supply and return ducts in unconditioned spaces.

Hangers and supports shall comply with SMACNA Chapter 5 including spacing, attachments, and vertical support requirements.

Duct schedule shall comply with SMACNA pressure class, seal class, and leakage class requirements for supply and return ducts connected to fan coil units.

Duct accessories including fire dampers, access doors, turning vanes, and flexible connectors shall be installed in accordance with SMACNA and UL requirements. Access doors shall be installed at required locations for maintenance.

Field quality control shall include testing and inspection of all installed duct systems and accessories to verify proper installation and operation. Dampers shall be operated to confirm full range of motion without binding or restriction.

Fire dampers shall be tested to verify full operational movement and to confirm that the correct heat-responsive device, including fusible links, is installed in accordance with the listing requirements. Access doors shall be inspected to verify that their locations provide adequate access to all components requiring maintenance, and that door sizes are sufficient to allow proper inspection, operation, and servicing of internal duct accessories.

Turning vanes shall be inspected for proper installation, alignment, and secure attachment, and shall be verified to be rigidly fixed in place without movement, vibration, or rattling during operation. Any deficiencies identified during testing and inspection shall be corrected and retested to the satisfaction of the Engineer.

Method of Measurement:

The accepted quantities for fire dampers and elevator sump pump shall be measured per unit each, which includes all necessary brackets, controls, and installation in accordance with the specifications identified with this document and on the plans.

The accepted quantities for pump discharge piping shall be measured per linear foot, which includes all necessary brackets and installation in accordance with the specifications identified with this document and on the plans.

The accepted quantities for ductwork shall be measured per lump sum, which includes all necessary brackets and installation in accordance with the specifications identified with this document and on the plans.

Basis Of Payment:

The accepted quantities of ductwork, fire dampers, elevator sump pump, and discharge piping, measured as provided above, will be paid for at the contract unit price specified in the bidding schedule, complete in place.

ITEM 9240122 – MISCELLANEOUS WORK (GIG-E SWITCH):

Description:

The contractor shall furnish and install field hardened Gigabit Ethernet Switches at designated locations as shown on the plans, as detailed in accordance with these special provisions, and as directed by the Engineer.

Materials:

Provide all Gigabit Ethernet Switches of the same manufacturer. All equipment shall be new and in strict accordance with the details shown on the plans and in the specifications. All Gigabit Ethernet Switches shall be fully compatible with the existing ADOT Network Management System (NMS) server. The contractor shall demonstrate, to the Engineer, the compatibility of the Gigabit Ethernet Switch before the material submittal can be approved by the Engineer.

Ethernet Switches shall support direct connectivity to existing Department networks configured in ring and mesh fault tolerant topologies and enable applications to operate reliably and with low latency.

Provide a high-performance and field hardened Gigabit Ethernet Switch supporting standard Open System Interconnection (OSI) Layer 2 functionality. Provide a Gigabit Ethernet Switch that supports direct connectivity to existing networks configured in ring and mesh fault tolerant topologies enabling applications to operate reliably and with low latency.

Include all equipment licenses, where required, for any software or hardware in the system.

Comply with the following standards for all Gigabit Ethernet Switches furnished, assembled, fabricated, or installed under this item:

- IEEE 802.1d – Spanning Tree Protocol
- IEEE 802.1d – MAC Bridges
- IEEE 802.1p – Class of Service
- IEEE 802.1q – VLAN Tagging
- IEEE 802.1w – Rapid Spanning Tree Protocol
- IEEE 802.1x – Port Based Network Access Control
- IEEE 802.3 – 10BaseT
- IEEE 802.3u – 100BaseTX, 100BaseFX
- IEEE 802.3x – Flow Control

- IEEE 802.3z – 1000BaseLX
- IEEE 802.3ab – 1000BaseTX
- IEEE 802.3ab – Link Aggregation
- RFC768 – UDP
- RFC783 – TFTP
- RFC791 – IP
- RFC792 – ICMP
- RFC793 – TCP
- RFC826 – ARP
- RFC854 – Telnet
- RFC894 – IP over Ethernet
- RFC1112 – IGMP v1
- RFC1519 – CIDR
- RFC1541 – DHCP (client)
- RFC2030 – SNTP
- RFC2068 – HTTP
- RFC2236 – IGMP v2
- RFC2284 – EAP
- RFC2475 – Differentiated Services
- RFC2865 – Radius
- RFC3414 – SNMPv3-USM
- RFC3415 – SNMPv3-VACM

Provide all Gigabit Ethernet Switches with a physical design that conforms to the following requirements:

- Shall be configurable in point-to-point, daisy-chain, ring, and mesh topologies for connectivity into new and existing fiber optic and copper-based Ethernet networks.
- Designed with an operating system that allows individual ports to be configured for port mirroring, speed, duplex, auto-negotiation, and flow control. The operating system shall also provide for broadcast storm frame filtering with user defined thresholds.
- Designed with an operating system that allows for the collection of statistics on a per port basis and provides for full support of Remote Monitoring (RMON) statistics, history, alarms, and event groups.
- Shall be capable of providing port security to prevent unknown devices from gaining access to the network. Unauthorized attempts to access the network shall result in the port being shut down for a definable period of time along with Simple Network Management Protocol (SNMP) trap and alarm generation.
- Shall have an operating environmental range of -40 to +74 degrees C with no fans.

Provide the following functionality and features:

(A) Port Performance:

- Two duplex single-mode fiber ports that operate at 25 km and 1,000 Mbps
- Digital Diagnostic Monitoring (DDM): The switch shall have DDM diagnostics enable and accessible thru the GUI management tool and command line syntax. The DDM shall display the optical TX power, RX power, voltage and temperature.
- Four RJ-45 copper ports with auto-negotiate operation at 10 Mbps, 100 Mbps, and 1000 Mbps
- RJ-45 copper ports with POE and POE+
- External optical attenuators as necessary to support interconnectivity with close range devices upstream or downstream
- Port security to prevent unknown devices from gaining access to the network. Unauthorized attempts to access the network shall result in the port being shut down for a definable period of time along with Simple Network Management Protocol (SNMP) trap and alarm generation
- Ports Individually configurable for port mirroring, speed, duplex, auto-negotiation, and flow control
- Individual port statistics and full support of Remote Monitoring (RMON) statistics, history, alarms, and event groups

(B) Packet-Processing:

- Processing type: store and forward
- Priority queues: 4
- Minimum number of VLANs: 64
- VLAN ID Range: 1 TO 4094
- Minimum Internet Group Management Protocol (IGMP) multicast groups: 256
- Minimum MAC table size: 8192
- Minimum packet buffer size: 1 Mbit

(C) Power Requirements:

- 120 VAC $\pm$ 10 percent, 60 $\pm$ 3 Hz

(D) Mechanical:

- Enclosure: Shall be constructed from a minimum 20-gauge high strength galvanized steel case with metal mounting plates, suitable for stand-alone, shelf, rack, or din mounting. Enclosure shall be permanently and clearly identified with name, model number, serial number, and any other pertinent information required to facilitate equipment maintenance.

Construction Requirements:

Minimum requirements for the Contractor or designated subcontractor involved in the installation and testing of the Gigabit Ethernet Switch equipment are:

- Three years' experience in the installation, testing and maintenance of Ethernet equipment.
- Two installations where an Ethernet switches were deployed, and the network has remained in continuously satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other support documents, and the names and contact information of the operating personnel who can be contacted regarding the network's operation.

Necessary documentation of subcontractor qualifications must be approved by Engineer prior to purchasing the field hardened Gigabit Ethernet Switch.

Installations of equipment shall be for ease of maintenance, with all component parts being readily accessible for inspection and maintenance.

Ensure that all external screws, nuts and locking washers are stainless steel. The use of self-tapping screws shall not be used without written approval by the Engineer.

Contractor shall meet all applicable codes and standards requirements for all external wiring to the Gigabit Ethernet Switches. All wires and cables shall be neatly installed and secured per common practices and standards. Contractor shall provide service loop at all connection points.

The contractor shall request the IP address, VLANs, host name, and other configuration settings from the Engineer 30 days prior to installing the Ethernet network switches. The host name shall include the cabinet ID number, device type (DMS, CCTV, VSL, Detector, Ramp Meter), and location description.

Ethernet network switches shall be physically labeled with the IP address, device type (DMS, CCTV, Ramp Meter), and location description.

Ethernet network switches shall be mounted vertically, in the middle of the DIN rail. The power supply shall be mounted to the left of the Ethernet network switch.

Wires and cables shall be neatly installed and secured using common practices and standards. The contractor shall provide service loops at connection points. Components shall be installed in a manner where parts are readily accessible for inspection and maintenance.

Contractor shall provide and install one duplex single mode SC to SC Fiber patch cable for each Fast Ethernet fiber port installed in the Gigabit Ethernet Switch.

Contractor shall provide and install one Category 5e patch cord for each Fast Ethernet copper port install in the Gigabit Ethernet Switch.

(A) Testing Requirements:

The Gigabit Ethernet Switch shall meet the following tests:

- Pre-Installation Testing:

The Contractor shall inspect the Gigabit Ethernet Switch upon delivery for any visual damage, inventory contents, and ensure proper functionality.

- Subsystem Testing:

The Contractor shall ensure the Gigabit Ethernet Switches, are correctly installed, configured, and are properly functioning as networked subsystem.

- System Acceptance Testing (SAT):

As part of the SAT the Contractor shall demonstrate that all Gigabit Ethernet Switches functioning and are operational for the duration of the 30 day SAT.

(B) Training Requirements:

In the event the contractor submits a Gigabit Ethernet Switch which is not currently in use by ADOT, the contractor shall arrange for and provide a training course for the Gigabit Ethernet Switch equipment components. The course shall be of adequate duration to cover the subject matter and shall have an instructor competent in the technical aspects of the Gigabit Ethernet Switch equipment. The training course shall provide training to up to 12 Engineering and Maintenance personnel.

The contractor shall submit a syllabus, training materials and a schedule for the Gigabit Ethernet Switch equipment training course to the Engineer for review and approval 45 days prior to the proposed start of training. The Engineer will notify the contractor of acceptability within 30 days of submittal. The contractor shall schedule the training no sooner than 14 days from receipt of the approved syllabus unless otherwise noted in the approval. Training materials shall include the course outline, material describing the course, and operations and maintenance manuals with any additional information needed

to adequately describe the subject being taught. Training materials shall not be copyrighted.

Method of Measurement:

The Gigabit Ethernet Switch installation will be measured as a unit for each Ethernet Switch furnished and installed, complete in place.

All mounting brackets, mounting hardware (i.e., screws, nuts, bolts), power cords, power transformer, fiber patch cables and adapters, copper patch cords, and documentation shall be included under this item.

Basis of Payment:

The accepted quantity of Gigabit Ethernet Switch, measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work, complete in place

ITEM 9240139 – MISCELLANEOUS WORK (MATCH EXISTING PAVEMENT SECTION):

Description:

This section provides specifications for furnishing all materials, preparing subgrades, placing aggregate base course, and asphaltic pavement surfacing, including mixing at a plant, hauling, and placing a mixture of aggregate materials, mineral admixtures, asphalt binder, and tack coat, as applicable.

The pavement structural section shall match the existing pavement section or be greater. Work under this item includes verification of the existing pavement structural section prior to installation.

Materials:

Aggregate base course material shall conform to MAG Standard Specifications Section 702, unless the use of a different type of material is specifically authorized.

Material for asphalt concrete pavement shall conform to MAG Standard Specification Section 710. Warm Mix Asphalt (WMA) technologies may be used within the mixture provided all specification requirements are met and the technology is on the ADOT Approved Product List. The specific required mix type shall be identified in the contract documents or as directed by the Engineer.

Construction Requirements:

Placement of Aggregate Base Course

The thickness of the aggregate base section shall match the existing pavement section or be greater. The Contractor shall confirm the thickness of the aggregate base course of the existing and adjacent pavement section prior to construction.

Placement of the aggregate base course shall conform to MAG Standard Specification Section 310. The compacted lift thickness shall not exceed 6 inches unless approved by the Engineer. Based on the type of material, equipment, and compaction methods used, the Contractor may propose a greater lift thickness to the Engineer for approval.

Compaction and Testing of Aggregate Base Course

The compaction of the aggregate base course shall conform to MAG Standard Specification Section 310. The Contractor is responsible for providing appropriate equipment and techniques to test and achieve the compaction results required by MAG Standard Specification Section 310.

Weather and Moisture Conditions for Placement of Asphalt Concrete Pavement

Asphalt concrete shall be placed only when the surface is dry, and when the atmospheric temperature in the shade is 40° F. (50° F for Asphalt Concrete lift less than 2-inch thick) or greater. No asphalt concrete shall be placed when the weather is foggy or rainy, or when the base or subbase on which the material is to be placed is unstable. Asphalt concrete shall be placed only when the Engineer determines that weather conditions are suitable.

Application of Tack Coat

A tack coat shall be applied to all existing and to each new course of asphalt concrete prior to the placing of a succeeding lift of asphalt concrete. If approved by the Engineer, the tack coat may be deleted when a succeeding layer of asphalt concrete is being applied over a freshly laid course that has been subjected to very little traffic.

The application of the tack coat shall comply with MAG Standard Specification Section 329. The grade of emulsified asphalt shall be SS-1h or CSS-1h as specified in MAG Standard Specification Section 713. The same material that is specified above for the tack coat shall be applied to the vertical surfaces of existing pavements, curbs, and gutters, against which asphalt concrete is to be placed.

The surface to be covered may require repair or patching as directed by the Engineer. This shall be addressed in the project specifications prior to the bidding of the project.

Mix Design for Asphalt Concrete Pavement

The mix design shall be submitted to the Engineer at least five working days prior to the start of asphalt concrete production. Mix designs provided by the agency may be utilized on projects at the Engineer's discretion. The Engineer will review and approve the mix design to assure it contains all of the required information as outlined in MAG Standard Specification Section 710.3.1. If WMA technologies are used within the mix design, the type of WMA technology used shall be indicated on the mix design. The target values for gradations, binder contents, and air voids will be established as the accepted Job Mix Formula (JMF) based upon the mix design. Mix designs not containing all of the information will be returned within five working days of receipt of all mix design information, for action and resubmission by the contractor.

Once the mix design has been approved by the agency and the mixing plant selected, the Contractor and/or his supplier shall not change plants nor utilize additional mixing plants without prior approval of the Engineer.

If the contractor elects to change its source of material, the contractor shall furnish the Engineer with a new mix design, which meets the requirements of MAG Standard Specification Section 710, as amended by the Project Specifications.

The contractor may make self-directed target changes to the approved mix design within the limits shown below. Requests for self-directed target changes shall be made in writing, acknowledged by the Engineer prior to the start of production of a lot, and will remain in effect until such time as any additional changes are implemented. The self-directed target changes must meet the contract requirements for mix design criteria and gradation limits.

TABLE 321-1 ALLOWABLE SELF-DIRECTED TARGET CHANGES	
MEASURED CHARACTERISTICS	ALLOWABLE SELF-DIRECTED TARGET CHANGES
Gradation (Sieve Size)	
3/8 inch	± 4% from mix design target value
No 8	± 4% from mix design target value
No 40	± 2% from mix design target value
No 200	+0.5% from mix design target value
Binder Content	± 0.2% from mix design target value
Effective Air Voids	None

The contractor may propose target changes, other than self-directed changes, to the approved mix design for the approval of the Engineer. The Engineer will determine if the proposed target change will result in mix production that meets the contract requirements for mix design criteria and gradation limits. The target changes will not be retroactive for the purpose of acceptance.

Mix Production for Asphalt Concrete Pavement

All materials shall be proportioned by weight in a hot mix asphalt plant in the proportions required by the mix design to provide a homogeneous and workable mass. Each hot mix asphalt plant shall be inspected in accordance with the provisions contained in the 'Hot Mix Asphalt Production Facilities' by the Arizona Rock Products Association and shall have a current inspection certificate. All measuring devices shall be calibrated at least annually by a technician licensed by the Arizona Bureau of Weights & Measures. Mixing plants shall conform to the requirements of AASHTO M-156, except as modified herein. If WMA technology is being used, any equipment associated with the production of hot mix asphalt shall be calibrated and in proper working order according to the WMA equipment specifications. If there are any deviations in the production or compacting temperatures of the hot mix asphalt with WMA technology, the mix design shall state the differences.

In drum mix plants, the mineral admixture shall be added and thoroughly mixed with the mineral aggregate by means of a mechanical mixing device prior to the mineral aggregate and mineral admixture entering the dryer. The moisture content of the combined mineral aggregate shall be a minimum of three percent by weight of the aggregate during the mixing process.

For drum-mix plants, the mineral admixture shall be weighed across a weight belt, or other approved alternative weighing system, with a weight totalizer prior to entry into the mechanical mixing device. The mechanical mixing device shall be a pug mill type mixer that is in good working condition. The rate of the aggregate feed shall not exceed the mixing device's capacity in ton per hour. The mixer shall be constructed to minimize the loss of mineral admixture and shall be located in the aggregate delivery system at a location where the mixed material can be readily inspected. The mixing device shall be capable of effective mixing in the full range of the asphalt concrete production rates.

The hot plant and equipment shall be constructed and operated to prevent loss of mineral admixture through the dust collection system of the plant.

A positive signal system shall be provided and used during production whereby the mixing shall automatically be stopped if the mineral admixture is not introduced into the mineral aggregate. The plant will not be permitted to operate unless the signal system is in good working condition.

The introduction of bituminous material shall be controlled by an automated system fully integrated with the controls of the mineral aggregate and mineral admixture. The production of the plant shall be controlled by the rate required to obtain a uniform mixture of all components. Drying and heating shall be accomplished in such a manner as to preclude the mineral admixture from becoming coated with un-spent fuel.

The completed asphalt concrete may be held in storage for up to 12 hours in insulated or heated silos, providing the minimum temperature noted herein for placement and compaction is met behind the placement device. If the Engineer determines that there is an excessive amount of heat, heat loss, drain down, segregation and/or oxidation of the mixture due to temporary storage, use of surge bins or storage bins will be discontinued.

The temperature of the asphalt concrete, with unmodified binders, upon discharge from the mixer shall not exceed 335° F. The discharge temperature may be increased on the recommendation of the binder supplier, when approved by the Engineer. If the asphalt concrete is discharged from the mixer into a hopper, the hopper shall be constructed so that segregation of the asphalt concrete will be minimized.

Transportation of Asphalt Concrete Pavement

Petroleum distillates or other substances that will have a detrimental effect on the asphalt concrete shall not be used as a release agent.

The beds of all transportation units shall be clean and smooth to allow the free flow of material into the paving machine's hopper.

Tarpaulins shall be furnished on all trucks and used when weather condition warrant, or if directed by the Engineer.

Placement of Asphalt Concrete

The thickness of the asphalt concrete section shall match the existing pavement section or be greater. The Contractor shall confirm the thickness of the asphalt concrete pavement of the existing and adjacent pavement sections prior to construction. Placement of asphalt concrete pavement shall conform to MAG Standard Specification Section 321. Placement of asphalt concrete pavement shall not commence until authorized by the Engineer. The Engineer's authorization to allow commencement of asphalt concrete paving will generally require all newly constructed valley gutters, curbing, and curb and gutters which new pavement is to be placed against to be in-place and in an acceptable condition. While it is preferred to have all newly constructed concrete items against which new pavement is to be placed be in an acceptable condition, the Engineer may allow paving to commence based on weather, the amount of defective concrete, or other considerations.

Placing: All courses of asphalt concrete shall be placed and finished by means of a self-propelled paving machine equipped with an automatically actuated control system, except under certain conditions or at locations where the Engineer deems the use of a self-propelled paving machine impracticable.

The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other end indirectly either through controlling the transverse slope or alternatively when directed, by controlling the elevation of each end independently.

The control system shall be capable of working with one of the following devices:

- (a) Ski or non-contact device of not less than 30 feet in length, supported throughout its entire length
- (b) Taut stringline or wire set to grade
- (c) Short ski or sonar sensing units from curb control
- (d) Joint matching shoe

Failure of the control system to function properly shall be cause for the suspension of asphalt concrete production. In order to achieve a continuous operation, the speed of the paving machine shall be coordinated with the hot mix plant and transport units.

If the asphalt concrete is dumped from the hauling vehicles directly into the paving machine, care shall be taken to avoid jarring the machine or moving it out of alignment. No vertical load shall be exerted on the paving machine by the truck.

If asphalt concrete is dumped upon the surface being paved and subsequently loaded in the paving machine, the loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphalt concrete shall be picked up and loaded into the paving machine.

Self-propelled paving machines shall spread the mixture without segregation or tearing, true to line, grade and crown indicated on the project plans. Pavers shall be equipped with hoppers and augers that will distribute the mixture uniformly in front of an adjustable floating screed. The raising of the hopper wings must be minimized and the paving machine will not be operated when in an empty condition.

Screeds shall include any strike-off device operated by tamping or vibrating action which is effective, without tearing, shoving or gouging the mixture and which produces a course with a uniform texture and density for the full width being paved. Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required. In the case of the screed, auger extensions and vibrators shall be installed wherever the screed is extended more than one (1) foot beyond the end of the base auger or auger extension. However, when placing material against an extremely uneven curb or edge over a short distance, the Engineer may waive the auger extensions and vibrators.

At any place not accessible to the roller, the mixture shall be thoroughly compacted with tampers to provide a uniform and smooth layer over the entire area compacted in this manner.

Joints: Transverse joints, before a surface course is placed in contact with a cold transverse construction joint, the cold existing asphalt concrete shall be trimmed to a vertical face for its full depth exposing a fresh face. The fresh face shall be tack coated prior to placement of the new asphalt concrete. After placement and finishing the new asphalt concrete, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than ¼ inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, parallel to the centerline.

Longitudinal joints of each asphalt course shall be staggered a minimum of 6 inches with relation to the longitudinal joint of the immediate underlying course's cold longitudinal construction joint.

Longitudinal joints with existing or cold (more than 32 hours old) asphalt concrete shall require the existing pavement to be trimmed to a vertical face for its full depth exposing a fresh face. The fresh face shall be tacked prior to placement of the adjacent course. Longitudinal joints with an existing asphalt pavement that is less than 32 hours old that has had its edge protected from damage may have adjacent new asphalt concrete placed after applying the required tack coat. After placement and finishing of longitudinal joints, both sides of the joint shall be dense and the joint shall be smooth and tight. The surface in the area of the joint shall not deviate more than ¼ inch from a 12-foot straightedge, when tested with the straightedge placed across the joint, in any direction.

Asphalt Leveling Course: A leveling course shall be used when specified, or as directed in writing by the Engineer, to bring existing pavement to a uniform grade prior to placing an overlay or other course. If a leveling course is being applied on an asphalt surface, a tack coat shall be applied. The compaction requirements contained in MAG Standard Specification Section 321.10 do not apply to leveling courses.

Compaction – Asphalt Base Course and Surface Course: It is the contractor's responsibility to perform Quality Control monitoring and/or testing during compaction operations to achieve the required compaction. The temperature of the asphalt concrete immediately behind the laydown machine shall be at least 265° F, unless WMA technology is being used. If WMA technology is being used then the minimum requirements will be stated within the mix design recommended by the WMA manufacturer. A probe type electronic thermometer with a current calibration sticker attached will be used to measure the temperature of the asphalt concrete mixture. When measuring the temperature of the mat, the probe shall be inserted at mid-depth and as horizontal as possible to the mat. The contractor is responsible to achieve the required compaction.

Asphalt compaction equipment shall be of sufficient size and weight to accomplish the required compaction. All compaction equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the project requirements. During the rolling operation, the speed of the roller shall not exceed three miles per hour, unless otherwise approved by the Engineer.

Pneumatic tired compactors shall be equipped with skirt-type devices mounted around the tires so that the temperature of the tires will be maintained during the compaction process.

The Engineer will determine the acceptability of the pavement compaction in accordance with MAG Standard Specification Section 321.10.

Smoothness: The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than ¼ inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel to the centerline of the roadway.

Asphalt Concrete Overlay: Asphalt concrete overlay consists of the placing and compacting plant mix asphalt concrete over existing pavement. The mix design and thickness of the overlay shall be as shown on the plans or as specified in the special provisions. Except when the existing asphalt surface is to be preheated and remixed, pavement surfaces shall be prepared as follows:

- (A) Areas designated for pavement repair by the contract documents (which may include severely raveled areas, severely cracked areas, over-asphalted areas, and other defects) shall be cut out and replaced. Pavement repairs shall be completed and approved before placing asphalt concrete overlay.

(B) Before placing asphalt concrete overlay, raised pavement markers shall be removed, and milling shall be completed. Milling shall be as shown on the plans or specified in the special provisions and shall be in accordance with MAG Standard Specification Section 317.

(C) After pavement repairs and milling have been completed, the entire surface shall be cleaned with a power broom.

(D) After surfaces have been prepared to the satisfaction of the Engineer, they shall receive a tack coat per MAG Standard Specification Section 321.4. Traffic will not be permitted to travel over surfaces that have received a tack coat, except when tack coat is applied to milled surfaces in compliance with MAG Standard Specification Section 317.2 for dust control purposes. When the overlay is to extend onto a concrete surface, the concrete surface shall be thoroughly cleaned of loose dust and cement particles and shall be tack coated.

Asphalt concrete overlay shall be placed as specified in MAG Standard Specification Section 321.8.1 and compacted as specified in MAG Standard Specification Section 321.8.4. The surface smoothness shall meet the tolerances specified in MAG Standard Specification Section 321.8.5.

Frames and covers of manholes, survey monuments, valve boxes, clean-outs and other existing structures shall be adjusted in accordance with MAG Standard Specification Section 345 to set flush with the finished surface of the new pavement. During adjustment, if pavement or base materials are removed or disturbed, they shall be replaced with approved materials installed in a manner acceptable to the Engineer.

On roads without curb and gutter, the existing unpaved shoulder elevation shall be adjusted by the Contractor to match the elevation at the edge of the new overlay and slope away from the new pavement surface at a rate that the existing quantity of shoulder material will allow. Shoulder material shall be compacted to a minimum of 95% of maximum density, determined in accordance with MAG Standard Specification Section 301.3. Shoulder adjustment to match the new pavement surface elevation shall not be measured. The cost of shoulder adjustment shall be included in the price paid for the asphalt concrete overlay or other related pay items. When the Engineer determines an insufficient amount of material is available for shoulder adjustment, the Engineer may require the Contractor to provide additional material. Acceptable material for shoulders includes the existing shoulder material, millings, untreated base materials, or a granular material approved by the Engineer. Engineer requested imported material for shoulder adjustment is not included in the price paid for the asphalt concrete overlay.

Quality Control

It is the contractor's responsibility to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required compaction and to perform Quality Control monitoring and/or testing during asphalt concrete production to achieve the required mix properties. The Engineer may obtain samples of any portion of any material at any point of the operations for his own use. Also, the Engineer may order the

use of any drying, proportioning and mixing equipment or the handling of any material discontinued which, in his/her opinion, fails to produce a satisfactory mixture.

The asphalt concrete produced shall conform to the requirements of the production tolerances established in MAG Standard Specification Section 321.10. When the asphalt concrete does not conform to the production tolerances, it shall be reported to the Engineer, and corrective quality control measures shall be implemented, or production shall cease immediately at no additional cost to the department.

Requests for referee testing as described in MAG Standard Specification Section 321.11 will only be considered based on quality control test results performed by a laboratory accredited by the AASHTO Accreditation Program (AAP) for the tests being performed or a laboratory listed in the current ADOT Directory of Approved Materials Testing Laboratories for the set of tests in question. The laboratory shall use properly certified technicians in accordance with ASTM D3666, Section 7 (Personnel Qualifications).

Acceptance Criteria: Asphalt concrete will be divided into lots for the purpose of acceptance. A lot shall be one day's production. Each lot shall be divided into sublots of 500 ton or fraction thereof. Tests used to determine acceptance will be performed by a laboratory accredited by the AASHTO Accreditation Program (AAP) for the tests being performed. The contracting agency shall provide an appropriately accredited laboratory or laboratories to perform the acceptance testing. Laboratories shall use properly certified technicians in accordance with ASTM D3666, Section 7 (Personnel Qualifications). The acceptance laboratory will take representative samples of the asphalt concrete from each subplot to allow for testing of gradation, binder content, air voids, pavement thickness, and compaction of base and surface courses. Acceptance of each subplot will be based on the test data from the sample(s) from that subplot. All acceptance samples shall be taken using random locations or times designated by the Engineer in accordance with ASTM D3665.

For permit work, testing that does not strictly adhere to the sampling and testing methodology and requirements outlined in this section shall be disregarded and not considered in any acceptance determination. All required retesting shall be at the expense of the permittee.

Gradation, Binder Content and Air Voids: The acceptance laboratory will take a sample of the asphalt concrete in accordance with the requirements of Section 2 or 4 of Arizona Test Methods 104 or AASHTO T-168 from each subplot. The minimum weight of the sample shall be 45 pounds. Asphalt binder content and gradation shall be determined in accordance with AASHTO T-308 using the ignition furnace for each subplot. The acceptance laboratory is responsible for obtaining the necessary materials and performing an ignition furnace calibration as outlined in AASHTO T-308 for each asphalt concrete mixture utilized on the project. The correction factor used for each test shall be clearly indicated on the report. Reports that do not include the correction factor, performed as stated in the previous sentences, shall be considered invalid and not allowed to be used for acceptance. The bulk density for Marshall Mix designs shall be tested in accordance with AASHTO T-245. The bulk density for Gyratory mix designs shall be determined in accordance with AASHTO T-312. The maximum theoretical density shall

be determined in accordance with the requirements of AASHTO T-209 including fan drying per AASHTO T-209 Section 15. Effective voids of the laboratory compacted specimens will be determined at a minimum of once per lot in accordance with the requirements of AASHTO T-269. Should the testing for effective air voids not meet the “Full Payment” or “No Corrective Action” requirements of MAG Standard Specification Table 321-5, additional testing for laboratory air voids on the remaining sublots will be performed as necessary to determine the extent of the deficiency. Acceptance testing results will be furnished to the contractor and the supplier within five working days of receipt of samples by the acceptance laboratory.

During production, the allowable deviations from the mix design gradation targets are listed in the tables below. The allowable production tolerances may fall outside of the mix design gradation bands.

TABLE 321-3A				
GRADATION ACCEPTANCE LIMITS FOR MARSHALL MIXES				
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	Base Mix
1 inch	---	---	---	±7%
3/4 inch	---	---	±7%	±6%
1/2 inch	---	±7%	---	---
3/8 inch	±7%	±6%	±6%	±6%
No. 8	±6%	±6%	±6%	±6%
No. 40	±4%	±4%	±4%	±4%
No. 200	±2%	±2%	±2%	±2%

TABLE 321-3B			
GRADATION ACCEPTANCE LIMITS FOR GYRATORY MIXES			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix
3/4 inch	---	---	±7%
1/2 inch	---	±7%	±6%
3/8 inch	±7%	±6%	---
No. 8	±6%	±6%	±6%
No. 40	±4%	±4%	±4%
No. 200	±2%	±2%	±2%

If the results from a single acceptance sample fall outside of the acceptance limits in MAG Standard Specification Table 321-3A or 321-3B as applicable, a second sample shall be taken and if the second acceptance sample is also outside of the acceptance limits the Contractor shall cease production of asphalt concrete. Production shall not begin again until calibration test results verify that adjustments made to materials or proportions yield a gradation that falls within acceptance limits in MAG Standard Specification Table 321-3A or 321-3B as applicable.

If the asphalt binder content is within $\pm 0.40\%$ of the mix design target value, the asphalt concrete will be paid for at the contract unit price. If the asphalt binder content deviates by more than $\pm 0.40\%$ from the mix design target value, the deficient area will be evaluated within the subplot by coring one additional location at a maximum interval of 100 feet on each side of the deficient sample. The asphalt content of the original deficient sample will be averaged with the asphalt binder content of the two additional cores to determine compliance with the acceptance requirements. If the resulting average of the asphalt binder content deviates by more than $\pm 0.40\%$ from the mix design target value, then MAG Standard Specification Table 321-4 shall apply to the subplot. If approved by the Engineer, the Contractor may obtain additional cores to assist in formulation of an Engineering Analysis, but the additional cores shall not be used for re-evaluating acceptance.

TABLE 321-4		
ASPHALT BINDER CONTENT ACCEPTANCE AND PENALTIES		
Deviation from that permitted	When the contracting agency is the owner: Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner (i.e. permits): Corrective Action
Over 0.2% above that permitted	Removal* or EA	Removal* or EA
Over 0.1% to 0.2% above that permitted	\$6.00	EA
Over 0.0% to 0.1% <u>above</u> that permitted	\$2.00	EA
Within permitted range	Full Payment	No Corrective Action
Over 0.0% to 0.1% below that permitted	\$2.00	EA
Over 0.1% to 0.2% below that permitted	\$6.00	EA
Over 0.2% below that permitted	Removal* or EA	Removal* or EA

NOTES: *The Contractor shall remove and replace the entire subplot that is deficient.
EA = Engineering Analysis per MAG Standard Specification Section 321.10.6

If the laboratory air voids fall within a range of 2.8% to 6.2%, the asphalt concrete will be paid for at the contract unit price. If the laboratory air voids are outside of this range, the deficient area will be evaluated within the subplot by coring one additional location at a maximum interval of 100 feet on each side of the deficient sample. The laboratory air voids of the original deficient sample will be averaged with the laboratory air voids obtained from each of the two additional cores to determine compliance with the acceptance requirements. If the resulting average of the laboratory air voids is outside the indicated range, then MAG Standard Specification Table 321-5 shall apply to the

sublot. If approved by the Engineer, the Contractor may obtain additional cores to assist in formulation of an Engineering Analysis, but the additional cores shall not be used for re-evaluating acceptance.

TABLE 321-5		
LABORATORY VOIDS ACCEPTANCE AND PENALTIES		
Laboratory Air Voids (Measured at Ndes or 75 blows as applicable)	When the contracting agency is the owner: Payment Reduction	When the contracting agency is not the owner (i.e. permits):
Less than 1.5%	Removal* or EA	Removal* or EA
1.5-2.0%	\$5.00	EA
2.1-2.7%	\$2.00	EA
2.8-6.2%	Full Payment	No Corrective Action
6.3-6.9%	\$2.00	EA
7.0-8.0%	\$5.00	EA
Greater than 8.0%	Removal* or EA	Removal* or EA

NOTES: *The Contractor shall remove and replace the entire sublot that is deficient.
EA = Engineering Analysis per MAG Standard Specification Section 321.10.6

If an agency or Engineer is purchasing asphalt concrete directly from a commercial material supplier, the agency or Engineer will use MAG Standard Specification Section 321.10, and specifically Tables 321-3A or 321-3B as applicable, 321-4 and 321-5 from MAG Standard Specification Section 321.10, when determining the acceptance of the asphalt concrete with the material supplier.

Surface Testing: If directed by the Engineer, surface drainage test shall be performed. The completed surfacing shall be thoroughly compacted, smooth and true to grade and cross-section, and free from ruts, humps, depressions or irregularities. An acceptable surface shall not vary more than $\frac{1}{4}$ inch from the lower edge of a 12-foot straightedge when the straightedge is placed parallel to the centerline of the roadway. The straightedge shall be furnished by the contractor and shall be acceptable to the Engineer.

All streets shall be water tested for drainage in the presence of the Engineer or designated representative before final acceptance. Any areas not draining properly shall be corrected to the Engineer's satisfaction at the Contractor's expense. Water for this testing shall be provided and paid for by the Contractor.

When deviations in excess of the above tolerance are found, humps or depressions shall be corrected to meet the specified tolerance. The defective pavement shall be cut out along neat straight lines or for multiple course pavements the surface course may be milled out, and the removed pavement replaced with fresh hot mixture and thoroughly compacted to conform with and bond to the surrounding area. Materials and work necessary to correct such deviations shall be at no additional cost to the Contracting Agency.

When pavement is cut out along neat straight lines, full depth longitudinal joints shall not be located within a lane wheel path or within forty-eight inches (48") of an asphalt pavement edge. Longitudinal joints shall comply with the restrictions for Type A Trench Repairs in MAG Standard Specification Section 336.3.

Asphalt Pavement Thickness: Asphalt pavement thickness will be determined from cores secured from each lift of each subplot. Such cores will be taken and measured by the Asphalt Concrete Coring Method. This method can be found in MAG Standard Specification Section 321.14. Each core location will be patched by the party responsible for the testing.

Acceptance or assessment of penalties for asphalt pavement thickness will be based on the combined total thickness of all asphalt concrete layers omitting all layers of asphalt-rubber asphalt concrete. If the final total pavement thickness exclusive of all ARAC layers is deficient from the target thickness by 0.25 inches or less, it will be paid for at the contract unit price.

If the thickness deficiency of the pavement core exceeds 0.25 inch, the thickness deficiency shall be evaluated by coring at a maximum interval of 100 feet on each side of the deficient core. The thickness of the original deficient core will be averaged with the thicknesses of the cores taken from each side of it to determine compliance with the acceptance requirements.

If the pavement thickness deficiency is greater than 0.25 inches and the contracting agency is not the owner (i.e. permits) the following will apply:

(1) If the pavement thickness deviates from the target thickness by more than 0.25 inch but not more than 0.50 inch, corrective action will be required. This corrective action shall consist of application of a Type II slurry seal coat in accordance to MAG Standard Specification Section 715. The Contractor may present an Engineering Analysis outlining other proposed remedial measures for the consideration by the Engineer. The Engineer will review the Engineering Analysis and decide within 30 working days whether to accept the proposed remedial measures.

(2) If the pavement thickness deviates from the target thickness by more than 0.50 inch, corrective action will be required. The deficient area shall be overlaid with no less than a 1-inch-thick lift, for the full width of the pavement to meet or exceed the designed thickness, with appropriate end and edge milling, with a mixture

approved by the Engineer. The Contractor may present an Engineering Analysis outlining other proposed remedial measures for the Engineer's consideration. The Engineer will review the Engineering Analysis and decide within ten working days whether to accept the proposed remedial measures. If the Engineer chooses to reject the Engineering Analysis, the indicated overlay shall be constructed by the Contractor at no additional cost to the Owner.

If the contracting agency is the owner and the pavement thickness deficiency is greater than 0.25 inches but less than 0.50 inches, Table 321-6 will apply. If the pavement thickness deficiency is greater than 0.5 inches, the deficient area shall be overlaid with no less than a 1-inch-thick lift for the full width of the pavement to meet or exceed the designed thickness using an asphalt mixture approved by the Engineer. The Contractor shall provide appropriate end and edge milling. The overlay and milling shall be accomplished by the Contractor at no additional cost to the contracting agency.

TABLE 321-6	
ASPHALT PAVEMENT THICKNESS PAYMENT REDUCTION	
For Thickness Deficiency of More Than 0.25 inches and less than 0.50 inches	
Total Specified Asphalt Pavement Thickness exclusive of ARAC (if any)	Reduction in Payment Applied to asphalt concrete Except ARAC layers (if any)
Less than 1.5 inches	50%
1.50 inches to 1.99 inches	33%
2.00 inches to 2.49 inches	25%
2.50 inches to 2.99 inches	20%
3.00 inches and greater	17%

Density

Pavement 1-1/2 Inches or Less in Nominal Thickness: Compaction shall consist of a “Rolling Method Procedure” using an established sequence of coverage with specified types of compactors. A pass shall be defined as one movement of a compactor in either direction. Coverage shall be the number of passes as are necessary to cover the entire width being paved.

The rolling sequence, the type of compactor to be used, and the number of coverages required shall be as shown in Table 321-7.

TABLE 321-7				
ROLLING SEQUENCE FOR LIFT THICKNESS 1½” OR LESS				
Rolling Sequence	Type of Compactor		No. of Coverages	
	Option No. 1	Option No. 2	Option No. 1	Option No. 2
Initial	Static Steel	Vibrating Steel	1	1
Intermediate	Pneumatic Tired	Vibrating Steel	4	2- 4*
Finish	Static Steel	Static Steel	1-3	1-3
* Based on the roller pattern which exhibits the best performance.				

The Contractor shall select the option for compaction and, when pneumatic-tired compactors are used will designate the tire pressure. Steel wheel compactors shall not be used in the vibratory mode for courses of one inch or less in thickness nor when the temperature of the asphaltic concrete falls below 180° F. Initial and intermediate compaction shall be accomplished before the temperature of the asphaltic concrete falls below 200° F.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated as specified, and with the number of coverages of the compactors as specified.

Pavement Greater than 1-1/2 Inches in Nominal Thickness: Achieving the required compaction is the responsibility of the contractor. The number and types of rollers is the contractor’s responsibility and shall be sufficient to meet these requirements

In-place air voids shall be determined in accordance with AASHTO T-269 utilizing cores taken from the finished pavement. The maximum theoretical density used in the determination of in-place air voids will be the average value from the acceptance samples determined for the lot as outlined in MAG Standard Specification 321.10.1.

The Engineer will designate one random test location for each subplot and the acceptance laboratory will obtain one core from that location. Regardless of subplot quantities or boundaries, a minimum of one core will be obtained per residential street and a minimum of one core per travel lane for collector and arterial streets. The outside one foot of each pass of the pavement course or any unconfined edge will be excluded from testing. The Engineer may exclude areas from the compaction lot that are not accessible by normal compaction equipment.

The Contractor shall provide the traffic control to facilitate any coring operations necessary for compaction acceptance.

Cores will be taken per the Asphalt Concrete Coring Method. This method can be found in MAG Standard Specification Section 321.14. Acceptance testing results will be furnished to the contractor within five working days of receipt of samples by the acceptance laboratory.

If the pavement density has in-place voids of between 4.0% and 8.0%, the asphalt concrete will be paid for at the contract unit price. If the acceptance core for a subplot indicates that the pavement density has in-place voids of less than 4.0% or greater than 8.0%, the deficient area will be evaluated by coring two additional locations at maximum intervals of 100 feet from the deficient core. The in-place voids of the original deficient core will be averaged with the in-place voids of the cores taken from 100 feet on each side of it to determine compliance with the acceptance requirements. If the resulting average of the in-place voids is outside the indicated range, then Table 321-8 shall apply to the subplot. If approved by the Engineer, the Contractor may obtain additional cores to assist in formulation of an Engineering Analysis, but the additional cores shall not be used for re-evaluating acceptance.

TABLE 416-8		
PAVEMENT DENSITY PENALTIES		
Limits of In-place Air Voids for design lift thicknesses 1.5 inches and greater	When the contracting agency is the owner Payment Reduction (\$ per ton of asphalt concrete)	When the contracting agency is not the owner i.e. permits Corrective Action
Below 3.0%	Removal* or EA	Removal* or EA
3.0% to below 4.0%	\$10.00	EA and Type II Surry Seal
4.0% to 8.0%	Full Payment	No Corrective Action
Greater than 8.0% to less than 9.0%	\$6.00	EA
9.0% to 10.0%	\$10.00	EA and Type II Surry Seal
Greater than 10.0%	Removal* or EA	Removal* or EA

NOTES: *The Contractor shall remove and replace the entire subplot that is deficient.
EA = Engineering Analysis per MAG Standard Specification Section 321.10.6

Engineering Analysis (EA): Within 10 working days after receiving notice that a lot or subplot of asphalt concrete is deficient and is found to fall within the “Removal or EA” band per Table(s) 321-4, 321-5, and/or 321-8, the contractor may submit a written proposal (Engineering Analysis) to accept the material in place at the applicable penalties along with possible remediation(s) listed in the “Removal or EA” category. Engineering Analysis can also be proposed for non-removal categories of “Corrective Actions” when the contracting agency is not the owner (i.e. permits).

The Engineering Analysis shall contain an analysis of the anticipated performance of the asphalt concrete if left in place. The Engineering Analysis shall also detail the effect of any proposed corrective action to the material(s) in place as it relates to the in-place material’s performance. The Engineering Analysis shall be performed by a professional engineer experienced in asphalt concrete testing and mix designs.

If a lot or subplot is accepted for referee testing and the referee test results still show a deficiency, the contractor shall have ten working days to submit an Engineering Analysis beginning upon notification of referee test results. When an Engineering Analysis

recommends that a specific lot or subplot should not be removed, the Engineering Analysis will recommend that the following penalties (Table 321-9) be paid when the contracting agency is the owner, for the specific criteria being reviewed by the EA.

TABLE 321-9		
ENGINEERING ANALYSIS PENALTIES for REMOVAL* LOTS/SUBLOTS LEFT IN-PLACE		
Acceptance Criteria	Acceptance Limits	Penalty When Contracting Agency is the Owner (\$/Ton)
Asphalt Binder Content	Over 0.2% points from that Permitted	\$9.00
Laboratory Air Voids (Measured at Ndes or 75 blows as applicable)	Less than 1.5% or Greater Than 8.0%	\$7.50
Limits of In-place Air Voids	Less than 3% or Greater than 10.0%	\$15.00

Within 15 working days, the Engineer will determine whether or not to accept the Contractor's proposed Engineering Analysis.

Referee:

If the Contractor has reason to question the validity of any of the acceptance test results, the Contractor may request that the Engineer consider referee test for final acceptance. Any request for referee testing must describe the contractor's reasons for questioning the validity of the original acceptance test results and must clearly describe which set of acceptance tests are in question. The Engineer may either accept or reject the request for referee testing. When referee testing is accepted the Contractor (at the Contractors own expense) will engage an independent laboratory accredited by the AAP or a laboratory listed in the current ADOT Directory of Approved Materials Testing Laboratories as appropriate the acceptance tests that are being questioned. The independent referee laboratory shall use properly certified technicians in accordance with ASTM D3666, Section 7 (Personnel Qualifications). For the set of test results in question, the referee laboratory shall perform a new set of acceptance tests (as required by MAG Standard Specification Section 321.10 representing the area for the set of tests in question). The referee tests will replace the original acceptance tests that were in question.

For permit work, the permittee, whose results necessitate referee testing, shall bear all expenses in the additional testing (i.e., secondary and the referee testing) if the original results are not substantiated by the referee testing procedure outlined in this section. Additionally, any testing performed that does not strictly adhere to the sampling and testing methodology and requirements in MAG Standard Specification Section 321.10 shall be disregarded and not allowed in any acceptance determination. Disregarded tests will be re-performed at the expense of the permittee.

These tests may include asphalt binder content, aggregate gradation, Marshall or Gyratory unit weight, maximum theoretical unit weight, laboratory air voids and in-place air voids (compaction). All referee testing shall conform to MAG Standard Specification Section 321.10. Samples for referee testing shall come from representative samples obtained from the completed pavement, as directed by the Engineer.

The number of samples taken will be the same as specified in Section 321.10. The independent laboratory shall compile the test results and transmit them to both the Engineer and the contractor. The independent laboratory shall include a report sealed and signed by an Engineer registered in the State of Arizona, who is experienced in asphalt concrete testing and mix design development. The signed report shall give an opinion that the material evaluated does or does not comply with project specifications, shall clearly describe any deficiencies, and the results will be binding between all parties.

Asphalt Core Method:

Core Drilling of Hot Mix Asphalt (HMA) for Specimens of 4" or 6" diameter.

Scope: This method is to establish a consistent method of the use of a diamond bit core to recover specimens of 4 or 6 inch diameter for laboratory analysis and testing. The method will require the use of: water, ice (bagged or other suitable type), dry ice, and a water-soap solution to be utilized when coring asphalt rubber concrete. Individuals doing the specimen recovery should be observing all safety regulations from the equipment manufacturer as well as the required job site safety requirements for actions and required personal protective equipment.

For permit work, testing of cores obtained in a manner that does not strictly adhere to the methodology outlined in this section shall be disregarded and not considered in any acceptance determination. Retesting shall be at the expense of the permittee.

Core Drilling Device: The core drilling device will be powered by an electrical motor, or by an acceptable gasoline engine. Either device used shall be capable of applying enough effective rotational velocity to secure a drilled specimen. The specimen shall be cored perpendicularly to the surface of pavement, and that the sides of the core are cut in a manner to minimize sample distortion or damage. The machinery utilized for the procedure shall be on a mounted base, have a geared column and carriage that will permit the application of variable pressure to the core head and carriage throughout the entire drilling operation. The carriage and column apparatus shall be securely attached to the base of the apparatus; and the base will be secured with a mechanical fastener or held

in place by the body weight of the operator. The core drilling apparatus shall be equipped with a water spindle to allow water to be introduced inside of the drill stem while operating. The cutting edge of the core drill bit shall be of hardened steel or other suitable material with embedded diamond chips in the cutting surface. The core barrel shall be of sufficient diameter to secure a specimen that is a minimum of four or six inches or whichever is prescribed for necessary testing. The core barrel shall not be missing more than one of the teeth used for cutting; if so, it shall be discarded and another barrel shall be used. The core barrel shall also be a minimum of two inches longer than the anticipated depth of pavement in accordance with project paving plans.

Accessory Equipment: A sufficient supply of ice and dry ice shall be provided to sufficiently cool the pavement prior to securing the samples from the designated areas in the pavement. The ice should also be used to adjust the temperature of the water used to cool the core bit. A water supply (usually a plastic 35–55 gallon drum) with sufficient hose to introduce the water into and through the spindle of the coring device by gravity feed. The drum should be white or light in color to minimize excessive thermal heating of the water (for coring of asphalt rubber cores see Note 1). At no time shall the water utilized in the coring operation exceed 65° F during the coring operation. Ice shall be utilized to ensure the temperature control of the water being introduced during the cutting operation. An ice chest or other suitably insulated container that can maintain a temperature of less than 70° F shall be used to secure the specimens during transport. The container will be equipped with flat shelving that will support the drilled cores throughout the entire specimen dimension during transport back to the testing facility.

Miscellaneous hand tools to remove the drilled specimen from the drill hole or the core barrel taking great care in not disturbing the specimen more than necessary (refer to fig. 1 in ASTM D5361).

Process: The pavement surface at the time of coring shall not exceed a temperature of 90° F; the pavement shall be conditioned with ice or dry ice to ensure that this requirement is met. Immediately after it has been ensured that the pavement has dropped to the required temperature, core drilling shall begin. The operator will then apply an even and continuous pressure (Note 2) to penetrate through the full depth of the pavement. The operator will concurrently ensure that enough water is moving over the core surface as to adequately remove any and all cuttings that could damage the drilled core. After the pavement thickness has been penetrated, the core shall be carefully removed from either the drill hole or the core barrel and be immediately transferred to an ice chest or other suitable container. Each individual core shall be placed on a shelf in the cooler with the exposed side of the specimen facing down, or the “top side” down. If the specimen is a two-lift core, the only acceptable means of separating lifts is with a power or other acceptable wet saw type of equipment (conforming to ASTM D5361); however, at no time shall cores be split using a mallet and screwdriver or metal straight edge when being tested for bulk density. Perpendicularity of the specimen shall be checked in the field after the specimen has been extracted from the surface. The core operator shall hold the core up to eye level and place the core top side down in a “speed square” or small carpenter’s square. The specimen placed in the square shall not depart from perpendicular to the axis more than 0.50 (approximately equivalent to 1/16 of an inch in 6 inches). If the

specimen is outside of this distance from square, it shall be discarded in the field and another sample cored that falls within tolerance. The cores upon arriving at the laboratory for testing shall be carefully cleaned and measured for thickness in accordance with ASTM D3549. A speed square shall be used to measure perpendicularity as compared to a 90 degrees angle and shall not depart from perpendicular to the axis more than 0.5 degrees (approximately equivalent to 1/16 of an inch in 6 inches). All remaining testing shall be done within the parameters of the current project and/or agency required specification.

The core operator that obtained the cores is responsible for restoration of the core holes at the conclusion of the coring process. Immediately before restoration, standing water and errant debris shall be removed from the holes. Core holes shall be patched back with an agency-approved material. One typical material is hot mix asphalt conforming to MAG Standard Specification Section 710, compacted in thin (1.5 inch) lifts with the temperature compaction range as specified on the mix design, or as established by the binder supplier. Another typical material is pre-packaged non-shrink grout conforming to ASTM C1107. If non-shrink grout is used, the individual restoring the core holes is responsible for protecting the finished work from tire traffic, etc. Other patch materials maybe used at the discretion of the Engineer.

*Note 1 – It should be noted that when the material to be cored is a rubberized asphalt mixture a wetting agent such as liquid dish soap shall be added to the water barrel to hinder the material from sticking or allowing the binder to spread during coring.

*Note 2 – This refers to pressure exerted on the core barrel and machine during the coring process. Too much pressure can cause damage to the core barrel and the motor; and too little pressure can cause a glazing of the diamonds, reducing cutting efficiency and premature wear of the barrel.

General:

Asphalt concrete shall be a mixture of asphalt cement and mineral aggregates. Mineral admixture, liquid anti-strip, or the combination thereof, shall be included in the mixture when required by the mix design or by the Engineer. Asphalt concrete shall be produced in accordance with MAG Standard Specification Section 321.

The designation for asphalt concrete mixes shall be based on the nominal maximum aggregate size of the mix. The applicable mix designations are 3/8 inch, 1/2 inch, 3/4 inch. Each mix shall be designed using Marshall or Gyratory compaction methods.

The following table (Table 710-1) displays the recommended range for lift thickness for various asphalt concrete mix designations found within Section 710. Please note that the minimum lift thicknesses are based on each mix designation's "Nominal Aggregate Size" and the relative coarseness of its gradation. The compacted thickness of layers placed shall not exceed the Maximum Lift Thickness of Table 710-1 except as otherwise provided in the plans and specifications, or if approved in writing by the Engineer.

TABLE 710-10				
RECOMMENDED LIFT THICKNESS FOR ASPHALT CONCRETE MIXES				
Asphalt Concrete Mix Designation (inches)	Minimum Lift Thickness Marshall Mixes	Maximum Lift Thickness Marshall Mixes	Minimum Lift Thickness Gyratory Mixes	Maximum Lift Thickness Gyratory Mixes
3/8"	1.0 inches	2.0 inches	1.5 inches	3.0 inches
1/2"	1.5 inches	3.0 inches	2.0 inches	3.0 inches
3/4"	2.5 inches	4.0 inches	3.0 inches	4.0 inches

Material:

Asphalt Binder: The asphalt binder specified in this section has been developed for use in desert climate conditions. When used in other climates, consideration should be given to adjustments in the asphalt binder selection. The asphalt binder shall be Performance Grade Asphalt conforming to the requirements of MAG Standard Specification Section 711 for PG 70-10, unless otherwise approved by the Engineer or specified differently in the plans or special provisions.

Aggregate: Coarse and Fine aggregates shall conform to the applicable requirements of this section. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Coarse aggregate for hot mix asphalt is material retained on or above the No. 4 sieve and Fine aggregate is material passing the No. 4 sieve. Aggregates shall be relatively free of deleterious materials, clay balls, and adhering films or other material that prevent coating with the asphalt binder. Coarse and Fine aggregates shall conform to the following requirements when tested in accordance with the applicable test methods.

TABLE 710-2		
COARSE/FINE AGGREGATE REQUIREMENTS		
Characteristics	Test Method	Requirements
Fractured Faces, % (Coarse Aggregate Only)	Arizona 212	85, 1 or more 80, 2 or more
Uncompacted Voids, % Min.	AASHTO T-304, Method A	45
Flat & Elongated Pieces, % 5:1 Ratio	ASTM D4791	10.0 Max.
Sand Equivalent, %	AASHTO T-176	50 Min.
Plasticity Index	AASHTO T-90	Non-plastic
L.A. Abrasion, % Loss	AASHTO T-96	9 max. @ 100 Rev. 40 max. @ 500 Rev
Combined Bulk Specific Gravity	AI MS-2/SP-2	2.35-2.85
Combined Water Absorption	AI MS-2/SP-2	0-2.5%

Tests on aggregates used in asphalt concrete outlined above, shall be performed on materials furnished for mix design purposes and composited to the mix design gradation.

Blend sand (naturally occurring or crushed fines) shall be clean, hard and sound material, which will readily accept asphalt binder coating. The blend sand grading shall be such that, when it is mixed with the other mineral aggregates, the combined product shall meet the requirements of Table 710-2.

The natural sand shall not exceed 20 percent for the Marshall mixes and 15 percent for the Gyratory mixes by weight of the total aggregate for a mix.

Reclaimed Asphalt Pavement (RAP): When allowed by the Engineer, Reclaimed Asphalt Pavement (RAP), as defined in MAG Standard Specification Section 701.5, may be used in asphalt concrete provided all requirements of MAG Standard Specification

Section 710 are met. References to use of RAP in MAG Standard Specification Section 710 apply only if RAP is used as part of the mixture.

When RAP is used in asphalt concrete, it shall be of a consistent gradation, asphalt content, and properties. When RAP is fed into the plant, the maximum RAP particle size shall not exceed 1 ½ in. The percentage of asphalt in the RAP shall be established in the mix design. The percentage of RAP binder shall be established in the mix design.

When RAP is used in base and intermediate courses, the amount of RAP aggregate and RAP binder should not exceed 30% contribution; Surface courses should be limited to 20% RAP aggregate and RAP binder contribution.

In addition to the requirements of MAG Standard Specification Section 710.3.1, the job mix formula shall indicate the percent of asphalt RAP and the percent and performance grade of virgin (added) asphalt binder.

When less than or equal to 15% RAP binder is used by weight of total binder in the mix, the added virgin binder shall meet the requirements for PG 70-10 as shown in MAG Standard Specification Section 711. When greater than 15% RAP is used by weight of the total binder in the mix, the added virgin binder will be dropped one grade for low and high temperature properties to a PG 64-16, unless testing indicates that the blend of the recovered RAP binder and virgin binder meets the requirements for PG 70-10 as shown in MAG Standard Specification Section 711. The virgin asphalt binder shall not be more than one standard asphalt material grades different than the specified mix design binder grade.

Mineral Admixture: Mineral admixture when used as an anti-stripping agent in asphalt concrete shall conform to the requirements of AASHTO M-17. Mineral admixture used in asphalt concrete shall be dry hydrated lime, conforming to the requirements of ASTM C1097 or Portland cement conforming to ASTM C150 Type II or ASTM C595 Type IP. The amount of hydrated lime or Portland cement used shall be determined by the mix design. The minimum mineral admixture content within a mix will be 1.00 percent, by weight of total aggregate if not using a liquid anti-strip additive.

Liquid Anti-Strip: When liquid anti-stripping additives are used, the additive shall conform to the requirements of AASHTO designation R 15-89. The agent shall be added per the manufacturer's recommended dosage rate and must meet the mix design requirements of Table 710-3 or Table 710-5 depending on the design type. Liquid anti-strip additives may be used in conjunction with or in lieu of mineral admixtures. The minimum dry strength for mixtures using liquid anti-strip additives shall be 125 psi for Marshall mixes and 95 psi for Gyratory mixes. Liquid anti-strips shall meet one of the following requirements:

	Requirement
Amine Value per ASTM D2073	325 min.
Acid Value per ASTM D465	255 mg min.
Included on the website for the AASHTO product evaluation & audit solutions program (NTPEP)	https://data.ntpep.org/WMA/Products

Mix Design Requirements

General: The mix design for asphalt concrete shall be prepared by a laboratory that is accredited through the AASHTO Accreditation Program (AAP) in Hot Mix Asphalt Aggregates and Hot Mix Asphalt. The laboratory shall be under the direct supervision of a Civil Engineer, registered by the State of Arizona, and who is listed by ADOT as a “Qualified Asphaltic Concrete Mix Design Engineer” within ADOT’s latest list of approved laboratories. The latest list of approved laboratories is available on ADOT’s web page www.azdot.gov. The date of the design shall not be older than two years from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

The mix design report shall include the following elements as a minimum.

- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.
- (3) A description of all products that are incorporated in the asphalt concrete along with the sources of all products, including admixtures and asphalt binder, and their method of introduction.
- (4) The supplier and grade of asphalt binder, the source and type of mineral aggregate, and the percentage of asphalt binder and mineral admixture used.
- (5) The percentage of RAP and RAP Binder being contributed to the total mix shall be included in the mix design report.
- (6) The mix design report shall state whether it is Gyratory or Marshall, and the size designation.
- (7) The results of all testing, determinations, etc., such as: specific gravity and gradation of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (ASTM D4867),

Marshall stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration's 0.45 Power Gradation Chart, plots of the compaction curves and the results of moisture sensitivity testing.

(8) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design.

(9) A specific recommendation for design asphalt binder content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.

(10) The supplier's product code, the laboratory Engineer's seal (signed and dated), and the date the design was performed.

(11) If a warm mix technology or additive is used, the following shall be included:

- Technology type and supporting manufacturer information; including instructions pertaining to laboratory mixture temperatures and curing.
- Amount (%) of additive (technology) used in the mixture.
- Attached copy of the ADOT approved product list, showing additive/technology
- Minimum plant production temperature shall not fall below manufacturer's recommendation.
- Minimum field compaction temperature shall be identified.
- Identify any special mixing or compaction temperatures or special methods to be used when conducting quality assurance or quality control testing of field collected samples. Example: if the field collected samples of warm mix asphalt can be treated as conventional hot asphalt mix, provide the equivalent conventional hot asphalt mix compaction temperature.

The mix design shall be submitted to the Agency or Engineer by the Contractor/Supplier for which it was developed as part of his project submittals. Once the mix design has been approved by the agency or Engineer, the Contractor and/or his supplier shall not change plants nor use additional mixing plants without prior approval of the Engineer. If a Contractor/Supplier elects to change the source of mineral admixture or binder, a volumetric check point may be completed in lieu of a new mix design.

The checkpoint shall comply with the mix design volumetric parameters listed in Table 710-3 for Marshall mixes or Table 710-5 for Gyratory mixes. Any change shall be to an equal alternative material, and this shall not apply to changes in aggregate source. Any changes in the plant operation, the producer's pit, modifiers in the asphalt binder, or any

other item that will cause an adjustment in the mix, shall be justification for a new mix design to be submitted.

Mix Design Criteria: The mix design shall be performed by one of two methods, Marshall Mix Design or Gyratory Mix Design. The method shall be specified on the plans, special provisions, or by the Engineer. A minimum of 4 points will be used to establish the mix design results. The oven aging period for both Marshall and Gyratory mix design samples shall be 2 hours.

Marshall Mix Design: The Marshall Mix Design shall be performed in accordance with the requirements of the latest edition of the Asphalt Institute's Manual, MS-2 "Mix Design Methods for Asphalt Concrete." The mix shall use the compactive effort of 75 blows per side of specimen. The mix shall comply with the criteria in Table 710-3.

TABLE 710-3				
MARSHALL MIX DESIGN CRITERIA				
Criteria	Requirements			
	3/8" Mix	1/2" Mix	3/4" Mix	Designated Test
1.Voids in Mineral Aggregate: %, min	15.0	14.0	13.0	AI MS-2
2.Effective Voids: %, Range	4.0±0.2	4.0 ±0.2	4.0 ±0.2	AI MS-2
3.Absorbed asphalt: %, Range*	0-1.0	0-1.0	0-1.0	AI MS-2
4.Dust to Eff. Asphalt Ratio, Range **	0.6-1.4	0.6-1.4	0.6-1.4	AI MS-2
5.Tensile Strength Ratio: % Min.	65	65	65	ASTM D4867
6.Dry Tensile Strength: psi, Min.	100	100	100	ASTM D4867
7.Stability: pounds, Minimum	2,000	2,500	2,500	AASHTO T-245
8.Flow: 0.01-inch, Range	8-16	8-16	8-16	AASHTO T-245

9.Mineral Aggregate Grading Limits		AASHTO T-27	
		Percent Passing with Admix	
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix
1-1/4 inch			
1 inch			100
3/4		100	90 – 100
1/2	100	85 – 100	---
3/8	90-100	62 – 85	62 – 77
No. 8	45-60	40 – 50	35 – 47
No. 40	10-22	10 – 20	10 – 20
No. 200	2.0 – 10.0	2.0 – 10.0	2.0 – 8.0

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

*** Mixtures using liquid anti-strip additives shall conform to the requirements of MAG Standard Specification 710.2.5.

Gyratory Mix Design: Gyratory Mix Designs shall be performed in accordance with the requirements of latest edition of the Asphalt Institute's SP-2 manual. Mix design laboratory compacted specimens shall be prepared using a gyratory compactor in accordance with AASHTO T-312.

The mix design shall be formulated in a manner described for volumetric mix designs in the current edition of the Asphalt Institute Manual SP-2, except the number of trial blend gradations necessary will be determined by the mix design laboratory. Duplicate gyratory samples shall be prepared at a minimum of four (4) binder contents to select the recommended binder content. The gyratory specimens shall be compacted to 160 gyrations. Volumetric data for the design number of gyrations, Ndes, and the initial number of gyrations, Nini, are then back calculated based on the bulk specific gravity, Gmb, of the Nmax specimens and the height data generated during the compaction process of those same specimens.

TABLE 710-4	
Number of Gyrations	
Nini	8
Ndes	100
Nmax	160

The corrected density of the specimens shall be less than 89.0 percent of maximum theoretical density at Nini. The corrected density of the specimens shall be less than 98.0 percent of maximum theoretical density at Nmax. The Gyratory mix shall comply with the criteria in Table 710-5.

TABLE 710-5				
GYRATORY MIX DESIGN CRITERIA				
Criteria	Requirements			Designated Test
	3/8" Mix	1/2" Mix	3/4" Mix	Method
1. Voids in Mineral Aggregate: %, Min.	15.0	14.0	13.0	AI SP-2
2. Effective Voids: %, Range	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2	AI SP-2
3. Absorbed Asphalt: %, Range *	0 - 1.0	0 - 1.0	0 - 1.0	AI SP-2
4. Dust to Eff. Asphalt Ratio, Range **	0.6 – 1.4	0.6 – 1.4	0.6 – 1.4	AI SP-2
5. Tensile Strength Ratio: %, Min.	75	75	75	ASTM D4867
6. Dry Tensile Strength: psi, Min.	75	75	75	ASTM D4867
7. Mineral Aggregate Grading Limits				AASHTO T-27
	Percent Passing with Admix			
Sieve Size	3/8 inch Mix	1/2 inch Mix	3/4 inch Mix	
1 inch			100	
3/4 inch		100	90-100	
1/2 inch	100	90-100	43-89	
3/8 inch	90-100	53-89	-	
No. 8	32-47	29-40	24-36	
No. 40	2-24	3-20	3-18	
No. 200	2.0-8.0	2.0-7.5	2.0-6.5	

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range.

*** Mixtures using liquid anti-strip additives shall conform to the requirements of MAG Standard Specification 710.2.5.

Moisture Sensitivity Testing: Moisture sensitivity testing will be performed in accordance with ASTM D4867 for both Marshall and Gyratory mix designs, without the freeze/thaw cycles. The minimum required Tensile Strength Ratio is indicated in the tables above.

Method of Measurement:

Matching existing pavement sections will be measured and per square yard for placement of aggregate base course and asphalt concrete mixture actually used, as allowed above, and shall include the required quantities of mineral aggregates, asphalt binder, mineral admixture, and tack coat.

Basis of Payment:

The installation of aggregate base course and asphalt concrete to match the existing pavement structural section, measured as provided above, will be paid for at the contract unit price per square yard. No separate payment for tack coat will be made.

ITEM 9240144 – MISCELLANEOUS WORK (PEDESTRIAN FENCE):

Description:

The work included under this item shall consist of fabricating, erecting, and installing 42" Pedestrian Fence in conformance with the requirements and details shown on the Project Plans, ADOT's Standard Specifications for Road and Bridge Construction (Standard Specifications), and these Special Provisions. The pedestrian fence includes the following elements:

- Steel pipe
- Steel picket
- Steel embed plate
- Headed shear stud

Materials:

Structural steel shall be in accordance with Section 604 of the Standard Specifications.

Steel pipe shall be steel conforming to ASTM A53, grade B.

Steel picket shall be steel conforming to ASTM A36.

Steel embed plate shall be steel conforming to ASTM A36.

Headed shear stud shall be steel conforming to ASTM A108.

Construction Requirements:

Structural steel shall be constructed in accordance with Section 604-3 of the Standard Specifications.

Method of Measurement:

Miscellaneous Work (Pedestrian Fence) will be measured for payment by linear foot. Overall pedestrian fence length shall be measured from outside edge of end post to outside edge of end post.

Basis of Payment:

The accepted quantities of Miscellaneous Work (Pedestrian Fence), measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work, complete in place, including steel pipe, steel picket, steel embed plates, headed shear studs, fabrication, paint, shop and working drawing preparation, and welding as described and specified herein and indicated on the Project Plans.

ITEM 9240175 – MISCELLANEOUS WORK (DOORS AND HARDWARE):

Description:

The work under these items shall consist of furnishing, fabricating and installing the doors and hardware with the details shown on the plans and the requirements of these specifications. The work also includes testing and the coordination with the contractor required to ensure code-compliant installations per manufacturer's recommendations

Materials

A. Hollow Metal Doors and Frames:

Hollow metal doors to have minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8. The contractor shall furnish door assemblies with U-factor of not more than 0.50 deg Btu/F x h x sq. ft. when tested in accordance with ASTM C1363 or ASTM E1423.

The contractor shall provide metallic-Coated Steel Sheet meeting ASTM A653/A653M, Commercial Steel (CS), Type B. Inserts, Bolts, and Fasteners shall be Hot-dip galvanized in accordance with ASTM A153/A153M. Power-Actuated Fasteners in Concrete shall be of Fastener system of type suitable for application indicated, fabricated from corrosion-

resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated. Grout to have Maximum slump of 4 inches per ASTM C467. Do not use slurry grout.

B. Door Hardware:

Basis of Design For Door Hardware:

Manufacturer List

Code	Name
AB	ABH Manufacturing Inc.
BE	Best Access Systems
NA	National Guard
ST	BEST Hinges and Sliding

Option List

Code	Description
1/4-20 SSMS/EA	Stainless Machine Screws w/Expansion Anchors
B4E	Beveled 4 Edges
CSK	Counter Sunk Screw Holes
N	Stainless Steel Components
SIA	Abrasive Coating

Finish List

Code	Description
32D	Satin Stainless Steel
630	Satin Stainless Steel
689	Aluminum Painted
AL	Aluminum
US32D	Stainless Steel, Dull

Set #1.0.

Doors: 101-A, 102-A, 103-A			
4	Butt Hinge	FBF199 4.5" x 4.5" NRP	32D
1	ST Electromechanical Lockset	45HW-7DEU15H PATD C RQE	630
1	BE Door Closer	EHD9016 AF90 DA AVB	689
1	BE Overhead Stop	N 9024 RA	
1	US32D Kick Plate	AB KP050 10" x 2" LDW B4E CSK	630
1	AB Power Transfer	PT1200EZ	
1	AB Wire Harness	EZDK_60	
1	AB Wire Harness	EZDK-12	

1	AB Card Reader	by Owners Security Vendor	
1	BY Power Supply	DKPS-2A	
1	RC Drip Cap	16A - 4" ODW	
1	NA Weatherstrip	160SA Head & Jambs	
1	NA Door Sweep	200NA	
1	NA Handicap Threshold	713 1/4-20 SSMS/EA SIA	AL

NA
NOTE: Doors are normally closed and locked. Access is gained by key or valid credentials. Free egress is allowed at all times without use of keys, credentials, special knowledge or effort.

Construction Requirements

A. Hollow Metal Doors and Frames:

The contractor shall Provide product data for each product to include construction details, material descriptions, core descriptions, and finishes. Provide shop drawings to include the following:

1. Elevations of each door type and frame.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Door hardware schedule
8. Include diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
 - a. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
 - b. Elevations: Include front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.

- c. Diagrams: Include point-to-point wiring diagrams that show each device in door opening system with related colored wire connections to each device.
- 9. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- 10. Manufacturer's qualification statement.
- 11. Installer's qualification statement.
- 12. Supplier's qualification statement.
- 13. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- 14. Keying Schedule:
 - a. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- 15. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- 16. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

For each type of thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.

The contractor shall Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

The contractor shall construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

The contractor shall provide Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B as indicated below:

Type: As indicated in the Door and Frame Schedule on Drawings.

Thickness: 1-3/4 inches.

Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A40 coating.

Edge Construction: Model 2, Seamless.

Edge Bevel: Provide manufacturer's standard beveled or square edges.

Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.

Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same

material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

Core: Polystyrene, polyurethane, or polyisocyanurate.

Frames:

Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.

Construction: Full profile welded.

Exposed Finish: Prime.

The contractor shall provide jamb anchors as indicated below:

Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.

Post installed Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

The contractor shall provide floor anchors for each jamb and mullion that extends to floor. Material to be per ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings. Solidly pack mineral-fiber insulation inside frames.

Contractor to coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar. Hand-trowel mortar into frame as masonry installed. Adjust hollow-metal frames with the following tolerances:

Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

Hollow metal frames shall be fabricated in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames. Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction. For single-door frames drill stop in strike jamb to receive three door silencers. Fit and adjust hollow-metal doors accurately in frames with clearances complying with ANSI/SDI A250.0

Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

Doors to have primed finish per manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

Contractor to Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

Contractor to set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes. Install frames with removable stops located on secure side of opening.

Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Door Hardware:

Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

Provide a lock for each door, unless it's indicated that lock is not required. Provide door closer on each exterior door, unless otherwise indicated. Provide door closer on each fire-rated and smoke-rated door. Spring hinges are not an acceptable self-closing device, unless otherwise indicated. Provide drip guards at head of outswinging exterior doors unless protected by roof or canopy directly overhead. Provide threshold at each exterior door, unless otherwise indicated. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated. Provide door bottom sweep on each exterior door, unless otherwise indicated. Provide applicable gasketing on doors indicated as "Gasketing." Provide necessary power supplies, power transfer

hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications. Aluminum fasteners are not permitted. Provide machine screws for attachment to reinforced hollow metal and aluminum frames. Self-drilling (Tek) type screws are not permitted.

Contractor shall install hardware in accordance with manufacturer's instructions and applicable codes. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

Contractor to mount hardware in compliance with ADA standards

Locksets: 40-5/16 inch (1024 mm).

Push Plates/Pull Bars: 42 inch (1067 mm).

Deadlocks (Deadbolts): 48 inch (1219 mm).

Exit Devices: 40-5/16 inch (1024 mm).

Door Viewer: 43 inch (1092 mm); standard height 60 inch (1524 mm).

Contractor shall Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal, anchor thresholds with stainless steel countersunk screws. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

Method of Measurement:

Door and hardware will be measured by a lump sum, complete in place.

Basis of Payment:

The accepted quantities for door and hardware, measured as provided above, will be paid for at the contract as a lump sum, which price shall be full compensation for the work complete in place.

ITEM 9240172 – MISCELLANEOUS WORK (ELEVATOR AND MACHINE ROOM EQUIPMENT):

Description:

The work under this item shall consist of furnishing, fabricating, and installing the elevators and machine rooms in accordance with the details shown on the plans and the requirements of these specifications.

Materials:

A. General Requirements:

Work shall conform to the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Part 2 for traction elevators. State or local requirements must be used if more stringent.

The contractor shall perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.

The contractor shall provide materials in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.

The contractor shall coordinate elevator work with the work of other trades for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor to ensure dimensional coordination of the work.

The contractor shall install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.

Before final acceptance, contractor shall remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.

At completion of elevator work, contractor shall remove tools, equipment, and surplus materials from site. Equipment rooms and hoistway shall be cleaned. Trash and debris shall be removed. Environmentally preferable and low VOC emitting cleaners shall be used for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

At time of Substantial Completion of elevator work, or portion thereof, the contractor shall provide suitable protective coverings, barriers, devices, signs, or other such methods or

procedures to protect elevator work from damage or deterioration. The contractor shall maintain protective measures throughout remainder of construction period.

The contractor shall cut walls, floors, and remove obstructions as necessary for proper installation of the elevator.

The contractor shall provide adequate storage facilities for elevator equipment prior to and during installation at ground level within 150 feet of hoistway.

The contractor shall install bevel guards at 75 degrees on all recesses, projections or setbacks over 2 inches (4 inches for A17.1 areas) except for loading or unloading.

Welded connections shall be furnished for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualification of welding operators.

B. Gearless electric traction passenger elevators

Elevator materials, components, and equipment shall be delivered by the manufacturer. The contractor shall be responsible for providing secure and safe storage on the job site.

The contractor shall furnish and install TK Elevator's Evolution 200 Self-Supported Machine Room-Less elevator. The color, pattern, and finish shall be from the manufacturer's full standard range, selected by the Architect during the submittal process.

Passenger elevator car shall be cab type TKAP. Walls shall be reinforced cold-rolled steel with two coats factory applied baked enamel finish, with applied vertical wood core panels covered on both sides with stainless steel, 5WL rigidized stainless steel panels, No. 4 satin finish. Reveals and frieze shall be stainless steel, No. 4 brushed finish. Canopy shall be cold-rolled steel with hinged exit. Ceiling shall be downlight type, metal pans with suspended LED downlights and dimmer switch. Number of downlights shall be dependent on platform size with a minimum of six. The metal pans shall be finished with a stainless steel, No. 4 brushed finish. Cab fronts, return, transom, soffit, and strike shall have panels faced with brushed stainless steel. Horizontal sliding car doors shall be reinforced with steel for panel rigidity. Doors shall be stainless steel panels, No. 4 brushed finish. Cab sills shall be extruded aluminum, mill finish. Handrails shall be 1.5-inch-diameter cylindrical metal on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, No. 4 brushed finish. Cab ventilation shall be per manufacturer's standard exhaust fan, mounted on the car top. Flooring in elevator

cab to be 1/4" slip resistant diamond plate with max total weight of 200 pounds installed per manufacturer's recommendations. Submit to architect for approval prior to install.

C. Elevator car enclosures, hoistway entrances, and signal equipment

Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, UL10B, and NFPA 80. The contractor shall provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory.

Doors and frames shall be hollow metal type at each hoistway, using stainless steel panels, No. 4 brushed finish with No. 4 brushed finish entrance frame.

Hoistway sills shall be extruded metal, with grooves on top surface. Aluminum shall have a mill finish.

D. Equipment, machines, controls, systems, and devices as required for safely operating the specified elevators at their rated speed and capacity

Hall stations shall be furnished with vandal resistant buttons with center jewels which illuminate to indicate that a call has been registered at that floor for the indicated direction. Each button shall be provided with an internal automatic stop to prevent damage of switches that register the call. Provide one set of pushbutton risers. All fixtures shall be vandal resistant type. Pushbutton risers shall have a brushed stainless steel finish. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

E. Materials and accessories as required to complete the elevator installation

All steel bars and members shall be carbon steel. Steel sheets shall be commercial quality cold-rolled steel, Class 1, matte finish. All steel structural elements shall have a factory-applied baked enamel finish. All steel architectural elements shall have a powder coat finish, with color selection based on the manufacturer's standard selections, selected by the Architect during the submittal process.

Plastic laminate shall be decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050-inch thickness. Laminate selection must be based on elevator manufacture's standard selections.

Construction Requirements:

A. Gearless electric traction passenger elevators

The elevator shall be TK Elevator's Evolution 200 Self-Supported Machine Room-Less elevator. The elevator shall have a rated capacity of 3500 lb, and a rated speed of 200 ft/min. The operation system shall be TAC32T. The travel, landings, and openings shall be arranged per plans. The clear car inside dimensions shall be 6'-8" wide by 5'-5 1/2" deep. The clear inside height of the car shall be 7'-4". The door clear height shall be 7 ft. The hoistway entrance size shall be 3'-6" wide by 7 ft high. The door shall be a one-speed door as indicated on the plans. Power shall be provided as 208 volts, 3 phase, 60 Hz. Isolation transformers shall be provided where power is less than 480VAC, 3 phase building power. The pit depth shall be 5 ft. The buttons and fixtures shall all be vandal resistant signal fixtures. The elevator shall include cellular phone operations, and data for code features.

Before starting elevator installation, the contractor shall inspect the hoistway, hoistway openings, pits and/or control room, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Elevator installation shall not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the installer. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

The contractor shall install elevator systems components and coordinate installation of hoistway wall construction. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings. All work shall comply with NFPA 70 for electrical work required during installation.

B. Elevator car enclosures, hoistway entrances, and signal equipment

Hoistway shall be plumb and legal, properly framed and enclosed, including a pit of proper depth, and a pit ladder for each elevator. Hoistway shall be clear and plumb with variations not to exceed 1/2 inch at any point. Hoistway shall maintain a temperature between 32 deg F and 122 deg F measured at the machine.

The contractor shall grout all door sills, hoistway frames, and signal fixtures after installation of the elevator equipment.

The contractor shall provide temporary enclosures, barricades and other protection from open hoistways and elevator work area during the time the elevator is being installed to meet all permanent installation safety codes. A temporary work platform shall be provided

at the top landing across the hoistway; if required, it should conform to all code and safety requirements.

The contractor shall erect hoistway sills, headers, and frames before erection of rough walls and doors. After rough walls are finished, erect fascias and toe guards. Set sill level slightly above finished floor at landings.

The contractor shall coordinate the installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

The contractor shall erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascia and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.

The hoistway platform shall be a fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood sub-floor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25 percent of the rated capacity.

The hoistway sling shall be steel stiles bolted or welded to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.

The guide rails shall be dry, non-lubricated steel, fastened to the building with steel brackets.

The guide shoes or roller guides with a minimum of three tires shall be mounted on top and bottom of the car and counterweight frame and be held in contact with the guide rail by adjustable devices.

Substantial buffers shall be provided in the elevator pit. Buffers shall be mounted on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.

The hoisting machine shall be a compact energy efficient permanent magnet Gearless traction type, consisting of PMAC motor, brake and driving sheave mounted on a rigid bedplate in the top of the hoistway. A large solid, forged shaft shall serve as a support for the motor rotor assembly and for the drive sheave and brake system. It shall be supported by roller bearings mounted in the machine housing.

The drive system shall be of the Variable Voltage Variable Frequency (VVVF) regenerative. The system shall be a vector-controlled pulse-width modulated AC drive. The variable voltage variable frequency drive shall convert the AC power supply using a two-step process to a variable voltage variable frequency power supply for use by the hoist motor. The speed control shall be by means of vector control providing direct torque and field

excitation automatically provided by permanent magnet. A digital absolute velocity encoder shall be provided giving feedback to the controller on armature position and motor speed. Dual solid-state electronics (IGBT Insulated Gate Bipolar Transistor) in series shall be used in place of mechanical contactors.

The motor shall be PMAC, totally enclosed, non-ventilated with class "B" insulation. Ventilation fans are used if the situation requires a larger motor such as systems requiring six belts or speeds greater than 350 fpm. The motor armature shall be dynamically balanced and supported by roller bearings of ample capacity. The armature and driving sheave shall be properly balanced for smooth, high-speed elevator performance. The PM machine shall be mounted horizontally in the top of the hoistway in a unitized formed steel structure on bearing plates furnished by the elevator installer. The unitized formed steel structure shall be mounted on the guide rails provided by TK Elevator.

The brake shall be a spring applied electric brake; held open by an electro-magnet actuated by a digital brake controller and designed to make smooth, positive stops. The Brake shall be designed to automatically apply in the event of interruption of power supply from any cause. Operation and control of the brake shall be all digital. The setting and lifting of the brake shall be software based and all electronic. All adjustments and setup of the brake shall be made using a PC interface. No contactors or resistors shall be used in the actuation of the brake.

Suspension belts shall be flat belts of polyurethane with an inner core of 12 steel cords with an FT1 fire rating such that hoistway sprinklers are not required by NFPA-13. Each belt shall have a suspension strength of 13,488 lb. Suspension tension monitor shall detect differences in belt tension and for loss of tension. If fault is detected, the car shall stop at the nearest floor and an Out of Service call be registered. Trip criteria shall be monitored and data shall be stored in redundant non-volatile locations. Belts shall be replaced prior to the end of service life. Messages shall be issued at 180, 90, and 30 days prior to the last day of service life. Any special tools, devices, software or equipment required for monitoring the wear of suspension shall be included with the installation of the equipment and become the property of the owner at time of elevator completion. This includes special ongoing monitoring systems, special tools and instruction needed to monitor the suspension system.

Governor ropes shall be of iron construction.

Each elevator shall be counterbalanced for smooth and economical operation by using iron or steel plate weights securely fastened in a steel counterweight frame. Counterweight shall equal the weight of the complete elevator car and approximately 50 percent of the specified capacity load.

Car safety shall be mounted on the bottom members of the car frame and be operated by a centrifugal speed governor. The governor shall be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed.

Electric limit devices shall be placed in the hoistway near the terminal landings. Limit switches shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

Each elevator car shall be furnished with a self-leveling feature to automatically bring the car to the floor landings and correct for over travel or under travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.

Sheave type two-point suspension hangers and tracks shall be provided for each hoistway horizontal sliding door. Sheaves shall be polyurethane tires with ball bearings properly sealed to retain grease. Hangers shall have an adjustable device beneath the track to limit the up-thrust of the doors during operation. Tracks shall be drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

A car top inspection station shall be provided with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station shall give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

C. Operation and control systems

The elevator controller shall be installed at the door jamb. Controller landing wall thickness shall be a minimum of 8-1/2 inches thick. For center opening doors, the controller is located on the right hand frame (from inside the elevator cab looking out). A telephone line, light fixture (19 fc), and convenience outlet shall be provided in the hoistway at the landing where the elevator controller is located. Final location must be coordinated with elevator contractor. These requirements must be coordinated between the general contractor and the elevator contractor.

The contractor shall install a standby power source, including necessary transfer switches and auxiliary contact, where elevator operation from an alternate power supply is required.

Elevator installer shall provide a direct or alternating current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. The door control system shall be digital closed loop and the closed loop circuit shall give constant feedback on the position and velocity of the elevator door. The motor torque shall be constantly adjusted to maintain the correct door speed based on its position and load. All adjustments and setup shall be through the computer-based service tool. Door movements shall follow a field programmable speed pattern with smooth acceleration and deceleration at the ends of travel. The mechanical door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at

the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. AC controlled units with oil checks, or other deviations are not acceptable.

The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position, or selected as a dispatch car.

If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.

When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel shall reverse and the door shall reopen to answer the other call.

The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer shall sound. When the obstruction is removed, the door shall begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors shall stop and resume closing only after the obstruction has been removed.

If the doors are closing and the infra-red beam(s) is interrupted, the doors shall reverse and reopen. After the obstruction is cleared, the doors shall begin to close.

If the doors are opening, but do not fully open after a field adjustable time, the doors shall recycle closed then attempt to open six times to try and correct the fault.

If the doors are closing, but do not fully close after a field adjustable time, the doors shall recycle open then attempt to close six times to try and correct the fault.

When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

A door protection system shall be provided using microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Wrap return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long

lasting LEDs shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.

An integral phone system shall be provided.

A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing the car(s) changing position, condition, and workload. All controller and operational circuits including the brake control and drive system shall be digital. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.

Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.

When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed. The car shall not stop at floors where "down" buttons have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.

When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.

A car that is stopping for the last hall call in the preference direction, and that hall call is for the opposite direction with no onward car calls, shall reverse preference when the selector position advances to the landing at which the car is committed to stop. A car that is stopping for the last hall call in the preference direction, and that hall call is for the same direction, shall hold its preference until the door is almost closed allowing time for a passenger to register an onward car call which shall maintain the preference. If no car call is registered before the door is almost closed, the car shall lose its preference and shall be available to accept calls in either direction.

When group operation is required, the group supervisory operation shall be embedded within selected car controllers. No separate group controller shall be supplied. The microprocessor shall constantly scan the system for hall calls. When hall calls are registered, the control system shall immediately calculate the estimated time for arrival using such information as, number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite direction of travel. When a car's status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.

The microprocessor shall provide flexibility to meet well defined patterns of traffic, including up peak, down peak, and heavy interfloor demands, and adjust for indeterminate variations in these patterns which occur in buildings.

Artificial Intelligence shall be an integral part of the group control system software. The enhanced artificial intelligence shall optimize the interfloor traffic performance. Inputs for the artificial intelligence shall include accurate passenger load from an electronic loadweigher, probable car calls generated from each hall call, type of building and observed traffic patterns.

A load weighing device shall be provided on each car which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass landing calls but not car calls. The passed landing calls shall remain registered for the next following car. The device shall be unaffected by the action of compensating chain or rope. The device shall detect a 50-lb load change under all conditions.

The load sensor shall use a load cell to accurately measure the weight in the car. The information shall be transferred via a serial link to the elevator controller.

The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.

The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slow down points in memory.

The drive control system shall be dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

Current shall be applied to the elevator drive before the brake is released and the speed pattern is dictated to eliminate roll back and sling shot effects of unbalanced loads in the car. The electronic loadweigher shall determine the load on the car determining a pre-torque reference to send to the drive.

Upon loss of the normal power supply, building-supplied standby power is available on the same wires as the normal power supply. Once the loss of normal power is detected and standby power is available, the elevator is lowered to a pre-designated landing and the doors are opened. After passengers have exited the elevator, the doors are closed and the car is shut down. When normal power is restored, the elevator automatically resumes operation.

The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.

D. Accessibility provisions for physically disabled persons

Floor identification pads shall be provided at each floor. Jamb pads shall comply with ADA requirements.

E. Equipment, machines, controls, systems, and devices as required for safely operating the specified elevators at their rated speed and capacity

Smoke detector\sensing devices and contacts wired to elevator control shall be provided as required by local code. A means to automatically disconnect the main line power supply to the elevator prior to the application of water in the elevator controller room shall be furnished by the contractor. This means shall not be self-resetting.

The contractor shall locate a light fixture (19 fc) and convenience outlet in pit with switch located adjacent to the access door.

Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42 inches minimum, (48 inches minimum for A17.1 areas) shall be provided at the same height, above sill of access door or handgrips.

The contractor shall lubricate operating parts of system, including ropes, as recommended by the manufacturer.

F. Testing to ensure code-compliant, fully operational elevators

City of Tolleson personnel shall be instructed in proper use, operations, and daily maintenance of elevators. Emergency provisions shall be reviewed, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. City of Tolleson personnel shall be instructed on the normal procedures to be followed in checking for sources of operational failures or malfunctions. A final check

shall be performed for each elevator operation, with City of Tolleson personnel present, immediately before date of substantial completion. Control systems and operating devices shall be determined to be functioning properly.

The elevator contractor shall provide standard cab, entrance, and signal fixture data to describe product for approval by the Engineer.

Shop drawings shall include the following elements:

- Equipment arrangement in the corridor, pit, and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
- Elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
- Floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
- Electrical power requirements and branch circuit protection device recommendations.

Manufacturer's standard selection charts for exposed finishes and materials shall be provided to the Engineer for approval for powder coat paint and plastic laminate.

Standard metal samples for metal finishes shall be provided upon request by the Engineer.

Operation and maintenance data shall be provided, including owner's manuals and wiring diagrams, and a parts list with recommended inventory.

The manufacturer of machines, controllers, signal fixtures, door operators cabs, entrances, and all other major parts of elevator operating equipment shall have a minimum of 15 years of experience in manufacturing, installing, and servicing elevators of the type required.

The major parts of the elevator equipment shall be manufactured by the installing company, and not be an assembled system.

The manufacturer shall have a documented, on-going quality assurance program.

The manufacturer shall be certified per ISO-9001:2000 Manufacturer Certified and ISO-14001:2004 Environmental Management System Certified.

The installer shall be the manufacturer or an authorized agent of the manufacturer with not less than 15 years of satisfactory experience installing elevators equal in character and performance to the project elevators.

Elevator and machine room equipment shall conform to the following regulatory requirements:

- ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
- NFPA 70 National Electrical Code
- NFPA 80 Fire Doors and Windows.
- USDOJ's "2010 ADA Standards for Accessible Design."
- Section 407 in ICC A117.1, when required by local authorities.

The elevator installer shall obtain and pay for all required inspections, tests, permits, and fees for elevator installation. Inspection and test documentation shall be delivered to the Engineer upon completion and acceptance of elevator work.

Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

The elevator manufacturer shall submit to the Engineer a standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after final acceptance.

Upon completion of the elevator installation and before permitting use of elevator, the contractor shall perform acceptance tests as required and recommended by Code and governing regulations or agencies. Other tests shall be performed as required by governing regulations or agencies. The Engineer, Architect, and governing authorities shall be notified in advance of dates and times tests are to be performed on the elevator.

The elevator installer shall furnish a maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.

The elevator installer shall submit a parts catalog and show evidence of local parts inventory with a complete list of recommended spare parts. Parts shall be produced by the

manufacturer of original equipment. The manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

Method of Measurement:

Elevator and machine room equipment will be measured by the unit each, complete in place.

Basis of Payment:

The accepted quantities for hydraulic passenger elevators, measured as provided above, will be paid for at the contract unit price each, which price shall be full compensation for the work complete in place, including all parts, operational elevator cabs in finished condition, lighting, elevator equipment, hydraulic jacks, sump pumps, hardware, fixtures, hatches, equipment room doors and locks, hoistway systems, fire protection, fire sprinklers, fire alarms, fire alarm panels, ductwork, pipe, support steel, hoist beams, guide rails, brackets, sleeves, anchoring, door sills, electrical wire, HVAC systems for the equipment room and elevator cab, grounding, electrical panels, power centers, breakers, pull boxes, GFI receptacles, switches, trenching, conduit, grout, paint, finishes, testing, automatic emergency lowering system and all other incidentals necessary to complete the work.

ITEM 9240174 – MISCELLANEOUS WORK (CONCRETE EQUIPMENT PAD):

Description:

The work under this item shall consist of constructing concrete equipment pads as shown on the project plans and in accordance with the requirements of these specifications.

Materials:

Concrete shall be Class S concrete conforming to the requirements of Section 1006 of the specifications.

Reinforcing steel shall conform to the requirements of Section 605 of the specifications.

Construction Requirements:

Concrete equipment pads shall be constructed in accordance with the requirements of the details indicated on the project plans and as specified herein.

Prior to placing concrete equipment pads, the material on which they are to be placed shall be compacted to a depth of at least 6 inches to a density of not less than 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual as directed and approved by the Engineer.

All soft or unsuitable material shall be removed to a depth of not less than 6 inches below subgrade and replaced with material approved by the Engineer.

The subgrade and forms shall be watered immediately before placing concrete. Concrete shall be placed in the forms and thoroughly consolidated. The concrete shall be consolidated by means of approved mechanical vibrators or by tamping or spading by hand. The fresh concrete shall be struck off so the surface will be at the proper elevation when the concrete is consolidated. Concrete shall be thoroughly worked so that the coarse aggregate is below the surface. The surface shall then be finished to grade and cross-section with a float, troweled smooth and then given a final fine brush finish.

The exposed edges shall be chamfered to a 3/4 inch distance unless a larger distance is indicated on the project plans.

Immediately following the required finishing operations, one or more applications of curing compound shall be applied to all exposed surfaces.

The curing compound shall be applied at the rate of not less than 1 gallon per 150 square feet of surface area, and in such manner as to entirely cover and seal all exposed surfaces of concrete with a uniform film.

Method Of Measurement:

Concrete equipment pads will be measured per each.

Basis Of Payment:

The accepted quantities of concrete equipment pads, measured as provided above, will be paid for at the contract unit price per each, which price shall be full compensation for the work, complete in place, including forming, placement of concrete, reinforcing steel, and subgrade preparation.

(925SRVY, 05/21/26)

SECTION 925 CONSTRUCTION SURVEYING AND LAYOUT:

925-3.01 General: the first paragraph of the Standard Specifications is revised to read:

At the preconstruction meeting, the contractor shall furnish to the Engineer, for approval, the following:

- (A) A schedule of hourly survey services rates and classifications for additional survey work, which shall remain fixed and in effect for the entire duration of the work and shall not be subject to renegotiation; and

- (B) A written outline detailing the method of staking, marking of stakes, grade control for various courses of materials, referencing, structure control, pavement markings, and any other procedures and controls necessary for survey completion. A part of this outline shall also be a schedule which will show the sequencing of the survey and layout work, throughout the course of the contract, listing a percentage of completion for each month.

925-5 **Basis of Payment:** the fourth paragraph of the Standard Specifications is revised to read:

If additional staking and layout are required as a result of additional work ordered by the Engineer, such work will be paid under items listed in the table below.

Payment will be made utilizing the schedule of rates provided per Subsection 925-3.01. No additional payment will be made for overtime hours. Should such additional work require the contractor to pay travel and subsistence costs for the survey party or survey parties utilized, payment for travel and subsistence will be made under the provisions of Subsection 109.04 of the specifications. The Engineer will determine whether the additional work shall be performed by the contractor or by Department forces.

(1001MATL, 06/17/21)

SECTION 1001 MATERIAL SOURCES: of the Standard Specifications is revised to read:

1001-1 **Description:**

The work under this section shall consist of the procuring of borrow, topsoil, subbase and base materials, mineral aggregates for concrete structures, surfacing, and landscape plating, from sources either designated on the project plans or in the Special Provisions or from other sources.

1001-2 **General:**

The contractor shall determine for itself the type of equipment and work required to produce a material meeting the requirements of the specifications.

Sites from which material has been removed shall, upon completion of the work, be left in a neat and presentable condition. Where practicable, borrow pits, gravel pits, and quarry sites shall be located so that they will not be visible from the highway.

The contractor shall provide an environmental analysis, as specified in Subsection 104.12 of the specifications, for any source proposed for use regardless of whether a previously approved environmental analysis exists for the site.

In accordance with Subsection 104.12 of the specifications, the contractor may utilize an existing environmental analysis approved after January 1, 1999, provided that the

analysis is updated as necessary to be in compliance with current regulations and with the contractor's planned activities.

It shall be the responsibility of the contractor to conduct any necessary investigations, explorations, and research, on-site and otherwise, before and after submitting the bid proposal, to satisfy itself that the specified quantity and/or quality of material exists in any proposed material source.

The contractor shall not produce material for the project, mobilize crushing equipment or clear a worksite prior to approval of the environmental analysis.

The contractor shall comply with the requirements of the landowner or agency having jurisdiction over the land.

The Department makes no representation regarding quality or quantity of materials in any source.

1001-2.01 Information Available:

The Department maintains a listing of materials sources for which a completed environmental analysis is available and the landowner has allowed the source to be placed on the list. Further information on material sources is available at <https://azdot.gov/business/environmental-planning/material-source-guidance>.

1001-2.02 Material Sources in Floodplains:

Any development of a material source that is determined to be in a flood plain must meet the requirements of the appropriate local, state, and federal agencies, including as applicable, the U.S. Army Corps of Engineers, Section 404 of the Clean Water Act, ADEQ or Tribal 401 Water Quality Certification, and the National or Arizona Pollutant Discharge Elimination System (NPDES/AZPDES).

If the contractor wishes to procure a material source within a floodplain, the contractor or material supplier shall submit a Floodplain Use Permit application to the appropriate floodplain management agency. The contractor shall submit to the Department documentation that the Floodplain Use Permit for the material source was approved and signed by the appropriate agency's Floodplain Administrator. The contractor or material supplier shall comply with all the requirements of the Floodplain Use Permit, including renewal of the Permit as needed or required.

The Department will require an engineering report if the material source is situated in the 100 year floodplain of any stream or watercourse, and located within one mile upstream and two miles downstream of any highway structure or surfaced roadway crossing. The engineering report shall be prepared by a professional engineer with expertise in hydrology, hydraulics, river mechanics, and fluvial geomorphology. The engineering report shall address the effects of the potential for structural damages following a 100 year flood event.

All other permits required to obtain a material source shall be furnished to the Department upon request.

Surplus material from agency administered flood control management projects may be used as borrow material only if the contractor submits written evidence to the Engineer that the flood control agency project was fully designed and funded.

Material sources in floodplains located on Native American Tribal Lands will be considered for use on an individual analysis. The analysis shall include a review of applicable land use plans, floodplain management plans, environmental plans, applicable laws and regulations pertaining to Native American Tribal Lands, and an engineering analysis of the effects on any highway facility or structure. The contractor shall obtain from the Bureau of Indian Affairs (BIA) and the Native American Tribal Council all permits, licenses, and approvals for the Department to review.

1001-2.03 Protection and Restoration:

The contractor shall comply with the requirements of Subsections 107.11 and 107.12 of the specifications for protecting and restoring the material source. The contractor shall assume full responsibility to protect and rehabilitate the material source to the satisfaction of the Department and in compliance with the requirements of the Federal Land Management Agency (FLMA) having jurisdiction or by the owner of the material source.

1001-3 Proposed Source:

1001-3.01 Approval Requirements:

(A) General:

The contractor shall notify the Engineer prior to or at the preconstruction conference as to the source that it proposes to use.

The contractor acknowledges that all the conditions set forth in this subsection shall be met prior to the source being approved for use.

Other than sampling and testing, the requirements of this subsection shall be completed prior to initiation of any activities that disturb the existing conditions at the proposed source.

Regulatory changes, specification changes, or other reasons may preclude the approval of a materials source. The contractor acknowledges that the Department may refuse to approve a material source even if the Department had approved the source for other projects.

(B) Specific Conditions for Approval:

The use of a source will require written approval by the Engineer. No approval will be given until the contractor has complied with the following conditions:

- (1) The contractor has submitted an environmental analysis, as specified in Subsection 104.12 of the specifications, of the source proposed for use and the Department has reviewed the analysis and satisfied itself that the use of such source will not have an adverse social, economic or environmental impact. The requirements of Subsection 1001-3.01 of the specifications shall be completed prior to initiation of any activities that disturb the existing conditions at the proposed source.
- (2) The contractor has furnished the Engineer with evidence that he has secured the rights to the source, including ingress and egress.

(C) Historical and Cultural Resources:

The archaeological survey report of the proposed material source shall be prepared by the contractor's archaeological consultant and shall conform to the requirements of Subsection 104.12 of the specifications.

In the event that prehistoric or historic structures and prehistoric or historic artifacts are encountered during any activity related to the construction of the material source, the contractor shall immediately cease operations within a 50 foot radius of the discovery location and notify the Engineer. In the event that an unmarked human burial and/or funerary remains are encountered during any activity related to the construction of the material source, the contractor shall immediately cease operations within a 100 foot radius of the discovery location and notify the Engineer. The Engineer will contact the Environmental Planning – Historic Preservation Team so that appropriate notification of the discovery is made per state and federal regulations.

After notifying the Engineer, the contractor shall, within good faith, secure the area and take all reasonable measures to protect the historical and cultural resources. No activity shall resume unless authorized by the Engineer. The Engineer will not authorize resumption of any activity until receiving confirmation from the Environmental Planning – Historic Preservation Team that the contractor may commence work.

If the Department determines that the proposed use will have major adverse impact on cultural or historic resources, the Department will not allow the use of the source.

(D) Permit from Navajo Nation:

For projects located on the Navajo Reservation, the Navajo Nation has adopted a permitting system for any sources, regardless of whether on or off the Navajo reservation, which are to supply material for projects located within its boundaries. No material source will be approved until the contractor submits a copy of the permit from the Navajo Nation

allowing materials from the proposed source to be used on the project. For information concerning the permit, the contractor shall contact the Navajo Nation Historic Preservation Office.

(E) Bureau of Land Management Material Sources:

If the contractor elects to pursue the use of material sources on BLM land under Title 30 Code of Federal Regulations, it is at the contractor's sole risk, and the Department bears no responsibility for any delays or costs associated with the request to use material sources on BLM Land.

The Department will not request or pursue any "free-use permit" under Title 23 Code of Federal Regulations or any other arrangement with BLM on this project.

1001-4 Special Access within Right Of Way:

The contractor may submit a request to the District Engineer to approve special access to a controlled access highway if special access is not shown on the project plans.

The request by the contractor shall be accompanied by an environmental analysis and by documents which specify the point(s) of access, the acquisition of right of way, the manner in which access will be attained, the traffic control plan, and crossovers, along with all other appropriate data which will allow the District Engineer to evaluate its request. If the request is approved, a supplemental agreement shall be entered into.

All costs associated with the special access requested by the contractor shall be borne by the contractor, including, but not limited to, cattle guards, fences, gates and restoration work.

When access is not being utilized, gates shall be closed and locked. Upon completion of all operations, the area within the right of way that has been disturbed shall be restored to the condition existing prior to the contractor's operations.

The decision by the District Engineer to deny a request by the contractor will be considered to be final.

1001-5 Fences and Cattle Guards:

Where the haul roads to material sources cross existing fence lines in areas where there is livestock of any kind, temporary cattle guards shall be installed by the contractor at each crossing.

The livestock operator or owner shall be contacted prior to the beginning of any operations and effective measures shall be taken and means provided by the contractor to prevent livestock from straying.

In operations where conditions will exist that are dangerous to livestock of any kind, temporary cattle guards and fence shall be installed around the pit area by the contractor to protect livestock.

Temporary cattle guards and fence installed by the contractor shall be removed and existing fence disturbed shall be replaced or reconstructed and all fence shall be left in as good condition as it was prior to the beginning of work.

(1002PAINT, 06/19/25)

SECTION 1002 PAINT: of the Standard Specifications is revised to read:

1002-1 General Requirements:

All paints specified herein shall be ready-mixed at the manufacturer's plant, except for inorganic zinc rich primer, which shall be mixed by the fabricator or at the project site just prior to application. All paints shall be standard paint products of the manufacturer with published product data sheets and shall comply in all details with the specifications.

Ready-mixed paint shall be homogeneous, free of contaminants, and shall be of a consistency suitable for the use for which it is specified. The pigment shall be finely ground and properly dispersed in the vehicle, according to the requirements for the type of paint, and this dispersion shall be such that the pigment does not settle appreciably, does not cake or thicken in the paint container, and does not become granular, jelled, or curdled. Any settlement of pigment in the paint shall be easily dispersed with a paddle so as to produce a smooth uniform paint of the proper consistency. The manufacturer shall include in the paint the necessary additives for control of sagging, leveling, drying, drier absorption, and skinning.

Lead, lead compounds, soluble barium compounds, or hexavalent chromium compounds shall not be used as raw materials in the paint formulas specified under this section, and shall not be added to any paint formulas specified under this section.

The use of halogenated solvents is not permitted.

Paint shall be furnished in new, unopened air-tight containers, which are clearly labeled with the exact title of the paint, Federal Specification number when applicable, name and address of the manufacturer, product code, date of paint manufacture, and the lot or batch number. The containers shall meet U.S. Department of Transportation Hazardous Materials Shipping Regulations. Precautions concerning the handling and the application of the paint shall be shown on the label of the paint containers.

All of the paints of any coating system consisting of individual paints (such as a primer, intermediate coat, and topcoat), shall be made by the same manufacturer, and shall be designed and sold to be used together as a system.

Only paints and paint systems approved in accordance with Subsection 1002-3 of the specifications and shown on the Department's Approved Products List (APL) will be allowed for use. Copies of the most current version of the APL are available on the Department's website from the ADOT Research Center, through its Product Evaluation Program. Paint supplied by an approved manufacturer with a different product code from that which was previously evaluated and approved will require evaluation to determine if it is acceptable.

The contractor shall submit to the Engineer a Certificate of Compliance for each lot or batch of paint supplied, in accordance with Subsection 106.05 of the specifications, prior to its use. Product data sheets listing the paint constituents and their proportions as well as Materials Safety Data Sheets (MSDS) are required for each paint material supplied prior to its use.

All applicable governmental environmental regulations shall be adhered to during cleanup and for the disposal of unused paint.

1002-2 Paint Types:

1002-2.01 Three-Paint Coating System:

(E) General:

A three-paint coating system shall be for use on metallic surfaces, and shall include a primer (Paint Number 1), intermediate coat (Paint Number 2), and topcoat (Paint Number 3) from the same system. All three paints shall be water-based, 100 percent acrylic (acrylic latex) paints, unless a non water-based primer is specified, in which case, the topcoat and intermediate coat must be a water-based acrylic paint.

Each individual paint shall conform to all of the chemical and physical characteristics and properties as declared on the manufacturer's product data sheet. In addition, the paint color shall be as specified in the project plans, and the consistency shall be in accordance with the manufacturer's recommendations. The contractor shall use the checking and calibration procedures found in ASTM D4212 and verify the paint consistency with the Engineer prior to each application.

Each coating is intended for spray application. Limited application can be made by brushing or rolling if approved by the Engineer.

Paint Number 1 - Primer:

This paint shall be used on blast cleaned steel surfaces for the first coat of a three-paint coating which must include Paint Number 2 and Paint Number 3 from the same system.

Paint Number 2 - Intermediate Coat:

This paint for intermediate coats shall be used on primed steel surfaces as the second coat of a three-paint coating system which must include Paint Number 1 and Paint

Number 3 from the same system. The paint shall be appropriately tinted to contrast with the prime coat.

Paint Number 3 - Topcoat:

Paint for topcoats shall be used as the third coat of a three-paint coating system which must include Paint Number 1 and Paint Number 2 from the same system.

For topcoats, the gloss shall be as specified on the project plans. The available colors for topcoats shall provide visual matches to the colors given in the Federal Standard No. 595. The colors shall be available in high-gloss enamels, if required.

1002-2.02 Zinc Rich Primer:

Zinc-rich primer shall be a solvent based, one-part, epoxy ester, zinc-rich coating made to contain no less than 89 percent by weight of zinc dust in the dried film. Zinc-rich primer is suitable for limited use on cuts, welds, or damaged galvanized surfaces, as needed to restore the continuity of cathodic protection. Zinc-rich primer shall be certified by the manufacturer to be compatible with any suitable water-based acrylic finish paint.

Zinc-rich primer shall be used where zinc paint is called for elsewhere in the specifications.

1002-2.03 Inorganic Zinc-Rich Primer:

Inorganic zinc-rich primer shall be a solvent-based three-component, inorganic, ethyl silicate, zinc-rich coating for use on steel surfaces which will be exposed to severely corrosive environments. The primer shall be mixed in accordance with the manufacturer's directions by the fabricator or at the project site just prior to application. Inorganic zinc-rich primer shall be made to contain no less than 80 percent by weight of zinc dust in the dried film, and shall be certified by the manufacturer to form a strong bond to properly cleaned and prepared steel surfaces, either sandblasted or galvanized. This primer shall also be certified by the manufacturer to be compatible with any suitable water-based acrylic finish paint.

1002-2.04 Alkyd Primer:

Alkyd primer shall be solvent-based, and shall be designed for ferrous metal surfaces where there are rusting issues which rule out the use of a water-based primer. Such surfaces may include ornamental iron, tanks, fabricated parts, handrails, and objects referred to as "black steel." Alkyd primer shall be certified by the manufacturer to be compatible with any suitable water-based acrylic finish paint.

1002-2.05 Direct-to-Metal (DTM) Combination Primer and Finish Paint:

This paint shall be a water-based acrylic paint specially designed for use as a direct-to-metal (DTM) primer or combination primer and finish. The product shall be certified by the manufacturer to form a strong bond to properly cleaned and prepared surfaces of

structural steel and other metallic products such as metal buildings, tanks, and pipes. It shall also be certified to bond with other properly cleaned and prepared surfaces such as galvanized steel, oil-based paints, and alkyd enamels. When used on ferrous metal surfaces where there are rusting issues, the paint shall be rust-inhibitive. Direct-to-metal combination primer and finish paints shall be designed to be usable as a complete two or three coat system. When used as a primer only, the paint shall be certified by the manufacturer to be compatible with any suitable water-based acrylic finish paint.

1002-2.06 Acrylic Emulsion Paint:

Acrylic emulsion paint shall be used on concrete and masonry surfaces, and shall be a water-based, 100 percent acrylic (acrylic latex) paint.

This paint may be tinted by using "Universal" or "all purpose" concentrates.

The color of the final coat of paint shall be as indicated on the project plans. If no color is specified on the plans, the paint color shall approximate that of paint color chip No. 30318, as specified by Federal Test Standard Number 595, when applied to either a concrete test specimen measuring 2 feet by 2 feet, or to the surface of the concrete structure to be painted.

The Engineer will determine color acceptance by visual inspection.

1002-3 Sampling and Testing:

(A) General:

Any lot or batch of paint may, at any time, be sampled and tested for conformance to the specifications and the chemical and physical characteristics and properties as declared by the manufacturer on the product data sheets submitted with the original samples used in the evaluation and approval of the product. Also, complete coating system samples may be required at any time for follow-up evaluation using the performance test method employed in the original evaluation for approval of the system.

(B) Coating Systems for Structural Steel and Other Metallic Surfaces :

Coating systems composed of the paints specified in Subsections 1002-2.01 through 1002-2.05 of the specifications will be tested as complete systems applied to steel panels and weathered in accordance with ASTM G154, and exposure cycle number 4 of ASTM D4587, in the Q-U-V Accelerated Weathering Tester, utilizing UVB 313 lamps. Each system shall have an evaluation rating of 100 or greater after 2000 hours of weathering. The procedure is as follows:

- (1) Paint coatings will be applied to cold rolled steel panels (ASTM D609, Type 3, ASTM A366). The paint will be thinned to 75 ± 2 Ku consistency using demineralized water. Three coats, each approximately 2 mils thickness are applied to each of four panels

according to ASTM D823. The fourth coated panel from each set will be inscribed with an "X" cut to the steel substrate and extending across the entire coated area;

- (2) The exposure cycle used with the weathering tester shall be D = 8 h UV/60 degree C followed by 4 h CON/45 degree C. One panel from each set of four shall be removed at 1000 hours and another at 1500 hours. The last two panels shall be removed at 2000 hours;
- (3) Paint systems will be evaluated on the basis of six measures of degradation which may be found to occur under the conditions of exposure. For each measure, a rating scale of one to five points will be applied. A rating of one point indicates the poorest performance and five points indicate the best performance. The rating from each measure is multiplied by a weighting factor which represents the relative importance of that measure. The product is a score for that measure. The sum of the scores for all measures is the overall score for the system. To be acceptable, paint systems shall have an overall score of 100 or higher;
 - (a) Cracking/Flaking: ASTM D660, ASTM D661, and ASTM D772 are used in combination to determine the rating scale. A weighting factor of three will be applied to the results of these tests;
 - (b) Blistering/Flaking: ASTM D714 and ASTM D772 are used in combination to determine the rating scale. A weighting factor of three will be applied to the results of these tests;
 - (c) Corrosion: A rating scale is derived from ASTM D610 for evaluating the degree of rusting. A weighting factor of three will be applied to the results of this test;
 - (d) Chalking/Erosion: ASTM D4214 and ASTM D662 are used in combination to determine the rating scale. A weighting factor of three will be applied to the results of these tests;
 - (e) Adhesion: The tape test is based on ASTM D3359 and the rating scale is from the Classification of Adhesion Test Results under Test Method B. A weighting factor of five will be applied to the results of this test; and
 - (f) Flexibility: ASTM D522, using a 1-1/4 inch mandrel, is employed to determine flexibility. The degree of cracking observed after bending is used to determine the rating scale. A weighting factor of five will be applied to the results of this test.

(C) Paint for Concrete and Masonry Surfaces:

Paint for concrete and masonry surfaces will be tested in accordance with the following procedures:

(1) Resistance to Accelerated Weathering:

The paint will be applied to concrete mortar panels and weathered in a Q-U-V accelerated weathering tester, according to ASTM G154, for 2000 hours utilizing UVB-313 lamps, and exposure cycle number 4 of ASTM D4587. The paint weathered in this manner shall show no appreciable change in color or appearance due to fading, chalking, or material reaction.

(2) Adhesion:

The paint shall be applied to a concrete or masonry test surface approved by the Engineer, in accordance with the application plan specified in Subsection 610-3.03 of the specifications. After a minimum period of 30 days of outdoor exposure, the adhesion of the paint will be measured. Testing will be performed in accordance with the requirements of ASTM D4541, Method E, with a strength of at least 100 pounds per square inch being required. In addition, testing will also be performed in accordance with the requirements of ASTM D3359, Method A, with a rating of 3A or higher being required.

(1003REBAR,12/17/20)

SECTION 1003 REINFORCING STEEL: of the Standard Specifications is revised to read:

1003-1 General Requirements:

Reinforcing steel shall be furnished in the sizes, shapes, and lengths shown on the plans and in conformance with the requirements of the specifications.

Certificates of Compliance conforming to the requirements of Subsection 106.05 of the specifications shall be submitted for epoxy coated reinforcing bars, as well as uncoated reinforcing bars, wire, and welded wire fabric. In addition, for epoxy coated reinforcing bars, Certificates of Compliance shall be submitted from the coating manufacturer and Certificates of Analysis shall be submitted from the coating applicator.

When reinforcing steel is delivered to the project site, the contractor shall furnish the Engineer with a copy of all shipping documents. Each shipping document shall show the sizes, lengths, and weights of the reinforcing steel separately for each structure.

Reinforcing steel shall be free of dirt, oil, paint and grease and shall conform to the requirements of Section 605 of the specifications. Reinforcing steel shall be protected at all times from damage. All reinforcing steel shall be free of dirt, oil, paint and grease. Rust, surface irregularities, or mill scale will not be the cause for rejection, provided the weight,

dimensions, cross-sectional area, and tensile properties of a manually wire brushed test specimen are not less than the requirements of the specifications.

1003-2 Reinforcing Bars:

Except when used for wire ties or spirals, steel bars used as reinforcement in concrete shall be deformed and shall conform to the requirements of ASTM A615 for Grade 60 steel. Unless otherwise specified, steel bars meeting the requirements of ASTM A706 may be substituted for ASTM A615 steel bars. When ASTM A706 bars are used, tack welding of the reinforcement will not be permitted unless approved by the Engineer.

Samples of reinforcing bars taken at the supplier's or fabricator's place of business shall be defined as pre-shipment samples, while those samples obtained from stockpile or shipment at the project shall be defined as project samples. A shipment shall be considered any amount of reinforcing bars delivered to a project on any given day, of one transported load.

Reinforcing bars sizes No. 4, No. 5, and No. 6 will be accepted with the submission of a Certificate of Compliance. All other reinforcing bar sizes shall be subject to pre-shipment and project sampling as outlined below.

1003-2.01 Pre-Shipment Sampling:

Prior to shipment of reinforcing bars to the project, the supplier or contractor shall contact Materials Group, Structural Materials Testing Section to obtain a laboratory number referenced to the project number. A random sample shall be taken at the supplier's place of business and delivered to the Structural Materials Testing Section. For bar size No. 14, the sample shall be one piece not less than 42 inches in length, selected at random for each shipment up to 30 tons. For bar size No. 18, the sample shall be one piece not be less than 42 inches in length, selected at random for each shipment up to 50 tons. For all other bar sizes, the sample shall be one piece not less than seven feet in length, selected at random for each shipment up to 20 tons. Samples shall be submitted for each bar size, grade, heat number, and manufacturer in the shipment. The pre-shipment bars that are obtained from the supplier or fabricator must be accompanied by a Certificate of Compliance. The information shown on the certificate must match the bar identification marks. If no Certificate of Compliance is available or the information shown on the certificate is incomplete or inaccurate, the bars will not be accepted for testing.

When the supplier or fabricator makes a shipment to a project, a Certificate of Compliance shall be furnished stating that the material in the shipment is from the same stock as the pre-shipment sample covered by the laboratory number assigned by the Structural Materials Testing Section. Reinforcing bars represented by the pre-shipment sample failing to comply with the specification requirements shall not be used on any project.

1003-2.02 Project Sampling:

The Engineer reserves the right to sample reinforcing bars at any time. Project samples shall consist of one sample bar not less than seven feet in length for all bar sizes. Placement of the reinforcing bars shall not be delayed while the contractor is awaiting test results.

Concrete placement operations shall not begin until satisfactory test results of the project sample bars are obtained.

When the supplier or fabricator makes a shipment to a project from outside the Phoenix or Tucson areas, or not otherwise subjected to pre-shipment sampling, the shipment shall be accompanied by a Certification of Compliance. Before any reinforcing bars from a shipment is to be incorporated into the project work, a project sample shall be taken, tested, and approved by the Structural Materials Testing Section. A project sample shall be taken as soon as practical upon arrival at the job site. A different project sample that is representative of each bar size, grade, heat number, and manufacturer from that shipment will be required. The sampling requirements described for pre-shipment sampling for the Phoenix or Tucson areas shall be used.

1003-3 Wire:

Steel wire used as spirals or ties for reinforcement in concrete shall conform to the requirements of AASHTO M 336. Wire shall be deformed or cold drawn (smooth).

1003-4 Welded Wire Fabric:

Welded wire fabric for concrete reinforcement shall conform to the requirements of AASHTO M 336.

1003-5 Epoxy Coated Reinforcing Bars:

1003-5.01 Steel:

Reinforcing bars shall conform to the requirements of Subsection 1003-2 of the specifications.

Epoxy coated reinforcing bars will be sampled and tested in the same manner as uncoated reinforcing bars. The coating and flexibility of the epoxy coated reinforcing bars will also be tested by the Department for acceptance.

1003-5.02 Epoxy for Coating:

A list of powdered epoxy resins which have passed prequalification tests, as described in ASTM A775, "Epoxy Coated Steel Reinforcing Bars", is maintained on the Department's Approved Products List (APL). The powdered epoxy resins selected by the contractor and furnished by the manufacturer shall be of the same material and quality as the resins listed on the APL, and shall be applied and cured in the same manner used to coat the

test bars in the original powder prequalification test. Copies of the most current version of the APL are available on the internet from the ADOT Research Center through its Product Evaluation Program.

Prequalification testing may be performed by the National Bureau of Standards, State laboratories, or qualified private laboratories.

The Certificate of Compliance from the coating manufacturer shall properly identify the batch and/or lot number, material, quantity of batch, date of manufacture, name and address of manufacturer, and a statement that the material is the same composition as the initial sample prequalified for use. The certificate shall also state that production bars and prequalification bars have been identically prepared and applied with epoxy powders.

Patching or repair material, compatible with the coating and inert in concrete shall be made available by the epoxy coating manufacturer. This material shall be suitable to repair areas of the coating which were damaged during fabrication or handling in the field.

1003-5.03 Application of Coating:

The coating applicator's facility shall be subject to approval by the Department. Applications for approval of facilities shall be made to the Department by the coating applicator.

The surface to be coated shall be blast cleaned in accordance with the requirements of the Society for Protective Coatings, Surface Preparation Standard SSPC-SP10, Near White Blast Cleaning.

The powdered epoxy resin coating shall be applied to the cleaned surface as soon as possible after cleaning and before visible oxidation occurs. In no case shall more than eight hours elapse between cleaning and coating.

The protective epoxy coatings shall be applied by the electrostatic spray method or the electrostatic fluidized bed method in accordance with the recommendations of the coating manufacturer. The epoxy coating may be applied before or after fabrication of the reinforcing bars.

The epoxy coating shall be applied as a smooth uniform coat. After curing, the coating thickness shall be in accordance with the requirements of ASTM A775. Coating thickness shall be controlled by taking measurements on a representative number of bars from each production lot. Coating thickness measurements shall be conducted by the method outlined in the Society for Protective Coatings Paint Application Standard SSPC-PA2.

The coating shall be checked visually after cure for continuity. It shall be free from holes, voids, contamination, cracks and damaged areas.

The coating shall not have more than two holidays (pinholes not visible to the naked eye) in any linear foot of the coated item. A holiday detector shall be used, in accordance with the manufacturer's instructions, to check the coating for holidays.

The flexibility of the coating shall be evaluated on a representative number of bars selected from each production lot. The coated bar shall be bent 120 degrees (after rebound) around a six-inch diameter mandrel. The bend shall be done at a uniform rate and may take up to one minute to complete. The test specimens shall be at thermal equilibrium between 68 and 85 degrees F at the time of testing. No cracking of the coating shall be visible to the naked eye on the outside radius of the bent bar.

The contractor shall furnish a Certificate of Analysis from the coating applicator with each shipment of coated steel. In addition to the requirements of Subsection 106.05 of the specifications, the Certificate of Analysis shall state that the coated items and coating material have been tested in accordance with the requirements of this subsection and that the entire lot is in a fully cured condition.

The coating applicator shall be responsible for performing quality control and tests. This will include inspection and testing to determine compliance with the requirements of this subsection for the coating thickness, continuity of coating, coating cure, and flexibility of coating.

The Department reserves the right to have its authorized representative observe the preparation, coating, and testing of the reinforcing bars. The representative shall have free access to the plant, and any work done when access has been denied will be automatically rejected.

If the representative elects, lengths of coated bars may be taken from the production run on a random basis for test, evaluation, and check purposes by the Department.

1003-5.04 Shop Repair:

Epoxy coated reinforcing bars which do not meet the requirements for coating thickness, continuity of coating, coating cure, or flexibility of coating shall not be repaired.

Reinforcing bars with these defects shall be replaced, or alternately stripped of epoxy coating, recleaned and recoated in accordance with the requirements of this specification.

Coating breaks due to fabrication and handling shall be repaired with patching material if the defective area exceeds 2 percent of the surface area of the bar in a one-foot length and the damaged spot is larger than 1/4 inch by 1/4 inch.

The repair of coating breaks shall be limited to bars on which the total of the defective coating areas does not exceed 5 percent of the surface area of the reinforcing bar. Bars with greater than 5 percent damage shall be replaced, or alternately stripped of epoxy coating, recleaned and recoated in accordance with the requirements of this specification.

1003-6 Prestressing Reinforcing Steel

Prestressing reinforcing steel shall conform to the requirements of Section 602-2.01 of the specifications.

Prestressing steel shall be high-tensile steel wire, high-tensile seven-wire strand or high-tensile alloy bars, as shown in the plans.

High-tensile steel wire shall conform to the requirements of AASHTO M 204.

High-tensile seven-wire strand shall conform to the requirements of AASHTO M 203 for Grade 270. In addition to the 0.5-inch diameter prestressing steel typically shown on the plans, 0.6-inch diameter seven-wire strand may be used for cast-in-place prestressed structures.

High-tensile alloy bars shall conform to the requirements of AASHTO M 275.

All prestressing steel shall be satisfactorily protected from damage by abrasion, moisture, rust, or corrosion and shall be free of dirt, rust, oil, grease, or other deleterious substances.

For every five reels of prestressing steel furnished, one sample not less than six feet long, will be tested by the Engineer. Samples of the furnished reels with the manufacturer's Certificate of Compliance, a mill certificate, and a test report may be shipped directly by the manufacturer to the Engineer.

1003-7 Dowel Bars for Portland Cement Concrete Pavement

Dowel bars shall be round, plain steel bars of the dimensions shown on the plans conforming to the requirements of AASHTO M 254 with Type B coating. The core material shall conform to the requirements of ASTM A615, Grade 60.

Epoxy coated dowel bars shall also conform to the requirements of Subsection 1003-5 of the specifications.

The Contractor shall furnish a Certificate of Compliance that properly identifies the coating material, the number of each batch of coating material used, quantity represented, date of manufacture, name and address of manufacturer, and a statement that the supplied coating material meets the requirements of AASHTO M 254 with Type B coating.

(1005PG, 06/19/25)

SECTION 1005 BITUMINOUS MATERIALS:

1005-3 Bituminous Material Requirements:

1005-3.01 Asphalt Cement: of the Standard Specifications is revised to read:

Asphalt cement shall be a performance grade (PG) asphalt binder conforming to the requirements of AASHTO M 320. Air blown/oxidized asphalt, Polyphosphoric acid (PPA) modification and re-refined/recycled engine oil bottom (REOB) will not be accepted. The

pressure aging temperature for all binders, including Terminal Blend rubberized binder and Polymer modified asphalt binder shall be as specified below:

PG Asphalt Binder	Pressure Aging Temperature
PG 70-XX and above	110 °C
PG 64-XX and below	100 °C

If Terminal Blend rubberized binder (XX-XXTR+) is used, it shall conform to the requirements of Table 1005-1 and 1005-1a.

If Polymer modified asphalt binder (XX-XXPM) is used, it shall conform to the requirements of Table 1005-1 and 1005-1b.

If, during asphaltic concrete production, it is determined by testing that asphalt cement fails to meet the requirements for the specified grade, the asphaltic concrete represented by the corresponding test results shall be evaluated for acceptance. Should the asphaltic concrete be allowed to remain in place, the contract unit price for asphaltic concrete will be adjusted by the percentage shown in Table 1005-1. Should the asphalt cement be in reject status, the contractor may, within 25 days of receiving notice of the reject status, supply an engineering analysis of the expected performance of the asphaltic concrete in which the asphalt cement is incorporated. The engineering analysis shall detail any proposed corrective action and the anticipated effect of such corrective action on the performance. Within three working days, the Engineer will determine whether or not to accept the contractor's proposal. If the proposal is rejected, the asphaltic concrete shall be removed and replaced with asphaltic concrete meeting the requirements of the specifications at no additional expense to the Department. If the contractor's proposal is accepted, the asphaltic concrete shall remain in place at the applicable percent of contract unit price allowed, and any necessary corrective action shall be performed at no additional cost to the Department.

1005-3.03 Emulsified Asphalt: the fourth paragraph of the Standard Specifications is revised to read:

Emulsified asphalts shall be homogeneous. If emulsified asphalt has separated, it shall be thoroughly mixed to insure homogeneity. If emulsified asphalt has separated due to freezing, it shall not be used. Emulsified asphalt shall not be used after 30 days from production.

1005-3.04 Emulsified Asphalt (Special Type): of the Standard Specifications is revised to read:

Emulsified asphalt (special type) shall consist of Type SS-1 or CSS-1 diluted with water to provide an asphalt content not less than 26 percent. The water used shall be potable. Potable water obtained from public utility distribution lines will be acceptable. The water used shall be free of injurious amounts of oil, acid, alkali, clay, vegetable matter, silt, or other harmful matter. The material shall not be diluted in the field.

1005-3.07 Other Requirements: the tables 1005-1, 1005-1a, and 1005-1b of the Standard Specifications are revised to read:

TABLE 1005-1 ASPHALT BINDER ADJUSTMENT TABLE			
Test Property	AASHTO Test Method	Test Result	Percent of Contract Unit Price Allowed
Dynamic Shear of Original Binder: $G^*/\sin \delta$, kPa	T 315	≥ 1.00 0.90-0.99 0.70-0.89 < 0.70	100 98 95 88 (1)
Dynamic Shear of RTFO Binder: $G^*/\sin \delta$, kPa	T 315	≥ 2.20 2.00-2.19 1.60-1.99 < 1.60	100 98 95 88 (1)
Dynamic Shear of PAV Binder: $G^*\sin \delta$, kPa	T 315	≤ 5000 5001-5500 5501-7000 7001-8000 > 8000	100 98 95 89 87 (1)
Creep Stiffness of PAV Binder: S, Mpa	T 313	≤ 300 301-330 331-450 451-600 > 600	100 98 95 89 87 (1)
m-value at 60 sec.	T 313	≥ 0.300 0.270-0.299 0.230-0.269 < 0.230	100 98 90 87 (1)
Notes: (1) Reject Status: The pay adjustment applies if allowed to remain in place. (2) Specified properties in AASHTO M 320 for flash point, viscosity at 135 °C, and mass loss are not considered performance related. Specification deficiencies for these properties shall be cause for a work stoppage until specification properties are met, but will not be cause for a pay adjustment. (3) Should the bituminous material be deficient on more than one property, the pay adjustment will be the greatest reduction to the contract unit price specified considering individual test results. (4) The information presented in this table does not apply to asphalt cement used for tack coats.			

TABLE 1005-1a Terminal Blend rubberized binder (XX-XXTR+)				
Test Property	Test Method	Requirement	Test Result	Percent of Contract Unit Price Allowed
Solubility, %, minimum	ASTM D7553 or ASTM D2042	98	-----	-----
Elastic Recovery @ 10°C, %, minimum	AASHTO T 301	75	75 70 - 74 < 70	100 89 87 (1)
(1) Reject Status: The pay adjustment applies if allowed to remain in place.				
Notes: In case of dispute, ASTM D2042 shall be used to determine the Solubility. The asphalt binder shall contain a minimum of 8 percent crumb rubber and a minimum of 3 percent SBS (styrene-butadiene-styrene) polymer. The crumb rubber shall be derived from processing whole scrap tires or shredded tire materials. The tires from which the crumb rubber is produced shall be taken from automobiles, trucks, or other equipment owned and operated in the United States. The processing shall not produce, as a waste product, casings or other round tire material that can retain moisture when stored or disposed of above ground. Modified binders shall be blended at the source of supply and delivered as a homogenous mixture to the job site. Modified Binders stored at the asphalt concrete mixing plant for more than two weeks or beyond the supplier recommended shelf life, whichever is less, shall be sampled and tested.				

TABLE 1005-1b Polymer Modified Asphalt Binder (XX-XXPM)				
Test Property	Test Method	Requirement	Test Result	Percent of Contract Unit Price Allowed
Solubility, %, minimum	ASTM D7553 or ASTM D2042	98	-----	-----

TABLE 1005-1b Polymer Modified Asphalt Binder (XX-XXPM)				
Test Property	Test Method	Requirement	Test Result	Percent of Contract Unit Price Allowed
Elastic Recovery @ 10°C, %, minimum	AASHTO T 301	75	≥ 75 70 – 74 < 70	100 89 87 (1)
(1) Reject Status: The pay adjustment applies if allowed to remain in place.				
Notes: In case of dispute, ASTM D2042 shall be used to determine the Solubility. Asphalt binder shall contain a minimum of 3 percent SBS (styrene-butadiene-styrene) polymer. Modified binders shall be blended at the source of supply and delivered as a homogenous mixture to the job site. Modified Binders stored at the asphalt concrete mixing plant for more than two weeks or beyond the supplier recommended shelf life, whichever is less, shall be sampled and tested.				

1005-3.07 Other Requirements: the table 1005-1c of the Standard Specifications is hereby deleted.

1005-3.07 Other Requirements: the table 1005-3 of the Standard Specifications is revised to read:

TABLE 1005-3 EMULSIFIED ASPHALTS							
Tests On Emulsion	Test Method	Requirement					
		RS-1	CRS-1	RS-2	CRS-2	SS-1	CSS-1
Viscosity: Saybolt Furol, seconds, range 77 °F 122 °F	AASHTO T 59	20-100	20-100	50-400	50-400	20-100	20-100
Settlement: 5 days, %, maximum	AASHTO T 59	5	5	5	5	5	5
Sieve: Retained on No. 20, %, maximum	AASHTO T 59 (1)	0.10	0.10	0.10		0.10	0.10
Particle Charge	AASHTO T 59		Pos.		Pos.		Pos. (2)

Demulsiability: 35 mL, 0.02 N calcium chloride %, minimum	AASHTO T 59	60		60			
Classification: Uncoated particles, %, minimum	Arizona Test Method 502				55		
Residue: (3)		55	60	63	65	57	57
Residue, %, minimum (4)							
Notes: (1) Distilled water shall be used. Two percent sodium oleate solution will not be accepted. (2) If the Particle Charge Test result is inconclusive, material having a maximum PH value of 6.7 will be acceptable. (3) Residue will be obtained in accordance with the requirements of Arizona Test Method 504 and shall conform to all the requirements of AASHTO M 320 for PG 64-16, except that for CRS-2 the dynamic shear ($G^*/\sin \delta$) on the original residue shall be a minimum of 1.00 kPa and a maximum of 1.50 kPa. (4) Residue by evaporation may be determined in accordance with the requirements of Arizona Test Method 512; however, in case of dispute, AASHTO T 59 will be used.							

1005-3.07 Other Requirements: the note (2) of Table 1005-3a of the Standard Specifications is revised to read:

(2) Testing shall be performed on residue by distillation. Testing on residue by oven evaporation will not be accepted.

1005-3.07 Other Requirements: the table 1005-5 of the Standard Specifications is revised to read:

TABLE 1005-5					
EMULSIFIED RECYCLING AGENTS					
Tests on Emulsified Recycling Agent	Test Method	Requirement			
		ERA-1	ERA-5	ERA-25	ERA-75
Viscosity: Saybolt Furol, 77 °F, seconds range	AASHTO T 59	15 - 40	15 - 100	15 - 100	15 - 100

Miscibility	AASHTO T 59	Passes	Passes	Passes	Passes
Sieve Test: %, maximum	AASHTO T 59 (1)	0.10	0.10	0.10	0.10
Particle Charge	AASHTO T 59	Positive	Positive	Positive	Positive
Residue: (2) Residue, %, minimum	(3)	60	60	60	60
Notes:					
(1) Distilled water shall be used. Two percent sodium oleate solution will not be accepted.					
(2) Residue will be obtained in accordance with the requirements of Arizona Test Method 504 and shall conform to the requirements specified in Table 1005-4.					
(3) Residue by evaporation may be determined in accordance with the requirements of Arizona Test Method 512; however, in case of dispute, AASHTO T 59 will be used.					

1005-3.07 Other Requirements: the Paving Asphalt row of the table 1005-6 of the Standard Specifications is modified to add:

TABLE 1005-6 OTHER REQUIREMENTS			
Grade of Asphalt Specification Designation	Range of Temperatures for Application by Spraying, °F (Not applicable for Plant Mixing)	Range of Aggregate Temperature s for Plant Mixing, °F	Basis of Conversion, Average Gallons Per Ton at 60 °F
Paving Asphalt	275 - 400	-----	
PG 76-22 PM			231
229			232
PG 70-22 PM			233
230			
PG 64-28 PM			

(1006PCC, 09/21/23)

SECTION 1006 PORTLAND CEMENT CONCRETE:

1006-2.01(A) General: of the Standard Specifications is revised to read:

Cementitious material is defined as an inorganic material or a mixture of inorganic materials that sets and develops strength by chemical reaction with water by formation of hydrates and is capable of doing so under water. In this specification, cementitious materials are defined as hydraulic cement (Portland cement, Portland-pozzolan cement or Portland-limestone cement) and supplementary cementitious materials (fly ash, natural pozzolan, or silica fume).

1006-2.01(B) Hydraulic Cement: the first paragraph of the Standard Specifications is revised to read:

Hydraulic cement shall consist of Portland cement, Portland-pozzolan cement or Portland-limestone cement.

1006-2.01(B) Hydraulic Cement: of the Standard Specifications is modified to add:

Portland-limestone cement shall conform to the requirements of ASTM C595 for blended hydraulic cement with moderate sulfate resistance, Type IL (MS).

1006-2.01(C)(2) Flyash and Natural Pozzolan: of the Standard Specifications is revised to read:

Fly ash and natural pozzolan shall conform to the requirements of ASTM C618 for Class C, F, or N.

TABLE 1006-5 Design Criteria: the column heading of the third column of the Standard Specifications is revised to read:

		Cementitious Material Content: Lbs. per Cu Yd. Minimum - Maximum		

1006-3.02(C) Mix Design Submittal Requirements: the items (16) and (18) of the Standard Specifications are revised to read:

- (16) Volume of each material measured to the nearest hundredth of a cubic foot;
- (18) Total volume measured to the nearest hundredth of a cubic foot;

1006-7.02(A) General: the fifth paragraph of the Standard Specifications is revised to read:

Concrete shall be sampled in accordance with ASTM C172 for acceptance testing of temperature, slump, unit weight and yield (when required) and air content (when required) as well as for fabrication of test cylinders for compressive strength determination at 28 days except that the concrete shall be sampled once during discharge at the middle portion of the batch. ASTM C172 includes sampling from stationary, paving and truck mixers, and from agitating and non-agitating equipment used to transport central-mixed concrete and from continuous mixing equipment as described in Specification ASTM C685/C685M. Sampling shall be at the point of discharge from truck mixers. Sufficient care shall be taken to obtain a representative sample by diverting the entire stream of the concrete to prevent segregation. Samples shall be of sufficient size to perform all the required tests and fabricate the necessary test cylinders but in no case less than 1 cubic foot.

1006-7.02(B) Class S and Class B Concrete: of the Standard Specifications is revised to read:

For Class S concrete with a compressive strength requirement less than 4000 psi, or Class B concrete, a strength test will consist of the average strength of two test cylinders. However, if the compressive strengths of the two test cylinders differ by more than 10 percent from the average of the two, the strength test result shall be the cylinder with the highest compressive strength.

For Class S concrete with a compressive strength requirement equal to or greater than 4000 psi, or Class P concrete, the compressive strength of each sample shall be determined by averaging the results of the three test cylinders. However, if the compressive strength of any one of the three test cylinders differs by more than 10 percent from the average of the three, its result shall be discarded and the compressive strength shall be the average of the remaining two cylinders. Should the individual compressive strength of any two of the three remaining cylinders differ by more than 10 percent from the average of the three, the results will be discarded and the compressive strength shall be the strength of the remaining cylinder.

1006-7.03(A)(3) Consistency: the third paragraph of the Standard Specifications is revised to read:

When the concrete is pumped, samples for consistency will be taken as the concrete leaves the mixer.

TABLE 1006-10 Air Entrainment Requirements: the table of the Standard Specifications is revised to read:

TABLE 1006-10 Air Entrainment Requirements		
Elevation	Air Entrainment Required	Required Air Content by Volume (%)
3000 feet or above	Yes	4 to 7
Below 3000 feet	Contractor's Option	≤ 7

(1010PIPE, 03/16/23)

SECTION 1010 DRAINAGE PIPE:

1010-6 Reinforced Concrete Pipe: the sixth paragraph of the Standard Specifications is revised to read:

Precast, reinforced concrete flared end sections shall conform to the requirements of the previously cited specifications to the extent to which they apply. The area of steel reinforcement per linear foot of the flared end section shall be at least equal to the minimum steel requirement for the reinforcement in that portion of the flared end section which abuts the pipe. Flared end sections may utilize in lieu of steel reinforcement a minimum of 5.0 pounds of macro fibers, conforming to ASTM C1116, per cubic yard of concrete mix.

APPENDIX A

Drilled Shaft Slump Loss Test

Slump Loss Test of Portland Cement Concrete:

This method shall be used to determine the slump loss of freshly mixed Portland Cement Concrete over a period of time. The purpose of this test procedure is to ensure that the concrete will maintain the minimum required slump throughout the anticipated concrete hauling and placement period.

The slump loss test results shall be submitted as part of the installation plan described in subsection 609-1.03 and performed prior to the mix design being submitted to the Engineer for approval.

The Slump Loss Test of Portland Cement Concrete shall be performed by a certified technician meeting the requirements of the ACI Concrete Field Testing Technician Grade I or equivalent and shall be per the following procedure and guidelines:

- (A) The test shall be performed on a sample of mixed concrete that complies with the proposed concrete mix design submitted for the drilled shaft foundations.
- (B) A test batch of the proposed concrete mix design submitted for the drilled shaft foundations shall be prepared at a temperature consistent with ambient and concrete temperatures anticipated during actual concrete placement.
- (C) The test batch shall be a minimum of three cubic yards.
- (D) After the test batch has been mixed per the mix design requirements, a minimum of one cubic foot of the concrete shall be sampled in accordance with the requirements of ASTM C172.
- (E) An initial test shall be performed for slump (per ASTM C143) and ambient and concrete temperatures (per ASTM C1064). Air content shall be tested per ASTM C231 or ASTM C173, if required by the proposed concrete mix design.

To simulate in-place plastic concrete, the certified technician shall:

- (1) Discharge approximately one cubic yard of the test batched concrete in a hole, form or suitable container having approximate dimensions of three feet by three feet by three feet deep. The dimensions of the hole form or suitable container used may be adjusted based on project requirements.
- (2) Line the hole, form or suitable container with plastic to prevent moisture loss. Cover the top of the hole, form or suitable container with plastic to prevent rapid evaporation.
- (3) Isolate the concrete from vibration for the duration of the test.

- (4) Obtain at least one cubic foot of concrete from the test simulated in-place concrete every hour and perform testing until the slump has reached the specified minimum slump requirements per section 609-2.01(D).
- (5) Re-cover the simulated in-place concrete with plastic after each slump test.

The contractor shall submit to the Engineer the following in tabular and graphical form, and shall include these results in the installation plan described in Subsection 609-1.03:

- (a) The Elapsed Time
- (b) Slump from simulated in-place sample
- (c) Air Temperature
- (d) Concrete Temperature
- (e) Percent Air (if air entrained)

The graphical form shall depict time versus each of the tests performed. The contractor shall also submit the type (hole, form or suitable container) and its respective dimensions used for the simulated in place testing. The Engineer may require additional testing after review of the results.

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: 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, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants /

Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:

The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-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 recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act ([29 CFR part 3](#))), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.* Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. Basic record requirements (1) Length of record retention. All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) Information required. Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) Additional records relating to fringe benefits. Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) Additional records relating to apprenticeship. Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. Certified payroll requirements (1) Frequency and method of submission. The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) Information required. The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHDL/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) Statement of Compliance. Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in [29 CFR part 3](#); and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) Use of Optional Form WH-347. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access* (1) *Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices (1) Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeyworkers on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeyworkers under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeyworkers shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility. a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901](#)–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to 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 Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal 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 any Federal contract, grant, loan, or cooperative agreement.

b. 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 Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

**STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS
EXECUTIVE ORDER 11246, July 1, 1978**

(Revised November 3, 1980)

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted:

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority:

c. "Employer Identification Number" means the Federal Social Security Number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin):

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race):

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership or participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown plan. Each Contractor or Subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each

construction trade in which it has employees in the covered area

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications. Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such site or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or women sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on the job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources complied under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations: by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and

female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative actions obligations (7a through p). The efforts of a contractor association, joint contractor- union, contractor community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under utilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm

debarred from Government Contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as an limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

TITLE VI / NON-DISCRIMINATION ASSURANCES

APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, the *Federal Highway Administration*, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performance by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and Regulations relative to Non-discrimination on the grounds of race, color, or national origin.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the *Federal Highway Administration* to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the *Federal Highway Administration*, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the *Federal Highway Administration*, may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with request to any subcontract or procurement as the Recipient or the *Federal Highway Administration* may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

TITLE VI / NON-DISCRIMINATION ASSURANCES

APPENDIX E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1687 *et. seq.*).

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION
TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY
(EXECUTIVE ORDER 11246)

JULY 1, 1978 (Revised November 3, 1980)

(Revised April 15, 1981)

1. The bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

	Minority	Female
Tucson and balance of Pima County Cochise, Graham, Greenlee and Santa Cruz Counties	24.1 27.0	6.9 6.9
Phoenix and balance of Maricopa County Apache, Coconino, Gila, Mohave, Navajo, Pinal, Yavapai and Yuma Counties	15.8 19.6	6.9 6.9

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in all areas where he has Federal or federally assisted work.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

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

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. Contractors and subcontractors are required to submit the required information through the LCPtracker system, a labor compliance software monitoring certified payroll and prevailing wage.

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 September 1.

"General Decision Number: AZ20260045 05/18/2026

State: Arizona

Construction Types: Highway

Counties: Arizona Counties of
Maricopa

Modification Number	Publication Date
0	01/02/2026
1	05/18/2026

CARP1912-003 07/01/2024

Rates

Fringes

CARPENTER, EXCLUDES FORMWORK CONCRETE.....\$ 35.89
14.98

ENGI0012-046 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: BULLDOZER.....\$ 35.56
18.12

ENGI0012-053 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: TRACTOR.....\$ 35.56
18.12

ENGI0012-063 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: OILER.....\$ 32.29
18.12

ENGI0012-065 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: FIELD EQUIPMENT
SERVICEPERSON.....\$ 35.56
18.12

ENGI0012-066 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: BACKHOE/BACKHOE & LOADER
COMBO/TRACK BACKHOE.....\$ 35.56
18.12

ENGI0012-069 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: LOADER/FRONT END LOADER...\$ 35.56
18.12

ENGI0012-070 12/01/2024

Rates

Fringes

TRUCK DRIVER: OFF ROAD TRUCK.....\$ 35.56
18.12

ENGI0012-071 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: CRANE/DERRICK.....\$ 36.64
18.12

ENGI0012-072 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: EXCAVATOR/TRACKHOE
(GREATER THAN 1/2 CUBIC YARD).....\$ 36.64
18.12
POWER EQUIPMENT OPERATOR: EXCAVATOR/TRACKHOE (1/2

CUBIC YARD OR SMALLER)\$ 35.56

18.12

ENGI0012-073 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: GRADE CHECKER.....\$ 36.64

18.12

ENGI0012-074 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: MOTOR GRADER/BLADE.....\$ 36.64

18.12

ENGI0012-075 12/01/2024

Rates

Fringes

POWER EQUIPMENT OPERATOR: MECHANIC.....\$ 37.67

18.12

IRON0075-014 08/01/2025

Rates

Fringes

IRONWORKER.....\$ 33.00

19.91

LABO1184-016 06/01/2025

Rates

Fringes

POWER EQUIPMENT OPERATOR: HORIZONTAL DIRECTIONAL
DRILL.....\$ 31.98

9.26

LABO1184-017 06/01/2025

Rates

Fringes

LABORER: FENCE ERECTOR.....\$ 27.41

9.26

LABO1184-021 06/01/2025

	Rates
Fringes	
TRAFFIC CONTROL.....	\$ 27.41
9.26	

LABO1184-025 06/01/2025

	Rates
Fringes	
LABORER: ASPHALT, INCLUDES RAKER, SHOVELER, SPREADER AND DISTRIBUTOR.....	\$ 29.91
9.26	

LABO1184-027 06/01/2025

	Rates
Fringes	
LABORER: GRADE SETTER.....	\$ 29.91
9.26	

LABO1184-029 06/01/2025

	Rates
Fringes	
LABORER: GUARDRAIL INSTALLER.....	\$ 29.91
9.26	

LABO1184-033 06/01/2025

	Rates
Fringes	
POWER EQUIPMENT OPERATOR: TRENCHER.....	\$ 30.88
9.26	

LABO1184-044 06/01/2025

	Rates
Fringes	
POWER EQUIPMENT OPERATOR: FORKLIFT.....	\$ 30.88
9.26	

LABO1184-047 06/01/2025

	Rates
Fringes	
TRUCK DRIVER: CONCRETE.....	\$ 30.88
9.26	

LABO1184-049 06/01/2025

Rates

Fringes

TRUCK DRIVER: WATER.....\$ 30.88
9.26

LABO1184-051 06/01/2025

Rates

Fringes

GENERAL LABORERS.....\$ 27.41
9.26

SUAZ2023-022 11/19/2024

Rates

Fringes

TRUCK DRIVER: SWEEPER.....\$ 20.24
5.48
TRUCK DRIVER: OIL DISTRIBUTOR.....\$ 29.41
7.63
TRUCK DRIVER: DUMP.....\$ 26.71
7.09
POWER EQUIPMENT OPERATOR: SCRAPER.....\$ 29.69
0.00
POWER EQUIPMENT OPERATOR: PAVER/SPREADER/FINISH
EQUIPMENT (ASPHALT, AGGREGATE, & CONCRETE).....\$ 32.67
0.00
POWER EQUIPMENT OPERATOR: MILLING MACHINE.....\$ 31.16
0.00
POWER EQUIPMENT OPERATOR: DRILL RIG/AUGER.....\$ 36.80
13.07
POWER EQUIPMENT OPERATOR: CONCRETE SCREED.....\$ 26.41
7.64
POWER EQUIPMENT OPERATOR: CONCRETE PUMP TRUCK.....\$ 43.11
10.87
POWER EQUIPMENT OPERATOR: COMPACTOR/ROLLER.....\$ 30.24
0.00
POWER EQUIPMENT OPERATOR: BROOM/SWEEPER.....\$ 25.95
6.62
POWER EQUIPMENT OPERATOR: BOOM/Crane TRUCK.....\$ 43.11
10.87
POWER EQUIPMENT OPERATOR: BOBCAT/SKID STEER/SKID
LOADER.....\$ 29.91
9.11
PAINTER: SIGN AND DISPLAY ERECTOR.....\$ 18.03
0.00

PAINTER: PAVEMENT MARKING.....	\$ 23.35
6.34	
LABORER: PIPELAYER.....	\$ 25.97
7.09	
LABORER: MASON TENDER.....	\$ 25.92
7.09	
LABORER: LANDSCAPE LABORER.....	\$ 19.00
6.34	
LABORER: CONCRETE SAW (HAND HELD/WALK BEHIND).....	\$ 25.22
5.08	
ELECTRICIAN.....	\$ 29.00
7.58	
CEMENT MASON/CONCRETE FINISHER.....	\$ 30.41
0.00	
CARPENTER: FORMWORK CONCRETE.....	\$ 29.86
8.89	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to

Executive Order 13658, the contractor must pay all covered workers at least \$13.65 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract from May 11, 2026, through December 31, 2026. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than **❖SU❖**, **❖UAVG❖**, **❖SA❖**, or **❖SC❖** denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for

the classifications reflected union rates. EXAMPLE:
UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The **☐SU☐** identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

☐SU☐ wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The **☐SA☐** identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the **☐SA☐** identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

=====

END OF GENERAL DECISION



ARIZONA DEPARTMENT OF TRANSPORTATION
PROJECT DELIVERY AND OPERATIONS DIVISION
CONTRACTS AND SPECIFICATIONS GROUP

BID SCHEDULE

CONTRACT # 2026025

TRACS No.	Project No.	Item	County	District	Gross Length	Net Length	Prepared By:
0000 MA T0L T061901C	T0L-0-(200)T	104117	MARICOPA	CENTRAL	0		Patwary Mohammed

Highway Termini	Location	Work Description
• CITY OF TOLLESION	• Van Buren at 96th Ave Tolleson	• System Enhancement (Traffic Mgmt and Engineering)

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
2020020	REMOVAL OF CONCRETE CURB	L.FT.	78		
2020021	REMOVAL OF CONCRETE CURB AND GUTTER	L.FT.	138		
2020025	REMOVAL OF CONCRETE SIDEWALKS, DRIVEWAYS AND SLABS	SQ.FT.	659		
2020029	REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ.YD.	242		
2020053	REMOVE (WATER SERVICE LINE)	EACH	1		
2020054	REMOVE (BACKFLOW PREVENTER)	EACH	2		
2020057	REMOVE AND SALVAGE (EXISTING PEDESTRIAN CROSSING POST & PEDESTRIAN PUSH BUTTON)	EACH	2		
2020060	REMOVE AND SALVAGE (EXISTING RECTANGULAR RAPID FLASHING BEACON EQUIPMENT & POLE)	EACH	2		
2020065	REMOVAL OF TREES	EACH	2		
2020113	REMOVE AND SALVAGE (SIGN)	EACH	1		
2020156	REMOVE (WATER METER BOX AND COVER)	EACH	1		
2020169	REMOVE (CONCRETE VALLEY GUTTER & APRON)	SQ.FT.	569		
2020400	REMOVE AND RELOCATE (STREET LIGHT POLE AND MAST ARM)	EACH	1		
2030501	STRUCTURAL EXCAVATION	CU.YD.	47		

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
2030506	STRUCTURE BACKFILL	CU.YD.	28		
4010007	PORTLAND CEMENT CONCRETE PAVEMENT (7")	SQ.YD.	8		
4040156	SLURRY SEAL	SQ.YD.	552		
5011008	PIPE, REINFORCED CONCRETE, CLASS III, 15"	L.FT.	54		
5030366	CATCH BASIN, TYPE E, (MAG DET. 534-1 & 534-2)(COMBO INLET)	EACH	1		
5030371	CATCH BASIN, TYPE F, (MAG DET. 535)	EACH	1		
5030500	JUNCTION BOX	EACH	1		
6010003	STRUCTURAL CONCRETE (CLASS S) (F'C = 3,500)	CU.YD.	45		
6010005	STRUCTURAL CONCRETE (CLASS S) (F'C = 4,500)	CU.YD.	20		
6040001	STRUCTURAL STEEL	LB.	3,119		
6050002	REINFORCING STEEL	LB.	17,784		
6090048	DRILLED SHAFT FOUNDATION (48")	L.FT.	60		
7010005	MAINTENANCE AND PROTECTION OF TRAFFIC	L.SUM	1		
7015051	OBLITERATE PAVEMENT MARKING (ARROW, SYMBOL OR LEGEND)	EACH	3		

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
7015052	OBLITERATE PAVEMENT MARKING (STRIPE)	L.FT.	750		
7015091	SPECIALTY SIGNS	SQ.FT.	30		
7016050	TRUCK-MOUNTED ATTENUATOR	EACH-DAY	1		
7016067	CHANGEABLE MESSAGE BOARD (CONTRACTOR FURNISHED)	EACH-DAY	56		
7016079	FLAGGING SERVICES (UNIFORMED OFFICER)	HOUR	420		
7040005	PAVEMENT MARKING (WHITE EXTRUDED THERMOPLASTIC) (0.090")	L.FT.	210		
7040006	PAVEMENT MARKING (YELLOW EXTRUDED THERMOPLASTIC) (0.090")	L.FT.	150		
7040072	PAVEMENT MARKING (TRANSVERSE) (THERMOPLASTIC) (ALKYD) (0.090")	L.FT.	585		
7050023	PAVEMENT MARKING, PREFORMED, SINGLE ARROW, TYPE I	EACH	2		
7050026	PAVEMENT MARKING, PREFORMED, LEGEND (ONLY), TYPE I	EACH	1		
7080201	WATERBORNE-TYPE I PAVEMENT MARKING (PAINTED) (WHITE)	L.FT.	310		
7080202	WATERBORNE-TYPE I PAVEMENT MARKING (PAINTED) (YELLOW)	L.FT.	150		

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
7320050	ELECTRICAL CONDUIT (2") (PVC)	L.FT.	15		
7320060	ELECTRICAL CONDUIT (2 1/2") (PVC)	L.FT.	10		
7320290	ELECTRICAL CONDUIT	L.SUM	1		
7320291	ELECTRICAL CONDUIT (2-2") (PVC) (TRENCHED)	L.FT.	70		
7320292	ELECTRICAL CONDUIT (2-2") (RIGID METAL)	L.FT.	200		
7320298	ELECTRICAL CONDUIT (2-1" INNERDUCT)	L.FT.	120		
7320410	PULL BOX (NO. 5)	EACH	2		
7320450	PULL BOX (NO. 7) (COA STD DTL A1710)	EACH	1		
7320480	RELOCATE EXISTING PULL BOXES	L.SUM	1		
7320650	CONDUCTORS	L.SUM	1		
7340101	CONTROL CABINET (DMS)	EACH	1		
7360104	LUMINAIRE (INTERIOR LIGHTING)	EACH	10		
7360105	LUMINAIRE (ELEVATOR WALL PACKS)	EACH	4		
7360114	LUMINAIRE (STAIR LIGHTING)	EACH	4		
7360235	LOAD CENTER CABINET (400A SES AND METER MAIN)	EACH	1		

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
7370309	REMOVE AND RELOCATE (STOP SIGN)	EACH	1		
7370410	ELECTRICAL SYSTEM (PED BRIDGE LIGHTING DMX CONTROL)	L.SUM	1		
7370412	ELECTRICAL SYSTEM (COMMUNICATIONS SYSTEM)	L.SUM	1		
7370414	ELECTRICAL SYSTEM (SECURITY SYSTEM PROVISIONS)	L.SUM	1		
7370416	ELECTRICAL SYSTEM (FIRE ALARM SYSTEM)	L.SUM	1		
7370420	ELECTRICAL SYSTEM (LIGHTING CONTROLS)	L.SUM	1		
7370421	ELECTRICAL SYSTEM (INVERTER BATTERY BACKUP SYSTEM)	EACH	1		
7370423	ELECTRICAL SYSTEM (DISCONNECT SWITCH)	EACH	9		
7370424	ELECTRICAL SYSTEM (400A 480V 3-PHASE PANEL)	EACH	1		
7370425	ELECTRICAL SYSTEM (200A 480V 3-PHASE PANEL)	EACH	1		
7370426	ELECTRICAL SYSTEM (200A 120/208V 3-PHASE PANEL)	EACH	2		
7370430	TRANSFORMER (75KVA 480V-120/208V)	EACH	1		
7370431	TRANSFORMER (30KVA 480V-120/208V)	EACH	1		
7370452	MISCELLANEOUS ELECTRICAL (ELECTRICAL RECORD DRAWINGS)	L.SUM	1		

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
7370455	MISCELLANEOUS ELECTRICAL (PED BRIDGE LIGHTING)	L.SUM	1		
7370652	FIBER OPTIC EQUIPMENT (CELLULAR MODEM)	EACH	1		
8030104	DECOMPOSED GRANITE (2" THICK)	SQ.YD.	11		
8080028	BACKFLOW PREVENTION UNIT (MAG 611-1)	EACH	1		
8080627	RECONSTRUCT WATER SERVICE	EACH	1		
8080633	WATER METER (FOR 1" SERVICE)	EACH	1		
9010001	MOBILIZATION	L.SUM	1		
9080101	CONCRETE CURB AND GUTTER, TYPE A (MAG DET. 220-1)	L.FT.	138		
9080108	CONCRETE SINGLE CURB (MAG DET. 222)(TYPE A) (H=6")	L.FT.	75		
9080135	CONCRETE VALLEY GUTTER (MAG DET. 240)	SQ.FT.	583		
9080241	CONCRETE SIDEWALK (MAG DET. 230)	SQ.FT.	652		
9080297	CONCRETE SIDEWALK RAMP (MAG DET. 237-1)	SQ.FT.	577		
9130035	RIPRAP (D50=6", TH=1')	CU.YD.	3		
9240015	FORCE ACCOUNT WORK (PROVIDE ELECTRICAL SERVICES)	L.SUM	1	\$40,000.00	\$40,000.00

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
9240038	MISCELLANEOUS WORK (FULLY GROUTED CONCRETE MASONRY UNIT)	SQ.FT.	4,362		
9240050	MISCELLANEOUS WORK (STEEL TRUSS BRIDGE)	L.SUM	1		
9240051	MISCELLANEOUS WORK (AESTHETIC TOLLESON LETTERING)	L.SUM	1		
9240052	MISCELLANEOUS WORK (LANDSCAPE AND IRRIGATION RESTORATION)	L.SUM	1		
9240055	MISCELLANEOUS WORK (WALL AND ROOF FINISHES)	L.SUM	1		
9240056	MISCELLANEOUS WORK (DUCTWORK, GALVANIZED STEEL)	L.SUM	1		
9240117	MISCELLANEOUS WORK (1 1/2" X 20 GA COMPOSITE STEEL FLOOR DECK)	SQ.FT.	213		
9240118	MISCELLANEOUS WORK (1 1/2" x 20 GA STEEL ROOF DECK)	SQ.FT.	254		
9240119	MISCELLANEOUS WORK (INDOOR FAN COIL UNIT, DUCTED CONCEALED, 36MBH)	EACH	2		
9240120	MISCELLANEOUS WORK (INDOOR FAN COIL UNIT, DUCTLESS, 24 MBH)	EACH	3		
9240121	MISCELLANEOUS WORK (OUTDOOR HEAT PUMP, SINGLE ZONE, 36 MBH)	EACH	3		

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
9240122	MISCELLANEOUS WORK (GigE SWITCH)	EACH	1		
9240127	MISCELLANEOUS WORK (STEEL STAIRS)	EACH	2		
9240135	MISCELLANEOUS WORK (FIRE DAMPER, 2 HR, 30"X10")	EACH	2		
9240136	MISCELLANEOUS WORK (DMS, 24'-3" X 5'-4")	EACH	2		
9240139	MISCELLANEOUS WORK (MATCH EXISTING PAVEMENT SECTION)	SQ.YD.	242		
9240144	MISCELLANEOUS WORK (PEDESTRIAN FENCE)	L.FT.	43		
9240146	MISCELLANEOUS WORK (REFRIGERANT LINESET, W/ CLOSED CELL FOAM INSULATION AND ALUMINUM JACKET)	L.FT.	370		
9240147	MISCELLANEOUS WORK (CONDENSATE DRAIN, 3/4" TYPE L COPPER)	L.FT.	50		
9240149	MISCELLANEOUS WORK (PUMP DISCHARGE DRAIN, 2" SCH 40 PVC)	L.FT.	30		
9240171	MISCELLANEOUS WORK (ELEVATOR SUMP PUMP)	EACH	2		
9240172	MISCELLANEOUS WORK (ELEVATOR & MACHINE ROOM EQUIPMENT)	EACH	2		
9240173	MISCELLANEOUS WORK (OUTDOOR HEAT PUMP, MULTI ZONE, 36 MBH)	EACH	1		

BID SCHEDULE

0000 MA T0L T061901C

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
9240174	MISCELLANEOUS WORK (CONCRETE EQUIPMENT PAD)	EACH	3		
9240175	MISCELLANEOUS WORK (DOORS AND HARDWARE)	EACH	3		
9240176	MISCELLANEOUS WORK (FIRE DAMPER, 2 HR, 54"X8")	EACH	2		
9250001	CONSTRUCTION SURVEYING AND LAYOUT	L.SUM	1		

BID TOTAL :

PROPOSAL

TO THE ARIZONA DEPARTMENT OF TRANSPORTATION:

Gentlemen:

The following Proposal is made for constructing project

000 MA TOL T061901C TOL-0(200)T
CITY OF TOLLESON
(VAN BUREN AT 96TH AVE, TOLLESON)

in the State of Arizona.

The following Proposal is made on behalf of _____

_____ and no others.

(NAME OF COMPANY, FIRM, OR CORPORATION)

The undersigned hereby certifies that (s)he has been duly authorized to submit a proposal on behalf of the company, firm, or corporation mentioned above; and further certifies, pursuant to Subsection 112(c) of Title 23, United States Code and Title 44, Chapter 10, Article 1 of the Arizona Revised Statutes, that neither (s)he nor anyone associated with the company, firm, or corporation mentioned above has, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such project and furthermore that no member or employee of the Arizona Department of Transportation is personally or financially interested, directly or indirectly, in the Proposal, or in any purchase or sale of any materials or supplies for the work to which it relates, or in any portion of the profits thereof.

The undersigned certifies that the approved Plans, Standard Specifications, Special Provisions and forms of Contract and Bond authorized by the Arizona Department of Transportation and constituting essential parts of this proposal, have been carefully examined, and also that the site of the work has been personally inspected. The undersigned declares that the amount and nature of the work to be done is understood and that at no time will misunderstanding of the Plans, Specifications, Special Provisions, or conditions to be overcome, be plead. On the basis of Plans, Specifications, Special Provisions, and the forms of Contract and Bond proposed for use, the undersigned proposes to furnish all the necessary equipment, materials, machinery, tools, apparatus, and other means of construction, and labor to do all the work in the manner specified, and to accept, as full compensation therefor, the sum of the various products obtained by multiplying each unit price, herein bid for the work or materials, by the quantity thereof actually incorporated in the complete project, as determined by the State Engineer. The undersigned understands that the quantities mentioned herein are approximate only and are subject to increase or decrease and hereby proposes to perform all quantities of work as either increased or decreased, in accordance with the provisions of the Specifications, at the unit price bid in the Bidding Schedule.

The undersigned further proposes to perform all extra work that may be required on the basis provided in the Specifications and to give such work personal attention and to secure economical performance.

The undersigned further proposes to execute the Contract Agreement and furnish satisfactory Bond within ten calendar days from the date of Notice of Award, time being of the essence. The undersigned further proposes to begin work as specified in the contract attached hereto, and to complete the work on or before expiration of the contract time as defined in the Specifications, and maintain at all times a Payment Bond and a Performance Bond, approved by the State Engineer, in an amount equal to one hundred (100) percent of the total bid. These bonds shall serve not only to guarantee the completion of the work on the part of the undersigned, but also to guarantee the excellence of both workmanship and material and the payment of all obligations incurred, until the work is finally accepted and the provisions of the Plans, Standard Specifications and Special Provisions fulfilled.

12-5901 R03/11

Proposal
Sheet 1 of 2

The undersigned hereby agrees to provide an electronic Proposal Guaranty in the amount and character named in the Advertisement for Bids. The Proposal Guaranty is submitted as a guaranty of the good faith of the bidder, and that the bidder will enter into written contract, as provided, to do the work, if successful in securing the award thereof, and it is hereby agreed that if at any time other than as provided in the Proposal there should be failure on the part of the undersigned to execute the Contract and furnish satisfactory Bond as herein provided, the State of Arizona, in either of such events, shall be entitled and is hereby given the right to retain the said Proposal Guaranty as liquidated damages.

If by a Corporation:

(Seal)

Corporate Name: _____

Corporate Mailing Address: _____ Zip Code: _____

Incorporated under the laws of the State of: _____

By (Signature): _____ Date: _____

President: _____

Secretary: _____

Treasurer: _____

If by a Firm or Partnership:

Firm or Partnership Mailing Name: _____

Firm or Partnership Address: _____

By (Signature): _____ Date: _____

Name and Address of Each Member: _____

If by an Individual:

Signature: _____ Date: _____

Mailing Address: _____

ARIZONA DEPARTMENT OF TRANSPORTATION
SURETY (BID) BOND
(Penalty of this bond must not be less than 10% of the bid amount)

KNOW ALL MEN BY THESE PRESENTS, THAT _____

as Principal, hereinafter called the Principal, and _____

a corporation duly organized under the laws of the state of _____
hereinafter called the Surety, holding a certificate of authority to transact surety business in this State issued by the Director of the Department of Insurance, are held and firmly bound unto the Arizona Department of Transportation, as Obligee, hereinafter called the Obligee, in the sum of Ten Percent (10%) of the amount of the bid of Principal, submitted by Principal to the Arizona Department of Transportation 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.

WHEREAS, the Principal is herewith submitting its proposal for TRACS/Project No.

000 MA TOL T061901C TOL-0(200)T
CITY OF TOLLESON
(VAN BUREN AT 96TH AVE, TOLLESON)

NOW THEREFORE, if the Obligee, acting by and through its Transportation board, shall accept the proposal of the Principal and the Principal shall enter into contract with the Obligee in accordance with the terms of such proposal, and give such bonds and certificates of insurance as may be specified in the contract documents 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 Obligee 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 is void. Otherwise it remains in full force and effect.

IN WITNESS WHEREOF, we hereunto set our hands and seals:

Principal

Surety

By

By Attorney-in-Fact

Title

Address Attorney-in-Fact

Subscribed and sworn before me
this _____ day of _____, 20 _____.

My Commission expires: _____

**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 it 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 it 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.

000 MA TOL T061901C TOL-0(200)T
CITY OF TOLLESON
(VAN BUREN AT 96TH AVE, TOLLESON)

R7/03

**CERTIFICATION WITH RESPECT TO THE
RECEIPT OF ADDENDA**

In the submission of a bid and by the signing of the Proposal, this will certify that the following numbered addenda issued on this project have been brought to my personal attention and furthermore that I understand and agree that those will be made a part of the Contract.

Addendum No. _____, _____, _____, _____, _____

PRINT NAME OF CONTRACTOR

SIGNATURE

TITLE

DATE

000 MA TOL T061901C TOL-0(200)T
CITY OF TOLLESON
(VAN BUREN AT 96TH AVE, TOLLESON)

**ARIZONA DEPARTMENT OF TRANSPORTATION
PARTICIPATION IN BOYCOTT OF ISRAEL CERTIFICATION FORM**

Unless and until the District Court's injunction in Jordahl is stayed or lifted, the Anti-Israel Boycott Provision (A.R.S. § 35-393.01(A)) is unenforceable and the State will take no action to enforce it. This attachment (Participation in Boycott of Israel) is no longer a mandatory part of the offer. Offers will not be evaluated based on whether this certification has been completed.

000 MA TOL T061901C TOL-0(200)T
CITY OF TOLLESON
(VAN BUREN AT 96TH AVE, TOLLESON)

This Certification is required in response to legislation enacted to prohibit the State from contracting with companies currently engaged in a boycott of Israel. To ensure compliance with A.R.S. §35-393.01, this form must be completed and returned with the bid. The bidder understands that this response will become public record and may be subject to public inspection.

As defined by A.R.S. §35-393.01:

1. "Boycott" means engaging in a refusal to deal, terminating business activities or performing other actions that are intended to limit commercial relations with Israel or with persons or entities doing business in Israel or in territories controlled by Israel, if those actions are taken either:
 - (a) In compliance with or adherence to calls for a boycott of Israel other than those boycotts to which 50 United States Code section 4607(c) applies.
 - (b) In a manner that discriminates on the basis of nationality, national origin or religion and that is not based on a valid business reason.
2. "Company" means a sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, Limited Liability Company or other entity or business association, and includes a wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate.
3. "Direct holdings" means all publicly traded securities of a company that are held directly by the state treasurer or a retirement system in an actively managed account or fund in which the retirement system owns all shares or interests.
4. "Indirect holdings" means all securities of a company that are held in an account or fund, including a mutual fund, that is managed by one or more persons who are not employed by the state treasurer or a retirement system, if the state treasurer or retirement system owns shares or interests either:
 - (a) Together with other investors that are not subject to this section.
 - (b) That are held in an index fund.
5. "Public entity" means this State, a political subdivision of this STATE or an agency, board, commission or department of this state or a political subdivision of this state.
6. "Public fund" means the state treasurer or a retirement system.
7. "Restricted companies" means companies that boycott Israel.
8. "Retirement system" means a retirement plan or system that is established by or pursuant to title 38.

All Bidders must select one of the following:

_____ **The bidder does not participate in, and agrees not to participate in during the term of the contract a boycott of Israel in accordance with A.R.S. §35-393.01.**

_____ **The bidder does participate in a boycott of Israel as defined by A.R.S. §35-393.01.**

By submitting this response, the bidder agrees to indemnify and hold the State, its agents and employees, harmless from any claims or causes of action relating to the State's action based upon reliance on the above representations, including the payment of all costs and attorney fees incurred by the State in defending such an action.

_____ Company Name	_____ Signature of Person Authorized to Sign
_____ Address	_____ Printed Name
_____ City State Zip	_____ Title

ARIZONA DEPARTMENT OF TRANSPORTATION
Forced Labor of Ethnic Uyghurs Ban Certification Form

Forced Labor of Ethnic Uyghurs Ban

Please note that if any of the following apply to the Contractor, then the bidder shall select the "Exempt Contractor" option below:

- Contractor is a sole proprietorship;
- Contractor has fewer than ten (10) employees; OR
- Contractor is a non-profit organization.

000 MA TOL T061901C TOL-0(200)T
CITY OF TOLLESON
(VAN BUREN AT 96TH AVE, TOLLESON)

Pursuant to A.R.S. § 35-394, written certification is required to show that the company entering into a contract with a public entity does not use the forced labor, or use 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.

Under A.R.S. §35-394:

1. "Company" means an organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, limited liability company or other entity or business association, including a wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate, that engages in for-profit activity and that has ten or more full-time employees.
2. "Public entity" means this State, a political subdivision of this State or an agency, board, commission or department of this State or a political subdivision of this State.

In compliance with A.R.S. §§ 35-394 et seq., all bidders must select one of the following:

☐	The bidder <u>does not</u> use, and agrees not to use during the term of the contract, any of the following: • Forced labor of ethnic Uyghurs in the People's Republic of China; • Any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China; or • 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.
☐	The bidder <u>does</u> participate in use of Forced Uyghurs Labor as described in A.R.S. § 35-394.
☐	Exempt Contractor. Select all statements that applies to this Contractor: ☐ Contractor is a sole proprietorship; ☐ Contractor has fewer than ten (10) employees; and/or ☐ Contractor is a non-profit organization.

Company Name

Signature of Person Authorized to Sign

Address

Printed Name

City State Zip

Title