Technical Specifications

Washington Elementary School District no. 6

Sahuaro Elementary School Fire Lane Improvements

November 2022

Kimley»Horn

TECHNICAL SPECIFICATIONS

Washington Elementary School District No. 6

Fire Lane Improvements

for:

SAHUARO ELEMENTARY SCHOOL

November 30, 2022

Prepared by

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MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1- GENERAL

1.01 GENERAL CONDITIONS

A. All Construction under this permit shall conform to the Maricopa Association of Governments Uniform Standard Specification and Details (MAG Specifications and Details), and the City of Phoenix Engineering and Construction Standards and Specifications.

1.02 SUPPLEMENTS

A. The following supplements modify, change, delete from, and add to, the MAG Specifications. When any portion of the MAG Specifications is modified or any paragraph or subparagraph, or clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of the MAG Specifications shall remain in effect.

Section 105.3

Add the following:

105.3.1 “Execute Work as per Contract Documents. Make no changes without having first received written permission. Where detailed information is lacking, before proceeding with Work, refer matter to Owner’s Representative for information.”

105.3.2 “Should conflicts occur in or between Drawing and Specifications, or within different areas within the plans and/or different areas within the Specifications, the Contractor is deemed to have estimated on the more expensive way unless he has asked for and obtained a written decision from the Owner’s Representative before submission of his proposal as to which method or materials will be required.”

END OF SECTION 00800

SECTION 01010

SUMMARY OF WORK

PART I - GENERAL PROJECT REQUIREMENTS

1.01 WORK INCLUDED

A. The work under the Base Bid of the Contract shall include all work indicated or specified within the Contract limit lines unless the work is specifically indicated as "Not In Contract". Also, included is all work which may be necessary to provide all water, gas, sewer, telephone, and electrical service to the site, including replacement of paving to meet the requirements of governing municipal authorities.

B. Conform to MAG Section 104, 'Scope of Work.'

1.02 PROJECT DESCREPTION

A. "Project:' "The Project," of which the "Work" of this contract is a part, is titled: "Washington Elementary School District, Sahuaro Elementary Fire Lane Improvements Elementary" located in the City of Phoenix.

B. The "Project" consists of the construction of new site and paving features, including, but not limited to:
Demolition
Earthwork
Concrete Fire Lane
Other work shown on the drawings and specified herein.

1.03 MATERIAL SUBSTITUTION

A. If the prime Contractor desires to use material other than that specified, he shall request approval of such substitutions, in writing, to the Engineers. Requests for substitutions shall be in the hands of the Engineer no later than 7 days prior to the stated date of bidding as identified in the Contract Documents. Four (4) copies of this request will be submitted or delivered to the following address: Kimley-Horn, 7740 N. 16th Street, Suite 300, Phoenix, AZ 85020. (602) 906-1107.

B. Submittals for approval of substitute materials shall contain sufficient information, descriptive brochures, drawings, samples or other data as is necessary to provide direct comparison to the specified materials. Each submittal shall be well marked and identified as to type and kind of items being submitted for approval. The Prime Bidder, at their own expense, shall furnish the necessary data to substantiate and validate that the physical, chemical, and operational qualities of each substitute item is such that this item will fulfill its required function. It is the sole responsibility of the bidder to submit complete descriptive and technical information so that the Engineer can make proper appraisal. Lack of proper information will be sufficient cause of rejection. References to catalogs that the Engineer may or may not have will not be acceptable. The substitution, if approved will be authorized by a written addendum to the contract Documents and will be made available to all bidders. The bid date and the scheduled completion time will not be affected by any circumstances developing from this substitution,

C. Award of the Contract in accordance with Contract Documents requires that the specified materials and equipment shall be furnished and installed.

D. Unless specifically submitted and approved in accordance with above, substitutions will not be allowed.

1.04 SPECIFICATIONS

A. In the preparation of these Specifications an effort has been made to segregate the various branches of the work under headings, by trades. This is done only for convenience and shall not relieve the Contractor of the responsibility of furnishing every item indicated or specified whether properly segregated or not.

B. No responsibility will be assumed by the Owner or the Engineer for omissions or duplications by the Contractor in the completion of the Contract due to any engineer error in the arrangement of the material in the-se Specifications nor shall any such segregation of work and materials operate to make the Engineer an arbiter in defining limits to the Agreements between the Contractor and his Subcontractors or Suppliers. The misplacement, addition or omission of any letter, word or punctuation, or lack of capitalization of a word, shall in no way damage the true spirit, intent, or meaning of these Specifications.

1.05 PROJECT MANUAL

A. Definition: The "Project Specifications and Contract Documents," including MAG, may be referred to herein as the 'Project Manual.'

B. Purpose: This Project Manual has been prepared by the Engineer for the Owner's use in the Owner's agreement with the Contractor. It is understood that the Contractor may have other or additional requirements in his agreement with his subcontractors or suppliers.

C. Segregation: In the preparation of this Project Manual, an effort has been made to segregate the various branches of the Work under headings, generally by trades or categories of work. This has been done for the convenience of the Engineer, and the Contractor shall have the responsibility of coordinating and furnishing every item indicated or specified whether properly segregated for his benefit or not.

D. Contractor's Use of Project Manual: No responsibility will be assumed by the Engineer for omissions or duplications made by the Contractor in the completion of the Contract due to any alleged error in arrangement of the material in this Project Manual, nor shall any such segregation of work and materials operate to make the Engineer an arbiter in defining limits to the agreements between the Contractor and his subcontractors or suppliers.

E. Intent: The misplacement, addition or omission of letters, words, or punctuation marks, or lack of capitalization of words, shall in no way damage the true spirit, intent, or meaning of this Project Manual.

F. References to Drawings: The words "shown," 'indicated," "noted," "scheduled," or words of like effect shall be understood to mean that reference is made to the Drawings accompanying this Project Manual.,

1.06 DISPOSITION OF UTILITIES

A. Procedure: Observe rules and regulations governing the respective utilities in executing all work under this heading.

B. Protection: Adequately protect active utilities from damage and remove or relocate only as indicated or specified.

C. Inactive and Abandoned Utilities: Remove, plug or cap inactive and abandoned utilities encountered during the Work. If there are no specific requirements, plug or cap such utility lines per applicable standards currently in use by the City of Phoenix.

D. Care and Maintenance: Send proper notices, make all necessary arrangements and perform all services required in the care and maintenance of all public utilities.

1.07 ENGINEERING SERVICES

A. It is understood that normal engineering liaison for the purpose of interpretation of the Contract Documents is provided for by the Owner. Should services of the Engineer be required to assist in the corrections, errors or omissions in the construction by the Contractor, or should services of the Engineer be required because of changes in structure or equipment where the Contractor has requested approval of substitute methods or materials, these services will be provided by the Engineer at standard hourly rates, and shall be paid for by the Contractor.

B. Cost of additional design work, revisions or inspection necessitated due to the Contractor's errors or omissions, shall be borne by the Contractor. Any engineering design provided by others and submitted for review shall bear the seal of an Engineer registered in Arizona. The Contractor shall verify in the field all existing conditions shown on the Drawings.

C. The Contractor or subcontractor shall not deviate from these plans or make field changes without notifying in writing, the design engineer for approval of these modifications. Any changes made without approval of the design engineer are subject to removal at the expense of the Contractor.

D. Any questions raised relative to accuracy of improvement installation shall not be raised subsequent to completion of work unless all survey stakes are maintained intact. Should such stakes not be present and verified as to their origin, no claim for additional compensation for correction shall be presented to any party and such work shall be corrected by the Contractor at his expense.

E. The Contractor shall preserve essential survey monumentation/offset points set by the City. Any such points disturbed shall be re-established at the Contractor's expense.

1.08 CONTRACTOR'S LICENSE LAW

A. Comply with, and require all subcontractors to comply with, state and city contractor's license laws and be duly registered and licensed thereunder.

1.09 APPROVED APPLICATORS

A. Where specific instructions in these Specifications require that a particular product and/or material(s) be installed and/or applied by an approved applicator of the manufacturer, ensure that subcontractors used for such work be so approved.

1.10 WATERTIGHT-WEATHERTIGHT AND SUITABLE FOR INTENDED USE

A. Accept the responsibility of constructing a watertight, weathertight, free-draining, usable project, suitable for use within a school site, anything in the Contract Documents notwithstanding.

1.11 EXTRA WORK

A. In accordance with the Agreement, and when authorized in writing by the Owner, extra work may be ordered. Claims for additional compensation for extra work done will not be recognized unless such extra work has been authorized in advance and in writing by the Owner.

1.12 SIGNED DRAWINGS AND SPECIFICATIONS

A. The Contract Documents shall be signed in accordance with the Agreement. These shall become the Contract Drawings and Project Specifications and Contract Documents. Keep one set at the job site at all times during the progress of the Work.

1.13 CONTRACTOR USE OF PREMISES

A. Storage Areas: The Contractor shall limit the storage of materials and equipment to areas as designed by the Owner.

B. Responsibility: Assume all responsibility for stored materials and equipment during the construction period and until final acceptance of the Work by the Owner.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART I – GENERAL

1.01 WORK INCLUDED

A. Payment for the various items in the bid proposal shall comply with MAG Section 109 and include all compensation to be received by the Contractor for furnishing all excavation, backfilling, connections, materials, tools, equipment, supplies, appurtenances and manufactured articles, and for all labor, subcontracting, operating, testing and incidentals appurtenant to the items of work being described, as needed to provide a completely finished operational and serviceable project as described in the contract documents, and including all costs of complying with the regulations of public agencies having jurisdiction, including the Safety and Health Requirements of the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor and permitting.

B. Unit prices shall be for the unit completely installed. No allowance will be made for materials on hand.

1.02 MEASUREMENT

A. Measurements of the completed work will be made in place, with no allowance for waste.

B. Measurements of distances will be made in a horizontal plane, unless otherwise stated.

C. Measurements of areas will be made in a horizontal plane, unless otherwise stated. Widths of paved areas will be measured based on the neat dimensions shown on the plans, unless altered in writing by the Owner's Representative to fit field conditions.

D. Measures of weights will be based on certified weighmaster's load slips, submitted to the Owner's Representative to fit field conditions.

1.03 NON-PAY ITEMS

A. No separate payment will be made for any item that is not specifically set forth in the bid proposal. All costs shall be included in the prices named in the bid proposal for the various identified items of work.

B. Payment for construction, modification, maintenance, removal and restoration of all access and storage facilities shall be included in the price bid for items of work where access facilities are required.

C. Payment for clearing and grubbing including backfill of holes left by any excavation shall be included in the price bid for construction or installation of the items to which said clearing and grubbing are incidental or appurtenant.

D. Payment for shoring and bracing of excavations including furnishing, installing and removing shoring or trench boxes for excavations as required by law, shall be included in

the price bid for construction or installation of the items to which said shoring and bracing are incidental or appurtenant.

E. Payment for roadway excavation shall be included in the price bid for the construction or installation of the items to which roadway excavation is incidental or appurtenant.

F. Payment for structural excavation and backfill shall be included in the price bid for the construction or installation of the items to which said installation and backfill are appurtenant.

G. Payment for bedding slurry for parallel trench installation shall be included in the price bid for pipe.

H. Payment for removal and replacement of all paving, surfacing and other natural and man-made features shall be included in the contract prices for items of work to which such removal and replacement is appurtenant.

I. Payment for dewatering shall be included in the cost of work to which dewatering is appurtenant.

J. Payment for drilling and blasting, including excavating, hauling and disposing of blasted rock, and importing acceptable backfill, shall be included in the contract prices for items of work to which drilling and blasting is appurtenant.

K. Payment for earthwork and trenching, including potholing, excavation, protection or replacement of existing utilities and laterals, dewatering, bedding, importation of backfill, backfilling, compaction, grading, dust control, noise control and disposal of excess materials shall be included in the contract prices for items of work to which such earthwork and trenching is appurtenant.

L. Payment for repair or replacement of water and sewer pipelines and services, or other structures, landscaping materials, paving, utilities and laterals damaged as a result of the Contractor's negligence, or failure to pothole existing utilities shown on the plans, identified in the field**,** or evidenced by surface features, shall be included in the unit prices for items of work being constructed at the time when these facilities were damaged. These items of work shall be at the Contractor's expense whether the repair was completed by the Contractor, or whether the repair was completed by the Utility's own forces and billed to the Contractor or the Owner. Payment for items billed to the Owner shall be deducted from the following Contractor's pay estimate.

M. Payment will be withheld for any section of pavement, bid on a unit price per square yard, if the finish thickness is 0.5 inches less than the thickness shown in the contract documents.

N. Payment for fittings, tees, taps, bends, caps, plugs, outlets, flanges, gaskets, nuts, bolts, washers, supports, pipe cuts, welding and other pipework items shall be included in the contract prices for the items of work for which pipework is appurtenant.

O. Payment for small diameter (3-inch and smaller) valves and piping shall be included in the contract prices for the items of work for which small valves and piping are appurtenant.

P. Payment for thrust restraint, including thrust blocks, welds, restrained joints, harnesses and all appurtenant work shall be included in the contract prices for the items of work requiring thrust restraining as needed or as directed by the Owner's Representative to

meet contract requirements, to allow field testing, and to protect neighboring structures and utilities.

Q. Payment for disinfection of potable water facilities shall be included in the contract prices for the items of work requiring disinfection.

R. Payment for painting and coating shall be included in the contract prices for the items of work requiring painting and coating.

S. Payment for water or power to be furnished by the Contractor shall be included in the appropriate bid items to which it is appurtenant.

T. Payment for submittals, resubmittals and operation and maintenance manual required in these Contract Documents shall be included in the contract prices for those items of work for which the submittals are required.

U. Payment for operating training shall be included in the contract prices for equipment where operator training is required.

V. Final payment will not be made until all work has been tested as a unit, demonstrating to the Owner's satisfaction that all structural, mechanical and electrical equipment functions successfully as a unit. Final acceptance will be made in writing by the Owner's Representative after this system demonstration has been completed.

W. Clean Up: No payment shall be made for any item in clean up. The cost of this work shall be included in other items of work for which payment is provided.

1.04 SUBMITTALS

A. The unit price per square yard bid for asphalt concrete pavement shall include full compensation for asphalt paving (per MAG Section 710 for I" Type D-1/2 and 2" Type C-3/4 Single Course Asphalt) and subgrade preparation (per MAG Section 301) including the required quantities of mineral aggregates (per MAG Section 702.2 and Section 310), filler material, prime coat asphalt cement and sand needed to construct the paved areas shown on the plans. Measurement will be based on square yard measured in a horizontal plane.

B. The unit price per lineal foot bid for each size and type of water pipe shall include full compensation for furnishing and installing the pipe, including but not limited to transporting all tools, equipment, personnel, and materials to and form the worksite; excavation, furnishing and installing pipe, fittings, nozzles, reducers plugs and blind flanges; thrust restraint, bonding on steel pipe or polyethylene encasement on ductile iron pipe, testing, disinfection, backfill and all appurtenant work. Measurement will be made in a horizontal plane along the centerline of the pipe. Vertical pipes will receive no payment.

C. The unit price bid for each size and type of buried line valve assembly shall include full compensation for valves, fittings, bolts, nuts and gaskets, thrust restraint, valve boxes, risers, valve supports or concrete pads, valve stem extensions, and all appurtenant work.

D. The unit price bid for air and vacuum valves shall include full compensation for air and vacuum valves including but not limited to valve, lateral and riser pipe and valving, fittings, valve box, vent and all appurtenant work.

E. The unit price for fire hydrants shall include full compensation for excavation, backfill, hydrant, valve, box and cover, tee or tangential outlet, pipe fittings, riser, extensions, concrete thrust blocks, and all appurtenant work.

F. The unit price bid for manholes and vaults shall include full compensation for installing concrete manholes and underground vaults including excavation, base, concrete foundation, formed invert, manhole, grade rings, frame, cover, ladder or steps, frame and cover, backfill, pavement replacement in excess of applicable pay widths, adjustment of cover to match existing grade, and all appurtenant work.

G. The unit price bid for all concrete work, including but not limited to building pads, pipe and valve supports, vaults, overflow boxes, wall foundations, gutters, driveway entrances, walks, and other concrete work shall include full compensation for all excavation and concrete work required, including but not limited to the cost of excavation, sawcutting existing concrete, formwork, reinforcing steel, and concrete work. Measurement and payment shall be considered incidental and appurtenant to all other related work.

H. The unit price per lineal foot bid for masonry block wall shall include full compensation for installing concrete masonry block wall according to the Contract Documents, including but not limited to the cost of excavation, steel reinforcement, foundation, masonry work, joining new masonry to existing fencing or structures, and all other appurtenant work. Measurement will be made along the top centerline of the wall.

I. The lump sum price bid for the irrigation system shall include full compensation for a completely functional irrigation system according to the contract documents, including but not limited to all valving, piping, connections, meters, backflow preventors, controllers, wiring, check valves, with the result being a complete and operable irrigation system in accordance with these contract documents and plans.

J. The unit price for electrical conduit shall be included in lump sum electrical cost and shall be full compensation for furnishing and installing conduit including, but not limited to transporting tools, equipment, personnel and materials to the worksite, furnishing and installing conduit per servicing electrical utility requirements, pull boxes pads and all appurtenant work. Measurement will be made along the centerline of the conduit. Where parallel conduits are installed in a common trench payment will be based on total length of conduit installed in the common trench.

K. The unit price for trenching for electrical conduit shall be included in lump sum electrical cost and shall be full compensation for excavation and backfill for electrical conduit installation.

L. The lump sum price bid for the electrical system and instrumentation shall include full compensation for on and off-site electrical work according to the Contract Documents including but not limited to panels, wiring, conduit, controls, instrumentation, excavation, conduit and wiring, pull boxes, fittings, lamp poles and foundations, ballasts, fixtures, lamps, lighting controls, lighting panels and all appurtenant work, with the result being a complete and operable electrical system in accordance with these Contract Documents and the Plans.

M. Vertical Curb and Gutter (H=6") 6-Inch Single Curb shall conform to the provisions of Section 340 of the MAG Specifications.. The curb and gutter and single curb shall be measured in linear feet complete in place to the line and grade as indicated on the plans and shall include all curb transitions as required. Payment will be made at the contract unit price per linear foot for 6" vertical curb and gutter (Std. Det. 220) and 6" single curb (Std. Det. 222, Type A).

N. Concrete Driveway Entrance, shall conform to the provisions of Section 340 of the MAG Specifications and the City of Phoenix Supplement to the MAG Specifications. Driveway shall be measured in square feet and will be based on the area within the limits indicated on the plans.

Driveway wings shall be six (6) feet when adjacent to curb and gutter with h=6".

Payment for driveways (Std. Det. 250) will be made at the contract unit price bid per square foot.

O. Pavement Removal and Replacement shall conform to Section 336 of the MAG Specifications and Standard Detail 200.

This work shall include full depth sawcut, removal of A.C. - pavement and base, compaction of subgrade and the replacement in kind of the A.C. pavement and base.

Measurement and payment shall be included in the contract prices for items of work to which pavement removal and replacement is incidental and appurtenant and shall include full compensation for sawcutting, removal of existing pavement, subgrade preparation, placement of bituminous pavement and base material.

Compaction shall conform to Section 301.3 of the MAG Specifications with the following revisions. Revise compaction table to read:

A - All streets 95 %
B - Other traffic 90%
C - Curb and gutter sidewalk 95 %

END OF SECTION

SECTION 01100

SUBMITTALS

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

B. Project Identification: Project consists of site and paving improvement work for the following school sites as identified in the plans.

1. Project Location:

WESD Sahuaro Elementary School, Phoenix, AZ

2. Owner: WASHINGTON ELEMENTARY SCHOOL DISTRICT

C. Identification: The Contract Documents for the WESD Site and Paving Improvements were prepared by Kimley-Horn and Associates, 7740 N. 16th Street, Phoenix, AZ.

1. The Work consists of, but is not limited to, grading, drainage, and paving improvements. See Approved Project Plans for entire scope of work.

1.03 CONTRACT

A. Project will be constructed under a general construction contract.

1.04 WORK

A. The Work shall be conducted in one phase.

1.05 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period.

1.06 SPECIFICATION FORMATS AND CONTENT

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

END OF SECTION 01100

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 WORK SPECIFIED HEREIN

A. This Section describes criteria for Project meetings to be held both before and during construction. This Section is complementary to the General conditions and Special Provisions and nothing herein shall be considered to waive any requirements of the General conditions or Special Provisions.

1.02 PRECONSTRUCTION CONFERENCE

A. A Preconstruction Conference to discuss the Project work will be held at a time and location established at a later date. The Contractor, together with representatives of his major Subcontractors, shall attend. Representatives of the City, the Engineer, and Utility Companies will be invited to attend. The purpose of this conference is to discuss the Project in detail, including scheduling of work, and to answer any questions that may arise. See the General Conditions for what the Contractor is to supply at this meeting. Unless followed up in writing, verbal authorizations or acknowledgment by anyone present shall not be binding.

1.03 PROGRESS MEETINGS

A. At a time designated by the Owner's representative, a weekly Progress Meeting will be held at the job site. The Contractor, together with representatives of his major Subcontractors, shall attend, as will the Owner and the Engineer. The Contractor shall be responsible for notifying the Subcontractors of their required attendance. The purpose of these meetings is to discuss the job progress, and to resolve any problems that may have developed since the last meeting. Unless followed up in writing, verbal authorizations or acknowledgments by anyone present shall not be binding.

B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.

C. Agenda:
1. Review minutes of previous meetings.
2. Review of Work Progress
3. Field observations, problems, and decisions
4. Identification of Problems that impede, or will impede, planned progress.
5. Review of submittal schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules
7. Maintenance of progress schedule.
8. Corrective measures to regain project schedule.
9. Planned progress during succeeding work period.
10. Coordination of projected progress
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work

D. Construction Manger will record minutes and distribute copies within two days after meeting to participants, with two copies to Engineer, Owner, participants, and those affected by decisions made.

E Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

1.04 CONSTRUCTION PROGRESS

A. Within 5 days after date established in Notice to Proceed, submit preliminary schedule.

B. If preliminary schedule requires revision after review, submit revised schedule within five days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.

D. Within ten days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment

END OF SECTION

SECTION 01210

CONTRACTOR'S OPERATIONS

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and MAG CITY OF PHOENIX SUPPLEMENTS TO DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

Work hour shall be 6am until 4pm, Monday thru Friday (Notify owner prior to Holiday or weekend work).

The contractor shall protect his work from vandalism. New concrete and materials vandalized will be the responsibility of the contractor to replace and or repair at no cost to the District.

END OF SECTION

SECTION 01290

PAYMENT PROCEDURES

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:

1. MAG Specification Part 100

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with Continuation Sheets.
b. Submittals Schedule.

2. Submit the Schedule of Values to Owner’s Representative at earliest possible date but no later than 8 working days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

    a. Project name and location.
    b. Name of Owner’s Represenative.
    c. Owner’s Represenative’s project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value.

        1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. No payment for off-site materials. Include evidence of insurance or bonded warehousing if required.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Owner's Representative and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owner's Representative will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Owner's Representative by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.

    a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.

3. Contractor's Construction Schedule (preliminary if not final).
4. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire Owner's insurance.
16. Initial settlement survey and damage report if required.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290

SECTION 01315

CONTRACTOR'S REQUESTS FOR INFORMATION / INTERPRETATION

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Administrative requirements for requests for information / interpretation.

1.02 DEFINITIONS

A. Request For Information / Interpretation (RFI):
1. A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as RFI.
2. A properly prepared request for information / interpretation shall include a detailed written statement that indicates the specific Drawings or Specification in need of clarification and the nature of the clarification requested.
    a. Drawings shall be identified by drawing number and location on the drawing sheet.
    b. Specifications shall be identified by Section number, page and paragraph.
3. Requests for information: Request made by Contractor in accordance with Owner's Representative's third party obligations to the contract for construction.

B. Improper RFI's:
1. RFI's that are not properly prepared.
2. Improper RFI's will be processed by the Engineer at the Engineer's standard hourly rate and Engineer will charge the Owner, and such costs will be deducted from monies still due the Contractor. The Contractor will be notified by the Engineer prior to the processing of improper RFI's.

C. Frivolous RFI's:
1. RFI's that request information that is clearly shown on the Contract Documents.
2. Frivolous RFI's may be returned unanswered or may be processed by the Engineer at the Engineer's standard hourly rate and Engineer will charge the Owner, and such costs will be deducted from monies still due to the Contractor.

1.03 CONTRACTOR'S REQUESTS FOR INFORMATION

A. RFI's shall be submitted on Engineer's Standard RFI Form.
1. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after photocopying or transmission by facsimile (fax).
2. RFI's shall be submitted in numerical order with no breaks in the consecutive numbering.
3. Each page of attachments to RFI's shall bear the RFI number and shall be consecutively numbered in chronological order.
4. RFI's may be submitted by E-Mail.
    a. Submittal by E-Mail is the preferred method of submittal.
    b. Address for E-Mail will be distributed by the Engineer at the Pre-Construction Conference.

c. An electronic version of Engineer's Standard RFI Form will be provided upon request.

B. When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Engineer shall be requested to make a clarification of the indeterminate item.

1. Wherever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or complexity of the item, Contractor shall prepare and submit an RFI to the Engineer.
2. RFI requesting clarification of an item required of a document known to have been prepared by a consultant to the Engineer, may be sent directly to the consultant with a copy to the Landscape Architect, if this direct communication is approved by the Engineer.

C. Contractor shall endeavor to keep the number of RFI's to a minimum. In the event that the process becomes unwieldy, in the opinion of the Engineer, because of the number and frequency of RFI's submitted, the Landscape Architect may require the Contractor to abandon the process and submit future requests as either submittals, substitutions or requests for change.

D. RFI's shall be originated by the Contractor.

1. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Engineer.

2. RFI's from subcontractors or material suppliers sent directly to the Owner's Representative, Landscape Architect or the Engineer's consultants shall not be accepted and will be returned unanswered.

E. Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFI's which request information available in the Contract Documents will be deemed either "improper" or "frivolous" as noted above.

F. In cases where RFI's are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's which fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.

G. RFI's shall not be used for the following purposes:

1. To request approval of submittals
2. To request approval of substitutions
3. To request changes which are known to entail additional cost or credit. (A Change Order Request form shall be used.)
4. To request different methods of performing work than those drawn and specified.

H. In the event the Contractor believes that a clarification by the Engineer results in additional cost or time, Contractor shall not proceed with the work indicated by the RFI until a Change Order (or Construction Change Directive, if applicable to project) is prepared and approved. RFI's shall not automatically justify a cost increase in the work or a change in the project schedule.

1. Answered RFI's shall not be construed as approval to perform extra work.
2. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.

I. Contractor shall prepare and maintain a log of RFI's, and at any time requested by the Engineer, Contractor shall furnish copies of the log showing outstanding RFI's. Contractor shall note unanswered RFI's in the log.

J. Contractor shall allow up to 5 working days review and response time for RFI's, unless review is required of multiple consultants, then the review and response period shall be 7 working days.

1. The Engineer will endeavor to respond in a timely fashion to RFI's.
2. RFI shall state requested date/time for response, however, this requested date/time for response is not a guarantee that the RFI will be answered by that date/time if that date/time is too expeditious.

1.04 ENGINEER'S RESPONSE TO RFI'S

A. Engineer will respond to RFI's on one of the following forms:
   1. Properly prepared RFI's:
      a. Response directly upon Request for Information / Interpretation form. Engineer's Supplemental Instruction.
      b. Request for Proposal.
   2. Improper or Frivolous RFI's:
      a. Notification of Processing Fee(s).
      b. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.
   3. Answers to properly prepared RFI's may or may not be made directly upon the RFI form as deemed appropriate by the Engineer.

B. Engineer may opt to retain RFI's for discussion during regularly schedule project meetings for inclusion of responses in meeting minutes in lieu of responding on a written form.

PART 2 PRODUCTS

Not applicable.

PART 3 EXECUTION

Not applicable.

END OF SECTION 01315

SECTION 01330

SUBMITTAL PROCEDURES

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Supplemental General Conditions and the Special Provisions, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Owner's representative's responsive action.

B. Informational Submittals: Written information that does not require Owner's representative's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: The Owner's representative will not provide Electronic copies of CAD Drawings of the Contract Drawings for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Owner's representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Submittals shall be submitted in a timely manner to allow adequate review time as scheduled below, resubmittal if necessary, and delivery of materials so as not to adversely affect the scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's representative's receipt of submittal.

1. Initial Review: Allow 3 working days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Owner's representative will advise Contractor when a submittal being processed must be delayed for coordination.
2. Concurrent Review: Where concurrent review of submittals by Owner's representative's consultants, Owner, or other parties is required, allow 3 working days for initial review of each submittal.
3. All submittals shall be routed as determined at the Pre-Construction Conference.
4. If intermediate submittal is necessary, process it in same manner as initial submittal.
5. Allow 3 working days for processing each resubmittal.
6. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately **4 by 5 inches** on label or beside title block to record Contractor's review and approval markings and action taken by Owner's representative.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Owner's representative.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Unique identifier, including revision number.
    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Owner's representative observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner's representative will return submittals, without review, received from sources other than Contractor.

1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Owner's representative on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
3. Transmittal Form: Provide locations on form to include the following information:

    a. Project name.
    b. Date.
    c. Destination (To:).
    d. Source (From:).
    e. Names of subcontractor, manufacturer, and supplier.
    f. Category and type of submittal.
    g. Submittal purpose and description.
    h. Submittal and transmittal distribution record.
    i. Remarks.
    j. Signature of transmitter.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating action taken by Owner's representative in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit sufficient number of copies of each submittal as will allow the Owner's representative to retain one (1) final approved copy of each submittal, unless otherwise indicated. Owner's representative will return the remaining marked up copies.
2. O & M Manuals: The contractor shall retain one copy of all marked up submittals to be copied and incorporated in the O&M Manuals.
3. Number of Copies: Submit copies of each submittal, as follows, unless otherwise indicated:

    a. Initial Submittal: Submit three copies of each submittal where selection of options, color, pattern, texture, or similar characteristics is required. Owner's representative will return submittal with options selected.
    b. Final Submittal: Submit three copies, unless copies are required for operation and maintenance manuals. Submit five copies where copies are required for operation and maintenance manuals. Owner's representative will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Document.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Mill reports.
    j. Standard product operating and maintenance manuals.
    k. Compliance with recognized trade association standards.
    l. Compliance with recognized testing agency standards.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Include the following information, as applicable:

    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shopwork manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
4. Number of Copies: Submit copies of each submittal, as follows:

    a. Initial Submittal: Submit one correctable, translucent, reproducible print and two blue- or black-line prints. Submit five prints where prints are required for operation and maintenance manuals. Owner’s representative will return the reproducible print. Mark up and retain one returned print as a Project Record Drawing.

b. Resubmittal: Same as initial submittal.

D. Samples: Prepare physical units of materials or products, including the following:

1. Provide sample panels and mock-ups as specified in the separate specification sections.
2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Owner’s representative's sample where so indicated. Attach label on unexposed side that includes the following:

    a. Generic description of Sample.
    b. Product name or name of manufacturer.
    c. Sample source.

5. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:

    a. Size limitations.
    b. Compliance with recognized standards.
    c. Availability.
    d. Delivery time.

6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

    a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
    b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

7. Number of Samples for Initial Selection: Submit three full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Owner’s representative will return submittal with options selected.
8. Number of Samples for Verification: Submit three sets of Samples. Owner’s representative will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.

a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

9. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.

F. Contractor's Construction Schedule: Comply with requirements in the SUPPLEMENTAL GENERAL CONDITIONS.

G. Submittals Schedule: Submit 3 copies of the Submittal Schedule within 3 working days of notice to proceed.

H. Application for Payment: Comply with requirements in the SUPPLEMENTAL GENERAL CONDITIONS.

I. Schedule of Values: Submit 3 copies of the Schedule of Values within 3 working days of the notice to proceed.

J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Submit 3 copies. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Owner’s representative will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and

certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Owner's representatives and owners, and other information specified.

D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

J. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.

K. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

L. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

M. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

N. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

O. Maintenance and Operation Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Section 01770 "Closeout Procedures". Submit 3 copies.

P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

T. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Owner's representative, Owner's representative will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner's representative.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 OWNER'S REPRESENTATIVE'S ACTION

A. General: Owner's representative will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Owner's representative will review each submittal, make marks to indicate corrections or modifications required, and return it. Owner's representative will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Informational Submittals: Owner's representative will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Owner's representative will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA, SAMPLES, TEST PANELS

PART I - GENERAL

1.0 WORK SPECIFIED HEREIN

A. All requirements and procedures for submittal of shop drawings, product data, and samples required for all work on the Project. This Section is complementary to the General conditions and Special Provisions and nothing herein shall be considered to waive any requirements of the General conditions or Special Provisions.

1.02 GENERAL

A. Provide shop drawings, product data, and samples specified herein in accordance with the following requirements.

B. Submits shop drawing, material lists, manufacturer's literature, samples and other required information in sufficient time to permit proper consideration and action on same before any materials or items, which such shop drawing, information and samples represent, are ordered. Allow sufficient time so that no delay occurs due to required lead time in ordering or delivery to the job site.

C. The Contractor will be held responsible for any delay in progress of the work due to his failure to observe these requirements. Time for completion of the Contract will not be extended on account of his failure to promptly submit shop drawings, product data, and samples.

D. Each submission shall be accompanied by required number of "Transmittal Forms," properly filled in.

1.03 SHOP DRAWINGS, PRODUCT DATA

A. Furnish to the Owner’s representative (who will then distribute to the consultants and to the City’s representative), for review, 6 prints of each sheet of shop (or setting) drawings and schedules for parts of the work as specified or required. Allow ample time for Engineer's and Owner’s representative comments and review.

B. Each shop drawing submittal shall be accompanied by a "Transmittal Form," signed by Contractor.

C. Do not execute work required by shop drawings until confirmation of review is obtained.

D. Submit shop drawings and details sufficiently in advance of the work in which they cover, and in accordance with a prearranged schedule, to afford ample time for checking, correcting, and rechecking, if necessary, for such drawings and details.

E. Before submitting shop drawings for review, Contractor shall check shop drawings of Subcontractors for accuracy, ascertain that all work contiguous with and having bearing on other work shown on shop drawings is accurately drawn, and that work shown is in conformity with Contract requirements.

F. All such drawings and details, when submitted, must bear the stamp of approval of Contractor, bearing checked data, as evidence that such drawings and details have been checked by him. Said "stamp' shall clearly state that the Contractor has checked the drawings, and, by his signature, he so certifies. Any drawings submitted without such executed stamp of approval, or whenever it is evident (despite the stamp) that the drawings have not been checked, they will be returned to the Contractor for resubmission and will not be considered. In such event, it will be deemed that the Contractor has not complied with this provision and the Contractor shall bear risk of all delays to the same extent as if no drawings or details at all had been submitted.

G. The contractor shall prepare composite drawings and installation layouts, when required to solve tight field conditions. Such drawings shall consist of dimensioned plans and elevations, and must give complete information particularly as to size and location of sleeves, inserts, attachments, openings, conduits, ducts, boxes, structural inferences, etc. These composite drawings and installation layouts shall he coordinated in the field by Contractor and his Subcontractors for proper relationship to the work of other trades, based on field conditions, and shall be checked and approved by them before submission to: the Owner's representative and Engineer for final review. The Contractor shall have competent technical personnel readily available for such coordinating and checking, as well as for supervision of work as per the drawings and installation layouts, which have been previously determined by him to be correct and carry the Engineer/Engineer review stamp.

H. Submission of shop drawings (in either original submission or when resubmitted with corrections) constitutes evidence that the Contractor has checked all information thereon, and that he accepts and is willing to perform the work as shown in a workmanlike manner and in accordance with best standard practice. No claim for an addition to the Contract Sum shall be based on work shown on shop drawings, unless such claim is noted in Contractor's Transmittal Form accompanying the shop drawings.

I. Cost of any changes in construction due to improper checking and coordination by the Contractor shall be paid for by him, and the Contractor shall be responsible for all additional costs, including coordination.

J. Shop drawings shall clearly delineate the following information:

1. Engineer's name and project number, Project name and address.
2. Drawing title, number, date, and scale.
3. Names of Contractor, Subcontractor, and fabricator.
4. Working and erection dimensions,
5. Arrangements and sectional views.
6. Necessary details, including complete information for making connections with other work.
7. Kinds of materials and finishes.
8. Show descriptive names of materials and equipment, classified item numbers, and locations at which materials or equipment are to be installed in the work. Use same reference identification as shown on Contract Drawings.

K. If shop drawings show variations for Contract Documents because of standard shop practice or other reasons, make specific mention of such variations in Transmittal Form.

L. Shop drawing review will be general. It shall not relieve the Contractor of responsibility for accuracy of such shop drawings, nor proper fitting, construction of work, furnishing of materials, or work required by Contract Documents and not indicated on shop

drawings. Show drawing approval shall not be construed as approving departures from Contract Documents.

M. Review of shop drawings and schedules shall not relieve the Contractor from responsibility for any violation indicated on such drawings or schedules of local, county, state or federal laws, rules, ordinances, or rules and regulations of commissions boards, or other authorities or utilities having jurisdiction.

N. When product data, consisting of manufacturer's printed literature is required to be submitted to the Owner's representative and Engineer, it shall be submitted in original form. Any fading type of reproduction will not be accepted. A minimum of 3 each is required; 2 for the Owner's representative and one to be returned to Contractor, who shall submit whatever additional copies be required for his distribution.

1.04 EQUIPMENT LISTS

A. Submit 6 copies of a complete list of all major items of mechanical, plumbing, and electrical equipment and materials within 30 days after award of Contract. Submit all items at one time in a neat and orderly manner. Partial lists will not be acceptable.

B. Submittals shall include the manufacturer's specifications, physical dimensions, and ratings of all equipment. Furnish performance curves for all pumps and fans. Where submittal sheet describes items in addition to that item being submitted, the submitted item shall be clearly marked on the sheet and superfluous information shall be crossed out.

C. The following list is representative of the type of equipment for which submittals are required.

1. Asphalt Pavement Mix
2. Storm Drain & Inlets
3. Irrigation Equipment
4. Concrete Mix Design
5. Chain Link Fencing, Gates, Locks
6. Wrought Iron Fencing, Gates, Locks
7. Traffic Signage
8. Pavement Markings & Paint
9. Drywell

D. Equipment submittals shall be complete including space requirements, weight, electrical and mechanical requirements, performance data and supplemental information requested by the Engineer.

1.05 SAMPLES

A. Deliver no material to the building site prior to receipt of Owner's representative and Engineer's written approval. Furnish materials equal in every respect to approved samples and execute work in conformity therewith.

B. The approval or acceptance of samples will not preclude the rejection of any material upon the discovery of defects in same prior to the final acceptance of the completed work.

C. After a material has been approved, no change in brand or make will be permitted unless satisfactory written evidence is presented to, and approved by, the Owner's

representative and Engineer that the manufacturer cannot make scheduled delivery of approved material, or that material delivered has been rejected and substitution of suitable material is an urgent necessity, or that other conditions are apparent which indicate approval of such substitute materials to be in the best interest of the Owner's representative.

D. All samples of materials requiring laboratory test shall be submitted to laboratory for testing not less than 5 days before such materials are required to be used in the work. Submit all other samples for approval within 5 days after signing of Contract.

E. Samples will receive consideration only when accompanied by a "Transmittal Form" signed by the Contractor.

F. The transmittal shall contain list of samples, Project, Contractor, manufacturer, brand, quarry, quality, etc.; also job number, specifications reference, ASTM or FS number (if any) and material being furnished. Enclose copies of transmittal with samples. Any deviation from Contract Requirements shall be so stated in the transmittal.

G. Label each sample to indicate Project, Contractor, manufacturer, brand, quality, etc.; also job number, ASTM or FS number (if any).

H. Samples which are rejected by the Owner's representative and Engineer must be resubmitted as soon as possible after notification of rejection, and shall be marked 'Resubmitted Sample" in addition to other information required.

I. The right is reserved to require submission of samples of any material or any material lists whether or not specifically specified in the Specifications.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1-GENERAL

1.01 WORK SPECIFIED HEREIN

A. Conform to MAG Section 105, "Control of Work," and Section 106, "Control of Materials."

B. Provide and maintain an effective Contractor Quality Control (CQC) program and perform sufficient inspections and tests of all items of work, including those of subcontractors, to ensure compliance with Contract Documents. Include surveillance and tests specified in the technical sections of the Specifications. Furnish appropriate facilities, instruments, and testing devices required for performance of the quality control function. Controls must be adequate to cover construction operations and be keyed to the construction sequence.

1.02 CONTROL OF ON-SITE CONSTRUCTION

A. Preparatory Inspection: Perform this inspection prior to beginning work on any definable feature of work. Include a review of Contract requirements with the supervisors directly responsible for the performance of the work; check to assure that materials, products, and equipment have been tested, submitted, and approved; check to assure that provisions have been made for required control testing; examine the work area to ascertain that preliminary work has been completed; physically examine materials and equipment to assure that they conform to Shop Drawings and Data and that the materials and equipment are on hand.

B. Conform to MAG Section 105, "Control of Work"

C. Initial Inspection: Perform this inspection as soon as work commences on a representative portion of a particular feature of workmanship; review control testing for compliance with Contract requirements.

D. Follow-up Inspections: Perform these inspections on a regular basis to assure continuing compliance with Contract requirements until completion of that particular work.

E. Documentation of CQC Report: Identify the inspections hereinbefore specified and document in the CQC report with a brief description of the subject matter covered and personnel involved.

1.03 CONTROL OF OFF-SITE OPERATIONS

A. Perform factory quality control inspection for items fabricated or assembled off-site as opposed to "off-the-shelf' items. The CQC representative shall be responsible for release of the fabricated items for shipment to the job site. The CQC representative at the job site shall receive the item and note any damage incurred during shipment. The Contractor shall be responsible for protecting and maintaining the item in good condition throughout the period of on-site storage and during erection or installation.

Although any item found to be faulty may be rejected before it is used, final acceptance of an item by the Owner is based on its satisfactory incorporation into the work and acceptance of the completed project.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 GENERAL

A. This section provides for temporary facilities and temporary work required in the performance of this contract. The Owner will identity construction and storage areas allocated to the Contractor, and the contractor shall limit his storage to the defined areas.

1.02 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities in a proper, clean, neat, safe, and sanitary condition for the duration of the contract. Upon completion of the contract remove all temporary facilities from the premises.

1.03 STORAGE ENCLOSURE

A. Provide suitable and temporary secure storage enclosure for materials. Contractor will be responsible for the protection of all materials and equipment left on site.

1.04 TOILET FACILITIES

A. Provide proper sanitary and adequate toilet facilities for the use of all workers employed on the project, located where directed, and enforce their use by all personnel on the project.

1.05 UTILITIES

A. Refer to SUPPLEMENTAL GENERAL CONDITIONS, Paragraph 17.

1.06 SAFETY AND HEALTH PROGRAM

A. This project, its prime Contractor, and his subcontractors shall, at all times, be governed by Chapter XIII of Title 19, Code of Federal Regulations, Part 1518-Safety and Health Regulations for Construction (36FR75) as amended to date.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved in writing by Owner. Provide materials suitable for use intended.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

1. All work and materials for temporary utilities shall comply with governing codes and ordinances.

2. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

3. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.

4. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.

END OF SECTION 01500

SECTION 01501

TRAFFIC CONTROL

PART I - GENERAL

1.01 SCOPE

A. Conform to the MAG section 401, City of Phoenix Barricade Manual and the Manual of Uniform Traffic Control Devices.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 GENERAL

A. Work Included: All requirements and procedures covering material and equipment to be utilized in the Work, and substitutions proposed by the Contractor. The provisions of MAG Section 106 shall apply to this work.

1.02 FACILITY AND EQUIPMENT

A. The Contractor shall provide, install, maintain and operate a complete and adequate facility for the handling, execution, disposal and distribution of all material and equipment required for the proper and timely performance of all work connected with the Contract.

1.03 WORKMANSHIP

A. Where not more specifically described in any of the various Sections of these Specifications, workmanship shall conform to all of the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrications, construction or installation, regularly furnished or required for completion, including any finish, and for successful operation as intended.

B. All work shall be executed by mechanics skilled in their respective lines of work.

1.04 MATERIAL REFERENCE STANDARDS

A. Where material is specified solely by reference to standard specifications the Contractor shall, if requested by the Engineer, submit to the Engineer for his review data on all such material proposed to be incorporated into the work of the Contract listing the. name and address of vendor, the manufacturer or producer, and the trade or brand names of such materials.

END OF SECTION

SECTION 01610

DISPOSAL OF DEMOLISHED MATERIAL

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and MAG CITY OF PHOENIX SUPPLEMENTS TO DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

Dispose of removed materials, waste, trash and debris in a safe, acceptable manner, in accordance with applicable laws and ordinances as prescribed by authorities having jurisdiction.

END OF SECTION

SECTION 01620

SURVEY

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and MAG CITY OF PHOENIX SUPPLEMENTS TO DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

The Contractor shall set the construction stakes establishing lines, grades, and elevations to include necessary utilities and appurtenances and shall be responsible for their conformance with plans and specifications. Construction staking shall be done in accordance with the applicable provisions of the Engineering and Architectural Services Department's "Standard Requirements for Staking, As-Builts, and Quantity Calculations", dated January 1, 1980. The Engineer will establish or designate a control line and benchmark of known location and elevation for use as a reference.

The Contractor shall furnish the Engineer a certified set of calculations and measurements to fully support the derivation of all pay quantities. This information will be prepared by a registrant of the Arizona State Board of Technical Registration.

The Contractor shall furnish the Engineer a set of "Record Drawings" on mylar tracings. Record drawings shall be certified by a registrant of the Arizona State Board of Technical Registration.

END OF SECTION

SECTION 01650
SPECIFIED PRODUCTS AND SUBSTITUTIONS

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

1. LISTED MANUFACTURERS

1.1 If a manufacturer is listed by name within a Section of the Specifications, he is approved to bid his product with the understanding that the product meets the minimum standards listed for the product desired. If modifications to his standard line are required to meet the minimum standards listed, it will be understood that such modification is a part of the Contract Document requirements and is included in his Bid.

1.2 The Contract Documents may depict the detailing of a single manufacturer's product in order to clarify the intent of the end product desired. If, during the course of construction, the product used affects other trades' Work, the user of the product will be responsible to the other trades for any additional costs that may be required to meet the intent of the Contract Documents.

2. NON-LISTED MANUFACTURERS

2.1 If a manufacturer is not listed by name within a Section of the Specifications, he must obtain Prior Approval from the Engineer before his product will be allowed to be used on the Project.

2.2 If the Engineer prior approves a manufacturer, the manufacturer will be considered as though he is a listed manufacturer and will have all of the same responsibilities that a listed manufacturer has.

3. PERFORMANCE SPECIFICATION

3.1 When no manufacturer is listed within a Section of the Specifications, it is intended as a performance specification, and any manufacturer can bid his product as if he were listed by name.

3.2 If the manufacturer elects to bid his product, it will be done with the understanding that he has all the same responsibilities that a listed manufacturer has.

4. PROPRIETARY SPECIFICATION

4.1 It is not the intent of these Specifications to have any proprietary products. If a single product is specified, it is because the Engineer does not know of another product that will meet the Project requirements.

4.2 In the event that a manufacturer has a product that will meet all of the Project requirements, he is invited to submit for Prior Approval.

5. PRIOR APPROVAL REQUIREMENTS

5.1 Products that require Prior Approval must conform to the following procedures and requirements before the Engineer will consider approval of a product.

5.2 Completely fill out the "Prior Approval Request Form" which is included within this Section.

5.3 In addition to a complete submittal of information to the Engineer, the submitter shall send to the appropriate engineers (i.e. mechanical, electrical, structural) as required.

5.4 The submitting party shall include sufficient information, descriptive brochures, Drawings, Samples, color charts, photographs, or other data as is necessary to provide direct comparison to the specified materials.

5.5 Each submittal shall be well marked and identified as to type and kind of items being submitted for approval.

5.6 It is the sole responsibility of the submitting party to submit complete descriptive and technical information so that the Engineer can make proper appraisal. Lack of proper information will be sufficient cause for rejection. References to catalogs that the Engineer may or may not have will not be acceptable.

5.7 Burden of proof of merit of requested substitution is upon submitter.

5.8 Knowledge and experience of applicator may be integral part of Specification; therefore, data concerning applicator (i.e., experience, organization, references, projects, and dates) may be material.

5.9 Proposed substitutions must be received by the Engineer no later than 5:00 P.M. local time on ___May 17th, 2011_____ *(at least 7 days prior to original deadline for receipt of bids)*.]

5.10 NOTE: Facsimiles will not be accepted.

5.11 Approved requests will be included in an Addendum so that all Bidders will know which products will be allowed on the Project.

END OF SECTION

OLSSON ASSOCIATES
7250 North 16th Street, Suite 210
Phoenix, Arizona 85020
Phone: 602-748-1000
Fax: 602-748-1001

PRIOR APPROVAL REQUEST FORM

I. Identification
Project:
Section No._____Section Title_____
Product
_____

II. This product is being submitted by:
_____General Contractor _____Supplier _____Subcontractor
_____Manufacturer
_____Other_____

III. Submitting Party
Name_____
___
Company_____
___
Address_____
___
City / State / Zip Code
_____
Phone_____
Fax:_____

IV. I am enclosing the following information for your review:

_____Samples _____Manufacturer's Product Data _____Test Reports
_____Photos _____Color Selection _____References
_____Drawings and Details
_____Other_____

V. I have forwarded the same data to the following engineer (s):
_____Structural _____Mechanical _____Electrical
____Other_____

VI. The product has been approved for use by this office on other projects
Please list:_____ _____ _____ _____

VII. Does this Product contain asbestos in any form? _____Yes _____No

_____

Review

Reviewed by:_____ Date:_____

____Approved ____Not Approved

____Insufficient Data Submitted
____Does Not Meet Specifications
____Aesthetics

____Other_____

____Notified

SECTION 01700

CLOSEOUT PROCEDURES

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Supplemental General Conditions and Special Provisions, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project Record Documents.
3. Operation and maintenance manuals.
4. Warranties.
5. Instruction of Owner's personnel.
6. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases. A Certificate of Occupancy from the City is required prior to issuance of Substantial Completion.
5. Prepare and submit Project Record Documents and Operation and Maintenance Manuals.
6. Deliver tools, spare parts, extra materials, materials designated in the construction documents, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in related utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Owner's representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner's representative will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner's representative that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Supplemental General Conditions.
2. Submit certified copy of Owner's representative's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner's representative. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
6. Provide Surety's Consent to Release of Final Payment

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Owner's representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner's representative will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of the list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first. For exterior spaces, identify major landmarks or adjacent amenities to describe the space.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Owner’s representative.
    d. Name of Contractor.
    e. Page number.

1.6 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Owner’s representative's reference during normal working hours.

B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

    a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
    b. Accurately record information in an understandable drawing technique.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
    d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

6. Contractor shall review the record drawings on a monthly basis with the owner's representative to verify that the record drawings are up to date. The contractor shall ensure that the record drawings reflect the actual construction progress accurate to within 48 hours.

C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders, Record Drawings**,** and Product Data, where applicable.
4. Contractor shall review the record specifications on a monthly basis with the owner's representative to verify that the record drawings are up to date. The contractor shall ensure that the record drawings reflect the actual construction progress accurate to within 48 hours.
5.

D. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Drawings and Record Specifications, where applicable.

E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

a. Emergency instructions and procedures.
b. System, subsystem, and equipment descriptions, including operating standards.
c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
d. Description of controls and sequence of operations.
e. Piping diagrams.

2. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of Installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.
h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents. Submit 3 copies of the manual.

1.8 WARRANTIES

A. Submittal Time: Submit written warranties on request of Owner's representative for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner**,** with at least seven days' advance notice.
4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:

1. System design and operational philosophy.
2. Review of documentation.
3. Operations.
4. Adjustments.
5. Troubleshooting.
6. Maintenance.
7. Repair.

3.2 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid

disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Replace parts subject to unusual operating conditions.
o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
q. Clean ducts, blowers, and coils if units were operated without filters during construction.
r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
s. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01700

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: Throughout the construction period, maintain the structures and site in a standard of cleanliness as described in this Section. Final cleaning prior to Final Acceptance.

B. Related Work Described Elsewhere: In addition to standards described in this Section, comply with all requirements for cleaning up as described in various other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Inspection: Conduct daily inspections, and more often if necessary, to verify the requirements of cleanliness are being met.

B. Codes and Standards: In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

C. Safety and Insurance Standards: Maintain Project in accordance with the following safety and insurance standards:

State Industrial Commission of Arizona
OSHA

D. Fire Protection: Store volatile waste in covered metal containers, and remove from premises daily.

E. Pollution Control: Conduct clean-up and disposal operations to comply with local ordinances and antipollution laws. Burning or burying of rubbish and waste material on the Project site is not permitted. Disposal of volatile fluid waste (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted. Take special care not to discharge toxic materials into park waterways.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 - EXECUTION

3.01 PROGRESS CLEANING

A. General:

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for instruction of this Work.
3. At least twice each month, and more often if necessary, completely remove all scrap debris and waste material from the job site.
4. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection, protection of preserve wildlife, and public safety.

B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Correct unsafe conditions.
3. Maintain the site in a neat and orderly condition at all times.
4. Provide for the disposal of all waste products, trash, debris, etc., and make necessary arrangement for legal disposal of same off the site.
5. Remove all surplus material, false-wok temporary strictures, including foundations thereof, of any description and debris of every nature resulting from operations.
6. Contractor shall provide trash containers for use by all trades.

C. Structures:

1. Weekly, and more often, if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.

3.02 FINAL CLEANING

A. General:

1. Definition: Except as otherwise specifically provided, "clean" (for the purpose of this Article) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
2. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct formal progress cleaning as described above.
3. Site: Unless otherwise specifically directed by the City, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris. Wash pavements with water jets.

B. Structures

1. Visually inspect all surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the City may require light sandblasting or other cleaning at no additional cost to the Owner.
2. Timing: Schedule final cleaning as approved by the City to enable the Owner to accept a completely clean project.
3. Existing Improvements: All existing improvements, inside or outside the property which are disturbed, damaged or destroyed by the work under the Contract shall be restored to the condition in which they originally were, or to the satisfaction of the City.

3.03 SITE CLEANING

A. Final site cleaning shall also consist of:

1. Raking and smoothing shrub beds.
2. Correcting puddling, wet areas, and compacted soils,
3. Conforming to the requirements in Section 02490 (landscape work).
4. Final adjustment of the irrigation system.
5. General cleanup, removal of litter, trimming, etc., to the standards commonly produced by skilled landscape maintenance personnel.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART I – GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Throughout progress of the Work of this Contract, maintain an accurate record of all changes in the Contract Documents, as described below.
2. Upon completion of the Work of this Contract, transfer the recorded changes to a set of Record Documents, as described below.

1.02 QUALITY ASSURANCE

A. General: Delegate the responsibility for maintenance-of Record Documents to one person on the Contractor's staff as approved in advance by the Engineer.

B. Accuracy of Records: Thoroughly coordinate all changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other documents where such entry is required to properly show the change. Accuracy of records shall be such that future search for items shown in the Contract Documents may reasonably rely on information obtained from the approved Record Documents.

C. Timing of Entries: Make all entries within 24 hours after receipt of information.

1.03 SUBMITTALS

A. General: The Owner’s approval of the current status of Record Documents will be a prerequisite to the Owner’s approval of requests for progress payment and request for final payment under the Contract.

B. Progress Submittals: Prior to submitting each request for progress payment, secure the Engineer's approval of the Record Documents as currently maintained.

C. Final Submittal: Prior to submitting request for final payment, submit the final Record Documents to the Owner’s representative and secure their approval.

1.04 PROJECT HANDLING

A. Use all means necessary to maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of the recorded data to the final Record Documents. In the event of loss of recorded data, use all means necessary to secure the data to the Owner’s approval; such means shall include if necessary in the opinion of the Owner’s representative, removal and replacement of concealing materials and, in such case, all replacements shall be to the standards originally specified in the Contract Documents,

1.05 RECORD DOCUMENTS

A. Job set: The Owner will provide a complete set of all Documents comprising the Contract.

B. Final Record Documents: At a time near the completion of the Work, the Contractor will transfer the information on the job set to a clean set of bluelines, if necessary, for clarity as required by the Owner's representative.

1.06 MAINTENANCE OF JOB SET

A. Identification: Immediately upon receipt of the job set described above, identify each of the Documents with the title 'RECORD DOCUMENTS - JOB SET."

B. Preservation:

1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Engineer.
2. Do not use the job set for any purpose except entry of new data and for review by the Owner's representative, until start of transfer of data to final Record Documents. The Record Documents shall not be used as a general reference set.
3. Maintain the job set at the site of Work as designated by the Engineer.
4. Making entries on Drawings: Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by note and by graphic line, as required. In the event of overlapping changes, different colors may be used for each of the changes. Sketches clarifying changes may be attached to the Drawings.

C. Making entries on other Documents:

1. Where changes are caused by directives issued by the Owner's representative, clearly indicate the change by note in ink, colored pencil, or rubber stamp.
2. Where changes are caused by Contractor-originated proposals approved by the Engineer, including inadvertent errors by the Contractor which have been accepted by the Engineer, clearly indicate the change by note in erasable colored pencil.
3. Make entries in the pertinent Documents as approved by the Owner's representative.
4. Conversion of schematic layouts:
   a. In most cases on the Drawings, arrangement of conduits and circuits, piping, ducts, and other similar items, is shown schematically and is not intended to portray precise physical layout. Final physical arrangement is as determined by the Contractor, subject to the Owner's approval. However, design of future modifications of the facility may require accurate information as to the final physical arrangement of items which are shown only schematically on the Drawings.
   b. Show on the job set of Record Drawings, by dimension accurate to within 1" of the centerline of each run of items such as are described above. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," etc. Show, by symbol or note the vertical location of the item ("under slab, " "in ceiling, " "exposed," etc.). Make all identification sufficiently descriptive that it may be related reliably to the Specifications.

5. Prepare separate sets of Record Drawing originals for the Architectural, Site, Structural, Mechanical, Plumbing, and Electrical Work.
6. In showing changes in the work, or added work, use the same legends as were used on the Contract Drawings. Indicate exact locations by dimensions and exact elevations given in job datum, by depth. Give dimensions from a permanent point. Give elevations to sewer and storm drainage lines to the invert elevation.
7. Mechanical, electrical and irrigation Record Drawings shall indicate exact routing of all piping, ductwork, power and control wiring, etc., location and function for all controls and whether manual or automatic, normal amperage readings for all motors taken at the equipment under normal load conditions.
8. Record Drawings and Project Manual shall contain the names, addresses and phone numbers of the subcontractors and shall be signed by the Contractor.
9. The Engineer may waive the requirements for conversion of schematic data where, in the Engineer's judgment, such conversion serves no beneficial purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Engineer.
10. Timing of Entries: Be alert to changes in the Work from how it is shown in the Contract Documents. Promptly, and in no case later than 24 hours after the change has occurred and been made known to the Contractor, make the entry or entries required.
11. Accuracy of Entries: Use all means necessary, including the proper tools for measurement, to determine actual locations of the installed items.

1.07 FINAL RECORD DOCUMENTS

A. General: The purpose of the final Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of design to proceed without lengthy and expensive site measurement, investigation and examination.

B. Approval of Recorded Data Prior to Transfer: Following receipt of the sepia transparencies described above, and prior to start of transfer of recorded data thereto, secure a review by the Engineer of all recorded data. Make all required revisions.

C Transfer of Data to Drawings: Carefully transfer all changed data shown on the job set of Record Documents to the corresponding sepias, coordinating the changes as required, and clearly indicating at each affected detail and other drawing the full description of all changes made during construction and the actual location of items described above. Call attention to each entry by drawing a "cloud" around the area or areas affected.

D. Transfer of Data to other Documents: If the Documents other than Drawings have been kept clean successfully during the progress of the Work, and if entries have been sufficiently orderly thereon to the approval of the Owner’s representative, the job set of those Documents (other than Drawings) will be accepted by the Owner as final Record Documents for those Documents. If any such Document is not so approved by the Owner’s representative, secure a new copy of that Document from the Owner; carefully transfer the change data to the new copy to the approval of the Owner’s representative.

1.08 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor shall have no responsibility for recording changes in the Work subsequent to acceptance of the Work by the Owner, except for changes resulting from replacements, repairs, and alterations made by the Contractor as part of his guarantee.

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART I - GENERAL

1.01 DESCRIPTION

A. Work Included: To aid in the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding the products incorporated in the work, furnish and submit the data described in this Section and in pertinent other Sections of these Specifications.

B. Related Work Described Elsewhere: Required contents of submittals may also be amplified in the pertinent other Sections.

1.02 QUALITY ASSURANCE

A. In preparation for data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the degree needed for communicating the essential data.

1.03 SUBMITTALS

A. General: Make all submittals in accordance with MAG.

B. Preliminary: Submit two copies of a preliminary draft of the proposed Manual or Manuals to the Owner's representative for review and comments.

C. Final: Unless otherwise directed in the pertinent other Sections, or in writing by the Engineer, submit three copies of the final Manual to the Owner's representative.

PART 2 - PRODUCTS

2.01 INSTRUCTION MANUALS

A. General: Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the following:

1. Format:

Size:	8-1/2" x 11"
Paper:	White bond, at least 20 lb. weight.
Text:	Neatly word-processed: no dot-matrix lettering will be accepted.

2. Drawings:11 " in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.
3. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion.

4. Binding: Use heavy-duty plastic-covered 3-ring binders with clear plastic pocket for cover insert. All binding shall be subject to the Engineer's approval.
5. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs., etc.

B. Information on Cover: Provide information which is clearly visible on or through the front cover with at least the following:

OPERATING AND MAINTENANCE INSTRUCTIONS

SCHOOL NAME
OWNER: WASHINGTON ELEMENTARY SCHOOL DISTRICT

(Name of Contractor)
(Type of work in this volume)

(Space for review signature of the Owner's representative and review date)

C. Contents: Include at least the following:

1. Neatly typewritten index near the front of the Manual, giving immediate information as to location within the Manual of all emergency data regarding the installation.
2. Complete instructions regarding operation and Maintenance of all equipment involved, including lubrication, disassembly, and reassembly, if applicable.
3. Complete nomenclature of all parts of all equipment.
4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other pertinent data regarding procurement procedure.
5. Electrostatic copy of all guarantees and warranties issued.
6. Manufacturers' bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
7. Such other data as required in pertinent other Sections of these Specifications.

PART 3 - EXECUTION

3.01 INSTRUCTION MANUALS

A. Preliminary: Prepare a preliminary draft of each proposed Manual. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and revering. Secure the Owner's approval prior to proceeding with final.

B. Final: Complete the Manuals in strict accordance with the approved preliminary drafts and the Owner's review comments.

C. Revisions: Following on-site review by the Owner's representative, review all proposed revisions of Manuals with the Owner. If the Contractor is required by the Engineer to revise previously approved Manuals, compensation will be made as provided under "Changes" in the General Conditions.

END OF SECTION

SECTION 02011

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 WORK SPECIFIED HEREIN

All labor, materials, equipment, and services necessary to provide the clearing, grubbing, removing, and disposing of all vegetation and debris within the limits of construction and related items as indicated or specified.

PART 2 - MATERIALS

N/A

PART 3 - EXECUTION

All work will be in accordance with MAG Section 201.

END OF SECTION

SECTION 02012

REMOVAL OF EXISTING IMPROVEMENTS

PART I – GENERAL

1.01 WORK SPECIFIED HEREIN

A. All labor, materials, equipment, and services necessary to provide the removal and disposal of existing improvements, such as pavements, curbs, gutters, and related items as indicated or specified**.**

PART 2 - MATERIALS

N/A

PART 3 - EXECUTION

A. All work will be in accordance with MAG Section 350.

END OF SECTION

SECTION 02050

DEMOLITION

PART I – GENERAL

1.01 COMPLY WITH MAG SECTION 350 EXCEPT AS MODIFIED HEREIN.

PART 2 – MISCELLANEOUS REMOVAL AND OTHER WORK

2.01 MODIFY SECTION 350.3 AS FOLLOWS:

A. The work under this section shall consist of removing and disposing of any obstacle to construction that is not included in any other bid item, whether it is shown on the plans or not, unless it is specifically called out on the plans to be removed or relocated by other agencies.

PART 3 – PAYMENT

3.01 DELETE TEXT IN SECTION 350.4 AND REPLACE WITH THE FOLLOWING:

A. Payment for removals and demolition will be made as a lump sum price, which price shall be full compensation for the item complete as described herein, per MAG Section 350 and on the plans.

END OF SECTION

SECTION 02051

SAWCUTTING

PART I – GENERAL

1.01 EXCEPT AS OTHERWISE REQUIRED IN THESE SPECIFICATIONS, CONSTRUCTION OF THIS PROJECT SHALL BE IN ACCORDANCE WITH ALL APPLICABLE MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS

1.02 RELATED WORK IN OTHER SECTIONS OF THESE SPECIFICATIONS:

A. Contractor shall coordinate sawcutting with other trades.

B. Areas to be sawcut shall be laid out and approved by the City Inspector prior to beginning work.

1.03 WORK INCLUDED:

A. Supply materials, equipment and labor to provide all saw-cutting for the project as indicated in the plans.

B. Sawcuts shall include asphalt, concrete curb, gutter, concrete sidewalk; and miscellaneous surfaces as indicated on the plans and details.

1.04 EXECUTION OF SAWCUTS

A. The sawcut operator shall be an experienced operator capable of providing professional, quality work.

B. Sawcuts shall be full depth cuts in sidewalks. All other cuts shall be 1 1/2" minimum or 114 of the thickness, whichever is greater. Concrete shall be removed and replaced to the closest joint where possible. All sawcut locations to be reviewed for acceptance with Owner.

C. Sawcuts shall be neat, clean, vertical cuts not varying more than 1/4" in 10' horizontal. Sawcuts on curves shall be a uniform, smooth radius.

D. Overlapping sawcuts at ends of cuts or comers will not be allowed. Contractor shall lower blade at comers or angle cuts to provide a full depth cut.

1.05 CONCRETE AND ASPHALT REMOVAL

A. Contractor shall exercise care in the removal of asphalt or concrete in order not to damage adjacent concrete or asphalt to remain. If adjacent surfaces or property is damaged, Contractor shall repair or remove and replace damaged surfaces on property to the satisfaction of the City Inspector.

END OF SECTION

SECTION 02070

SELECTIVE DEMOLITION

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Provisions and Division 1 Specification Sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

A. Extent of selective demolition work is indicated on Drawings.

1.03 SUBMITTALS

A. Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.

B. Permits, Ordinances, etc.: Procure and pay for all necessary permits or certificates required to complete the work specified. Make any and all required notifications and comply with all applicable federal, state and local ordinances.

1.04 CONDITIONS AND REQUIREMENTS

A. Conditions of structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

B. Partial demolition and removal: Items indicated to be removed but of salvageable value to Owner may be removed as work progresses. Salvaged material shall remain the property of the Owner and be delivered to a location as specified by the Owner.

C. Protection

1. Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

2. Provide shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent vegetation or other work to remain

3. Remove protection at completion of work.

D. Damages: Promptly repair or replace damages caused to adjacent facilities, vegetation, etc., by demolition work at no cost to Owner.

E. Traffic:

1. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

2. Do not close, block or otherwise obstruct streets, walks, or other occupied or used facilities without permission from City of Phoenix. Provide alternate routes around closed or obstructed traffic ways if required.

3. A haul permit will be required per City of Phoenix requirements.

F. Explosives: Use of explosives will not be permitted.

G. Utility Services:

1. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

2. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

H. Environmental controls:

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

2. Do not use water when it may create hazardous or objectionable conditions such as flooding and pollution.

3. Control dust on jobsite during construction. A County Dust Permit is required.

I. Protection of existing improvements:

1. Provide protection necessary to prevent damage to existing site items which are to remain in place.

2. Protect improvements on adjoining properties and on Owner’s property.

3. Restore damaged improvements to their original condition, as acceptable to Owner.

J. Protection of existing trees and vegetation:

1. Protect existing trees and other vegetation against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, foot or vehicular traffic, or parking of vehicles within drip line. Provide

temporary guards to protect trees and vegetation to be left standing. See section 02116 for tree protection fencing.

2. Water trees and other vegetation to remain within the Contractor's limits of construction area as indicated on the Drawings as required to maintain their health during course of construction operations (water cost to be Contractor's responsibility). See Section 02116 for temporary irrigation.

3. Provide protection for roots over 1-1/2" diameter cut during construction operations. Coat cut faces with emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

4. Repair or replace trees and vegetation which are damaged by construction operations, in a manner acceptable to the Owner's Representative. Employ arborist to repair damages to trees and shrubs.

5. Salvageable improvements: Carefully remove items indicated to be salvaged, and store as directed by Owner.

K. Inspection and Documentation: Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph or videotape existing condition of structures, surfaces, vegetation, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with the Owner's Representative prior to starting work.

L. Preparation:

1. Provide shoring, bracing, or support to prevent movement, settlement or collapse of adjacent facilities, vegetation or other work to remain.

2. Cease operations and notify the the Owner's Representative immediately if safety of structure, vegetation or other work appears to be endangered. Take precautions to support structure, vegetation or other work until determination is made for continuing operations.

3. Locate, identify, stub off and disconnect utility services that are indicated to be abandoned.

4. Provide bypass connections as necessary to maintain continuity of service to onsite and offsite facilities. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary during changeover.

M. Demolition:

1. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

2. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw.

3. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

4. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to the Owner's Representative in written, accurate detail. Pending receipt of directive from the Owner's Representative, Rearrange selective demolition schedule as necessary to continue overall job progress without delay.

N. Site Clearing:

1. General: Remove or relocate trees, shrubs, grass, improvements, or obstructions interfering with the installation of new construction under the direction of the Engineer. Remove such items elsewhere on site or premises under the direction of the Engineer. Removal includes digging out stumps and roots.

2. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.

3. Clearing and grubbing: Clear site of trees, shrubs and other vegetation, as indicated on plans.

4. Completely remove stumps, roots, and other debris protruding through ground surface, to a depth of 12 inches below existing grade.

5. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

6. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

7. Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

8. When encountered, remove all existing abandoned footings, foundations or other construction unless written permission is provided by the Owner's Representative.

9. When removing existing turf as shown on the plans a state certified applicator shall apply required chemicals in accordance with EPA label restrictions and recommendations. Prove hydraulic equipment for the liquid application of chemicals with a leak-proof tank, positive agitation methods, controlled application pressure and metering gages. A chemical treatment plan shall be provided to the Landscape Architect as specified in the paragraph SUBMITTALS. Turf areas removed that are located outside the limits of demolition, shall be replaced at no additional cost to the owner.

O. Salvage Materials:

1. Salvage items: Where indicated on Drawings as "Salvage – Deliver to Owner, " carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.

P. Disposal of demolished materials:

1. Remove debris, rubbish and other materials resulting from demolition operations from project site. Transport and legally dispose of materials off site.

2. Burning of removed materials is not permitted on Project Site.

Q. Clean-up and repair:

1. Upon completion of demolition work, remove tools, equipment and demolished materials from site.

2. Repair demolition preformed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION

SECTION 02110

SITE CLEARING

PART 1 - GENERAL

1.01 DESCRIPTION

A. General

1. Furnish all labor, materials, tools, equipment, and services for all Site cleaning, tree protection, stripping topsoil and demolition as indicated, in accord with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

B. Related Work Specified Elsewhere

1. Earthwork - Section 02300.

1.02 QUALITY ASSURANCE

A. Perform work in accordance with OSHA and EPA requirements and state and local requirements.

PART 2 - PRODUCTS

None.

PART 3 - EXECUTION

3.01 PROTECTION

A. Protect improvements on adjoining properties as well as those on Owner's property. All site clearing and salvage operations shall be limited to the areas as shown on the plans. No clearing salvage, storage or vehicular traffic shall extend beyond the above-defined site as shown on the plans.

B. Restore any improvements damaged by this work to original condition, as acceptable to Owner or other parties or authorities having jurisdiction.

C. Protect existing trees and other vegetation to remain against damage.

1. Do not smother trees by stockpiling construction materials or excavated materials within drip line.

2. Avoid foot or vehicular traffic or parking of vehicles within drip line.

3. Provide temporary protection as required.

D. Repair or replace trees and vegetation damaged by construction operations.

1. Repair to be performed by a qualified arborist.

2. Remove trees which cannot be repaired and restored to full-growth status.

3. Replace with new like materials.

3.02 SALVAGEABLE ITEMS

A. Contractor shall coordinate with Owner's Representative and adhere to specific requirements.

3.03 SITE CLEARING - GENERAL

A. Tag all trees, shrubs and other vegetation, improvements, or obstructions that interfere with new construction to be removed and coordinate with Owner's Representative for approval.

1. Removal includes stumps of trees and their roots.

2. Protect roots and branches of existing trees indicated to remain, where they obstruct new construction. Coordinate with Owner's representative any pruning of branches or roots prior to pruning.

B. Remove other items when specifically indicated.

3.04 CLEARING AND GRUBBING

A. Clear from above surface of existing ground all trees not marked to remain, shrubs, brush, downed timber, rotten wood, heavy growth of grass and weeds, vines, rubbish, structures, and debris.

B. Grub (remove) all stumps, roots, root mats, and debris encountered within limits of construction.

3.05 DISPOSAL OF WASTE MATERIALS

A. Do not burn combustible materials on site.

B. Remove all waste materials from site and legally dispose of material.

C. Do not bury organic matter on site.

END OF SECTION

SECTION 02116

PROTECTION OF EXISTING VEGETATION

PART 1 - GENERAL

1.01 SCOPE

A. Protection and care of existing trees.

B. Temporary irrigation of existing trees.

1.02 INTENT

A. Established trees and shrubs are key features of the project, and the Contractor shall give plant protection the highest priority throughout the construction period.

PART 2 - PRODUCTS

2.01 TREE PROTECTION FENCING

A. 6' "Orange" Tensar Utility Safety Fence (or equal) attached to "T" poles securely embedded in ground per the land development code section 10-06-005. Locate as shown on plans.

2.02 TEMPORARY IRRIGATION

A. Temporary irrigation may be provided by one of the following methods:

1. Water truck.

2. Temporary pipe.

PART 3 - EXECUTION

3.01 PROTECTION OF EXISTING VEGETATION

A. Limits of Disturbance: Prior to any construction, Contractor shall stake and flag a limit of construction line and receive approval from the Engineer. The Contractor shall stay within all defined limits of grading/disturbance. The Contractor shall not cause any disturbance, i.e., track, drive vehicles or equipment, trench, blade or grade outside the limits of disturbance. To construct any item outside the defined limits of disturbance, i.e., utilities, irrigation, etc., the Contractor shall trench/construct facilities only; no blading off of area along the trench lines, etc. Contractor shall stay within 10' each side of the centerline of the trench.

B. <u>No grading is allowed within the drip line of the trees or shrubs except as approved by the Engineer</u>.

C. Defined limits of disturbance do not relieve the Contractor of the responsibility to protect vegetation outside of the defined limits.

D. Permits: Contractor shall obtain all permits.

3.02 PROTECTION FENCING

A. Install continuous protection fencing at locations as shown on the plans, as staked and approved by the Engineer.

B. Fencing shall be firmly anchored by driving posts into the ground, or by other method if approved in advance by the Engineer.

C. Fencing shall remain in place during the progress of the Work, and shall only be removed when heavy construction work (such as paving, structures, and earthwork) is completed, and final landscape and irrigation work is started. Submit schedule for removal of fencing to Engineer for approval.

D. No construction activity, including equipment and material storage, is allowed within the boundaries of plant protection fencing until the Engineer authorizes the commencement of landscape and irrigation work.

3.03 CUTTING ROOTS FOR WORK WITHIN THE ROOT ZONE

A. Where work must encroach on the root zone of a tree, saw-trench to a depth of 24 inches at the limit of work or at the exterior face of the tree protection fence.

3.04 PLANT CARE

A. The Contractor shall be fully responsible for the protection, care, and healthy growth of existing plants to remain including, but not limited, those that do not have irrigation due to construction activity.

B. The Contractor shall provide all care including watering, control of infestations and disease, and physical protection, until Final Acceptance.

C. Irrigation: Watering shall be performed a minimum of once per month from October to May, twice per month from June to September, or as is needed for healthy tree growth. Watering shall be performed as follows:

1. Trees:

   a. Construct a minimum 8” berm around the drip line of each tree.

   b. Watering shall consist of filling the berm to the top and allowing it to soak in. This shall constitute one watering.

2. Shrubs:

   a. Construct a minimum 4” berm around the drip line of each shrub.

   b. Watering shall consist of filling the berm to the top and allowing it to soak in. This shall constitute one watering.

3. Contractor shall be responsible for establishing a water suply for temporary irrigation as part of the contract.

4. Temporary irrigation shall commence 5 working days after the Contractor’s receipt of the Notice to Proceed, and shall be in operation until the permanent irrigation system is in place and fully operational.

The Contractor remains responsible for effective sustained tree watering until final Acceptance, with or without the use of the permanent irrigation system.

D. The Contractor shall maintain the tree water berms throughout the construction period and remove them as part of the final clean up and finish grading of the site, or until the permanent irrigation system is fully operational.

3.05 REPLACEMENT OF DAMAGED PLANTS

A. Damage to existing trees to remain due to actions or neglect is not allowed. The Contractor shall be responsible for the full replacement in kind of existing trees and shrubs severely damaged or killed, caused by mechanical damage, neglect, or negligence. The Engineer shall approve replacement materials.

END OF SECTION

SECTION 02220

STRUCTURE EXCAVATION AND BACKFILLING

PART 1 - GENERAL

1.01 WORK SPECIFIED HEREIN

A. All labor, materials, equipment and services necessary to complete the structure excavation, backfilling and related items as indicated or specified.

1.02 SUBSTITUTIONS

A. In accordance with Section 01600 and MAG Section 106 - Control of Materials.

1.03 QUALITY ASSURANCE

A. Provide testing as specified herein and as indicated in soil investigation. Apply whichever is most restrictive.

B. Provide one field density test of under-slab fill for every 2,000 square feet of building area.

C. Provide two field density tests of backfill at locations and elevations directed.

D. See Section 01400 for provisions covering payment for testing.

PART 2 - PRODUCTS

2.01 UNDER-SLAB FILL

A. Fill directly under slabs-on-grade shall be granular base having gradation as determined by ASTM C-136 within the following limits:

Sieve Size (Square openings)	Percent Passing By Dry Weight
1-1/8"	100
No. 4	38 - 70
No. 8	25 - 60
No. 30	10 - 40
No. 200	3 - 12

PART 3 - EXECUTION

3.01 UNDER-SLAB FILL PLACEMENT

A. Place under-slab fill to the thickness and grade indicated, smooth and even, free of void. Compact to specified density. Grade to a tolerance of 1/4" in 10 feet.

3.02 BACKFILL

A. After completion of the foundations, walls and other constructions and removal of forms, clean the excavations of trash and debris.

B. Place the backfill symmetrically against each side of the walls to prevent eccentric loading. Place backfill in horizontal 6" layers with the proper moisture content for the required degree of compaction.

C. Backfill pipe and conduit trenches in a manner to prevent disturbance to the pipes or conduits. Fill under and around pipes thoroughly to a point approximately 12" above the top of the pipe and compact. Backfill remainder of trench in 6" layers and compact.

3.04 COMPACTION

A. Compaction of under-slab fill and backfill shall be in horizontal lifts not exceeding 6" in thickness. Compact to the percent of maximum density at optimum moisture content in accordance with ASTM D-698 in accordance with soils report.

END OF SECTION

SECTION 02227

TRENCH EXCAVATION AND BACKFILL

PART 1 – GENERAL

1.01 WORK SPECIFIED HEREIN

All labor, materials, equipment, and services necessary to provide the excavation and backfill of any or all waterlines, sewer lines, conduits. sleeves, and related items as indicated or specified.

PART 2 - MATERIALS

N/A

PART 3 - EXECUTION

All work will be accordance with MAG Section 601.

END OF SECTION

SECTION 02260

FINISHED GRADING

PART 1 -GENERAL

1.01 DESCRIPTION

A. General

1. Furnish all labor, materials, tools, equipment, and services for all finished grading, as indicated, in accordance with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

B. Definitions

Extent of grading: see the Construction Documents.

C. Location-of Work. All areas as shown on the project plans.

1.02 QUALITY ASSURANCE

A. Finish grading tolerance: 0.1 ft. plus/minus from indicated contours and/or elevations.

PART 2 - EXECUTION

2.01 ROUGH GRADE REVIEW

A. Rough grading shall be reviewed by Owner's Representative in Section 02200, Earthwork.

2.02 FINISH GRADE PREPARATION

A. Correct, adjust and/or repair rough graded areas.

1. Cut off mounds and ridges.

2. Fill gullies and depressions.

3. Perform other necessary repairs.

4. Bring all subgrades to specified contours, even and properly compacted.

B. Refer to Project Notes on Plans for coordination of Finish Grading criteria.

** END OF SECTION**

SECTION 02271

RIPRAP CONSTRUCTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This item is supplementary to the applicable portions of MAG Section 220, Riprap Construction.

PART 2 - PREPARATION OF GROUND SURFACES

2.01 TEXT IN MAG SECTION 220.3 IS DELETED AND THE FOLLOWING INSERTED:

A. Areas of riprap placement shall be excavated and compacted to the lines, grades and densities indicated by the plans.

PART 3 - GROUTED RIPRAP

3.01 MAG SECTION 220.5 IS SUPPLEMENTED BY THE FOLLOWING:

A. Riprap which shall be exposed at the surface shall be hard placed to securely embed the bottom two-thirds of the material in integral color mortar to match rip-rap. The top one-third shall be uniform, tight and natural in appearance. Immediately after completion of placement, all excess mortar shall be removed from the exposed faces by brushing or other methods approved by the Owner's representative. Sprinkle a single layer of sand over the integral color mortar.

B. Prior to acceptance, all exposed rock shall be final cleaned by brushing or sandblasting to a natural and uniform appearance. The finished surface shall be uniform and shall not vary from the finish grades depicted on the plans.

END OF SECTION

SECTION 02282

VEGETATION CONTROL

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 REFERENCES:

a. State Chemist's Office, City of Phoenix label registration regulations.

1.02 QUALITY ASSURANCE: Notify Owner and quality assurance person 24 hours in advance and receive consent to proceed. Make application during normal working hours. Allow minimum 12 hours after application before allowing concrete to be placed over application.

1.03 SUBMITTALS:

a. Shop Drawings: Submit rate of application verification plan.

b. Product Data: Submit label.

c. Sample: Submit certified copy of label.

d. Record Documents: Submit record of meter readings or other approved data verifying rate of application and affidavit certifying treatment made in accordance with Specifications.

1.04 WARRANTY: Provide applicator's warranty for two-year period to do any additional work necessary to satisfactorily prevent rupture of asphalt surfaces by vegetation upon evidence of such growth within guarantee period.

PART 2 - PRODUCTS

2.01 VEGETATION CONTROL CHEMICAL: Occidental Chemical Corp. "Monobor-Chlorate," non-migrating, growth penetration barrier.

a. Label: State registered with percent of active ingredients.

b. Packaging: Deliver to job site in original sealed, labeled, containers.

PART 3 - EXECUTION

3.01 APPLICATOR: State licensed by Control Board and Registrar of Contractors.

3.02 PREPARATION OF CHEMICAL: Dilute in water in concentration of applicator's choice, consistent with method of application, equipment, and application rate control method to be employed.

3.03 COORDINATION:

a. Do not apply until all operations which may disturb treated work are complete. Apply immediately before paving is begun.

b. Applicator to issue written, time-dated authorization for work to conceal treated area.

3.04 APPLICATION:

a. Vegetation Control Soil Treatment:

1. Building Floor: As required to provide chemical barrier to protect concrete from rupture by vegetation growth and not less than one pound of vegetation control chemical in water solution per 25 sq. ft. of area. Verify rate of application and volumes used by use of metered application equipment or approved verification system.

END OF SECTION

Append MAG to Include the Following:

SECTION 02300

EARTHWORK

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 GENERAL

1.01 DESCRIPTION

A. Earthwork for Site shall conform to Section 201, 205, 206, 210, 211, 225 MAG Specifications and as modified herein. Earthwork shall consist of all local excavation, borrow and fill construction operations necessary to bring the grade to the contours and elevations shown on the plans or as directed by the Engineer.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Clearing and grubbing shall conform to MAG Section 201 or as modified herein. Voids and cavities shall be filled with clean excavated materials and compacted to the surrounding new material densities. Areas to receive constructed fill shall be cleared of all existing vegetation. Waste material shall be disposed of off the project site.

3.02 SITE SOILS

A. The Contractor may encounter soils of medium plasticity, which exhibit high swell potentials when compacted and wetted. Utilize the soils as recommended in the Soils Report. Materials tests by City personnel will determine the suitability of these soils for fill placement in different locations.

B. Contractor may encounter soil and/or rock conditions that may require heavy excavation equipment.

C. Fill Construction: The fill shall consist of onsite soils and shall be constructed in conformance with MAG Section 211 and as modified herein, except the cost of the fill construction shall be included in the lump sum price bid for Earthwork.

D. The work shall include excavation, haul, and disposal of deleterious materials; including landfill dump fees if required. The work shall conform to the Uniform Standard Specifications for Public Works Construction, Maricopa Association of Governments. A Soils Report is attached in the Appendix of the Technical Specifications.

E. Fill material, shall be free from roots, organic matter, trash, other deleterious material. Turf sub-grade to a depth of 6 inches below finish grade shall be free of all deleterious materials and rocks 2 inches in any dimension and to a depth of

2 inches below finish grade, shall be free of all rocks greater than 1/2 inch. Screen and rake fill from top 6" of turf area as necessary. Landscape areas (non turf) shall be tilled and bladed to remove rocks greater than 2 inches to a depth of 4 inches below finish grade.

F. Do not place material in layers greater than 8 inches loose thickness per soils report. Material and stone greater than 6" but smaller than 12" may be placed at a depth greater than (1) foot except in trenches and plant pit backfill areas.

G. Landscape mounds and depressions shall be staked at 25 feet along the contour that defines the edge and staked at all high and low points to define the intended land form. Swales shall be staked at 25 foot intervals when engineered slopes are less than 2 percent.

H. Open turf areas shall be staked on a 50 foot grid with cuts and fill to finish grade.

3.03 PAVEMENT AREAS

A. The following requirements apply to the areas within and extending 5 feet beyond the footprint of buildings, exterior slabs and pavements.

B. Structure and pavement areas:

1. Moisture condition and place all fill and backfill materials required to achieve specified grades. Fill materials shall be moisture conditioned, placed and compacted in horizontal lifts of thicknesses compatible with the compaction equipment being used.

C. Compact subgrade fill, backfill, subbase filler base material as per MAG specifications.

D. Any soils which are disturbed or over-excavated by the contractor outside the limits of the plans or specifications shall be replaced with materials compacted as specified above.

3.04 LAWN AREA COMPACTION

A. Areas of new fill in planting beds and lawn areas shall be compacted to approximately 85 percent of the material's maximum dry density. Planters shall be water settled. The contractor shall take precautions to prevent over-compaction of fill because tight compaction retards plant growth. Scarify entire lawn area to a depth of 4" two weeks prior to beginning turf installation.

3.05 EXCAVATION FOR STRUCTURES

A. Engineered, controlled earthwork pad for structures, paving, etc., shall be constructed in accordance with MAG. Costs for the initial testing of earthwork shall be paid for by the contractor. Costs for re-testing due to failure of work to comply with these specifications shall be paid for by the Contractor.

B. Notify Engineer when excavations are ready for inspection before concrete is placed or reinforcing and other formwork is erected. Place concrete footings after excavation has been inspected and approved and when weather conditions permit. It shall be the Contractor's responsibility to coordinate the inspections to ensure no job delays.

C. Structural excavations including walls will be certified for safe bearing capacity by testing laboratory as required by City of Phoenix Construction Code. The City of Phoenix will require a 48-hour notice prior to testing the excavations.

3.06 PROJECT CONDITIONS

A. Verify and locate all existing underground utilities in areas of work. Notify Engineer if location of proposed facilities has to be altered to accommodate existing conditions.

B. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

C. Underpin adjacent structures, including utility service lines, which may be damaged by excavation operations.

D. Promptly repair damage to adjacent facilities caused by earthwork operations. Cost of repair at Contractor's expense.

E. Promptly notify the Engineer of unexpected sub-surface conditions.

F. Grade at excavations to prevent surface water draining into excavated areas.

G. All haul material shall be disposed of properly off-site as approved by the Engineer. Haul loads over highways or city streets shall comply with legal load requirements. All material shall be removed from shelf areas of vehicles in order to eliminate spilling of materials, and loads shall be watered or covered to eliminate dust. The contractor shall also regularly clean existing streets to prevent buildup of haul material as directed by Engineer.

H. Environmental Requirements: Place, spread or roll fill materials during favorable weather conditions. When the work is interrupted by rain, do not resume fill operations until evidence is furnished which establishes that moisture content and density of the previously placed fill are as specified.

1. SWPPP: The Contractor is required to develop a Storm Water Pollution Prevention Plan (SWPPP) and receive approval prior to starting operations. Ensure that the project meets the minimum standard requirements of the SWPPP and the plan is implemented prior to the start of any construction.

2. Dust Control: Comply with requirements of governing authorities. Use whatever means necessary to control dust on and near the work and on and near off-site borrow, storage and spoil areas. Thoroughly moisten surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

3.07 MATERIALS

A. Materials shall conform to MAG Uniform Standard Specification for Public Works Construction and as modified by City of Phoenix Supplements. All fill material is subject to testing and inspection.

3.08 PREPARATION

A. Establish extent of grading and excavation by area and elevation. Designate and identify datum elevation and project engineering reference points. Set required lines, levels and elevations.

B. Do not cover or enclose work of this Section before obtaining required inspections, tests, approvals and location recording.

3.09 EXISTING UTILITIES

A. Before starting grading and excavation, establish the location and extent of underground utilities in the work area. Exercise care to protect existing utilizes during earthwork operations. Perform excavation work near utilizes by hand and provide necessary shoring, sheeting, and supports as the work progresses.

B. Maintain and protect as required existing utility lines which pass through the work area.

C. Protect active utility services uncovered by excavation.

D. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

E. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

3.10 On Site and Off Site Grading comply to MAG Specification Sections 205, 206, 210, 211, 220, 225, and 230 or as modified herein.

A. ROADWAY EXCAVATION SECTION 205;

Modify 205.1 DESCRIPTION as follows:

Roadway excavation shall consist of excavation involved in grading and construction of site work, and roadways, except structure excavation, trench excavation and any other excavation separately designated.

Modify 205.2 UNSUITABLE MATERIALS as follows:

Delete the 3rd paragraph entirely; “The removal and disposal of such unsuitable material will be paid for as roadway excavation”.

Add the following paragraph: Turf and landscape areas; Turf subgrade to depth of 6 inches below finished grade shall be free of all deleterious materials and rocks 2 inches in any dimension and to a depth of 2 inches below finish grade free of all rocks greater that ½ inch. Landscape areas (non turf) shall be tilled and bladed to remove rocks greater than 2 inches to a depth of 4 inches below finish grade.

Modify 205.6 SURPLUS MATERIALS

First sentence; modify to read as follows: Unless otherwise shown on the plans, specified in the special provisions, or approved by the Engineer, no surplus excavated materials shall be disposed on site or within the right of way.

Delete 205.8 PAYMENT

B. STRUCTURE EXCAVATION AND BACKFILL SECTION 206

Modify 206.1 DESCRIPTION:

Add the following paragraphs: Excavation, including engineered, controlled earthwork pad for structures, paving, etc., shall be constructed in accordance with MAG. All costs for the initial testing of earthwork will be paid for by the Contractor. Costs for re-testing due to failure of work to comply with these specifications shall be paid for by the Contractor.

Structural excavations including wells will be certified for safe bearing capacity by testing laboratory as required by the City of Phoenix Construction Code. The City of Phoenix will require a 48-hour notice prior to testing the excavations.

Modify 206.3 INSPECTION:

Add the following sentence: It shall be the Contractor's responsibility to coordinate the Inspections to ensure no job delays.

Modify 211.2 PLACING:

Modify the 1st sentence as follows: Rocks, broken concrete, organic material, trash, or other solid materials, which are larger than 4 inches in the greatest dimension shall not be placed in fill construction.

Add the following paragraphs: Fill in Turf and landscape areas; Turf subgrade to a depth of 6 inches below finish grade shall be free of all deleterious materials and rocks 2 inches in any dimension and to a depth of 2 inches below finish grade shall be free of all rocks greater than ½ inch. Fill in Landscape areas (non turf) shall be free of rocks greater than 2 inches to a depth of 4 inches below finish grade.

Fill placement in turf and landscape areas shall be compacted to not more than 90 percent of the materials maximum dry density. Scarify over compacted areas to a depth of 4 inches prior to planting turf or placement of organic materials.

Modify 2.11.3 COMPACTING:

Add the following paragraphs: strip the site of any existing fill zones (including end-dumped fill piles), back fill zones and unsuitable soils. During stripping, observe the surface for evidence of buried debris, vegetation or disturbed materials, which will require additional removal. If encountered, these materials shall be removed. Areas steeper than 5H to 1V should be benched and any depressions widened to accommodate compaction equipment.

Areas within and extending 5 feet beyond the footprint of the building, over which fills are to be placed, shall be cleared and scarified to a depth of 8 inches, moisture conditioned and compacted to provide a bond between the existing ground and the material to be deposited thereon.

Add the specific compaction requirements listed in section 3.03.E of this specification.

Delete 7th paragraph, 2nd sentence: Broken Portland cement concrete, and bituminous type movement obtained from project excavation will be permitted in fill with the following limitation: (A), (B), (C), and (D).

Section 211.5 MEASUREMENT: delete this section in its entirety

Section 211.6 PAYMENT: delete this section in its entirety

PART 4 MEASUREMENTS AND PAYMENT

A. It shall be the responsibility of the Contractor to verify estimated quantities prior to bid. The earthwork shall be lump sum.

B. Contractor shall visit the site, and obtain all information necessary to determine existing site and subsoil conditions that will affect the work. No representation or warranty is made by the Architect/Engineer or Owner.

C. Payment for all earthwork, including spreading and compacting the soil, shall include all costs and operations associated with clearing and grubbing, excavating, screening, loading, depositing, moisture conditioning, spreading and compacting the material complete in place an haul if required. The Contractor shall include all costs for this work, including the cost for construction water in the lump sum bid item for “EARTHWORK”. No separate payment will be made for sub-grade preparation. The cost of this work shall be included in the unit prices bid for asphalt pavement, concrete sidewalks, stairs, courts, curbs and headers.

D. It shall be the Contractor’s responsibility to satisfy himself of the extent of the work and estimate quantities prior to the bid. No adjustment in compensation will be made regardless of the actual quantity of excavated, over-excavated fill or borrow material handled to complete the work shown. No additional compensation will be made if special excavating equipment is required to perform the work indicated. The Contractor should anticipate hard dig situations in cuts greater than 3’ and the need for special equipment to complete bid work.

E. Contractor to spoil excess dirt onsite prior to haul off activities.

F. Contractor shall visit the site and obtain all information necessary to determine existing site and subsoil conditions that will affect the work. No representation or warranty is made by the Architect/Engineer or Owner.

END OF SECTION

SECTION 02310

SITE GRADING

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION and CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1- GENERAL

1.01 WORK SPECIFIED HEREIN

A. All labor, materials, equipment, and services necessary to provide complete site grading and related items as indicated or specified.

1.02 RELATED WORK

A. MAG Section 106 and Part 200

B. Storm Water Pollution Prevention Plan (Prepared and submitted by Contractor)

1.03 SUBMITTALS

A. General: Submit the following according to the conditions of the Contract and Division 1 of the Specifications.

B. Fill Material: Submit ½ cubic foot of fill soil for approval by the Engineer prior to installation.

C Schedule of Values: The Contractor shall submit a schedule of values that will be used as the means of measuring payment for needed additional work. The items required as part of the bid package include:

1. Import per cubic yard
2. Export per cubic yard
3. Excavation per cubic yard
4. Site Preparation, Placement, Watering, and Compaction per cubic yard

1.04 EXECUTION, PRODUCTS AND MATERIALS

A. All work will be in accordance with MAG Specifications Sections 107, 210, 211, 225 and 601, and all City of Glendale modifications to the specifications.

1.05 SITE INVESTIGATION

A. Bidders must visit the site to form their own conclusions as to the character of the site preparation and grading work.

1.06 CONSTRUCTION STAKING

A. Construction staking is to be provided by the Contractor as part of their work.

1.07 FINISHED GRADE

A. “Finished Grade”, as used herein refers to the required final grade elevation indicated to the top surface of the structure, pavement, etc. If the finished grades indicated by spot elevations conflict with those indicated by contours, obtain clarification from Engineer. Set subgrades to allow for thickness of base, paving, etc.

B. Unless otherwise indicated, give Project site areas uniform slopes between points for which finished grades are indicated or between such points and existing established grade, except provide roundings at abrupt changes in slopes.

1.08 JOB CONDITIONS

A. Surface drainage: Provide and maintain positive surface drainage during construction. Prevent infiltration of water into utility or foundation excavations from any source. Follow the Storm Water Pollution Prevention Plan.

PART 2 - PRODUCTS

2.01 FILL MATERIAL, GENERAL

A. Approval required. Fill material shall be in accordance with the Soils Report, and approved by the Engineer.

PART 3- EXECUTION

3.01 SITE PREPARATION

A. Prior to construction activity on the site, the property shall be cleared per MAG Section 201.

B. The entire site shall be inspected for any evidence of prior excavations, uncontrolled backfill or soft spots. Should these anomalies be encountered, the material shall be removed and replaced with suitable material. All compaction of backfill shall be accomplished by mechanical means and may not be water settled.

C. All existing rubble, building materials and rock over 6” diameter and other debris that exists on site shall be completely removed by the contractor and properly disposed of off site at no additional cost to the Owner. This includes surface material and those materials encountered during grading, trenching, foundation preparation and other construction activities to a minimum depth 18” below finish grade in under paving and landscape areas, 24” under footings. Backfill and compact excavations as specified in the Soils Report.

D. Finish grading shall include the removal of all surface rock over 1” diameter or as otherwise specified.

3.02 COMPACTION AND DENSITY CRITERIA

A. Compaction of cleaned exposed native soils shall be accomplished to the density criteria recommended as per MAG specifications.

B. Natural undisturbed soils or compacted soils subsequently disturbed or removed by construction operations shall be replaced with materials compacted as specified above.

C. All areas of development- widen any pits, ditches, depressions, etc. as necessary to accommodate compaction equipment and to provide a level base for placing fill.

3.03 EARTHWORK QUANTITIES

A. The Contractor shall compute the earthwork quantities by a method best suited for an accurate quantity determination. The Contractor is solely responsible for using these numbers to determine his bid. The Contractor shall utilize the soils reported as a reference to determine the earthwork quantities. If major discrepancies between the engineer's estimate and the Contractor's estimate exist, the Contractor shall submit in writing as part of their bid the reason for the deviation and the difference in the quantities based upon this deviation within 14 days of being awarded the bid. The contractor shall supply the Engineer with the Contractor's earthwork calculations for evaluation and alternative generation as part of the submittal within 14 days of being awarded the bid.

3.04 EXCAVATING

A. Over-excavation: Backfill and compact all over-excavated areas whether caused through error or carelessness as specified or fill below. Perform all of this without additional compensation.

B. Material: Material to be excavated shall be non-classified and shall include all earth or other materials encountered in excavating. The Contract Sum is understood to cover the removal of all such materials to the depth and extent indicated or specified.

C. Spoil: Remove all excess excavated material from the site and legally dispose of it at no additional cost.

3.05 PREPARATION OF SUBGRADE

A. Grading: Prior to placement of fill materials, all surfaces shall be even and free from ruts, hummocks, or other uneven features which could impede uniform compaction. Sloping areas steeper than 5:1 (horizontal: vertical) shall be benched to prevent slippage planes between existing slopes and fills. Benches shall be level and wide enough to accommodate compaction and earthmoving equipment.

B. Elevation: Prepare subgrade at all areas to proper elevation to receive fill and base course materials.

3.06 EXCESS-WATER CONTROL

A. Unfavorable weather: Do not place, spread, or roll any fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Engineer.

B. Flooding: Provide berms or channels to prevent flooding of subgrade. Promptly remove all water collecting in depressions.

D. Softened subgrade: Where soil has been softened and eroded by flooding or placement during unfavorable weather, remove all damaged areas and recompact as specified for fill and compaction below.

E. Dewatering:
   1. Provide and maintain at all times during construction, ample means and devices with which to remove promptly and dispose of all water from every source entering the excavations or other parts of the Work.
   2. Dewater by means that will ensure dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3.07 GRADING

A. General: Grade site to slopes and elevations as shown on the Drawings, except as otherwise directed by the Owner's representative.

B. Surface drainage: Graded areas shall be constructed with positive slopes to prevent surface water ponding. The contractor shall guarantee that all graded areas shall drain, except for closed retention basins shown on the Drawings. Make any and all needed modifications to achieve positive drainage.

C. Grading tolerances:
   1. Rough grade: Parking areas and ball fields: 0.10 foot
   2. Finish grade: Base course under concrete slabs: Tolerance = 0.5 in. vertical in 10'-0" horizontal.
   3. Turf: At areas designated as turf, allow for topsoil or amendments and grade to within a tolerance of 0.10 foot to required elevations.
   4. Planting areas: Shrub areas are typically to be set from 1 to 11/2 inches below adjacent grade of pavement or lawn, where grades are not indicated on Drawings.

D. Treatment after completion of grading:
   1. After grading is completed and the Engineer has finished inspection, permit no further excavating, filling or grading except with the approval and inspection of the Engineer.
   2. Use all means necessary to prevent erosion of freshly graded areas during construction and until such times as permanent drainage and erosion control measures have been installed.
   3. Protect all newly graded areas from foot and vehicular traffic. Keep areas free from trash and debris.
   4. Repair and re-establish grades in any areas settled, rutted, or eroded.
   5. De-compaction. Scarify soils to a depth of 8 inches in all areas compacted by the passage of construction equipment which are to be stolonized or planted.

E. Areas suspected or known to be non-draining:
   1. Immediately notify the Engineer if any areas are suspected or known to be closed depressions or non-draining areas, except for designated stormwater retention basins.
   2. Take all necessary actions, at no cost to the Owner, including re-grading, adjustment of proposed pavement grades, and provision of culverts, needed to provide free drainage and prevent ponding and standing water.

END OF SECTION 02210

SECTION 02490

LANDSCAPING

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 QUALITY ASSURAINCE

A The landscape contractor shall have performed similar work as required in this specification for a period of five years previous to the award of this contract.

1.02 SCOPE OF WORK

A Contractor shall provide all labor, materials, including water, equipment and incidentals as shown, specified and required to perform landscaping work. The extent of the landscaping work is shown on the drawings and in schedules. The types of landscaping required include the following:

1. Landscape grading
2. Sodding
3. Hydroseeding
4. Trimming of existing tree
5. Maintenance work as specified until completion of the Contract
6. Soil amendments
7. Decomposed granite
8. Inert Groundcovers
9. Fertilizers
10. Miscellaneous landscape materials
11. Guarantees

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

1.03 SUBMITTALS

A. General: Submit the following according to the conditions of the Contract and Division 1 of the Specifications.

B. Sod and hydroseed procurement logs of materials required.

C. Decomposed Granite: (1) One quart bag(s) filled ¾ full with each type of inert groundcover to be used.

1.04 COORDINATION

A. Review installation procedures under other sections and coordinate the installation of items that must be installed with the landscaping.

1.05 OBSTRUCTIONS BELOW GROUND AND UTILITIES

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

PART 2 - INSTALLATION

2.01 GENERAL

A. Determine location of under-ground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes until removal is mutually agreed upon by all parties concerned.

2.02 LANDSCAPE GRADING

A. The work under this section shall consist of grading, contouring, smoothing, and otherwise shaping areas at the locations designated on the project plans.

2.03 TRIMMING TREES

A. The work under this section shall consist of trimming existing trees locations designated on the project plans

PART 3 - MATERIALS: SOD AND HYDROSEED

3.01 GENERAL

A The Contractor shall coordinate pre-approval of plant material and delivery with the Owner and applicable nurseries as required.

3.02 PROTECTION AFTER DELIVERY

A Upon delivery to the site, all nursery stock shall be planted as soon as possible. Until planting, plants shall not be exposed to excessive sun or drying winds. Stock, which is not satisfactory in the opinion of the Owner’s representative, shall be immediately replaced with acceptable stock at no expense to the Owner.

3.04 OBSTRUCTION BELOW GROUND

A. Any rock or other underground obstructions shall be removed, if possible, to the depth necessary to permit proper planting, according to plans and specifications. If underground construction obstructions or rock are encountered in the excavation of planting areas, other locations of the planting may be selected by the Contractor only upon approval of the Owner’s Representative. The Contractor is responsible for determining the locations of existing underground installations prior to starting work and protecting the installations in place. Damage will be corrected at the expense of the Contractor to the satisfaction of the Owners Representative. Coordinate work with

other trades so conflicts will not exist or delay the work. Coordinate grades with earthwork and with placement of irrigation systems.

PART 4 - SOIL PREPARATION

4.01 TOPSOIL

A. Topsoil, existing on site, or imported, shall be screened, fertile, friable soil free from nut grass, refuse, roots, heavy clay, noxious weeds or any material toxic to plant growth. Contractor shall test for pH, and pH shall not be lower than 5.5 nor exceed 8.3, and soluble salts shall not exceed 1,500 ppm. Contractor shall add amendments as required to meet the above specification.

4.02 FINE GRADING

A. Topsoil shall conform to Section 4.01.

B. Fine grade by hand raking or dragging with an approved drift, removing all debris and rocks ½ inch diameter and greater. True surface to finished grade, even and firm at all points. Generally, finished grade shall be 1 ½ inches to 2 inches below tops of adjacent curbs, walks and slabs.

4.03 SPRINKLER HEADS

A. Heads shall be raised to the proper heights as detailed prior to planting.

PART 5 – DECOMPOSED GRANITE

5.01 MATERIALS

A. Decomposed granite shall be native, local, desert, decomposed granite stone. Fines shall be kept to a maximum of 25 percent of the total volume. The decomposed granite shall be from a single source, free from coating, clay, caliche or organic matter. Contractor shall provide Owner’s representative with a sample of material showing color and gradation for approval before installation.

B. Decomposed granite color to match existing.

C. Decomposed granite size shall be 1/4” minor or approved equal, as noted on plans.

D. Chemical herbicide shall be Dachtol or Surflan pre-emergent or equal.

5.02 SUBGRADE PREPARATION

A. Contractor shall examine the subgrade, verify the elevations, and observe the conditions under which the work is to be performed. The existing grade shall be fine graded and raked free of organic matter and other debris one-inch diameter and larger. Contractor shall apply one application of pre-emergent herbicide as per manufacturer's directions prior to installing granite and one application after granite has been installed, compacted and raked level. The Owner’s representative is to be notified prior to pre-emergent applications.

5.03 DECOMPOSED GRANITE INSTALLATION

A. Landscape Planter Areas

1. Installed granite shall be raked to remove any irregularities. Installation shall provide a two-inch depth of decomposed granite after compacting. Methods of compacting shall be approved by the Owners Representative. Unless otherwise specified in the drawings, granite finish grade shall be one and one-half inches below top of curb or sidewalk surfaces.

PART 7 - CLEAN UP

7.01 CLEAN UP

A During landscape work, store materials and equipment where directed. Keep pavements and sidewalks clean and work area in an orderly condition. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

B. Remove all rubbish, equipment and rejected material daily from the site.

C. Protection includes all temporary fences, barriers and signs and other work incidental to proper maintenance.

PART 8 - INSPECTIONS

8.01 INSPECTIONS

A. When the landscape work is completed, including maintenance, the Engineer and Owner's Representative will make a pre-final and final inspection to determine acceptability. Where inspected landscape work does not comply with the requirements, replace rejected work and continue specified maintenance until re-inspected by the Engineer and found to be acceptable. Remove rejected plants and materials promptly from the project site.

PART 9 - MAINTENANCE, GUARANTEE AND REPLACEMENT

9.01 MAINTENANCE

A. Contractor shall begin maintenance immediately after entire plantings have been accepted by the Engineer.

B. Contractor shall maintain landscape work until final acceptance, but in no case less than 90 days after the work has been accepted by the Engineer.

C. NOTE: Instruct City/Park Maintenance personnel in the proper maintenance of landscape work.

9.02 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment, tools, services, skill, etc., required to maintain the landscape in an attractive condition throughout the contract period. Maintenance of plant materials shall include, but not be limited to, pruning, weeding, mowing, fertilizing, irrigation programming, pest control, and landscaped

areas debris clean up, per specifications. Maintenance shall be performed a minimum of once a week throughout the maintenance period.

9.03 WORK FORCE

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

9.04 MATERIALS

A. All materials as noted (but not limited to this list) shall conform to the bid specifications:
   1. Pre-emergent
   2. Fertilizer
   3. Plant material
   4. Decomposed granite
   5. Granite boulders

9.05 TREE AND SHRUB CARE

A. Maintain trees and shrubs in a healthy, growing condition by performing necessary operations, including the following:
   1 Pruning: Prune and shape only as necessary to maintain the usual form of the plant, to stimulate growth, to maintain growth within space limitations, and to maintain a natural appearance.
   2 Staking: Stakes are to be inspected weekly and adjusted or removed as necessary.
   3 Weed Control: In groundcover area, keep areas between plants free of weeds. Use recommended, legally approved, herbicides whenever possible. Avoid frequent soil cultivation.

9.06 GROUNDCOVER CARE

A. Foster attractiveness at all times by following these practices:
   1 Granite Areas: Landscape granite shall be inspected weekly. Man-made debris shall be removed and weeds and grass controlled with chemicals.
   2 Weed Control: Keep all landscape areas free of broadleaf or grassy weeds, with pre-emergent and/or selective contact herbicides. Cultivating or hoeing weeds is not a recommended practice. Project shall not be accepted until all noxious weeds are eradicated.

9.07 IRRIGATION SYSTEM

A. Watering shall be scheduled by supervising horticulturist and shall be at intervals and quantities consistent with seasonal requirements of the plant materials in the landscape.

B. Where practical, watering shall be done at night or early morning. Watering times shall be coordinated with the Owner.

PART 10 – GUARANTEE

10.01 GUARANTEE AND REPLACEMENT

A. Guarantee plant materials under this contract to be in good, healthy and flourishing condition of active growth at end of guarantee period. Replace dead plants and plants

not in vigorous, thriving condition without cost to Owner immediately during maintenance period, and as soon as weather conditions permit during normal growing season during the guarantee period. Replace contract plantings that die back and lose form and size originally specified even if they have resprouted. Frost kill or damage caused by other than inadequate staking not covered by this guarantee. However, Contractor shall, if requested, make replacement at reasonable cost and include replaced plants within maintenance and guarantee of project. Except for failures beyond control of Contractor, such as neglect, damage by others, vandalism, and floods, make replacements of comparable quality, type, and size. Continue replacements until each plant has successfully established itself for required guarantee time period. A sum sufficient to cover estimated cost of possible replacement, but not exceeding 5 percent of contract price including materials and labor may be retained by Owner until replacement obligations are complete.

10.02 GUARANTEE AND MAINTENANCE TIME SCHEDULE

	Guarantee Period	Maintenance Period
Trees	One year	90 days
Shrubs	One year	90 days
Plants in Flats	One year	90 days

10.03 LANDSCAPE GUARANTEE AND MAINTENANCE PERIOD

A. Upon acceptance after maintenance period, furnish a written guarantee on all plant material agreeing to guarantee the continued growth of active plant material growth for the specified guarantee periods.

B. The Contractor shall inspect the landscape materials periodically during the guarantee period and shall notify the Engineer and Owner in writing, if, in the Contractor's opinion, the landscape materials are not receiving proper care.

10.04 LANDSCAPE ACCEPTANCE

A. Contractor shall notify Owner in writing when Contractor believes that the landscaping is substantially complete to begin the maintenance period. Notification shall be submitted in writing, through the General Contractor, and received by the Owner at least seven (7) days prior to the requested maintenance period observation. Upon subsequent observation and acceptance of landscaping by the Owner, the maintenance period start date shall be established. At completion of the maintenance period, the condition of work will again be observed by the Owner to determine acceptance and the start date of the guarantee period. There shall be no relationship of landscape acceptances and general project final acceptance.

END OF SECTION 02490

SECTION 02511

DECOMPOSED GRANITE

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes provisions for stabilized decomposed granite trails over prepared sub-base or sub-grade.

B. Prepared sub-base is specified in another Division 2 section.

C. Rolling of prepared sub-base and stabilized granite is included in this Section.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division I Specification Sections.

1. Material Certificates signed by material producer and Contractor, certifying that each material complies with or exceeds specified requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

1. A. General: Use locally available materials and gradations that exhibit a satisfactory record of previous installations.

B. DG: Shall be 1/4” screened decomposed granite, color to as per approved plans and meet all requirements as specified in Section 702 of MAG with the following additions. The decomposed granite shall not contain lumps or balls of clay, caliche, organic matter or calcareous coating. The Contractor shall ensure that sufficient quantity is available from a single source to complete the project. Landscape Architect shall approve 1/2 cubic foot sample prior to ordering.

C. The screening requirements for the stabilized decomposed granite shall be as follows:

Sieve Size	Range of % Passing
3/8”	100
No. 4	95-100
No. 8	75-80
No. 16	55-65
No. 30	40-50
No. 50	25-35
No. 100	20-25
No. 200	5-15

D. Stabilizer for Granite: Shall be a non-toxic, organic binder available from Stabilizer Solutions, Phoenix, Arizona. Stabilizer shall be incorporated into the granite at a rate specified by the manufacturer or approved equal.

PART 3 - EXECUTION

3.1 SUBSURFACE PREPARATION

A. General: Remove loose material from compacted sub-base surface immediately before applying.

B. Roll prepared sub-base surface as approved by the manufacturer's representative. Vibratory tampers or compaction equipment is not permitted for rolling the granite.

C. Do not begin granite work until deficient sub-base areas have been corrected and are approved by the manufacturer's representative.

3.2 BLENDING STABILIZER

A. Blend stabilizer with decomposed granite as per manufacturer’s recommendations

3.3 ROLLING

A. General: Begin rolling when mixture will bear roller weight without excessive displacement.

B. Compact mixture with rollers per the manufacturers specifications and as directed by the manufacturers representative.

2. C. Protection: After final rolling, do not permit vehicular or pedestrian traffic or trail until it is approved by the Owner’s representative.

D. Erect barricades to protect granite from traffic until mixture has cured.

3.4 DECOMPOSED GRANITE

A. Granite shall be mixed with stabilizer In accordance with stabilizer manufacturer's instructions.

3. B. The granite shall be placed in 3" lifts over the subgrade per the manufacturer's recommendations. Each lift shall be rolled to eliminate collapsible pockets of granite. The granite shall not be mixed with and shall be protected from contamination by on-site soil materials and other undesirable materials prior to installation any time during the installation operation. Granite which, in the opinion of the Landscape Architect, has undesirable contaminants shall be removed from the project. When completed, the granite shall be at the maximum level of compaction (100% min.) and shall match the proposed grades, elevations and typical sections shown on the plans.

3.5 FIELD QUALITY CONTROL

A. A manufacturer's representative shall be present on site at all times during the granite installation operations. The representative shall advise the Landscape Architect on matters relating to the quality and performance of the Contractor.

B General: Testing for compliance with requirements for thickness and surface smoothness will be done by manufacturer's representative and/or the Owner's testing laboratory. Repair, remove or replace unacceptable surface as directed by Landscape Architect.

C. A sample area selected by the Landscape Architect, approximately 8' x 8' in size shall be prepared for approval. This area, once approved will become the test panel for granite installations on the project. The approved section may remain as part of the completed work.

D. Thickness: In-place compacted thickness tested in accordance with manufacturer's specifications will not be acceptable if exceeding the following allowable variations:
1. Finish Surface: Plus or minus 1/4 Inch.

E. Surface Smoothness: Test finished surface course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of trail. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
1. Finish Surface: 1/8 inch.

F. Check surface areas at intervals as directed by Landscape Architect.

END OF SECTION

SECTION 02514

CONCRETE CURB, WALK, GUTTERS, DRIVEWAYS

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. All labor, materials, equipment, and services necessary to provide the preparation and placing of all concrete curb, walk, gutters, driveways.

1.02 MATERIALS

As per section 725 and 729 of the “Uniform Standard Specifications for Public Works Construction” and City of Tempe supplements with the following modifications:

Subsection 343.2.2 Exposed Aggregate: is modified to add:
Type I paving will utilize aggregate with a maximum size of ¼” diameter
Type II paving will utilize aggregate with a maximum size of ½” diameter
Type III paving will utilize aggregate with a maximum size of 1 ½” diameter

1.03 EXECUTION

All work will be in accordance with Section 340 of the “Uniform Standard Specifications for Public Works Construction” and City of Tempe supplements

** END OF SECTION **

SECTION 02699

SODDING

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all labor, material, and equipment that are required to complete the work described herein in strict accordance with the terms of this specification and the contract documents.

B. The work shall be for all new turf areas shown on the plans and shall include incorporation of soil amendments, fine grading, planting and turf establishment.

1.02 REQUIREMENTS

A. Rough grading shall be performed per the grading plans. Turf planting contractor shall coordinate the extent of grading with the General Contractor to establish limits of responsibility. Final grades shall consider the incorporation of soil amendments, tilling, and water settling. Refer to the General Notes for the process required to determine final grades.

B. Turf planting contractor shall coordinate planting procedures with the irrigation contractor to make certain that all heads, lines and other system components are properly located and at the correct elevations. The turf irrigation system must be fully functional and approved by the City's representative prior to planting the turf.

C. Contractor shall complete the installation, aiming, final testing and approval of all sports lighting prior to any turf installation.

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract.

B. Product Certificates signed by manufacturers, certifying that their products comply with specified requirements.

1. Manufacturer's certified analysis for standard products.

2. Analysis for other materials by a recognized laboratory made according to the methods established by the Association of Official Analytical Chemists, where applicable.

3. Certification of type of sod, identifying sod source, including name and telephone number of supplier.

C. Samples of each of the following:

1. 5 lb. of mulch required for Project, in labeled plastic bag.

D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed

projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Topsoil amendment recommendation from sod supplier

F. Planting schedule indicating anticipated dates and locations for each type of planting shall adhere to the following: winter sod from September 15 to April 15 shall be overseeded with 90% pure rye grass at 10 lbs/l,000 sf. However, the project will not be accepted until the sod is established as specified herein.

G. Maintenance instructions recommending procedures to be established by the owner or owner's representative for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed sodding work similar in material design, and extent to that indicated for this Project and with a record of successful landscape establishment.

1. Installer's Field Supervisor: Require Installer to maintain an experienced full-time supervisor on the Project site during times that sodding is in progress.

B. Amendment recommendation: Provide sod suppliers recommended topsoil amendments and application rate to Landscape Architect for approval.

1. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce satisfactory topsoil.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Delivery schedule at least ten (10) calendar days prior to the intended date of the first delivery.

1. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration' during delivery and while stored at site.

2. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producer's Association's (ASPA) "Specifications for Turfgrass Sod Materials and Transplanting/Installing.

3. Deliver sod after preparations for planting have been completed and install immediately. If planting is delayed more than 18 hours after delivery, return sod to the Grower at the Contractor's expense.

4. Inspection: Sod shall be inspected upon arrival at the job site, and unacceptable material shall be removed from the job site.

5. Fertilizer: Delivery of fertilizer to the site shall be in original, unopened containers bearing manufacturer's chemical analysis. Instead of containers, fertilizer may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

6. Soil Amendments: Soil amendments shall be delivered to the site in the original unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

7. Chemical Treatment: Chemical treatment materials shall be delivered to the site in the original unopened containers with legible labels indicating the Environmental Protection Agency (EPA) registration number and the manufacturer's registered uses.

B. Storage: Materials shall be stored in areas designated by the Contractor.

1. Sod and Fertilizer: Chemical treatment materials shall not be stored with other landscape materials.

1.06 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. All requisite repairs to damage caused by work of this section shall be at contractor's expense. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble, fill, adverse drainage conditions, or obstructions, notify Landscape Architect or owners representative before planting.

1.07 COORDINATION AND SCHEDULING

A. Coordinate installation of sod during normal planting seasons. If sod will be laid in the winter (from September 15 to April 15) the sod is to be overseeded with rye grass. Cooperate with all other contractors working on the site to lead to an eventual successful completion of the project.

1.08 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant the following sod for a period of one year after date of final acceptance by the owner or owner’s representative against defects including death and unsatisfactory growth, except for defects resulting from neglect or abuse by Owner, abnormal weather conditions unusual for warranty period.

C. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

D. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at the end of the warranty period.

E. Plant Replacements shall be of the same variety and size as specified on plans and be replaced at no cost to the Owner.

1.09 LAWN MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Sodded Lawns: 90 days after date of Final Acceptance.

2. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.

B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth lawn. All lawns shall be uniform in color leaf texture shoot density and be reasonably free of visible imperfections at acceptance. A proper stand of turf will be defined as a minimum of 100 grass plants per square foot and where no gaps are larger than 4 inches in diameter.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4 inches (100 mm). Contractor is responsible for all cost involved in getting water to the site and for water utilized during the length of the project.

1. Water lawn at the minimum rate of 1 inch (25 mm) per week or at such intervals and at such a rate that wilting, puddling, or runoff does not occur.

D. Post-Fertilization: Ammonium phosphate fertilizer shall be applied at the rate of six pounds per 1,000 square feet (one pound actual nitrogen) after the first month and again prior to the final acceptance. The application shall avoid excessive high nitrogen levels. Stolons must be adequately rooted prior to nitrogen application. If not properly rooted, foliar application of 12-48-8 fertilizer may be required. Consult with Landscape Architect and stolon supplier.

E. Mow lawns to a height of 1 inch whenever the average height becomes 1 1/2 inches. The clipping shall be removed. Repeat mowing as required to maintain specified height without cutting more than 40 percent of the grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet and mow only when the soil is firm.

1. Fertilizers: All fertilizers shall be uniform in composition, free flowing, and suitable for application with equipment. Application rates shall be as follows: FE-138 iron chelate at two pounds per 1,000 square feet, one and one-half pounds of phosphate P205 per 1,000 square feet and one pound of plant-absorbable nitrogen per 1,000 square feet.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Sod: Only Certified Turfgrass sod complying with ASPA specifications for machine-cut thickness, size, strength, moisture content, and mowed height, and free of weeds and undesirable native grasses will be used. Provide viable sod of uniform

density, color, and texture of the bluegrass species, strongly rooted, and capable of vigorous growth and development when planted.

B. Sod shall be Hybrid Bermuda 'Midiron' or as approved by the owner or owner's representative.

2.02 TOPSOIL

A. Topsoil: If required shall comply with ASTM D 5268, have a pH range of 5.5 to 7.4 percent organic material minimum, free of stones 1 1/2" larger in any dimension, and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

2. Topsoil Source: Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.

2.03 SOIL AMENDMENTS

A. Soil Amendments: Soil amendments shall consist of fertilizer and soil conditioners meeting the following requirements:

1. Fertilizer: Commercial grade, free flowing, uniform in composition.

Granular Fertilizer: Ferrous Sulphate (hydrated) shall be commercial grade.

2. Soil Conditioner: For a single use or in combination to meet requirements for topsoil.

a. Gypsum: Commercially packaged, free flowing, minimum 95% calcium sulphate by volume, free of any toxic material, and one hundred percent (100%) of the ground material shall pass through a 10-mesh screen and at least fifty percent (50%) shall pass through a 100-mesh screen.

b. Organic Soil Conditioner: Decomposed wood derivatives: Ground bark, sawdust, or other wood waste material free of stones, sticks, Soil, and toxic substances harmful to plants, stabilized with nitrogen and having the following properties:

Particle Size: Minimum percent by weight particle size - minimum percent by weight passing;

	Percent
No. 4 mesh Screen	95
No. 8 mesh Screen	80

Nitrogen Content: Minimum percent based on dry weight:

	Percent
Redwood Sawdust	0.5
Fir or Cedar Sawdust	0.7
Fir or Pine Bark	1.0

c. Mulch: Mulch shall be free from weeds, mold, and other deleterious materials.

d. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 (2.36 mm) sieve and a minimum 75 percent passing a No. 60 (250 micrometer) sieve.

e. Aluminum Sulfate: Commercial grade, unadulterated add at.

f. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

g. Peat Humus: Finely divided or granular texture, with a pH range of 6.0 to 7.5, composed of partially decomposed moss Peat (other than sphagnum), peat humus, or reed-sedge peat.

h. Manure: Well-rotted, unbleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth-

i. Herbicides- EPA registered and approved, of type recommended by manufacturer.

j. Water- Clean Potable water.

2.04 FERTILIZER

A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Commercial, Phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character consisting of fast and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:

D. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorous, and Potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.05 EROSION CONTROL MATERIALS

May be required on steep slopes to maintain turf establishment. To be field determined.

A. Anchor sod on slopes exceeding 6:1 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

PART 3 - EXECUTION

3.01 SODDING CONDITIONS

A. Examine areas to received sod for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected. Notify immediately the owner or owner's representative of any problems.

3.02 SITE PREPARATION:

A. Preparation of Sodded Areas:

1. Contractor shall verify the rough grades are as indicated on the grading plans and the areas to receive sod are ready for addition of soil amendments.

2. Site preparation work shall be performed only during periods when beneficial results can be obtained. When high winds, excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped until satisfactory conditions resume.

B. Application of Soil Amendments:

1. Soil Test: A Bio Assay / Agronomy test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required.

2. Organic Soil Conditioner: Composted decomposed wood derivatives - 3 c.y. per 1000 s.f.

3. The following amendments shall be applied at the stated rates and thoroughly incorporated into the soil to a minimum depth of 6" (six inches) as part of the tillage operation:

a. Soil Sulfur: Rate of 15 pounds per 1000 square feet of lawn area.

b. Ammonium Phosphate: Rate of 15 pounds of ammonium phosphate (16-20-0) per 1000 square feet of lawn area.

c. Zinc sulfate: Rate of 1 pound of zinc sulfate per 1000 square feet of lawn area.

d. Iron Sulfate: Rate of 3 pounds of iron sulfate per 1000 square feet of lawn area.

4. Deviations: Deviations in the ground surface in relation to the grades indicated shall be corrected prior to addition of amendments.

5. Tillage:

a. Soil shall be tilled to a minimum depth of 6" (six inches) by rototilling, milling, or other method as approved by the owner or owner's representative.

b. In order to prevent settlement following planting of the sod, Contractor shall settle and compact tilled area to approximately 85% maximum density. This shall be accomplished by water settling, rolling or other methods necessary to assure all voids are removed and soil has attained final settlement. Contractor will be responsible for repairs of any areas that settle following planting operations during the guarantee period.

c. Final Physical Nature: Upon completion of the tillage and settlement operation, the physical nature of the subsoil shall be such as to permit a water infiltration rate of not less than 0.6 inches per hour. Contractor shall verify this condition has been met. The resulting soil shall be a friable condition, suitable for planting.

6. Finish Grading:

a. Sodded areas shall be filled as needed or have surplus soil removed to attain the proper finished grade. Drainage patterns shall be maintained as indicated on the drawings. Sodded areas compacted by construction operation shall be completely pulverized by tillage. Soil used for repair of erosion or grade deficiencies shall conform to topsoil meeting same analysis as the existing onsite topsoil. Finished grade shall be one inch below the adjoining grade of any surfaced area or as otherwise indicated on the plans. New surfaces shall be blended to existing areas.

b. Sodded areas shall have debris and stones larger than 1/2” in any dimension removed from the surface.

c. Finish graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion.

C. Application of Soil Treatment Chemicals:

1. When soil treatment becomes necessary to remove a pest or weeds, a state-certified applicator shall apply required chemicals in accordance with EPA label restrictions and recommendations. Provide hydraulic equipment for the liquid application of chemicals with a leak-proof tank, positive agitation methods, controlled application pressure and metering gages.

2. A chemical treatment plan shall be provided to the City’s representative and Landscape Architect as specified in the SUBMITTALS section of these specifications.

3.03 SOD PLANTING PREPARATION

A. Limit sub-grade preparation to areas that will be planted in the immediate future.

B. Loosen sub-grade to a minimum depth of six inches (6”). Remove stones larger than 1/4 inches (6 mm) in any dimension and sticks, roots, rubbish, and other extraneous materials.

D. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is excessively wet.

1. Place approximately ½ the thickness of planting soil mixture required. Work into top of loosened sub-grade to create a transition layer and then place remainder of planting soil mixture.

2. Allow for sod thickness in areas to be sodded.

3.04 SODDING NEW LAWNS ON STEEP SLOPES

A. Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to off set joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 3:1.

2. Anchor sod on slopes exceeding 6:1 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within 2 hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1½ inches (38 mm) below the sod.

D. Protection of sodded areas: Immediately after sodding operations, the areas shall be protected against traffic or other use by fencing. Adhere to Sod providers recommendations and warranty.

3.05 TURF ESTABLISHMENT AND GUARANTEE PERIOD

E. Length of Period: On acceptable completion of the turf installation, the Turf Establishment Period will be in effect for a minimum of 90 days after substantial completion and final acceptance of the project by the owner or owner's representative, whichever is longer. The Guarantee Period for the turf areas shall be one year. The turf will not be accepted separate from the remainder of the project. In order to begin the Turf Establishment Period the owner or owner's representative must be satisfied that all work has been completed in accordance with the plans and specifications and that the irrigation system is fully functional and properly watering all turf areas.

F. Maintenance During Establishment Period:

1. General: Maintenance of the turfed areas shall include eradicating weeds, protecting embankments and ditches from erosion, maintaining mulch material, and protecting turfed areas from traffic.

2. Repair: Turf condition shall be re-established as specified herein for eroded areas, damaged or barren areas. Mulch shall be repaired or replaced as required.

3. Mowing: After a 75% stand of turf is achieved, scheduled mowing shall be performed at a 1" cutting height, 1 time per 7 day period, until establishment period has been completed.

4. Watering: Watering shall be at intervals to obtain a moist soil condition to a minimum depth of two inches. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Run-off, puddling and wilting shall be prevented.

5. Post-Fertilization: Ammonium phosphate fertilizer shall be applied at the rate of six pounds per 1,000 square feet (one pound actual nitrogen) after the first month and again prior to the final acceptance. The application shall avoid excessive high nitrogen levels. Sod must be adequately rooted prior to nitrogen application. If not properly rooted foliar application of 12-48-8 fertilizer may be required. Consult with the owner or owner's representative and sod supplier.

6. Chemical Treatment:

   a. When a pest or disease becomes apparent during the Turf Establishment Period, a state-certified applicator shall apply required chemicals in accordance with EPA label restrictions and recommendations. Hydraulic equipment for the liquid application of chemicals shall be provided with a leak-proof tank, positive agitation methods, controlled application pressure and metering gages. Pre-emergent herbicides will not be used.

   b. A Chemical Treatment Plan shall be provided to the Owner as stated in the paragraph SUBMITTALS.

3.06 FINAL ACCEPTANCE

A. At the end of the construction, a final inspection will be made. Rejected areas shall be replanted or repaired as directed by the owner or owner's representative.

B. Preliminary Inspection: Prior to the completion of the sod establishment period, a preliminary inspection shall be held by the owner or owner's representative. Time for the inspection shall be established in writing. The acceptability of the sodded areas in accordance with the sod establishment period shall be determined. Unacceptable sod areas shall be replanted or repaired as directed by the owner or owner's representative and as soon as conditions permit.

C. Final Inspection: A final inspection shall be held by the owner or owner's representative to determine that deficiencies noted in the preliminary inspection have been corrected. Time for the inspection shall be established in writing

3.07 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during

installation and maintenance periods. Treat, repair, or replace damages landscape work as directed.

3.08 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

** END OF SECTION 02699 **

SECTION 02741

ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.01 SUBMITTALS

A. Design Mix: Submit design mix-formula for asphalt concrete not less than 7 days in advance of actual placement of material.

B. Certificates: Submit Certificate of Compliance indicating that materials to be incorporated in Work meet Specification requirements.

1.02 QUALITY ASSURANCE

A. Comply with Maricopa Association of Governments (MAG) Specifications except as specified otherwise.

1.03 DELIVERY, STORAGE AND HANDLING

A. Transport bituminous mixtures to site in clean trucks and in manner to prevent segregation of materials or inclusion of foreign substances.

B. Mix to consist of specified aggregate and bitumen.

C. Asphalt surface course mixture to have minimum temperature of 285 degrees F. (141 degrees C.) and maximum temperature of 350 degrees F. (177 degrees C.)

1.04 SITE CONDITIONS

A. Environmental Requirements:

1. Conform to applicable requirements of MAG Section 321.

2. Place asphaltic concrete when surface is dry, when the ambient temperature in shade is 40 degrees F. (7 degrees C.) and rising, or above 50 degrees F. (10 degrees C.) if falling.

3. Do not place asphaltic concrete when weather is foggy, rainy, or when base on which material is to be placed is wet or frozen.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate Base Course:

1. Base materials: Conform to MAG Sections 310 and 702 and requirements specified herein. Material to be crushed rock product with a plasticity index not exceeding' 5 and comply with grading requirements shown in Table 702.

2. Aggregate: Clean and free of organic matter and of such a nature that it can be compacted to a dense and firm layer capable of supporting loaded trucks and self-propelled pavers without rutting.

3. Deliver aggregate to site in thoroughly blended condition and handle in manner to prevent excessive segregation. Do not mix underlying soil or subbase with aggregate base material. Do not mix underlying soil or subbase with aggregate base material.

B. Tack Coats:

1. Tack Coat: Mixing type emulsion SS-I-H, as specified in MAG Section 713, diluted in proportion of approximately 50 percent water and 50 percent emulsion. See MAG Section 321.

C. Asphaltic Concrete Paving:

1. Refer to MAG Section 710.

2. Asphalt concrete shall be Type C-3/4 single course mix. Percentage asphalt range: 5.0 to 6.0.

3. When test procedures determine aggregate is subject to stripping, add dry hydrated lime conforming to requirements of ASTM C207, Type N; portland cement conforming to Section 725 of MAG Specifications; or other approved anti-strip agent.

D. Composition and Grading: Comply with MAG Section 710.3. Aggregates and mix to be incorporated into Work shall show loss in LA Rattler (ASTM C131) (after 500 revolutions) of 40% max.

E. Surface Seal Coat:

1. Emulsified Asphalt: Provide emulsified asphalt Grade SS-1 h as specified in MAG Section 713, diluted with a minimum of one part water to one part of emulsified asphalt.

2. Sand Blotter: In accordance with following sieve analysis:

a. 3/8 inch (9.53mm): 100%
b. NO.4 (4.75mm): 90 - 100%
c. No. 200 (0.0015mm): 0 - 12%

2.02 EQUIPMENT

A. Spreading and Finishing Equipment: Comply with MAG Section 321.5.2.

1. Equipment to be of good condition and capable of performing Work specified in satisfactory manner.

2. Start finish rolling after pavement has cooled sufficiently to permit removal of roller marks and continue in whatever direction is necessary to produce a pavement surface free of indentations. See MAG Section 321.

3. Leveling Course: Comply with MAG Section 321.5.3.

2.03 MIXES

A. Job-mix formula shall indicate percentage passing for each specified sieve size of mineral aggregate and percent of asphalt to be used for each asphalt concrete mixture to be incorporated on Project. Job-mix formula (gradation), with allowable tolerances for a single test, to be used for job control. Single test variation tolerance is shown in following table. In no event shall less than 2 percent of mineral aggregate pass a No. 200 (0.0015mm) sieve.

1. NO.4 and larger (4.75mm and larger): + 7
2. No. 30 (0.009Smm): + 5
3. No. 200 (0.0015mm): + 2
4. Asphalt, percent by weight of mix: + 4

PART 3 EXECUTION

3.01 PREPARATION

A. Backfill curbs prior to paving.

B. Base Preparation: Comply with MAG Section 321.5.1.

3.02 APPLICATION

A. Base Course:

1. Construct aggregate base course on subgrade and compact to a minimum of 95 percent of maximum density in accordance with ASTM 01557.

2. Thickness: As shown on Drawings.

3. See Drawings for extra heavy duty areas requiring extra thickness for aggregate base course and asphaltic concrete.

B. Tack Coat:

1. Apply tack coat to vertical surfaces of existing pavement, curbs, gutters and construction joints, against which additional material is to be placed, to a new or old pavement to be overlaid, and to other surfaces as designated by Engineer.

2. Tack coat to be slow setting type emulsion as specified. If emulsion is applied undiluted, apply at rate of 0.02 to 0.10 gallons per square yard (0.08 to 0.38 liters per square meter); if emulsion is applied diluted 1:1 with water, apply at rate of 0.05 to 0.10 gallons per square yard (0.19 to 0.38 liter per square meter), as directed by Engineer.

3. Clean surfaces of loose and foreign material prior to application of tack coats.

C. Asphaltic Concrete:

1. Construct asphalt pavement in accordance with applicable requirements of MAG Section 321.
2. Place asphaltic concrete in thickness as recommended by Soils Report.
3. If pavement is constructed in lifts using an asphalt concrete base in the first lifts, base to be thoroughly cleaned by whatever means necessary prior to application of tack coat and placement of surface layer.

D. Compaction: Comply with requirements of MAG Section 321.5.4.

1. Compact asphalt concrete surfacing to a density of 95 percent of 75 blows (ASTM 01559).
2. Measure asphalt density by means of a nuclear density gauge, or core testing. Nuclear gauge method will be preferred.

E. Upon completion, pavement surface to be smooth, dense and of uniform texture and appearance.

1. All areas to properly drain and be free of standing water.

F. Tolerances:

1. Thickness: Compacted thickness shall be within the following tolerances from thickness indicated.

a. Base Course: Plus or minus 1/2 inch (12mm).
b. Surface Course: Plus or minus 1/4 inch (6mm).

2. Surface Smoothness:

a. Base Course: Plus or minus 1/2 inch (12mm), measured using a 10 foot (6000mm) straight-edge placed in any position on finished surface, except across flow lines.

b. Asphalt Concrete Surface Finish: Minus 1/4 inch from the lower edge of a 25 foot straight-edge laid on the finished surface of the asphalt and parallel with the center line of the road or drive.

c. Asphalt Concrete Crowned Surface Finish: Plus or minus 1/4 inch, measured with a crowned template.

G. Corrective Requirements for Deficiencies: Comply with MAG Section 321.6.

H. Paving Termination:

1. Provide thickened edge at paving terminations that do not have wood header forms or concrete curbs.

2. Pavement termination to be minimum 12 inches wide x 8 inches deep (300mm wide x 200mm deep) or as shown on Drawings.

I. Surface Seal Coat: Comply with MAG Section 334.

1. Preparation of Surfaces:

a. Immediately before applying the emulsion, clean area to be surfaced of dirt and loose material by means of power brooms, supplemented by hand brooms if necessary, except that when the fog seal is applied within 24 hours from the time a bituminous paving is completed. Brooming may be omitted provided condition of surface is approved by Engineer.
b. Do not apply seal coat until an inspection of surfaces has been made by Engineer and it is determined that surfaces are suitable for application of emulsion.

2. Application of Asphalt Emulsions:

a. Mix diluted material well before applying.
b. Apply by distributor truck equipped with fog nozzles at approximate rate of 0.10 gallon per square yard (0.38 liters per square meter).
c. Exact rate of application to be as directed by Engineer. Distributor truck shall comply with MAG Section 712.

3. Sand Blotter:

a. After asphalt emulsion has cured to such extent that emulsion will not be picked up by traffic, apply sand blotter as directed or required by Engineer where there is an excess of asphalt.
b. After treated area has been opened to traffic, immediately cover excess asphalt emulsion which comes to surface with additional sand.

3.03 FIELD QUALITY CONTROL

A. Smoothness Tests:

1. Test conformance of crown and grade of pavement as indicated. Finished surface to be smooth and finished within specified tolerances.

2. Immediately after initial rolling, correct variations by adding or removing material as required. Cut out and replace any spots deficient in thickness with fresh mixture which is properly bonded to existing pavement.

3. After final rolling, retest surface and correct irregularities in excess of specified tolerance by removing defective Work and replacing with new material.

B. Water Testing: Perform water testing of streets per MAG Section 321.

END OF SECTION

SECTION 02742

PAINTED PAVEMENT MARKINGS

PART1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, curb markings, and fire lanes.

1.02 REFERENCE STANDARDS

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.

B. FHWA MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; U.S. Department of Transportation, Federal Highway Administration; http://mutcd.fhwa.dot.gov; current edition.

1.03 SUBMITTALS

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.05 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint; color(s) as indicated.

1. Parking Lots: White.

2. Handicapped Symbols: Blue.

B. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean surfaces thoroughly prior to installation.

1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

2. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.

3. Sandblasting: Use equipment of size and capacity necessary, providing not less than 150 cfm of air at pressure not less than 90 psi at each nozzle used.

D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

F. Temporary Pavement Markings: When required or directed by Engineer, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.

1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.

2. At Contractor's option, temporary marking tape may used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to owner.

3.03 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with FHWA MUTCD manual (http://mutcd.fhwa.dot.gov) for details not shown.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends.

1. Apply paint in one coat only. ,
2. Wet Film Thickness: 0.015 inch, minimum.
3. Length Tolerance: Plus or minus 3 inches.
4. Width Tolerance: Plus or minus 1/8 inch.

G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.

1. Mark the International Handicapped Symbol at indicated parking spaces.
2. Hand application by pneumatic spray is acceptable.

H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved obliteration method.

F. Replace removed markings at no additional cost to owner.

END OF SECTION

SECTION 02812
SITE IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Underground, automatically controlled spray irrigation systems including electrical connections, water main connections, and accessories.

B. Related Sections
   1. Section 02490 – Landscaping.
   2. Section 02699 – Sodding.

1.2 REFERENCES

A. ASTM International (ASTM)
   1. ASTM D2239 - Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
   2. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series).
   3. ASTM D2564 - Solvent Cement for poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
   4. ASTM D2609 - Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe.
   5. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
   6. MAG SEC.750 – Iron Water Pipe and Fittings.

B. National Fire Protection Agency (NFPA)
   1. NFPA 70 - National Electrical Code (NEC).

C. American Society of Safety Engineers
   1. ASSE 1013 – Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
   2. ASSE 1015 – Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies.

1.3 SUBMITTALS

A. Submittal process: Submit in accordance the General Conditions. Submit required submittals within 7 days after contract award. Submittals shall be available at all times to the Owner's Representative Construction Manager.

B. Quality Assurance Submittals:
   1. Irrigation Contractor Qualifications: Provide minimum of 3 references and list of similar projects with owner's names, addresses, and telephone numbers.

C. Closeout Submittals:
   1. As-Built Drawings: Furnish two sets, noting exact locations of elements and changes to Construction Drawings.
   2. Operation Manual: Furnish two copies, bound in 1 inch diameter three ring binders, indexed and tabbed for easy reference, and labeled on spine and cover. Manual shall include following:
      a. Approved submittals as specified herein.
      b. Installation instructions including mounting details for control valves.
      c. Operating Instructions:
         <u>Recommended operation sequence, frequency, and length of operation cycle, as per relationship to estimated absorption rate, evaporation rate, and anticipated flow.</u>
      d. Maintenance Instructions:

Manufacturers' product data, installation, and maintenance instructions.
Copies of completed warranty information. Contractor to complete and mail necessary warranty registration information to manufacturer keeping copies for Owner.

3. Controller Chart: Prepare color coded chart reduced in size, mounted on the inside of the controller cabinet, containing same plan information as as-built drawings, and laminated in plastic on both sides, with following specific information:
   a. Note routing of main line, control wires, and controller location.
   b. Identify valves as to size, station number shown on controller, and type of irrigation head (e.g. micro spray head, rotary head) for each valve.
   c. Delineate each station's limits of coverage by color-coding, with each station having different color showing its zone with zone number designation.
   d. Size, type, and location of water source.
4. Meetings and Inspections Log.
5. Certification of Conformance: Provide certificate of satisfactory performance of irrigation system installation signed by the Contractor and Landscape Architect or Irrigation Designer.

1.4 QUALITY ASSURANCE

A. Contractor Qualifications:
   1. Minimum of 3 consecutive years experience in area of project and having installed other jobs of similar size and scope including drip irrigation.

B. Pre-Work Meeting and Inspection: Convene a pre-work meeting at the Project site prior to commencing subgrade preparation for site paving to review conditions of operations, procedures and coordination with related work. Require attendance of parties directly affecting work of this Section including but not limited to Contractor, irrigation contractor, site work contractor, Landscape Architect or irrigation designer.
   1. Tour, inspect, and discuss conditions of Project site.
   2. Review approach and schedule for the following items:
      a. Water source.
      b. Electrical source
      c. Mainline routing and installation.
      d. Zone installation and site preparation.
      e. Material availability.
      f. Sleeve installation, installation of curb and paving markings for sleeve locations and coordination with site work contractor.
      g. Required Inspections.

C. Irrigation Inspections: Conduct the following inspections during the course of the work in the presence of the Landscape Architect or irrigation designer to verify conformance to specification requirements. Notify Owner's Representative for observation of inspection by the Landscape Architect or irrigation designer. Correct noted deficiencies during each inspection prior to proceeding with subsequent work. After each inspection complete Irrigation Inspection Checklist included at the end of this Section signed by all signitors listed thereon.
   1. Pre-Installation Inspection and Static Pressure Test: Perform static pressure test, completed installation of sleeves, sleeve markings of curbs and paving, status of irrigation schedule and water source, potential conflicts between irrigation installation and other site utilities.
   2. Mainline Inspection: Inspect the installed main line, electronic control valves, wiring prior to backfilling main line.
   3. Substantial Completion Inspection: Inspect all completed irrigation work. Landscape Architect or Irrigation Designer will develop a punch list of deficient or incomplete items and deliver to Contractor within 3 calendar days of inspection date.
   4. Final Inspection: Within 30 days of project substantial completion date and subsequent to correction of punch list deficiencies, convene a final inspection of all irrigation work.
   5. Warranty Inspections: Convene a warranty inspection 30 calendars days prior to expiration of warranty period specified in Part 3 of Section 02910.

D. If additional Landscape Architect or Irrigation Designer site visits for observation of inspection are required beyond those described herein as determined by Owner's Representative to determine correction to non-conforming or in

complete work, the Contractor shall reimburse the Owner the sum of $4000 for each additional visit to cover expenses. Additional site observations will be performed as required until all deviations have been corrected by the Contractor and closed by the Owner's Representative.

E. Meeting and Inspection Log: Maintain log of required meetings and inspections. Record the date; time; weather conditions; and a brief summary of the discussions, decisions, and agreements reached. Landscape Architect or Irrigation Designer will review and sign log at the conclusion of the meeting. Furnish copy of log to each party attending.

1.5 MEETING AND EVENT NOTIFICATIONS

A. Provide the following notifications to the Owner's Representative within the time period listed below. Owner's Representative will notify Owner, Landscape Architect or Irrigation Designer, and other necessary sub consultants:
1. Pre-Work Meeting: Minimum 14 calendar days prior to meeting date.
2. Pre-Installation Inspection and Static Pressure Test: 7 calendar days prior to inspection date.
3. Mainline Inspection and Hydrostatic Test: 7 calendar days prior to inspection date.
4. Substantial Completion Inspection: 7 calendar days prior to irrigation substantial completion.
5. Final Inspection: 7 calendar days prior to irrigation final inspection date.
6. Warranty Inspection: 14 calendar days prior to inspection date.

B. Provide notifications by email or other written means to show proof of delivery.

1.6 PROJECT CONDITIONS

A. Visit site and become familiar with nature and location of work, existing conditions, and conditions that will exist during installation.

1.7 WARRANTY

A. Guarantee Site Irrigation System for a period of 12 months following the Substantial Completion Date in accordance with the Extended Maintenance/Warranty Chart and as follows:
1. Defects in material, equipment, and workmanship.
2. Repair of damage to premises resulting from leaks or other defects in material, equipment, and workmanship to satisfaction of Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers shall include:
1. The Toro Company - Irrigation Division, (877) 345-8676
2. Rain Bird Corporation – Area Specifications Manager, Doug Prouty (602) 743-2568
3. Rain Bird Corporation – Western Region Commercial Pump Manager, Herb Hofmann (602) 725-5517.
4. BERMAD, Inc. – Irrigation Division, (800) 839-3884
5. Badger Meter – Impeller Products, Data Industrial, (800) 338-0312.
6. LASCO Fittings, Inc., (800) 776-2756.
7. Paige Electric, Mark Haas (714) 280-0109
8. Barrett Engineered Pumps (619) 232-7867 Represented by Green Product Sales (949) 584-7311

2.2 PIPE

A. Polyvinyl Chloride (PVC): Pipe over 1 inch diameter shall conform to ASTM D224, SDR 21, and Class 200.

B. Polyvinyl Chloride (PVC): Pipe 1 inch diameter and under shall conform to ASTM D2241, SDR 13.5, and Class 315.

C. Flexible Polyethylene (PE): Pipe shall conform to ASTM D2239, SDR 11.5, PE23, rated at 100 PSI, National Sanitation Foundation (NSF) approved. Subject to approval of Owner, PE shall be used for laterals in areas where ground is subject to freezing for extended periods of time each year.

D. Ductile Iron Water Pipe: All ductile iron water pipe shall be designed in accordance with AWWA C-150 and shall be manufactured in accordance with AWWA C-151. The class shall be as designated in the plans or special provisions.

E. Joints:
   1. Pipe sizes 2 1/2 inch or smaller shall have bell and socket joints.

F. Pipe sizes larger than 2 1/2 inch shall have snap connections with rubber gasket joints. Thrust blocking shall be required in accordance with Section 02510.

G. Fittings:
   1. Polyvinyl Chloride (PVC) Fittings: Fittings shall conform to ASTM D2241, Schedule 40, and Molded.
   2. Flexible Polyethylene (PE) Lateral Line Fittings: Fittings shall conform to ASTM D2609, Type 1 PVC insert fittings designed for used with this type of pipe. Pipe and fittings shall be joined with stainless steel pinch clamps or worm gear clamps, including stainless steel screw.
   3. Ductile Iron Fittings: Iron fittings shall be either Gray-Iron or Ductile Iron conforming to AWWA C-110 or C-153 with a minimum pressure rating of 250 psi. Flanged ends shall conform to AWWA C-110. Push-on and mechanical joints ends shall conform to AWWA C-111. Fittings shall be cement mortar lined and coal-tar coated in accordance with AWWA C-104.

H. Risers above finished grade shall be black in color or receive 2 coats of black exterior semi-gloss enamel paint if a color other than black.

2.3 ACCESSORIES

A. Sleeves: Sleeves for pipes passing beneath paving or sidewalks shall conform to ASTM D2241, Schedule 40. Minimum diameter of 4-inch or 2 sizes larger than pipe scheduled to pass through them.

B. PVC Solvent Cement: Cement shall conform to ASTM D2564.

C. Swing Joint Connections: Connections between heads and laterals shall be thick wall, flexible, polyethylene pipe, with fittings that have male barbs on one end and either male or female screw ends opposite. Glue fittings and female barb adapters are not allowed.

2.4 CUTOFF OR ISOLATION VALVES

A. 3 inches or Smaller: Provide PVC compact ball valves manufactured by Red White Valve Corporation, Lake Forest, CA.

B. Larger than 3 inches: Provide cast iron and bronze mechanical joint valves, fusion bonded epoxy coated exterior and interior, Resilient Wedge Valve as manufactured by Clow Valve Co., Oskaloosa, IA.

C. Provide a valve key and cast iron cylindrical valve box with top with each valve.

2.5 ELECTRIC CONTROL VALVES

A. Provide one of the following:
   1. Toro P220 Brass Series remote control valves.
   2. Toro P220 Scrubber Series remote control valves.

B. Provide 3M DBY & DBR watertight connectors.

2.6 SPRINKLER HEADS

A. Full , 3/4, ½ and ¼, Circle Rotary Sprinklers with Rain Bird Nozzles:
   1. Acceptable Products
      a. Rain Bird 8005-SS series 70psi, w/#16 nozzles
      b. Rain Bird Falcon 6504 Full Circle, Stainless Steel Riser, High Speed. For use on softball infield.

B. ½ and ¼ Circle 4" Pop-Up Spray Sprinklers with Rain Bird Nozzles:
   1. Acceptable Products
      a. Rain Bird 1800-SAM series w/R17-24 Rotary nozzles.
      b. Rain Bird 1800-SAM series w/5' & 10' MPR nozzles.

2.7 VALVE BOX

A. Valve boxes shall be manufactured by Rain Bird, Carson Industries, PENTEK, or equal by acceptable manufacturer. No irrigation valve box shall be placed in pavement areas unless otherwise shown on the Drawings.

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2.8 AUTOMATIC CONTROLLER

A. Controller for sports field shall have a weatherproof, lockable plastic enclosure with internal transformer and utilize existing lockable security cage.:
   1. Rain Bird ESP-LXMEF Series
   2. Rain Bird ESP-24MC – Existing, for Court Yard and Front Entry areas.

2.9 CONTROL WIRE

A. Control Wires.
   1. Flow Sensor – Paige Electric PE-39 (3 pair) in ¾" schedule 80 electrical conduit.
   2. Master Valve – Use existing control wires from spare valve next to station #2.

2.10 BACKFLOW PREVENTOR - EXISTING

2.11 METER – EXISTING

2.12 IRRIGATION BOOSTER PUMP

A. Irrigation pump shall be manufactured by Barrett Engineered Pumps or equally acceptable manufacturer.

IBC615J-5-2-2.5/VFD-F System Model Number	100 GPM System Design Flow Rate	80 PSI System Design Pressure	2 1/2 INCH System Piping Size
60 PSI Minimum Suction Pressure	208/230/460 VAC System Electrical Voltage	1/3 PHASE 60 Hz System Electrical Phase and Frequency	
C615J Pump Model Number	100 GPM Pump Capacity (GPM)	85 FEET Pump Total Head (Feet)	
5 HP Pump Horsepower	3500 RPM Pump RPM	Undetermined System Full Load Amperage	

PART 3 - EXECUTION

3.1 PREPARATION

A. Pressure/Flow Test: Perform calculations according to the Irrigation Association's 3-Step Method. Provide written calculations to the Owner's CEC including the following site information:
   1. Static or residual pressure at the POC.
   2. Calculation of pressure for "worst case" sprinkler head.
   3. Calculation of GPM per zone.

B. Prior to installation, receive approval from Owner or Civil Engineer to proceed with construction.

C. Contractor shall field verify all aboveground and underground utilities prior to start of work.

3.2 EXCAVATION

A. Trenching and Backfilling:
   1. Trenching and backfilling shall conform to Section 02300.
   2. Excavate trench to proper depth as shown or specified.
   3. Minimum trench width shall be 3 1/2 inches.
   4. Over excavate trenches deeper than required in soils containing rock or other hard material that might damage pipe and backfill to proper depth with selected fine earth or sand.
   5. Backfill and hand tamp over excavation prior to installing piping.
   6. Keep trenches free of obstructions and debris that would damage pipe.
   7. Irrigation piping shall not be installed in same trench as heating duct, electric ducts, storm and sanitary sewer lines, water and gas mains.

B. Do not cut sidewalks, paved areas, or curb and gutter when trenching for piping unless otherwise noted on the Drawings.
   1. Provide sleeves as specified in Part 2 above under paving prior to installation of paving.
   2. Auger, bore, or tunnel under existing paving without disturbing pavement. Damaged pavement shall be removed and replaced in accordance with Section 02740 or 02751.

3.3 WATER METER - EXISTING

A. Provide water meter box for irrigation system if required or shown on the Drawings.

3.4 PIPING INSTALLATION

A. Minimum cover from top of piping to finished grade shall be provided as follows:
   1. Lawn and planting areas:
      a. Mains and Control Valves: 18 inches minimum, 24" inches maximum.
      b. Laterals: 12 inches.
   2. Drives or parking areas: 24 inches.

B. Clearances: Maintain 3 inch minimum horizontal clearance between parallel lines in same trench or vertical clearance between lines crossing at angles.

C. Special Requirements - PVC and PE pipe:
   1. Snake pipe in trench at least 1 foot per 100 feet of pipe to allow for thermal expansion.
   2. Pipe laterals shall be laid to drain to low point drains located at lowest elevations of each zone.

D. Rest full length of pipe section on bed of trench, excavating recesses to accommodate joints. Do not lay pipe on unstable material or blocking, or when in opinion of Owner conditions are unsuitable.

E. Threaded Plastic Pipe Jointing:
   1. Do not use solvent cement on threaded joints.
   2. Wrap joints with Teflon tape or use virgin Teflon lubricant.

F. Bell and Socket Plastic Pipe Jointing: Cement joints in accordance with ASTM D2855.

G. Ductile Iron Pipe Jointing: Mechanical joints for cast iron or ductile iron water pipe shall conform to AWWA C-111 and shall include cast iron glands, synthetic rubber gaskets, and T-head bolds and nuts.

3.5 SLEEVING

A. Provide sleeves for both piping and control wiring where either passes under paved surfaces.
   1. Depths of sleeves shall be same as that required for piping at each location or condition.
   2. Extend sleeves 24 inches beyond paving or sidewalks at each end.
   3. Install permanent benchmark at top of curbs for reference to sleeve locations.

3.6 VALVES

A. Do not locate beneath paved surfaces.

B. Install plumb to within 1/16 inch.

C. Locate within valve box with 6 inch deep layer of pea gravel beneath bottom of valve.

D. Top of pea gravel layer shall be a minimum of 3 inches below bottom of valve.

E. Flow Meter:
   1. Location as shown on plans.
   2. Valve will be wired to proposed Rain Bird ESP-LXMEF with (3 pair) PE-39 cable in ¾" schedule 80 electrical conduit

F. Master Valve:
   1. Location as shown on plans.
   2. Valve shall be energized by master valve circuit on automatic controller.

3.7 SPRINKLERS

A. Install plumb to within 1/16 inch with top collar, not nozzle, flush with finish grade.

B. Provide swing joint with each sprinkler except where entire head is raised above grade and/or where rigid riser piping is required or existing swing joint will be utilized.

C. Heads adjacent to paving and curb: Locate between 6 and 12 inches from edge of paving or back of curb to prevent car overhang to conflict with a fully extended sprinkler.

3.8 ELECTRICAL CONNECTIONS AND CONTROL WIRE

A. Conform to the National Electrical Code (NEC) and local electrical codes.

B. Provide electrical connection to system as designated on the Drawings and as specified herein.

C. Wire Placement:
   1. Do not run control and power supply wiring in same conduit.
   2. Provide continuous runs of wire between controller and valves. Splices shall be made with one of following:
      a. Watertight below ground electrical junction boxes.
      b. Water-tight connectors, such as utilized for valves, and located within valve box for ease of locating.
      c. The location of electrical splices shall be shown on the As-Built drawings.
   3. Bury control wire beside pipe in same trench. Bundle and tape together at not more than 10 ft intervals.

D. Expansion Loops: Construct by wrapping wire around 1/2 inch diameter pipe to create coil. A 3 foot section of wire shall be used to create 12 inch coil with 6 foot section being used to create 24 inch coil.
   1. Provide 12 inch coils at each wire splice, not including valves, and at each change of wire direction.
   2. Provide 24 inch coils at each control valve and where each valve enters conduit for automatic controller.

3.9 BACKFILLING

A. Sand or fine-grained soils shall be used for initial backfill to sufficient depth to prevent damage to pipe from rocks or other debris during compaction of subsequent backfill.

B. Fill trench to within 3 inches of finish grade with excavated soil and compact in accordance with Section 02300 Earthwork.

C. Fill top 3 inches with existing topsoil in planting or turf areas and wheel roll until compaction of backfill is same as surrounding soil.

D. Grade backfilled trench uniform with surrounding grades.

3.10 BACKFLOW PREVENTORS - EXISTING

3.11 AUTOMATIC CONTROLLER

A. Location and installation shall be as shown on the Drawings and approved by Owner prior to installation.

B. Provide rigid conduits for both power supply and flow sensor control wiring.
   1. Flow Sensor control wire conduit shall extend to 18 inches minimum below grade.

C. Provide electrical grounding for controller in accordance with manufacturer's written instructions.

3.12 FLOW METER

A. Location and installation shall be as shown on the Drawings and per manufacturer’s written recommendations.

3.13 IRRIGATION BOOSTER PUMP

A. A simplex water pressure booster system as designed and fabricated by Barrett Engineered Pumps (619) 232-7867. The system shall be a completely prefabricated system with pump, piping, electrical and structural elements. The entire booster pump assembly shall be UL Listed and Approved.

B. Pump shall be:
   1. Single stage end suction close coupled centrifugal, cast iron bronze fitted construction, equipped with mechanical shaft seal, back pullout design. Impeller shall be keyed and locked to the shaft with a hex head impeller nut and washer. Pump shaft shall be high strength S.A.E. 1045 carbon steel protected in the stuffing box area by a replaceable bronze shaft sleeve. Pump shall be directly coupled to a C-face electric motor.

C. Electric motor shall be of the squirrel cage induction type suitable for full voltage starting. Motor shall be ODP to aid in cooling. Electric motor shall be rated for continuous service. The motor shall have horsepower ratings such that the motor will carry the maximum possible load to be developed under the designed pumping conditions and not overload the motor beyond the nameplate rating of the motor. Motor shall have a 1.15 service factor. The motor shall conform to the latest NEMA Standards for motor design and construction.

D. Pump Control Panel shall have a NEMA3R plain front non-metallic enclosure with padlock latches. This Includes power and control re-settable thermal circuit breakers, heavy duty magnetic starter with adjustable overload pro

tection, Hand-Off-Auto switch to select mode of operation, and heavy duty numbered terminal strips for power and control wiring lead terminations.

E. If 24V control started, a Metal oxide varistor protected pump start relay shall be incorporated in panel to start pump with signal from an irrigation controller.

F. All system piping shall be Schedule 10S 304 stainless steel. All major fittings shall be 304 stainless steel with flanges to allow for system disassembly or major component removal. All instrumentation fittings shall be 304SS. System shall incorporate an integral full pipe size bypass line with isolation valve to allow for pump removal and repair without disrupting water supply to system.

G. Isolation valves shall be all stainless quarter turn ball valves with hard chrome ball on lines 2" and less. Isolation valves shall be lug style butterfly valves with Buna-N elastomeric seats, ductile iron nickel coated disc, and stainless steel stem with handle and 10 position galvanized memory plate on lines 2½" and greater.

H. Gauges shall be 2½" diameter face, glycerin filled with stainless casing and brass internals.

I. Flow switch shall be a 316 stainless steel and solid state thermal sensor designed to measure change in flow velocity and in temperature. The flow switch shall include an integrated bar graph with 10 LED lights and shall be capable of providing indication of flow (green), closed (orange), and open (red) conditions.

J. Pump system shall be mounted on a structural aluminum skid with mounting flanges on front and back to allow for mounting of skid to concrete pad. Skid equipped with pipe support on suction and discharge piping. All nuts and bolts and washers shall be stainless steel on skid and piping. Skid shall include mounting hardware for integral aluminum enclosure.

K. The system enclosure shall be vandal and weather resistant, marine grade aluminum alloy 5052-H32 construction with rectangular punch-outs for viewing and heat dissipation. The enclosure shall be low profile hinged top design with padlock provision. The cover shall be secured to the concrete pad with stainless steel hardware. The enclosure shall measure 30D" x 42W" x 30H" and concrete pad dimensions shall be 42" x 54" x 4". The enclosure shall be as manufactured by V.I.T. Products, Inc. and shall be UL Listed and Approved.

L. Pump assembly shall include the following option(s):
   1. (VFD-F) Where specified by the System Design Parameters, an **Fuji Variable Frequency Drive** system to receive feedback signal from system mounted stainless steel pressure transducer, and in conjunction with internal software driven PID control loop maintain customer adjustable constant system discharge pressure by varying the speed of the pump in response to varying system load.

M. The services of a factory representative or trained service professional shall be made available on the job site to check installation and perform the startup and instruct the operating personnel. A startup report containing voltage and amperage readings, suction and discharge pressure readings, estimated flow conditions, and general operating characteristics shall be submitted to the Owner.

N. One electronic set of operating and maintenance manual shall be provided to the owner after startup and shall include parts manuals for major components, performance curve for pump, general sequence of operation, and electrical schematic for control panel.

O. The warranty period shall be a non-prorated period of 36 months from date of purchase.

3.14 FIELD QUALITY CONTROL

A. Inspection and Adjustments: Following installation and prior to Substantial Completion Inspection, make final adjustments to site irrigation including but not limited to the following:
   1. Flush system completely, with nozzles and screens removed to extract debris.
   2. Verify sprinkler operation and alignment for direction of throw. Correct as necessary.
   3. Check pop-up rotor/rotator nozzling for proper arc of spray with no overthrow onto pavement. Adjust nozzles as necessary for proper throw and matched precipitation rate.

4. Ensure uniform distribution exists.
5. Ensure proper irrigation head operational after landscaping and/or sod installation.

B. Main Line Inspection and Hydrostatic Tests:
1. Owner's CTL Inspector and Irrigation Designer will observe testing.
2. Center load Piping with small amount of backfill to prevent arching or slipping under pressure.
3. Install risers and caps on mainline and sub-main lines. Apply continuous and static water pressure of 75 psi for a minimum of 3 hours when welded plastic joints have cured at least 3 hours.
4. Allowable Leakage:
   a. Utilize the following formula to calculate the allowable leakage for O-ring gasket pipe.

$$\frac{L=SD(P)^{0.5}}{133,200}$$

In which: L=Allowable leakage in gallons per hour
S=Length of pipe tested in feet
D=Pipe diameter in inches
P=Average test pressure in PSI gauge

   b. No allowable leakage shall be acceptable with solvent based mainline system.
5. Repair leaks and retest.

C. Demonstration: Following final adjustment, operate entire installation to demonstrate complete and successful operation of equipment.

END OF SECTION 02812

IRRIGATION INSPECTION CHECKLIST

INSPECTION PROCEDURE

- Contractor shall arrange and conduct inspection and complete checklist and identify defects.
- Conduct inspections in accordance with the Quality Assurance and Quality Control provisions of the Specifications.
- All undersigned parties shall accompany inspection.
- Visually identify location of each defect at the site.
- After irrigation inspection is complete FAX signed inspection form to Owner's Representative Construction Manager within 24 hours.

COMPLETION OF CHECKLIST AND DEFECTS FORM

- Answer each checklist item Yes or No.
- Mark "N/A" on checklist items which do not apply.
- Identify defects and resolutions on the Owner's Representative Deviation Log. (www.bldgportal.com, enter username and password, select Deviation Log)
- Number each defect as follows:
    - Identification Symbol-Checklist Item No.-Defect No. (E.g. ML-1-3)
    - The defect number shall be numbered in sequence for each checklist item.

(ML) MAIN LINE INSPECTION:

Piping:

1.	Is the correct type and size of pipe installed?	YES___	NO___	N/A___
2.	Is the pipe installed at the correct depth?	YES___	NO___	N/A___
3.	Does the trench meet the required minimum width?	YES___	NO___	N/A___
4.	Is rock present within the trench?	YES___	NO___	N/A___
5.	If rock is present, has it been properly mitigated?	YES___	NO___	N/A___
6.	Is minimum 3 inch clearance provided between the main and lateral lines?	YES___	NO___	N/A___
7.	Are joints primed prior to solvent weld?	YES___	NO___	N/A___
8.	Is the main line snaked minimum of 1 foot per 100 foot of trench?	YES___	NO___	N/A___
9.	Are joints cemented in accordance with ASTM standard specified?	YES___	NO___	N/A___
10.	Does PVC cement conform to ASTM standards specified?	YES___	NO___	N/A___

Valves:

1.	Is valve box installed plumb and flush with proposed finish grade?	YES___	NO___	N/A___
2.	Is 6 inch layer of coarse gravel installed beneath base of valve?	YES___	NO___	N/A___
3.	Is master valve sized to allow proper flow rate?	YES___	NO___	N/A___
4.	Are splices installed with waterproof connections?	YES___	NO___	N/A___

Control Valves:

1.	Are continuous wire runs provided between valve boxes and controller?	YES___	NO___	N/A___
2.	Is control wire placed beside main line?	YES___	NO___	N/A___
3.	Are control wires bundled and taped at 10 foot intervals?	YES___	NO___	N/A___
4.	Are expansion loops provided at each valve, wire splice, and each change of direction?	YES___	NO___	N/A___

(SC) SUBSTANTIAL COMPLETION INSPECTION

1.	Does mainline pressure meet design requirements?	YES___	NO___	N/A___
2.	Are the backflow prevention/master valve installed as shown on the plans and functioning properly?	YES___	NO___	N/A___
3.	If pump station is installed, does it operate at the specified capacity?	YES___	NO___	N/A___
4.	Does head layout provide 100 percent coverage?	YES___	NO___	N/A___
5.	Does drip system layout and installation provide 100 percent coverage?	YES___	NO___	N/A___
6.	Are the controller / flow sensor functioning properly?	YES___	NO___	N/A___
7.	Is the ET source communicating with the base station?	YES___	NO___	N/A___
8.	Are rain and freeze sensors installed and functioning properly?	YES___	NO___	N/A___

(F) FINAL INSPECTION

1.	Does mainline pressure meet design requirements?	YES___	NO___	N/A___
2.	Does head layout provide 100 percent coverage?	YES___	NO___	N/A___
3.	Does drip system layout and installation provide 100 percent coverage?	YES___	NO___	N/A___
4.	Are the controller / flow sensor functioning properly?	YES___	NO___	N/A___
5.	Is the ET source communicating with the base station?	YES___	NO___	N/A___

(W) WARRANTY INSPECTION

1.	Does mainline pressure meet design requirements?	YES___	NO___	N/A___
2.	Does head layout provide 100 percent coverage?	YES___	NO___	N/A___
3.	Does drip system layout and installation provide 100 percent coverage?	YES___	NO___	N/A___
4.	Are the controller / flow sensor functioning properly?	YES___	NO___	N/A___
5.	Is the ET source communicating with the base station?	YES___	NO___	N/A___

(H) HYDROSTATIC TEST:

1.	Does the main line hold the specified pressure for the specified length of time?	YES___	NO___	N/A___
2.	Are leaks present?	YES___	NO___	N/A___
3.	Were repairs made and line retested?	YES___	NO___	N/A___
4.	If retesting is required, does retest pass?	YES___	NO___	N/A___
5.	Does o-ring gasket pipe remain within the calculated allowable leakage?	YES___	NO___	N/A___

ATTENDED BY:

GENERAL CONTRACTOR _____
(Signature)

_____
(Printed name and title)

IRRIGATION CONTRACTOR _____
(Signature)

_____
(Printed name and title)

LANDSCAPE ARCHITECT OR
IRRIGATION DESIGNER _____
(Signature)

_____
(Printed name and title)

OWNER'S REPRESENTATIVE _____
(Signature)

_____
(Printed name and title)

SECTION 02814

IRRIGATION REPAIR AND REPLACEMENT

PART1 GENERAL

1.01 DESCRIPTION

A. Work Included: Provide all labor, materials and equipment as necessary to repair or replace any part of the existing irrigation system damaged or otherwise affected during the performance of this Project.

1.02 APPLICABILITY OF THIS SECTION

A. Repairs Not Shown or Specified: This Section is applicable ONLY for those cases where the Contractor has damaged existing irrigation system and applicable technical specifications have not been incorporated in the Contract Documents.

B. Other Sections of the Specifications: Where specific technical specifications have been incorporated into the Contract Documents; those technical specifications shall take precedence.

1.03 QUALITY ASSURANCE

A. All materials and methods shall be in accordance with the Uniform Standard Details and Specifications for Public Works Construction sponsored by Maricopa Association of Governments (M.A.G.), latest edition.

B. The Owner shall be the-final judge of the existing conditions, the damage caused by the Contractor and the acceptance of the repair and replacement Work specified herein.

1.04 INTENT OF CONTRACT SPECIFICATION

A. It is the intention of this Specification to accomplish the work of repairing and/or replacing the existing irrigation system to operate in an efficient and satisfactory manner. The Specification can only indicate the intent of the work to be performed rather than a detailed description of the performance of the work. It shall be the responsibility of the Contractor to install said materials and equipment in such a manner that they shall operate efficiently and evenly and support optimum plant growth and health.

1.05 SAFEGUARDS

A. The Contractor shall maintain sufficient safeguards, such as railings, temporary walks, lights, barricades, etc., against the occurrence of accidents, injuries or damage to any person or property resulting from his work, and shall alone be responsible for the same if such occurs.

1.06 PROTECTION OF WORK AND PROPERTY

A. The Contractor shall continuously maintain adequate protection for all his work and materials from damage, destruction, or loss, and shall protect the Owner's property from damage arising in connection with this Contract. He shall make good any such damage, destruction, loss, or injury. He shall adequately protect adjacent property as provided by law and the Contract Documents.

B. Prior to excavation for irrigation piping or equipment, Contractor shall locate underground utility lines, piping, and structures and take proper precautions to avoid damage to such improvements. In the event of a conflict between such lines and irrigation piping or equipment locations, Contractor assumes responsibility for making repairs for damages resulting from work as herein specified.

PART 2 PRODUCTS

2.01 MATERIALS - GENERAL

A. Unless otherwise specified, materials, equipment, apparatus and appliances used for irrigation repair or replacement shall be new and in perfect condition.

2.02 PIPE, PIPE FITTINGS, AND CONNECTIONS FOR IRRIGATION SYSTEM

A. All pipe shall be free of blisters, internal striations, cracks, or any defects or imperfections. Pipe shall be continuously and permanently marked with Oimension Ratio No., Manufacturer's name, size, schedule, or pressure class, type, and working pressure, material code designation, seal of the testing agency that verified the suitability of the pipe (NSF). Pipe sizes shall conform to water velocity/pressure loss ratio not to exceed 5 ft./second.

B. Plastic Pipe:

1. 4 inch Pressure Lines and Larger: Class 200 integral bell gasketed PVC pipe with reinforced gaskets. The pipe shall be manufactured to iron pipe size outside dimensions, with SOR's and tolerances in compliance with ASTM 0-2241, Polyvinyl Chloride (PVC) plastic pipe, SDR PRo The pipe shall have an integral bell end and the gasket seal shall be reinforced with a steel band. The joint shall be in compliance with the requirements of ASTM 0-3139, "Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals". The pipe shall be extruded from PVC meeting the requirements of Cell Classification 12454-A or as defined in ASTM 0-1784, "PVC Compounds". Pipe manufactured by "Vinyl-Tech" or approved equal.

2. 3 inch and smaller pressure lines, non-pressure lines, and sleeves: Schedule 40 PVC (poly-vinyl chloride) solvent Weld Pipe complying with ASTM Designation 0-1785, latest edition. Pipe manufactured by Swanson or approved equal.

C. Plastic Pipe Fittings:

1. Threaded PVC fittings: Schedule 80, Type 1, Grade 1, Polyvinyl Chloride (PVC) per ASTM 0-1784, 02464, and 02467, uniformly grey in color, manufactured by Spears or approved equal.

2. Slip socket PVC fittings: Schedule 40, Type 1, Grade 1, Polyvinyl Chloride (PVC) per ASTM 0-2466 and 0-1784 uniformly white in color. Manufactured by Spears or approved equal.

3. Fittings for 4 inch and larger gasketed PVC Pressure Lines: Schedule 40 PVC, epoxy coated steel or cast iron.

2.03 PIPE CONNECTION MATERIALS

A. Joint compound for threaded connections: Teflon tape, or approved equal UL listed.

B. Adhesive solvents and primer for all classes and schedules of PVC: Slow Drying solvent cement shall be used whenever ambient air temperature is 90 degrees F. or higher. P-70

purple primer and slow-set solvent cement as manufactured by Industrial Polychemical Service, Gardena, California.

C. Solvent for Slip-Fix vinyl hose and fittings: Shall be P-70 primer and #795 Solvent cement as manufactured by Industrial Polychemical Service, Garden, California.

D. All cans of solvents and primers shall have labels intact and shall be stamped with the date of manufacture. No cans dated over one year old will be permitted.

2.04 SPRINKLER HEADS, BUBBLERS AND EMITTERS: Match the existing equipment (Le. manufacturer, precipitation, and type).

2.05 AUTOMATIC SPRINKLER SYSTEM:

A. Control Valves shall be of same size and type for valve to be replaced.

B. Control wire shall be UF-UL listed, color-coded copper conduction direct burial size No. 14 AWS.Use approved waterproof wire connectors as splices and locate all splices within valve boxes. Common wire and valve control wires shall match color of existing wire.

2.06 VALVE BOXES: Rectangular or round heavy-duty plastic valves boxes with bolt-down lid or approved equal. Valve boxes shall be large enough for easy removal or maintenance of valves. Valve box tops to be factory marked with the word "Irrigation". Provide and install Manufacturer's valve box extensions as required to enclose valves and equipment. Valve boxes installed in lawn shall be green and boxes installed in granite shall be tan color.

2.07 BACKFILL MATERIALS

A. Irrigation Pipe Trench Backfill:

1. 2 inch cover and bedding for pressure irrigation mainline and all Non-Pressure Laterals:
Screened soil having no rock or debris larger than __%",

2. Other Backfill Materials: Clean native soil with no rock or debris larger than 1 inch.

3. Pea gravel (for use around drains and valves: __% inch maximum round,

4. Water worn, washed rock.

PART 3 EXECUTION

3.01 PROTECTION: Provide adequate means for protection of the public by posting signs and/or barriers as required and/or specified in Contract Specifications.

3.02 GENERAL REQUIREMENTS:

A. Contractor shall provide temporary continuous watering of plants and lawn to remain until irrigation system can be repaired or replaced.

B. Contractor shall be responsible for scheduling and coordination to facilitate the most expeditious completion of the repairs and replacement in a workmanlike manner, including all required irrigation utility connections with other project trades.

C. Contractor shall replace, repair, or modify existing irrigation system in conformance with

MAG. Specification Section 440~1, 440.2, 440.3, 440.4, 440.5, 440.6, and 440.7.

3.03 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 03000

CONCRETE (SIDEWALKS AND SITE DETAILS)

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 505 - CONCRETE STRUCTURES

505.3 FORMS

The Contractor shall use the following references: ACI 347 - Recommended Practice for Concrete Formwork, where not in conflict with MAG Uniform Standard Specifications, requirements of Project, or requirements of Contractor, is suggested as generally acceptable. ACI 301 - Specification Structural Concrete for Buildings. ACI 506 - Application of Shotcrete. Have publications available.

505.5 PLACING REINFORCEMENT

Fabrication, placement, splicing and welding in accordance with CRSI standards, ACI 318 and Drawings. Clear concrete coverage unless otherwise noted shall be as follows:

Cast against earth: 3"
Exposed to weather: Typical 2"; No. 5 and smaller, 1.5"

505.6.1 JOINTS

Construction joint (C.J.) or keyed joint (K.J.) may be required for construction convenience or concrete placement. C.J. or K.J. may not be shown on Drawings, but may be directed or requested by Contractor. Location must be approved. Provide form, key, dowels, continuous reinforcing, water stop, thickened slabs as required.

Expansion joint filler shall have a typical thickness of 1/2" exterior, 1/4" interior. Typical exposed joint shall have ASTM 1752 Type III self-expanding cork. Typical concealed joints shall be ASTM 1751 preformed. Typical with sealants required shall be ASTM 1752 Type II cork or Type I sponge rubber used only at the basketball court. No asphalt sealants shall be used. Expansion joint shall be located as shown on Drawings.

Shrinkage joints (control joints) required for contraction or shrinkage crack control may be sawn when plan and location approved or as shown on the Drawings.

PART 505 - CONCRETE STRUCTURES AND PART 525 - PNEUMATICALLY PLACED MORTAR

The following CSI format Specification Sections 03100 - FORMWORK, 03200 - REINFORCEMENT, and 03300 - CAST-IN-PLACE CONCRETE, shall be added to the MAG Uniform Standard Specification for Public Works Construction and be incorporated as part of Section 505 and Section 525.

END OF SECTION

SECTION 03100

FORMWORK (Sidewalks and Site Details)

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 REFERENCES: ACI 347 Recommended Practice for Concrete Formwork, where not in conflict with Specifications, requirements of Project, or requirements of Contractor, is suggested as generally acceptable. ACI 301 Specification Structural Concrete for Buildings. ACI 506 Application of Shotcrete. Have publications available.

1.02 NOTICE: This specification establishes minimum requirements for reasons of appearance, construction means and methods. Construction safety, means, methods, loads, shoring, reshoring or Contractor's responsibility to design, install, inspect, use, and remove are not part of this Specification. Provide engineering necessary to achieve Work and protect Project. Architectural approval or observation is not required.

1.03 COORDINATION:

a. Contractor's safety and structural requirements which exceed requirements of engineering notations on Drawings or this Section govern.

b. Engineering notations on Drawings which exceed requirements of this Section govern.

1.04 SUBMITTALS: Submit product data for all leave-in materials.

PART 2 - PRODUCTS

2.01 GENERAL: Non-staining, non-corrosive, compatible with concrete and finishes strengths, and bonds.

2.02 FORMWORK:

a. Material and Design: Adequately rigid for forming concrete and holding embedded Work in shape and location required. Stop major leakage of forms, decks, or other construction by taping or similar means. Removable forms remain property of Contractor. Remove from Project when need is satisfied.

b. Appearance: Where concrete is exposed, form effect on appearance as approved. Control joint marks, surface texture, shapes as shown.

c. Coordination: Coordinate with concrete and embedded materials and provide as they are required for cleanliness, dimension, stability, absorption, tightness, and compatibility

2.03 CONSTRUCTION JOINT (C.J.) OR KEYED JOINT (K.J.): Joint required for construction convenience or concrete placement. May not be shown on Drawings. May be directed. May be requested by Contractor. Location must be approved. Provide form, key, dowels, continuous reinforcing, water stop, thickened slabs as required.

2.04 SIDEWALK EXPANSION JOINTS: ASPHALT IMPREGNATED FIBERBOARD with Contie removable joint caps and polyurethane sealant.

2.05 EXPANSION JOINT (E.J. OR EXP. JT.) FILLER: Typical thickness ½" exterior, ¼" interior with#1020 Expansion Joint Cap by BoMetals, Inc., 3033 Springs Industrial Drive, Powder Springs, GA 30127, 1-800-862-4835. Typical exposed, asphalt impregnated fiberboard (compressible) with back rod and polyurethane sealant (sealant and basketball courts only). Typical concealed on interior, ASTM 1751 preformed fiberboard (compressible).

2.06 SHRINKAGE JOINT (S.J.) (Control Joint): Joint required for contraction or shrinkage crack control, no form required. Removable if formed. Exterior flatwork paving may be sawn when plan and location approved.

2.07 FORM RELEASE AGENT: Contractor's choice subject to appearance and compatibility.

2.08 MEMBRANE (VAPOR BARRIER): Polyethylene film, conforming to ASTM C-171. Color, clear. Minimum thickness is 6mil. Maximum moisture loss 0.055 g./cm. sq. in accordance with ASTM C-156. Provide maximum widths giving consideration to installation conditions.

2.09 MISCELLANEOUS ACCESSORIES: As shown or required.

PART 3 - EXECUTION

3.01 FABRICATION: Sufficiently leak resistant, sufficiently movement resistant and true to shape elevations and dimensions. Complete. Slope to Drains.

3.02 JOINTS:

a. Construction:

1. Use only when necessary or as shown on Drawings.

2. Structural, horizontal members: Locate at mid-span.

3. Keyed: Slabs at structural.

b. Expansion Joint (E.J.) in Slabs-on-Grade and Columns:

1. Where required for thermal expansion.

2. Where butts another solid.

3. At stress locations.

4. As detailed or shown.

5. Slightly edge tool at exposed locations.

6. At sealant, design as required for sealant (i.e., width, depth, shape).

c. Shrinkage Joint (S.J.): Refer to Cast-In-Place Concrete Section.

d. Sawn Joint: Refer to Cast-In-Place Concrete Section.

PART 4 - FLATWORK

4.01 GRADE: As shown on Drawings, to drain surface water toward bowl drain.

4.02 SLAB ON GRADE: Form with flat bottom and joints in manner to allow unrestricted shrinkage toward centroid. Joint to provide near square dimensions.

1. Recesses, Drains: Slope floors to drain, drain trenches, away from Skate Track.

2. Membrane (Vapor Barrier) Curing Sheet.

2.1 Curing Sheet: Coordinate with concrete curing. Membrane may be placed at Contractor's option under slab-on-grade for balancing concrete curing to protect against curling and delayed shrinkage cracks.

2.2 Installation: Use largest practical width. Seam by lapping 6" and taping continuously, or by folding over twice similar to sheet metal standing seam, wire stapling, and laying flat. Turn up full depth at terminations. Turn up and seal with tape at penetrations. Allow fullness to prevent ruptures. Replace where construction operations perforate excessively.

4.03 ACCESSORIES: Install all accessories placed under this Section in accordance with manufacturer's recommendations. Cooperate with other trades placing Work in or beneath concrete.

4.04 REMOVAL: When approved by Contractor's Engineer or when full design strength is established by approved tests.

END OF SECTION

SECTION 03200

REINFORCEMENT

MAG UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND CITY OF PHOENIX ENGINEERING DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ARE HEREBY AMENDED TO INCLUDE THE FOLLOWING:

PART 1 - GENERAL

1.01 REFERENCES: Work noted in accordance with following basic reference specifications and standards unless otherwise specified. Have available on-site.

A. ACI-301, "Specification for Structural Concrete for Buildings."

B. ACI-315, "Details and Detailing of Concrete Reinforcing."

C. ACI-315R, "Manual of Engineering and Placing Drawings for Reinforced Concrete Structures."

D. ACI-318, "Building Code Requirements for Reinforced Concrete."

E. CRSI, "Manual of Standard Practice."

1.02 COORDINATION:

A. Contractor's safety and structural requirements which exceed requirements of engineering notations on Drawings or this Section govern.

B. Engineering notations on Drawings which exceed requirements of this Section govern.

1.03 SUBMITTALS: Submit reinforcing plans, elevations, schedules, and bonding diagrams showing fabricator's complete details and erector's complete placement plans. Submit independent laboratory certification of tensile strengths of non-domestic material. Welding only permitted when submitted in advance.

PART 2 - PRODUCTS

2.01 REINFORCEMENT BARS AND FABRIC:

A. Bars: As noted on plans. Typical, ASTM A615. Typical, Fy=40 KSI; No. 6 and larger, Fy=60 KSI. Welded reinforcing ASTM A706. Deformed with supplementary bend requirements.

B. Bar Mats: ASTM A614. Typical, Grade 40, deformed, clipped. Size, spacing, and other types as noted on Drawings.

C. Wire: ASTM A82.

2.02 BAR SUPPORTS AND ACCESSORIES: As required to complete Work in accordance with CRSI Manual. Non-stain types where subject to staining exposed Work. Reinforcement supported from the ground shall rest on precast concrete blocks not less than 4 inches square, and having a compressive strength equal to the specified compressive strength of concrete being placed. No leave-in wood supports.

PART 3 - EXECUTION

3.01 GENERAL: Fabrication, placement, splicing and welding in accordance with CRSI standards, ACI 318 and Drawings. Clear concrete coverage unless otherwise noted.

A. Cast against earth: 3"

B. Exposed to weather: Typical 3"; No. 5 and smaller, 1.5"

C. Column Ties: 1.5"

3.02 MARKING: Tag all elements to coordinate placement Drawings with materials.

3.03 CLEANING: Before placing, clean free of mill and rust scale and any material reducing bond.

3.04 PLACEMENT: Secure and support against displacement and sag, including footing reinforcing and fabric.

3.05 SPLICING: Minimum not less than noted on Drawings, in accordance with referenced documents, locations subject to approval, and not less than following:

A. BARS: 40 diameter unless otherwise noted. Place in contact and tie with 16 ga. steel wire. Stagger, none at maximum stress point. Bars continuous unless noted or location approved. Provide bent bars around corners. Dowel verticals of concrete into foundation. Dowel verticals of masonry into concrete.

B. FABRIC: Lap one full wire space plus 2"; minimum 9" total. Tie minimum 24" o.c. with 16 gage steel wire.

C. WELDING: Use only as noted on Drawings and only when approved. Low hydrogen electrodes in accordance with AWS. No tack welding without prior review of procedure by Engineer.

END OF SECTION

TECHNICAL SPECIFICATIONS

Washington Elementary School District No. 6

Fire Lane Improvements

for:

SAHUARO ELEMENTARY SCHOOL

November 30, 2022

Prepared by

Kimley»Horn

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