TECHNICAL SPECIFICATIONS

For

City of Page

Page Splash Pad

PROJECT NO. 23.1672.001

PROFESSIONAL ENGINEER SEALS:

This book of specifications and related contract documents represents the efforts of the following firms:

- J2 Engineering and Environmental Design, LLC. (J2) (Landscape Architecture)
- Kreuzer Consulting Group (Kreuzer) (Civil Engineering)
- Wright Engineering (Wright) (Electrical Engineering)

A registrant of each firm has affixed their professional seal below, which attests that those portions of these specifications, which relate to their respective discipline area, were prepared under their direction.

J2 - Landscape Architecture

Wright – Electrical Engineering

Kreuzer- Civil Engineering

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SPECIAL CONDITIONS

STANDARD SPECIFICATIONS:
Except as otherwise required in these special provisions, construction of this project shall be in accordance with all applicable Maricopa Association of Governments (MAG) Uniform Standard Specifications, and MAG Standard Details following the 2023 edition of each and the 2021 City of Page supplements. All measurement and payment for items unless modified herein or on attached bid schedule shall also be in compliance with the above stated standards.

LOCATION OF THE WORK:
Page Splash pad is located within Page Sports Complex, 477, Haul Road, Page, Az 86040.

DESCRIPTION OF WORK:
Development of Page Splash Pad Phase I consists of preparing the site for the park development including grading. Miscellaneous improvements per the plans include relocating a swing set, new paving, seat walls, shade structures, a ramada, splash pad equipment, , water, sewer and electrical additions, landscape and irrigation. Phase II is providing additional infrastructure similar to Phase I.

GEOTECHNICAL REPORT:
A Geotechnical Engineering Report is not provided as part of these construction documents.

GENERAL:
Warning, regulatory, guide and route marker signs and delineators and markers that interfere with construction operations shall be removed, salvaged, and reinstalled as directed by the Engineer. No measurement or direct payment will be made for this work, the cost is being considered as included in the price of contract items.

The schedule and traffic control shall be developed in such a way that access or alternative access to the site by the City of Page (COP) is maintained at all times during construction. The contractor shall contact adjacent residences two weeks prior to construction in the area to inform adjacent property owners regarding the work effort and expected schedule to complete. Traffic control plans shall be submitted to the Engineer for approval. The Engineer based upon a review, discussion, and acceptance of the traffic control efforts by the City will provide approval of the traffic control plans.

WORKING HOURS:
Work on this project shall not begin before 6:00 a.m. and shall conclude prior to 7:00 p.m. each weekday unless otherwise approved by the City. Work at times other than those

specified will be considered by the City subject to the duration and type of activity proposed and the resulting impact on adjacent residential and commercial areas.

If the Contractor is permitted to work between the hours of 7:00 p.m. and 6:00 a.m., the City will determine what measures the Contractor will be required to make to inform the affected public.

Hours for hauling operations shall be subject to approval by, and if necessary, permits from the City of Page, Page County, and other applicable municipalities, in accordance with local ordinances.

NOISE MITIGATION:
The Contractor is responsible for any construction noise mitigation measures needed to meet the noise ordinances of the City and Coconino County.

COORDINATION AND MAINTENANCE OF TEMPORARY TRAFFIC CONTROL:
The Contractor shall coordinate construction efforts with adjacent or adjoining projects that could be under construction at the same time in accordance with MAG Sections 105.6 and 105.7. Where work overlaps other contractor's work, coordination will be required to determine work zone traffic control setups and improvement match points that will benefit the City.

Temporary signing and marking associated with work under this contract shall not conflict with other temporary signing and marking associated with adjacent projects. Lane closures, full roadway closures and detours shall be coordinated between projects to minimize confusion to pedestrians, bicyclists and the motoring public.

The Contractor will be responsible to furnish, erect, maintain and remove all temporary signs that, in the opinion of the Engineer, are necessary to warn, regulate and guide traffic adequately between projects. Compensation for this work shall be considered included in the bid item price for **Maintenance of Traffic**.

BUSINESS, UTILITY FACILITIES AND PRIVATE PROPERTY ACCESS:
Emergency vehicle, postal delivery, garbage pickup, school bus routes, and driveway accesses to businesses, utility facilities, and private property shall be maintained at all times. Short-term closures may be permitted subject to prior approval by the Engineer and property owner. Contractor shall notify property owners ten calendar days in advance of any construction on driveways or streets that result in lane restrictions or closures.

For properties with one access point and at all side streets, Contractor shall construct half of the driveway or street while maintaining the other half for ingress/egress movements at all times. Where an individual property has existing dual access points, Contractor shall close, complete construction, and open one access point before starting on the other. At the direction of the Engineer, flaggers may be required when Contractor is working at or restricting any of the driveways for businesses or private property access.

SHORING:
Shoring may be required for certain trenches related to work shown on the project plans. The Contractor shall be responsible for determining the exact limits and locations of any required shoring. Shoring shall be installed in accordance with all applicable Federal, State and Local safety requirements. No direct payment will be made for shoring, costs for this work shall be included in the total bid price for the project.

DEWATERING:
It is the Contractor's responsibility to make conditions for the removal and/or control of surface and subsurface water infiltrating into the work areas during construction. No direct payment will be made for dewatering accumulated ground or surface water, or water of any origin including irrigation water, costs for this work shall be included in the total bid price for the project.

SAW CUTTING:
Saw cuts at locations where new improvements abut existing asphalt pavement or concrete surfaces will be required. This shall include existing bituminous pavements, concrete pavements, sidewalks, driveways, and curbs and gutters where new construction shall match the elevation of existing surfaces that are to remain. Saw cut lines may be subject to change by direction of the Engineer to best fit the conditions found in the field.

Saw cuts shall be made a minimum depth of 1½" and in all cases deep enough to insure a neat vertical joint. No measurement or payment will be made for saw cutting. The cost shall be included in the respective price for bid items for which the asphalt or concrete needs to be removed in order to install the new improvements.

PERMITS:
Contractor is responsible for obtaining all necessary permits from appropriate governing agencies and paying applicable fees prior to starting such construction activities. Governing

agencies may include, but are not limited to, City of Page, Arizona Department of Environmental Quality, Page County, and State of Arizona.

Samples of permits could include:

- Dust control
- Haul routes
- Storm water pollution control
- Traffic control
- Transporting plants
- City Permits
- State Permits

CONDITION OF MATERIALS:

All materials incorporated into the project are expected to be placed into service in new, clean, and unblemished condition. Any materials stored unprotected from their original manufacture's packaging shall be cleaned of any foreign matter prior to use. All stored materials shall be protected from surface scarring and dents. All materials found to deviate from manufacture's original size, shape or condition may be subject to reorder at the discretion of the Engineer.

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

SECTION 105
CONTROL OF WORK

105.6 COOPERATION WITH UTILITIES: *is modified to add*:
The location of underground and overhead utilities as shown on the plans is based on the best available information gathered from as-builts, field surveys, and Blue Stake markings. The Contractor shall not assume that this represents an exact location of the indicated utility. No guarantee is made to the accuracy of the location shown on the plans. It is the responsibility of the Contractor to verify and determine the exact location of all utilities.

The following utilities are expected to be located within the limits of this project. These utilities, along with the contact information, are listed below.

Utility Name	Contact Name	Phone Number	Email	Type of Facility
Alliant Gas	DIndy Bird	(928) 645-2391		Gas
Page Electric Utility	Vandine Doctor	(928) 645-2114	x	Electric, Sewer, Street Lights, Water
City of Page	Tamra Tibbets	(928) 645-4300	x	Culverts, Sewer, Storm Drains
CTLQL – Centurylink	USIC Dispatch Center	(800) 778-9140	x	Coaxial, Fiber Optics
South Central Utah Telephone Assoc., Inc	Lori Coleman	(435) 826-0222	x	Coaxial, Fiber Optics

The above utilities are not expected to be in conflict with the proposed project improvements, but will require clearances from their utilities as set forth in the plans or in each respective utility's documentation. In addition to the utility owners listed in the table above, Contractor shall coordinate the project's construction activities with the City of Page. Contractor shall ensure that the Parks Department and Police Department are provided with adequate access at all times during construction to be able to drive vehicles through the project site. Contact information is provided below:

Agency Name	Contact Name	Phone Number	Email
City of Page	Darren Coldwell	928-645-4241	dcoldwell@pageaz.gov

105.8 CONSTRUCTION STAKES, LINES AND GRADES: *is deleted in its entirety and replaced with the following:*

Contractor shall be responsible for creating red-lines for "As-Built" record drawing preparation. All alterations from the plans must be approved by the Engineer prior to the work being done and subsequently documented on as-built drawings. The Contractor shall keep accurate data and field notes as construction progresses for preparation of the "As-Built" drawings. Contractor shall submit redlined drawings to the Engineer for preliminary review. Contractor shall make all corrections required and resubmit a new copy to the Engineer for review and approval. Final payment will be made upon Engineer's acceptance of the redlined "As-Built" drawings. These final red-lined "As-Built" drawings must be prepared by a licensed Arizona Land Surveyor. Contractor shall provide both a hard copy and digital copy of the "As-Built" drawings to the City.

Contractor shall furnish all materials, personnel, tools, and equipment necessary to perform all surveying, construction staking, establishment of all excavation boundaries, and verification of the accuracy of all existing control points which have been provided by the City. Contractor shall furnish sufficient construction stakes, lines, and grades to accomplish the work as indicated on the plans. Contractor shall verify all horizontal and vertical controls and establish secondary points and/or benchmarks for construction. The control point verification process shall include locating and making ties to all section lines, right-of-ways, and roadway monuments in the vicinity of the proposed work. Included in this work shall be all calculations required for the satisfactory completion of the project in conformance with the plans and these specifications. The work shall be done under the direction of a registered professional engineer or a registered land surveyor employed by the contractor. The crew chief shall be NSPS Certified Level III, NICET Certified Level III, or a registered Land Surveyor-in-Training. A minimum of 50 percent of the survey crew shall be either NSPS Certified Level II or NICET Certified Level II.

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

The Contractor shall carefully preserve all construction stakes, reference points and other survey points, and in the case of their loss or destruction, shall replace them at the direction of the Engineer. Wooden lath or stakes used during construction shall be removed as part of the project's final clean up.

Existing cadastral corners, such as section corners, quarter corners, intersecting street centerline monuments, and property corners that are destroyed by the Contractor shall be re-established by a registered land surveyor employed by the Contractor.

Where utility adjustments are required, the Contractor shall perform all layout work and set all control points, stakes and references necessary for carrying out all such adjustments.

The Contractor shall furnish all traffic control, including flagging for survey and staking operations. Traffic control devices and procedures for construction surveying shall be in accordance with the requirements of the MUTCD.

Prior to beginning any survey operations, the Contractor shall furnish to the Engineer, for approval, a written outline detailing the method of staking, marking of stakes, grade control for various courses of materials, referencing, structure control, pavement markings, and any other procedures and controls necessary for survey completion. A part of this outline shall also be a schedule which will show the sequencing of the survey and layout work, throughout the course of the contract, listing a percentage of completion for each month.

RESETTING MONUMENTS:
The Contractor shall be responsible to maintain all existing monumentation, including section line, right-of-way, and roadway monumentation. Monumentation disturbed during construction shall be re-established by the Contractor, and recorded at the appropriate county recorder's office.

Section corner, quarter corner, and property corner monuments shall be re-established following the procedures in the Manual of Surveying Instructions 2009, published by the U.S. Department of the Interior, Bureau of Land Management, and all applicable statutes and requirements specified in the current Arizona State Board of Technical Registration's "Arizona Boundary Survey Minimum Standards."

Section line, right-of-way, and roadway monumentation re-established by the Contractor shall bear the registration number of the Land Surveyor in responsible charge of the location.

Monuments used to define section lines shall be stamped in accordance with Manual of Surveying Instructions 2009, published by the Department of Interior, Bureau of Land Management. Roadway monumentation shall be stamped in accordance with the requirements of the appropriate municipal jurisdiction.

Monuments that are re-established shall be recorded at the appropriate county recorder's office, and a copy of the Corner Recordation documentation shall be submitted to the Engineer and City within five working days of recordation.

Add the following:

105.8.1 MEASUREMENT:
Measurement for construction staking and preparation of red-lines for as-builts will be measured as a single complete unit of work on a lump sum basis under the bid item

Construction Stakes, Lines and Grades. The work shall include all materials, equipment, tools, and labor necessary to facilitate construction, staking of right-of-ways and easements, and resetting monuments.

Add the following:

105.8.2 PAYMENT:
Payment for Construction Stakes, Lines, and Grades will be by the lump sum and will be made as follows:

The approved schedule showing the sequencing and percentage of the survey and layout work shall be the basis on which monthly progress payments shall be made. The schedule shall be subject to periodic review, at the request of either party, if the survey and layout work lags or accelerates. If necessary, the schedule shall be revised to reflect changes in survey and layout progress. When approved, the revised schedule will become the basis of payment. Final payment will not be made until the Contractor's as-built red-line drawings are received and approved by the Engineer.

105.10 INSPECTION OF WORK: *is modified to add*:
The Contractor is advised that COP facilities to be relocated by the Contractor will be monitored and inspected by COP's inspector to verify compliance with their requirements and standards.

SECTION 107
LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

107.1 COMPLIANCE WITH LAWS: *Add the following new subsection*:

Environmental Mitigation Measures:

To prevent the introduction of invasive species seeds, the contractor shall inspect all earthmoving and hauling equipment at the equipment storage facility and the equipment shall be washed prior to entering the construction site.

To prevent invasive species from leaving the site, the contractor shall inspect all construction equipment and remove all attached plant/vegetation and soil/mud debris prior to leaving the construction site.

If suspected hazardous materials are encountered during construction, work shall cease at that location and the Engineer will be notified immediately to make arrangements for proper treatment and disposal of those materials.

The contractor shall develop a Storm Water Pollution Prevention Plan, Notice of Intent and Notice of Termination, and submit it to the Engineer for approval.

The contractor, upon approval from the Engineer, shall submit the Notice of Intent and Notice of Termination to the Arizona Department of Environmental Quality.

This project is located within a designated municipal separate storm water sewer. Therefore, the contractor shall send a copy of the Notice of Intent and Notice of Termination to the City.

The contractor shall comply with all local air quality and dust control rules, regulations, and ordinances which apply to any work performed pursuant to the contract.

The contractor shall not enter into non-disturbance areas as indicted on the project plans.

Add the following:

107.2.3 PAYMENT:
Payment for **Storm Water Pollution Prevention Plan** will be by the lump sum and will be made as follows:

The approved schedule showing the sequencing and percentage of storm water pollution prevention items required shall be the basis on which monthly progress payments shall be made. The schedule shall be subject to periodic review, at the request of either party, if the

need for storm water pollution prevention items lags or accelerates. If necessary, the schedule shall be revised to reflect changes in construction that impact the use of these items. When approved, the revised schedule will become the basis of payment. Final payment will not be made until the Contractor has removed all temporary pollution prevention items to the satisfaction of the Construction Manager.

Add the following:

107.6.4 Construction Fencing: Contractor shall provide a temporary construction fence around the entire work area to prevent unauthorized access to the construction site. The fence shall be a minimum of 6ft tall chain link. Contractor shall provide a submittal to the City for review and approval within 48 hours of Notice to Proceed with the proposed fencing layout which will identify the limits of the fencing and all access points. All access points shall have the ability for multiple locks to allow for both Contractor, City, and Utility company access as needed. The submittal shall also include the type of fencing product and how the fence is mounted and installed. This fencing shall be installed prior to any construction activities occurring on site. This fencing shall remain throughout the duration of construction until the City and Contractor agree upon a date for the removal of the temporary fencing. The cost for the installation and removal of this fencing is considered included in the cost of **Contractor Mobilization and Demobilization**.

SECTION 109
MEASUREMENTS and PAYMENTS

109.1 MEASUREMENT OF QUANTITIES: *is modified to add*:
The **City of Page Controlled Allowance** bid item shall be utilized at the discretion of the City for the completion of unspecified work not covered by other bid items. Authorization for Work under this bid item shall be made by the Engineer prior to the start of such work. All bidders shall incorporate the amount pre-entered in the bid proposal and shall include the same in the total amount bid for this project. Payment for work completed under this bid item shall be made based on the Engineer's approved methods of unit of measure and unit of payment.

109.10 PAYMENT FOR MOBILIZATION/DEMOBILIZATION: *is modified to add*:
The lump sum item established under Mobilization/Demobilization includes compensation to the Contractor for expenses to set up marshalling yards, secure the project site, to relocate equipment to and from the various project sites, and to perform final cleanup.

SECTION 201
CLEARING AND GRUBBING

201.1 DESCRIPTION: *Delete in its entirety and replace with the following*:

This work shall consist of removing objectionable material from the right of way, easements, the project limits as identified on the project documents, and such other areas as may be specified in the special provisions. Clearing and grubbing shall be performed in advance of grading operations.

201.3 CONSTRUCTION METHODS: *Delete the first paragraph and replace with the following*:

The construction site shall be cleared of all trees, stumps, brush, roots, weeds, rubbish, debris, and other objectionable matter, except as follows.

Delete the fourth paragraph and replace with the following:

From excavated areas, all stumps, roots, and other obstructions shall be grubbed to a depth of not less than thirty-six (36) inches below finish grade.

SECTION 206
STRUCTURE EXCAVATION AND BACKFILL

206.5.1 MEASUREMENT: *Delete the subsection and replace with the following*:
No separate measurement will be made for structure excavation and backfill.

206.5.2 PAYMENT: *Delete the subsection and replace with the following*:
No separate payment will be made for structure excavation and backfill the cost of which is considered included in the item for which structure excavation and backfill is required.

SECTION 211
FILL CONSTRUCTION

211.1 DESCRIPTION: *Add the following*:

Fill construction shall also consist of site improvements to the contour lines and grades as shown on the project plans. Fill construction shall also consist of spreading any excess soil material on adjacent COP owned parcels as indicated on the plans.

211.2 PLACING: *Delete the first paragraph and replace with the following*:

Rocks, broken concrete, or other solid material shall not be placed in fill areas.

Delete the third paragraph and replace with the following:

Clods or hard lumps of earth of 2 inches in greatest dimension shall be broken up before compacting the material in the embankment.

Delete the fourth paragraph and replace with the following:

Fill material will large rocky material greater than 1 inch, or hard lumps such as hardpan or cemented gravel is not acceptable as fill material as shall be removed from the project by the contractor.

211.3 COMPACTING: *Delete the fourth paragraph and replace with the following*:

Areas over which fills are to be placed shall be cleared and scarified to a depth of 6 inches to prove a bond between the existing ground and the material to be deposited thereon. Unless otherwise specified, the original ground area upon with fills are to be constructed shall be compacted to a uniform density of not less than 95 percent unless the area is intended to be planted then the density shall not exceed 85 percent.

Delete the fifth paragraph and replace with the following:

The loose thickness of each layer of fill material before compaction shall not exceed 8 inches.

Delete the sixth paragraph.

Delete the seventh paragraph and replace with the following:

Broken Portland cement concrete and bituminous type pavement obtained from the project excavations will not be permitted in the fill.

211.5 MEASUREMENT: *Delete in its entirety and replace with the following:*

No separate measure will be made for fill construction.

211.6 PAYMENT: *Delete in its entirety and replace with the following:*

No separate payment will be made for fill construction the cost of which is considered under the bid item Earthwork.

SECTION 301
SUBGRADE PREPARATION

301.3 RELATIVE COMPACTION: *COP MAG Supplements is modified to add*:

Relative compaction shall be as outlined in (A), (B), above or per the recommendations in the geotechnical report. If a conflict occurs between the geotechnical reports and items (A), (B), the recommendations of the geotechnical report shall be followed.

301.7 MEASUREMENT: *Delete and replace with the following*:

No separate measurement will be made for subgrade preparation.

301.8 PAYMENT: *Delete and replace with the following*:

No separate payment will be made for Subgrade Preparation including any stripping, scarifying, grading, excavation, hauling, filling, compacting, and disposing of excess or unsuitable materials; the cost of which is considered included in the price of other items of work for which the subgrade preparation is required.

SECTION 310
PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE

310.3 COMPACTION: *COP MAG Supplements is modified to add:*

Compaction shall be as outlined in (A) and (B) above or per the recommendations in the geotechnical report. If a conflict occurs between the geotechnical report and items (A) and (B) the recommendations of the geotechnical report shall be followed.

310.5 PAYMENT: *COP MAG Supplements delete and replace with the following:*

No separate measurement or payment will be made for the supplying or placing of aggregate base course when it is associated with pavement, decomposed granite, or other type of topping surface, the cost of which is considered included in the cost of the item of work for which aggregate base course is required.

Measurement and payment for Compacted AB will be measured and paid per cubic yard of aggregate base installed and compacted in place.

SECTION 340
CONCRETE FLATWORK

340.1 DESCRIPTION: *Is modified to add*:

Concrete placement on this project will be held to a high standard for aesthetic quality and visual appearance of the finished product.

340.2 MATERIALS: *Delete the first sentence and replace with the following*:

Concrete shall be as specified on the plans, special provisions, and standard details, but shall be a minimum of MAG class 'A'.

Add the following:

340.2.2 Steel Reinforcement: Steel Reinforcing shall be in accordance with MAG standard specification section 727

Add the following:

340.3.9.1 Sample Panels: For each color, finish, and textured concrete paving type Contractor shall provide sample panel(s) 5 foot by 5 foot in size, or as stated in the project plans, for approval by the engineer. Samples of each type of concrete header shall be provided in a 5 foot length by width of header for each color, finish, and texture as called for on the project plans. Samples shall incorporate a minimum of one expansion joint and control joint of each type as called for on the project plans. Concrete for samples shall utilize the same approved mix design as will actually be used in the project work.

Contractor will be required to provide as many samples as required, up to five (5) sample panels for each color and textured concrete, to achieve the aesthetic intent and quality of workmanship to the satisfaction of the Engineer. The approved sample panel (s) shall remain in place on site for the duration of the project for a standard of reference for quality. No separate measurement or payment will be made for sample panels.

340.3.10 Deficiencies: *is modified to add*: Any concrete placed on the project that is not of the same quality as the approved sample panel will be removed and replaced by the contractor. Contractor is responsible for securing the project site and monitoring concrete pours and placements to ensure that concrete is of sufficient hardness that scratching, etching, and/or other type of marring by vandalism is not able to occur.

Cracked, broken, or marred concrete will not be accepted. Misshapen, deformed or poorly finished concrete will not be accepted. Contractor will remove and replace any concrete to

the nearest control or expansion joint. All control joints shall be saw cut in accordance with Section 601. Patching of concrete will not be accepted. All removal and replacement of unacceptable concrete will be at no additional cost to the Contracting Agency.

SECTION 350
REMOVAL OF EXISTING IMPROVEMENTS

350.2.2 Others: *is modified to add*:

All existing concrete shall be fully removed from the site and properly disposed of by the contractor. Demoed concrete shall not be buried on site.

All voids left from removals shall be filled and compacted in accordance with Section 201 and 211.

Swing set shall be removed without damage and relocated with similar footings and reinforcement. The swing shall be replaced in kind and size if damaged.

Any metal items removed from the site shall be taken to a local scrap yard/recycling center by the contractor and recycled.

Contractor is responsible for all transportation and legal proper disposal of all removal items.

SECTION 355
UTILITY POTHOLES-KEYHOLE METHOD

355.8 PAYMENT: *Delete in its entirety and replace with the following*:
No separate measurement or payment will be made for potholing, the cost of which is considered to be included in the cost of the item being installed which requires potholing and location of other existing utilities.

SECTION 401
TRAFFIC CONTROL

401.10 MEASUREMENT: *is modified to add the following*:

Measurement for **MAINTENANCE OF TRAFFIC** shall be made on a lump sum basis. This lump sum measurement shall include all materials, equipment and labor necessary to facilitate traffic control per the contract documents. Items of traffic control include but are not limited to the obliteration of existing and temporary pavement markings used for traffic control, flagmen, barricades, sign panels, sign stands, warning lights, message boards, pilot cars, and related temporary pavements and steel plates.

No direct measurement of individual traffic control elements or devices will be made. All traffic control devices, unless otherwise noted, shall be considered as included in the lump sum measurement for **MAINTENANCE OF TRAFFIC** bid item.

No direct measurement for temporary pavements or removal of such will be made. All sawcutting, grading, aggregate base course materials, asphaltic concrete pavement, labor, and equipment for temporary pavements shall be considered as included in the lump sum measurement for **MAINTENANCE OF TRAFFIC** bid item.

SECTION 424
GRADING

424.1 DESCRIPTION: *Delete in its entirety and replace with the following*:

This grading shall include all work necessary to bring the surface of the site to the grade and cross-sections shown on the plans or as directed by the Engineer. This work shall occur after the initial Earthwork (Mass Grading) has occurred.

424.2 ROUGH GRADING: *Delete (A) in its entirety and replace with the following*:

Fill material shall contain no rocks over one-inch (1") in diameter, broken concrete, or debris of any nature.

424.4 PAYMENT: *Delete in its entirety and replace with the following*:

Fill material shall contain no rocks over one-inch (1") in diameter, broken concrete, or debris of any nature.

SECTION 425
TOPSOIL

425.1 DESCRIPTION: *Add the following*:
This work shall also consist of salvaging and stockpiling of existing on site topsoil and placement of salvaged topsoil in planting areas.

425.3 CONSTRUCTION METHODS: *Add the following*:

425.3.2 Salvaging and placement of topsoil: After clearing and grubbing has occurred and prior to grading operations the contractor and engineer will walk the site to determine any areas where the existing topsoil should either not be salvaged and used for planting areas and/or select preferred existing top soil areas that should be salvaged and used for planting areas. Upon approval from the engineer remove from the top twelve inches of "preferred" topsoil and place in a stockpile on-site a quantity that will cover (plate) the planting areas to a depth of eight inches; allowing for a shrink factor of 20%. The stockpile shall be placed in a pile no higher than three feet. During construction no driving or dumping shall be allowed on the stockpile. The stockpile shall be kept free of weeds, trash, and construction debris during the entire construction period.

425.4 MEASUREMENT: *Delete and replace with the following*:

No separate measurement or payment will be made for salvage, stockpiling, and plating of topsoil.

425.5 PAYMENT: *Delete and replace with the following*:

No separate payment will be made for salvage, stockpiling, and plating of topsoil, the cost of which is considered included within other landscape items.

SECTION 430
LANDSCAPING AND PLANTING

430.2.GENERAL: *Add the following to the list of materials to be certified (14th paragraph)*:

Decomposed Granite

Add the following:

Certification shall indicate suppliers name, address, telephone number, date of purchase, name, model number and technical description of item purchased, and quantity of each item purchased.

430.4 PREPARING THE SITE FOR LANDSCAPING: *Delete the 2nd sentence of the 2nd paragraph and replace with the following*:
Removal includes digging out stumps and roots to a depth as specified in Section 201.

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

430.5.4 Plant Location: *Delete in its entirety and replace with the following*:

The Contractor shall stake the location of planting areas and planting pits prior to any excavation. Subject to the Engineer's approval, minor relocations shall be done at this time to avoid unsuitable conditions, such as utilities, rocky areas, poor soil, etc. Prior to planting, a percolation test shall be performed on tree pits and all saguaro and ocotillo planting pits to determine adequate drainage. Fill pit half-full of water. Allow 24 hours to drain. If drainage does not occur within 24 hours, new locations for the plant(s) may be selected by Engineer. Engineer also reserves the right to direct additional work to achieve proper drainage on a plant-by-plant basis. Where drainage is insufficient, install a rock caisson. Each caisson shall have a four-foot deep (4') by 8-inch (8") diameter hole filled with AASHTO No 57 Stone filled to the bottom of the pit. Increase the depth of the caisson to eight feet if encountering ground water, caliche, or impervious rock. No separate measurement or payment will be made for the installation of rock caisson.

Existing plant materials shall be protected in place. The contractor shall be responsible for maintaining the health and vigor of all plant material within the construction area including the limit of construction, staging areas, and irrigation systems impacted by construction activities. The contractor shall maintain adequate irrigation to existing plant materials.

Existing plant materials that are deemed by the Owner to be dead and/or declined beyond salvage shall be replaced in type, kind and size by the contractor at no expense to the owner.

430.5.6 Tree and Shrub Plantings: *Delete the 1st sentence and replace with the following:*

The size of the pits shall be a minimum of two (2) times the diameter of the plan root ball or container size, and only as deep as the rootball.
Add the following:

All planting pits shall be completely filled with water and allowed to completely drain so that all sides and bottom soil of planting pit is thoroughly moist prior to any plant being installed. Provide twenty (20) pounds of Live Earth (or equal) Humate soil conditioner per cubic yard of plant backfill mix.

430.6 LAWN AREAS: *Delete in its entirety and replace with the following:*
The City of Page will determine what method of turf grass material (Hydro Sprigging, Sodding) will be used on this project based on time of year when turf installation and establishment are programmed to occur as identified on the Contractor construction schedule. The method identified in the bid schedule shall dictate what is anticipated, but the City maintains the right to modify that selection based on the construction window.

430.6.1 Definitions:
Finish Grade: Elevation of finished surface of planting soil.

Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

Sand: Sand that is imported for use as a plated soil profile.

430.6.2 Submittal and Qualification Requirements:
Certification of turfgrass sod and sprigs. Include identification of source and name and telephone number of supplier.

Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

Qualification Data: For qualified landscape Installer.

Product Certificates: For sand, soil amendments and fertilizers, from manufacturer.

Material Test Reports: For sand, existing native surface topsoil and imported or manufactured topsoil.

Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf areas during a calendar year. Submit before expiration of required initial maintenance periods.

Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.

Professional Membership: Installer shall be a member in good standing with Arizona Contractors Association and the American Nursery and Landscape Association, Arizona Branch.

Experience: Ten years' experience in turf installation.

Installer's Field Supervision: Require installer to maintain an experienced full-time supervisor on Project site when work is in progress.

Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the Arizona State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.

Testing methods and written recommendations shall comply with USDA's Handbook No. 60. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Landscape Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.

Report suitability of tested soil for turf growth.

Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

Dirty Sand Analysis (only if sand based turf is shown on the plans): Provide a sieve analysis of the sand it should comply with the Gradation provided within this specification.

Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in Turfgrass Producers International (TPI's) "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

Bulk Materials:
Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

430.6.3 Installation Considerations:

Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

Seasonal conditions:

Note that if the contractor elects to install overseeded sod the contractor is responsible to guarantee that the sod will make a healthy transition from overseeded rye species to the Hybrid Bermuda the following spring. If the turf fails to make an adequate transition between the species and seasons as determined by the City of Page, the contractor shall be responsible for new sod turf replacement at no additional cost to the City.

Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in 430.6.5. Begin maintenance immediately after each area is planted and continue until acceptable turf is established and turned over to City of Page.

Sod Turf: Four (4) months from date of written Landscape Acceptance.
When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

430.6.4 Materials:

Sod:
Healthy living material only certified Turfgrass sod complying with ASPA specifications for machine cut thickness, size, strength, moisture content and mowed height and fee of weeds and undesirable native grasses will be used. Provide viable sod of uniform density, color, texture, strongly rooted and capable of vigorous growth and development when planted. Thatch thickness shall not exceed ¼".

Species/Types:
Soil Sod: Grown on Soil. Species: Hybrid Bermuda grass: "Tifway 419"

Sand Sod: Grown on Sand (Only allowed if shown on plans). Species: Hybrid Bermuda grass: "Tifway 419"

Inorganic Soil Amendments:
Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

- Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.

Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

Sand: "Dirty Sand" natural or manufactured, and free of toxic materials.

Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

Organic Soil Amendments:
Compost: Compost shall consist of composted organic vegetative materials. Prior to being furnished on the project, compost mulch samples shall be tested for the specified microbiological and nutrient conditions, including maturity and stability, by a testing laboratory approved for testing of organic materials. Written test results shall be submitted to the City's representative for approval.

Compost material shall be dark brown in color with the parent material composted and no longer visible. The structure shall be a mixture of fine and medium size particles and humus

crumbs. The maximum particle size shall be within the capacity of the contractor's equipment for application to the constructed slopes. The odor shall be that of rich humus with no ammonia or anaerobic odors.

Compost shall also meet the requirements of Compost Table below:

COMPOST TABLE	
Cation Exchange Capacity (CEC)	Greater than 50 meq/100 g
Carbon : Nitrogen Ratio (C : N)	Less than 20 :1
PH (of extract)	6 – 8.5
Organic Matter Content	Greater than 25%
Total Nitrogen (not added)	Greater than 1%
Humic Acid	Greater than 5%
Maturity Index	Greater than 50% on Maturity Index at a 10 :1 ratio
Stability	Less than 100 mg O2/Kg compost dry solids – hour

Fertilizers:
Bonemeal: Commercial, raw or steamed, finely ground; a minimum of percent nitrogen and 20 percent phosphoric acid.

Commercial Fertilizer shall be Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

- Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

Planting Soils:
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 ½" and larger in any dimension, and other extraneous materials harmful to plant growth.

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.

Topsoil Source: Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.

Sand: Sand for "Turf on Sand" ,only for areas identified and shown on the plans, shall be:

Common Name: Dirty Sand

Sieve	Average Retained
#4	5
#10	20
#18	20
#35 & #60 Combined	35
#100	25
#270	20
#270 PAN	8

Target KSat: The proposed range of KSat is 2 to 15. Since the greatest risk falls with the KSat running too low, the target will be 10. The City of Page will be advised if the range falls outside of 4 to 12.

Mulches:
Straw Mulch: Provide air-dry, clean, mildew- and seed-free, straw of wheat, only. Rye straw and oat straw will not be accepted.

Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

Compost Mulch: Compost shall consist of composted organic vegetative materials. Prior to being furnished on the project, compost mulch samples shall be tested for the specified microbiological and nutrient conditions, including maturity and stability, by a testing laboratory approved for testing of organic materials. Written test results shall be submitted to the Landscape Architect for approval.

Compost material shall be dark brown in color with the parent material composted and no longer visible. The structure shall be a mixture of fine and medium size particles and humus crumbs. The maximum particle size shall be within the capacity of the contractor's equipment for application to the constructed slopes. The odor shall be that of rich humus with no ammonia or anaerobic odors.

Compost shall also meet the requirements of Table 2:

TABLE 2	
Cation Exchange Capacity (CEC)	Greater than 50 meq/100 g
Carbon : Nitrogen Ratio (C : N)	Less than 20 :1
PH (of extract)	6 – 8.5
Organic Matter Content	Greater than 25%
Total Nitrogen (not added)	Greater than 1%
Humic Acid	Greater than 5%
Maturity Index	Greater than 50% on Maturity Index at a 10 :1 ratio
Stability	Less than 100 mg O2/Kg compost dry solids – hour

Wood cellulose fiber mulch shall be from thermo-mechanically processed wood, processed to contain no growth germination inhibiting factors. The mulch shall be from virgin wood manufactured and processed so the fibers will remain in uniform suspension in water under agitation to form homogenous slurry. Paper products will not be considered as virgin wood.

The wood fiber mulch shall have the properties shown in Table 3 below:

TABLE 3	
Virgin Wood Cellulose Fiber	90% min.
Recycled Cellulose Fiber	10% max.
Ash Content	0.8% +/-0.3%
PH	4.5 +/-1.0
Water Holding Capacity	10:1 (water:fiber) Min.

Nonasphaltic Tackifier: Tacking agent shall be a naturally occurring organic compound and be non toxic. It shall be a product typically used for binding soil and mulch in sprigging or erosion control operations. Approved types shall consist of mucilage or gum by dry weight as active ingredient obtained from guar or plantago. The tacking agent shall be labeled indicating the type and mucilage purity.

The contractor shall have the tacking agent swell volume tested by an approved testing laboratory using the USP method. The standard swell volume shall be considered at 30

milliliters per gram. Material shall have a swell volume of at least 24 milliliters per gram. Certified laboratory test results shall be furnished to the Landscape Architect for each shipment of homogenous consistency to be used on project areas or as directed by the Landscape Architect. Tacking agent rates shall be adjusted to compensate for swell volume variation. Material tested with lesser volume shall have the tacking agent rate increased by the same percentage of decrease in swell volume from the standard 30 milliliters per gram. Material tested with greater volume may reduce tacking agent rates by the same percentage of increase in swell volume from the standard 30 milliliters per gram. Tacking agent shall be pure material without other starches, bentonite, or other compounds that would alter the swell volume test results of mucilage, or the effectiveness of the tacking.

Herbicides and Pesticides:
Pesticide: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

430.6.5 Installation: Examine areas to be planted for compliance with requirements and other conditions affecting performance.

Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

Uniformly moisten excessively dry soil that is not workable and which is too dusty.

Proceed with installation only after unsatisfactory conditions have been corrected.
If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

Protect grade stakes set by others until directed to remove them.

Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

Limit turf subgrade preparation to areas that can be successfully planted and completed to owner's satisfaction in a 24 hour period.

Newly Graded Subgrades: Loosen subgrade to a minimum depth of six (6) inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

Apply fertilizer recommended by soil testing lab directly to subgrade before loosening. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

Delay mixing fertilizer with planting soil if planting will not proceed within two (2) working days.

Mix lime with dry soil before mixing fertilizer.

Spread planting soil or sand (see plans for soil or sand areas) to a depth of six (6) inches, but not less than required, to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 6 inches of subgrade by tilling. Spread remainder of planting soil.

Spread sand on loosened subgrade. No driving on subgrade allowed. Work sand from edge.

Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

- Remove existing grass, vegetation, and turf. Do not mix into surface soil.
- Loosen surface soil to a depth of at least six (6) inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top six (6) inches of soil. Till soil to a homogeneous mixture of fine texture.
- Apply fertilizer as recommended by lab directly to surface soil before loosening.
- Remove stones larger than one (1) inch in any dimension and sticks, roots, trash, and other extraneous matter.

- Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

Before planting, obtain City of Page acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

Forty-eight (48) hours prior to turf installation operations fine grade lawn areas to a smooth, even surface with a loose uniformly fine texture. Finish drag or rake lawn areas removing all deleterious material ½" or larger from the surface and to a depth of 2 inches below the surface. Roll the lawn surface to obtain the desired compaction and remove ridges. Finish grade shall be as shown on the plans. Finish grade shall be set 1-1/2" inches below adjacent paving, curb and headers. The City of Page representative shall be able to push a hand probe to a depth of four (4) inches at any location where turf is to be established

Sodding:
Lay sod to form a solid mass with tightly fitted joints. Butt end and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset 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.

Saturate sod with fine water spray within two (2) hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1.5 inches below the sod.

Turf Maintenance:
Contractor shall develop and submit a minimum of three (3) months prior to any turf maintenance activities a turf maintenance plan. The plan shall be submitted to the City of Page for approval prior to any turf maintenance activities. The plan should include a month by month breakdown of turf maintenance activities showing but not limited to; fertilization schedules, watering/irrigation schedule, aeration program, mowing program, weed control (by type and season), insect/pest control treatments, and resodding efforts if required.

Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade,

and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.

Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

Watering: If permanent irrigation system is not functioning contractor shall install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 6 inches.

Schedule watering to prevent wilting, puddling, erosion, and displacement of sprig or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 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. Schedule initial and subsequent mowings to maintain the following grass height:

Mow bermudagrass variety to a height of 1/2 to 3/4 inch by use of a reel mower only- rotary style mower is not acceptable.

Mow ryegrass variety to a height of ½ to 1 inch

Turf Post-fertilization: Apply fertilizer after initial mowing and when grass is dry.

Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

Turf Post-Insect Control: Apply pest control agents at appropriate seasonal schedules to control insects that may impact turf areas. All applications of any insecticide shall be applied by a licensed and bonded applicator per manufacturer instructions and materials approved in advance by City of Page staff.

Satisfactory Turf:
Turf installations shall meet the following criteria as determined by Landscape Architect or City of Page representative:

Satisfactory Sprigged Turf: At end of construction period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. area and bare spots not exceeding 5 by 5 inches

Satisfactory Sodded Turf: At end of construction period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 100 percent over any 10 sq. ft. area and bare spots not exceeding 2 by 2 inches

Satisfactory Overseeded Sod Turf: At end of construction period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 100 percent over any 10 sq. ft. area and bare spots not exceeding 2 by 2 inches. The contractor shall be responsible to replace any and all overseeded sod areas if the overseeded rye grass does not adequately transition back to a healthy vibrant stand of the base Bermuda species the following spring. Acceptability of the transition between species will be determined by City of Page staff.

Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

All satisfactory turf areas will not be considered acceptable or complete until all turf surface areas have been leveled and all turf areas are top dressed with a City approved top dressing material.

Pesticide Application:
Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

At the final project acceptance at the end of the warranty period, the Landscape Architect or Owner's Representative will make a final acceptance inspection of all planted areas. If at that time, there is any appearance of plant material insect or fungus/pathogen infestation prior to the acceptance, the Contractor is responsible to eradicate and treat for the specific issue and replace any and all damaged turf areas and plant materials.

Cleanup and Protection:
Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

Remove non-degradable erosion-control measures after grass establishment period.

430.8 DECOMPOSED GRANITE AREA: *Delete in its entirety and replace with the following:* Decomposed granite shall be native, local, desert, decomposed granite stone at the size and color specified on the plans. The decomposed granite shall be from a single source, free from coating, clay, caliche or organic matter. Contractor shall provide Engineer with a one-ton sample of each material spread on-site to the required depth as indicated on the plans as well as a gradation report showing that the proposed granite is in compliance with the required gradations for review and approval a minimum of 15 working days prior to installation. Color to be as indicated on plans.

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

Any existing weeds or Bermuda grass growing in designated landscape areas shall be treated with a post-emergent spray, such as "Round-up", or an approved equal. Any existing or new trees or vegetation shall be protected from the spray drift. There will be no separate payment for the weed spraying. Bermuda grass or weeds must be completely eradicated from all areas of the landscape and where designated by the Engineer. The Contractor shall remove all non-planted vegetation from all areas designated to receive decomposed granite (by chemical or mechanical means) and maintain the designated areas "vegetation-free" for a minimum period of 40 working days prior to placement of the decomposed granite, or as specified by the Engineer.

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

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

Contractor shall apply three (3) applications of pre-emergent:

- One application of pre-emergent herbicide prior to installing granite
- One application after granite has been installed, compacted, and raked level
- One application 30 Days prior to the end of the maintenance period

The Engineer is to be notified prior to all pre-emergent applications.

The pre-emergent herbicide shall be applied in the manner recommended by the manufacturer to prevent germination of noxious weeds, and shall be equivalent to Surflan, or an approved equal, and shall be applied at a rate specified by the manufacture to control weeds in an ornamental setting. Pre-emergent herbicide shall be applied to the designated granite areas, prior to the final water settling operation. Water to activate the pre-emergent herbicide shall be applied to the areas of the herbicide application as recommended by the manufacturer's label. The amount of water specified by the manufacturer may be adjusted due to rainfall, if approved by the Engineer.

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

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

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

430.10 HEADER/EDGER INSTALLATION: *Add the Following*:
Concrete shall be as specified on the plans. If no class is specified on the plans concrete shall be a minimum of Class A.

430.12 MAINTENANCE: *Add the following*:

The contractor shall provide adequate personnel to accomplish maintenance.

The contractor shall provide a maintenance schedule for the duration of the maintenance period to the Engineer for review and approval. The maintenance schedule shall include the following:

- the specific day of the week and the specific time the Landscape Maintenance will occur and expected duration of time on the project site
- the specific activities that will be taking place at each maintenance visit

Landscape Maintenance shall be in accordance with MAG Standard Specifications and City supplements to MAG and shall include, but not be limited to, mowing of turf areas, dethatching of turf areas, aerification of turf areas, inspection of plant materials, grooming of inert ground cover, pesticide and herbicide applications, and inspections of the irrigation systems with appropriate repairs, replacements, and adjustments as required for a fully operational irrigation system able to provide 100% water coverage to plant materials. Irrigation modifications shall be reviewed and approved by the Engineer prior to the work being completed. Any modifications to the irrigation systems shall be as-built by the Contractor.

The Contractor shall inspect the plants at least once per week and perform appropriate maintenance. Maintain trees and shrubs in a healthy, growing condition by performing necessary operations, including the following:

Prune and shape only as necessary to maintain the usual form of the plant, to stimulate growth, to maintain growth within space limitations, to retain required height and spread, to provide for sight visibility, and to maintain a natural appearance. Prune, thin out and shape trees and shrubs in accordance with standard horticultural practices. Unless otherwise directed by the Engineer, do not cut tree leaders, and remove only injured or dead branches. All pruning shall occur per the direction of the Engineer. All pruning shall be by a certified arborist or under the direct supervision of a certified arborist. Contractor shall submit certifications of arborist to the Engineer for review and approval a minimum of 10 working days prior to any pruning activities taking place.

Remove from site any excessively pruned or malformed stock resulting from improper pruning and replace at no additional cost to the Contracting Agency. Do not shear plant material. Any plant material improperly maintained, as determined by the Engineer, the Contractor shall remove and replace at no additional cost to the Contracting Agency.

In groundcover area, keep areas free of weeds. Use recommended, legally approved, herbicides whenever possible. Avoid frequent soil cultivation. Keep all landscape areas free of broadleaf and grassy weeds with pre-emergent and/or selective contact herbicides. Cultivating or hoeing weeds will not be allowed practice. The Contractor shall eradicate all noxious weeds or the Contracting Agency will not accept the project.

The Contractor shall notify the Engineer 48 hours prior to the application of any chemical treatments. Qualified personnel shall do chemical mixing and use the application equipment in the presence of the Engineer. An Arizona pesticide licensed contractor shall perform all chemical control. The Engineer shall approve the personnel, materials and methods of application of chemicals prior to beginning the operation.

Inspect landscape granite weekly. Remove man-made debris, weeds, and grass controlled with chemicals. Any erosion that has occurred in granite areas will be the responsibility of the Contractor to remedy, repair, and replace granite.

Existing plant material shall be protected in place. The health and vigor of the plant material impacted by construction, including but not limited to impacts to existing irrigation, will be the responsibility of the contractor. Mortality of existing plant material will require the replacement of the dead and/or beyond recoverable plant material with like kind and size. It will be the sole discretion of the Owner if the plant material is deemed unrecoverable.

430.13.1 Landscaping: *Delete the 1st sentence and replace with the following*:
The Plant Establishment Period shall be one hundred and twenty (120) days and shall take place within the working days for the project.

430.14 PLANT WARRANTY AND GUARANTEE: *Delete the 2nd sentence and replace with the following*:
All plant material and installation, exclusive of trees, saguaros and ocotillos, shall be 100% guaranteed by the Contractor for an additional 120 Calendar Days following completion of the Plant Establishment and Maintenance Period and the acceptance of the planting areas by the Engineer.

Add the following:
Contractor shall replace plants within seven days of notification from the Engineer. Install replacement plants of the same kind and size as originally specified and as described in the contract documents.

Contractor shall replace trees within seven days of notification from the Engineer. Install replacement trees of the same kind and size as originally specified and as described in the contract documents.

SECTION 440
LANDSCAPE IRRIGATION SYSTEM INSTALLATION

440.2 GENERAL: *Add the following*:
The plans indicate a detailed layout of irrigation lines, laterals, and emitter locations; however, some of the piping may be shown diagrammatically outside of the planting areas for graphic clarity. The contractor shall follow the intent of the plan layout and shall review and obtain written approval from the Owner's Authorized Representative for any requested changes.

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

A landscape maintenance period is a part of this contract and shall include monitoring of the irrigation systems on a weekly basis or more often as required to keep the system in proper operating condition. Maintenance activities shall include all controller adjustments, all repairs to any type of irrigation equipment installed as a part of the construction phase of the contract. All repairs to the irrigation system shall be completed within 24 hours' notice of the required repair. Any loss of plant material due to irrigation system deficiencies shall be replaced with like sized and quality material.

The contractor shall maintain the work during construction and until the project is accepted.

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

Provide work and materials in accordance with latest edition of National Electric Code, Uniform Plumbing Code as published by the International Association of Plumbing and Mechanical Officials, and applicable laws, regulations and codes of governing authorities.

All irrigation equipment and materials shall be supplied by the manufacturers as indicated on the plans, details and specifications. If no manufacturer is specified, the contractor shall supply as part of his submittal package complete manufacturer cut sheets detailing materials, construction methods and standards

All materials utilized on this project are intended to be new and of the best grade available. No used, salvaged, reclaimed, remanufactured, or seconds will be accepted.

Add the following:

440.2.1 QUALITY ASSURANCES:

The irrigation contractor shall be licensed by the State of Arizona with a K-21 classification "Landscaping and Irrigation Systems" license in good standing. The irrigation contractor shall also be a "Certified Irrigation Contractor" as certified by the Irrigation Association.

The irrigation contractor shall submit evidence of possession in good standing for the required licenses and certifications at the pre-construction meeting.

The irrigation contractor shall, at the pre-construction conference, submit the name of the project superintendent and the on-site foreman who will be in charge of daily project activities. The superintendent and foreman shall have a minimum of 5 years' experience in the construction of similar projects in size and complexity.

The irrigation contractor shall not change the approved superintendent or on-site foreman without prior approval of the Engineer.

Once construction activities have commenced, it is the intention of this project that the job site be fully manned/staffed until the completion of the work without gaps in progress.

The contractor shall provide two week look ahead schedules of work site activities and material deliveries. Regularly scheduled weekly meetings shall be held to review the schedules, progress, quality control and other items as needed.

All materials and each part or detail of the work shall be subject to inspection by the Engineer. The Engineer shall be allowed access to all parts of the work and shall be furnished such information and assistance by the contractor as required to make a complete and detailed inspection.

The contractor shall schedule its operations to allow a reasonable amount of time for inspection of the work. The contractor shall not be entitled to additional compensation or an extension of the work time for delay resulting from such inspections.

All work found to be unacceptable or work or materials that were installed without inspection shall be removed and replaced at no additional cost.

Upon failure on the part of the contractor to comply with any order of the Engineer under provisions of this subsection, the Engineer will have the authority to cause unacceptable work to be removed and to deduct the costs from any monies due the contractor.

440.2.2 Coordinate Work with Other Trades:

The irrigation contractor shall coordinate his work with the general contractor and the work of other trades conducting construction activities on the project site. The irrigation contractor

shall receive grades plus or minus 0.10 foot of the finished grade of the project. Beginning work shall constitute acceptance of grade and soil conditions.

The irrigation contractor shall arrange his work and shall place and dispose of the materials being used so as not to interfere with the operations of the other contractors within the limits of the same project and on adjoining projects. The contractor shall join the contractor's work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

440.2.3 SUBMITTALS:

- Ball valves
- Irrigation Controllers
- Bicoders
- Air Vacuum Release Valve
- Mainline Drain Assembly
- Master Valve
- Flow Sensor
- Quick couplers
- Turf Remote Control Valves
- Drip Remote Control Valves
- Valve Boxes
- Tracer Wire
- Turf Rotors
- Multi Outlet Emitters
- Emitter Boxes
- Rigid PVC pipes- all sizes and materials
- Flex pipes
- Distribution tubing
- Pipe glue, primer, tapes
- Fittings
- Swing joints
- Flushing end cap ball valves
- Geotextile Fabric
- Two Wire Control Cable
- Wire Connectors
- Control Wire PVC Conduit
- Lightning Arrestor
- Warning Tape
- Sleeving pipe

440.2.4 Record Drawings:
Do not permanently cover work until as-built information is recorded.

The record drawings shall show all changes in the Contract work, or work added, on these Record Drawings in a contrasting color, including work changed by Addendum or Bulletin

440.2.5 Operation and Maintenance Manuals:
The controller programs shall include programming indicating which programs will be operated concurrently and the total; system flow during individual and concurrent run programs. All programs will include cycle and soak periods for slope and soil considerations to minimize runoff. Programs shall also demonstrate adherence to a 6 hour (10:00pm to 4:00am) water window.

Maintenance manuals shall include manufacturer's parts sheets for all equipment installed. Provide an equipment source name address and phone number for each piece of equipment.

440.5. TRENCH EXCAVATION AND BACKFILL: *Replace the minimum depth over pipeline with the following*:

Depth over pipes and conduits shall be as indicated on the plans.

Add the following:

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

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

440.6. PIPE INSTALLATION: *Add the following*:

All mainline piping 2 ½" and smaller shall be solvent weld schedule 40 PVC conforming to ASTM D-1785.

All turf and drip lateral pipes shall be solvent weld schedule 40 PVC conforming to ASTM D-1785.

All fittings for use on 2 ½" and smaller mainline pressure pipe shall be schedule 80. Fittings for use on lateral piping shall be schedule 40. Only schedule 80 PVC fittings may be threaded. Use Teflon tape on threaded connections, pipe dope is not acceptable.

Install 3" detectable warning tape over all mainline pipes, 6" above the top of the installed pipe.

Install thrust blocks for fittings on pipe greater than or equal to 3-inch diameter or any diameter rubber gasket pipe. Use 3,000 PSI concrete, 2-mil plastic, and No. 4 Rebar. Use cast-in-place concrete bearing against undisturbed soil. Size, orientation and placement shall be as shown on the installation details. Wrap fitting with plastic to protect bolts, joint, and fitting from concrete. Install rebar as shown on the installation details. Do not allow PVC to come in contact with the thrust block.

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

440.7 VALVES, VALVE BOXES, AND SPECIAL EQUIPMENT: *Add the following*:

All valve boxes are to be green when in turf or tan when in granite, or purple when reclaim/effluent water is being utilized.

440.8 SPRINKLER HEAD INSTALLATION AND ADJUSTMENT: *Add the following*:
Emitter assemblies provide a connection to the 3/4" lateral line using a ½" S.D.R. 13.5, class 315 PVC (maximum length 15'), extension utilizing schedule 40 PVC fittings, and 1/2" flex hose riser (schedule 40)(maximum length 18") with 1/2" threaded male adaptor to receive the emitter. The 1/2" PVC will not be measured or paid and is to be considered included in the cost of the emitter assembly. The emitters shall be installed to the high side of the plant. Install emitters with the port quantity and flow rate as shown on the plans emitter schedule. Emitters shall extend 1/2" above finished grade. No use of 1/4" distribution tubing is allowed. Do not substitute multi-port emitters for single-port emitters.

Drip lateral flush end caps shall be installed at the end of the 3/4" drip lateral runs. Install at the locations shown on the plans per the plan details. Locate drip flush end caps within 10" round valve boxes. Where both tree and shrub drip laterals end at the same location it will be acceptable for both lateral line end caps to be located within the same 10" round valve box.

No separate measurement or payment will be made for the flush end cap assembly as shown on the project plans the cost of which is considered included in other items of work.

440.9 AUTOMATIC CONTROL SYSTEM INSTALLATION: *Add the following*:

Automatic controller shall be Irritrol #EGP8-S, 8 station (base model, expandable in the future) conventional wire controller with stainless steel wall mounted cabinet; #RM-WETHR-ETRS wired weather station; route new control wires to controller in one 2" conduit.

Ground controller per manufacturer's specifications. See electrical plans for power supply.

440.10 GENERAL WIRING: *Delete the 2nd paragraph and replace with the following*:

All control wiring shall be a conventional wire system utilizing Paige #P7001D cables or approved equal with #14 AWG solid core underground feeder type IUF & TWU wire. All wiring shall be installed within continuous gray PVC electrical conduit when below grade and within EMT conduit when above grade. All conduit ends shall be sealed.

440. 11 FLUSHING AND TESTING: *Add the following*:

The Contractor shall be responsible for controller, sprinkler, and emitter outlet adjustments for a period of one hundred twenty (120) days as described in the establishment period.

Add the following new section:

SECTION 441
IRRIGATION SLEEVES

441.1 DESCRIPTION:

Sleeves for under asphalt, concrete, pavements or other hardscape elements shall be size and schedule as noted on the plans. If no size is provided the sleeve shall be a minimum of two times the aggregate size of the pipes to be installed within the sleeve.

Boring will be permitted only where sleeves must pass under obstructions which cannot be removed or when approved by the Engineer. Any boring operations will be at no additional cost to the Contracting Agency. When any cutting or removal of asphalt and/or concrete work is necessary, it shall be saw cut in accordance with MAG Section 601.2.7. When sleeves on the drawings are shown in paved areas, but running parallel and adjacent to planted areas, the intent of the drawings is to install the sleeves in the planted area.

Sleeves shall be installed per details in plans.

Asphalt cut and patch operations necessary for sleeve installation outside of the street prism between curbs shall be considered incidental to the sleeve installation. All asphalt cutting shall be done with proper equipment to allow straight and true cuts through the entire depth of the asphalt being removed. Contractor shall replace any patch work if the patch compacts more than ½" or if any of the patches becomes dislodged within one year. All asphalt shall comply with MAG section 336 and MAG Standard Detail 200.

441.2 MEASUREMENT AND PAYMENT:
Measurement and payment shall be in accordance with Section 109. The lump sum or unit prices established in the proposal sheets shall be full compensation for furnishing labor, materials, tools and equipment, and performing work necessary to complete the landscape irrigation system described or specified in the contract documents.

SECTION 505
CONCRETE STRUCTURES

505.1 DESCRIPTION: *add the following*:

The work under this item shall also include the construction of the sedimentary cast in place concrete seat walls, retaining walls and other concrete structures.

Furnish materials, labor, transportation, services, and equipment necessary to furnish and install Lithocrete® Sedimentary Wall System as indicated on Drawings and as specified herein.

Only experienced Architectural Cast-in-place Concrete installers, certified to install (Lithocrete®) are acceptable for this project. Acceptance of certification will be based on proof of certification, experience and approved samples and mockups to be provided within 30 days after Notice to proceed. If timeframe is exceeded, suitable certification/experience is not provided, or mockups are unacceptable – installer will not be eligible to install project.

505.3 FORMS: *delete the second sentence of the 4th paragraph and replace with following*:

All plywood shall be at a minimum APA Plyform Class I, B-B exterior type, mill oiled. All plywood shall be manufactured to U.S. Product Standard PS 1-95 and must meet all APA standards. If plywood is used to create any smooth, non-textured surface, Medium Density Overlay (MDO) plywood shall be used. MDO shall be of exterior type with one face of medium density overlay as described in voluntary product standard PS-1, and be specifically manufactured for concrete formwork, with all edges sealed.

505.6.6 Sedimentary Cast in Place Concrete Materials: Add the Following:

Portland Cement to be Type I, IA, II, IIA, III, IIIA, IV, and V cements, to conform to ASTM C150. Use same brand of cement from single source throughout entire project. Sedimentary wall colors to be formulated by installer per Lithocrete® wall systems. Special colors and textures are achieved per Lithocrete® sedimentary wall systems with consent of the design intent of the project.

Washed Concrete Sand, use Clean, hard, and durable washed concrete sand, conforming to ASTM C33. Use same sand from single source throughout entire project.

Coarse Aggregate use Clean, hard, and durable coarse aggregate, conforming to ASTM C33. Use same aggregate from single source throughout entire project.

LITHOCRETE® aggregate shall be ½" angular, color to match integral color. Submit samples for approval prior to installation. Lithocrete® aggregate may vary, however must be consistent with shop drawings.

Admixtures: Integral Concrete Coloring Admixture: Refer to project Shop Drawings for color type. All Lithocrete sedimentary wall system's incorporate project specific color systems and shall be referenced in the project submittal package after contract and verified in the close out package to ownership.

Air Entrainment Admixtures: Conforming to ASTM C260.

Acceptable Manufacturers:

Grace Construction Products; Daravair®, (800) 433-0020 or
www.graceconstruction.com/concrete/air_entraining.html#daravair.

Master Builders, Inc.; Micro-Air®, (800) 628-9990 or
www.masterbuilders.com/MB/pub/Product.asp?TypeCat=2&ParentID=78&ProductID=22.

Water Reducing Admixtures: Conforming to ASTM C494, Type A.

Acceptable Manufacturers:
Grace Construction Products; WRDA® (800) 433-0020
www.graceconstruction.com/concrete/water_reducers.html#wrda.

Master Builders, Inc.; Micro-Air® (800) 628-9990 or www.masterbuilders.com.

Integral Concrete Coloring Admixture to be Davis Colors. See plans for type. Color mixtures will be applied as per the manufacturer's specifications.

Proportion and mix of cement, aggregate, admixture and water to attain required plasticity and strength in accordance with current edition of ACI Manual of Concrete Practice and PCA "Design and Control of Concrete Mixtures."

Concrete mixtures to be designed by an approved commercial testing laboratory, using approved materials to obtain specified minimum compressive strength, by owner.

Concrete Mix Criteria:

1. Slump: minimum of 3 inch, max 8 inch to match mockup.
2. Minimum PSI Rating at 28 days: 3,000.
3. Maximum Water/cement ratio: 0.65.
4. Coarse aggregates depending on desired appearance may vary from 1" to 3/8".

5. Admixtures:
   a. Air entrainment: Per local standards
6. Fly ash: ASTM C618 – Type F.
7. Non-Chloride Accelerators: Do not use corrosive accelerators such as calcium chloride.
8. Concrete Delivery: Use of concrete loads exceeding 90 minutes from time of batch plant must be approved by Owner's Authorized Representative.
9. Ensure that batch plant guarantees single source supply for cement, sand, and aggregate for the entire project.

LITHOCRETE® SEDIMENTARY WALL INSTALLATION

1. Lithocrete® Sedimentary walls are a patented wall process. Installation of Lithocrete® walls must be performed by a licensed Lithocrete® installer only.

2. For certified Lithocrete® installers, see elsewhere in this specification or contact Lithocrete® at 800-899-9921. (Approved installer Progressive Hardscapes)

3. Lithocrete® is installed in accordance with U.S. Patents: U.S. Patents (# 5,887,399- # 5,950,394 - # 6,082,074)(TM# 646,052, TM # 1,879,329, TM # 2,358,183, TM # 2,358,054 Reg # 75/646,052)

4. Lithocrete® process incorporates use of following patented products:Lithocrete® Etch Retarder®.
   LithosealTM Sealer.

Seal surface of wall surface using Lithocrete® Sealer.

505.6.3.3 Construction Requirements:
(2) Shop Drawings: *Add the Following*:

505.6.6 Mock Up: The Contractor is required to construct a fully complete mockup panel(s) for each varying finish that occurs on concrete structures. Prior to construction, provide up to (3) 6-foot long Lithocrete® sedimentary wall system as specified on Drawings.

A fully complete mock-up panel shall consist of a fully finished panel and shall be representative of how the final structure aesthetic enhancements will appear. All concrete structure aesthetic enhancements shall receive a minimum Class II finish.

The mockup seatwall(s) and retaining wall(s) shall be constructed and erected a minimum of 30 days prior to production of the walls for review and approval by the Engineer. No

construction is to begin until the mockup(s) are accepted by the Engineer. The contractor may have to construct an additional two (2) mockup seatwalls and/or retaining walls, for a maximum total of three (3) mockup seatwalls and/or retaining walls until a final mockup texture, finish, etc. are approved by the Engineer.

The mock up panel(s) shall be set in a vertical position, reinforced, and able to remain in place until the project improvements are accepted by the Engineer. The mock up seatwall(s) shall remain in place throughout the construction and shall be used as a reference standard for quality of finish and will serve as one source for comparison during construction and as a means of comparison to achieve final acceptance. The acceptable structure aesthetic enhancements should have a pleasing appearance with minimal color and texture variations and minimal surface defects when viewed at a distance of five (5) feet. Final acceptance of the mockup panel will be determined by the Engineer.

The Contractor shall remove and properly dispose of the mock up seatwalls(s) and retaining wall(s) at the completion of the project as directed by the Engineer.

No separate measurement or payment will be made for the mock-ups the cost of which is considered included in the price of the concrete structure being treated.

505.8 Curing: Add the following:

After initial Lithocrete® installation, cure for minimum 7 days.

505.9 Finishing Concrete: Add the following:

Due to the natural appearance of sedimentary walls it is common to not use control joints, random cracking is part of the overall aesthetics of the system. Random cracking is acceptable in the finished product. Lithocrete® Sedimentary walls contain natural materials and acceptance is at the sole discretion of Lithocrete® should lack of owner acceptance become an Issue.

505.11.1 Reinforcing Steel: delete in its entirety and replace with following:

No separate measurement will be made for reinforcing steel.

505.12.1 Reinforcing Steel: *delete in its entirety and replace with the following*:

No separate payment will be made for reinforcing steel the cost of which is considered included in the structure for which it is associated with.

505.12 PAYMENT: *Add the following*:

Payment for the Seatwalls will be measured on a line foot basis for a fully complete and installed.

Payment for the cast in place retaining will be measured on a line foot basis fully complete and installed.

505.12.3 Minor Concrete Structures and Accessories: *delete in its entirety and replace with the following*:

No separate payment will be made for accessories to structures the cost of which is considered included in the cost of the structure for which it is associated with. Minor structures will be paid on a lump sum or unit price basis as set forth in the bid tab.

Add the following new Section:

SECTION 513
SITE FURNISHINGS

513.1 – DESCRIPTION:
Work specified in this item shall include all labor, equipment, and materials to provide and install the site furnishings as shown in the project plans and details and in accordance with the manufacturer's specifications and these special provisions.

513.2 – GENERAL:
Site amenity manufactures listed in the plans are to establish a baseline for quality and desired aesthetic intent. Contractor may submit an equal substitution, for City approval, in accordance with MAG Standard Section 106.4 Trade Names and Substitutions.

513.3 – CONSTRUCTION REQUIREMENTS:
All site furnishings shall have shop drawings and submittals provided for review and approval by the City per MAG standard section 105 Control of Work. All site furnishings shall be placed in the field and have the layout reviewed and approved by the Engineer prior to final installation.

All site furnishings shall be installed per manufacture specifications and as shown on the project plans and details. All Site furnishings shall be mounted with stainless steel hardware. All mounting hardware shall be vandal resistant. Any nuts shall be tack welded to bolts.

Specialty fencing shall be constructed according to applicable sections of MAG Section 515 Steel Structures.

513.4 – MEASUREMENT:
Picnic tables, barbeque grills, benches, pet waste station, and trash receptacles as shown on the plans will be measured per each unit installed, complete in place.

Specialty fence as shown on the plans will be measured per linear foot installed, complete in place.

513.5 – PAYMENT:
The accepted quantities of Picnic tables, barbeque grills, benches, pet waste station, and trash receptacles measured as provided above, will be paid for at the contract unit price per each unit installed, complete in place as on the drawings, including all hardware, equipment, materials, labor, excavation, concrete footings, and incidentals necessary for complete installation of the site furnishings.

The accepted quantities specialty , measured as provided above, will be paid for at the contract unit price per linear foot installed , complete in place as on the drawings, including all hardware, equipment, materials, labor, excavation, concrete footings, and incidentals necessary for complete installation of the fencing.

Add the following new Section:

SECTION 514
FABRIC SHADE STRUCTURES

514.1 DESCRIPTION:
Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this section.

514.1.1 Summary: A single fabric shade structure contractor shall be responsible for the design, wet-stamped engineering drawings by an Arizona Registered Structural Engineer, permitting, fabrication, supply, and erection of the work specified herein, including foundations. The intent of this specification is to have only one shade contractor be responsible for all of the functions listed above.

Approved Shade Structure Contractor/Manufacture are:

- USA Shade www.usa-shade.com
- Sky Ways by landscape structures www.playlsi.com
- Or City approved equal as identified in section 514.1.2

514.1.2 Substitutions: To qualify as an approved equal, please submit the following manufacturer, installer and product documentation at least ten days prior to the bid:

- Two (2) full sets of fabric samples
- Detailed material and performance specifications for all fabric, steel, hardware and cables used in shade structure
- Two (2) full sets of powder coating color metal "chips"
- List of at least five (5) reference sites within 100 miles of bid location
- List of at least five (5) customer references within 100 miles of bid location
- Proof of compliance with all quality assurance criteria, as per Section 514.1.4
- Full set of wet stamped (by an engineer in the state of Arizona engineering drawings for the proposed structures
- Proof of installation competency and/or certification for type and size of structure specified.
- List of any and all deviations from product specifications in section 514.2

No substitutions will be allowed after the deadline. Any approval of alternate manufacturers and structures shall be by addendum prior to the bid date and shall not be allowed without written notification.

514.1.3 Submittals:

Bid Submittals: Provide proof of existing reference sites with structures of similar project scope and scale.

Provide a minimum of eighteen (18) fabric samples to demonstrate fabric color range, and a digital (PDF) or paper document showing a minimum of nine (9) powder coat color choices. Also, provide a letter of authorization from the fabric manufacturer delineating authorized use of the specified fabric.

Manufacturer to provide proof of all quality assurance items:

- A list of at least 5 reference projects in region that have been installed a minimum of 12 years
- Proof of General Liability, Professional Liability, and Umbrella insurance, as per Section 514.1.4
- Proof of a minimum of $10,000,000 aggregate bonding capacity
- Proof of current IAS certification, as per Section 514.1.4.
- Proof of an Annual Maintenance Inspection Program.
- Proof of a Corporate Safety and/or Injury & Illness Prevention Program.

514.1.4 Quality Assurance: Fabrication and erection are limited to firms with proven specific area experience in the design, fabrication, and erection of fabric shade structures, and such firms shall meet the following minimum requirements. No substitutions shall be allowed for the following:

- A single shade structure contractor shall design, engineer, manufacture, and erect the fabric shade structures, including the foundations, and shall provide a dedicated Project Manager throughout the entire Scope of Work related to the shade structure(s).
- All manufacturers shall have at least 15 years' experience in the design, engineering, manufacture, and erection of fabric shade structures, engineered to IBC 2018
- Requirements with similar scope, and a successful construction record of in-service performance.
- All manufacturers shall provide proof with bid submittal of a minimum of $2,000,000 (AG) General/Public Liability insurance, $3,000,000 Professional Liability (PL) insurance, and additional $10,000,000 Umbrella/Excess Liability insurance.
- Manufacturer shall be accredited by the IAS (International Accreditation Service) for Structural Steel Fabrication under IBC 2006 Section 1704.2.5.2.
- The fabric shade structure contractor shall have a Corporate Quality Control program/manual, which describes their complete quality assurance program.

- All manufacturers must be a current Member Contractor with ISNetworld, which confirms the bidder's strict adherence to Safety, Insurance, Quality, and Regulatory standards.

514.1.5 Warranty: The successful installer shall provide a 12-month warranty on all installation labor and materials.

A supplemental warranty from the manufacturer shall be provided for a period of 10 years (pro-rated) on fabric and 10 years (non-prorated) on the structural integrity of the steel, from date of shade invoice.

The warranty shall not deprive the Owner of other rights the Owner may have under the provisions of the Contract Documents, and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

514.2 MATERIALS:

514.2.1 General: The fabric shade structure(s) shall conform to the current adopted version of the International Building Code 2018.

All fabric shade structures shall be designed and engineered to meet the minimum of 115mph "Ultimate" Wind Load, Risk Category II, Exposure C, and a Snow Load of 5 psf and Live Load of 5 psf. All fabric shade structures shall be engineered with a zero wind pass-through factor on the fabric.

514.2.2 Steel: All steel members of the fabric shade structure shall be designed in strict accordance with the requirements of the "American Institute of Steel Construction" (AISC) Specifications and the "American Iron and Steel Institute" (AISI) Specifications for Cold-Formed Members and manufactured in a IAS- (International Accreditation Service) accredited facility for Structural Steel Fabrication under IBC 2006 Section 1704.2.5.2.

All connections shall have a maximum internal sleeve tolerance of .0625" using high-tensile strength steel sections with a minimum sleeve length of 6".

All non-hollow structural steel members shall comply to ASTM A-36. All hollow structural steel members shall be cold-formed, high-strength steel and comply with ASTM A-500-10, Grade B. All steel plates shall comply with ASTM A-572, Grade 50.

All galvanized steel tubing shall be triple-coated for rust protection using an in-line electroplating coat process. All galvanized steel tubing shall be internally coated with zinc and organic coatings to prevent corrosion.

514.2.3 Bolts: All structural field connections of the shade structure shall be designed and made with high-strength bolted connections using ASTM A-325, Grade B.

Where applicable, all stainless steel bolts shall comply with ASTM F-593, Alloy Group 1 or 2. All bolt fittings shall include rubber washers for water-tight seal at the joints. All nuts shall comply with ASTM F-594, Alloy Group 1 or 2.

514.2.4 Welding: All shop-welded connections of the fabric shade structure shall be designed and performed in strict accordance with the requirements of the "American Welding Society" (AWS) Specifications. Structural welds shall be made in compliance with the requirements of the "pre-qualified" welded joints, where applicable and by certified welders. No onsite or field welding shall be permitted.

All full penetration welds shall be continuously inspected by an independent inspection agency and shall be tested to the requirement of IBC 2018.

514.2.5 Powder Coating: Galvanized steel tubing preparation prior to powder coating shall be executed in accordance with solvent cleaning SSPC-SP1. Solvents such as water, mineral spirits, xylol, and toluol, which are to be used to remove foreign matter from the surface. A mechanical method prior to solvent cleaning, and prior to surface preparation, shall be executed according to Power Tool Cleaning SSPC-SP3, utilizing wire brushes, abrasive wheels, needle gun, etc.

Carbon structural steel tubing preparation prior to powder coating shall be executed in accordance with commercial blast cleaning SSPC-SP6 or NACE #3. A commercial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, mill scale, rust, coating, oxides, corrosion, and other foreign material.

Powder coating shall be sufficiently applied (minimum 3 mils thickness) and cured at the recommended temperature to provide proper adhesion and stability to meet salt spray and adhesion tests, as defined by the American Society of Testing Materials.

Raw powder used in the powder coat process shall have the following characteristics:

- Specific gravity: 1.68 +/- 0.05
- Theoretical coverage: 114 +/- 4ft2/mil
- Mass loss during cure: <1%
- Maximum storage temperature: 80F

Interpon® 800 is a high-durability TGIC powder coating designed for exterior exposure. Tested against the most severe specifications, Interpon 800 gives significantly improved gloss retention and resistance to color change.

When the fabric shade structure(s) will be located within potentially corrosive environments such as (pools, reclaimed water irrigation, saltwater bodies, other standing bodies of water) hot dip galvanizing of Carbon steel or rust protection undercoat primer will be required on all structures at USA Shade's discretion. The rust protection primer shall be Sherwin-Williams® POWDURA® epoxy powder coating Z.R Primer and shall be applied to Carbon steel in accordance with the manufacturer's specifications. Primer should be fused only and then top coated with the selected powder coat to ensure proper inter-coat adhesion.
The primer's attributes shall be:

- Specific gravity (g/ml): 2.37
- Coverage at 1.0 mil (ft2/lb): 81.6
- Adhesion: ASTM D-3359 5B
- Flexibility: ASTM D-552 Pass 1/8"
- Pencil hardness: ASTM D-3363 H-2H
- Impact resistance (in.lb): ASTM D-2794 Dir & Rev, 120 in-lbs
- Salt spray resistance: ASTM B-117 2000 hours
- Humidity resistance: ASTM D-4585 2000 hours
- 60° Gloss: ASTM D-523 50 ~ 70
- Cure schedule (metal temp): 10min @ 200°C (390°F)/25min @ 135°C (275°F)
- Film thickness range (mils): 2.0 ~ 3.0

514.2.6 Tension Cable: Steel wire rope cable is determined based on calculated engineering loads. Standard cabling is galvanized. Stainless steel cabling required when hot dip galvanized frame or primer frame are required.

- 0.25" (nominal) galvanized 7x19 strand core wire rope shall be used for tension loads up to 4,500 lbs.
- 0.375" (nominal) galvanized 7x19 strand core wire rope shall be used for tension loads up to 9,000 lbs.
- 0.5" (nominal) galvanized 6x19 strand core wire rope shall be used for tension loads up to 13,500 lbs.

514.2.7 Fabric Roof Systems: Shadesure® shade fabric is made of a UV-stabilized, high-density polyethylene (HDPE), as manufactured by Multiknit® (Pty) Ltd. HDPE mesh shall be a heat-stentered, three bar Rachel-knitted, lockstitch fabric with one monofilament and two tape yarns to ensure that the material will not unravel if cut. Raw fabric rolls shall be 9.8425 feet wide.

Fabric Properties:

- Life Expectancy: minimum 10 years with continuous exposure to the sun
- Fading: minimum fading after 5 years (3 years for Red)
- Fabric Mass: 5.31 oz/yd2 ~ 5.6 oz/yd2 (180gsm ~ 190gsm)
- Fabric Width: 9.8425 feet (3m)

- Roll Length: 164.04 feet (50m)
- Roll Dimensions: 62.99 inches x 16.5354 inches (160cm x 42cm)
- Roll Weight +/- 66 lbs (+/- 30kg)
- Minimum Temp: -13°F (-25°C)
- Maximum Temp: +176°F (80°C)

Fabric shall meet the following flame spread and fire propagation tests:

- ASTM E-84
- NFPA 701 Test Method 2
- Stitching & Thread:
- All sewing seams are to be double-stitched.
- The thread shall be GORE® TENARA® mildew-resistant sewing thread, manufactured from 100% expanded PTFE (Teflon™). Thread shall meet or exceed the following:
- Flexible temperature range
- Very low shrinkage factor
- Extremely high strength, durable in outdoor climates
- Resists flex and abrasion of fabric
- Unaffected by cleaning agents, acid rain, mildew, salt water, and is unaffected by most industrial pollutants
- Treated for prolonged exposure to the sun
- Rot resistant

Shade and UV Factors: Shade protection and UV screen protection factors shall be as follows:

Color	Shade %	UV Block %
Laguna Blue	92%	96%
Royal Blue	86%	94%
Navy Blue	90%	94%
Turquoise	83%	92%
Rainforest	89%	96%
Desert Sand	80%	92%
Black	95%	96%
Sunflower Yellow	70%	94%
Terracotta	84%	90%
Arizona	86%	91%
White	57%	86%
Silver	88%	93%
Red	91%	92%
Electric Purple	84%	90%
Zesty Lime	83%	92%
Cinnamon	88%	93%
Olive	93%	97%

Chocolate	92%	93%

514.3 CONSTRUCTION REQUIREMENTS:

514.3.1 Installation: The installation of fabric shade structures shall be performed by manufacturer or manufacturer-approved contractor. All installation personnel must have experience in the erection of tensioned fabric structures.
The installation shall comply with the manufacturer's instructions for assembly, installation, and erection, per approved drawings.

514.3.2 Concrete: Concrete work shall be executed in accordance with the latest edition of American Concrete Building Code ACI 318-14.

Concrete specifications shall comply in accordance with the Section 505 Concrete Structures.

Concrete, detailed as per plans, and shall be as follows:

- 28 Days Strength F'c = 3,000 psi (per IBC Table 1808.8.1 item 2b)
- Aggregate: HR
- Slump: 3 ~ 5 inch
- Portland Cement shall conform to C-150
- Aggregate shall conform to ASTM C-33

All reinforcement shall conform to ASTM A-615 grade 60. Reinforcing steel shall be detailed, fabricated, and placed in accordance with the latest ACI Detailing Manual and Manual of Standard Practice.

Whenever daily ambient temperatures are below 80 degrees Fahrenheit, the contractor may have mix accelerators and hot water added at the batch plant (See Table 1).

The contractor shall not pour any concrete when the daily ambient temperature is to be below 55 degrees Fahrenheit.

TABLE 1

Temperature Range	% Accelerator	Type Accelerator
75~80 degrees F	1%	High Early (non calcium)
70~75 degrees F	2%	High Early (non calcium)
Below 70 degrees F	3%	High Early (non calcium)

514.3.3 Foundations: All anchor bolts set in new concrete shall comply with ASTM F1554 GR 55. All anchor bolts shall be Hot-Dip Galvanized.

Footings and full rebar cages shall be drilled or dug, set, and poured as per manufacturer's specifications. USA SHADE estimates the foundations as 36" wide x 14' deep with a full rebar cage of 18 #8 vertical rebar at 13'6" long per footing and 29 #4 rings.

514.4 MEASUREMENT:
Work under this section will be measured per lump sum.

514.4 PAYMENT:
The fabric shade structures be full compensation for the work, complete, as described above and as shown on the plans and details, including all labor, equipment and materials necessary to construct each fabric shade structure. No separate measurement or payment will be made for production of construction drawings, permit review process, or permitting fees, the cost of which is considered included in the cost of the fabric shade structure itself.

SECTION 515
STEEL STRUCTURES

515.1 DESCRIPTION: *Add the following*:
The work under this item shall consist of furnishing all materials and labor and constructing ramadas, shade structures, gates and other steel structures, complete in place as shown on the plans and as described in these specifications. The work will also include furnishing signed and sealed construction drawings and structural calculations by a registered professional engineer licensed in the State of Arizona, which is specialized in structural engineering, for the ramada structure and shade structures. The work will also include submitting the construction drawings of the ramadas and shade structures to the City for permit review and obtaining and payment for all permit processes and fees.

515.1.1 Shop Drawings: *Add the following*:

The contract drawings will not be used in any way, shape or form to develop the fabrication drawings.

Shop drawings for the steel structures and connections design, for erection details and methods shall be developed and submitted in accordance with Standard Section 105.2 Plans and Shop Drawings. Shop Drawings shall be unique drawings and not standard forms requiring filling in blank spaces unless all extraneous information is deleted and standard forms provide an exact description of work. All relative design information such as member sizes, welding details, construction details, erection details and general notes shall be clearly shown. Drawings shall have cross-referenced details and sheet numbers. The Contractor shall clearly indicate on the working drawings all shop welds and field welds.

Add the following:

515.1.5 Materials: Materials shall conform to the requirements specified on the plans and these specifications. If a discrepancy exists between the project plans and these specifications the more stringent of the requirements shall prevail. The contractor shall furnish complete copies, in triplicate, of all mill reports on steel materials furnished.

All metal components shall be powder coated in accordance with the plans and details.

Anchor bolts shall conform to the requirements of ASTM F1554.

High strength bolts shall conform to the requirements of ASTM A325.

Concrete shall conform to MAG Class 'A', with a 28-day minimum compressive strength f'c, of 3,000 psi.

Reinforcing steel shall conform to the requirements of ASTM A615 and be furnished as Grade 60.

Add the following:

515.3.1 Construction Requirements: The work under this item shall conform to applicable sections of the Standard Specifications as amended by these Special Provisions. Any concrete structures associated with steel structures shall be in accordance with Section 505 Concrete Structures.

The Contractor shall be responsible for reviewing all available geotechnical investigation reports. The geotechnical investigation reports are available in Appendix A.

515.3.1.2 Welding and Inspection: Welding of structural steel shall conform to the requirements of the American Welding Society (AWS), Structural Welding Code, D1.1 current edition.

Properly accredited, experienced certified welders, in accordance with the American Welding Society, shall perform all welding. Each welder shall submit to the Engineer satisfactory evidence of passing AWS qualification tests and maintenance of qualifications for welding structural steel joints in the positions required. Submit welding procedure specifications to the Engineer for review.

At minimum, at least one foot of weld for each size and type of weld and type of joint shall be tested using nondestructive testing (NDT). The entire weld shall be tested when rejectable discontinuities are found in any test length of the weld. All welds shall be visually inspected. Correct improper workmanship, remove and replace, or correct as instructed by the Engineer, all welds that are found unacceptable or deficient.

515.3.1.3 Fabrication: All vertical members shall be plumb and true after installation. Out of plumb tolerance shall be 1/8 inch per 10 feet.

515.5 PAINTING: *Is modified to add*:
Custom Fencing shall come primed and powder coated from manufacture.

515.6 METHOD OF MEASUREMENT: Delete and replace with the following:

Custom fencing will be measured as stated in MAG 513 Site Furnishings.

Picnic Ramadas will be measured per each of work including all labor, materials, equipment, excavation and backfill, concrete foundations, steel reinforcing, anchor bolt assembly and

structural steel fabrication; including welding, testing, delivery and erection, paint and finishes.

515.7 PAYMENT: *Delete in its entirety and replace with the following*:

Custom fencing will be paid as stated in MAG 513 Site Furnishings.

The accepted quantity of Picnic Ramadas, measured as provided above, will be paid by the contract unit price which shall be full compensation for the work, complete, as described above and as shown on the plans and details, including all labor, equipment and materials necessary to construct the Picnic Ramada. No separate measurement or payment will be made for production of construction drawings, permit review process, or permitting fees, the cost of which is considered included in the cost of the ramada itself.

SECTION 530
PAINTING

530.8 SURFACE PREPARATION FOR PAINTING: *is modified to add*:
Surface preparation shall be a minimum of SSPC-SP7, per project plans, details, as stated in other sections of MAG, or standard section 530.8. The stricter surface preparation requirements shall prevail.

530.9 PAINTING: *is modified to add*:
Paint shall be per project plans, details, as stated in other sections of MAG, or standard section 530.9. The stricter painting requirements shall prevail.

Primer shall be a reinforced inorganic zinc rich primer Devoe Cathacoat 302H at 3-5 mils DFT, or approved equal.

Top coat shall be a high solids aliphatic polyurethane Devoe Devthane 379H at 3-5 mils DFT, or approved equal.

Powdercoat Top Coat, when called for in the project plans, shall be TGIC polyester, powder coat shall be a at 3-5 mills DFT. Any powder coat finish shall come with a compatible zinc rich prime coat from the same manufacture as the top coat.

530.11 PAYMENT: *the first paragraph is revised to read*:
No separate payment will be made for the preparation of surfaces, shop prime coat and field touch-up coats on structural steel and miscellaneous metal items and shall be considered as included in the prices for the structural steel and miscellaneous metal items. No separate payment will be made for second and finish coats on structural steel or miscellaneous metal items shall be considered as included in payments for the structures. No separate payment will be made for cleaning all painting on miscellaneous metal items and shall be considered as included in the price for the item.

SECTION 727
STEEL REINFORCEMENT

727.1 GENERAL: *is modified to add*:
The quality, grade, type, size and quantity designed of steel reinforcement shall be in conformance with the details on the Project Plans, and in accordance with these special provisions and as directed by the Engineer.

SECTION 757
SPRINKLER IRRIGATION SYSTEM

757.1 General: *Delete the third paragraph and replace with the following:*

No steel or galvanized pipe or fittings shall be allowed for use on the project.

757.2.1 Plastic Pipe: *Delete the first paragraph entirely:*

757.2.2 Plastic Pipe: *Delete the first paragraph and replace with the following:*

Rigid Plastic Pipe shall be extruded from 100% virgin normal impact unplasticized polyvinyl chloride (PVC) Type I, Grade I or II resin 2000 psi (PVC 1120 or 1220). Design stress ASTM D1784, Department of Commerce PS-21-70, PS-22-70, Standard Dimension Ration (SDR) 21 or greater than 200 psi. Pipe shall conform to ASTM D-2241 and D-2672. See plans for application and exact grade.

Delete the sixth paragraph of and replace with the following:

Mainline piping up to and including 2 ½" size shall be schedule 40 solvent welded. All turf and drip lateral piping up to and including 3" size shall also be schedule 40 solvent welded. Mainline pipe 3" size and larger shall be SDR 21/Class 200 bell end (ring tite) conforming to ASTM F-477.

757.2.3 Pipe and Fittings:

Delete the first paragraph (A) and replace with the following:

(A) Steel Pipe and fittings or couplings shall not be permitted on the project.

Delete the second paragraph (B) and replace with the following:

Plastic Pipe Fittings and Couplings: For all continuously pressurized mainlines up to and including 2 ½" in size all fittings shall be schedule 80. All lateral line pipe fittings shall be schedule 40. Only schedule 80 fittings shall be threaded. Plastic flange and saddle fittings are not permitted.

Delete the fifth paragraph (C) and replace with the following:

1. Copper Pipe shall be Type K, hard tempered, ASTM B88, with fittings of wrought solder joint type in accordance with ANSI B16.22.

2. Solder joints with silver solder: 45 percent silver, 15 percent copper, 16 percent zinc, 24 percent cadmium and solidus at 1125 degrees F. and liquids at 1145 degrees F., conforming to ASTM B206 and FS QQB-655C.

757.3 Valves and Valves Boxes: *Delete this subsection and replace with the following:*

757.3.1 General Valve Boxes:

Valve Boxes: All valve boxes unless otherwise specified shall be constructed of rigid high density polyethylene (HDPE) resin, chemically inert plastic, and include UV inhibitors with 6-inch extensions available where required.

All valve boxes covers unless otherwise specified shall be bolt down plastic T-style covers secured with a 3/8-inch stainless steel bolt, washer and nut. Apply the appropriate identifying letters and/or numbers with a heat-brand.

Identification letters and numbers shall be 2 inches high and heat branded onto the box cover. Identification shall be as indicated on the detail drawings. Heat branding shall be accomplished using branding irons specifically designed for this purpose utilizing stencil number/letter outlines. Heat branding shall not weaken or in any way puncture the valve box cover.

All valve box bodies and covers unless otherwise specified shall be green in color when located in turf areas, or tan in color when located in granite/desert areas, or purple in color when directed within plans to use with reclaimed water. Reclaimed water valve boxes shall have appropriate reclaimed water warnings embossed onto the cover in English and in Spanish, as well as the international "Do Not Drink" symbol.

Round valve boxes unless otherwise specified shall be 10-inch diameter x 10 inches high. If higher round box is required, either an 18" high box shall be used or a 6" extension may be used if available.

Round emitter boxes shall be 6 1/2 inches diameter x 8 3/8 inches high molded of structural foam polyolefin material with color and UV stabilizers added. Emitter boxes shall be used with multi-port emitter installations only and boxes along with covers shall be green in color when located in turf areas, or tan in color when located in granite/desert areas, or purple in color when directed within plans to use with reclaimed water.

Rectangular valve boxes unless otherwise specified shall be 15 3/4 inches wide x 25 1/4 inches long x 15 1/4" inches high. If higher rectangular box is required, a 6" extension may be used.

Rectangular valve box at master valve shall be 26 1/4 inches wide x 37 3/4 inches long x 18 inches high and include polymer concrete ring adapter with polymer concrete flush cover.

7. Valve boxes used for irrigation equipment shall be as follows:

10-Inch diameter round valve boxes shall be used for gate valves, ball valves, quick coupler valves, drip system flush end caps, and wire splice boxes if required.

6-Inch diameter round emitter boxes shall be used for multi-port emitters only.

15 3/4 Inches wide x 25 1/4 inches long x 15 1/4" inches high rectangular valve boxes shall be used for all turf and drip remote control valve assemblies.

26 1/4 inches wide x 37 3/4 inches long x 18 inches high rectangular valve box shall be used for master valve installation only.

8. Install valve boxes in planting areas and according to the construction details. Only one valve per box will be allowed. Align valve boxes at right angles to adjacent hardscape whenever possible. Where several valve boxes are located in the same area, arrange them in a uniform and orderly fashion. Valve boxes shall be installed with an 6-inch deep layer of 3/8-inch pea gravel at the base of the box over geotextile fabric. When grouped together, allow a minimum of 12 inches between valve boxes.

Add the following:

757.3.2 Ball Valves: Ball valves 2-inch and smaller shall be of the brand, size and type indicated on the irrigation plans.

Ball valve shall be Sch 80 pvc with full port rated to 235 psi working pressure (sxs);

757.3.3 Gate Valves: Gate valves 3-inch and larger shall be of the brand, size and type on the irrigation plans.

Gate valves shall be manufactured of epoxy coated ductile iron with EPDM rubber encapsulated ductile iron resilient wedge. The valve shall include a 2" square operating nut and non-rising stem. All fasteners shall be stainless steel.

Gate valves shall meet the requirements of ANSI/AWWA C515 with 250 psig rating.

757.3.4 Bypass Master Valves: Bypass master valves shall be of the brand, size and type on the irrigation plans.
Normally closed master valve (valve may be configured as normally closed or normally Open- comes n.c. from factory) with glass-filled nylon globe style body rated to 220 psi, 150 mesh external control water filter with 3-way solenoid, & 2" fpt connections; install Hunter station decoder #icd-100

Mounted to inside of valve box and connect to 2-wire path with grounding per manuf.

757.3.5 Bypass Flow Sensor: Bypass flow sensor shall be of the brand, size and type on the irrigation plans.
Hunter flow-sync flow sensor #hfs with 2" schedule 80 pvc tee #fct-208 with flow range of 10 gpm - 55 gpm;
Install hunter sensor decoder #icd-sen mounted to inside of valve box and connect to 2-wire path with grounding per manuf. Specifications (see irrigation plans for 2-wire path).

757.3.6 Remote Control Valves: Remote control valves shall be of the brand, size and type indicated on the irrigation plans. Valve shall be constructed with a glass filled nylon globe style body, filter sentry, EPDM diaphragm, & adjustable pressure regulator.

757.3.7 Quick Coupler Valves: Quick coupler valves shall be of the brand, size and type indicated on the irrigation plans.

Quick coupler valve shall have a body constructed of red brass with a wall thickness guaranteed to withstand normal working pressure of 150 P.S.I. without leakage, with female threads opening at base. Quick coupler valve shall have a hinge cover constructed of red brass with leather like vinyl cover bonded to it in such a manner that it becomes a permanent type of cover. Quick couplers shall include a swing joint and 10" round valve box.

757.3.8 Drip Equipment: Emitters shall be pressure compensating type designed to work with a minimum filtration of 150 mesh.

Each emitter has six ports of equal flows. Emitters shall have flow rates of 1.0 and2.0, gallons per hour. Each emitter is color-coded to indicate flow: blue is .5 gph, black is 1.0 gph, red is 2.0 gph. External surfaces are constructed with UV-resistant PVC material. Each emitter port has its own diaphragm, made of molded silicone, allowing for greater consistency than one standard large diaphragm. Rubber MPE Caps may be used to cap off any unused ports. Operating pressure of 5-65 psi.

The drip control zone kit shall include a 1" ICV Filter Sentry Globe valve constructed of polypropylene glass filled body, 40 psi filter regulator with polypropylene body and 150 mesh stainless steel screen 1" inlet and ¾" outlet.

SECTION 790
PAINT

790.3 PAINT COATS: *is modified to add*:
Paint coats shall be per project plans, details, as stated in other sections of MAG, or standard section 790.3. The stricter painting requirements shall prevail.

790.4 MATERIALS: *is modified to add*:
Materials shall be per project plans, details, as stated in other sections of MAG, or standard section 790.4. The stricter materials requirements shall prevail.

790.5 MIXED PAINTS: *is modified to add*:
Mixed paints shall be per project plans, details, as stated in other sections of MAG, or standard section 790.5. The stricter mixed paint requirements shall prevail.

Add the following new section:

SECTION 800
ELECTRICAL

800.1 DESCRIPTION:
This section describes in general, requirements of the electrical and related items and work necessary for the complete job indicated by the contract documents. The general conditions are applicable to this section and shall form a part of the contract.

800.1.1 General List of Work: The work of this section and related work described in other sections is indicated on the drawings and included, but not necessarily limited to:

- Service Entrance Section including all circuit breakers, hand off automatic switches, time clocks, control relays, pushbuttons and lighting contactors necessary to complete the job in a workmanlike manner;
- All other electrical equipment and services needed to complete a usable and operable facility in accordance with all pertinent codes and regulations;
- Electric service, complete, to point of connection with the utility company's facilities;
- Main distribution panel with metering equipment and feeder switches or circuit breakers;
- Complete branch circuit wiring system for lighting and electrical;
- Lighting fixtures, poles, pole bases;
- Trenching and backfilling for underground electrical installation.

800.1.2 Permits: Secure and pay for all necessary permits and licenses, services and all inspection fees as required by the City.

800.1.3 Quality Assurance: For the actual fabrication, installations, and testing of the work of this Section, use only thoroughly trained and experienced personnel who are completely familiar with the requirements of this work and with the installation recommendations of the manufacturers of the specified items.

In acceptance or rejection of installed electrical system, no allowance will be made for lack of skill on the part of the installers.

800.1.4 Codes and Ordinances: Install all work in accordance with the National Electrical Code and its latest revisions, with any City requirements, and with all pertinent requirements and standard specifications.

800.1.5 Certificates: All work included shall comply with all State and Local rules and regulations. Furnish to the Owner all certificates of inspection and approvals as required.

800.1.6 Examination of Premises: Prior to submitting proposal, the bidder shall examine all general construction drawings and visit construction site to become familiar with existing conditions under which he will have to operate and which will in any way affect the work under this contract. No subsequent allowance will be made in this connection in behalf of the Contractor for any error or negligence on his part.

Prior to ordering any materials or doing any work, verify dimensions at the site. Correctness of dimensions will be this Contractor's responsibility. No extra charge or compensation will be allowed for differences between actual dimensions and dimensions indicated on drawings. Immediately report differences to Engineer and do not proceed with work until Engineer renders his decision.

800.1.7 Concrete, Excavation, Fill and Backfill: Furnish all concrete, excavation, fill and backfill, and steel required for this work unless specifically noted otherwise.

Concrete shall be Class "A", 3000 p.s.i. and shall be mixed, placed and cured in conformance with MAG Specifications.

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

Compaction of backfill shall be vertical lifts not exceeding a lift height of 6". In accordance with local codes and standards, compact to 85 percent of maximum density at optimum moisture content.

All existing landscape and hardscape areas must be replaced in kind after construction of electrical trenches and installation of electrical equipment.

800.1.8 Electrical Drawings: The drawings are generally diagrammatic and indicate the manner, method and nature of the installation. The Specifications denote the style and quality of material and workmanship. Where a conflict exists between the Drawings and Specifications, promptly notify the Engineer. The Engineer will make the proper interpretation and his decision will be final.

Any items not mentioned in these specifications or not indicated on the plans but which are necessary for successful and efficient operation of the work shall be held to be implied and shall be furnished and installed as part of the contract.

800.1.9 Standard of Material and Workmanship: All materials shall be new and shall conform to UL Standards in every case where such a standard has been established and shall bear the UL label. All work shall be performed in a workmanship manner in accordance

with the best-accepted standards and shall present a neat mechanical appearance when completed.

Ratings of all electrical equipment shall be in accordance with National Electrical Manufacturers Association (NEMA).

800.1.10 Painting: All exposed electrical equipment, conduit, flush panel fronts, transformers, switches, switchboards, panels, panel mounting boards, and similar items shall be painted as specified under the Painting Section of the MAG Specifications per City's request.

800.1.11 Temporary Power: Provide temporary power as required by the job. This service shall be maintained throughout the entire job as the work progresses.

800.1.12 Cleanup Process: At all times keep the premises free from accumulation of waste materials or rubbish caused by employees. Metal floor pans shall be provided for pipe threading machines and benches and shall be used at all times to prevent concrete floors from becoming oil soaked. Upon completion of the job remove all debris, clean all switch plates, fixtures, panel trims and in general leave the premises in a clean and tidy condition.

800.1.13 Final Inspections and Tests: Furnish all meters, cable, connection and apparatus necessary for making tests.

Test system for shorts and grounding compliance. Faulty wiring shall be removed and replaced. Any device, apparatus or fixture installed showing substandard performance shall be removed and replaced as directed by the City Inspector.

800.1.14 Utilities:
Location of Underground Utilities: The Contractor shall notify the interested "Utilities" prior to the start of construction, and shall ascertain the locations of the various underground utilities either shown on the plans and/or which may be brought to his attention. The exact locations of these underground utilities shall be determined by excavations made by the Contractor prior to any trenching operations.

Damage to Existing Utilities: The Contractor shall assume full responsibility for all damage to all utilities due to his operations, and shall repair the damaged utilities as required herein, at his own expense. Damaged water and irrigation lines shall be replaced in kind.

800.1.15 Guarantee: Fully guarantee all work under this Section for a period of one year from the date of final acceptance by the City, against imperfect workmanship or failure or malfunction of materials and/or equipment due to faulty or imperfect workmanship. Give this guarantee in writing to the City at the time if issuing final certificate. Work found to be defective within period shall be replaced without cost to the City.

800.1.16 Shop Drawings: All data shall be submitted at one time, bound and indexed in an orderly manner. Prior to starting work, submit to the Engineer for approval, six (6) sets of shop drawings of lighting fixtures, electrical enclosures and equipment, and all other equipment to be fabricated.

800.1.17 Documents: The contractor shall preserve all manufacturers' paperwork that is shipped with equipment assemblies, lighting control panel components and field installed components. All literature accompanying each and every item shall be considered a part of that item such as specification sheets, installation instructions, operating and maintenance write-ups, etc.

As-builts shall be provided to the City and shall be of the highest quality. Poor quality copies will not be accepted.

800.2 MATERIALS:

800.2.1 Wire and Cable: Conductors shall be soft drawn, annealed copper having conductivity of not less than 98% of that of pure copper, have a uniform in cross-section, free from flaws, scale and other imperfections.

All interior branch wiring shall be Type "XHHW" 600 volt, unless otherwise noted and a minimum of 12 AWG except for control wiring which shall be a minimum of 14 AWG.

Wire 8 AWG and larger shall be stranded.

Manufacturers shall be Simplex, General Cable, Okonite, Rome Cable, Anaconda, General Electric and Kaiser or approved equal.

No running splices in conduit shall be accepted.

Make all above ground connections and splices for #10 wire and smaller with Buchanan "B-Cap", 3-M "Scotchlok", or Ideal "Wing Nut" preinsulated wire connector (sizes as recommended by manufacturer). Make connection and splices for #8 conductors and larger with solderless pressure or compression type connectors by O.Z., Burndy, Buchanan, T & B, or Illsco. Tape all splices with plastic so insulation is at least equivalent to insulation of conductor. Thoroughly clean ends before splicing. Where plastic tape is used and there is any danger of insulation damage from pressure of joint against non-current carrying metal parts, use friction tapes for additional protection. Vinyl plastic tape shall be Scotch #33 or Plymouth.

Make all underground cable and conductor splices in a pull box or j-box and connected and insulated with a Tyco Electronics Gelcap-sl or connected with copper compression h-tap connector or approved equal and insulated with a 3M Scotchcast splice kit 85 series or Tyco Electronics Gelcap or City approved equal.

All wires in panel boards, gutters, switchboards, wire ways and pull boxes shall be neatly arranged with terminations located directly opposite terminals and routed in a neat and workmanlike manner through spaces where the wire passes.

Exercise due care when pulling wire and cable through raceways, to prevent conductors from kinking and injuring insulations.

UL approved pulling compounds may be applied to the conductors to insure ease of pulling. Under no circumstances shall any medium containing water, acid or petroleum base be used.

Leave no less than 6" or wire at each outlet for connection to lighting fixture, switch receptacle, and other pieces of equipment. Where wires feed through an outlet or junction box, neatly tuck a 6" long loop in bottom of box.

Control wiring and all other stranded wiring to screw connections shall be provided with T & B "STA-KON" terminals.

Solid conductors shall loop tightly and completely around terminal screws on all wiring devices.

800.2.2 Conduit Raceways: Conduit systems shall be rigid galvanized steel, non-metallic fiber or polyvinylchloride (PVC) plastic as specified herein, or as indicated on the plans. All systems shall be continuous.

Rigid Steel Conduit: shall be heavy walled, hot dipped, galvanized or sherardized. Use rigid steel conduit in concrete slabs on grade, in exposed locations such as tunnels and equipment rooms, and where exposed to weather. Make all joints with standard couplings or unions; use of running threads is prohibited. Ream conduit ends after cutting use double lock nuts at terminations. Use insulated bushings throughout.

No conduit placed in a concrete slab shall be greater than ¾" trade size diameter and no conduit smaller than ½" shall be installed underground. No conduit shall be imbedded in a slab that is less than 3-½" thick except for local offsets. Unless otherwise noted or specified, tops of underground conduit or ducts shall not be less than 18" below grade. Assemble joints together using approved couplings to make watertight joints.

Schedule 40 PVC Electrical Conduit: UL listed 4" and smaller may be used for direct burial of underground branch circuits (with bond wire). All bends shall be manufactured, not field made.

800.2.1.1 General: Stubs and risers above grade to panels and cabinets shall be rigid steel conduit and shall be grounded as described under "grounding".

Where exposed, install conduit parallel to walls and partitions; do not cross-window openings.

All conduit bends 45 degrees and larger, and 2 inches and above shall be manufactured bends or field make with a hydraulic bender.

Coat metallic conduit below grade or encased in concrete with two coats of Koppers Bitumastic, or half-lap with Scotch Wrap #50, minimum thickness to be 20 mils.

800.2.3 Conduit Fittings: Provide double lockouts and bushings at all rigid conduit terminations except at threaded hubs. Bushings shall be O.Z. type "A" molded bakelite except for 2" conduit and larger shall be O.Z. type "B" or type "BL" where grounding is required.

800.2.4 Gutter, Pullboxes and Junction Boxes: Boxes shall be fabricated from code gauge steel without knockouts and a minimum 14 gauge front cover. Finish shall be galvanized steel or phosphate undercoating, with 2 finish coats hammer gray or baked enamel.

Junction boxes shown outside flush or surface mounted shall be watertight all welded construction with neoprene gasketed screwed covers NEMA Type 3R.

800.2.5 Nameplates: Provide lamicoid nameplates for all distribution switches, breakers, lighting and power panels, contactors, and any control equipment.

800.2.6 Electrical Service: The electrical service shall be as shown on the plans by the Utility Company.

Provide all necessary material and labor required by the serving utility for delivery of power to the service entrance equipment.

800.2.7 Service Entrance Equipment: Service entrance shall be 12 gauge standardized, modular formed steel dead front construction, and front accessible.

The enclosure shall be weatherproofed and factory painted per City specifications with primer and rust inhibitor undercoat.

The service entrance shall have space and necessary provisions for metering as required by the Power Company and P.U.E.S.R. Standards.

Main and branch feeder over-current devises shall be fusible or circuit breaker type and sized as noted on the drawings.

The switchgear assembly shall be braced for short circuit stress as noted on the drawings. All distribution equipment shall be of the same manufacturer.

Approved manufacturers are: Cutler Hammer, RSE-Sierra, Federal Pacific, General Electric, Square D, Sylvania, Westinghouse, Milbank or Myers.

All service entrance and all distribution equipment and panels shall have fully rated copper bussing.

800.2.8 Lighting Fixtures:
Luminaires: Certified copies of the testing laboratory's findings shall be submitted to the Engineer. No luminaires shall be ordered until approved by the Engineer.

Each luminaire shall be furnished with an instruction sheet, which clearly shows installation procedures.

800.2.9 Poles: Area light poles shall be as specified on the plans.

PVC conduit elbows shall be installed in the base as needed for conductor entry.

800.2.10 Lighting Contactors: Lighting contactors shall be sized to facilitate all the lighting circuits within the pedestal or panel, and shall be Square D, Cutler Hammer, Furnas, Allen Bradley, Siemens or approved equal.

800.3 CONSTRUCTION REQUIREMENTS:

800.3.1 Grounding: The neutral conductors and all other exposed non-current carrying metal parts as required by Code shall be grounded. Grounding bushings shall be used as required and shall be O.Z. insulated Type “BL”, or approved equal. No grounding shall be made to gas piping. Where equipment or devises are served by non-metallic ducts, enclosure shall be grounded by means of a code size bare or green insulated equipment ground wire installed in the duct with the current carrying conductors and be bonded securely in each cabinet terminating the ground wire. Copper jumpers shall bridge flexible conduit and be installed with ground wire. All service grounds shall be in accordance with the “UFER” ground.

All panels containing ground or bonding wires shall be equipped with a ground bus for terminating all such wires.

See Concrete Section for description of concrete reinforcement grounding.

800.3.2 General: Work covered under this section includes manufacturing, equipping, wiring and assembling of all lighting fixtures. Provide lighting fixtures complete for each and every light outlet in the type, quality and size of fixture indicated on the drawings.

Check the drawings with the fixture schedules for completeness, as numbers on the schedule are for the purpose of indicating the general type, quality and size of fixtures that will be required. The use of catalog numbers for a fixture does not necessarily include all the required accessories that may be demanded for a complete installation.

Provide all light-sources, lamps and other light producing media called for and suitable for specified equipment and functions. Unless otherwise called for, all lamps operating without controlling ballasts or transformers, operate on 120 volts.

The use of a vendor's name and catalog number is for convenience in specifying the quality, style, size finish and performance required and does not intentionally exclude similar equipment available from other manufacturers. A computer read-out for the substitute fixtures with the above minimum levels, guaranteed by the manufacturer, shall be submitted to the Engineer for evaluation. Judgment of equality shall be by the Engineer and his acceptance or rejection shall be final.

800.3.3 Installation of Lighting Fixtures: Installation of all lighting fixtures shall be done by qualified and experienced mechanics.

Protect the lighting fixtures from damage during their unloading or removal, storage or installation. Any broken fixtures, glassware, etc., must be replaced with new parts, without any additional expense to the City, undue delay or inconvenience.

Upon completion of the installation of the lighting fixtures and lighting equipment, they must be in first-class operating order and in perfect condition as to finish, etc. Check for proper operation and appearance, alignment of fixtures and proper placement of lenses, louvers, lamps and other light-controlling or modifying appurtenances.

Cleaning: Immediately prior to final inspection, damp clean all glassware, fixture trims, reflectors; clean lamps or install new lamps as directed, with glass and fixtures free of labels.

800.4 MEASUREMENT:
Measurement for the Conduit and Trenching will be measured by the linear foot for each diameter size from center to center of pull boxes or from end to end of conduit when no pull boxes are used.

Measurement for the Conductors will be made on a linear foot basis for all work and equipment.

Measurement for the Electrical Service Entrance Section and Control Equipment as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the Concrete Pull Box as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the LED Pathway Area Light and Concrete Pole as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the LED Playground Area Light and Concrete Pole as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the LED Street Light and Pole as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the Ramada LED Light and Receptacle as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the 20A Post Mounted Receptacle as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the LED Playground Area Light as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the Electric Distribution Equipment as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the Pump Yard Electrical Equipment as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the LED Flag Pole Light as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the 50A Event Receptacle as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the Pump Yard Control Equipment as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

Measurement for the Pump Yard Lighting Equipment as herein specified and shown on the associated electrical plans will be made on a per unit basis for each location shown on the plans.

800.5 PAYMENT:
The accepted quantity for Conduit and Trenching, as measured as provided above, will be paid for at the contract unit price per linear foot, which price shall be full compensation for the work, complete in place. No direct payment will be made for rigid metal conduit bends or rigid non-metallic conduit bends at pull boxes, expansion fittings and coupling fittings, the cost being considered as included in the contract price for the conduit items. No separate measurement or direct payment shall be made for saw cutting, boring, jacking, trenching, pavement removal, debris disposal and pavement replacement done as part of conduit installation, the cost being considered as included in the contract price for the conduit items.

The accepted quantity for Conductors, as measured as provided above, will be paid for at the contract unit price per linear foot, which price shall be full compensation for the work, complete in place.

The accepted quantity for Electrical Service Entrance Section and Control Equipment, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for Concrete Pull Box, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for LED Pathway Area Light and Concrete Pole, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for LED Playground Area Light and Concrete Pole, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for LED Street Light and Pole, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for Ramada LED Light and Receptacle, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for 20A Post Mounted Receptacle, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for LED Playground Area Light, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for Electric Distribution Equipment, as measured as provided above, will be paid for at the contract lump per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for Pump Yard Electrical Equipment, as measured as provided above, will be paid for at the contract lump sum price, which price shall be full compensation for the work, complete in place.

The accepted quantity for LED Flag Pole Light, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for 50A Event Receptacle, as measured as provided above, will be paid for at the contract per unit price, which price shall be full compensation for the work, complete in place.

The accepted quantity for Pump Yard Control Equipment, as measured as provided above, will be paid for at the contract lump sum price, which price shall be full compensation for the work, complete in place.

The accepted quantity for Pump Yard Lighting Equipment, as measured as provided above, will be paid for at the contract lump sum price, which price shall be full compensation for the work, complete in place.

Add the following new section:

SECTION 900
SPLASH PAD

900.1 DESCRIPTION:
Under this Section, the Contractor shall be responsible for the installation of a series of water play features, water piping, and associated items with the construction of the spray features. All work shall be performed as indicated on the Specifications and include every aspect of work as obvious or implied and necessary to make the work complete and fully operational.

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

The water spray features, prefabricated mechanical equipment with controls, and design and construction documents shall be provided by Vortex USA, Inc. 3500 South Dupont Highway, Suite EP-101, Dover, Delaware, 19901, Ph. 1(877)586-7839 or approved equal.

The Contractor shall be required to install all of the manufactured equipment and water play features, all water piping and the independent features, and all associated work.

900.1.1 Codes and Ordinances: All materials shall be in conformance with the international series of Codes, as adopted by City of Page, and all other applicable codes and ordinances that govern the type of work. Nothing in the Plans and Specifications shall be construed to permit work not conforming to the applicable codes and ordinances.

Should any change in the Plans and Specifications be required to comply with the applicable codes and ordinances, the Contractor shall notify the Architect at the time of submitting his bid. After entering into the Contract, the contractor shall be held responsible to complete all Work necessary to meet these codes and ordinances without additional cost to the Owner.

Should the Contractor perform any work that does not comply with all applicable codes and ordinances, he shall bear all costs arising in correcting the deficiencies.

Permits and Fees: The contractor shall obtain and pay for all permits and fees required and provide any City or State required engineering drawings sealed by an Arizona registrant.

900.1.2 Quality Assurance: All products or items described herein shall be new, unless otherwise specified and shall be from the specified manufacturer or approved equal. Products shall be complete in all respects and in perfect working order.

Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers of articles used in this contract furnish directions covering points not shown in the drawings.

All water play equipment, systems and design shall be from a single source, from one manufacturer unless noted otherwise.

All mechanical systems are to be prefabricated, pre-plumbed, pre-wired, pre-tested and UL listed as provided by the specified manufacturer or approved equal.

Schedule 80 PVC to be utilized for all splash pad mechanical system piping.

900.1.3 Coordination: The Contractor shall be charged with the responsibility of making arrangements for the coordination of delivery of all equipment to the job site.

The Contractor shall place order for all water feature equipment immediately after award of bid and approval of product submittals to ensure adequate time for manufacturing and shipping. If any materials or equipment are not ordered in time, additional costs made by equipment manufacturers to their equipment in time to meet delivery schedule together with any special handling costs, shall be borne by the Contractor. NO project extension shall be granted due to improper lead time in ordering.

900.1.3 Explanation of Drawings: Drawings provided are schematic and not for construction.

Manufacturer to provide complete set of sealed construction drawings per local codes, by an Arizona registrant, including: All design and construction drawings for splash pad project construction to consist of construction of concrete pad, mechanical system, electrical and control systems, embed spray fixtures / drain box installation details, water play structure assembly / installation on concrete splash pad, equipment systems installation and hookups.

900.1.4 SUBMITTALS:
Materials List: Complete materials list with data cut sheets (3 copies) shall be submitted prior to ordering or performing any work. Materials list shall include manufacturer's name, product name, data cut sheet, specifications, finishes and description of all materials and equipment to be used.

Shop Drawings: Equipment manufacturer shall provide three (3) sets of complete splash pad design and construction documents and water feature product installation drawings indicating all materials, equipment and installation required

Equipment, Operation and Maintenance Manuals (to be provided prior to system start-up) Prepare and deliver (2) manuals with the following information to the Construction Manager

Catalog cut sheets and parts sheets with model numbers on all material and equipment installed. Include manufacturer's name, location and phone numbers for each product. Complete operations and maintenance instructions on all products.

900.2 MATERIALS:

900.2.1 General: Contractor shall be responsible for purchasing all specialized water feature mechanical and electrical materials and tools for the splash pad and shall then furnish all components to the Owner.

Materials not listed within these specifications but required for the complete installation of the feature mechanical and/or electrical systems, shall be furnished by the Contractor.

Materials not specified herein, shall be provided in accordance with information shown on the drawings and the general provisions of this part of the specification.

Substitutions in the list of equipment included in this section may be made by the Equipment Supplier only if the equipment is of better quality and more effective than that listed, improves system design and performance or delivery times, and only if the changes are thoroughly documented and pre-approved in writing by the Owner.

900.2.2 Specialized Splash Pad Material Manufacturer/Supplier: Approved Manufacturer – Subject to compliance with requirements, the following is the approved Manufacturer/Supplier for specialize splash pad system equipment listed in this specification unless otherwise noted.

Nouran Ibrahim
Sales Project Coordinator
7800 Trans Canda, Point-Calire, Quebec, Canada, H9R 1C6
1 877 586 7839 (USA & Canada)
+1 514 694 3868 (International)
nibrahim@vortex-intl.com
www.vortex-intl.com

Local Sales Rep: Monte Corley
monte@miracleplayground.com
1-800-905-1411 ext 105

Or Owner approved equal.

All splash pad water play equipment specified and supplied to the Contractor shall be supplied by a single Equipment Supplier/Manufacturer.

The aquatic play products shall be suitable for installation in municipal and commercial aquatic facilities and public play areas.

Products shall be manufactured by a company that has at least TEN (10) years of experience in the design and engineering of children's aquatic play areas. Any aquatic play product belonging to a new product line or series should demonstrate meeting the effective norm or show the conformity and resistance of the prescribed materials if it is proposed equivalency. The contractor or manufacturer must demonstrate meeting specifications by providing technical documents and drawings to be included in their bid proposal.

The Equipment Supplier shall have previously supplied splash pad system design, drawing and equipment, similar in size and complexity to the specified project.

900.2.3 Material Manufacturer Warranty: Product warranty on all mechanical system components shall be a one year warranty against defects in workmanship and materials. Product warranty on all stainless steel shall be a twenty five year warranty against defects in workmanship and materials. All finishes on stainless steel structures shall have a two year warranty. Warranty period starts from date of shipment. Warranties exclude normal wear and tear, abuse, improper installation and maintenance.

Scope of Responsibility: The liability of the manufacturer under this warranty is limited to the replacement of defective material within the warranty period.

900.2.4 Water Play Features: As shown on the drawings.

900.2.5 Water Feature Construction:
Structure Components: The manufacturer shall supply a complete assembly including: pipe structure, nozzle(s), product attachments, 2 piece base skirt, 2 piece color, mounting system, gasket, hardware, and fasteners.

Structures: Above grade water play structures are to be constructed from Type 304L stainless steel designed to resist damage from wind speed of 100 mph and seismic Zone (4) classification. Structural tube to have standard 150# flanged connection on mounting base. Structure to be surface mounted which allows them to be removable for winterization, maintenance, repair and swapping out products. Colors specified by renderings

Structure Mounting System: Structure to be anchored to a thickened concrete slab with 5/8 inch stainless steel studs. Studs to be drilled and anchored into place with fast setting two-part component adhesive per manufacturer installation instructions.

Structure Finishes: All structure finishes are to be a three part epoxy paint coating, non-toxic, compatible with treated water, and corrosion resistant. UV stabilizers are to be added to the finish coat to provide color protection in indoor or outdoor installations.

Structure 2 Piece Base Skirt: 2 Piece Base skirts to be fabricated from fiberglass re-enforced plastic with durable finish and fit over base mounting flange and mounting hardware. Base skirt to be provided with vandal-proof stainless steel security fasteners for securing skirt to structure mounting flange.

Structure 2 Piece Collar: 2 Piece Collar to be fabricated from urethane.

Ground Spray Components: The manufacturer shall supply a complete assembly including: spray jet pod, non-slip cover plate, nozzle, vandal proof stainless steel hardware, and winterization cover plate.

Ground Spray Jet Pods-PVC: Jet pod is to be constructed of heavy-duty gas welded PVC material with stainless steel hardware. Structure fittings and connection ports to be gas welded; triple bead fabrication for strength and durability. Jet pod to be designed to be completely encapsulated into thickened concrete slab.

Ground Spray Cover Plate: The cover plate is to be constructed of a heavy-duty PVC plastic material with a colored, non-slip coating. The cover plate is to be secured to jet pod with tamper resistant stainless steel fasteners.

Ground Spray Nozzles: Nozzles to be manufactured from non-corrosive, heavy-duty PVC material or plastics. Nozzles are to be non-clogging.

Ground Spray Winterization: Ground spray embeds shall come complete with winterization cover plate. All water to be evacuated from structure by either blowing out plumbing lines or by gravity draining back to valve vaults. Prior to plugging, use of a biodegradable swimming pool anti-freeze is recommended.

Ground Spray LED Lighting: Lighting system to consist of prefabricated LED lighted nozzle fixtures for all ground sprays. System includes necessary Junction Boxes, Transformers, Transformer Enclosures, and interface with main control panel.

Products Flow Rate Design: Feature flow rates and supply line sizes are not to exceed as specified.

900.2.6 Mechanical System- Drain Away: Splash pad project design to consist of a single pass domestic water system to be housed in restroom mechanical room. All installation shall be coordinated with restroom plans and installation. Splash pad mechanical system shall be provided by splash pad manufacturer.

Domestic operating system to be designed per local codes and consist of all mechanical components necessary for a fully operating splash pad system.

Mechanical components to be fully integrated consisting of:

- UL Listed Control Panel
- Pre-Plumbed Distribution Manifold
- Drain Box

Activator: is to be a structure that has a low voltage touch sensor within the cap of the structure. Patrons touch the top of the structure to send a signal to the control panel to activate water flow. Activator to be a 4" diameter tubular structure with UV resistant finish. Activator to be provided with complete assembly including tubular structure, acrylic accent, graphic face plate, 2 piece collar and 2 piece skirt.

Control Panel: is to be a PLC interface U.L. listed and incorporate adjustable time clock controls to set hours of operation and set duration time of activated devises, individual controlled sequencing of spray events and activation bollard relay switches for splash pad system. Main power supply and connection to be provided by contractor.

Distribution Manifold: is to be a pre-plumbed water delivery system from feature water supply to water play features. Distribution Manifold to be constructed of heavy-duty gas welded schedule 80 PVC materials. Distribution Manifold to be pre-plumbed with manual flow control valves that regulate water flow levels to each water element and electric solenoid valves for sequencing of water play elements.

Drain Box: to consist of a 12" diameter plastic basin with grate top and 6" outlet. Each drain box has a nominal capacity of 250 gpm gravity supply.

900.3 EQUIVALENCIES CLAUSES:

900.3.1 General: To enable all venders to be judged equitably, they shall be based on the specified products in this document and shown on the drawings.

The proposal for any substitute products must be attached to the bid, identifying the substitute product by its trade name along with any savings it may represent for the client. Bidding contractor will be required to cover any additional cost for installation of a substituted product.

Following the opening of the bid, only those substitutes proposed by the lowest bidder of the specified products, will be considered

All substitute approval requests shall be accompanied by manufacturing drawings, including spray zones, plumbing and electrical schematics and written warranty from the manufacturer. No substitution or equivalency submitted will be considered if products to be

considered are not part of manufacturer standard existing product line or a written proof that product has been manufactured previously by the substitute manufacturer.

The owner/consultant reserves the right to grant or deny approval for proposed substitutions without prejudice to his rights and his decision shall be final. The above conditions apply to this section independently of any other clauses on the subject found in this document.

900.4 CONSTRUCTION REQUIREMENTS:

900.4.1 General: Should the bidder wish to substitute products other than the products specified herein, the bidder shall list products and submit a written Substitution for of Proposal at least 10 calendar days prior to the date of receipt of bids. The bidder shall submit specifications, cut sheets, and performance data, along with an itemization listing each and every deviation from the specifications herein.

The manufacturer shall furnish the purchaser with at least two sets of complete installation and operating manuals. The installation manual will illustrate the installation of the entire system.

900.5 COMMISSIONING OF THE SPLASH PAD:
Upon completion of construction, the contractor shall provide owner/operator adequate training on facility operations and maintenance. The contractor may request that the equipment manufacturer provide on-site start-up and training for the owner/operator.

900.6 MEASUREMENT:
Work under this section will be measured as lump sum for each Splash Pad Equipment alternative per the bid schedule.

900.7 PAYMENT:
The accepted quantity of Splash Pad Equipment, measured as provided above, will be paid by the contract unit price which shall be full compensation for the work, complete, as described above and as shown on the plans and details, including all labor, equipment and materials necessary to construct the Splash Pad Equipment. No separate measurement or payment will be made for production of construction drawings, permit review process, or permitting fees, the cost of which is considered included in the cost of the Splash Pad Equipment itself.

Add the following new section:

SECTION 920
ARTIFICIAL GRASS SURFACING

920.1 DESCRIPTION:
It shall be the responsibility of Artificial Turf Installer to provide all labor, materials, equipment and tools necessary for the complete installation of an artificial grass system as indicated on the drawings and in the specifications herein.

The work shall include the following items:

- Install Artificial Grass system with fibers approximately 1 1/2 inches (1- 1/2″) high.
- An aggregate base will be installed by the contractor for installation of the artificial turf.
- A poured cushion layer per section 910 as indicated on the drawings

920.1.1 Pre-Installation Meetings: Conduct conference at the project site prior to the start of construction operations.

920.1.2 Submittals:
Product Data: For each type of product submit the following:

- One (1) of the product warranty for proposed artificial grass product
- One (1) copy of their maintenance instructions. These instructions will include all necessary instructions for the proper care and maintenance of the newly installed artificial turf system
- One (1) copy of a signed letter from artificial grass vendor certifying that the proposed artificial grass product is manufactured in the USA
- One (1) copy of independent laboratory test reports on system or components

Shop Drawings: For artificial grass surfacing.
Contractor shall supply complete shop drawings and manufacturer's specifications for review and approval by Town representative and landscape architect prior to ordering.

Include sections and details.

Show locations of seams and method of seaming.

Samples: For each type of artificial grass surfacing indicated.

Turf Fabric: 12 inches square.

Seam Sample: 24 inches square with seam centered in sample.

920.1.2.1 Informational Submittals:
Qualification Data: Contractor shall submit a list of 3 similar project completed within the past 5 years.

Product Test Reports: For each artificial grass surfacing assembly.

Field quality-control reports: Contractor required to test all artificial turf installations per manufacture specifications. Contractor shall submit results of testing to City. Testing shall occur with City representative present.

920.1.2.2 Closeout Submittals:
Maintenance Data: For artificial grass surfacing, including maintenance cleaning instructions, to include in maintenance manuals.

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

Turf Fabric: Minimum of 100 square foot for each type indicated.

Seaming Tape and Adhesive: One roll of seaming tape and one gallon of adhesive.
One new set of maintenance tools, of type recommended by artificial grass surfacing manufacturer for installation.

920.1.3 Quality Assurance:
Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

The artificial grass vendor must provide competent workmen skilled in this type of dog surface installation. The artificial grass vendor shall provide a qualified installation foreman to coordinate and review the component parts of the artificial grass system. Foreman shall be introduced to owner or owner's representative prior to start of construction.

The artificial grass vendor and installer must be experienced with no less than six completed playground installations (1500sf or greater) where a knitted artificial grass surface was installed. Installer must be competent in the installation of this material, including attachment of seams, proper trimming, and attaching techniques, prior to the start of turf installation.

The artificial grass vendor shall submit its manufacturer's warranty, which warrants the artificial grass product:

- Provide coverage of artificial grass for a minimum of ten (10) years from the date of substantial completion.
- Warrant that the materials installed meet or exceed the product specifications.
- Be from a single source (certified by manufacturer) covering workmanship and all materials.
- Assure the availability of exact or substantially the same replacement materials for the artificial grass system for the full warranty period.
- Include general wear and damage caused by UV degradation. The warranty may specifically exclude vandalism and Acts of God beyond the control of the manufacturer or installed.

920.1.4 Delivery, Storage, and Handling: Store materials in location and manner to allow installation of artificial grass surfacing without excess disturbance of granular base.

920.1.5 Warranty: Manufacturer agrees to repair or replace artificial grass surfacing that fails in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

- Deterioration and excessive wear.
- Deterioration from UV light.
- Seam separation.

Warranty Period: Limited Lifetime.

920.2 MATERIALS:

920.2.1 Artificial Grass Surfacing: Artificial grass shall be 'Kid Play'. Available through Artificial Grass Superstore, Chandler, AZ; Representative – Mike Alexander (602) 625-4846.

Artificial Grass Surfacing: Complete surfacing system, consisting of artificial yarns bound to water-permeable backing and infill indicated.

Turf Fabric: Woven turf fabric with multicolored fiber and UV resistance, complying with the following:

- Yarn Fiber: Polyethylene with Brown Thatch 60 oz./sq. yd..
- Pile Height: 1 1/2 inches
- Color: - Blades- Field/Clover
- Color: Thatch- Tan/Olive
- Fabric Construction: Tufted
- Tufting Gauge: N/A – knitted product
- Backing: Woven Polypropylene and polyurethane
- Coating Type: 22oz Polyurethane
- Total Product Weight: 88 oz / SY

- Roll Width: 15 ft

920.2.2 Nailer Board: 2" x 2" Trex nailer board.

920.2.3 Stainless Steel Staples: 1" stainless steel staples with ¼" crown.

920.3 CONSTRUCTION REQUIREMENTS:

920.3.1 Base and Drainage Construction: The artificial grass base contractor shall strictly adhere to the installation procedures outlined under this section and by the engineer's drawings. Any variance from these requirements must be accepted in writing, by the artificial grass vendor, and submitted to the owner or owner's representative, verifying that the changes do not adversely affect the performance or warranty.

Excavation: Existing ground cover shall be excavated to the depth established on the excavation plan. The sub-grade shall also be compacted to a recommended 90% compaction rate.

Plastic Nailer Board: The artificial turf perimeter fastening structure shall be installed before the drainage aggregate.

Install an artificial nailer board around perimeter and all penetrating objects. Nailer board shall be flush to grade (or as specified in site detail drawings) when adjacent to soft surface (i.e. natural grass, mulch). Nailer board shall be 1/2" to 3/4" below grade when adjacent to hard walking surface (i.e. concrete or tile).

This shall be the responsibility of the artificial turf base contractor. See artificial turf edge attachment detail.

Base Drainage Aggregate: Installation of the free draining base aggregate of 3/8" to 5/8" clean compactable angular stone (any mix with fines in excess of 20% must be approved by manufacturer), shall follow procedures provided. If the sub-base does not permit liquids to freely percolate, auxiliary drainage is required. Base material must be installed to a recommended depth of 3 1/2". The drainage network and its existing elevations shall not be disrupted through ground pressures from trucks, dozers, or by any other means.

The stone shall be left firm and compacted while allowing the porosity and drainage capabilities of the aggregate profile.

The free draining base course should be designed to meet local soil and weather conditions. It must be installed to a minimum depth of 3 1/2" with a recommended compaction rate of 90%.

Resilient base shall be installed under artificial turf in playground areas as indicated on drawings and details and per manufacturer's direction. Resilient base shall provide fall protection per ASTM standards.

920.3.2 Artificial Grass System Installation: After a final inspection of the stone base by the artificial grass contractor and the owner's representative, the artificial turf installation shall begin. The artificial grass product shall be delivered in 15-foot-wide rolls.

Artificial grass rolls shall be joined via adhesive bond seaming and reinforced with specialty turf adhesive where necessary.

Seams shall be flat, tight, and permanent with no separation or fraying.

Grass rolls must be installed with pile leaning the same direction.

Artificial Turf Perimeter Attachment: After final layout and seaming of the artificial grass product, the artificial turf material shall at a minimum be secured to the top of plastic nailer board firmly anchored to sidewalk, curb, wall, or by rebar making up the perimeter of the artificial turf area.

The turf shall be attached to plastic nailer board by stainless steel staples, screws, and/or nails.

Soil or surfacing material outside of the defined artificial turf area shall be backfilled against turf wrapped perimeter edge and have zero transition edge to artificial turf unless otherwise specified.

Concrete and solid walking surfaces should be 1/2" to 3/4" higher than the top of the board. Infill Application: It is imperative that no infill is utilized with artificial turf used with dogs.

920.3.3 Closeout: The artificial grass vendor must verify that a qualified representative has inspected the installation and that the finished surface conforms to the manufacturer's requirements.

Extra materials: Owner shall be given the option to retain and store excess materials such as excess turf left over from the project.

920.3.4 Clean Up: Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.

During the contract and at intervals as directed by the owner or owner's representative and as artificial grass system installation is completed, clear the site of all extraneous materials, rubbish, or debris, and leave the site in a clean, safe, well-draining, neat condition.

Surfaces, recesses, enclosures, etc. shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the owner.

920.4 MEASUREMENT:
The item shall be measured on a per square foot basis.

920.5 PAYMENT:
The item will be paid for complete and in place as measured above inclusive of all labor, materials, excavation, base layers, artificial turf fabric, etc for a fully installed artificial turf surface.

Add the following new section:

SECTION 930
ENGINEERED WOOD FIBER

930.1 DESCRIPTION:
The work specified in this section consists of the installation of Engineered Wood Fiber in accordance with these specifications, and in conformity with the dimensions and notes shown in the plans.

930.1.1 Quality Assurance and Compliance Details:

Accessibility of Surface Systems - ASTM F1951: Determination of accessibility of surface systems under and around playground equipment.

Impact Attenuation - ASTM F1292: Impact attenuation of surface systems under and around playground equipment.

Standard for Engineered Wood Fiber - ASTM F2075: Minimum characteristics for those factors that determine particle size, consistency, purity and ability to drain.

IPEMA Certification: Manufacturer must provide proof of certification. "In the interest of public playground safety, IPEMA provides an independent laboratory which validates a manufacturer's certification of conformance to ASTM F1292 and ASTM F2075. A list of current validated products, their thickness and critical heights may be viewed at www.ipema.org."

930.1.2 Acceptable Product and Manufacturers:

Robertson Recreational Surfaces (or approved equal)
West Coast Operations
2140 E. Cedar St
Tempe, AZ 85281
1(800)858-0519
www.robertsonsurfaces.com

930.2 MATERIALS:
Product is manufactured of a ground wood fiber comprised of softwoods and/or hardwoods, consisting of randomly sized wood fibers the majority of which do not exceed 2" in length and no more than 15% fines to aid in compaction.

Product to have minimal bark and to be free of twigs, leaf debris and other organic material.

Product depth, after installation, must be in accordance with the procedure described in ASTM F1292 and meet guidelines for critical height as set forth by the Consumer Product Safety Commission for use of wood products for protective surfacing.

930.3 CONSTRUCTION REQUIREMENTS:

930.3.1 SUB-BASE TYPES & DETAILS: Engineered Wood Fiber may be installed over compacted earth. If it is deemed that additional drainage is necessary; a layer of gravel can also be a suitable substrate.

930.3.2 SITE PREPARATION AND REQUIREMENTS: For in-ground (i.e. on grade) installations, excavate area to proper depth per plans.

Both in-ground and above-ground systems must be properly graded. A one percent (1%) grade is recommended for proper drainage. Engineered wood fiber systems should not be installed on grades exceeding 10 percent. Substrate (for both in-ground and above-ground systems) must be firmly compacted, especially when additional fill material has been provided. The substrate should be free of stones, roots and other vegetation.

930.3.3 INSTALLATION: All materials provided, including product data, specifications, installation instructions and maintenance procedures, as well as all site specific plans, instructions and specifications, be reviewed by a certified engineer, architect or landscape architect familiar with local soil and climatic conditions.

Further, purchaser should determine and specify fall heights and equipment use zones as required by the Consumer Product Safety Commission's Handbook for Playground Public Safety, applicable ASTM standards, and state and local codes and regulations.

Installation Instructions:

1. Install playground equipment

2. For above-ground systems, install retaining wall.

3. Install applicable drainage system.

4. If manufactured drainage is being used, the Terraflow should be laid out in parallel strips on six-foot centers. The strips must run from the high side of the playground to the low side. Terraflow drains should be placed directly on the sub-grade and should be covered with geotextile cloth after layout is complete. As an option for playgrounds with poor drainage, a Terraflow header strip may be cut and placed perpendicularly to the parallel strips already in

place. This header strip should be placed on the low end of the playground. Any joints can be taped with a waterproof tape to maximize drainage.

5. If gravel drainage is used, place 3 in. of drainage gravel on a layer of geotextile fabric. The lower end of the site should be connected to drainage to channel collected water away from the site. Overlap all seams a minimum of 3 in. Slit fabric to fit around equipment uprights. Where possible, overlap all slits with next piece of fabric.

6. Cover drainage system (either manufactured drainage or gravel) or earth substrate with geotextile fabric. Overlap all seams a minimum of 3 in. Slit fabric to fit around equipment uprights. Where possible, overlap at slits with next piece of fabric.

7. With permanent marker or warning label, mark uprights of equipment with compacted system depth.

8. Install the TotTurf engineered wood fiber to the proper depth, mounding in the center of the play areas of the playground. Extra materials will be provided to allow for compaction. Use a small front-end loader to spread surfacing. Operator should be careful not to travel on the fabric or turn sharply on the engineered wood fiber. It will also be necessary to spread manually. Install all the material delivered and please note that the surfacing will be several inches above grade until it compacts. TotTurf engineered wood fiber needs to be compacted in order to be considered handicapped accessible. This can be achieved over time and usage, or with a mechanical compactor. Saturating the initial load with water will help with compaction.

9. For a smooth finished surface, hand rake. After two weeks of active use, surface should be raked again.

10. Periodical adjustments of TotTurf engineered wood fiber are required under slides, swings and other concentrated use zones. Installing Robertson Industries, Inc., mats in these areas will help control displacement in these high use zones. WARNING: Failure to maintain engineered wood fiber at the initial installation depth may result in an injury and void your warranty.

930.4 WARRANTY:
Engineered Wood Fiber comes with a 25-year system or 15-year performance warranty. Ask your Robertson Industries, Inc., representative for a copy of our full TotTurf Engineered Wood Fiber warranty.

930.5 MAINTENANCE:
Maintain engineered wood fiber per manufacturer's recommendations. Surface shall be kept smooth and even. Additional wood fiber shall be added as required to maintain proper fall attenuation.

930.6 MEASUREMENT:
The item shall be measured on a per square foot basis.

930.7 PAYMENT:
The item will be paid for complete and in place as measured above for a complete installation of engineered wood fiber.