

# POWER ROAD IMPROVEMENTS

## Riggs Road to Chandler Heights Road

### PROJECT NO. A1405



PREPARED BY:  
Stantec Consulting Services Inc.

October 3, 2025



## FINAL TECHNICAL SPECIFICATIONS

## SPECIAL PROVISIONS

IFB No. 24-\_\_

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## **PART 100 – GENERAL CONDITIONS**

The "Uniform Standard Specifications for Public Works Construction" which are sponsored and distributed by the Maricopa Association of Governments (MAG), and which are hereinafter referred to as the "MAG Standard Specifications," are hereby adopted and a part of these contract documents. Copies of these documents, with revisions, may be obtained at the Maricopa Association of Governments, 302 North 1st Avenue, Phoenix, AZ, 85003 and on the internet at <https://www.azmag.gov/Programs/Public-Works/Specifications-and-Details>. The current version at the time of bidding and updates/revisions will be utilized.

Portions of the current Town of Queen Creek Design Standards and Procedures Manual are adopted as part of these contract documents. Copies of these documents are available at: [Design Standards & Procedures Manual | Queen Creek, AZ](#).

Portions of the current Town of Queen Creek Traffic Engineering Standards and Details are adopted as part of these contract documents. Copies of these documents are available at [Traffic Engineering Standards and Details | Queen Creek, AZ](#).

Portions of the current Town of Queen Creek Street Light Design Guidelines and Standards Details are adopted as part of these contract documents.

Portions of the Town of Queen Creek Right of Way Construction Inspection Requirements are adopted as part of these contract documents. Copies of these documents available on the internet at [Engineering Inspections | Queen Creek, AZ](#).

Portions of the current Maricopa County Department of Transportation Supplement to the MAG Standard Specifications are also adopted as part of these contract documents. Copies of these documents may be obtained at:

Maricopa County Department of Transportation  
2901 W. Durango Street  
Phoenix, AZ 85009  
Telephone (602) 506-8600  
<http://www.mcdot.maricopa.gov>

Portions of the current Arizona Department of Transportation (ADOT) Standard Specifications for Road and Bridge Construction are also adopted as part of these contract documents. Copies of these documents may be obtained online at [Specifications & Pay Items List | Department of Transportation](#)

## **SECTION 101 – ABBREVIATIONS AND DEFINITIONS**

### **101.2 Definitions and Terms**

The following additions are made to definitions in Section 101.2 of the MAG Standard Specifications:

Contracting Agency: Town of Queen Creek, Arizona  
Consulting Engineer: Stantec Consulting Services Inc.  
Engineer: Town of Queen Creek designee or Project Manager  
Inspector: Town of Queen Creek designee  
Owner: Town of Queen Creek, Arizona

## **SECTION 104 – SCOPE OF WORK**

### **104.1 Work to be Done**

Section 104.1 of the MAG Standard Specifications is modified to add:

#### **CIP No. A1405**

Town of Queen Creek Capital Improvement Project (CIP) No. A1405 will widen Power Road from an existing 2-lane section (1 lane in each direction) to a 5-lane section (2 lanes in each direction plus a two-way left turn lane) between Riggs Road to just south of Chandler Heights Road. In addition to adding vehicle lanes, the A1405 improvement includes the addition of bike lanes, curb and gutter, street lighting, and drainage improvements. The widening project will include a 6' sidewalk on the east side. A new traffic signal will be installed at Cloud Road. Traffic signal modifications at Power Road and Ivy Lane will be modified to account for the widened roadway. The A1405 project will also include the installation of landscaping and irrigation along the east side of Power Road between Riggs Road and Chandler Heights Road.

The corridor traverses through a low density rural residential area and contains a few yard gates fronting Power Road on the west side of the road. On the east side of Power Road, there is a mix of low density residential, undeveloped land, a church, and Casteel High School.

Drainage facility modifications along the corridor have also been designed to capture the required storm events for the roadway improvements. The roadway drainage improvements are implemented using catch basins and scuppers which outlet to the existing drainage channel on the east side of the road. A new 2-barrel concrete box culvert will be constructed under Cloud Road to convey the existing storm water in the drainage ditch east of Power Road.

#### **104.1.1 General**

Section 104.1.1 of the MAG Standard Specifications is modified to add the following:

The work shall be as described in the specifications, as shown on the project plans, and in compliance with permit requirements.

The work shall conform to the Town of Queen Creek Design Standards and Procedures Manual, MAG Standard Specifications, latest edition, and other referenced specifications and special provisions. Any section or sub-section of any Standard Specification included within these Contract Documents by reference only is understood to be made part of these Contract Documents. The CONTRACTOR shall have at least one copy of all referenced standard specifications and details at the job site at all times.

Standard Drawings and the manuals referenced in the project contract documents shall be required for construction of this project, insofar as applicable for any work to be performed within the public right-of-way and within the Town jurisdictional limits.

- Town of Queen Creek Design and Procedures Manual
- Design and Construction Standards Manual for Water, Sewer and Irrigation Systems for

Town of Queen Creek, dated 12/11/2013.

- Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, with latest revisions.
- Town of Queen Creek Engineering Standards and Details

All work mentioned or indicated within the Contract Documents shall be performed by the CONTRACTOR as part of this Contract unless it is specifically indicated in the Contract Documents that such construction is to be excluded or modified.

#### **104.1.6 Pre-Construction Video**

CONTRACTOR shall record and provide a copy of a pre-construction video along the project to the Town of Queen Creek prior to commencing work and retain a copy for their records. At a minimum, this video shall show the existing condition of the roads and surrounding features and improvements within the project limits, condition of landscaping and fences in close proximity of the work, and similar physical condition features and include a soundtrack to assist in identification of location and features.

It is not envisioned that the required video quality, sufficient to extract still images of acceptable quality if required, can be achieved by filming from a moving vehicle. Filming of the pre-construction video should be carried out on foot unless circumstances preclude this and the mode of filming is pre-agreed with the CIP Inspector. The Town reserves the right to reject the pre-construction video and require filming to be repeated before commencement of work on site if the video is found to be unacceptable.

The video shall be supplied to the Town on DVD disc or Thumb Drive in .wmv, flv, .mp4 or .mpg format. There will be no separate payment for this video as it is considered incidental to the CONTRACTOR'S mobilization.

#### **104.2 Alteration of Work**

Section 104.2 of the MAG Standard Specifications is modified to add the following:

##### **104.2.4.1 Re-use of Existing Materials by the Contractor**

Where specifically called for in the approved plans, specifications or by the Town, certain existing materials may be re-used by the CONTRACTOR. Otherwise, if the CONTRACTOR proposes to re-use existing materials, with or without either material repair, rejuvenation, processing, or blending with new materials to meet the required specification; or without CONTRACTOR's verification of the available material quantity proposed for re-use from their own investigation or exploration, such proposal shall be deemed a Value Engineering Proposal (VEP) and shall be treated as such in accordance with Section 104.2.6 of these Special Provisions. An affirmative answer to a bidder's question regarding the possible re-use of any materials other than those specifically indicated as such within the construction documents shall be considered an answer that such a proposal will be considered by the Town if so submitted by bidder or CONTRACTOR with documentation of available quantities but is not an affirmative answer that such a proposal is approved and the bid can be based upon such proposal.

##### **104.2.6 Value Engineering Proposals by the Contractor**

Proposals may be submitted to the Engineer for modifying the plans, specifications, or other requirements of the contract for the sole purpose of reducing the total costs of construction without impairing in any manner the essential functions or characteristics of the project, including service life, economy of operations, ease of maintenance, benefits to traveling public, desired appearance or design and safety standards.

After execution of the contract, an initiative may be recommended by the Contractor. The initiative must be identified as a Value Engineering Proposal (VEP), and may include

modifications to the plans or specifications, construction phasing procedures, or other contract requirements.

Any cost savings generated to the contract as a result of the VEP offered by the Contractor and approved by the Town will be shared equally between the Contractor and the Town.

Bid prices are not to be based on the anticipated approval of a VEP. The unit bid price for all such work shall be deemed to be based on the engineered plans' and specifications' specified materials and labor including incidentals. Such materials shall be considered to be furnished new, previously unused and as specified in accordance with the project specifications unless otherwise noted in the plans or specifications. If a VEP is rejected, the contract work shall be completed in accordance with the original terms of the contract documents. Substitutions based upon re-use of materials are not to be used for bidding purposes unless otherwise specifically stated as allowed by the Engineer or Town. Any risk associated with bid prices based on an unapproved VEP contrary to these provisions is solely the bidder's / CONTRACTOR's risk.

Any decision whether to approve or accept a VEP shall be within the sole discretion of the Town. The Town will bear no liability for any delay in considering a VEP, the refusal to accept or approve such a proposal, or any other matter connected with a VEP.

## **SECTION 105 – CONTROL OF WORK**

### **105.2 Plans and Shop Drawings**

Section 105.2 of the MAG Standard Specifications is modified to add:

All project materials and equipment not provided by Town of Queen Creek shall be reviewed by the Town or Engineer prior to purchase and installation. Any work in which materials or equipment not previously reviewed by the Engineer are used shall be performed at the CONTRACTOR'S risk and may be considered as unauthorized and unacceptable and are not subject to the payment provisions of the contract. Such materials or equipment may be subject to removal at the discretion of the Town.

Before ordering or installing any material or equipment, the CONTRACTOR shall submit two (2) printed copies or one electronic copy of each proposed material and/or equipment package, including shop drawings, manufacturer's details or drawings, material and performance information and specification compliance to the Town for review by the Town and / or Engineer. To be acceptable, the submittal package shall be complete and contain all items supplied on the project by the CONTRACTOR, including pre-approved items. The Town of Queen Creek reserves the right to reject an incomplete or unclear material submittal. All items shall be identified by manufacturer's part number, model, specification or other pertinent catalogue information. The materials from any catalog cuts shall be clearly indicated by the CONTRACTOR. One (1) reviewed copy will be returned to the Contractor for further action.

All equipment or material specified or shown on signal plans, or other drawings, by brand name, part number, or model number is intended to be descriptive of the type, required features, and quality of material or equipment desired. Another equal brand name, part number, or model number may be substituted so long as it is in accordance with these specifications and is equal in form, fit, function, performance, reliability, and is approved by the Engineer prior to utilization.

### **105.5 Cooperation of Contractor**

The first paragraph shall be replaced with the following two paragraphs:

The CONTRACTOR shall be furnished with the approved plans and contract book containing the specifications and special provisions in an electronic publishing file format (.pdf). The CONTRACTOR shall reproduce and furnish to their subcontractor(s) and crews the appropriate

number of plan sets and contract books to allow successful execution of the project. The CONTRACTOR and all subcontractors personnel shall have available on site at least one set of plans, referenced standard specifications and detail, and special provisions at all times when performing work. This task is not a separate pay item and shall be considered incidental to the project work. The contractor and all subcontractors shall produce such documents when requested on-site by the Town inspector or project management staff.

The CONTRACTOR shall plan to conduct and attend weekly project progress update meetings throughout the duration of the project. These meetings shall be held at the Town offices and a meeting room will be furnished free of charge. The attendees shall include the CONTRACTOR'S Project Manager or Engineer, Project Superintendent, any Subcontractor's representative whose attendance may be important and add to the discussion that is expected to occur at the meeting, the Town's Project Manager, the Town's Inspector, the Town's Traffic Engineering representative, the Town's Public Outreach representative, and other Town staff or consultants as may be desirable due to the expected content of the meeting. The CONTRACTOR shall prepare and furnish an agenda and follow-up summary meeting notes reporting on the actions and discussion occurring at the meeting by agenda item. The agenda shall include at a minimum discussion of schedule and upcoming three week look-ahead work forecast; traffic control issues and needs; specific upcoming work tasks that may need coordination or discussion; dust and erosion control measures performance and adequacy; specific issues that arose during the previous week that required discussion, action, and/or resolution; outstanding past issues; contractual issues that have arisen or are outstanding; utility coordination issues that may exist; and public outreach needs and updates. Additional agenda items may be added or removed as the project and project progress dictates. These meetings and related administrative efforts are not a separate pay item and shall be considered incidental to the project work. A format for such agendas and meeting notes can be furnished if desired and so requested.

The CONTRACTOR will furnish a record of the weekly meetings to the attendees within two working days.

#### **105.5.1 Special Construction and Schedule Considerations**

Add the following subsection:

The CONTRACTOR is expected to perform certain portions of work at a time and in a manner that minimizes service interruption. The CONTRACTOR shall work closely with the Town Utilities Department and Town Project Manager to develop a plan for work execution that minimizes service interruptions during operation hours, weekends or nights when the businesses are open. Work that interrupts electrical, sewer or water service shall be performed in a manner that allows the respective service to be restored as rapidly as possible and interrupts service for no longer than 8 hours. A work plan shall be presented for concurrence to the Town Project Manager and affected Town staff at the CONTRACTOR's earliest convenience but no later than at least ten (10) working days prior to actual work efforts in area. Adequate work planning to coordinate required operations, inspections, installation progress and completion testing shall be performed.

Road closures, driveway closures, and interruptions to water service, sewer service, electrical service, trash pickup, mail and shipping services, and other work will be an inconvenience to businesses, residents, customers, and suppliers, and shall be avoided. The CONTRACTOR is expected to perform certain portions of work at a time and in a manner that avoids and/or minimizes service interruption. If any closures or services interruptions are required by the CONTRACTOR, a work plan shall be submitted to the Town Project Manager for prior approval at the CONTRACTOR's earliest convenience but no later than ten (10) working days prior to the



actual work efforts in the area. Adequate work planning to coordinate required operations, inspections, installation progress and completion testing shall be performed. Approval of any closures and service interruptions will be at the sole discretion of the Town Project Manager.

The existing road between approximately 179+50 and 191+50 is 2-lane only, total width approximately 24 feet. Construction of the required road width will require careful thought around sequencing and schedule. The Town has assumed that the contractor will elect to construct one or both outside lanes before reconstructing the center piece. If this, or an alternative means and method approach by the Contractor, requires the addition of any temporary running surface to accommodate road traffic during construction, then the Contractor shall build this into rates for pavement works. The Town prefers the CONTRACTOR to phase the work focusing construction of the east side of Power Road first.

The CONTRACTOR will be reimbursed under a separate pay item for the one-time cost of providing the temporary paving necessary to extend the existing roadway to the west. This paving will facilitate a two-lane traffic shift, giving the CONTRACTOR possession of the east side of Power Road for construction activities.

The CONTRACTOR shall comply with all restrictions governing the use of vehicles and mechanical equipment adjacent to the STID pipeline.

Maintenance of the temporary pavement shall be included in the pay item rate.

Any additional requirements for temporary pavement will be deemed incidental to the work and will not be separately measured or reimbursed.

The construction of the box culvert under Cloud Road will require coordination with the Town's traffic engineer. The Contractor shall provide a minimum of 1-lane total (one-way) during all times and provide traffic control signage for any detours required.

Unrestricted access to Casteel High School shall be maintained at all times. Storm drain and any other open-cut crossings of Power Road can only be performed outside of Casteel High School operating hours.

Unrestricted access to Rock Point Church shall be maintained at all times.

Unrestricted access to Basher's Retail Complex shall be maintained at all times.

Adequate pre-warning and traffic control devices shall be used to clearly mark any partial roadway closures. Adequate safety offsets, barriers and shoring shall be used to permit traffic to pass near the construction work areas.

#### **105.6 Cooperation with Utilities**

Section 105.6 of the MAG Standard Specifications is modified to add:

Contractor is advised that the location, number, and type of utilities shown on the plans are based on information made available by public utilities owners and users at the time the plans were prepared. Underground utilities may be present on this project which were not disclosed to the Engineer. No representation is made that the utility locations indicated on these plans are accurate, complete, or exclusive. It shall be the Contractor's responsibility to field verify all utility locations and to coordinate in a timely manner with the pertinent utility companies so that any obstructing utility installation may be adjusted without delay to the Contractor's project schedule. In addition, the Town will not consider additional compensation requests from the Contractor to perform any potholing, utility company coordination, etc. needed to locate or verify utility location, to adjust contract work items as necessary to avoid utility line conflict, to cooperate with utilities in adjusting schedule as needed to allow for utility company work, relocations etc. The Contractor's bid shall include the above coordination, work, and adjustments.

### **105.7 Cooperation Between Contractors**

Section 105.7 of the MAG Standard Specifications is modified to add:

The CONTRACTOR is advised that there may be construction activity adjacent to and within the project site.

The CONTRACTOR is to coordinate the work to accommodate the construction activities.

The CONTRACTOR shall contact the Town to verify all projects in the vicinity of this project.

The CONTRACTOR is advised that it shall schedule and coordinate all work activities so as not to adversely conflict with this work.

#### **CenturyLink:**

CONTRACTOR will be required to coordinate with CenturyLink during construction.

CenturyLink has existing underground facilities along the project. CenturyLink will relocate the facilities that conflict with the improvements.

CenturyLink Contact:

Ms. Tosha Fries

(480) 735-8362

Email: tfries@terratechllc.net

#### **Cox Communication:**

CONTRACTOR will be required to coordinate with Cox Communication during construction.

Cox Communication has existing underground along the project. Cox Communication will relocate the facilities that are in conflict with the improvements.

Cox Communications Contact:

Jeff Krause

(623) 328-2202

Email: jeff.krause@cox.com

#### **San Tan Irrigation District (STID):**

CONTRACTOR will be required to coordinate with STID during construction. There is an existing irrigation line running north/south along the west side of Power Road and lines running to wells at Riggs Road and Cloud Road. There are also irrigation service delivery valves serving properties on the west side of Power Road for flood irrigation.

CONTRACTOR shall physically locate the existing irrigation line and shall not run vehicles or mechanical equipment within 5 feet zone of the running centerline. All work within 5 feet of the centerline shall be completed using hand methods or methods approved by the Town. Line breakage caused by construction shall be replaced by the CONTRACTOR at no additional cost to the Town. Construction fencing or temporary barrier shall be placed at 5 feet on both sides of the STID line except at existing crossing roadways or driveways.

The A1405 Project has work within 5 feet of the irrigation line at the Power Road intersections of Ivy and Cloud including the installation of sidewalk ramps. Locations along the project may include fill slopes within the 5 foot zone.

San Tan Irrigation District Contact:

Todd Angle

(480) 988-3385

Email: todd@santanid.com

**Southwest Gas:**

CONTRACTOR will be required to coordinate with Southwest Gas during construction. Southwest Gas has existing facilities along Power Road along the east side. Southwest Gas will be lowering facilities at some Storm Drain crossing points. The CONTRACTOR shall evaluate the Southwest Gas relocation plans for coordination and phasing.

Southwest Gas Contact:

Mr. Gene Florez

(480) 730-3841

Email:gene.florez@swgas.com

**SRP Distribution and Transmission:**

CONTRACTOR will be required to coordinate with SRP Distribution during construction. SRP Distribution has existing underground power crossing Power Road at Cloud Road. SRP will be installing power for street lights along the project. The CONTRACTOR shall coordinate with SRP when excavation occurs near underground power for the concrete box culvert. The CONTRACTOR shall coordinate with SRP for the required work to be completed by the CONTRACTOR. Trenching, conduits, racks, sweeps, pull tape, equipment pads will be by the CONTRACTOR.

SRP Distribution Contact:

Wendy LeSueur

(602) 236-8230

Email: wendy.lesueur@srpnet.com

**Town of Queen Creek Utility Department Contact:**

Mr. Mike Huber, PE

Utilities Engineering Manager

Email: mike.huber@queencreek.org

**Rancho Jardines Irrigation District**

CONTRACTOR will be required to coordinate with Rancho Jardines during construction.

Rancho Jardines has existing irrigation facilities on properties along Power Road along the east side, north of Cloud Road.

Jim Millspaugh

(480) 570-2643

**105.8 Construction Stakes, Lines and Grades**

Section 105.8, Construction Stakes, Lines and Grades is deleted and replaced by the following:

**General:** The CONTRACTOR shall furnish all materials, personnel, and equipment necessary to perform all surveying, staking, laying out of control lines and verifications of the accuracy of all existing control points which are delineated in the Contract Documents. The work shall be done under the direction of a Registered Land Surveyor licensed to practice in the State of Arizona.

**Staking Outline:** Prior to beginning any survey operations, the CONTRACTOR shall furnish to the Town of Queen Creek Project Manager, for approval, a written outline detailing the method of staking, interval of stakes, marking of stakes, grade control for various courses of materials, referencing, structure control, 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.

**Field Books:** The CONTRACTOR shall furnish field books to be used for recording survey data and field notes. These books shall be available for inspection by the Town at any time and shall become the property of the Town upon completion of the work.

**Survey Control Verification:** The CONTRACTOR shall be responsible to stake construction elevations tied to the primary bench mark.

- A. Control Points (horizontal and vertical) – The existence and location of all survey monuments, bench marks and control points shall be verified prior to demolition or construction activity. Immediately notify the Town of Queen Creek Project Manager when location discrepancies greater than two-hundredths (0.02) foot horizontal or one-hundredth (0.01) foot vertical are found. All datum shall be Town of Queen Creek. Control benchmarks may be disturbed by the construction performed. The CONTRACTOR's surveyor shall provide adequate temporary benchmarks to re-establish control benchmarks that are disturbed or destroyed.
- B. Control Lines – Construction control lines with grade breaks, transition points, horizontal and vertical curves, etc., shall be established and referenced prior to construction.
- C. Temporary Benchmarks – Temporary benchmarks shall be established and referenced.

**Pre-Construction Location Survey:** All existing features which are located prior to construction shall be referenced to survey monuments along control lines by stationing in accordance with the construction documents and by offset distance from the control lines. All features shall be relocatable after construction. Distances measured shall be within one-hundredth (0.01) foot.

- A. Survey monuments – All survey monuments that lie within the construction area that may be disturbed shall be referenced to a specific point on at least four (4) stable objects by distance measurement. Reference objects shall be located no greater than three-hundred (300) feet from the survey monument being referenced.
- B. Water and Sewer line appurtenances – Water and sewer line surface appurtenances such as manholes, valves and cleanouts that lie within the construction area shall be located and noted on the Contractor's approved construction documents prior to any demolition or excavation.
- C. Match Points and Removals – Verify the location (horizontal and vertical) of existing facilities to which the project connects. Immediately notify the Town of Queen Creek Project manager when location discrepancies of connecting facilities greater than one-tenth (0.10) foot horizontal or two-hundredths (0.02) foot vertical are found.

**Construction Stakes:** The Contractor shall set construction stakes and marks establishing lines and grades for road work, curbs, gutters, path, structures, buildings, centerlines for utilities and necessary appurtenances and other work as indicated in the Contract Documents and shall be responsible for their conformance with the plans and specifications.

The stakes shall be established in accordance with the following guidelines which represent the minimum standard and the CONTRACTOR shall provide additional stakes and controls necessary to perform the work. The CONTRACTOR shall be held responsible for the preservation of all stakes and marks and will replace, at no additional cost to the Town; any construction stakes or marks which have been carelessly or willfully destroyed by acts of nature or other parties.

**A. Curbs, Curb and Gutter, Valley Gutter**

- 1. Curb and gutter shall be staked and installed prior to sidewalk, driveway and corner ramp construction.
- 2. Cut/fill stakes for rough grade shall be set at one hundred (100) feet intervals with cuts to the top of curb.

3. Finish grade stakes shall be set to curb grade at twenty-five (25) feet intervals, at grade brakes, angle points, transitions, returns, driveways, alley entrances, sidewalk ramps and other curb control points. The stakes shall be tacked for line on a 2-foot offset to the back of curb.
4. Face of curb forms shall be checked for grade at flow line prior to placing concrete where longitudinal grades are two-tenth percent (0.20%) or less.
5. Face of curb forms shall be checked for grade at gutter line prior to placing concrete for transitions at 30-foot intervals.
6. Valley gutter stakes shall be set offset five (5) feet from the centerline of the valley gutter at twenty-five (25) feet intervals, marked with cuts to the flowline of the valley gutter.

**B. Storm Sewer and Drainage**

All cuts will be to the invert of the pipe, given to the nearest one-hundredth (0.01) of a foot.

1. Stakes for storm sewer will be driven flush with the existing ground, set on an offset at fifty (50) feet intervals. Stakes will be marked with the offset and indicated cut.
2. Wyes for laterals will be marked with a line only stake.
3. Manholes shall be marked with the offset and indicated cut on top of manhole grade and inverts.
4. Stakes for storm water inlets, two (2) per inlet, will be set on a line normal to the roadway at the center line of the inlet five (5) and ten (10) feet from the face of curb. The stakes will be marked with the offset to the face of curb and the cut or fill on the top of curb and inverts.
5. Cut sheets shall be supplied to the Contractor and Town of Queen Creek Inspector.
6. Stakes for drainage ditch shall be set at fifty (50) feet intervals.

**C. Roadway**

Subgrade stakes shall be set to subgrade elevation at fifty (50) feet intervals on straight sections, twenty-five (25) feet intervals through vertical curves, on horizontal curves with radius of six-hundred (600) feet, or less, and/or slopes of less than four-tenths of one percent (0.4%) and the beginning and end of horizontal and vertical curves and grade breaks. Stakes shall be set at crown lines, at grade break lines and at edges of pavement which do not abut concrete curb and gutter or at the edge of pavement abutting vertical curbs or other structures whose surface grade will not be flush with the finished pavement grade. Quarter lines will be staked where the distance between the crown line stakes and the curb and gutter face exceeds twenty (20) feet. Select shall be staked the same as sub grade.

ABC stakes shall be set to ABC elevation at thirty-three (33) feet intervals on straight sections, twenty-five (25) feet intervals through vertical curves, on horizontal curves with radius of six-hundred (600) feet, or less, and/or slopes of less than four-tenths of one percent (0.4%) and the beginning and end of horizontal and vertical curves and grade breaks. Stakes shall be set at crown lines, at grade breaks and at edges of pavement which do not abut concrete curb and gutter or at the edge of pavement abutting vertical curbs or other structures whose surface grade will not be flush with the finished pavement grade. Quarter lines will be staked where the distance between the crown line stakes and the curb and gutter face exceeds twenty (20) feet.

Pavement edges shall be controlled by utilizing a wire control mechanism or screeding along a concrete gutter or other structure whose surface grade is flush with the finished pavement grade. Stakes shall be set to finished elevation at thirty-three (33) feet intervals on straight sections, twenty-five (25) feet intervals on curves with radius of six-hundred (600) feet, or less, and/or slopes of less than four-tenths of one percent (0.4%) and the beginning

and end of horizontal and vertical curves and grade breaks.

**D. Sidewalks**

Stakes are not required for sidewalks five (5) feet or less in width which are adjoining existing curb and gutter.

Sidewalk stakes shall be set to grade on an offset and tacked for line at twenty-five (25) feet intervals at the beginning and end of horizontal and vertical curves and grade breaks.

Where sidewalk grade and elevation differs from adjacent curb grade, sidewalk shall be staked at all grade breaks and elevation control points provided.

**E. Traffic Signing and Pavement Markings**

The CONTRACTOR shall delineate the procedures and controls to be utilized in the Staking Outline.

**F. Landscaping**

The CONTRACTOR shall delineate the procedures and controls to be utilized in the Staking Outline.

**Re-establishment Survey:**

Monument locations will be marked with "straddlers" (four nails with metal "shiners") driven into the pavement and placed in pairs, approximately six feet apart and opposite to each other. Lines connecting opposing pairs shall form a ninety-degree cross with three-foot legs. The center of the cross will signify the exact location of the center of the monument to be set. Monuments will be drilled or punched after they have been set.

Manhole, valve box and cleanout locations shall be painted on the new pavement for rim adjustment.

**Inspection and Acceptance of Work:**

The Town reserves the right to make inspections and random checks of any portion of the staking and layout work. Checks by the Town or his representative shall in no way relieve the Contractor of his/her responsibility to construct the project in accordance with the Contract requirements. If, in the Town's opinion, the work is not being performed in a manner that will assure proper control and accuracy of the work, the Town will order any or all of the staking and layout work redone at no additional cost.

**Record Drawings (As-Built):**

A full-size set of project drawings shall be kept on-site and updated on a weekly basis or more frequent as necessary with a red pencil or red ink to reflect any field adjustments, changes, omissions, additions, etc. as they occur on the project. The Town Inspector will check site record drawings (as-builts) on a weekly basis to ensure all modified project elements have been properly recorded on the field plan set. Record drawings reviews at progress meetings shall occur monthly.

The CONTRACTOR shall provide plan sheets for use in preparing final record drawings (as-builts). Information shall be shown on these plans in red opaque ink, depicting the constructed dimensions, elevations, grades and materials including locations of existing underground utilities found during construction. Changed values shall be stricken out.

The CONTRACTOR shall exercise extreme care in handling any provided originals and will return them to the Town in like condition. In the event the originals are damaged or determined by the Town to be unacceptable, the CONTRACTOR shall replace the originals by contacting the Design Engineer of record and have new drawings produced. All costs incurred, as the result of replacing the originals shall be borne by the CONTRACTOR. The Town will be the sole

judge in determining whether the record drawings (as-builts) are acceptable in either condition or detail.

All work included in the contract documents as well as changes to the contract shall be noted as correct or modified by either checking off the information if it is correct, or by drawing a neat line through the original data and writing in the correct information in opaque ink if the information is incorrect. Unless noted otherwise below in the minimum as-built requirement section, station/offset measurements will be from construction centerline/monument line both parallel and transverse to roadway; added items or location changes shall be physically drawn at revised or new locations on the record drawings (as-builts); and all measurements and stations should be to the nearest tenth foot.

The minimum requirements for record drawings (as-builts) acceptance is as follows:

**1. Project Drawing Quantity Notations:**

Any project drawing or quantity summary sheet that shows a quantity on it that is incorrect shall be corrected by drawing a neat line through the original quantity and writing in the correct information. When space on the drawing does not allow room to indicate the corrections, a separate table may be drawn on a separate sheet with reference on both plan sheets to the plan sheet that the table refers to or to the sheet where the table is located.

**2. Existing/New Utilities:**

All underground infrastructure utilities, whether depicted on the project plans or not, shall be verified, corrected or added to the record drawings (as-builts) noting the beginning and ending station/offset location and elevation of utility relative to finished roadway grade or other identifiable ground or permanent roadway/project feature. Any electrical installation work for street lighting or power connection shall be located relative to construction centerline/monument line or relative to back of curb and gutter (whichever is closer) including the depth of the facility.

**3. Removals:**

Dimensions and/or other volumetric descriptions and station/offset location of all removed items.

**4. Curb/Gutter/Valley Gutter:**

Beginning and ending station offset location of straight curb/gutter/valley gutter runs relative to construction centerline monument line; flow line elevation; and station offset location of PC's and PT's.

**5. Driveway/Alley Entrances:**

Beginning and ending station/offset including driveway wings.

**6. Sidewalk:**

Beginning and ending station/offset and any other modification necessary to incorporate or avoid existing facility conflicts.

**7. Sidewalk Ramp:**

Curvilinear distance deviations measured along gutter flow line from curb and gutter PC/PT or other shifts/adjustments to properly align with pedestrian crosswalks or other modifications necessary to incorporate/avoid existing facility conflicts.

**8. Path:**

Beginning and ending station/offset and any other modification necessary to incorporate or avoid existing facility conflicts.

**9. Roadway Pavement:**

Beginning/ending station and measured completed roadway width from edge of pavement to

edge of pavement in straight roadway sections; measured completed roadway width perpendicular to construction centerline/monument line from both edges of pavement to construction centerline/monument line in curved roadway sections; and actual sawcut removal/tie-in to existing pavement locations.

**10. Pipelines:**

When pipeline parallels the construction centerline/monument line, verify or correct the perpendicular distance between the two. When pipeline angles relative to the construction centerline/monument line or is in a curved roadway section, as-built measured straight pipe run distances, angle points, changes in size, fitting/tee locations tied-in with practical known construction centerline/monument line location or other easily verifiable permanent point. Distances between fittings are from fitting centerline. Fire hydrant and catch basin branch lines are to be shown in profile including pipeline bends and collars. All project drawing pipeline cross-sections and profiles are to be corrected to reflect modified pipeline locations/alignments. Station and offset locations for sewer line laterals are from main line to ROW line with beginning/ending line location tied to a monument or to a property corner. Locations where waterlines cross curb and gutter are to be noted by station. Where waterlines run parallel to curb and gutter, note locations relative to back of curb or construction centerline/monument line (whichever is closer) including angle points and elevation.

**11. Manhole/Catch Basin/Box Culvert/Valve/Cleanout/Tee:**

Beginning/ending station and offset. Stationing is to commence at the downstream manhole/head wall (or as depicted on drawings) with location of tap/wye/tee/lateral/head wall locations clearly noted.

**12. Bridges, Box Culverts and Other Structures:**

Station/offset distances/centerline-bearing line/finished elevations of all bridge or structure elements. Bridge deck and girder elevations must reflect before and after concrete placement elevations. Inverts for all culvert barrel inlets and outlets and resulting culvert length(s) and slope(s).

**13. Landscaping and Irrigation:**

Note beginning and ending station offset elevation including size of PVC, sleeve pull-box/electrical-valve/water-service/tap/meter/bubbler/drip-line locations.

**14. Traffic Signal:**

Signal pole station/offset; electrical conduit, sleeve, controller, meter pedestal and pull box station/offset with distances of electrical conduit runs noted and tied in with known point.

**15. Roadway Striping/Signage:**

Any new/relocated sign shall be located by station and offset from construction centerline/monument line. Any change in roadway marking is to be noted on record drawings (as-builts).

**16. Roadway Street Lighting:**

Street light poles and pull boxes are to be located by station and offset from construction centerline / monument line. Conduit location and depth of cover noted from top of curb.

**17. Linear Items:**

Fences, walls, ditches, etc. should be located by station/offset and tied in with a permanent point.

The record drawings (as-builts) shall be certified by an Arizona Registered Land Surveyor. Record drawings (As-builts) shall be delivered to the Town Project Manager within thirty (30) calendar days from the date of final inspection and acceptance by the Town of the work



substantially completed under this contract. Work under this bid item includes transfer of all information noted by the CONTRACTOR on the on-site record drawings (as-builts) set described above.

Record drawings are required to be submitted in both CAD and pdf formats.

Acceptance of submitted record drawings (as-builts) and other records required to be submitted by the Contractor under the Contract, is a requirement for certification of Final Completion

### **Measurement and Payment:**

Construction Surveying and Record Drawings (As-Builts) will be measured as a single complete item of work together with construction surveying and paid at the Lump Sum price complete item of work as indicated on the Bid Schedule, which amount shall be considered full compensation for the work as described herein and required to clearly indicate all specific record drawings (as-builts) information.

Final payment for survey work under this bid item will be made when the Town accepts the final record drawings (as-builts). Should the CONTRACTOR fail to submit acceptable record drawings (as-builts) within the maximum 30 calendar day period noted above, the Town will execute a deduct change order for 10 percent of the bid item total from the contract (or \$2,500.00, whichever is greater) for every five working day period that the CONTRACTOR fails to provide acceptable record drawings (as-builts) (not including Town review time). If the CONTRACTOR fails to submit acceptable record drawings (as-builts) after the 3rd submittal, the Town will deduct 50% from the bid item total from the contract (or \$10,000.00, whichever is greater) and execute a final change order noting the Town's justification for penalizing the CONTRACTOR for unacceptable record drawings (as-builts) preparation.

### **105.12 Maintenance During Construction**

Add the following provisions:

#### **105.12.1 Fugitive Dust Control Operations and Pollution Prevention Management Plan**

The CONTRACTOR shall create, develop, publish and have a plan in place to control fugitive dust and track off soils. The plan shall indicate what best management practices (BMPs), measures, actions and procedures are to be implemented and executed by the CONTRACTOR to accomplish the pollution prevention (including fugitive dust control) goals. The CONTRACTOR shall apply for, pay for and secure the required permits for the project as appropriate. All required permit signage shall be created and erected as required by law, promulgated regulations, project specifications, special provisions, plan notes and permit requirements. If performing work extended under an approved and issued general or blanket-type permit, all permit requirements issued in conjunction with the permit shall be met.

#### **105.12.2 Mechanical Sweeping**

Mechanical sweeping shall be included as a part of the project's fugitive dust control and Stormwater Pollution Prevention or Management Plan to control track out of earthen and other materials from the project site. The limits of sweeping shall include all adjacent, pass-through and nearby paved street areas where construction related vehicles and/or vehicles hauling and/or delivering materials to or from the project site for a minimum distance of ¼ mile or further as field observations indicate are necessary. Sweeping operations frequency and duration shall be as necessary to remove any such debris or materials that have been tracked out of the project site. When such sweeping operations extend across railroad tracks, the mechanical sweeping equipment shall be raised prior to and when crossing the tracks to prevent damage to the rails or crossing surface and to prevent false signals from being generated due to low

voltage electrical short circuiting.

**ITEM 105.80000 CONSTRUCTION SURVEY, LAYOUT AND RECORD DRAWINGS LS**

**SECTION 106 – CONTROL OF MATERIALS**

**106.1 Source of Material and Quality**

Section 106.1, add the following paragraph:

In order to expedite the inspection and testing of materials, the CONTRACTOR shall furnish complete shop drawings and submittals to the Town as to the origin, composition and manufacture of material to be used in the Work. Such submittals shall be furnished promptly after execution of the Contract but, in all cases, prior to delivery of such materials.

**106.2 Samples and Tests of Materials**

Section 106.2, add the following paragraphs:

The CONTRACTOR shall hire an independent third party Material Testing Firm to perform Quality Control testing for the project and pay all cost required. The Material Testing Firm shall establish, provide, and maintain an effective quality control program that details the methods and procedures that will be taken to assure that all materials and completed construction required by this Contract conform to Contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the Contract technical specifications, the CONTRACTOR shall assume full responsibility for accomplishing the stated purpose.

The CONTRACTOR shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including types and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejections, etc; proposal remedial action and corrective actions taken if required. These records must cover both conforming and defective features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the Contract.

Legible copies of all test results shall be furnished to the Town's Project Manager in a Weekly Summary Report submitted in a timely manner to address any potential issues quickly. Before final completion, the CONTRACTOR shall submit a final testing report summary containing all testing results which certifies that the work complies with the Contract Documents. This testing report shall be sealed by a Professional Civil Engineer, registered in the state of Arizona who was responsible for overseeing the testing and sampling for said company. **There will be no separate pay item for this work; the cost should be incorporated into the applicable bid items' unit prices.**

The Town reserves the right to perform Quality Assurance testing required to certify the quality of materials for this project through its designated agent for professional materials testing services. The purpose of assurance testing will be to verify the quality of the finished project for the Town. The testing will, in no way, relieve the CONTRACTOR of his/her responsibility for his own quality control, assurance, and furnishing materials and finished products that meet the project specifications. A pre-construction meeting to coordinate testing services shall be scheduled and held at the Town offices by the CONTRACTOR.

## **SECTION 107 – LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC**

### **107.1 Compliance with Laws**

Section 107.1 of the MAG Standard Specifications is modified to add the following:

The Town will endeavor to ensure that small, minority and woman-owned business enterprises shall have every opportunity to participate in providing professional services, purchased goods and contractual services to the Town without fear of discrimination based on race, religion, sex, age, disability or national origin. A Small Business, Minority and Woman-Owned Business Enterprise goal has **NOT** been established for this contract. However, participation by such firms is encouraged.

The CONTRACTOR shall take all necessary measures to assure compliance by their employees and subcontractors with the adopted and applicable federal, state and local laws, ordinances, statutes, rules and regulations pertaining to stormwater discharge as well as air, groundwater and surface water quality.

### **107.2 Permits**

Section 107.2 has been revised to read:

It is CONTRACTOR's responsibility to obtain all permits and licenses; pay all fees, charges, bonds and taxes; and prepare all required notices for the lawful execution of the work. The Contractor is responsible for securing the Maricopa County Department of Transportation Right-of-Way Permits. MCDOT permit fees will be reimbursed to the Contractor at cost with no markup from the *Allowance for Extra Work Bid Item 109.21000* with submittal of a valid payment receipt.

#### **107.2.1 Town Encroachment Permit**

Town of Queen Creek permits for the improvements within the right-of-way are available from the Town at no cost to the Contractor and subcontractors for Town Capital Improvement Projects. Please refer to the General Construction Notes on the plans for further information. All permit requests must be filed by the Contractor or subcontractor performing the work, not the General or Prime Contractor.

A copy of all Town issued permits shall be provided to the Town's Project Manager by the CONTRACTOR or SUBCONTRACTOR to whom issued.

#### **107.2.2 Air Quality Permit**

Air quality dust control (or earthmoving) permits may be obtained from Maricopa County Air Quality Department, 3800 N. Central Ave., Suite 1400, Phoenix, AZ 85012; One Stop Shop, 501 N. 44<sup>th</sup> St., Suite 200, Phoenix, AZ 85008; or online at [Dust and Miscellaneous Portal | Maricopa County, AZ](#). Additional information may be requested by calling Telephone Number (602) 506-6010. The following forms and actions related to air permits may be filed at Maricopa County's self-service kiosks including Air Permit Cancellation Request, Contact Update Form, Subcontractor Change Request Form, Dust Control Plan Change, Dust Permit Cancellation Request, and Permit Acreage Increase Request.

A copy of the earthmoving permit and dust control plan shall be submitted to the Town Project Manager prior to commencement of any earthmoving activities. The required Dust Permit project site signs shall be posted near a project announcement sign at the project site. The costs for such permits and signs shall be considered incidental to the work with no separate payments made.

#### **107.2.3 AZPDES Construction Activity General Permit**

The project is expected to require an Arizona Pollutant Discharge Elimination System

(AZPDES) Construction Activities General Permit (CGP) based on the land area disturbed. Unless otherwise directed by the Town, the CONTRACTOR shall be responsible for applying for and securing the Construction Activities General Permit (CGP) including preparation of the Stormwater Pollution Prevention Plan (SWPPP), filing of the NOI and NOT, maintaining the monitoring activities records, and performing all other related administrative, monitoring and recordkeeping activities.

#### **107.2.3.1 Regulation Compliance**

The CONTRACTOR shall be responsible for compliance with the AZPDES CGP requirements as administered by the Arizona Department of Environmental Quality (ADEQ). This permit, administered by the Arizona Department of Environmental Quality (ADEQ), generally requires preparation of a Stormwater Pollution Prevention Plan (SWPPP), filing a Notice of Intent (NOI), monitoring possible pollution activities and event outcomes over the course of the construction activity, performing all administrative and record keeping duties related to the permit and SWPPP, and filing a Notice of Termination (NOT) following final project stabilization to close out the permit. The CONTRACTOR shall take all necessary measures and perform all necessary actions to assure compliance by employees and subcontractors with the AZPDES CGP. As the permittee, the CONTRACTOR is responsible for preparing, in a manner acceptable to ADEQ, all documents required by the regulations, which shall include but not necessarily be limited to, the documents noted previously above in this paragraph.

#### **107.2.3.2 Stormwater Pollution Prevention Plan (SWPPP)**

The CONTRACTOR shall author, develop, publish, implement, update and revise the SWPPP, as necessary, to assure compliance with permit requirements. ADEQ has documents and check lists available on their web site to assist with preparation of a SWPPP.

<http://www.azdeq.gov/node/524> and <http://www.azdeq.gov/node/2328> The preparer should be aware that a complete SWPPP includes textual and graphic exhibit elements and includes measures and Best Management Practices (BMPs) for disturbance areas as well as equipment and materials parking, storage and service areas. A copy of the SWPPP shall be retained on the project site at all times during construction. Additional resources for preparing a SWPPP are available in the Drainage Design Manual for Maricopa County, Volume III Erosion Control. This manual is available from the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009 or on-line at [Home Page - Flood Control District, Maricopa County, Arizona](#). The CONTRACTOR should consider the SWPPP a living plan and document. Construction activity completion or new task initiation may require new or additional measures and BMPs be installed or used as construction progresses.

#### **107.2.3.3 Notice of Intent (NOI) and Notice of Termination (NOT)**

As of June 1, 2017, NOIs, NOTs and other CGP permitting forms are now completed, submitted and paid for completely on-line at ADEQ's myDEQ on-line e-permitting portal. See this on-line page, <http://www.azdeq.gov/node/1143> and this on-line page, [http://static.azdeq.gov/mydeg/stormwater\\_get\\_new\\_noi.pdf](http://static.azdeq.gov/mydeg/stormwater_get_new_noi.pdf) for more information related to myDEQ. This method requires the business user to register for an on-line account. Please visit the first link provided above for more information. An electronic copy of the NOI shall be submitted to the Town Project Manager prior to commencing construction. The CONTRACTOR should apply / submit for the NOI in a timely manner to prevent delays to project construction.

Upon project substantial completion, acceptance, final site stabilization and demobilization clean up, CONTRACTOR shall submit to the permitting agency a completed, duly executed Notice of Termination (NOT) for each NOI issued following the procedures in place at the myDEQ portal. Such action will terminate all AZPDES CGP coverage for the project.

#### **107.2.3.4 Time Extension or Claims Related to Permitting**

Failure of the CONTRACTOR or a Subcontractor of any tier to submit a required NOI or other

permit application or failure to properly administer or provide permit compliance action(s) that results in a construction delay or additional costs will not be granted a request or claim for time extension or additional cost.

#### **107.2.3.5 Inspections**

CONTRACTOR shall perform regular monitoring and inspections of all stormwater pollution control Best Management Practice (BMPs) on the project as required under the provisions of the AZPDES Construction General Permit for Arizona. The CONTRACTOR shall prepare reports on such monitoring, inspection, corrective action and other activities as required by the CGP and shall retain the reports as noted in CGP and section below. The CONTRACTOR shall maintain all stormwater pollution control BMP devices on the project in proper working order and replace those damaged beyond repair. Such maintenance shall include necessary cleaning and/or repair for the duration of the project. BMPs found to be inadequate shall be subject to corrective action to update the SWPPP and implement better suited and appropriate BMPs. This provision includes adjusting the SWPPP, BMPs and actions related thereto to accommodate construction progress and new construction activities.

#### **107.2.3.6 Recordkeeping**

The CONTRACTOR shall retain the originals of all AZPDES CGP documents including the NOI, SWPPP, modifications and updates thereto, inspection and reporting forms and NOT for a period of at least three (3) years following the completion of the project and in accordance with the recordkeeping requirements of the CGP. The CONTRACTOR shall make such documents available for inspection by representatives of the Environmental Protection Agency (EPA), ADEQ, Maricopa County Environmental Services Department or Flood Control District, and Town of Queen Creek upon request.

The CONTRACTOR shall post and maintain legible copies of all encroachment, right-of-way, dust control, air quality, storm water, electrical or other permits, NOIs and clearances at the site at all times. The project superintendent or foreman having copies of all such documents within a notebook, electronic reading device, folder, binder or other document organization method when present on the site shall satisfy this requirement along with required posting by permitting agencies. Electronic copies of all such permits and NOIs shall be provided by the CONTRACTOR to the Town's project manager as such documents are secured and acquired.

#### **107.2.3.7 Fines and Penalties**

Any and all fines and/or penalties imposed by the ADEQ for CONTRACTOR's failure to comply with any or all permit requirements and /or conditions or stipulations shall be borne solely by the CONTRACTOR and shall not be a basis of claim for additional payment due.

#### **107.2.3.8 Payment**

The lump sum price for the AZPDES CGP and any other permits noted above shall include all material, labor, and costs relating to the NOI, NOT, SWPPP, inspections, monitoring, corrective and other actions, applications, filings and payments therefore and associated therewith and thereto. This includes, but is not limited to, preparation, installation, maintenance, removal, assuring proper operation, cleaning, replacing, and disposal costs associated with clean-up and repair following storm events, runoff or releases on the project. The lump sum price for AZPDES and other permitting shall be inclusive of all related costs, and no additional claims shall be made by the CONTRACTOR under any other specification provision, including changed conditions. CONTRACTOR shall be compensated for this bid item at a rate of 25% of the total bid price claimable with the first progress payment and the remaining 75% bid price claimable prorated over the remaining length on the project to substantial completion and clean up.

#### **107.2.4 Marshalling Yard Permit**

The Contractor is required to obtain a permit from the Town when using vacant property to park and service equipment and store material for use on Town construction contracts. This permit will conform to the requirements of MAG Subsection 107.6.1, as amended by the Town

#### **107.5.3 Asbestos Pipe Mitigation Compliance**

##### **107.5.3.1 Description**

Although the Town is not knowingly aware of any existing asbestos-containing concrete pipe within the project limits, this provision is included if asbestos-containing concrete pipe is encountered and removal is deemed necessary. The work under this item consist of testing verification, removal, handling, and satisfactory disposal of the asbestos-containing pipe material in accordance with the regulations specified herein.

If suspected asbestos-containing pipe is discovered during excavation, the CONTRACTOR notify the Town's Project Manager immediately and shall work closely with the Town to test the materials and develop a plan for work execution prior to any further construction activities within the vicinity of the suspected pipe. The Town's Project Manager shall give a written Notice to Proceed to the CONTRACTOR prior to continuing work under this specification.

##### **(A) General:**

The CONTRACTOR and its abatement subcontractor shall comply with 40 CFR 61, Subpart M, except that asbestos material shall be removed and disposed of in accordance with ALL provisions of 40 CFR 61.145, including "Notification Requirements" and "Procedures for Asbestos Emission Control" specified therein, regardless of the quantity of asbestos present on the project.

##### **(B) Asbestos Abatement Subcontractor:**

The CONTRACTOR shall select an asbestos abatement subcontractor that has the ability to remove, manage and dispose of asbestos materials. All individuals performing asbestos abatement related work on this contract shall possess at least one of the following certifications:

- AHERA Contractor/ Supervisor for asbestos abatement, or
- AHERA Worker Certification for all asbestos abatement workers/laborers.

The certification shall be current and must be valid throughout the duration of the project.

The asbestos abatement subcontractor shall have three years of documented experience performing related work in the State of Arizona.

The CONTRACTOR shall submit documentation of the asbestos abatement subcontractor's certifications for all employees to be working on the project and the qualifications of the firm at the preconstruction conference. The contractor's documentation of qualifications shall provide details indicating the types of relevant experience and shall provide the number of months of each type of experience to be considered for approval.

The Town will approve or reject the abatement subcontractor within 10 calendar days after receipt of documentation of experience and certifications.

The CONTRACTOR will not be allowed an extension in contract time for any delays to the work because of the failure of the contractor's asbestos abatement subcontractor to meet the Town's qualifications.

##### **(C) Removal Plan**

The asbestos abatement subcontractor shall be responsible for preparation of a comprehensive

removal and disposal plan (hereinafter referred to as the removal plan) for removal, handling, and disposal of the asbestos materials. The removal plan shall comply with 40 CFR 61, Subpart M, as specified above. The removal plan shall include environmental measures and worker safety and health regulations required in OSHA and other applicable federal, state and local requirements for the removal and disposal of asbestos material.

The contractor shall submit the removal plan to the Town's Project Manager for review a minimum of 10 working days prior to any work that will disturb the asbestos material.

The Engineer will determine if the removal plan addresses all the required elements and will return it as approved or disapproved within 10 working days after receipt. The asbestos materials shall not be disturbed until the removal plan has been approved in writing by the Engineer.

**(D) Compliance Responsibility:**

All work involved with the removal, handling, and disposal of the asbestos materials shall be performed by the contractor's selected asbestos abatement subcontractor.

However, the CONTRACTOR shall be fully responsible for the work, and for the proper disposal of the removed asbestos materials as specified herein, all in accordance with the applicable federal, state, and local standards, regulations and requirements. The CONTRACTOR shall bear the responsibility for any non-compliance, and shall hold the Town, its agents, officials, and employees harmless from all liability which may result from non-compliance with such applicable federal, state and local standards, regulations and requirements.

**107.5.3.2 Construction Requirements**

The asbestos abatement subcontractor shall supply potable water for their employees to wash their hands after handling the asbestos materials, prior to eating, drinking, or tobacco use of any kind.

The asbestos abatement subcontractor shall remove the asbestos materials in accordance with the approved removal plan. The asbestos materials shall not be abraded in any way including grinding, sanding, or heating.

The CONTRACTOR shall also provide a letter and manifest certifying that the asbestos abatement subcontractor has disposed of the asbestos material in accordance with the final removal plan. Such letter and manifest shall be submitted to the Town within 10 working days of final disposal.

A time extension will not be granted due to the contractor's failure to comply with the requirements specified herein.

**107.5.3.3 Method of Measurement**

Asbestos Pipe Mitigation Compliance will be measured by the linear foot of pipe removed.

**107.5.3.4 Basis of Payment**

Payment for removal of asbestos concrete pipe, measured as provided above, will be paid for at the contract price per linear foot for the total length of pipe removed rounded to the nearest foot, which price will be full compensation for the work, including testing, development of the removal plan, removal, handling, and disposal of the asbestos material.

**107.6 Public Convenience and Safety**

*Modify the following Subsections:*



**107.6.1 Contractor's Marshaling Yard:** *Add the following paragraphs before the first paragraph:*

The Contractor shall not store equipment, personal vehicles or materials within the right-of-way without providing written notification, obtaining prior approval of the Town Inspector and permit from the Town.

The Contractor shall obtain a permit from the Town for marshalling areas they propose to use. Minimum requirements include the following:

**107.6.1.1 Contractor's Marshalling Yard when the Agency is the Contracting Party:**  
*Add the following paragraphs :*

(H) The Contractor shall notify adjacent property owners/residents of the proposed use.

(I) An appropriate distance from adjacent property will be set by the Town on a case-by-case basis based on the size and type of equipment to be used on the project.

(J) A sight or sound barrier may be required if deemed necessary by the Town.

## **107.6.2**

The CONTRACTOR's daily work hours may vary based on time of year and shall adhere to the Town of Queen Creek ordinance for Noise Regulations During Construction (Section 9-1-7).

The ordinance may be found at <https://www.queencreek.org/home/showdocument?id=22185>.

## **107.7 Barricades and Warning Signs**

Section 107.7 of the MAG Standard Specifications is modified to add the following:

### **Project Information Construction Signs**

It shall be the responsibility of the CONTRACTOR to furnish and erect project information construction sign(s) (Project Sign(s)) in accordance with this Specification. The Project Sign(s) shall be professionally prepared and subject to approval by the Town.

The size, shape, and information to be depicted upon the Project Sign(s) are as described in the text and depicted in the template graphic presented below. The Town will furnish the project name. The Town's Public Outreach Consultant, MakPro Services, will acquire, secure, supply and furnish the project hotline telephone number and information website URL address. The CONTRACTOR shall provide their business name and construction schedule information for use on the sign. The Town shall furnish a native Adobe Illustrator (.ai) or encapsulated postscript (.eps) graphic file of the sign layout to the CONTRACTOR for use in ordering and manufacturing the sign(s).

The sign(s) shall be 4-feet by 8-feet in size. Sign panel materials shall be 3/4 inch, exterior grade plywood sign board or 0.080 inch aluminum sign blank. The sign(s) shall have three main parts. Part 1 shall have a CONSTRUCTION ORANGE background with BLACK letters and numerals. Part 2 shall have GRAY and BLACK backgrounds and progress indicators as depicted for the lower portion of the sign. Part 3 shall have a black background with white letters. The sign(s) shall have ASTM Type XI grade retro-reflective sheeting applied over the entire sign including all lettering and graphics. Letter and logo height and spacing shall be as shown in the graphic file furnished.

The sign(s) consist of three parts and shall list the following information:



- Part 1
1. Project Name
  2. The word "IMPROVEMENTS"
  3. Town Logo
  4. Project Construction Dates
  5. Contractor's Business Name
  6. The Town's Public Outreach Hotline telephone number AND project website URL address for project information.
- Part 2
7. A Progress Bar section where colored, printed, vinyl coated magnetic sheet progress indicators with numbers can be placed over four default gray colored indicators during the project indicating progress milestones.
- Part 3
8. The slogan "NEIGHBORS AT WORK. PLEASE DRIVE WITH CARE." Or other slogan the Town determines to use.

**Construction Sign Detail (below)**



The Progress Bar portion shall have rust resistant coated, flat steel bars mounted to the sign panel with rust resistant counter sunk screws or bolts, washers and nuts to which flexible, printed, die cut magnetic sheet progress arrow panels can be mounted during the duration of the project.

The progress arrow panels shall be colored, flexible, vinyl coated, die cut, 0.05-inch magnetic sheet, nominally 11" by 23.5" in size, on which progress value numbers are printed. Such coatings and printing inks shall be UV and weather resistant, die cut to size and shape of the indicators on the sign. The progress arrow panels shall be provided with two color red backgrounds with white numbers and symbols.

Sign supports shall be 4-inch by 4-inch pressure treated wooden posts, painted WHITE and set a minimum of 2.5 feet into the ground. The sign(s) shall be mounted and installed so that the sign bottom edge shall be a minimum of 5 feet above the ground. If an aluminum sign panel is used, the sign shall be mounted on two perforated tube, 1-3/4-inch square steel support stringers placed horizontally across the support posts and secured to the posts. See ADOT Detail S-3, Sheet 4 of 4 for additional details and information. All hardware shall be rust resistant and meet ADOT

standards.

The Project Signs shall be maintained in good condition by the CONTRACTOR for the duration of the project and shall be removed and disposed of by the CONTRACTOR during the final project clean up.

The required Project Signs shall be installed by the CONTRACTOR within fourteen days of issuance of the Notice to Proceed or an Authorization to Begin Limited Work. The cost for the project sign(s) shall be considered incidental to the other project contract items. No separate measurement or payment will be made for the project information construction sign(s).

The project will require two project information construction signs. One sign will be erected at each end of the project along Power Road, just north of Riggs Road and south of Chandler Heights Road facing what would be oncoming traffic, respectively. The signs are expected to be posted within the adjacent right-of-way or, with permission of the landowner, on adjacent property.

#### **107.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE:**

Add the following paragraphs:

All areas that are shown on the plans as Natural Area Open Space (NAOS) shall be staked and flagged prior to any grading activity. Inadvertently disturbed areas shall be revegetated with indigenous material in natural densities.

#### **107.11 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES:**

Add the following paragraphs:

Existing in-service water valves, sewer manholes, or sewer clean-outs that are damaged during construction or are inaccessible due to construction shall be repaired or made accessible within seven (7) working days. If the deficiencies are not corrected within the prescribed time period, the necessary repairs will be performed by the Town of Queen Creek or its designee at the expense of the Contractor.

The Contractor shall be responsible for the immediate repair and reporting of any damage to any STID facilities within the site. This includes underground leaks. Reinstatement and repair of any temporary or permanent work that is required to be removed to facilitate the repairs will be the responsibility of the Contractor.

Notwithstanding the requirement to repair any utility damage during the construction phase, before commencing any construction activity, and again at completion, the Contractor will arrange for a CCTV condition survey of the section of STID pipe within the construction zone. Any deterioration of the STID pipe between the initial and final CCTV inspections will be rectified by the Contractor at The Contractors cost. Completion will not be certified until these repairs are carried out to the satisfaction of the CIP Inspector. No additional payment will be made to the Contractor for the CCTV survey as cost shall be included with Item 109.10000 – Mobilization/Demobilation.

The Contractor shall be responsible for the immediate repair and reporting of any damage to any traffic signal equipment. This shall include, but shall not be limited to, such items as: underground conduit, detectors, detector lead-in wiring, signal heads, signal poles, mast arms, cables, controller, and other signal-related equipment. Wire splicing will not be permitted. Modification of traffic signals for construction shall require advance design and approval prior to the start of construction. All materials and installations shall conform to the latest Arizona Department of Transportation standard drawings and specifications for traffic signals, except as approved by the Town Traffic Engineer.

### **107.12 Furnishing Right-of-Way**

Section 107.12 of the MAG Standard Specifications is modified to add the following:

Before utilizing any TCE, including Driveway Letter TCE, provided on property outside of the project right-of-way or easement(s), the CONTRACTOR shall provide written notice of intent to utilize the TCE to the residents living or business operating on the property a minimum of 10 working days in advance. This notice shall include a brief “work to be performed” description and the expected work duration. This notice shall also include a CONTRACTOR’S staff contact name and phone number for the convenience of the residents, in case of emergency or complaints. This requirement is in addition to any public outreach efforts utilized or performed by the Town. Names dates and times of who the notice was provided to shall be recorded and provided to the Town project manager.

<b>ITEM 107.01000</b>	<b>AZPDES AND OTHER PERMITTING</b>	<b>LS</b>
<b>ITEM 107.01600</b>	<b>COMPLIANCE WITH TOQC MS4 STORMWATER REGULATIONS</b>	<b>LS</b>
<b>ITEM 107.02000</b>	<b>ENVIRONMENTAL COMPLIANCE</b>	<b>LS</b>
<b>ITEM 107.02025</b>	<b>ASBESTOS PIPE MITIGATION COMPLIANCE</b>	<b>LF</b>

## **SECTION 108 – COMMENCEMENT, PROSECUTION AND PROGRESS**

### **108.1 Notice to Proceed**

Section 108.1 of the MAG Standard Specification is modified to add the following:

The Town shall issue a notice to proceed (NTP) for the improvements related to Project A1405 to the CONTRACTOR once all contractual documents are obtained and appropriately executed. Utilities with facilities located in the project vicinity, particularly SRP, Cox Communications, Southwest Gas, and Century Link are aware of the project schedule and are expected to have their relocation work completed prior to the anticipated start of the project. The CONTRACTOR may be provided with a letter approving the authorization to perform limited work that will benefit the project completion schedule and Contractor’s progress if any utilities fail to complete their facility relocation prior to the anticipated start of the project. This may also occur if other construction by others within the project limits is not completed and conflicts with the CONTRACTOR’S proposed work schedule.

### **108.4 Contactor’s Construction Schedule**

Add the following paragraphs at the end of the section:

The CONTRACTOR shall plan to begin work as early as possible. All project work shall be substantially complete within **294** calendar days of the Notice to Proceed and Final Completion shall occur no more than 30 days after substantial completion.

The CONTRACTOR shall submit an overall project schedule at the commencement of the project as noted above. This schedule shall be maintained and updated bi-weekly throughout the project to reflect significant schedule changes appropriate to the allowed project duration.

The CONTRACTOR shall coordinate these update needs with the contracting agency representative. The schedule shall be presented to the Agency in both electronic publishing (.pdf) and hard copy format. The Town may request electronic format submittal of the schedule and updates to software directly by the CONTRACTOR.

During the execution of the project, The CONTRACTOR shall also submit a three-week look-ahead forecast schedule updated weekly. These schedules shall be presented as a subset of

the overall schedule or in a format such as an Excel spreadsheet and shall depict the upcoming work tasks and associated durations by days. Special actions or tasks for certain subsets of the work may be requested to be presented separately by the Agency and shall be furnished if so requested. The look-ahead schedule intent is to identify upcoming traffic control and public outreach needs, monitor anticipated progress and upcoming tasks, and allow the project team to discuss and coordinate project needs. These look-ahead forecast schedules shall be presented to the Agency in both electronic publishing (.pdf) and hardcopy format.

Furnishing project schedules and updates to same is not a separate pay item and shall be considered incidental to the project work.

The CONTRACTOR shall review and assess all materials availability and delivery timeframes very early in the project and plan their activities for shop submittals, ordering and construction means and methods accordingly. If the CONTRACTOR discovers or encounters any potential schedule issues in this assessment process that will materially impact, restrict or prohibit work commencement and completion in accordance with the proposed contract dates noted above, they shall promptly notify the Town Project Manager to discuss the issues and develop a mutually acceptable course of action.

#### **108.4.1 Completion Requirements**

Substantial Completion to be achieved within 294 days of the Notice to Proceed

Final Completion to be achieved within 30 days of Substantial Completion

#### **108.4.2 Warranties**

Warranty periods will not commence until Final Completion unless otherwise stated in the Contract

##### **108.5.1.2 Watering**

Watering operations shall be included as a part of the project's fugitive dust control and Stormwater Pollution Prevention or Management Plan to control track out of earthen and other materials from the project site. Watering operations shall take place on all earthen surfaces within the project limits subject to vehicular or construction equipment traffic or surfaces or friable materials that have been or are being disturbed by construction operations. Water shall be applied by means of, but not limited to, tanks, sprayers, pipes, hoses, nozzles, or sprinklers. The limits of watering may extend to and include adjacent, pass-through and nearby paved street areas where construction related vehicles and/or vehicles hauling and/or delivering materials to or from the project site as field observations indicate are necessary to remove and control fugitive dust and material track out. Watering operations frequency and duration shall be as necessary to minimize or prevent creation of fugitive dust from the construction activities on the project site and to facilitate removal of significant debris or materials that may have been tracked out of the project site. When such watering operations extend across railroad tracks, the watering equipment and operations shall be placed and performed in such a manner as to not damage the railroad tracks and railroad subgrade; and to prevent damage to the rails, ties or crossing surface; and to prevent false signals from being generated due to low voltage electrical short circuiting.

All such dust control work and related efforts shall be considered incidental and part of the overall work with no separate payment made for such efforts.

## **SECTION 109 – MEASUREMENTS AND PAYMENTS**

### **109.5.6 Bonds and Insurance**

Add the following paragraph:

When additional work is being paid for under an allowance item included in the original bid schedule and contract, no additional compensation shall be paid to the CONTRACTOR for cost of insurance or performance and payment bonds as such cost is already included in the original contract price.

### **109.10.1 Mobilization**

The Town will compensate CONTRACTOR for one-time, round trip mobilization/demobilization of CONTRACTOR's personnel, equipment, supplies and incidentals, establishment of offices, buildings and other facilities required for the performance of the work on the project, as well as preparatory work and operations prior to the commencement of the work on the project site.

### **109.10.2 Measurement**

Measurement of all work completed under the contract will be measured by the Town according to United States standard measures. The methods of measurement and computation to be used in determination of quantities of materials furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice. Mobilization/demobilization will be measured for payment by the lump sum as a single complete unit of work.

Measurement for Traffic Control shall be made on a lump sum basis, spread over the duration of the Contract. This item shall include all material, equipment, and labor necessary to facilitate traffic control per the contract documents.

### **109.10.3 Payment**

Payment for pay items in the proposal will be as indicated in the applicable standard specification or in the special provisions.

Payment for mobilization/demobilization, measured as provided above, will be made at the contract lump sum price. Payment shall be made in equal one-third portions. The first payment will be paid with CONTRACTOR's initial billing. The second payment will be made when the total payments to CONTRACTOR for the bid items, exclusive of payments for mobilization/demobilization, equals one-half of the total bid by CONTRACTOR, exclusive of mobilization/demobilization. The remaining one-third will be paid as part of the second to last progress payment. Final payment due CONTRACTOR will be for retention.

When other contract items are adjusted as provided in Section 109, and if the costs applicable to such items of work include mobilization costs, such mobilization costs will be considered as recovered by CONTRACTOR in the lump sum price paid for mobilization, and will be excluded from consideration in determining adjusted compensation under Section 109.

If the CONTRACTOR performs a second mobilization/demobilization of personnel, material and/or equipment at the Town Project Manager's express written request, the Town will compensate the CONTRACTOR for such expenses at the CONTRACTOR's actual costs. The CONTRACTOR shall provide all documentation for these costs at the request of the Town Project Manager.

<b>ITEM 109.05000</b>	<b>INSURANCE</b>	<b>LS</b>
<b>ITEM 109.07000</b>	<b>BONDS</b>	<b>LS</b>
<b>ITEM 109.10000</b>	<b>MOBILIZATION/DEMOBILIZATION</b>	<b>LS</b>

An Allowance for Extra Work bid item is included in the bid schedule for unforeseen items discovered during construction or directed work determined desired by the Town and adjacent to or within the project limits or work zone. Extra work involving unit bid items already included in the Bid Schedule shall be paid for at such unit rates. Work items not provided in the Bid Schedule shall be negotiated with the Contractor to determine total prices for extra work. Only actual extra work items may be invoiced against this bid item per MAG 109.4 and 109.5.

<b>ITEM 109.21000</b>	<b>ALLOWANCE FOR EXTRA WORK - CIP</b>	<b>AL</b>
<b>ITEM 109.22000</b>	<b>ALLOWANCE FOR EXTRA WORK - UTILITIES</b>	<b>AL</b>

Payment for Uniformed Off-duty Law Enforcement Officers shall be made at full reimbursement of actual invoices with a maximum 5% markup. Allowances for Off-Duty Officers provided in the bid schedule shall be invoiced against only charges for such items with supporting invoices provided with the payment request. Implementation of Traffic Control shall follow Section 401.

<b>ITEM 109.40110</b>	<b>TRAFFIC CONTROL</b>	<b>LS</b>
<b>ITEM 109.40120</b>	<b>OFF-DUTY OFFICER</b>	<b>AL</b>

## **PART 200 – EARTHWORK**

### **SECTION 201 – CLEARING AND GRUBBING**

#### **201.1 Description**

Section 201.1 of the MAG Standard Specifications is modified to add the following:

This work shall consist of removing objectionable material from the right-of-way, easements and such other areas as identified on the plans. Some of the items to be cleared include trees smaller than 12-inch diameter, bushes and cacti, logs, railroad ties, cable barrier fence, and boulders. Items not specifically identified on the plans to be removed but are required to be removed for construction shall be identified to Town's Representative and removed as determine at no additional cost to the Town. Clearing and grubbing shall be performed in advance of grading operations. Trees that are to be removed shall be completely unearthed, including the root structure. The resultant void shall be filled with soil and compacted to required levels based on the location within the project.

#### **201.5 Payment, Clearing and Grubbing**

Section 201.5 of the MAG Standard Specifications is modified to add the following:

Payment for clearing and grubbing will be made at the contract lump sum price, and shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with clearing and grubbing as described in this specification, the special provisions and on the construction plans.

#### **ITEM 201.50000      CLEARING & GRUBBING**

**LS**

### **SECTION 215 – EARTHWORK FOR OPEN CHANNELS**

#### **215.1 Description**

Add the following to this section:

The work in this section consists of clearing, excavation, fill, backfill, grading, and disposal of excavated and removed material for the construction of the retention basins as shown on the plans. Any excavated material not used for the project is to become the property of the Contractor and removed from the site.

#### **215.3 Excavation**

Add the following to this section:

The basins shall be excavated to the neat lines shown in the plans. Basin bottom dimensions, locations, and basin side slopes are included in the plans. Basin side slope surfaces shall be compacted to a uniform density of not less than 95% unless otherwise noted below. Finished bottom of basin surfaces shall be scarified a minimum of 12" deep to promote infiltration. Once scarified, the basin bottom shall be closed off to vehicular and construction traffic or re-scarified prior to project close-out.

#### **215.5 Grading**

Replace this section with the following:

Grading of the basins, embankments, and channels shall conform to the following tolerances:

- A. A vertical tolerance of none above and three (3) inches below the specified grade will be allowed on:
1. Basin side slopes in both cut and fill;
  2. Embankments and access road side slopes in cut;
  3. Channels in both cut and fill;
  4. Top surface of access road in both cut and fill;
  5. Embankments and access road side slopes in fill;
  6. Top surface of embankments in both cut and fill; and
  7. All landscaped areas.
- B. A vertical tolerance of plus or minus 0.1 foot from the specified grade will be allowed on:
1. The basin bottom

### **215.7 Measurement**

Add the following to this section:

Earthwork for Open Channels and Retention Basins will be measured by the cubic yard in the original space occupied and the volume of the material removed will be computed by the average end area method. No addition measurement or payment will be made for over-excavation beyond the grades specified on the project plans.

Grading and subgrade excavation required for riprap placement will be considered incidental to those items.

### **215.8 Payment**

Add the following to this section:

Earthwork for Open Channels and Retention Basins will be paid for the contract unit price per cubic yard of excavation. Such price shall include all labor, equipment and materials for stripping, excavation, fill, backfill, compaction and grading, dust control, survey as required, hauling, removal and disposal of excavated material and debris.

## **ITEM 215.80000 EARTHWORK FOR OPEN CHANNELS AND RETENTION BASINS CY**

### **SECTION 220 – RIPRAP CONSTRUCTION**

#### **220.1 Description**

This section is modified to add:

Loose Riprap over non-woven, geosynthetic filter fabric is to be placed at all scupper spillway terminations, culvert, and pipe inlets and outlets as shown on the project plans.

#### **220.2 Materials**

This section is modified to add:

Riprap aggregate shall be stone and cobbles angular and irregular in shape and be of similar color to adjacent landscape aggregate (decomposed granite, gravel mulch or blanket as described) unless otherwise noted in the plans. Rounded, river run materials may be furnished if they have been crushed and processed to produce angular, irregular shaped, unrounded particles meeting the specified particle size distribution / gradation to the satisfaction of the Town's project representative. Samples of the proposed processed materials shall be furnished for review or the CONTRACTOR shall arrange a visit to the aggregate supplier's processing facility and proposed processed material stockpile by the CONTRACTOR and the Town's



project representative to view and approve the proposed material prior to use. If the material proposed is rejected by the Town for any reason, the CONTRACTOR shall locate an alternative source of material meeting the requirements and acceptable to the Town at no additional cost to the Town.

Erosion Control Geosynthetic: Erosion control geosynthetic shall meet the requirements of MAG Specification Section 796 and Table 796-3 Class B.

The identification, packaging, handling, and storage of the geotextile fabric shall be in accordance with ASTM D 4873. 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 will be stored on site or at another identified storage location in a manner which protects them from the elements. If stored outdoors, they 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. Fabric shall be placed in the manner and at the locations shown on the project 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 fabric strips shall be placed to provide a minimum 24-inch of overlap for each joint. On horizontal joints, the uphill strip shall overlap the downhill strip. On vertical joints, the upstream joint shall overlap the downstream strip.

#### **220.5 Riprap Placement**

Add the following:

The top of rock riprap shall not extend above the finish grades shown on the plans or the existing adjacent grades. Over excavation shall be provided matching the full riprap thickness called for on the plans prior to placement of riprap and shall be considered incidental to the work.

#### **220.8 Payment**

Section 220.8 of the MAG Standard Specifications is modified to add the following:

Payment for riprap will be made at the contract unit price per cubic yard. Payment shall be full compensation for furnishing all labor, materials, tools, and equipment, and doing all the work involved in fabricating and placing the riprap. This includes, but is not limited to, transport, processing, and placement of the riprap and underlayment fabric, respectively, as described in the MAG Standard Specifications, on the plans, and in the special provisions.

<b>ITEM 220.51108</b>	<b>RIPRAP CONSTRUCTION, DUMPED -ANGULAR D50=8"</b>	<b>CY</b>
<b>ITEM 220.51112</b>	<b>RIPRAP CONSTRUCTION, DUMPED -ANGULAR D50=12"</b>	<b>CY</b>

## **PART 300 – STREETS AND RELATED WORK**

### **SECTION 301 – SUBGRADE PREPARATION**

#### **301.3 Relative Compaction**

Section 301.3 of the MAG Standard Specifications is modified to add the following:

Relative compaction requirements for subgrade preparation are defined by MAG Specifications Section 301.3. Compaction requirements for structure excavation are defined by MAG Specification 206. Subgrade preparation and compaction shall be as follows:

1. Exposed native soils that will receive fill, pavement areas, and exterior slabs including sidewalks, once properly cleared, should be prepared in accordance with the project geotechnical report. In absence of such report or guidance therein, such soils shall be scarified to a minimum depth of six inches, conditioned, to within +2/-4% of optimum moisture content, and compacted to 95 percent of the maximum dry density as determined by the applicable ASTM test methods.

#### **Required Inspections**

Roadway subgrade shall be inspected during grading operations and prior to placing aggregate base course. The minimum number of density tests required is one for each 1000 square yards, or as otherwise recommended or required by these specifications or the geotechnical report.

#### **301.7 Measurement**

Section 301.7 of the MAG Standard Specifications is modified to add the following:

Subgrade Preparation will be measured by the square yard of area of new asphalt concrete pavement, PCCP, and Stabilized DG per budgeted project.

Prior to bidding the work, the CONTRACTOR shall thoroughly satisfy himself as to the actual conditions and earthwork quantities involved. No claim shall be made for any earthwork excess or deficiency thereof after the beginning of grading.

#### **301.8 Payment**

Section 301.8 of the MAG Standard Specifications is modified to add the following:

Payment for subgrade preparation will be made at the contract unit price per square yard based on the pavement areas defined above. Such payment shall constitute full compensation for all of the work required to prepare the subgrade.

**ITEM 301.20000      SUBGRADE PREPARATION**

**SY**

### **SECTION 310 – PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE**

#### **310.3 Compaction**

Add the following:

Base material shall be placed in accordance to Section 310 of the Standard Specifications. Compaction of existing base shall be accomplished by scarifying the full depth of the base course. The scarified and compacted base shall be true, even and uniform conforming to the grade as

shown in the project plans.

### **310.5 Payment**

Section 310.4 of the MAG Standard Specifications is modified as follows:

Payment for untreated base (ABC) will be made at the unit bid price per square yard. Such payment shall constitute full compensation for supplying, placing and compacting the ABC complete in place, with no allowance for waste, and shall include labor, equipment, tools and incidentals necessary to complete the work as defined on the project plans and in the specifications.

<b>ITEM 310.20400</b>	<b>AGGREGATE BASE COURSE - 4" THICK</b>	<b>SY</b>
<b>ITEM 310.21000</b>	<b>AGGREGATE BASE COURSE - 10" THICK</b>	<b>SY</b>
<b>ITEM 310.21200</b>	<b>AGGREGATE BASE COURSE - 12" THICK</b>	<b>SY</b>

## **SECTION 321 – PLACEMENT AND CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT**

### **321.2 Materials and Manufacture**

Section 321.2 of the MAG Standard Specifications is modified to add the following:

#### **Inspection and Acceptance:**

The Town of Queen Creek will perform inspection and will require twenty-four (24) hour notice. The Contractor shall have an independent testing company on-site at the on-set of construction to establish a rolling pattern and monitor compaction. A minimum of one density test for every 1000 square yards is required.

Certificates of mix design for each product is required prior to paving.

### **321.5 Mix Design**

Add the following:

All AC mixes shall meet the East Valley Asphalt Committee (EVAC) requirements.

### **321.13 Payment**

Section 321.9 of the MAG Standard Specifications is modified to add the following:

Payment for AC Pavement will be full compensation for placing all materials specified, with no allowance for waste, and shall include labor, equipment, tools, and incidentals necessary to complete the work complete in place in accordance with the construction plans and as prescribed and directed by the Town of Queen Creek. Payment will be made at the contract bid price per square yard.

<b>ITEM 321.81015</b>	<b>ASPHALT CONCRETE PAVEMENT – TYPE A 1/2" MIX – 1.5" THICK</b>	<b>SY</b>
<b>ITEM 321.81020</b>	<b>ASPHALT CONCRETE PAVEMENT – TYPE A 1/2" MIX - 2" THICK</b>	<b>SY</b>
<b>ITEM 321.83025</b>	<b>ASPHALT CONCRETE PAVEMENT – TYPE A 3/4" MIX – 2.5" THICK</b>	<b>SY</b>
<b>ITEM 321.83030</b>	<b>ASPHALT CONCRETE PAVEMENT – TYPE A 3/4" MIX - 3" THICK</b>	<b>SY</b>

## **SECTION 329 – TACK COAT**

### **329.3 Application**

Section 329.3 of the MAG Standard Specifications is modified as follows:

Tack coat shall be diluted in the proportion of 50 percent water and 50 percent emulsion and applied at the rate of 0.08 gallons per square yard. Application shall be made in advance of subsequent construction as ordered by the Engineer.

### **329.7 Payment**

Section 329.73 of the MAG Standard Specifications is modified to add the following:

Payment for the application of tack coat will be made at the unit bid price per ton. Such payment shall be compensation in full for supplying and applying the tack coat complete in place in accordance with the specifications and the project plans.

**ITEM 329.30000      TACK COAT**

**TN**

## **SECTION 336 – PAVEMENT MATCHING AND SURFACING REPLACEMENT**

### **336.1 Description**

Section 336.1 of the MAG Standard Specifications is modified to add the following:

This section controls the work associated with sawcutting pavement, as required by the construction plans.

#### **336.2.4.1 Permanent Asphalt Pavement Replacement**

Add the following:

Permanent pavement replacement is not required at locations where new full pavement construction is called for on the roadway plans. Surface replacement and matching will only be required at locations where existing asphaltic pavement is being removed for trenching to install or remove existing utilities or irrigation facilities; and at new pavement matching to existing pavement at continuation for new roadways as shown on the approved roadway construction plans and details.

### **336.5 Payment**

Section 336.5 of the MAG Standard Specifications is modified to add the following:

Payment for sawcutting pavement will be made at the unit bid price per linear foot. Such payment shall constitute full compensation for providing equipment and accomplishing this work complete in place as identified on the construction plans and in the specifications. Payment for sawcutting required for temporary pavement replacement shall be included in the cost of the pipe.

**ITEM 336.21000      SAWCUT ASPHALTIC CONCRETE PAVEMENT**

**LF**

## **SECTION 340 - CONCRETE CURB, GUTTER, SIDEWALK, CURB RAMPS, DRIVEWAY AND ALLEY ENTRANCE**

### **340.1 Description**

This section is modified to add the following:

The work under this item includes new concrete construction. This work shall conform to the requirements of the MAG Uniform Standard Specifications for Public Works Construction.

Where new traffic signal pole push buttons are to be installed adjacent to existing sidewalks or curb ramps, the Contractor shall construct a new ADA accessible apron or provide access around the pole base as shown in the details on the plans. The Contractor shall modify these details as necessary to accommodate any changed field conditions or variation in pole location at no additional cost to the Town.

When constructing the signal pole apron, the Contractor can either block out the pole base or cast the anchor bolts into the apron. Regardless of the method chosen, the Contractor shall grout the base following installation and leveling of the pole in accordance with the Standard Specifications. The Traffic Engineer will decide on the better of the two options available on site according to placement. All pole foundations shall be flush with apron or sidewalk.

Prior to pouring any concrete the Contractor shall reach out to the CIP Inspector who will contact the Town of Queen Creek Traffic Engineering Department 48 hours in advance for an inspection.

### **340.3 Construction Methods**

Section 340.3 of the MAG Standard Specifications is modified to add the following:

Construct in accordance with Sections 340, 601 and 725, except as modified below.

Sub-grade shall be compacted to 95% at a moisture content of optimum or up to 2% below. Compaction tests shall be done for every 300 feet of curb, or once per pour day minimum.

There shall be a maximum interval of 50 feet between expansion joints in the curb and gutter.

Each concrete load shall be tested for air, temperature, and compressive strength.

### **340.5 Measurement**

Section 340.5.3 of the MAG Standard Specifications is modified to add the following:

The detectable truncated domes shall be the Neenah R-4984 cast iron, 24" x 30" plates unpainted/uncoated. Detectable warnings shall not be measured for payment, this item is considered integral to the walking surface that they form a part of and the cost is included in the related pay item.

### **340.6 Payment**

Section 340.6 of the MAG Standard Specifications is modified to add the following:

Unless otherwise quantified on the plans, no additional measurement and payment will be made for additional materials and labor needed to match existing grades to proposed driveways, such cost shall be included in bid items for which the work is necessary.

Payment will be full compensation for placing all materials specified complete in place, with no allowance for waste, and shall include labor, equipment, tools, and incidentals necessary to complete the work as prescribed and directed by the Town.

**ITEM 340.10210      CONCRETE CURB & GUTTER, MAG STD. DET. 220-1, TYPE A      LF**

ITEM 340.14010	CONCRETE SINGLE CURB, MAG STD. DET 222, TYPE A	LF
ITEM 340.19100	CONCRETE CURB TERMINATION, MAG STD. DET. 222	EA
ITEM 340.23710	CONCRETE CURB RAMP, MAG STD. DET. 237-1, ATTACHED SW, W/ DETECTABLE WARNING	EA
ITEM 340.23720	CONCRETE CURB RAMP, MAG STD. DET. 237-2, DETACHED SW, W/ DETECTABLE WARNING	EA
ITEM 340.43060	CONCRETE SIDEWALK, 6' WIDE, MAG STD. DET. 230	SF
ITEM 340.51100	CONCRETE DRIVEWAY ENTRANCE, MAG STD. DET. 250-1 (RESIDENTIAL)	SF
ITEM 340.61100	CONCRETE VALLEY GUTTER AND APRON, MAG STD. DET. 240	SF

## **SECTION 345 – ADJUSTING FRAMES, COVERS AND VALVE BOXES**

### **345.1 Description:**

Delete the fourth paragraph and replace with the following paragraph:

Any missing or defective frames, covers, valve boxes or related hardware shall be reported to the Engineer in writing during the initial location process to allow for timely replacement. The Contractor shall be responsible for providing replacement items if they are not available from the Town. The Contractor is responsible for providing items required to accomplish the required adjustments such as additional adjusting rings, valve box extensions, meter box extensions, and pull box extensions.

### **345.3 Adjusting Frames:**

Add the following paragraphs:

Manholes, monuments, valve boxes, and catch basins shall be adjusted to finished grade upon completion of paving, including slurry seals or related improvements in accordance with the following requirements:

Within paved areas, if the final grade of any surface treatment is more than 3/8" above or below the existing frame, cover, or grate, it shall be adjusted to match the final grade.

Manholes and valve boxes outside of paved areas shall be adjusted to 2 inches above finished grade and shall have a concrete collar.

Catch basins outside of paved area shall be adjusted so that ponding does not occur.

Monuments and brass caps shall be adjusted per the Town's Standard Details.

Manholes, monuments, valve boxes, and catch basins requiring adjustment and showing defects such as rocking lids, cracks, or missing material shall be replaced by the Contractor.

Access frames and covers for curb opening catch basins shall be round per MAG Detail Standard Detail No. 536-2.

### **345.4 Adjusting Valve Boxes:**

Add the following paragraph:

All valve boxes shall be adjusted to finished grade upon completion of paving, including slurry seals or related improvements in accordance with the following requirements:

- (A) All valve boxes that will be within a pavement area when construction is completed shall be per MAG Standard Detail No 391-1, Type "C" and have a lid per the Town's Standard details. Entire top surface of concrete collar shall be flush with top of valve box regardless

of whether valve is in a paved area or not. Any existing type "A" or type "B" boxes within these areas must be replaced with type "C" boxes.

- (8) Existing type "A" or type "B" valve boxes may remain within areas that will be outside of any pavement area when construction is completed, but must be adjusted to finished grade with a concrete collar per MAG Standard Detail No. 391-1, Type "C", and lids per the Town's Standard details.

### **345.5 Adjusting Manhole And Valve Covers With Adjustment Rings:**

Add the following paragraph:

When adjusting manhole frames, no more than 3 adjusting rings shall be permitted on the finished manhole riser. Bricks shall not be permitted as a material for adjusting rings.

### **345.7 Payment**

Section 345.7 of the MAG Standard Specifications is modified to add the following:

Payment for manhole, water or gas valve, survey frame and cover; and pull box grade adjustments will be made at the contract unit price per each. Such payment shall constitute full compensation for performing all of the work associated with the manhole grade adjustments as defined on the project plans and in the specifications. Adjustment rings for polymer manholes shall be polymer.

<b>ITEM 345.34000*</b>	<b>ADJUST SURVEY MONUMENT FRAME AND COVER, MAG STD. DET. 120</b>	<b>EA</b>
<b>ITEM 345.41000</b>	<b>ADJUST METER BOX, PULL BOX</b>	<b>EA</b>
<b>ITEM 345.43100*</b>	<b>ADJUST WATER VALVE BOX TO GRADE, TOQC STD DET QW302</b>	<b>EA</b>
<b>ITEM 345.51000</b>	<b>ADJUST MANHOLE, FRAME &amp; COVER, MAG STD. DET. 422</b>	<b>EA</b>

## **SECTION 350 – REMOVAL OF EXISTING IMPROVEMENTS**

### **350.1 Description**

Section 350.1 of the MAG Standard Specifications is modified to add the following:

This work shall consist of removal and salvage, disposal or relocation of various existing improvements, such as pavement, structures, pipes, headwalls, catch basins, curbs and gutters, riprap, fences, mailboxes, and other all items necessary for the accomplishment of the improvements.

Where the items are identified to be salvaged, the CONTRACTOR shall deliver the item to a location to be determined by the Town of Queen Creek. The location for salvaged item delivery shall not be located more than 5 miles from the project site. Where salvage items are to be re-installed on site, they shall remain on site.

### **350.3 Miscellaneous Removal and Other Work**

Section 350.3 of the MAG Standard Specifications is modified to add the following:

- (A) Relocate existing single and double leaf gates includes the removal, replacement, all necessary hardware, post, and foundations necessary to remove and reinstall gates as shown on the project plans. The CONTRACTOR shall inspect and document all existing conditions prior to gate removal. The CONTRACTOR shall notify and coordinate with the Town all gates in poor condition which may not warrant relocation. The Town will make the final determination of the condition and if replacement is required.



Remove and replace existing fencing in-kind includes, but not limited to, the removal, replacement, all necessary hardware, post, CMU block, steel, fencing, foundations, shop drawings, and fabrication required to remove and replace all existing fencing in-kind at the locations shown on the project plans. Existing fenced types may vary including but not limited to pipe, chain-link, steel mesh, wrought iron, block wall, or a combination of materials. The CONTRACTOR shall take inventory and document all existing fence identified to be removed. The CONTRACTOR shall develop a plan which keeps the existing parcel with the same level of fencing or approved equal during construction. At no time shall the existing fenced area be left unfenced without written consent by the property owner and approval by the Town. All new chain link fence shall be installed in accordance with MAG Specification 420 with new materials provided for all ties, clips and other hardware and foundations. All new block wall fence shall be installed in accordance with MAG Specification 510. The CONTRACTOR shall submit shop or submittal drawings for each fence type to be replaced.

- (B) Existing Mailboxes will be removed, and mail service transferred to a new cluster box unit. The CONTRACTOR shall coordinate with the Town and the United States Postal Service to avoid disruptions in service.
- (C) Sign removal includes sign panels, post, foundation, and associated hardware within the right of way. Signs designated to be relocated shall be carefully stockpiled or stored by the CONTRACTOR.

Signs designated to be removed shall be carefully removed and delivered at no additional cost to the Town Street Department at the Corporation Yard on Queen Creek Road between Signal Butte Road and Meridian Road. The CONTRACTOR shall contact Tony Garcia at (480) 358-3823 or Jan Martin at (480) 747-0583 to make arrangements for delivery to the Town.

The condition of signs that are to be salvaged or relocated shall be evaluated by the CONTRACTOR to the suitability of relocation. Any signs the CONTRACTOR deems as insufficient for reinstallation shall be documented and reported to the Town before the start of any work. Signs that are to be salvaged or relocated and are damaged or destroyed as a result of the CONTRACTOR's operations or signs which were not reported to be damaged prior to work shall be repaired or replaced by the CONTRACTOR at no additional cost to the Town. Signs may not be removed until an alternative, interim, or permanent sign has been installed.

Holes, cavities and depressions resulting from the removal of posts and post bases shall be backfilled with suitable earthen material which shall be compacted to a density of not less than 95 percent.

- (I) Fire Hydrants designated to be removed shall be carefully removed and delivered at no additional cost to the Town Street Department at the Corporation Yard on Queen Creek Road between Signal Butte Road and Meridian Road. The CONTRACTOR shall contact Tony Garcia at (480) 358-3823 or Jan Martin at (480) 747-0583 to make arrangements for delivery to the Town.
- (J) Saguaro Cacti and other native cacti to be removed or relocated shall comply with all requirements required by Arizona law and the Arizona Department of Agriculture. The CONTRACTOR shall obtain any necessary permits for cacti removal or relocations. Cacti removal or relocation permit fees will be reimbursed to the Contractor at cost with no markup from the *Allowance for Extra Work Bid Item 109.21000* with submittal of a valid payment receipt.

- (K) Payment for valve removal or abandonment in place shall be for each item completed.



- (L) Existing school zone sign and flasher device shall be inspected prior to relocation. If determined by the Town that the device is in poor condition and not functioning adequately, it shall be replaced. Relocation shall include all materials, foundations, demolition, pull boxes, cables, and associated hardware required to move the existing school zone flasher and complete the installation in working order in the final location.
- (M) Existing water meters shall be relocated wherever possible. The Town shall be responsible for determining the condition of the meter and if replacement is required.
- (N) Relocate Roadway Street Light including the luminaire arm and luminaire on the traffic signal pole as designated on the traffic signal plans.
- (O) Remove and salvage Traffic Signal Equipment shall include traffic signals poles, mast arms, signal heads, video and radar detectors, cabinets, illuminated street signs, and appurtenances.
- (P) Abandonment of the 15" Irrigation pipe where shown on the project plans shall be solidly filled with slurry or grout and capped. The cost of removal of irrigation pipe for the necessity of installation or construction of other bid items shall be paid for as an incidental cost for said item.
- (Q) Remove existing fence (private wall) shall include the removal of the existing block wall and foundation as indicated on the project plans. Where the wall is not to be replaced as part of the project, the CONTRACTOR shall construct a new end cap with foundation using conventional methods to provide the private wall with a clean and finished look. Reconstruction of the end cap shall be included in the cost of fence removal.
- (R) Other items identified for removal and replacement or relocation that are not specifically identified above shall be replaced in accordance with the associated specification section(s) for new construction.

### **350.4 Payment**

Section 350.4 of the MAG Standard Specifications is modified to add the following:

Payment for removals are noted below and shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with removing said items as described in the special provisions and on the construction plans.

Payment for remove and replace fence shall be per unit price per linear foot and shall include full payment for all new and salvaged materials, hardware, wire ties, clips, posts, post foundation concrete, post excavation and other incidental materials, labor, tools, equipment and other items and efforts to perform the work.

Any reusable traffic sign, street light, and signal salvage items will be delivered to the Town of Queen Creek Field Operations Facility yard for work within the Town Limits.

Payment for remove and salvage items noted below and shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with removing said items as described in the special provisions and on the construction plans.

Payment for relocate items noted below and shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with relocating said items as described in the special provisions and on the construction plans.

When the project does not include a pay item nor is called out on the project plans, the removal of the item shall be considered incidental to other pay items. These items shall be reported to the town prior to its removal.

ITEM 350.32320	RELOCATE EXISTING FIRE HYDRANT	EA
ITEM 350.33210*	RELOCATE EXISTING TRAFFIC SIGNAL INDICATION FACE (PEDESTRIAN MAN/HAND W/ COUNTDOWN)	EA
ITEM 350.33400	RELOCATE EXISTING SCHOOL SIGN AND FLASHER	EA
ITEM 350.40100	REMOVE EXISTING ASPHALT	SY
ITEM 350.40400	REMOVE EXISTING BOLLARD	EA
ITEM 350.42200	REMOVE EXISTING CONCRETE CURB AND GUTTER	LF
ITEM 350.42700	REMOVE EXISTING CONCRETE HEADWALL	EA
ITEM 350.43100	REMOVE EXISTING CONCRETE SIDEWALK	SF
ITEM 350.43200	REMOVE EXISTING CONCRETE SINGLE CURB	LF
ITEM 350.43510*	REMOVE EXISTING CONCRETE APRON	SF
ITEM 350.43720	REMOVE EXISTING FENCE – CHAIN LINK	LF
ITEM 350.43740	REMOVE EXISTING FENCE – PRIVATE WALL	LF
ITEM 350.43770	REMOVE EXISTING FENCE – WOVEN WIRE	LF
ITEM 350.44700	REMOVE EXISTING RIP RAP	SY
ITEM 350.44920	REMOVE EXISTING SIGN AND POST	EA
ITEM 350.45110	REMOVE EXISTING PULL BOX	EA
ITEM 350.45200	REMOVE EXISTING TREE (GREATER THAN 12")	EA
ITEM 350.50170	REMOVE EXISTING PIPE, BACKFILL & COMPACT, (DEPTH = 30" OR GREATER)	LF
ITEM 350.54120	REMOVE EXISTING PIPE, WATER LINE 6"	LF
ITEM 350.54130	REMOVE EXISTING PIPE, WATER LINE 8"	LF
ITEM 350.54150	REMOVE EXISTING PIPE, WATER LINE 12"	LF
ITEM 350.55500	REMOVE AND REPLACE EXISTING PCC DRIVEWAY	SF
ITEM 350.56700	REMOVE AND SALVAGE EXISTING TRAFFIC SIGNAL EQUIPMENT	LS
ITEM 350.56720	REMOVE AND SALVAGE EXISTING TRAFFIC SIGNAL POLE	EA
ITEM 350.56900	REMOVE AND SALVAGE EXISTING VALVE	EA

## **PART 400 – RIGHT-OF-WAY AND TRAFFIC CONTROL**

### **SECTION 401 – TRAFFIC CONTROL**

#### **401.2 Traffic Control Devices**

Section 401.2 add the following:

All traffic control devices and their application shall conform to the Manual on Uniform Traffic Control Devices (MUTCD) handbook and current revisions (United States Department of Transportation, Federal Highway Administration), the special provisions and any field modifications made by the Town Traffic Engineer or designee.

All traffic control devices shall meet the guidelines of NCHRP 350.

##### **401.2.1 Temporary Traffic Control Devices**

It shall be the responsibility of the CONTRACTOR to provide, erect, maintain, remove and/or relocate all temporary and existing traffic control devices and signal indications necessary to properly mark and control the construction area(s) for the safe and efficient movement of all roadway users.

The CONTRACTOR shall provide additional devices as determined by the Town Traffic Engineer or his/her designee, to safely control traffic.

The Town Traffic Engineer, or designee, reserves the right to make contact with the traffic control subcontractor at any time to request any materials or services deemed necessary for the safety of the public or workers. The cost of these materials or services shall be included in the cost of Traffic Control.

The CONTRACTOR shall install temporary traffic control warning signs and devices prior to the start of any work in accordance with the approved Traffic Control Plan (TCP). Each 600-foot point of the project shall be signed with construction speed limit signs, placed at locations where the need for relocation during construction is minimized.

All temporary traffic control devices shall be ballasted with sandbags or other approved ballast. The amount of sandbags used shall be enough to provide adequate safety for the traveling public and resist wind blown overturning. The CONTRACTOR shall mount signs on wind resistant, spring-type bases. The CONTRACTOR shall place flags above all temporary construction signs. The CONTRACTOR shall use warning lights to mark traffic control devices at night. The CONTRACTOR shall mount Type B high-intensity flashing warning lights on all advanced warning signs within the work zone.

The CONTRACTOR shall use an arrow board for all stationary or moving lane closures. The CONTRACTOR is responsible for all costs incurred in replacing all lost or damaged traffic control devices and traffic control warning signs.

Portable concrete barrier (PCB) installations shall be in accordance with Chapter 9 of the AASHTO Roadside Design Guide. The PCB shall use F-shape faces. Each section shall be properly connected to the adjacent section to provide barrier continuity to resist movement, snagging, and/or instability of impacting vehicle. PCB panels and connections shall meet NCHRP 350 Test Level 3.

#### **401.2.2 Pavement Markings**

Pavement markings used as an integral part of the traffic control plan shall be kept distinct and visible during their use. Temporary pavement markings shall match and meet the markings in place at both ends of their usage. Conflicting existing pavement markings or prior temporary markings shall be obliterated to prevent driver confusion.

#### **401.3 Flagmen or Pilot Cars**

Section 401.3, add the following:

All flaggers shall be properly trained and certified by either the International Municipal Signal Association (IMSA), or American Traffic Safety Services Association (ATSSA) and shall carry proof of training with them at all times. Flaggers shall use "STOP/ SLOW" paddles to control traffic; orange construction flags are not permitted.

#### **401.4 Traffic Control Measures**

Section 401.4, add the following:

##### **401.4.1 Traffic Control Plan**

Construction shall not commence without an approved Traffic Control Plan (TCP). At the time of the pre-construction meeting, the CONTRACTOR shall submit a proposed TCP for each phase of the work to the Town for approval and permit according to the Town established procedure. The review of the TCP by the Town shall be 10 working days. Plans shall be of an appropriate size and legible. Plans found to be deficient by the Town Traffic Engineer shall be returned for correction. The CONTRACTOR shall design the traffic control plan using the posted speed limit existing prior to work starting as the design speed. The TCP shall show all striping, signing, barricading and distances for all devices for all movements of roadway users during each phase of construction. The signing shall show both existing and temporary construction signs, identify conflicting signs to be covered/removed or relocated, and identify other features that may conflict with the placement of temporary signage. The TCP shall also show the duration with the start and end date of each phase. The TCP shall include all requests for lane closures or restrictions per requirements in section 105.5.1.

##### **401.4.2 Traffic Control Technician**

No Traffic Control Technician is required for this project.

##### **401.4.3 Intersection Restriction**

Off-duty Police Officers are required during any construction activity that requires interaction of construction equipment or vehicles with the open flowing traffic. Request can be made at <https://www.queencreekaz.gov/government/police-department/off-duty-officers> or using the number listed there.

##### **401.4.4 Traffic Control Devices**

The CONTRACTOR shall provide and maintain all necessary traffic control devices until acceptance of the project by the Town.

All signs shall be equipped with two orange construction flags, except "End Road Work Thank You" sign, unless noted otherwise. All construction warning signs shall have a black legend on an orange fluorescent background unless otherwise noted. The mounting height for embedded post mounted signs shall be a minimum of seven feet, and the mounting height for portable stand (rigid and spring) mounted signs shall be a minimum of five feet, measured from the bottom of the sign to the near edge of pavement elevation.

Type “A” flashing warning lights shall be required on all nighttime construction signs except the “End Road Work Thank You” sign.

For signs installed on embedded posts, the nearest edge or corner of a sign should be seven feet from the nearest edge of pavement.

With the exception of advance construction zone signing, when traffic control devices are not in use, they shall be moved at least 10 feet from the roadway and turned away from traffic so the legend is not visible to the public. This includes sign supports without sign panels. Any signs which are not in use but which cannot be moved at least 10 feet from the roadway shall be covered or turned away so the public cannot read the legends.

All existing signs in conflict with the construction signs shall be covered in place, as directed by the Town Traffic Engineer. The CONTRACTOR shall store and reinstall items which have been removed or relocated in a manner approved by the Town Traffic Engineer. The cost shall be considered as included in the price of the contract items.

Construction signs and changeable message boards, except advance construction zone signing, shall not be displayed to traffic more than 72 hours prior to the start of construction, except as required by the Town. These signs may be installed sooner but, if so they shall be covered or turned away from traffic. The cost for covering or turning them shall be considered part of the sign installation cost. No further compensation will be made. These signs shall be removed within 24 hours after the completion of the construction activities. Advance construction zone signs shall be displayed a minimum of three (3) days prior to the start of construction activities.

Vertical panels or Type II barricades shall be placed on all taper and tangent sections of the traffic control during construction. A Type “C” steady-burning yellow light shall be mounted on every vertical panel or Type II barricade during nighttime activities to delineate the edge of traveled way.

The retroreflective sheeting on all traffic control signs, barricades, vertical panels, and other work zone traffic control devices except orange signs shall meet the criteria established for Type IV, Type VIII, Type IX, or Type XI sheeting in ASTM D4956-07. All orange signs shall have fluorescent reflective sheeting and shall meet the criteria established for Type VIII, Type IX, or Type XI sheeting in ASTM D4956-07. All sign panels and their supports shall be installed to meet the current crash testing requirements.

All construction access and staging areas shall be located within the existing right-of-way or easement for the length of the project.

#### **401.4.6 Failure to Provide Adequate Traffic Control Measures**

If the CONTRACTOR fails to provide adequate traffic control measures, the Town may have the work accomplished by other sources. The cost of having this work accomplished by other sources will be computed in accordance with Section 109.5. The total cost will be deducted from monies due or to become due to the CONTRACTOR.

#### **401.5 General Traffic Regulations**

Section 401.5, add the following:

##### **401.5.6 Road Closure and Road Restrictions**

A road closure for the convenience of the CONTRACTOR is not authorized without Town approval and must be demonstrated to be required for construction and traffic safety.

No roadway closures or lane closures will be allowed during holidays or special event periods, unless otherwise approved by the Town Traffic Engineer.

The CONTRACTOR shall notify and coordinate with the Town Traffic Engineer at least 10

working days prior to any lane closures. Coordination may consist of obtaining permits, approval of work zone limits, duration of construction, special events or other concerns presented by the Town Traffic Engineer. The CONTRACTOR is responsible to obtain all necessary permits prior to commencing work.

#### **401.5.7 Minimum Lane Requirements**

The CONTRACTOR shall develop traffic control plans to maintain a minimum of one lane of travel in each direction for existing paved streets. At signalized intersections, left turn lanes shall be maintained open when possible. Left turn prohibitions shall require Town Traffic Engineer approval prior to construction. Such approval is at the sole discretion of the Town. Minimum lane requirements may be modified by Section 105.5.1.

#### **401.5.8 Temporary Lane Diversions**

For construction or trenching that requires movement of traffic from the normal travel lanes, temporary lane diversions may be used only during daylight hours and the normal traffic lanes shall be restored prior to the end of daylight hours. Traffic plates and temporary pavement shall be used to restore traffic lanes. Temporary pavement shall be a minimum of 2" thick AC on compacted subgrade per MAG 321. The Town Project Manager or the Town Traffic Engineer, under unusual conditions, may authorize exceptions.

#### **401.5.9 Regulatory Speed Limit Signs**

Appropriate regulatory speed limit sign shall be used where traffic is maintained on temporary detour roads, diversions, or on traffic lanes that are severely restricted.

#### **401.5.10 Signal Equipment Repair**

If existing signal equipment is damaged, the CONTRACTOR shall immediately notify Town's CIP Inspector and the Project Manager, in order to facilitate the prompt restoration of the traffic signal operation. All costs associated with the repair of damaged traffic signals caused by CONTRACTOR construction activity shall be borne by CONTRACTOR.

#### **401.5.11 Portable Concrete Barriers / Steel Plating**

Open excavations and trenches within 10 feet of an active traffic lane shall be protected at night and during non-working days from vehicle traffic by steel plating or the use of portable concrete barriers. Open excavations as may occur with reinforced concrete box culvert construction and other work shall require portable concrete barriers to separate vehicle traffic from the work site. The CONTRACTOR shall use Portable Concrete Barrier when construction hazards warrant, or as requested by the Town Traffic Engineer. Impact attenuation devices shall be provided by the CONTRACTOR commensurate with concrete barrier requirements.

#### **401.6 Measurement**

Section 401.6 is replaced with the following:

Measurement for Traffic Control shall be made on a lump sum basis. This item shall include all materials, equipment and labor necessary to facilitate traffic control per the contract documents. Items of Traffic Control include, but are not limited to, the obliteration of existing and temporary pavement markings or markers, portable or temporary traffic signal equipment, pilot cars, flagmen, barricades, sign panels, sign stands, warning lights, and related temporary pavements.

Measurement for Barricade, MAG Standard Detail 130, Type shall be on a Lineal Foot basis.

#### **401.7 Payment**

Section 401.7 is replaced with the following:

All elements of work necessary for traffic control 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. Payment for traffic control will be made via a contractors bid lump sum, drawn down monthly over the duration of the construction.

Payment for Uniformed Off-duty Law Enforcement Officers will be billed against allowance items 109.40120 Off-Duty Officer.

Payment for other construction fencing or pedestrian routes, if requested by the Town, shall be provided under the traffic control allowance.

**ITEM 401.21010      BARRICADE, MAG STD. DET. 130, TYPE A**

**LF**

### **SECTION 405 – SURVEY MONUMENTS**

#### **405.5 Payment**

Section 405.5 of the MAG Standard Specifications is modified to add the following:

Payment for placing survey monuments will be made at the contract unit price per each, and shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with placing the survey monuments complete in place as described in the special provisions and on the construction plans. Additionally, a new Arizona Land Survey Corner Record shall be recorded with the Maricopa County Recorder by the Contractor's RLS. A copy of the recorded document(s) shall be provided to the Town.

**ITEM 405.32000      SURVEY MARKER, MAG STD. DET. 120, TYPE B**

**EA**

### **SECTION 420 – CHAIN LINK FENCES**

#### **420.1 Description**

Section 420.1 of the MAG Standard Specifications is modified to read:

This work shall consist of constructing woven wire fences at the locations and in accordance with the details shown on the plans, and as provided in these specifications and the special provisions. When installation procedures are not covered within these specifications, standard details, special provisions, plans or other documents, installation will comply with ASTM F567.

#### **420.5 Payment**

Section 420.5 of the MAG Standard Specifications is modified to add the following:

The price bid and paid per linear foot for woven wire fence shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all the work involved in constructing the fence complete in place as specified on the plans, and in the special provisions.

**ITEM 420.37000      WOVEN WIRE FENCE, ADOT STD C-12.10, TYPE 4**

**LF**

## **SECTION 430 – LANDSCAPING AND PLANTING**

### **430.1 Description**

Modify the first paragraph to read:

Section 430.1 of the MAG Standard Specifications is modified to add the following:

The work under this section shall consist of furnishing all labor, materials, and equipment to install decomposed granite, trees, plant material, gravel mulch as designated for installation on the project plans.

Modify the second paragraph to read:

Existing utilities and improvements not designated for removal or relocation shall be protected in place. Determine the location of underground utilities (call Blue Stake) and perform all work in a manner which will avoid possible damages to the utility. The Contractor shall repair any damages at no additional cost to the Owner. Hand excavate around utilities as required.

### **430.2 General**

Section 430.2 of the MAG Standard Specifications is modified to add the following:

The Contractor shall furnish all labor, materials, equipment, incidental and appurtenant items of work needed to install the landscape, to the extents and details shown in the plans.

#### **430.2.1 Repair of Existing Landscape Areas**

Add entire subsection:

The project work includes the addition of sidewalks, ramps and curb and gutter, box culverts and installation or replacement of underground utilities including water, irrigation and various electrical and communication lines. The installation of these new curb and gutter, sidewalk sections, box culverts and underground utilities will impact existing landscape and irrigation systems. It is anticipated that the construction of the sidewalk and channel grading will disturb the existing landscape and irrigation. The CONTRACTOR shall make the necessary landscape and irrigation repairs necessary to restore the landscape areas disturbed by the curb and walk installations. The CONTRACTOR shall take all measures to provide temporary irrigation for existing landscaping to maintain health of said landscaping.

The CONTRACTOR and the Town representative shall inspect all landscape and irrigation that is expected to be impacted prior to the start of construction activities. The purpose of the inspection will be to establish the existing condition of the landscape and irrigation systems. This inspection shall set a minimum level of performance that the CONTRACTOR shall meet with the restoration activities.

The landscape repairs (where occurs outside right-of-way) will consist of plant replacement, decomposed granite installation, boulder relocation, concrete header saw cutting, repair or replacement. Salvage and replacement of existing decomposed granite is an acceptable alternative to installation of new granite. Salvaged granite shall be free from dirt and when reinstalled, shall be washed to clean granite after installation.

The irrigation repairs and replacement will consist of drip emitter and distribution line adjustment, drip PVC and poly lateral line adjustment, and adjustment to existing turf spray heads, remote control valves with wye filters and associated wiring, pressure regulators and valve boxes for drip systems, turf control valves with valve boxes, as well as adjustment or



relocation of other existing spray heads to minimize overspray. No heads shall spray over sidewalk towards roadway.

Landscape rock materials (if not salvaged) shall match the existing color and gradation. Replacement plant materials shall be sized as follows ground covers- 1-gallon, shrubs- 5 gallon, trees- 36" box (with dual 3" diameter lodge pole pine stakes). Turf, shall be by seeded hybrid Bermuda.

Irrigation equipment shall be commercial grade equal to or better than that which is existing. All new sprinkler piping shall match existing pipe sizes and material. Any new pipe shall be schedule 40 PVC. All fittings shall be schedule 80 for mainline or schedule 40 for lateral lines. All remote-control valve wiring shall be 14 AWG UF-600 for direct burial. Wire splices shall be Dri-splice. All emitters shall be pressure compensating. Turf spray heads shall be 4" pop-up RainBird 1804 or equal.

CONTRACTOR shall operate all irrigation within and around all disturbed construction areas to confirm both new and existing irrigation is operational (existing irrigation as determined to be operational prior to construction only) by controllers and emitting water to all plants and grass without leaks or excessive overspray.

All repair of existing landscape areas shall be guaranteed for one year from the time of project acceptance.

All hardscape in the vicinity of repairs shall be swept clean and washed down by hose prior to final acceptance.

See Plans for the locations of proposed improvements. Existing landscaped areas adjacent to all these locations shall be restored or repaired to the satisfaction of the private property owner (if applicable) and the Town Project Manager.

Add new subsection as follows:

#### **430.2.2 Quality Assurance**

Provide trees, shrubs and ground cover of quantity, size, genus, species, and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 American Standard for Nursery Stock and Arizona Nursery Standards.

Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, abrasions, or disfigurement. The Landscape Architect/Town Representative shall inspect all trees and shrubs either at the place of growth or at the site prior to planting for compliance with requirements for genus, species, variety, size, and quality. If the trees at the source do not meet approval, contractor shall find and arrange to review trees for approval at alternate sources.

The Landscape Architect/Town Representative reserves the right to further inspect trees and shrubs for size and condition of root ball and root system, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during the progress of the work. Remove rejected trees, shrubs or ground cover immediately from the project site.

Tags: Tags shall be on all trees supplied by growers and shall be left on the trees after planting. Shrub plant material shall have identification tags on 10% of the total quantity of each species. All Plants: (Waterproof tag bearing legible designation of botanical and common name)

patented or trademark plants must all bear appropriate tags.

Add new subsection as follows:

#### **430.2.3 Approvals**

Irrigation system work shall be inspected for recommended approval by the Landscape Architect/Town Representative prior to start of any work in this section.

Add new subsection as follows:

#### **430.2.4 Project Conditions**

Subsurface Improvements:

Protection: Protect all existing underground and surface utility structures.

Repair: Restore all damaged improvements to original condition at no cost to Owner.

Add new subsection as follows:

#### **430.2.5 Submittals**

Materials lists: Within forty-five days of award of the Contract, submit a complete list of materials proposed to be furnished and installed under this Section, demonstrating complete conformance with the requirements specified.

Materials list shall include the weed control materials and quantities per acre intended for use in controlling the weed types prevalent and expected on the site, as supplied by the Pest Control Advisor. Pest Control Advisor shall furnish the Landscape Installer and Landscape Architect/Town Representative with data demonstrating the compatibility of the weed control materials and methods with the intended plant and seed varieties.

Documentation: Submit documentation within 30 days after Award of Contracts that all trees and shrubs have been ordered. Arrange procedure for review of plants at time of submission.

Certificates: Deliver all certificates to the Landscape Architect/Town Representative upon delivery to job site. Include:

Quantity of commercial fertilizers used.

Quantity of soil amendments.

Quantity of plant material.

If tagged plants are not observed by the Town, then submit photos of all plants proposed. Each photo shall include a readable scale in each photo (and person in photo for trees). Landscape Architect/Town Representative shall be notified when all plants are delivered to the site. No plants shall be removed off the truck without approval by the Landscape Architect/Town Representative.

Add new subsection as follows:

#### **430.2.6 Delivery, Storage, And Handling**

Contractor shall notify the Landscape Architect/Town Representative 48 hours prior to any plant material being delivered to the site. Protect plant material from deterioration during delivery and

while stored at the site. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches, or destroy natural shape. Do not drop boxes during delivery.

Do not prune prior to delivery unless otherwise approved by the Landscape Architect/Town Representative.

Deliver plant material after preparations for planting have been completed and plant immediately.

Do not install plant life when ambient temperatures may drop below 35 degrees F or above 105 degrees F.

Do not install plants when wind velocity exceeds 20 mph.

Replacements: In the event of damage, immediately make repairs and replacements as necessary to the recommended approval of the Landscape Architect/Town Representative at no additional cost to the Agency.

Add new subsection as follows:

#### **430.2.7 Responsibility and Coordination During Weed Abatement**

During Weed Abatement procedures, the Landscape Installer is responsible for the erection of signs and barriers required to prevent intrusion into the treated areas and to notify the public.

No material or methods used for Weed Abatement shall affect the landscape planting. No material or method shall render the job site unusable for more than ten days from date of application.

#### **430.3 Lawn Areas:**

Delete Section in its entirety

#### **430.4 Decomposed Granite Area**

Delete in its entirety and replace with:

##### **A. Decomposed Granite**

1. Decomposed granite (Gravel Mulch) shall be native, local, desert, decomposed granite stone at the size and color specified on the plans. The decomposed granite shall be from a single source, free from coating, clay, caliche or organic matter. Contractor shall provide Town Inspector with a sample of material for approval before installation. Multiple samples may be required.
2. Contractor must examine the subgrade, verify the elevations, and observe the conditions under which the work is to be performed. The existing grade shall be fine graded and raked free of organic matter and other debris 1-inch diameter and larger. Contractor shall apply one application of pre-emergent herbicide as per manufacturer's directions prior to installing granite, one application after granite has been installed, compacted and raked level and one application 30 days prior to the end of the maintenance period. The Town Inspector is to be notified prior to all pre-emergent applications.
3. Installed granite shall be raked to remove any irregularities. Installation shall provide a minimum two-inch depth of decomposed granite after compacting. Methods of compacting such as rolling, etc., shall be approved by the Town Inspector. Unless otherwise specified in the drawings, granite finish grade shall be one (1) inch below top of curb or adjacent sidewalk surfaces.

4. All disturbed (non-seed) areas shall be treated with a pre-emergent weed spray "Gallery", or an approved equal. In addition, any existing weeds or Bermuda grass shall be treated with a post-emergent spray, such as "Round-up", or an approved equal. Any existing or new trees, vegetation or adjacent crops shall be protected from the spray drift. There will be no separate payment for the weed spraying. Bermuda grass or weeds must be completely eradicated where designated by the Engineer from landscape, sand or decomposed granite areas.

#### **430.4.1 Decomposed Granite ½-Inch Screened (Gravel Mulch)**

Contractor shall supply and place decomposed granite in areas designated on the plans. Gradation requirements are as follows:

Decomposed Granite 1/2 Inch Screened

Sieve Size	Percent Passing
1/2 Inch	100
1/4 Inch	50-60

Contractor shall provide 1-gallon volume samples to the Town of Queen Creek for all granite specified for approval by Town Representative and Landscape Architect prior to placement.

Rock color and source: Rock shall be "Superior Gold" as manufactured by Kalamazoo Materials Inc. contact: Tracey Lockwood (480) 349-0632, or approved equal.

All disturbed areas shall be treated with a pre-emergent per the plans and details and any active weed growing area with a post-emergent spray, such as "Round-up" or an approved equal. There will be no separate payment for the weed spraying. Bermuda grass or weeds must be completely eradicated where designated by the Town of Queen Creek from landscape or decomposed granite areas. All weed control products and the Town of Queen Creek shall approve herbicides for use prior to any applications. Contractor shall submit copies of all manufacture specifications and application rates to the Town for review and approval prior to application. Herbicides and weed control shall only be performed by a licensed applicator; Contractor shall supply information on applicator to the Town of Queen Creek for approval. Contractor shall apply two applications of pre-emergent herbicide- the first at the time of granite installation and the second within one week prior to the end on the maintenance period. The Contractor shall contact the Engineer prior to herbicide application so that the Engineer can inspect the proper mixing and application of the herbicide. The Contractor shall guarantee a weed free condition will exist for a 6-month period following the end of maintenance of the project. Should any weeds occur the Contractor shall remove and dispose of all weeds and reapply the pre-emergent herbicide again at no cost to the Town. The Contractor shall again guarantee a weed free condition for an additional 6 months.

#### **430.4.2 Salvage and Replace Existing Granite**

If enough quantity is available, CONTRACTOR may salvage and replace decomposed granite in areas new construction disturbs existing landscaped areas. Otherwise, install new granite to match existing granite per 430.4.3. Granite shall be installed so that the finish grade of the top of the granite is 1" below the top of adjacent walks, driveways and ramps and flush with existing granite. Granite shall be installed per section 430.4 paragraphs above.

### 430.5 Tree, Shrub, And Ground Cover Planting

Delete and replace with the following:

#### 430.5.1 Materials

All materials shall conform to the requirements of this section of the Specifications, except as modified herein.

#### 430.5.2 Amended Planting Soils

Contractor shall have a minimum of 2 two soil agronomy tests performed by a certified testing agency and recommend soil amendments to be added to the backfill for the planting of trees and shrubs. The following backfill amendments may be modified as recommended by the testing agency. Submit test results to Town Representative.

Uniformly blend the following materials per cubic yard:

Clean native soil at 75% volume,

25% organic mulch (humus) by volume:

Composted nitrogen fortified with maximum particle size of 1/4 inch,

Boron less than 1.0 ppm,

Total soluble salt concentrations less than 3.0 mmhos/cm.

No animal manures.

1.5 lbs. 15-15-15 plus 9% sulfur commercial fertilizer,

1.5 lbs. agricultural sulfur (fine ground),

2.0 lbs. magnesium sulfate (9.8% Mg),

0.75 bs. ferrous sulfate (31%Fe),

0.50bs. manganese sulfate (28-30% Mn),

0.50lbs. of zinc sulfate (35.5%Zn).

0.20bs of Mitogrow root stimulant, [www.mitogrow.com](http://www.mitogrow.com) (702) 492-9700

10% Clean Course Sand by volume: Course sand sieve analysis shall have 100% passing a #4 sieve with minimal passing through a #200 sieve.

15% minimum Soil Conditioner by volume:

PRODUCT	BULK DENSITY	APPLICATION RATE
AXIS	22 lbs/cuft.	15% by volume or,
Turfacer	33-38 lbs/cuft	30% by volume or,
Approved Equal	To be determined	

AXIS: [www.axisplayball.com](http://www.axisplayball.com) (EnviroTech Soils Solutions Inc.) (866) 546-3722

Turfacer: [www.turfacer.com](http://www.turfacer.com) (Profile Products LLC) (800) 207-6457

0.5 lb. superphosphate,

Material shall comply with the following:

Nitrogen	0.0%
Potassium	9.0% min.
Phosphorus	0.0%
Sulfur	10% Min.
Manganese	0.0%
Calcium	20.0%

1.0 lb. iron sulfate,

Material shall be fine granular with the following criteria and shall comply with American Water Works Association AWWA specification B402-90:

Iron	30.0% min.
Sulfur	18% min.
Oxygen	35% min.
Water	14% Min.

#### **430.5.3 Planting Tablets**

Fertilizer planting tablets shall be tightly compressed commercial grade planting tablets having a 12-8-8 formula, weighting 7 grams each, as "Gro-Power" or Scotts Agriform 20-10-5, weighting 10 grams each planter tablets or approved equal. The planting tablets shall be delivered to the site in the original, unopened containers, bearing the manufacturer's guaranteed analysis. Damaged tablets will not be accepted.

CONTAINER SIZE (AS APPLIES TO PROJECT)	QUANTITY
1 Gallon	1 Ea.
3 Gallon	2 Ea.
5 Gallon	2 Ea.
24-inch Box	6 Ea.
36-inch Box	8 Ea.
48-inch Box	12 Ea.

#### **430.5.4 Plant Materials**

Nomenclature: The scientific and common names of plants herein specified conform to industry standards. (Refer to list of plant materials on Drawings).

Labeling: Each group of plant materials delivered to the site shall be clearly labeled as to species and variety and nursery source.

Quality and size:

Plants shall be in accordance with the Arizona State Department of Agriculture's regulation for nursery inspections, rules and grading. Plants shall have a normal habit of growth and shall be sound, healthy, vigorous, and free of insect infestations, plant diseases, sun scalds, fresh abrasions of the bark, excessive abrasions, or other objectionable disfigurements. Plants shall have normally well-developed branch system, with vigorous and fibrous root systems which are not root or pot bound. In the event of disagreement as

to condition of the plants furnished by the Contractor in containers will be determined by removal of earth from the roots of not less than two plants or more than 2% of the total number of plants of each species or variety. Where container grown plants are from several sources, the roots of not less than two plants of each species or variety from each source will be inspected. In case the sample plants reviewed are found to be defective, the Landscape Architect/Town Representative may judge acceptability. Any plants rendered unsuitable for planting because of this review will be considered as samples and will be provided at the expense of the Contractor.

The size of the plants will correspond with that normally expected for species and variety of commercially available nursery stock and in accordance with Arizona Nurserymen Association for tree sizes, or as specified in the special Conditions or Drawings. The minimum acceptable size of plants measured before pruning with the branches in normal position, shall conform to the measurements, if any, specified on the Drawings in the list of plants to be furnished. Plants larger in size than specified may be used with the recommended approval of the Landscape Architect/Town Representative, but the use of larger plants will make no change in contract price. If the use of larger plants is recommended for approval, the ball of earth or spread of roots for each plant shall be increased proportionately.

**Rejection or Substitution:** Plants not conforming to the requirements herein specified shall be considered defective, and such plants, whether in place or not, shall be marked as rejected and immediately removed from the site of the work and replaced with new plants at the contractor's expense. The plants shall be of the species, variety, size and condition specified herein or shown on the drawings. Under no condition will there be any substitution of plants or sizes for those listed on the accompanying plans, except with the expressed written consent of the Landscape Architect/Town Representative.

**Pruning:** At no time shall the tree or plant materials be pruned, trimmed or topped prior to delivery, and any alteration of their shape shall be conducted only with the recommended approval and when in the presence of the Urban Forester.

**Protection:** Plants shall be handled and stored so that they are adequately protected from drying out, from wind burn, or from other injury.

**Right of Review:** The Landscape Architect/Town Representative reserves the right to recommend approval or rejection at any time upon delivery or during the work, any or all plant material regarding size, variety or condition.

**Plant Availability:** Due to high demand or limited availabilities at sources, it is recommended all plants are sought after secured at beginning of this project. Please be advised sources for plants were available when specified. The contractor shall not limit source availability to Arizona. Contractor shall look to other states outside Arizona to find and secure plant material.

#### **430.5.5 Import Soil for Plants**

Import soil: pH shall not exceed 7.8, with boron less than 1.0 ppm and total soluble salt concentrations less than 3.0 mmhos/cm.

#### **430.5.6 Tree Staking And Guying**

For Trees Under 2.5" Caliper:

Stakes: Stakes supporting trees shall be minimum 3" diameter Lodge pole Pine or Douglas  
A1405 Power Rd – Riggs Road to Chandler Heights Road

Fir and capable of standing in the ground at least two years.

Ties: Tree ties shall be "Twist-Brace" (TB-24) black in color for standard application, and "Wonder-Ties" for multi-applications. Install tree ties and indicate on the drawings.

For trees between 2.5" and 4" Caliper:

"Arbor Brace Tree Guying System" #ATG-R [www.treestaking.com](http://www.treestaking.com) or approved equal: (3) Polypropylene guy lines 3/4"x12'=800 lb. test, olive drap, UV resistant

(3) Nickle plated non-rusting or stainless-steel spring cam-lock tension clips.

(3) Arrowhead Nylon Anchors (4"x3-3/4")

For trees between 4" and 6" Caliper:

"Arbor Brace Tree Guying System" #ATG-R [www.treestaking.com](http://www.treestaking.com) or approved equal: (3) Polypropylene guy lines 1"x12'=1,000 lb. test, olive drap, UV resistant

(3) 1-1/4" Nickle plated non-rusting or stainless steel spring cam-lock tension clips (1,500 lb. break strength).

(3) Arrowhead Nylon Anchors (5-1/2"x4-1/2")

For Trees over 6" Caliper:

Tree shall be reviewed and evaluated by Town Representative to determine if bracing is required and bracing system to use.

Note: Is it encouraged to only stake trees if absolutely necessary. Remove all Nursery supplied stakes.

Prior to the start of work, trash and deleterious materials on the surface of the ground shall be removed and legally disposed of.

#### **430.5.7 Weed Abatement**

Prior to the installation of the irrigation system, weed growth shall be removed from within the areas designated to be cleared and grubbed.

Existing perennial grasses and weeds in the planting areas will require control prior to removal, spray these areas in accordance with product manufacturer recommendations and in accordance with (AZDA) State of Arizona Department of Agriculture, Pest Management Division recommendations for weed control. Allow herbicide to kill weeds. Rake or hoe off dead weeds to a depth of one to two inches below the surface of the soil. Physically remove weeds from the site.

Upon completion of the irrigation system and rototilling of soil amendments into the soil and immediately preceding the installation of plant material, perform weed abatement as follows, and per AZDA and manufacturer's recommendation.

Apply by spray a non-selective herbicide to eradicate existing weeds. Do not irrigate for seven days after application.

Remove weeds after herbicide has had time to sufficiently kill. Remove dead weeds by rake or hoe to a depth of one to two inches below the surface of the soil. Remove weed residue and top growth and dispose of in a legal manner.



#### **430.5.8 Tree and Shrub Installation**

Planting and bare dirt areas are to be treated with a pre- emergent chemical (subject to approval by Landscape Architect/Town Representative prior to application). Chemicals are to be applied by a State of Arizona licensed Pest Control Agent at the rates recommended by the manufacturer. This treatment shall be applied at the following times during the contract: a) before planting, b) at the beginning of plant establishment period, and c) at the end of the plant establishment period.

Actual planting shall be performed during those periods when weather and soil conditions are suitable and in accordance with locally accepted practice, as reviewed by the Landscape Architect/Town Representative.

Irrigation work shall have been reviewed by the Landscape Architect/Town Representative prior to beginning any planting.

Installation of plant material shall be in accordance with the details on the Landscape Plans.

Locations for plants and outlines of areas to be planted shall be marked on the ground by the Contractor before any plant pits are dug. Such locations shall be reviewed by the Landscape Architect/Town Representative. If an underground construction or utility line is encountered in the excavation of planting areas, notify Landscape Architect/Town Representative so that other locations for planting may be selected.

##### **Excavation for Planting:**

Excavation for planting shall include the stripping and stacking of acceptable topsoil encountered within the areas to be excavated for trenches, tree holes, plant pits, and planting beds.

Protect areas from excessive compaction when trucking plants or other material to the planting site.

Excavated holes shall have vertical sides with roughened surfaces and shall be of a size that is at least two times the width and depth of the original plant container. The holes shall be large enough to permit handling and planting without injury or breakage to the roots or root ball.

##### **Planting:**

No planting shall be done in any area until the area concerned has been satisfactorily prepared in accordance with these Specifications.

All plant root balls shall be moist upon arrival at site and kept that way through planting and approval final working irrigation system with whatever means necessary including; hand watering, hose, water truck, temporary or permanent irrigation system.

No more plants shall be distributed in the planting area during a single day than can be planted and watered on that day.

Containers shall be cut and plants shall be removed in such a manner that the ball of earth surrounding the roots is not broken and they shall be planted and watered as herein specified immediately after the removal from the containers. Containers shall not be cut prior to placing the plants in the planting area.

Three inches of amended backfill shall be thoroughly mixed with three inches of native soil at the bottom of each hole to provide a transitional soil mix of at least six inches between

the native soil and the backfill.

Clean/screened Native soil (no rocks over 1") shall be placed at the bottom of each hole, and thoroughly compacted to a height that when a plant is placed in the hole, its root crown is 1-inch above the established final grade for trees and 1/2"-inch for shrubs. Plants which settle deeper than specified above shall be raised back to the correct level. After the plant has been placed, add amended backfill to the hole to cover approximately one half the height of the root ball. At this stage, water shall be added to the top of the partly filled hole to thoroughly saturate the root ball and adjacent soil.

After the water has completely drained, fertilizer tablets shall be placed in the quantity and locations as recommended by the manufacturer of the tablets.

The remainder of the hole shall then be backfilled with amended soil.

Set the tablets to be used with each plant on the top of the root ball while the plants are still in their containers so the required number of tablets to be used in each hole can be easily verified.

Remove all nursery stakes, ties, and tags above and below ground. Trees must stand vertical (plumb) prior to staking to be acceptable.

Top of root ball is defined at the location of the uppermost lateral root, not the soil level in the plant container. Top of root ball to be 1" above existing grade – no native soil or backfill to be placed on top of the root ball.

Backfill hole with planting mix in layers, tamp soil at 50% total backfill depth and water/soak before adding more soil. Root ball shall not be allowed to dry out either before, during, or after planting.

#### **430.5.9 Watering Irrigated Plants**

Apply water to planted areas during operations and thereafter until acceptance of the work.

Immediately after planting, apply water to each shrub by means of a hose. Apply water in a moderate stream in the planting hole until the material about the roots is completely saturated from the bottom of the hole to the top of the ground.

Apply water in sufficient quantities and as often as seasonal conditions require to keep the planted areas sufficiently moist at all times well below the root system of plants. DO NOT OVERWATER.

Intervals between irrigation (OFF) sequence should be judged by the length of the time mulch remain damp. Once the mulch begins to dry out, the water (ON) sequence should be repeated.

#### **430.5.10 Plant Establishment and Maintenance Period**

The Contractor shall continuously maintain areas involved in this contract during the progress of the work and during the establishment and maintenance period until final acceptance of the work by the Landscape Architect/Town Representative.

Plant establishment and maintenance period: The contractual establishment and maintenance period shall be for no less than 1-year after substantial completion has been granted. The contractual establishment period begins on the first day after planting on this project is completed and accepted and the planted areas are brought to a neat, clean, and weed free condition.

Days upon which no work will be required, as determined by the Landscape Architect/Town

Representative, will be credited as one of the plant establishment working days regardless of whether or not the Contractor performs plant establishment work.

Days when the Contractor fails to adequately maintain plantings, replace unsuitable plants, or do weed control or other work, as determined necessary by the Landscape Architect/Town Representative, will not be credited as one of the plant establishment working days.

In order to carry out the plant establishment work, the Contractor shall furnish sufficient workers and adequate equipment to perform the work during the plant establishment period.

Improper maintenance or possible poor condition of any planting at the termination of the scheduled establishment period may cause postponement of the final acceptance of Plant Establishment. Contractor shall bear all costs for extension of the Plant Establishment/Maintenance period.

Areas shall be kept free of debris, and planted areas shall be weeded at intervals of not more than ten days apart in duration. Hand watering, trimming, pruning, fertilization, grooming landscape rock spraying, and pest control, shall be performed as required and shall be included in the establishment period. Maintenance shall include pest control.

The Contractor shall maintain the irrigation systems in a like new operating condition, adjusting head heights and spray arcs as necessary. The Contractor is responsible for proper watering of planting areas, for providing necessary supplemental water as may be required, and shall replace material damaged due to improper moisture.

During the maintenance period, the Contractor shall be responsible for maintaining adequate protection for planting areas. Damaged areas shall be repaired and plant materials replaced at the Contractor's expense.

The Contractor's maintenance period will be extended past 360 days if these provisions are not filled.

Repair and re-groom all decorative rock areas damaged by contractor's vehicle traffic. Work includes sweeping any decorative rock off adjacent pavement areas.

Replace dead or damaged plants of the same species and size within 1 week of notification.

Maintenance work shall not disrupt or pose any safety risks to the public using the roadways surrounding these landscaped areas. All work shall be coordinated and approved in advance with the Landscape Architect/Town Representative.

#### **430.5.11 Guarantee and Replacement**

All plant material installed under the contract shall be guaranteed against poor, inadequate, or inferior materials and/or workmanship for a period of one year after substantial completion is granted. Any plant found to be dead or in poor condition due to such faulty materials or workmanship, as determined by the Landscape Architect/Town Representative, shall be replaced by the Contractor at his expense.

Material found to be dead, missing, or in poor condition during the establishment period shall be replaced within 24-hours. The Landscape Architect/Town Representative shall be the judge as to the condition of material. Material to be replaced within the guarantee period shall be replaced by the contractor within 5 days of written notification by the Landscape Architect/Town Representative.

Replacement shall be made to the same specifications required for original plantings within five working days after written notification.

Material and Labor involved in the replacing of material shall be supplied by the Landscape Contractor at no additional cost to the City.

#### **430.5.12 Reviews**

Normal progress reviews shall be requested from the Landscape Architect/Town Representative at least 4 days in advance of an anticipated inspection. A review will be made by the Landscape Architect/Town Representative on each of the steps listed below. The Contractor will not be permitted to initiate the succeeding steps of work until he has received written recommendation of approval to proceed by the Landscape Architect/Town Representative.

Immediately prior to the commencement of the work on this Section.

Spotting of shrubs, trees and palms, and minor adjustments prior to planting.

Final review, start of establishment and maintenance period.

After plant establishment and maintenance.

Final acceptance of project at the end of the plant establishment period.

#### **430.13 Measurement and Payment**

Add the following:

Payment for ½" screened Decomposed Granite Gravel Mulch (Superior Gold), 2" Thick shall be at the contract unit price per square yard for all areas of new installation. The unit price shall be considered full compensation for the complete in-place placement and shall include all cost, materials, equipment, labor and operations necessary as described herein and on the project plans.

Payment for installation of decomposed granite pre-emergent shall be paid at the contract unit price per square foot for areas to receive new decomposed granite gravel mulch. The unit price shall be considered full compensation for the complete in-place placement and shall include all multiple treatments, cost, materials, equipment, labor and operations necessary as described herein and on the project plans.

Payment for Plant Establishment Maintenance Warranty shall be at the contract unit price of lump sum based on providing all labor and materials to inspect and maintain all landscape and irrigation improvements for all areas of new installation. The unit price shall be considered full compensation for the complete in-place placement and shall include all cost, materials, equipment, labor and operations necessary as described herein and on the project plans.

<b>ITEM 430.45000</b>	<b>DECOMPOSED GRANITE PRE-EMERGENT</b>	<b>SF</b>
<b>ITEM 430.50136</b>	<b>TREE – 36" BOX</b>	<b>EA</b>
<b>ITEM 430.50205</b>	<b>PLANT – 5 GAL</b>	<b>EA</b>
<b>ITEM 430.53110</b>	<b>GRAVEL MULCH – (2" THICK)</b>	<b>SY</b>
<b>ITEM 430.53120</b>	<b>GRAVEL MULCH – (3" THICK)</b>	<b>SY</b>
<b>ITEM 430.90000</b>	<b>PLANT ESTABLISHMENT MAINTENANCE</b>	<b>LS</b>

### **SECTION 440 - SPRINKLER IRRIGATION SYSTEM INSTALLATION**

Sprinkler irrigation system shall conform to Section 440 of the MAG Uniform Standard Specifications except as modified herein.

#### **440.2 General**

Add the following:

All irrigation materials and equipment installed shall be warranted for a period of no less than 1-year from date of project completion. Contractor shall repair and replace at no cost to the agency any irrigation item(s) that fall into disrepair or fails regardless of cause. Repairs shall be made within 24 hours of notification or sooner within plant establishment period. Any irrigation lines being installed under existing pavement and features that will not be replaced with the project shall use trenchless methods for installation.

All residential property existing irrigation systems that extend into the Right-of-Way shall be removed and capped at the property line. Coordinate and schedule existing irrigation system modifications with each property owner. See also section 430 regarding modifications to existing landscape and irrigation systems within private property. All turf, trees, shrubs, and groundcovers that will remain and be repaired outside Right-of-Way impacted by new construction shall receive 100% irrigation coverage to ensure existing/new plant health is flourishing.

#### **440.3 Materials**

Replace with the following:

Prior to start of construction, the contractor shall submit shop drawings per section 105 and product information for all products and materials specified that shall conform per Section 757.

Contractor shall circle all items proposed for installation for review and only submit those products circled. Failure to identify all products and materials for installation in submittal will be rejected. Submittals shall contain the following:

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Wiring Diagrams: For power, signal, and control wiring.
- C. Coordination ("As-built") Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.
- D. Zoning Chart: Show each irrigation zone and its control valve.
- E. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- F. Field quality-control reports.
- G. Operation and Maintenance Data: For controllers and automatic control valves to include in operation and maintenance manuals.

Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- A. Emitters: Equal to one percent of amount installed for each type indicated, but no fewer than 25 single units and 10 multi-port units
- B. Drip-Tube System Tubing (Flexible PVC): Equal to one percent of total length installed

for each type and size indicated, but not less than 100 feet (30 m).

Single-outlet Drip Emitters: Device to deliver water at approximately 20 psig (138 kPa).

1. Body Material: PE or vinyl, with flow control. Emitters shall be of the permanently assembled, pressure compensating, single outlet type with ½" FPT inlet. The flow rate per outlet shall be nearly the same at inlet pressures of 5 to 50 psi. The single outlet emitter manufacturer and model shall be as noted on the Project Plans.
2. Riser to Emitter: PVC flexible tubing, 1/2-inch outside diameter.

Application Pressure Regulators: Integral with the Filter Unit.

Flexible PVC Tubing:

- A. Flexible thick-wall PVC Flex Hose (flexible PVC) shall contain a special chemical that inhibits the growth of algae within the hose. It is compatible with off-the-shelf fittings, adaptors, adhesives, most emitters as well as chemicals and fertilizers normally used in irrigation systems. Pipe sizes: 1/2-inch, 0.68 O.D., 0.090 Wall; 3/4-inch, 1.05-inch O.D., 0.150-inch Wall.
- B. Use for emitter sub-laterals between the hard pipe PVC laterals and the emitters and for the emitter risers. For straight lengths of pipe from the PVC lateral to the emitter location that exceed 6 feet, Class 315 PVC pipe may be used between the lateral and the 45-degree elbow at the emitter riser. Loops for trees shall be done using flexible PVC.
- C. Joints: Solvent welded conforming to the manufacturer's instructions. Male adapter fittings shall be solvent welded to the end of the emitter riser to accept the threaded emitter.
- D. Filter Units –Pressure Regulating:
  1. Basket type glass-filled nylon body with removable, 120 mesh, stainless steel screen; male pipe threads on ends, 3/4-inch or 1-inch to match the valve size.
  2. Quick filter replacement by removing threaded top with O-ring and indicator that tells when to clean the filter. Shall have a no-spill feature to make sure dirt doesn't fall back into the filter during cleanup operation.

Controller: Controller Stations for Automatic Control Valves: Each station is variable from approximately one minute to 9.55 hours. Include switch for manual or automatic operation of each station. Controller shall include the following (no substitutions):

- A. Weathermatic Smartline solar controller #SL4800SLR-1YR-BDL-FLOW; with the following,
- B. Conventional wire system,
- C. Weathermatic #SLPED-ENC stainless steel pedestal,
- D. Weathermatic #SLW1 wireless weather station,
- E. (2) batteries with connections,
- F. (2) Weathermatic #SLSOLAR-48 solar array panels and pole (pole shall be supplied by Contractor),
- G. Voltage meter,
- H. DC/AC converter,
- I. Weathermatic #SL-AIRCARD
- J. Pre-wired, & extended (2) year warranty.
- K. Contractor to provide concrete pad and galvanized post for mounting solar panels & weather station per detail.
- L. Timing Device: Adjustable, 24-hour clock, with automatic operations to skip operation

any day in timer period, to operate every other day, four independent programs that can overlap, 8 start times per program:

1. Manual or Semi-automatic Operation: Allows this mode without disturbing preset automatic operation.
2. Program Day Cycles: Custom days of the week, odd and even days, skip days.

Flow Sensor: Weathermatic #SLFSI-T10 Smartlink PVC tee style insert flow sensor with HDPE impeller & Buna-n O-ring with flow range of 0.86-52 GPM; in Carson #910 tan valve box with bolt down t-cover.

#### **440.6 Pipe Installation**

Replace the fourth paragraph with the following:

When conduit is to be installed under existing asphalt or concrete which is to remain, the CONTRACTOR shall use jacking, boring, or hydraulic driving methods only. Where piping on the drawings is shown under paved areas, but running parallel and adjacent to planted areas, the intent of the drawings is to install the piping in the planted area.

#### **440.8 Sprinkler Head Installation and Adjustment**

Add the following:

(D) Drip irrigation specialty installation: Install single-outlet emitters on flexible PVC pipe riser to the mounting height indicated. Emitters shall be located as shown on the plans.

1. Tree emitters shall be placed where location on the plans. In no case shall the emitters be grouped around the base of the tree.
2. Emitters for shrubs with one emitter shall be placed approximately 14 inches from the center of the shrub.
3. Emitters for shrubs with two emitters shall be placed approximately 16 inches from the center of the shrub, equally spaced around the perimeter.

#### **440.9 Automatic Control System Installation**

Add the following:

Contractor shall contact Weathermatic (888) 484-3776 to obtain name of local representative to order system and coordinate installation of system. Work shall also be coordinated with Town of Queen Creek staff for initial startup, operation and connection to Town's operating system via Aircard. All work shall be installed in accordance with Weathermatic's recommendations and as noted on the plans.

#### **440.11 Measurement and Payment**

Add the following:

<b>ITEM 440.41000 IRRIGATION CONTROLLER ASSEMBLY SYSTEM</b>	<b>EA</b>
<b>ITEM 440.60030 PIPE – PVC – SCHEDULE 40 - 1"</b>	<b>LF</b>
<b>ITEM 440.60060 PIPE – PVC – SCHEDULE 40 – 2"</b>	<b>LF</b>
<b>ITEM 440.62040 SLEEVE – PIPE – PVC – SCHEDULE 40 – 4"</b>	<b>LF</b>
<b>ITEM 440.71060* GATE VALVE ASSEMBLY – 2"</b>	<b>EA</b>
<b>ITEM 440.72200 DRIP EMITTER ASSEMBLY – MULTI OUTLET</b>	<b>EA</b>

**ITEM 440.72320\* DRIP LATERAL FLUSH CAP ASSEMBLY**  
**ITEM 440.73100 FLOW SENSOR ASSEMBLY – 1”**  
**ITEM 440.74200 MASTER VALVE ASSEMBLY – 1 1/2”**  
**ITEM 440.76100 REMOTE CONTROL VALVE ASSEMBLY, DRIP – 1”**  
**ITEM 440.91000 SOLAR POWER ASSEMBLY**

**EA**  
**EA**  
**EA**  
**EA**  
**EA**

## **SECTION 460 – REMOVAL OF PAVEMENT MARKINGS AND RAISED PAVEMENT MARKERS**

Add the following MCDOT Supplement to MAG Specifications Section 460 in its entirety, as modified below:

### **460.1 Description**

The Contractor shall furnish experienced supervision, labor, all materials, equipment, tools, transportation and supplies required to accomplish the pavement marking removal in accordance with these specifications, where indicated on the Striping Plans, or where determined by the Engineer.

### **460.2 Construction**

The Contractor shall determine the type of pavement markings that exist in the field and the appropriate removal methods specified in this Section.

Existing traffic pavement markings shall not be covered over with slurry seal, black paint or stain of any kind.

The Contractor shall accomplish pavement marking obliteration as per the requirements indicated on the Plans or where determined by the Engineer. The Contractor shall be responsible for verifying the striping removal limits of the project before commencement of the work. The striping removal limits may exceed the construction project limits, or new striping limits in order to match and tie into the existing striping.

Existing pavement markings shall be removed to the fullest extent possible from the pavement by one of the methods identified in this Section, unless another method is approved by the Engineer. The method used shall not materially damage the surface or texture of the useable pavement. Sand or other material deposited on the pavement as a result of removing pavement markings shall be removed as the work progresses. Accumulations of sand or other material, which might interfere with drainage or might constitute adverse safety conditions to traffic, will not be permitted.

Where blast cleaning is used for the removal of pavement markings or for removal of objectionable material, the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation, or by other methods approved by the Engineer. Blasting shall not be used within 12 ft. of a lane occupied by traffic.

Any damage to the pavement caused by pavement marking removal shall be repaired by methods acceptable to the Engineer. When asphalt slurry is used to repair damage to the pavement caused by pavement marking removal or the obliteration of the marks remaining after the markings have been removed, the asphalt slurry shall be placed parallel to the new direction of travel and shall not be less than two feet in width.

#### **460.2.1 Approved Methods of Removal**

The following methods have been approved by the County for the removal of traffic paint,



thermoplastic markings, Type 1 (Permanent) performed plastic tape, raised pavement markers and barrier/guardrail markers.

#### **460.2.1.1 Traffic Paint**

1. Sandblasting
2. Turbo-blaster (Steel shot method)
3. Chip Seal: When using this method, the entire roadway surface, edge of asphalt to edge of asphalt, shall be covered.
4. Asphalt Overlay: The asphalt overlay thickness and dimensions shall meet County specifications.

#### **460.2.1.2 Thermoplastic**

1. Grinding followed by sandblasting.
2. Chip Seal: The application of this method depends on the length of time the Thermoplastic Marking has been on the roadway surface. The use of a chip seal before grinding / sandblasting is at the discretion of Contractor. If the chip seal does not adhere to the existing thermoplastic markings, the Contractor shall grind and / or sandblast the thermoplastic markings off and chip seal the exposed area. All costs for this work shall be borne by the Contractor. When applying chip seal, the entire roadway surface, edge of asphalt to edge of asphalt, shall be covered. Chip seal shall not be applied to a Portland cement surface.
3. Asphalt Overlay: The asphalt overlay thickness and dimensions shall meet the County specifications.

#### **460.2.1.3 Type I – Perforated Plastic Pavement Marking Tape**

1. Grinding
2. Chip Seal: The application of this method depends on the length of time the Tape has been on the roadway surface. The use a chip seal before grinding is at the discretion of Contractor. If the chip seal does not adhere to the existing tape markings, Contractor shall grind off the tape markings and chip seal over the exposed area. All costs for this work shall be borne by the Contractor. When applying chip seal, the entire roadway surface, edge of asphalt to edge of asphalt, shall be covered. Chip seal shall not be applied to a Portland cement surface
3. Asphalt Overlay: The asphalt overlay thickness and dimensions shall meet the County specifications

#### **460.2.1.4 Raised Pavement Markers**

1. Hammer and Chisel
2. Blade (Use of Heavy Duty Equipment)

#### **460.2.1.5 Barrier Markers for Bridges, Concrete and Guardrail**

1. Hammer and Chisel

#### **460.3 Measurement**

Measurement for removing painted stripe, removing thermoplastic stripe and Type 1 –preformed plastic marking tape will be by the linear foot along the centerline of the pavement stripe to be removed. Skips in dashed lines will not be included in the measurement.

Measurement for removing striping with a plan width greater or less than the basic 4" wide stripe will be made by the following method:

Plan Width of Striping (inches) x Linear Foot

4.0 (inches)

Double marking lines, consisting of two 4" wide stripes will be measured as two individual marking lines. Crosswalk lines, stop bars, stop lines, gore lines, cross hatch lines, chevron lines and railroad marking transverse lines will be measured for centerline length and adjusted for widths other than 4" as defined above.

Thermoplastic pavement symbols and legends will be measured by each unit removed.

Removal of thermoplastic, raised pavement markers, or painting markings located on surfaces to be removed shall not be measured.

No measurement for the removal of raised pavement markers will be made and shall be included in the striping removal.

#### **460.4 Payment**

Payment for Removing Painted Stripe will be at the unit contract price per linear foot for the length of painted line applied to the nearest foot.

Payment for Removing Painted Symbols and Removing Painted Legends will be per each for each symbol or legend removed.

Payment for Removing Thermoplastic Stripe and Removing Type 1 – Preformed Plastic Marking Tape will be per linear foot of striping removed.

No additional payment for Removing Raised Pavement Markers will be made and shall be considered incidental to the striping removal.

All damage to the surface of the road caused by pavement marking removal shall be repaired by the Contractor at his expense. Sealant applied to all areas of pavement marking obliteration shall not be paid for separately, the costs being considered included in the Obliterate Existing Pavement Marking item.

**ITEM 460.11000      OBLITERATE EXISTING STRIPING**  
**ITEM 460.12000      OBLITERATE EXISTING SYMBOL**

**LF**  
**EA**

#### **SECTION 461 – PAINTED PAVEMENT MARKINGS**

Add the following section per the MCDOT supplement to the MAG Standard Specifications Section 461 in its entirety, as modified below:

##### **461.1 Description**

The work under this section shall consist of cleaning and preparing the pavement surface, furnishing all materials, experienced supervision, labor, equipment, tools, transportation, supplies and applying white or yellow, water-borne, lead-free, rapid-dry traffic paint and reflective glass beads at the locations and in accordance with the details shown on the plans, MUTCD, the requirements of these specifications, or where determined by the Engineer.

The work under this section shall consist of cleaning and preparing the pavement surface, furnishing all materials, experienced supervision, labor, equipment, tools, transportation, supplies and applying a two-part epoxy coating using DecoCoat DP-200 Coating at the equestrian crosswalk locations on the plans and in accordance with the manufacturer application requirements, the requirements of these specifications, or where determined by the Engineer.

## **461.2 Materials**

### **461.2.1 Pavement Marking Paint**

General:

All material used in the formulation of the pavement marking paint shall meet the requirements herein specified. Any materials not specifically covered shall meet the approval of the Engineer. Certificates of Compliance conforming to the requirements of Arizona State Department of Transportation Standard Specifications for Road and Bridge Construction 2008 edition, section 106-05 shall be submitted for each lot or batch of paint prior to its use.

DecoCoat DP-200 is a two-part epoxy coating available from DecoCoat Polymer Systems (<https://decocoatsystems.com>). The color to be painted shall be the Traditional Terra Cotta unless otherwise approved by the Town.

### **461.3 Construction Requirements**

#### **461.3.1 Equipment**

The traffic paint and beads shall be placed on the pavement by a spray-type, self-propelled pavement marking machine.

DecoCoat DP-200 shall be painted using equipment in accordance with the manufacturer's recommended application requirements.

#### **461.3.2 Application**

The pavement surface shall be applied when the pavement surface is dry and the weather is not foggy, rainy, or otherwise adverse to the applications of markings. The surface shall be free from excess asphalt or other deleterious substances before traffic paint, beads or primer are applied. The Contractor shall remove dirt, debris, grease, oil, rocks or chips from the pavement surface prior to applying the markings. Any area that cannot otherwise be satisfactorily cleaned shall be scrubbed with a biodegradable chemical. The method of cleaning the pavement surface and removal of detrimental material is subject to approval by the Engineer and shall include sweeping and the use of high-pressure air spray.

Mixing, surface preparation, coverage rates, limitations and precautions of DecoCoat DP-200 shall follow the recommendations of the manufacturer's application instructions. Five layers of DecoCoat DP-200 shall be installed at all locations shown on the project plans.

Painting shall not be applied when the atmospheric temperature is below 50 F.

#### **461.3.3 Work Coordination**

Add the following Section 461.3.3 – Work Coordination

##### **461.3.3.1 Coordination with Project Signage**

Installation of required permanent project traffic control and regulatory signage shall be schedule coordinated with the installation of pavement striping and markings. Required project signage shall be installed immediately following or in conjunction with project pavement markings. The Contractor shall allow sufficient schedule time for the review and approval of any required shop drawings, field surveying, production, delivery and crew scheduling.

Mixing, surface preparation, coverage rates, limitations and precautions of DecoCoat DP-200 shall follow the recommendations of the manufacturer's application instructions. Five layers of DecoCoat DP-200 shall be installed at all locations shown on the project plans.

#### **461.3.3.2 Coordination of Pavement Markings and Symbols**

All pavement markings noted to be installed and applied as traffic paint prior to application of thermoplastic markings shall include pavement markings and symbols along with said striping. Said markings and symbols shall be applied during or at the same general time as any associated striping. Obliteration of existing prior or temporary striping shall occur immediately prior to application of new markings and symbols.

#### **461.3.3.3 Coordination of Marking Obliteration and Temporary Construction Traffic Control**

All existing or prior pavement markings and symbols in conflict with temporary construction traffic control or proposed construction improvements being performed shall be obliterated by acceptable means to eliminate conflicting driver confusion. Upon markings obliteration, traffic control markings or devices shall be placed as necessary to direct and inform drivers. Temporary efforts may be needed while temporary, interim or permanent markings or devices are installed. Multiple lanes and merge areas, in particular, shall require traffic control efforts. The Contractor shall have plans for such efforts and shall coordinate with the necessary subcontractors and crews to have sufficient means and methods available to provide adequate traffic control. Methods required may include signage, markings, devices, off-duty officers or other means and methods.

#### **461.3.3.4 Coordination with Paving Improvements**

Immediately following installation and construction of new or temporary pavement or surface treatments, temporary delineation of traffic lanes shall be made using temporary pavement paint markings or devices, such as self-adhesive flexible chip seal markers (a.k.a. TRPMs), of the appropriate color and reflectivity. Such markings or devices shall also be used to delineate lane shifts, narrow lanes or horizontal lane shifts, particularly across intersections. These temporary markings shall be installed prior to opening the new pavement or surface treated area to traffic. Such markings or devices shall be maintained and touched up or replaced as necessary for the duration of the project until removed or replaced with other markings or devices.

#### **461.3.3.5 Coordination with Other Contractors or Projects**

The project's Contractor shall coordinate the project improvements, construction sequence, schedule, means, methods and other items as necessary with other contractors performing work immediately adjacent to or connecting to the project. This effort will occur to make sure proposed improvement work by both contractors will match each other both vertically and horizontally as well as size and location-wise. Any mismatches identified will be brought to the Owners attention for discussion, solution identification and resolution selection. This effort shall include holding and conducting meetings with the Owner(s) and other contractor(s) as necessary and producing documentation of said coordination efforts. Names, contract information, locations, discussion items, action items and proposed and decided outcomes shall be documented.

All work under this Section 461.3.3 shall be considered necessary and incidental to the construction improvements and no additional separate payment shall be made for such coordination efforts.

#### **461.4 Measurement**

Pavement marking paint will be measured by the linear foot along the centerline of the pavement stripe. Skips in dashed lines will not be included in the measurement. Length of

pavement markings will be based on a 4-inch wide stripe. Measurement for striping with a plan width greater or less than the basic 4 inches as shown on the plans or requested by the Engineer will be made by the following method:

Plan Width of Striping (inches) x Linear Feet

4-inches

Symbols, legends, painted medians, painted curbing, and painted islands will be measured by each unit applied. Each legend, regardless of the number of letters, will be considered as a single unit.

Painting of DecoCoat DP-200 will be measured by square feet pavement painted with DecoCoat DP-200.

No separate measurement will be made for cleaning and preparing the pavement surface, including abrasive sweeping and high-pressure air spray. The cost of disposal of excess materials, cleaning fluids, and empty material containers, will be considered as included in the contract items.

#### **461.7 Payment**

Pavement striping of the type specified, measured as provided above, will be paid for at the contract price per linear foot for the total length of painted line applied to the nearest foot, which price shall be full compensation for the work complete, including cleaning and preparing the pavement surface and glass beads, as described and specified herein and on project Plans.

<b>ITEM 461.10100</b>	<b>PAINT TRAFFIC STRIPE - WHITE 4"</b>	<b>LF</b>
<b>ITEM 461.10200</b>	<b>PAINT TRAFFIC STRIPE - YELLOW 4"</b>	<b>LF</b>

Pavement symbols and legends as provided above, will be paid for at the contract price for each painted symbol or legend, which price shall be full compensation for the work complete, including cleaning and preparing the pavement surface, and glass beads, as described and specified a herein and on the project Plans.

Payment for Paint DecoCoat Polymer System DP200 shall be at the contract unit price per square feet. Payment shall be considered full compensation for the item complete-in-place including all labor, materials, equipment, and all other items necessary and incidental to the painting of all layers of DecoCoat DP-200.

<b>ITEM 461.12000</b>	<b>PAINT DECOCOAT POLYMER SYSTEM DP200</b>	<b>SF</b>
<b>ITEM 461.12200</b>	<b>PAINT SYMBOL (ARROW)</b>	<b>EA</b>
<b>ITEM 461.12700*</b>	<b>PAINT SYMBOL (SCHOOL)</b>	<b>EA</b>

## **SECTION 462 – THERMOPLASTIC PAVEMENT MARKINGS**

Add the following section per the MCDOT supplement to the MAG Standard Specifications Section 462 in its entirety, as modified below:

### **462.1 Description**

The work under this section shall consist of cleaning and preparing pavement surfaces and furnishing and applying either white or yellow paint or hot-sprayed thermoplastic reflectorized stripes or pavement markings to the prepared pavement at the locations and in accordance with the details shown on the project plans and the requirements of these specifications and the

Special Provisions. Thermoplastic installation waiting period shall be 30 to 45 calendar days after the painted stripe has been installed.

The work under this section shall conform to the requirements of Section 704 of the ADOT Standard Specifications for Road and Bridge Construction.

#### **462.5 Payment**

The accepted quantities of thermoplastic pavement markings of the type specified in the bidding schedule, measured as provided above, will be paid for at the unit price, complete in place, including pavement surface preparation and glass beads.

Pavement marking stripes will be paid for at the contract unit price per linear foot complete in place for the total length of lines applied to the nearest foot, including surface preparation. If the Engineer determines that additional striping beyond the project limits are required in order to tie into and meet the existing striping, then this striping will be paid for at the contract unit bid price for the total length of lines applied.

<b>ITEM 462.11000</b>	<b>THERMOPLASTIC TRAFFIC STRIPE - WHITE 4"</b>	<b>LF</b>
<b>ITEM 462.21000</b>	<b>THERMOPLASTIC TRAFFIC STRIPE - YELLOW 4"</b>	<b>LF</b>

Thermoplastic pavement marking legends and symbols will be paid for at the contract unit price per each. Such payment shall be full compensation for furnishing all material, labor, tools and equipment and accomplishing the work associated with application of the legends and symbols to the pavement, including surface preparation, as described in the special provisions and on the construction plans.

<b>ITEM 462.32000</b>	<b>THERMOPLASTIC ARROW</b>	<b>EA</b>
<b>ITEM 462.33000</b>	<b>THERMOPLASTIC BIKE LANE SYMBOL</b>	<b>EA</b>
<b>ITEM 462.35000*</b>	<b>THERMOPLASTIC SCHOOL</b>	<b>EA</b>

### **SECTION 463 – RAISED PAVEMENT MARKERS**

Add the following section per the MCDOT supplement to the MAG Standard Specifications Section 463 in its entirety, as modified below:

#### **463.1 Description**

The work under this section shall consist of cleaning and preparing the pavement surface; furnishing all materials, equipment, tools and labor; and placing raised pavement markers of the type specified at the locations and in accordance with the details shown on the plans and the requirements of these specifications.

#### **463.4 Measurement**

Pavement markers will be measured as a unit for each marker furnished and placed.

#### **463.5 Payment**

The accepted quantities of pavement markers, measured as provided above, will be paid for at the contract unit price for the type designated in the bidding schedule, complete in place, including adhesive and surface preparation.

<b>ITEM 463.12000</b>	<b>REFLECTORIZED RAISED PAVEMENT MARKER - TYPE BB (BLUE, 2-WAY)</b>	<b>EA</b>
<b>ITEM 463.14000</b>	<b>REFLECTORIZED RAISED PAVEMENT MARKER - TYPE D (YELLOW, 2-WAY)</b>	<b>EA</b>
<b>ITEM 463.15000</b>	<b>REFLECTORIZED RAISED PAVEMENT MARKER - TYPE G</b>	<b>EA</b>

ITEM 463.16000	(CLEAR, 1-WAY) REFLECTORIZED RAISED PAVEMENT MARKER - TYPE H (YELLOW, 1-WAY)	EA
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## **SECTION 465 – TRAFFIC SIGNS**

Add the following section per the MCDOT supplement to the MAG Standard Specifications Section 464 and 465 in their entirety, as modified below:

### **465.1 Description**

The work under this section shall consist of providing and erecting traffic signs; furnishing all materials, equipment, tools and labor; and placing and erecting traffic signs of the type specified at the locations and in accordance with the details shown on the plans and the requirements of these specifications.

The work under this section shall conform to the requirements the Town of Queen Creek signing and marking standards and sections 464 and 465 of the MCDOT supplement to the MAG Standard Specifications for Public Works Construction.

### **465.2 Material**

The MCDOT Supplement to the MAG Uniform Standard Specifications is modified to add:

All signs shall be faced on new 0.080 aluminum blanks.

Sheeting shall be ASTM Type XI for all permanent regulatory, warning, guide, information, and object marker signs (including legends and borders)

All warning signs (yellow series) shall be manufactured with ASTM Type XI 3M Fluorescent Yellow

4081 diamond grade reflective sheeting or approved equal.

Sheeting shall be manufactured by 3M Corporation or an approved equal with equal or greater warranty periods. All signs shall be manufactured using matching components approved by the sheeting manufacturer.

All street name signs shall be constructed of pressure sensitive AST Type XI 3M White 4090 diamond grade reflective sheeting or approved equal. All transparent acrylic, pressure sensitive film shall be 3M series 1177 green electro cut film or approved equal. Signs shall be manufactured by applying white sheeting to the entire aluminum blank, then a green translucent pressure sensitive film containing the cut out street name is applied. This method results in a white legend on a green background.

All object markers shall conform to Section 703 of the ADOT Standard Specifications for Road and Bridge Construction, 2008 version, and ADOT Standard Detail M-23 and M-24

### **465.5 Payment**

Payment for placing the permanent traffic signs will be made at the unit price per square foot of sign panel installed. Such payment shall constitute full compensation for furnishing all material, labor, tools, fastening hardware, and equipment and accomplishing all work associated with placing the permanent traffic signs complete in place as described in the special provisions and on the construction plans.

ITEM 465.10100	FLAT SHEET ALUMINUM SIGN PANEL, HIGH INTENSITY GRADE	SF
ITEM 465.10200	FLAT SHEET ALUMINUM SIGN PANEL, DIAMOND GRADE	SF

Payment for placing the perforated signs posts will be made at the contract unit price per linear feet. Slip bases and sign post foundations will be made at the contract unit price per each. Such payment shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with constructing the foundations and erecting the sign posts complete in place as described in the special provisions and on the construction plans.

**ITEM 465.12000      PERFORATED SIGN POST (2S)**  
**ITEM 465.31000      SIGN POST FOUNDATION**

**LF**  
**EA**

## **SECTION 470 – SALT RIVER PROJECT (SRP) RELATED WORK**

Add the following Section:

### **470.1 Description**

The work under this section shall consist of furnishing and installing electrical conduit, ground rods, pull boxes, new meter at Cloud Road, and other equipment associated with SRP's conversion of the existing 12kV overhead electrical distribution to underground distribution and street lighting. This work includes excavation, trenching, boring, backfilling, and grading for SRP conduits, equipment pads and other equipment. Refer to the SRP drawings associated with Work Order #T3494634 for the exact scope of the work that shall be furnished and installed by the contractor.

### **470.2 Payment**

Payment for the SRP related work will be made at the contract lump sum price and shall constitute full compensation for the work described above and as shown in the to be issued SRP drawings including all incidentals necessary to complete the work including delivery, storage and handling of materials. No separate measurement or payment will be made for the various types of means and methods that may be required for installation.

**ITEM 470.10000      SRP RELATED WORK**

**LS**

## **SECTION 471 – ELECTRICAL UNDERGROUND INSTALLATION**

Add the following Section:

### **471.1 Electrical Conduits**

#### **471.1.1 Description**

The work under these items shall consist of furnishing and installing conduit as shown in the project plans. This work shall conform to Section 732 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek Signal Standard Details and Requirements.

#### **471.1.2 Submittals**

The contractor shall submit the following items:

**(A)            Material:**

- 1) Certification of Compliance letter from the HDPE and PVC conduit manufacturer to the Engineer stating that the product meets these Specifications



- 2) Original data sheets from the HDPE conduit manufacturer which substantiates that the product meets these Specifications
- 3) Manufacturer recommended coupling device for HDPE to PVC interface.
- 4) Certification substantiating pull tape with a minimum pulling tension rating of 2,500 lbs
- 5) Certification of analysis and compliance substantiating that HDPE conduit meets these specifications.
- 6) Unoccupied conduits plug, or cap substantiating that conduit cap meets these specifications.
- 7) Occupied conduits plug, or cap substantiating that conduit cap meets these specifications
- 8) Unoccupied innerduct plug or cap substantiating that innerduct meets these specifications.
- 9) Occupied innerduct plug or cap substantiating that innerduct meets these specifications

**(B) Construction:**

**1) Conduit by Trenchless Methods**

- a. The proposed bore profile shall be submitted to the Town, after the contractor has completed the necessary potholing, and approved prior to beginning the operation at each location
- b. All final installation profiles shall be submitted to the Engineer

**2) Incorporation of Existing Conduit or Innerduct, Empty or Occupied**

- a. Schedule for timeframes of when the existing cables are to be disconnected two weeks prior to disconnecting any existing cables.

### **471.1.3 Materials**

**(A) PVC:**

PVC conduit and materials shall conform to the requirements of Subsection 732-2.02, of the ADOT Standard Specifications for Road and Bridge Construction.

Should the contractor choose to substitute HDPE conduit in place of the installation of direct buried PVC conduit, the HDPE conduit shall conform to the requirements specified herein for HDPE conduit, 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 Specifications and obtain 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 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.

Conduit elbows used for fiber optic cable installations (including future installations) shall be a minimum of 36-inches. All other conduit elbows shall be a minimum of 24-inches.

**PVC Substitution**

Should the contractor choose to substitute HDPE conduit in place of the installation of direct buried PVC conduit, the HDPE conduit shall conform to the requirements specified herein for HDPE conduit, 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 Specifications and obtain 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.

#### Conduit Accessories

Unless otherwise shown on the 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.

Conduit elbows used for fiber optic cable installations (including future installations) shall be a minimum of 36-inches. All other conduit elbows shall be a minimum of 24-inches.

#### **(B) HDPE:**

HDPE conduit shall have a minimum rating of SDR 11 for both horizontal directional drill and plowing installation methods. 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/CM<sup>3</sup> 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) 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.

**(E) 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.

**471.1.4 Construction Requirements**

Conduit shall be installed in accordance with Subsection 732-3.01 of the ADOT Standard Specifications for Road and Bridge Construction, except as specified herein.

**(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 a record 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 a record 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, 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 additional cost to the Town.

#### **(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 the project plans. Conduit encased in a structural member shall be installed in accordance with the National Electrical Code, or as accepted 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. The contractor shall 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 as shown in the Town of Queen Creek ITS Standard Details. Backfill compaction shall be in accordance with S the Town of Queen Creek ITS Standard Details.

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 ADOT Standard Specifications for Road and Bridge Construction.

#### **(G) Conduit in Trenches:**

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 with a product specifically designed and manufactured to seal either a filled or empty conduit, as the case may be, as described herein below.

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 acceptance.

All occupied 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 acceptance.

Taping the ends of the conduit shall not be allowed.

Immediately after HDPE conduits are installed, they shall be sealed to prevent the intrusion of water, mud, gravel, vermin, etc. The innerducts shall be sealed after tracer wire and/or pull tape, cable and/or fiber installation with a product specifically designed and manufactured to seal either a filled or empty innerduct, as the case may be, as described herein below.

All unoccupied HDPE conduits 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 acceptance.

Occupied conduits 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.

#### Surface Demarcation of underground conduit

A three inch "Y" shall be cut into the face of the curb directly over conduit located under rolled or vertical curbs.

#### SubSurface Demarcation of underground conduit

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 or is called for on the Plans 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 Contractor will be paid at the Trench unit price in these locations.

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 ADOT Standard Specifications for Road and Bridge Construction.

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.

Conduit installed by direct plowing shall include a vibratory plow, and conduit feeder tube to displace the soil and install the conduit at the required depth. The Contractor shall use the appropriate direct bury plowing equipment based on the field soil conditions and the conduit depth.

Open trenching and plow trenching shall be backfilled, compacted and regraded to meet pre-disturbance condition following the installation of the conduit.

**(I) Pull Tape:**

The contractor shall install pull tape with a minimum pulling tension rating of 2,500 lbs. in all new and existing empty conduits and all conduits with new fiber optic cable.

For all conduits that require pull tape, the pull tape shall terminate at the end of the conduit with a minimum of two feet of coiled slack in each pull box. The pull tape traveling through conduit that terminates in a pull box, shall have its wire ends connected together to allow for a continuous locating signal to be used for the entire conduit run.

**(J) Conduits Embedded in Concrete Structures or attached to Concrete Structures:**

Attachment or embedding conduit in any concrete structure shall require advance approval of the Engineer.

Approved use of attached or embedded conduit either within an open bridge cell or attached to structures shall be rigid metal conduit (RMC). Where required for esthetic 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.

For bridges over 1,000 feet in length, or as indicated on the project plans, intermediate junction boxes shall be evenly spaced.

**(K) Incorporation of Existing Conduit or Innerduct, Empty or Occupied:**

Existing underground conduit to be incorporated into a new system shall be cleaned and blown out with compressed air.

Where cables are to be installed in conduit with existing cables or wires that will remain, the contractor shall disconnect, remove, reinstall, and reconnect the existing cables and wires as determined by the Engineer, to facilitate the installation of the new cable.

Two weeks prior to disconnecting any existing cables, the contractor shall submit a schedule, for acceptance by the Engineer, with the timeframes of when the existing cables are to be disconnected.

The contractor shall be responsible for any damage to the existing cables or wires caused by this operation. Existing wires and cables shall be considered in good condition unless the contractor demonstrates to the contrary to the Engineer, prior to commencing removal of any cable or conductor from the conduit(s).

No more than one week prior to installation of cable or conductors, all new and existing conduits in which cable or conductors are to be installed shall be cleared/cleaned by pulling through a metal-disc mandrel with a diameter of 90 percent of the conduit inside diameter for PVC conduit, or a ball mandrel with a diameter of 80 percent of the conduit inside diameter for HDPE. The conduit may be brushed or swabbed, if deemed necessary, prior to pulling the mandrel through the conduit.

Where indicated on the plans, the contractor shall remove and dispose of existing cables and/or conductors in existing conduits. Prior to their removal, all cables and/or conductors to be removed shall be identified and marked at all intermediate pull boxes. These cables and/or conductors shall be cut at all intermediate pull boxes before being removed. Conduits to remain empty for future use shall have a detectable pull tape installed.

Where multiple cables, conductors, pull tape, and/or new innerducts are required to be installed in the same conduit, all the materials shall be installed at the same time.

**(L) Conduit Entering Pull Boxes:**

Conduit entering pull boxes shall be installed in accordance with the details shown on the project plans and the Town of Queen Creek ITS Standard Details.

The conduit ends shall be sealed after mandrelling, tracer wire and/or pull tape, cable and/or fiber, installation with a product specifically designed and manufactured to seal either a filled or empty conduit, as the case may be, as described herein below.

All unoccupied or occupied conduit ends 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 acceptance.

Taping the ends of the conduit shall not be allowed.

When end caps or plugs are removed, all new conduit ends in pull boxes shall be provided with an approved conduit end bell, as shown in the ITS Standard Drawings. End bells shall be installed prior to the installation of the conductors or cables. Approved insulated grounding bushings shall be used on steel conduit ends.

**(M) Innerduct:**

The innerduct shall be continuous and of sufficient length to permit the associated runs to be made without splices between pull boxes.

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 HDPE innerduct 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 the HDPE innerduct into the conduit. Lubricant shall be used to provide lubrication for the HDPE innerduct as it is pulled in. The pulling tension for installing innerduct into the conduit shall not exceed 75 percent of the HDPE manufacturer's tensile strength rating in order to prevent the innerduct from "necking down" or deforming.

**(N) Cathodic Protection:**

Prior to any trenching, the contractor shall verify the existence of any cathodic protection in all existing utilities and take all necessary precautions to maintain existing cathodic protection.

**(O) Bridge Attachments**

The contractor shall attach rigid metal conduit on the bridge structure at the locations shown on the Plans and as per the details in the Plans.

**471.1.5 Method of Measurement**

Conduit and innerduct, when paid for as a separate pay item, will be measured by the linear foot for each diameter size with the number of conduits shown, 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.

Direct buried HDPE conduit shall be paid at the unit bid price of direct buried PVC conduit.

No separate measurement will be made for additional conduit or innerduct plugs, caps, end caps or end bells necessary for the avoiding of obstructions and removing/reinstalling existing signage.



No measurement will be made for conduit or innerduct that is below ground in vertical conduit stub-ups, field equipment cabinets, or node building.

No separate measurement will be made for conduit or innerduct plugs, caps, end caps or end bells.

No separate measurement will be made for removal and/or replacement of any or all cables and/or conductors to be removed nor the identification and marking of such.

No separate measurement will be made for warning tape, Pull tape, lubricant, labels, conduit cleaning, mandrelling and sealing, or testing.

No separate measurement will be made for RMC that shall be painted to match the color of the existing bridge structure.

No separate measurement will be made for open trenching or plow trenching backfilling, compaction nor regrading to meet pre-disturbance condition following the installation of the conduit.

No separate measurement will be made for use of the appropriate direct plowing equipment.

No separate measurement will be made for use of pulling equipment such as swivels, grips, pulling eyes, drilling or lubricating fluids and other attachment hardware external to the conduit.

No separate measurement will be made for excavation and backfilling of excavation pits.

No separate measurement will be made for equipment used to determining the installation profile including but not limited to, registering the depth, angle, rotation and directional data and profile nor the equipment at the surface used to gather the data and relay the information to the equipment operator.

No separate measurement will be made for developing or establishing the proposed bore profile nor the necessary potholing at each location.

No separate measurement will be made for utilizing non-corrosive, sit-tight, water-tight couplings when joining segments of HDPE conduit nor for the use of permitted heat fusion, electrofusion fittings and mechanical connections.

No separate measurement will be made for 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 Rigid metal electrical conduit used to cross existing bridge structures.

#### **471.1.6 Basis of Payment**

The accepted quantities of conduit, and innerduct, measured as provided above, shall be paid for at the contract unit price per linear foot, which price shall be full compensation for the work, complete in place.

Direct buried HDPE conduit shall be paid at the unit price per linear foot of direct buried PVC conduit, which price shall be full compensation for the work, complete in place.

No separate payment will be made for additional conduit or innerduct plugs, caps, end caps or end bells necessary for the avoiding of obstructions and removing/reinstalling existing signage, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for conduit or innerduct that is below ground in vertical conduit stub-ups, field equipment cabinets, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for innerduct used only within the confines of a pull box, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for, conduit or innerduct plugs, caps, end caps, end bells, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for removal and/or replacement of any or all cables and/or conductors to be removed nor the identification and marking of such, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for warning tape, Pull tape, lubricant, labels, conduit cleaning, mandrelling and sealing, or testing, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for RMC that shall be painted to match the color of the existing bridge structure, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for open trenching or plow trenching backfilling, compaction nor regrading to meet pre-disturbance condition following the installation of the conduit including restoration of the surface to existing condition, including concrete, pavement, decomposed granite and other landscaping items where appropriate, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for use of the appropriate direct plowing equipment, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for use of pulling equipment such as swivels, grips, pulling eyes, drilling or lubricating fluids and other attachment hardware external to the conduit, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for excavation and backfilling of excavation pits, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for equipment used to determining the installation profile including but not limited to, registering the depth, angle, rotation and directional data and profile nor the equipment at the surface used to gather the data and relay the information to the equipment operator, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for developing or establishing the proposed bore profile nor the necessary potholing at each location, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for utilizing non-corrosive, sit-tight, water-tight couplings when joining segments of HDPE conduit nor for the use of permitted heat fusion, electrofusion fittings and mechanical connections, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for, 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 Rigid metal electrical conduit used to cross existing bridge structures, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for repair of irrigation facilities, its cost being incidental to this item and incorporated into this item.

No separate payment will be made for locating of existing conduit when new conduit is to be intercepted with existing conduit, its cost being incidental to this item and incorporated into this item.

<b>ITEM 471.10150</b>	<b>ELECTRICAL CONDUIT – SCHEDULE 40 PVC - 1" (TRENCH) (STREET LIGHTING)</b>	<b>LF</b>
<b>ITEM 471.10220</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC - 2" (TRENCH) (TRAFFIC SIGNAL)</b>	<b>LF</b>
<b>ITEM 471.10330</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC – 2 1/2" (TRENCH) (SIGNAL SERVICE)</b>	<b>LF</b>
<b>ITEM 471.10420</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC - 3" (TRENCH) (TRAFFIC SIGNAL)</b>	<b>LF</b>
<b>ITEM 471.20210</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC – 2-3" (TRENCH) (TRAFFIC SIGNAL)</b>	<b>LF</b>
<b>ITEM 471.20230</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC – 2-3" (TRENCH) (ITS CONDUIT)</b>	<b>LF</b>
<b>ITEM 471.20240</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC – 2-3" (DIRECTIONAL BORE) (ITS CONDUIT)</b>	<b>LF</b>
<b>ITEM 471.20250*</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC - 8-1.25" (TRENCH)</b>	<b>LF</b>
<b>ITEM 471.20260*</b>	<b>ELECTRICAL CONDUIT - SCHEDULE 40 PVC - 8-1.25" (DIRECTIONAL BORE)</b>	<b>LF</b>

## **471.2 Pull Boxes**

### **471.2.1 Description**

The work under this item shall consist of furnishing and installing No. 9 pull boxes at the design locations shown on the plans. The work shall conform to Section 732 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek ITS Standard Detail and Requirements.

The work under this item shall consist of furnishing and installing Communication No. 7 pull boxes with or without extension at the design locations shown on the plans. The work shall conform to Section 732 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek ITS and Traffic Signal Standard Detail and Requirements.

### **471.2.2 Submittals**

The contractor shall submit the following items:

#### **471.2.2.1 No. 9 Pull boxes**

##### **(A) Material:**

- 1) Certification substantiating conformance to the most current version of the Society of Cable Telecommunications Engineers (SCTE) "Specification for Underground Enclosure Integrity" ANSI/SCTE 77
- 2) Certification substantiating that the pull box and lid provides an HS20 – 44 load rating

**(B) Testing:**

- 1) Test Results to certify that the pull box sidewalls and lids remain intact when subjected to the loading conditions specified
- 2) Testing Notebook and Electronic PDF Files

**471.2.2.2 No. 7 Pull boxes**

**(A) Material:**

- 1) Certification substantiating conformance to the most current version of the Society of Cable Telecommunications Engineers (SCTE) "Specification for Underground Enclosure Integrity" ANSI/SCTE 77
- 2) Certification substantiating that the pull box and lid provides an ANSI/SCTE 77 Tier 22 load rating

**(B) Testing:**

- 3) Test Results to certify that the pull box sidewalls and lids remain intact when subjected to the loading conditions specified
- 4) Testing Notebook and Electronic PDF Files

**471.2.3 Materials**

**471.2.3.1 No. 9 Pull boxes**

The pull box and lid shall meet structural requirements for AASHTO Specification HS20-44 loads and as shown on the project Plans.

**(A) Covers:**

The wording on the No. 9 pull box covers shall read, "QUEEN CREEK FIBER OPTICS" in four-inch letters.

The No. 9 pull box cover shall have a square, hinged lid that opens a full 180 degrees. Opening of the lid shall be spring assisted from both the open and closed positions via a torsion bar lift system. The lid shall lock down with at least one stainless steel penta-head bolt that shall be captive to the lid. The lid shall also have provisions for an externally mounted padlock for extra security. The padlock shall mount in a cavity in the pull box cover, so no part of the padlock is exposed.

**(B) Cable Mounting Hardware:**

Each No. 9 pull box shall be supplied with six unistrut embedded in the concrete walls of the pull box, with a 24" 18-hole rack mounted to each unistrut with two ½"-spring nuts and bolts, as shown on the Plans. Eight 5" hooks that mount in the 18-hole racks shall be supplied. Shop drawings for the rack and hook system shall be submitted to the Town for approval. The installation method of the rack and hook system and details of how the Contractor proposes to use the rack and hook system to support cable slack and fiber optic splice closures shall be included in the shop drawings.

**(C) General Requirements:**

All pull boxes and lids shall conform to the applicable TOQC ITS Standard Details, 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 4-inch height for No. 9 pull boxes.

All pull boxes shall have a locking mechanism consisting of a padlock cover plate, sized 4" by 6" and a lock down bolt to secure padlock cover plate to lid.

No. 9 pull boxes shall be fabricated of concrete and provide at a minimum of 12 conduit access ports on each of the four sides. Pull box lid wording shall be as indicated above, unless the project plans and Special Provisions specify otherwise.

No. 9 pull boxes shall be a precast, polymer concrete, fiberglass reinforced, pull box, conforming to the most current version of the Society of Cable Telecommunications Engineers (SCTE) "Specification for Underground Enclosure Integrity" ANSI/SCTE 77. The pull box and lid shall have rated for HS20 – 44 load. Contractor shall submit test results to certify that the pull box sidewalls and lids remain intact when subjected to the loading conditions specified.

#### **471.2.3.2 No. 7 Pull boxes**

All No. 7 pull boxes shall be furnished by the Contractor and shall be Christy Fiberlite or approved equal per Town of Queen Creek Approved Materials List.

All pull boxes and lids shall conform to the applicable Town of Queen Creek Standard Detail ITS-05, project plans and these Special Provisions.

Pull box lids shall bear the words "FIBER OPTICS", "QUEEN CREEK TRAFFIC", OR "QC STREET LIGHTING" 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 shall consist of two captive 3/8" -16 UNC hold down hex head bolts (9/16" socket size) and washer. The bolts shall be of sufficient length to fully engage the lid's connection to the body. Washer shall be of sufficient diameter and thickness to avoid damage to the lid when the bolts are tightened. All lid hold-down hardware, including that in the box body shall be stainless steel.

No. 7 pull boxes shall be a precast, polymer concrete, fiberglass reinforced, pull box, conforming to the most current version of the Society of Cable Telecommunications Engineers (SCTE) "Specification for Underground Enclosure Integrity" ANSI/SCTE 77. The pull box and lid shall have an ANSI/SCTE 77 Tier 22 load rating. Concrete pull boxes and lids shall not be used. Contractor shall submit test results to certify that the pull box sidewalls and lids remain intact when subjected to the loading conditions specified.

Chipped, cracked, or otherwise damaged pull boxes and lids will not be accepted.

#### **471.2.4 Construction Requirements**

Prior to any pull box installation, the Contractor shall verify, with utility as-builts, the existence of any cathodic protection in all existing utilities and take all possible precautions to maintain existing cathodic protection.

After Blue Staking has been accomplished, the Contractor shall mark the proposed pull box

location with white paint prior to excavation. Above ground pull box locations shall be marked with tape. The pull box locations must then be approved by the Town before installation begins. Pull boxes shall be field located to avoid drainage swales, maintenance vehicle pathways or repeating wheel loads.

The contractor shall restore the surrounding surface conditions back to their original state, including concreted areas.

When installing a No. 9 pull box, the contractor shall only lift the pull box and covers using the lifting hardware installed for that purpose. The lid shall be oriented such that the lid hinge lies along the side of the pull box farthest from the roadway.

Pull Box installation shall include all materials shown in the most current addition of the TOQC ITS Standard Details and in accordance with Section 732-3 of the ADOT Standard Specifications for Road and Bridge Construction.

The compaction around pull boxes shall not cause the sides to deflect or any part of the box or lid to crack or become dented. The contractor shall replace any cracked, broken, chipped or damaged pull boxes or lids at no additional cost to the Town of Queen Creek.

#### **471.2.5 Method of Measurement**

No. 9 pull boxes will be measured per each pull box furnished and installed.

No. 7 pull boxes will be measured per each pull box furnished and installed.

No separate measurement will be made for excavation, backfill, drainage aggregate, compaction, and surface restoration.

#### **471.2.6 Basis of Payment**

The accepted quantities for No. 9 pull boxes, 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.

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.

No payment will be made for excavation, backfill, drainage aggregate, compaction and surface restoration, its cost being incidental to this item and incorporated into this item.

<b>ITEM 471.70050</b>	<b>PULL BOX (SRP STANDARD)</b>	<b>EA</b>
<b>ITEM 471.70210</b>	<b>PULL BOX NO. 7</b>	<b>EA</b>
<b>ITEM 471.70220</b>	<b>PULL BOX NO. 7 W/EXTENSION</b>	<b>EA</b>
<b>ITEM 471.70300</b>	<b>PULL BOX NO. 9 VAULT</b>	<b>EA</b>

### **471.3 Ground Rod**

#### **471.3.1 Description**

The work under this item shall consist of furnishing and installing Ground Rods at the design locations shown on the plans and project details. The work shall conform to Section 732 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek Street Light Standard Detail and Requirements.

#### **471.3.2 Measurement**

Ground rod will be measured per each rod and CU bond furnished and installed.

#### **471.3.3 Payment**

Payment for the installation of the ground rod with CU bond will be made at the contract unit price per each. Such payment shall constitute full compensation for furnishing all material, labor, tools, and equipment and accomplishing all work associated with installing the ground rod complete in place as described in the special provisions and on the construction plans.

**ITEM 471.80000      COPPER ROD 5/8" X 8'**

**EA**

### **SECTION 472 – TRAFFIC SIGNAL AND ROADWAY LIGHTING FOUNDATIONS**

Add the following section per the ADOT Standard Specifications for Road and Bridge Construction Section 731 in its entirety, and the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

#### **472.1 Description**

The work under this item includes the installation of new traffic signal poles and pole foundations. This work shall conform to Section 731 of ADOT Standard Specifications for Road and Bridge Construction, the Town of Queen Creek Signal Requirements, and the Town of Queen Creek Street Light Design Guidelines and Standard Details.

Where new traffic signal poles are to be installed next to existing sidewalk or new or existing curb ramps, the Contractor shall construct a new ADA accessible apron (a.k.a Concrete Apron) to provide access around the base of the pole as shown on the plans and details. The Contractor shall modify these details as necessary to accommodate any changed field conditions or variation in pole location at no additional cost to the Town.

Prior to pouring any concrete the Contractor shall contact the Town 48 hours in advance for an inspection. The measurement and cost associated with this item shall be incidental to the work associated with the construction costs of providing and installing the signal pole foundations.

Contractor shall not pour concrete foundations until foundation locations, elevations, and bolt patterns are inspected and approved by the Town.

The Contractor shall pothole all foundations for potential conflicts. The cost associated shall be considered incidental to complete the work associated with this item. Hand digging for potential conflicts is considered a form of pot holing and considered incidental to complete the work associated with this item.

Concrete samples shall be obtained each day of pouring for signal foundations. All foundations shall be vibration poured. Poles shall not be installed until concrete compressive strength test results are received and approved by the Town. The Contractor is responsible for all the expenses for testing of concrete material for foundations. Concrete material testing will not be paid for separately and should be included in the unit price for foundation.

Pedestrian push buttons shall meet or exceed all ADA accessibility guidelines and shall be mounted 42 inches above the finished surface of the sidewalk according to the Town of Queen Creek Standard Details for Traffic Signal Construction. Activation timing shall be determined and completed by the Town.

#### **Roadway Light Pole Foundations:**

Roadway light pole foundations installed by the CONTRACTOR for roadway lighting will be measured as a unit for each roadway light pole foundation installed. All labor and materials for

installing each roadway light pole foundation per Town of Queen Creek Detail LT-7, including, but not limited to, materials, excavating, compacted backfill material around the pole foundation, and restoration of affected area to original condition shall be included as part of the light pole unit of measurement.

Excavating and compacting backfill shall be in accordance with ADOT Standard Specifications and SRP requirements.

CONTRACTOR shall refer to the roadway lighting general notes, construction notes and details on the Roadway Lighting Plans to install street light poles.

CONTRACTOR shall coordinate with the Town of Queen Creek to install a unique street light number on each pole according to Town requirements.

CONTRACTOR shall coordinate with SRP to install a Hazardous Voltage Warning label on each pole according to SRP requirements.

#### **472.5 Payment**

The accepted quantities of foundations for signals or streetlights, measured as provided above, will be paid for at the contract unit price per each, for the type of support or foundation designated in the bidding schedule, complete in place, which such price shall constitute full compensation for all of the work associated with constructing the foundations as defined on the project plans, standard details, and in the specifications. No direct measurement or payment will be made for signal cabinet, meter pedestal, or load center cabinet foundations, the cost being considered part of the related item.

<b>ITEM 472.10100</b>	<b>POLE FOUNDATION, STREET LIGHT</b>	<b>EA</b>
<b>ITEM 472.10200</b>	<b>POLE FOUNDATION, STREET LIGHT (SPREAD FTG)</b>	<b>EA</b>
<b>ITEM 472.20100</b>	<b>POLE FOUNDATION, TYPE A</b>	<b>EA</b>
<b>ITEM 472.20600</b>	<b>POLE FOUNDATION, TYPE PB (PUSH BUTTON)</b>	<b>EA</b>
<b>ITEM 472.20700</b>	<b>POLE FOUNDATION, TYPE Q</b>	<b>EA</b>
<b>ITEM 472.20800</b>	<b>POLE FOUNDATION, TYPE R</b>	<b>EA</b>
<b>ITEM 472.40000</b>	<b>CONTROL CABINET COURTESY PAD</b>	<b>SF</b>
<b>ITEM 472.50000</b>	<b>CONTROL CABINET FOUNDATION, TYPE IV</b>	<b>EA</b>

### **SECTION 474 – TRAFFIC SIGNAL AND STREETLIGHT POLE INSTALLATION**

Add the following section per the ADOT Standard Specifications for Road and Bridge Construction Section 731, and the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

#### **474.1 Description**

The work under this item includes the installation of new traffic signal poles, traffic signal mast arms, roadway street light poles, pedestrian light poles, and parking area poles. This work shall conform to Section 731 of ADOT Standard Specifications for Road and Bridge Construction, the Town of Queen Creek Signal Requirements, and the Town of Queen Creek Street Light Design Guidelines and Standard Details.

#### **474.7 Payment**

Payment for roadway street light poles will be made at the contract unit price per each. Such payment shall constitute compensation in full for furnishing and installing said items complete in place as defined on the project plans and in the specifications.

<b>ITEM 474.20150</b>	<b>TRAFFIC SIGNAL POLE, TYPE A 16'</b>	<b>EA</b>
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ITEM 474.20400	TRAFFIC SIGNAL POLE, TYPE PB	EA
ITEM 474.20500	TRAFFIC SIGNAL POLE, TYPE Q	EA
ITEM 474.20600	TRAFFIC SIGNAL POLE, TYPE R	EA
ITEM 474.22410*	STREET LIGHT POLE, TOQC STD. DET. LT-4 W/MAST ARM	EA
ITEM 474.30350	MAST ARM, 35 FT.	EA
ITEM 474.30400	MAST ARM, 40 FT.	EA
ITEM 474.30450	MAST ARM, 45 FT.	EA

## **SECTION 475 – ELECTRICAL POWER SERVICE AND CONTROLLER CABINET INSTALLATION**

Add the following section per the ADOT Standard Specifications for Road and Bridge Construction Section 734 in its entirety, the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

### **475.1 Description**

The work under this item includes the installation of control cabinets, meter pedestals, and load center cabinets. This work shall conform to Section 734 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek Signal Requirements.

Cabinet/controller and Assembly material shall be in accordance with the Town of Queen Creek Approved Materials List.

The meter pedestal for the Traffic Signal shall be a combination battery backup unit and meter pedestal per the Town of Queen Creek Approved Materials List, Myers catalog # MEUG3A-2050-UPS-M100-AZ (MOD) or approved equal. The foundation shall be construction in accordance with the ADOT Standard Details and Specifications.

The Contractor shall provide the traffic signal control and cabinet assembly. The type of controller shall be Cobalt/TS2. The type of cabinet is an ADOT Type IV, NEMA TS-2, Type 1 Econolite "Plug-n-Go". The Controller shall include the Cabinet, controller, 12 load switches, Exterior generator power input plug, surge suppression, manual control handheld remote with detachable headphone jack, malfunction management unit. Foundation shall be constructed per ADOT Standard Details and Specifications.

The load center cabinet and foundation shall be in accordance with the ADOT Standard Details and Specifications.

Testing of the controller operation after installation shall be accomplished at the site. The Contractor shall be required to provide traffic control at the intersection with a uniformed off-duty officer during testing of the controller. Uniformed off-duty officers shall be obtained and scheduled through the Town of Queen Creek. Five (5) days notice is required to obtain a police officer.

A Town of Queen Creek representative will be present during all wiring operations and connections.

The Town of Queen Creek shall perform a one-month test of the controller operations before installation. The Contractor shall coordinate with Traffic Engineering at (480) 358-3003, a minimum of 48 hours, in advance of pickup of the controller/cabinet.

The Contractor shall notify the Town of Queen Creek Traffic Engineering representative at least five (5) days in advance of the scheduled traffic signal activation. Contact the Town Traffic Engineer at (480) 358-3003.

"Traffic Signal Control Change" ahead warning signs must be installed by the Contractor prior to  
A1405 Power Rd – Riggs Road to Chandler Heights Road

turn on of each signal.

#### **475.5 Payment**

Payment for the installation of the meter pedestal and controller cabinet will be made at the contract unit price per each. Such payment shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with installing the meter pedestal and controller cabinet as described in the special provisions and on the construction plans.

<b>ITEM 475.12000</b>	<b>METER PEDESTAL / SERVICE CABINET &amp; FOUNDATION</b>	<b>EA</b>
<b>ITEM 475.20000</b>	<b>CONTROL CABINET ASSEMBLY</b>	<b>EA</b>

### **SECTION 476 – SIGNAL INDICATIONS AND MOUNTINGS**

Add the following section per the ADOT Standard Specifications for Road and Bridge Construction Section 733 in its entirety, the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

#### **476.1 Description**

The work under this item includes the installation of traffic signal heads and mounting assemblies, and emergency pre-emption devices and systems. This work shall conform to Section 733 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek Signal Requirements.

The Town of Queen Creek will provide all new red, yellow, green, and arrow LED signal heads and LED pedestrian heads and mounting assemblies. The Contractor shall provide all other labor, material, tool, and equipment necessary for installing signal and pedestrian heads provided by the Town.

Mounting holes for all traffic signal mounting brackets shall **NOT BE** drilled prior to standing the poles on their foundations, but shall be drilled once the poles are standing to ensure best mounting location.

Emergency Vehicle Preemption system shall consist of an optical emitter, optical detectors, detector cable, and phase selectors. The approved emergency vehicle, Tomar Strobecom II 4090-22-ST or 4090-1-ST Series Detectors, 4140 optical signal processor card, and two 700 Mini Strobes, and manufacturer approved cabling. The card shall be mounted in the detector rack provided with the signal cabinet. Preemption cables shall run unspliced from the sensor to the signal pole, to the controller cabinet terminals. Preemption devices shall be furnished and installed by the Contractor.

Traffic Mounting Assemblies shall be powder coat painted black per ADOT Standard Detail T.S. 9-0.

The detector shall be mounted approximately as shown in the plans and shall be compatible with the design and brand used by the Town of Queen Creek.

#### **476.4 Payment**

Payment for the installation of traffic signal faces and mounting assemblies will be made at the contract unit price per each. Such payment shall constitute compensation in full for installing the heads and assemblies defined on the project plans and in the specifications.

Payment for the installation of the emergency pre-emption devices will be made at the contract unit price per lump sum. Such payment shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with installing the

emergency pre-emption as described in the special provisions and on the construction plans.

ITEM 476.10200	PEDESTRIAN PUSH BUTTON W/SIGN	EA
ITEM 476.10201*	PEDESTRIAN PUSH BUTTON W/SIGN (EQUESTRIAN MOD)	EA
ITEM 476.20000	TRAFFIC SIGNAL INDICATION FACE (PEDESTRIAN MAN/HAND W/COUNTDOWN)	EA
ITEM 476.20001*	TRAFFIC SIGNAL INDICATION FACE (PEDESTRIAN MAN/HAND WO/COUNTDOWN)	EA
ITEM 476.20002*	TRAFFIC SIGNAL INDICATION FACE (BIKE ASSEMBLY)	EA
ITEM 476.20003*	TRAFFIC SIGNAL INDICATION FACE (EQUESTRIAN ASSEMBLY)	EA
ITEM 476.20100	TRAFFIC SIGNAL INDICATION FACE – TYPE F	EA
ITEM 476.20400	TRAFFIC SIGNAL INDICATION FACE – TYPE G	EA
ITEM 476.30100	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE II)	EA
ITEM 476.30400	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE V)	EA
ITEM 476.30500	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE VII)	EA
ITEM 476.30600	TRAFFIC SIGNAL MOUNTING ASSEMBLY (TYPE XI)	EA
ITEM 476.40100	EMERGENCY PRE-EMPTION SYSTEM	EA

## **SECTION 477 – INTERSECTION AND ROADWAY LIGHTING**

Add the following section per the ADOT Standard Specifications for Road and Bridge Construction Section 733 in its entirety, the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

### **477.1 Description**

#### Traffic Signal Related Work:

The work under this item consists of the furnishing and installation of the luminaires and internally illuminated street name signs. This work shall conform to Section 731 & 733 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek Signal Requirements, and the Town of Queen Creek Street Light Design Guidelines and Standard Details.

All luminaires are to be powder coated to match the color of the decorative bases and fixtures. The Contractor shall coordinate with the Town of Queen Creek to maintain paint color consistency.

#### Roadway Luminaire and streetlight poles:

CONTRACTOR shall furnish and install LED Roadway luminaires on streetlight poles including luminaire mast arms. Installation shall be per NEC standards.

Install the photocell on top of each luminaire and position the photocell facing north for controlling the luminaire.

### **477.5 Payment**

Payment for the installation of the luminaires will be made at the contract unit price per each. Such payment shall constitute compensation in full for furnishing and installing said items complete in place as defined on the project plans and in the specifications.

Payment for the installation internally illuminated street name signs will be made at the contract unit price per each. Such payment shall constitute compensation in full for furnishing and installing said items complete in place as defined on the project plans and in the specifications. Luminaires for the traffic signal pole installation shall include the plumbizer, finial, and hardware

required to mount the luminaire.

<b>ITEM 477.20150*</b>	<b>LUMINAIRE, 125 W LED</b>	<b>EA</b>
<b>ITEM 477.60300</b>	<b>LUMINAIRE, MAST ARM 20'</b>	<b>EA</b>
<b>ITEM 477.90000</b>	<b>ILLUMINATED STREET NAME SIGN</b>	<b>EA</b>

## **SECTION 478 – ELECTRICAL CONDUCTORS**

Add the following section per the ADOT Standard Specifications for Road and Bridge Construction Section 732 in its entirety, and the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

### **478.1 Description**

The work under this item includes the furnishing and installation of electrical conductors. This work shall conform to Section 732 of ADOT Standard Specifications for Road and Bridge Construction, the Town of Queen Creek Signal Requirements, and the Town of Queen Creek Street Light Design Guidelines and Standard Details.

#### **Electrical Signal Conductors**

The Contractor shall not use either THHN or THHW wire.

Type XHHW or THW wire is acceptable in conduit.

All IMSA signal conductors shall be solid with the exception of 51-5 and 50-2.

Watertight fuses shall be utilized in the pull box adjacent to the luminaire pole.

Splicing for the (2) 25-Conductor cables shall be kept to a minimum and shall only take place in pull boxes. At no time shall any splices of any kind be allowed in conduit.

At pull box locations, all splices and cables shall be tagged and labeled per Town of Queen Creek requirements, which are as follows:

3M Scotchcote Wire Marker Tape, Panduit shall be used to indicate phase number and location as necessary.

Electrical service conductors shall be provided and installed by SRP.

One main signal common of adequate size (No. 8 AWG minimum size) to accommodate the electrical load of the installed signals plus all future signals shall run from the controller cabinet, around the intersection to each corner pull box. This conductor shall be stranded, with white insulation.

Video detection cables shall run unspliced from the hand hole at each pole to the controller cabinet. A manufacture supplied cable and pre-installed connector shall be supplied for connection to the back of the camera down the pole to the hand hole then spliced into the cable from the signal cabinet. (Video detection splicing will only be allowed in the pole hand hole). Contact the Town for approved products.

Emergency vehicle preemption cable shall run unspliced from the controller cabinet to the sensor. Absolutely NO SPLICES are allowed in preemption cables.

A No. 8 AWG solid copper conductor, with green insulation, shall be used in all PVC conduits containing electrical voltage circuits. Generally, the ground bond wires are connected together in each pull box, connected to the ground rod(s), and each pole to form a continuous grounded system

#### **478.5 Payment**

Payment for the installation of the Traffic Signal electrical conductors will be made at the contract unit price per lump sum per each intersection with signal installation. Such payment shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with installing the conductors complete in place as described in the special provisions and on the construction plans.

Payment for the installation of the Street Light electrical conductors will be made at the contract unit price linear feet. Such payment shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with installing the conductors complete in place as described in the special provisions and on the construction plans.

Payment for the installation of electrical service conduit for traffic signal will be made at the contract unit price per lump sum. Such payment shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with installing the electrical service for the traffic signals complete in place as described in the special provisions and on the construction plans.

<b>ITEM 478.10000</b>	<b>ELECTRICAL CONDUCTORS</b>	<b>LS</b>
<b>ITEM 478.21300</b>	<b>ELECTRICAL CONDUCTORS #6 BARE</b>	<b>LF</b>
<b>ITEM 478.23100</b>	<b>ELECTRICAL CONDUCTORS #12</b>	<b>LF</b>

### **SECTION 482 – FIBER OPTIC CABLE**

#### **482.1 Description**

The work under these items includes furnishing, installing, and testing Single Mode Fiber Optic (SMFO) backbone communication cables in conduit as required and shown in the Plans to connect facilities and/or to connect field devices.

The contractor shall furnish and install fiber optic splice closures at locations shown in the Plans. These splice closures will be used to house and protect the splices for fiber optic cable splicing.

The work shall conform to Section 732 of ADOT Standard Specifications for Road and Bridge Construction and the Town of Queen Creek Signal Standard Detail and Requirements, and as modified below:

#### **482.2 Submittals**

The CONTRACTOR shall submit the following items:

- (A) Material:**
  - 1) Fiber Optic Cable Compliance from manufacturer
  - 2) Fiber Optic Subsystem Installation Certification in accordance with the cable and splice manufacturer's recommendation
  
- (B) Construction:**
  - 1) Conduit Length Measurement Procedures
  - 2) Conduit Length Measurement Results
  - 3) Pulling Tension and Speed Compliance Documentation
  - 4) Existing Occupied Conduit Installation Procedures

**(C) Testing:**

- 5) Pre-Installation Fiber Optic Cable OTDR Test Results
- 6) Post-Installation Fiber Optic Cable Power Meter Test Results
- 7) Post-Installation Fiber Optic Cable OTDR Test Results
- 8) Fiber Optic Cabling Testing Notebook and Electronic PDF Files

**482.3 Materials**

**(A) Single Mode Fiber Optic Cable:**

The contractor shall supply SMFO cable that meets the following specifications:

**(1) Documentation:**

The contractor shall provide certification that the cables furnished and installed are in conformance with the appropriate specifications. This certification shall be in two parts:

Part 1, the contractor shall secure a certification from the cable manufacturer that the cable is in conformance with the Rural Electrification Administration (REA) Bulletin PE-90 (where applicable) and these Special Provisions.

Part 2, the contractor shall certify that the installation of the communication cable subsystem is in accordance with the cable and splice manufacturer's recommendations and these Special Provisions.

**(2) Technical Requirements:**

All fiber optic cable shall be SMFO cable that is of loose tube construction, filled with a water-blocking material, and constructed by a certified ISO 9001 or 9002 manufacturer. Fiber optic cable shall be dielectric and comply with the requirements of REA PE-90 except as modified by the following requirements:

Number of fibers:	144 or as specified
Cladding diameter:	125 ±1.0 µm
Core-to-cladding offset:	≤0.8 µm
Cladding non-circularity:	≤1.0-percent
Maximum attenuation:	≤0.35 dB/km at 1310 nm, ≤0.25 dB/km at 1550 nm
Microbend attenuation (1 turn, 1.25-inch dia.):	≤0.5 dB at 1550 nm
Microbend attenuation (100 turns, 3' dia.):	≤0.05 dB at 1310 nm
Mode-field diameter (matched cladding):	9.3 ±0.5 µm at 1310 nm; 10.5 ±1.0 µm at 1550 nm
Maximum chromatic dispersion:	≤3.2 ps/(nm x km) from 1285 nm to 1330 nm and <18 ps/(nm x km) at 1550 nm
Fiber polarization mode dispersion:	≤0.5 ps/(km) <sup>1/2</sup>

Fiber coating:	Dual layered, UV cured acrylate
Coating diameter:	245 $\mu\text{m}$ $\pm$ 10 $\mu\text{m}$
Minimum storage temperature range:	-40 to 158 degrees Fahrenheit
Minimum operating temperature range:	-40 to 158 degrees Fahrenheit
Rated life:	Certify a 20 year life expectancy when installed to manufacturer's specifications

Buffer Tubes: Each buffer tube shall be filled with a dry water-blocking material that provides for an efficient and craft-friendly cable preparation.

Buffer tubes shall be stranded around a central member using the reverse oscillation or "S-Z", stranding process. Filler rods shall be used in the fiber optic cable to lend symmetry to the cable section.

Central Strength Member: The fiber optic cable shall have a central strength member designed to prevent buckling of the cable.

Cable Core: The fiber optic cable shall utilize a dry water-blocking material to block the migration of moisture in the cable interstices.

Tensile Strength Members: The fiber optic cable shall have tensile strength members designed to minimize cable elongation due to installation forces and temperature variation.

The fiber optic cable shall withstand a 600 lbf (pound-force) maximum installation tensile load and a long term installed maximum tensile load of 200 lbf.

Cable Jacket: The fiber optic cable jacket shall be constructed of a high or medium density polyethylene (HDPE or MDPE) jacket that has been applied directly over the tensile strength members and water-blocking material. The jacket shall have at least one ripcord designed for easy sheath removal.

The cable shall be wound on the reel in such a manner as to provide access to both ends of the cable to enable testing to be performed while the cable is on the reel.

The cable shall be capable of withstanding total immersion in water with natural mineral and salt contents, and wasp/hornet spray without damage or decrease in function.

#### **(B) Fiber Optic Splice Closure:**

Fiber optic splice closures shall be either shell design or cylindrical, butt-end style corrosion resistant, watertight, and meet the requirements of CR-771-CORE. Underground splice closures shall seal, bond, anchor, and provide efficient routing, storage, organization, and protection for fiber optic cable and splices. The splice closure shall provide an internal configuration and end cap with a minimum of two express ports for entry and exit of backbone cable and a minimum of three additional ports for distribution and branch cables.

Fiber optic splice closures shall be designed to accommodate heat-shrink fusion splice trays in sufficient quantities to perform the required number of splices. At a minimum, the splice closure

shall accommodate 144 splices. Each splice closure shall be supplied with at least one spare heat shrink fusion splice tray and the hardware to terminate at least one additional 12 strand fiber optic cable.

Fiber optic splice closures shall have a reliable dual seal design with both the Micro-fiber and SMFO cable jackets and core tubes sealed, without the use of water-blocking material. The fiber optic splice closures shall be capable of being opened and completely resealed without loss of performance.

The fiber optic splice closure minimum dimensions shall be at least 29 inches long by 11 inches wide.

#### **482.4 Construction Requirements**

No fiber optic cable shall be installed until the pull boxes and cabinets through which fiber cables will pass or terminate have been approved for fiber optic cable installation.

Installation of fiber optic cable shall be continuous and without splices between allowable splice points as identified on the Plans and Specifications. The contractor shall perform all final length measurements and order cable accordingly. Prior to conducting the length measurements, the contractor shall submit a process and schedule for acceptance to the Town. Prior to ordering fiber optic cables, the contractor shall submit the results for acceptance to the Town.

##### **(A) Conduit Validation:**

No more than one week prior to installation of fiber optic cable, all new and existing conduits in which fiber optic cable is to be installed shall be cleared/cleaned by pulling through a metal-disc mandrel with a diameter of 90 percent of the conduit inside diameter for PVC conduit, or a ball mandrel with a diameter of 80 percent of the conduit inside diameter for HDPE. The conduit may be brushed or swabbed, if deemed necessary, prior to pulling the mandrel through the conduit. Where cable is to be installed by the contractor over existing cables that remain in place, conduit clearing/cleaning is not required.

The contractor shall ensure that the cable is protected from dragging or scraping on sharp edges and excessive bending. The contractor shall not cause the cable to violate the minimum bending radius for which the cable was designed, as specified by the cable manufacturer. In the event the contractor violates the minimum bending radius, the entire length of cable from the previous splice point shall be removed from the project and a new cable shall be pulled, at no additional cost to the Town.

##### **(B) Installation Procedures: Empty Conduits**

Fiber optic cables shall be pulled through conduit with a device designed to provide a firm hold on the exterior covering and the central strength member of the cable. Cable shall not drag on the ground or pavement and be guided into conduits to avoid contact with sharp edges.

The contractor shall ensure that the tensile load on the cable does not exceed the manufacturer's allowed maximum tensile load by using a break-away tension limiter set below the recommended tensile limit of the cable being pulled and/or a system that provides a means of alerting the installer when the pulling tension approaches the tensile load limit.

##### **1) Lubrication for conventional capstan pulling method**



During pulling, the cable shall be lubricated at each pull box, as directed by the Town. The contractor shall use a pre-lubrication or continuous lubrication method. Continuous lubrication methodology shall include equipment that can measurably verify during the operation the rate of lubrication application ensuring the lubricant quantity enumerated below is being met. The lubricant used shall be compatible with the cable jacket, as recommended by the cable manufacturer. Liquid detergent shall not be used.

The contractor shall use a pre-lubrication or continuous lubrication method. Lubricant quantity for each pull shall be as follows:

$$Q = 0.0008 \times D \times L$$

Where:

Q = is the quantity of lubricant in gallons  
D = is the diameter of the conduit in-inches  
L = is the length of the pull in feet

## 2) Lubrication for jetting/blowing method

The contractor shall lubrication of the inner wall of the duct by using a form spreader/sponge. At the jetting end of the conduit insert one spreader/sponge pushing it into the conduit several inches. Leave enough room to then pour in the type and amount of lubricant per the manufacturer's recommendations for the duct diameter and distance the cable is to be jetted. Lubricate and insert the second spreader/sponge into the end of the conduit. Secure the conduit lead end to the jetting machine's seal air block or other device such as a pressure tester apparatus and apply compressed air to blow the sponge and lubricant through the conduit.

The contractor shall submit documentation identifying the manufacturer's recommendation for maximum pulling tension and speeds, and these values shall not be exceeded. The contractor shall have this documentation on site during each fiber optic cable installation pull. If the contractor fails to continuously lubricate the cable, the work shall be stopped until a meeting is held between the contractor and the Town to discuss why the terms of this specification are not being met. No compensation for the work stoppage shall be given.

Use of equipment required to install cable, including equipment to limit pull-tension and speed will be incidental to these items. All installation equipment will remain the property of the contractor.

### **(C) Installation Procedures: Existing Occupied Conduits:**

Where fiber optic cables are to be installed in existing conduit with existing loop lead-in cables or other cables or conductors that shall remain the contractor shall not damage the existing loop lead-in cables, conductors or any other cables present within the conduit. Where fiber optic cables are to be installed in an existing conduit that contains existing loop lead-in cables, the contractor shall disconnect, remove, reinstall, and reconnect the existing loop lead-in cables as specified in Subsection 735-3.01 (D) and (E), to facilitate the installation of the new fiber optic cable. When the contractor removes existing cables/conductors to facilitate the fiber optic

cabling installation, the existing cables/conductors shall be reinstalled at the same time as the fiber optic cabling. The contractor shall be responsible for any damage to the existing loop lead-in cables caused by this operation and mitigate such damage through an accepted process submitted to the Town prior to affixing such mitigation efforts.

Unless approved by the Town, new fiber optic cables or other cables or conductors shall not be pulled over existing fiber optic cables in any existing conduit or existing innerduct. When an existing fiber optic cable is present in an existing conduit, the contractor shall disconnect, remove and re-install it at the same time with the new fiber optic cable or other cables or conductors. The existing fiber optic cable shall then be reconnected in the same manner as it was in its original condition, including any fusion splicing or connectorization, unless otherwise specified in the project plans or Special Provisions.

Two weeks prior to disconnecting any existing conductors or cables, the contractor shall submit a process and schedule for acceptance by the Town, with the timeframes of when the existing cables are to be disconnected.

**(D) Cable Slack & Coiling:**

In all locations where fiber optic cable enters an existing or new No. 9 pull box, cable slack shall be loosely looped into a circular shape, using the rack and hook system integral to the wall of the No. 9 pull box. The cable slack loop shall not exceed the minimum bend radius of the fiber optic cable.

Each new fiber optic cable shall be attached to the rack and hook system with industry standard nylon cable ties. Cables should be looped independently of one another. Cable ties shall encompass the cable loops of one cable per cable tie, applying ties to each cable individually. Cable ties shall be tightened to prevent cable slippage, but not as to deform or damage the cable sheath.

No. 9 pull boxes with splice closures shall have 50 feet of cable slack provided for each cable entering the pull box, between the splice closure and the point where the cable enters/exits the pull box, allowing the attached splice closure to be removed up to 50 feet from the pull box, unless a greater distance is noted on the project plans or in the Special Provisions.

No. 9 pull boxes without splice closures shall provide a minimum of 100 feet of slack in each cable passing through the pull box, unless otherwise noted on the project plans or in the Special Provisions.

**(E) Splicing:**

At the locations shown in the project plans or as specified in the Special Provisions, the contractor shall perform all required fusion splicing. The contractor shall install the splice closure in a manner proposed to and submitted for review and acceptance by the Town, such that the trunk cable entries are on the same side of the end cap so if additional fiber optic cables are installed at a later date, the two existing seals remain undisturbed.

Where the contractor is splicing to existing fiber, the contractor shall be careful and not disturb any existing splices. Existing splices that are damaged shall be repaired by the contractor immediately, at no cost to the Town of Queen Creek.

Splicing of fiber optic cable shall be conducted only at communications hub buildings, specified

pull boxes, and connector housing units as shown on the project plans and in the Special Provisions.

All splices and connectors shall be prepared in accordance with the manufacturer's recommendations. Each splice between two new fibers shall introduce less than 0.1 dB attenuation. For splices between one new and one existing, or reconnection of two existing fibers, the maximum allowable attenuation shall be 0.3 dB.

**(F) Connectors:**

Backbone fiber optic cables, typically connecting between communications hubs and No. 9 pull boxes with splice closures, shall not be connectorized.

**482.5 Test Requirements**

Fiber optic cable shall meet the following test requirements.

**(A) Pre-Installation Testing:**

The contractor shall inspect and provide opportunity for Town of Queen Creek inspection, all cable upon delivery, and prior to installation. Cable that is found to have visual damage shall be tested and the test results submitted to the Town, using an OTDR per the following Post Installation Testing section prior to installation.

**(B) Post-Installation Testing:**

After installation and splicing of fiber optic cable, the contractor shall perform the following tests:

*Power Meter Test:*

The contractor shall conduct Power Meter Tests for each fiber to measure installed fiber cable attenuation, demonstrate connectivity, and correct splicing. Power meter tests shall be conducted after all cable has been installed, all splices have been made, all fiber optic pigtailed have been installed, and all break-outs have been installed. Testing shall be conducted at the cable ends in one direction for all fiber strands using 1310 nm wavelength. Each link shall be tested separately from field cabinet to the respective trunk cable termination panel in the Hub and from field cabinet to field cabinet for fiber links that do not go directly to a hub. The use of a fiber optic jumper to couple the connectors together in field cabinets to create a continuous end to end link is not permitted. The testing shall include a test summary spreadsheet that includes at a minimum the following parameters:

- Fiber ID
- From
- To
- Wavelength of Test
- Cable Length
- Number of Splices
- Number of Connectors
- Fiber Loss Budget (dB)
- Pass/Fail

The contractor shall perform Power Meter Tests on each fiber strand terminated with connectors utilized in circuits, in accordance with Method A.3 of TIA/EIA-526-7 – "Measurement of Optical

Power Loss of Installed Single-mode Fiber Cable Plant”, and submit test results for each fiber to the Town for review and acceptance.

#### *OTDR Tests:*

The contractor shall conduct bi-directional tests using an OTDR in accordance with EIA/TIA-455-8 for each fiber strand (including non-spliced fiber strands) from field cabinet to hub location, between hub locations, between field cabinets locations, inclusive of all branch cables, pigtails, and patch panels. The contractor shall demonstrate that the attenuation for each fiber, splice, and connector, individually and as a whole, comply with the fiber loss budget and the requirements of the project Special Provisions. The contractor shall test each fiber at 1310 nm and 1550 nm using a launch cable of a length recommended by the OTDR manufacturer. The OTDR shall be set to operate in auto event mode with the event threshold set at 0.1 dB or lower. The contractor shall submit printed and electronic OTDR traces to the Town for review and acceptance. Any electronic traces submitted that were shot without the auto events feature shall be re-tested by the contractor at no additional cost. The contractor shall clearly annotate each event (connector, pigtail, splice, etc.), event location, and identify the measured loss.

The contractor shall test all fibers in all splice enclosures the contractor works in, whether existing or new, including dark fibers.

The contractor shall identify unacceptable losses and make corrective actions at no additional cost to the Town of Queen Creek. Failed splices shall be remade and re-tested for compliance. The contractor shall replace cable in its entirety that is not compliant with these Specifications, at no additional cost to the Town of Queen Creek.

The contractor shall submit an electronic copy of the actual OTDR traces and any software applications required for the Town of Queen Creek to view the files.

Following completion of all testing, and acceptance by the Town of Queen Creek, the contractor shall compile and submit organized test notebooks reflecting the pre and post-installation tests, in electronic form (PDF) to the Town. These notebooks shall include a fiber test summary sheet that includes at a minimum the following parameters:

- Pre-Installation Test
  - Fiber ID
  - Length
  - Pass/fail
- Post-Installation Test
  - Power Meter Test
    - Fiber ID
    - Length
    - Pass/Fail
    - Any fiber strands requiring re-testing
  - OTDR
    - Fiber ID
    - Length
    - Pass/Fail
    - Any fiber strands requiring re-testing

## **482.6 Measurement**

### **SMFO Cable**

The SMFO cable will be measured by the linear foot for each cable furnished and installed; it will be measured horizontally along the route from center of pull box to center of pull box, or center of pull box to center of foundation.

No separate measurement will be made for cable that is below ground in vertical conduit stub-ups or for slack cable in pull boxes.

No separate measurement will be made for splicing and terminating cables, Pull tape, lubricant, labels, conduit cleaning and sealing, or testing.

No separate measurement will be made for the correction of unacceptable splice losses.

No separate measurement will be made for the re-testing of fiber strands tested without auto event feature.

Use of equipment required to install cable, including equipment to limit pull-tension and speed will be incidental to these items. This installation equipment will remain the property of the contractor.

#### SMFO Splice Closures

Fiber optic splice closures will be measured as a unit for each splice closure unit furnished, and installed, complete in place.

### **482.7 Payment**

#### SMFO Cable

The SMFO cable, measured as provided above, will be paid for at the contract unit linear foot price, which price shall be full compensation for the work, complete in place and successfully tested.

No payment will be made for cable that is below ground in vertical conduit stub-ups or for slack cable in pull boxes, its cost being incidental to this item and incorporated into this item.

No payment will be made for splicing and terminating cables, Pull tape, lubricant, labels, conduit cleaning and sealing, or testing, its cost being incidental to this item and incorporated into this item.

No payment will be made for materials required to complete the system, its cost being incidental to this item and incorporated into this item.

#### SMFO Splice Closures

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

**ITEM 482.51030**  
**ITEM 482.71100**

**FIBER OPTIC CABLE, SINGLE MODE 144**  
**UNDERGROUND FIBER OPTIC SPLICE CLOSURE**

**LF**  
**EA**

### **SECTION 483 – CLOSED CIRCUIT TELEVISION**

Add the following section per the MCDOT supplement to the MAG Standard Specification Section 483, the ADOT Standard Specifications for Road and Bridge Construction Section 733, and the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

#### **483.1 Description**

The work under this section shall consist of furnishing and installing closed circuit television (CCTV) cameras at locations shown on the Plans.

#### **483.2 Material**

The CCTV Camera shall be Axis Communication model Q6042-E with a smoked dome.

The CCTV Camera cable shall be an outdoor rated CAT5e cable.

The CCTV Camera mounting bracket shall be Axis Communications model T-91A67.

The CCTV Camera surge protection shall be LCOM brand model HGLN-CAT5-HP or approved equal.

#### **483.3 Construction Requirements**

The new CCTV Camera shall be installed on traffic signal poles per TOQC Standard Details. The CCTV Camera cabling shall run unspliced from the camera to traffic signal controller cabinet. The CONTRACTOR shall deliver the CCTV Camera to the TOQC Traffic Department for configuration a minimum of 10 working days prior to installation.

After the CCTV Camera installation, the CONTRACTOR shall test to verify that the pan, tilt, zoom, and preset functions are performing properly. The testing shall occur at both the local level, and from the TOQC Traffic Management Center (TMC)

#### **483.4 Measurement**

CCTV Camera Assembly will be measured for each camera system installed and tested to the TOQC approval.

#### **483.5 Payment**

The accepted quantities of CCTV Camera Assembly, measured as provided above, will be paid for at the contract unit price for the type designated in the bidding schedule, complete in place including furnishing and installing CCTV camera cabling, mounting brackets, and surge protection. No additional measurement or payment will be made for the testing of the CCTV Camera.

### **ITEM 483.10100 CCTV CAMERA ASSEMBLY**

**EA**

#### **SECTION 485 – VIDEO IMAGE DETECTORS**

Add the following section per the MCDOT supplement to the MAG Standard Specification Section, the ADOT Standard Specifications for Road and Bridge Construction Section 733, and the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

#### **485.1 Description**

The Contractor shall provide and install the video detection system, including system hardware and software. The Contractor shall provide the cable from the pull boxes to the controller, and all equipment necessary for installing the video detection system as identified. The Town of Queen Creek shall supervise the installation and testing of the video detection system and computer equipment. All Video Image Detector Systems must be on the Town of Queen Creek Approved Materials List.

Video detection cables shall run unspliced from the hand hole at each pole to the controller cabinet. A manufacture supplied cable and pre-installed connector shall be supplied for connection to the back of the camera down the pole to the hand hole then spliced into the cable from the signal cabinet. (Video detection splicing will on be allowed in the pole hand hole). Contact the Town of Queen Creek for approved products.

Camera locations shall be coordinated with and approved by the Town. Cost associated with this

item shall include mounting brackets and necessary equipment and labor.

#### **485.7 Payment**

The accepted quantity of video detection system will be paid for at the contract unit price per each. Such payment shall constitute full compensation for all labor, materials and equipment required for the furnishing, installation, testing and documentations.

### **ITEM 485.10000 VIDEO DETECTION SYSTEMS (4 CAMERA SYSTEM)**

**LS**

#### **SECTION 486 – COMMUNICATIONS EQUIPMENT**

Add the following section per the MCDOT supplement to the MAG Standard Specification Section 486, the ADOT Standard Specifications for Road and Bridge Construction Section 733, and the Town of Queen Creek Traffic Engineering Standards and Details, as modified below:

#### **486.1 Description**

The work under this section shall consist of furnishing and installing field hardened Ethernet switch and wireless radio/antenna system at locations shown on the Plans.

#### **486.2 Materials**

The field hardened Ethernet switch shall be Ruggedcom model #6GK6092-0PS23-0CA0-Z-A00-B00-C00-D00 with four single mode, 1300nm, 25km SFP's (99-25-0101=1000LX SFP, Single mode, LC, 1310nm, 25km) with External power supply Ruggedcom RPS1300.

Gator Patch shall be Fiber Connections #G6XXJ012FRB-Y-Z 12 Fiber Gator Patch ITS drop cable.

#### **486.3 Construction Requirements**

The new field hardened Ethernet switch shall be installed in the traffic signal cabinet per TOQC Standard Details. The installation shall be for ease of maintenance, with all component parts being readily accessible for inspection and maintenance.

The Contractor shall provide and install one CAT5e cable patch cord for connection between the Traffic signal controller and Ethernet switch.

The Contractor shall deliver the Ethernet switch and wireless radio/antenna to the TOQC Traffic Department for configuration a minimum of 10 working days prior to installation.

After the Ethernet switch installation, the contractor shall a test to verify the proper function of the network subsystem. The traffic signal controller shall be tested for reliable communication between the TOQC TMC and the field device. The communications shall be monitored for a 72 hour period for any communications failures or loss of data.

#### **486.4 Measurement**

Field hardened Ethernet switch will be measured for each Ethernet switch successfully installed and tested to the TOQC approval.

#### **486.5 Payment**

The accepted quantities of field hardened Ethernet switch, measured as provided above, will be paid for at the contract unit price for the type designated in the bidding schedule, complete in place including furnishing and installing camera cabling.

No additional measurement or payment will be made for conducting the network system testing.

ITEM 486.10000	FIELD HARDENED ETHERNET SWITCH	EA
ITEM 486.20000	WIRELESS RADIO / ANTENNA SYSTEM	EA
ITEM 486.95000	GATOR PATCH	EA



## **PART 500 – STRUCTURES**

### **SECTION 505 – CONCRETE STRUCTURES**

#### **505.1 Description**

Section 505.1 of the MAG Standard Specifications is modified to add the following:

All new storm drain manhole frames and covers shall be adjusted to grade according to MAG Standard Detail 422. There shall be no additional payment for new storm drain manhole frame and cover adjustment.

All new storm drain manhole covers shall read “Queen Creek Storm Sewer”.

No separate payment will be made for concrete pipe collars (MAG Standard Detail 505) and lateral pipe connections (MAG Standard Detail 524), the cost being considered incidental to the storm drain construction.

**505.1.1 Precast Reinforced Concrete Box Culvert:** Unless otherwise noted on the plans, the Contractor shall have the option to utilize precast box culvert sections when a cast-in place concrete box culvert is specified in the project plans. The precast box culvert sections shall be designed for the same design cover shown on the plans for cast-in-place box culvert; shall be of equal or larger size opening and shall satisfy the design requirements of ASTM C 1577. The contractor shall follow the ADOT Stored Specification 601PRCCULV, Dated 02/16/23 (ITEM 6017105 – PRECAST REINFORCED CONCRETE BOX CULVERT) and any accompanying ADOT Standard Specifications. No additional Payment shall be made for utilizing Precast as the cost shall be included in the base bid for cast-in-place bid items. ADOT Stored Specifications can be downloaded at [Specifications & Pay Items List | Department of Transportation \(azdot.gov\)](https://www.azdot.gov/specifications/PayItemsList.aspx)

#### **505.12 Payment**

Section 505.12 of the MAG Standard Specifications is modified to add the following:

Payment for catch basins, scuppers with spillways, headwalls, trash guards, and trash racks will be made at the contract unit price per each.

Payment for concrete retaining wall will be made at the contract unit price per linear feet. The contract unit price shall include full compensation for all labor, materials, tools and equipment necessary to provide the concrete retaining wall complete in place, including all concrete, reinforcing steel, expansion joint material, safety rail, and joint seal.

Safety rails with three-coat paint system shall be considered as included in the construction of drainage scuppers, headwalls, or retaining walls. No separate payment will be made for safety rails at scupper, headwall, or retaining wall locations unless otherwise noted on the plans. Safety rails shall be constructed per Section 520.

Such payment shall constitute full compensation for all of the work, materials, labor fabrication, hardware and incidentals associated with constructing said items complete in place.

<b>ITEM 505.02000</b>	<b>STRUCTURAL CONCRETE, ADOT CLASS S, F'C=3000 PSI</b>	<b>CY</b>
<b>ITEM 505.10500</b>	<b>REINFORCING STEEL</b>	<b>LB</b>
<b>ITEM 505.42130</b>	<b>CATCH BASIN, COP STD. DET. P1569-1, TYPE M-1, L=10'</b>	<b>EA</b>

ITEM 505.42140	CATCH BASIN, COP STD. DET. P1569-1, TYPE M-1, L=17'	EA
ITEM 505.44300	CATCH BASIN, COP STD. DET. P1572, TYPE Q, TRIPLE CATCH BASIN	
ITEM 505.52110	CONCRETE SCUPPER & SPILLWAY, MAG STD. DET 206, CURB OPENING 1-4'	EA

## **SECTION 510 – CONCRETE BLOCK MASONRY**

### **510.6 Payment**

Section 510.6 of the MAG Standard Specifications is modified to read:

Payment for concrete masonry block wall will be made at the contract unit price per linear feet. The contract unit price shall include full compensation for all labor, materials, tools and equipment necessary to provide the concrete masonry block wall complete in place, including all concrete, reinforcing steel, foundations, blocks, end and top caps.

ITEM 510.50000	CONCRETE MASONRY UNIT WALL	LF
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## **SECTION 520 – STEEL AND ALUMINUM HANDRAILS**

### **520.1 Description**

Section 520.1 of the MAG Standard Specifications is modified to add the following:

The plans identify handrails to be constructed at scupper and headwall locations. Handrails shall be painted, color to be approved by the Town of Queen Creek. The paint shall conform to the section below.

### **520.2 Fabrication and 530.9.1 Structural Steel**

Add the following:

Steel handrail or safety rail per MAG Standard Detail 145, where not specified in the plans to be galvanized, shall be painted. The paint system shall be a three-paint coating system in accordance with Arizona Department of Transportation (ADOT) Standard Specification 1002 and shall be listed on the ADOT Approved Product List in Category T-1 or T-2 or shall be an equal to the products so approved and listed. The paint system shall consist of a primer coat, intermediate coat and top coat. The primer shall not be applied over a galvanized metal surface. All surface preparation shall be per specification and manufacturer's recommendations. The top coat paint shall have a semi-gloss or gloss finish. The top coat color shall be Federal Standard 595 Color FS 13578. When matching newly painted surfaces to existing painted surfaces, a physical sample of the colored new paint system on a sample of the new substrate shall be provided to the Town Project Manager for comparison to the existing paint color to be matched. Existing painted surfaces may have faded since application and may be lighter in color and less glossy than expected. If an "equal to" paint system product is proposed, it shall be the responsibility of the CONTRACTOR and/or their vendor to supply sufficient product literature and technical data that shows the comparison to the approved product and specification with highlights, arrows, underlining or similar annotation for review by the Town Project Manager. **No separate measurement or payment shall be made for painting under this provision.** All materials, labor, tools, equipment and incidentals for painting shall be included in the unit price bid for the railing or bid item to which the railing is an included part.

**520.4 Description**

Section 520.4 of the MAG Standard Specifications is modified to add the following:

No measurement will be made for handrail when attached to concrete scuppers as they will be included to the cost of Concrete Scupper and Spillway per section 505.

No measurement will be made for handrail when attached to concrete headwalls as they will be included in the cost of Concrete Headwalls per section 505.

No measurement will be made for handrail when attached to concrete retaining walls as they will be included in the cost of Concrete Retaining Walls per section 505.

**520.5 Payment**

Section 520.5 of the MAG Standard Specifications is modified to add the following:

No payment will be made for handrail when attached to concrete scuppers as they will be included to the cost of Concrete Scupper and Spillway per section 505.

No payment will be made for handrail when attached to concrete headwalls as they will be included in the cost of Concrete Headwalls per section 505.

No payment will be made for handrail when attached to concrete box culvert wing walls as they will be included in the cost of the wing walls per section 505.

## **PART 600 – WATER, SEWER, STORM DRAIN AND IRRIGATION**

### **SECTION 601 – TRENCH EXCAVATION, BACKFILLING, AND COMPACTION**

#### **601.4 Foundation, Bedding, Haunching, Backfilling and Compaction**

The following is added:

No extra monetary compensation or additional time will be authorized for claims that soil conditions differ from those anticipated or those indicated by soil logs and/or reports. It is the CONTRACTOR's responsibility to make his own determination as to actual existing conditions.

#### **601.4.6 Compaction Densities**

The following is added:

Compaction densities for storm drain shall comply with the requirements set in the Town of Queen Creek Right of Way Construction Inspection Requirements and Section 106.2 Samples of Tests and Materials in these special provisions.

### **SECTION 604 – PLACEMENT OF CONTROLLED LOW STRENGTH MATERIAL**

#### **604.6 Payment**

Add the following:

Payment for CLSM – 1 Sack wall will be made at the contract unit price per cubic yards. Such payment shall constitute full compensation for all of the work associated with construction of said items complete in place including trenching, installing CLSM, and final grading.

**ITEM 604.30120      CONTROLLED LOW STRENGTH MATERIAL (CLSM) – 1 SACK      CY**

### **SECTION 610 – WATER LINE CONSTRUCTION**

#### **610.2 General**

Add the following:

All existing water pipelines requiring shut down in order to perform connections shall be scheduled to occur at night or weekends when affected businesses are closed during periods of low water usage by residents. All shut downs shall be restricted to between 10:00pm and 6:00 am. The CONTRACTOR shall coordinate with the Town's inspectors for any shut downs.

All pipe shall be manufactured, handled, loaded and shipped, unloaded and stored at the job site in such a manner as to prevent any damage to the pipe. Any pipe section that becomes damaged shall be repaired as directed by the Town Utilities Department or Town Project Manager, if in his opinion a satisfactory repair can be made. If the Town Utilities Department or Town Project manager determines repairs cannot be made, the material shall be replaced with undamaged materials at the CONTRACTORS's expense. No handling method will be permitted involving lifting for the inside of the pipe.

#### **610.4 Construction Methods**

Add the following:

Trenching shall comply with MAG Section 601 and adhere to maximum trench widths as defined in Table 601-1.

#### **610.16 Measurement and Payment**

##### **(A) Pipe**

Add the following:

Payment for water line and trench will be made at the contract unit price per linear foot. Such payment shall constitute full compensation for all of the work associated with construction of said items complete in place including fittings and coordination with the Town Fire Department. Costs for testing, joint restraint, temporary or permanent pipe supports, encasement and thrust blocks shall be included with Pipe installation cost.

Contractor shall work with the Town of Queen Creek for connections to existing mains. Information on the plans is based on best available and actual conditions may vary. Contractor is responsible for verifying field conditions. Contractor may propose alternate tie-in options for review and consideration. There will be no increased payment to the Contractor for the connection due to changed field conditions or an alternate proposal.

##### **(B) Service Line Construction**

Delete this item. Payment for services is with Section 631.

##### **(C) Relocation of Existing Meter and Boxes**

Delete this item. Payment for services is with Section 631.

##### **(D) Permanent Pipe Supports and Encasement of Existing Pipes**

Delete this item. Payment for services is with Pipe.

##### **(E) Concrete Thrust Blocks**

Delete this item. Delete this item. Payment for services is with Pipe

##### **(F) Valves**

Delete this item. Payment for services is with Section 630.

##### **(G) Fire Hydrants**

Add the following:

Payment for fire hydrant will be at the contract unit price for the installation of each fire hydrant complete in place and in operating condition, including the 6 inch ductile iron pipe, valve, frame and cover; and fittings, required for making the connection from the main to the hydrant , and shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with furnishing and installing the water pipe complete in place as described in the special provisions and on the construction plans.

##### **(H) Pavement and/or Surfacing Replacement**

Modify as follows:

No separate payment shall be made for pavement and/or surfacing replacement in the area to be replaced as part of the road project.

Permanent replacement shall be included with Section for trenches outside the road replacement limits in covered in Section 336.

<b>ITEM 610.30220</b>	<b>DUCTILE IRON PIPE, CL350 W/ RESTRAINED JOINTS, 6" DIP</b>	<b>LF</b>
<b>ITEM 610.30510</b>	<b>PVC, DR-18, AWWA C-909 W/ RESTRAINED JOINTS, 6" PIPE</b>	<b>LF</b>
<b>ITEM 610.30530</b>	<b>PVC, DR-18, AWWA C-909 W/ RESTRAINED JOINTS, 12" PIPE</b>	<b>LF</b>

## **SECTION 611 – WATER, SEWER, AND STORM DRAIN TESTING**

### **611.1 Description**

Add the following:

New waterlines shall be tested in accordance with Section 611 of the MAG Standard Specifications and the TOQC Water Utility Department "Design & Construction Standards Manual".

### **611.6 Payment**

No separate payment shall be made for waterline testing. Payment shall be included with Section 610.

## **SECTION 618 – STORM DRAIN CONSTRUCTION**

### **618.1 Description**

Add the following:

The work under this section shall consist of furnishing all labor, equipment, and the materials to install the flared end sections in accordance with the details shown in the project plans.

### **618.2 Materials**

Section 618.2 of the MAG Standard Specifications is modified to add the following:

The allowable pipe material for storm drain pipe is rubber gasket reinforced concrete pipe. For pipe classes, see the Plans.

### **618.3 Construction Methods**

Underground storm drain retention chambers shall be installed per the recommended manufacturers requirements as specified in the project plans. The CONTRACTOR shall verify all underground utilities in the vicinity and protect the utilities in place during excavation per MAG Section 601. Excavation and shoring requirements shall be per MAG Section 601.

### **618.5 Measurement**

Add the following:

(C) Flared End Section: Measurement for Flared End Sections shall be measured per each.

### **618.6 Payment**

Section 618.6 of the MAG Standard Specifications is modified to add the following:

Payment for storm drain pipe shall include concrete pipe collars (MAG Standard Detail 505) and lateral pipe connections (MAG Standard Detail 524) as specified on the plans; no separate payment will be made for concrete pipe collars and lateral connections.

Payment for storm drain or irrigation pipe will be made at the contract unit price per linear foot, and shall constitute full compensation for furnishing all material, labor, tools and equipment and accomplishing all work associated with the furnishing and installing the pipe complete in place as described in the special provisions and on the construction plans.

<b>ITEM 618.22120</b>	<b>RGRCP STORM DRAIN, CLASS IV PIPE – 15”</b>	<b>LF</b>
<b>ITEM 618.22130</b>	<b>RGRCP STORM DRAIN, CLASS IV PIPE – 18”</b>	<b>LF</b>
<b>ITEM 618.22140</b>	<b>RGRCP STORM DRAIN, CLASS IV PIPE – 24”</b>	<b>LF</b>
<b>ITEM 618.41005</b>	<b>END SECTION 15” FLARED, PIPE CULVERT</b>	<b>EA</b>
<b>ITEM 618.41010*</b>	<b>END SECTION 18” FLARED, PIPE CULVERT</b>	<b>EA</b>
<b>ITEM 618.41015*</b>	<b>END SECTION 24” FLARED, PIPE CULVERT</b>	<b>EA</b>

### **SECTION 630 – TAPPING SLEEVES, VALVES AND VALVE BOXES ON WATER LINES**

<b>ITEM 630.30000</b>	<b>AIR-VACUUM RELEASE VALVE</b>	<b>EA</b>
<b>ITEM 630.31022</b>	<b>GATE VALVE, BOX &amp; COVER, TOQC STD DTL QW301, 6”</b>	<b>EA</b>
<b>ITEM 630.31042</b>	<b>GATE VALVE, BOX &amp; COVER, TOQC STD DTL QW301, 12”</b>	<b>EA</b>

### **SECTION 631 – WATER TAPS AND METER SERVICE CONNECTIONS**

Add the following:

Service Installation shall include pipe, meter box, fittings and connection to the existing service line where noted per the Town of Queen Creek detail for each size as noted. Town of Queen Creek will install all meters.

<b>ITEM 631.31020</b>	<b>WATER SERVICE CONNECTION, 1-1/2”</b>	<b>EA</b>
<b>ITEM 632.01000</b>	<b>BACKFLOW PREVENTION ASSEMBLY W/ ENCLOSURE</b>	<b>EA</b>