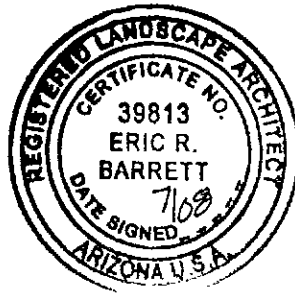


**M & O Agencies Inc.
Office Complex**

Landscape Technical Specifications



A handwritten signature in black ink, appearing to read "Eric Barrett", written over a horizontal line.

EXPIRES 9/30/2009

**ARC Studios, Inc.
6300 E. El Dorado Plaza #A220
Tucson, AZ 85715
(520) 882-9655**

This landscape architect's seal
pertains only to Landscape and
Irrigation items in these specifications.

July 2008

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SECTION 02 811 - UNDERGROUND SPRINKLER IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all work and material, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with the installation of underground sprinkler system complete, as shown on drawings and/or specified herein. When the term "Contractor" is used in this section, it shall refer to the irrigation contractor.

1.2 RELATED DOCUMENTS

- A. Conditions of the contract and Division 1 General Conditions are hereby made a part of this section.

1.3 Applicable Standards

- A. ASTM D2241 - Poly (Vinyl Chloride)(PVC) Plastic Pipe (SDR-PR)
- B. D2464 - Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings, Threaded, Schedule 40
- C. D2564 - Solvent cements for Poly (Vinyl Chloride)(PVC) Plastic Pipe and Fittings
- D. D2855 - Making Solvent - Cemented Joints with Poly (Vinyl Chloride)(PVC) Pipe and Fittings
- E. F-477 - Gasket Pocket Pipe

1.3 WARRANTEE AND MAINTENANCE

A. Warrantee:

- 1. The Contractor is required to guarantee the sprinkler irrigation system in accordance with the requirements below. A copy of the guarantee form shall be included in the Operations and Maintenance Manual. The guarantee form shall be on the Contractor's letterhead and contain the following information:

GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler irrigation system we provided to be free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear, and unusual abuse or neglect excepted. We agree to repair or replace any defects in material or workmanship including repair of backfill settlement which may develop during the period of one year from the date of Substantial Completion and to repair or replace any damage related to such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Owner, after receipt of written notice from the Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

Project: M & O Agencies Inc. Office Complex

Location: Tucson, Arizona

Signed: _____

Address: _____

Phone: _____

Date of Acceptance: _____

Warranty Period: One (1) Year

B. Maintenance

1. Work shall include but not be limited to:

- a. Adjustment of sprinkler height and plumb to compensate for settlement and/or plant growth.
- b. Backfilling of all trenches.
- c. Adjustment of head coverage (arc of spray) as necessary.
- d. Unstopping heads plugged by foreign material.
- e. Adjustment of controller as necessary to insure proper sequence and watering time.
- f. All maintenance necessary to keep the system in good operating condition.

2. Exclusions

- a. Guarantee and maintenance after final acceptance does not include alterations as necessitated by re-landscaping, regrading, addition of trees or the addition and/or changes in sidewalks, walls, driveways, etc., except to the extent that such work is caused or necessitated by the irrigation Contractor or his general Contractor.

1.4 SUBMITTALS

- A. The Contractor shall submit to the Owner's Representative two (2) copies of shop drawings or manufacturer's "cut sheet" for each type of sprinkler head, pipe, controller, valves, check valve assemblies, valve boxes, wire, conduit, fittings and all other types of fixtures and equipment which he proposes to install on the job. The submittal shall include the manufacturer's name, model number, equipment capacity and manufacturer's installation recommendation, if applicable, for each proposed item.
- B. No work can begin until all submittals are approved. No partial submittal will be accepted and submittals shall be neatly bound into a brochure and logically organized. After the submittal has been approved, substitutions will not be allowed except by written consent of the Owner's Representative.
- C. Shop drawings
 1. Include dimensions, elevations, construction details, arrangements and capacity of equipment, as well as manufacturer's installation recommendations.
- D. Record Drawings
 1. Record dimensioned locations and depths for each of the following:
 - a. Sprinkler pressure line routing (Provide dimensions for each 100 lineal feet (maximum) along each routing, and for each change in directions).
 - b. Gate Valves, Irrigation control valves, Control wire routing, Sleeves under paving and other related items as may be directed by the Owner's Representative.
- E. Dimensioning
 1. Locate all dimensions from two permanent points (buildings, monuments, sidewalks, curbs or pavements).
- F. Changes
 1. Record all changes which are made from the Contract Drawings, including changes in the pressure and non-pressure lines.
 2. Record all required information on a set of blackline prints of the drawings. Do not use these prints for any other purpose.
 3. Maintain information daily. Keep drawings at the site at all times and available for review by the Owner's Representative.

G. Record Drawing Submittal

1. When record drawings have been approved by the Owner's Representative, transfer all information to a set of reproducible mylars using permanent india ink.
2. Changes using ball point pen are not acceptable.
3. Make dimensions accurately at the same scale used on the original drawings, or larger.
4. If photo reduction is required to facilitate controller chart housing, notes or dimensions shall be a minimum 1/4" in size.
5. Reproducible mylars will be furnished by the Owner's Representative at cost for printing and handling.

1.5 CONTROLLER CHARTS

- A. Do not prepare charts until record drawings have been approved by the Owner's Representative.
- B. Provide one controller chart for each automatic controller installed. Chart may be a reproduction of the Record Drawing, if the scale permits the chart to fit into the controller door. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.
- C. Chart shall be blackline print of the actual system showing the area covered by that controller. Identify the area of coverage of each remote control valve, using a distinct different pastel color drawn over the entire area of coverage.
- D. Following approval of charts by the Owner's Representative, they shall be sealed between two layers of 20 mil plastic sheets.
- E. Charts must be completed and approved prior to final acceptance of the irrigation system.

1.7 OPERATING AND MAINTENANCE MANUAL

- A. Provide two individually bound manuals detailing operating and maintenance requirements for the irrigation system.
- B. Manuals shall be delivered to the Owner's Representative no later than 10 days prior to completion of work.
- C. Provide descriptions of all installed materials and systems in sufficient detail to permit maintenance personnel to understand, operate and maintain the equipment.
- D. Information Required
 1. Index sheet, stating the Irrigation Contractor's name, address, telephone number and name of person to contact, Duration of guarantee period, Equipment list providing the following for each item:
 - a. Manufacturer's name
 - b. Make and model number
 - c. Name and address of local manufacturer's representative
 - d. Spare parts list in detail
 - e. Detailed operating and maintenance instructions for major equipment.

1.8 SUBSTITUTION OF MATERIALS

- A. This irrigation system has been designed around the irrigation components herein stated and as shown on the plans. Any changes of brand name, trade name, trademarked, patented articles, or any other substitutions will be allowed only by written order signed by the Owner's Representative. The Owner is under no obligation to accept materials other than as specified. If a bidder wishes for a substitute item to receive consideration as an approved equal, the bidder and each item must meet all the following requirements without exceptions.

4. The superintendent shall have a minimum of 7 years irrigation installation experience and a minimum of 2 years supervisory experience.

1.10 NOTIFICATION OF OWNER'S REPRESENTATIVE

- A. The Owner's Representative shall have free access to the work whenever it is in preparation or progress and proper facilities for such access and inspection. The Contractor shall notify the Owner's Representative when he will and will not be on the job. Should the Contractor work periodically on the job, the Owner's Representative shall have the right to require the Contractor to give a 24 hour notice of each and every day or partial day that he intends to work on the project. The Contractor shall perform no work unless the Owner's Representative has been properly notified. Failure to notify the Owner's Representative may require the Contractor to redo, uncover pipe, expose for inspection, etc., all that the Owner's Representative was unable to inspect.

1.11 EXISTING UTILITIES

- A. Location and Elevations: The Contractor shall examine the site and verify to his own satisfaction the locations and elevations of all utilities both public and private and availability of utilities and services required. The Contractor shall inform himself as to their relation to the work and the submission of bids shall be deemed as evidence thereof. The Contractor shall repair at his own expense, and to the satisfaction of the Owner's Representative, for damage to any utility shown or not shown on the plans.
- B. Should utilities not shown on the plans be found during excavations Contractor shall promptly notify Owner's Representative for instructions as to further action.
- C. Contractor shall make necessary adjustments in the layout as may be required to connect to existing stubouts, should any such stubouts not be located exactly as shown and as may be required to work around existing work, at no increase in cost to the Owner. All such work will be recorded on record drawings and turned over to the Owner's Representative prior to final acceptance.

1.12 COOPERATION

- A. Work under this contract may be accomplished with other Contractors and trades on the project site at the same time. The Contractor shall allow each Contractor and trade adequate time at the proper stage of construction to fulfill his contract

1.13 ELECTRIC POWER

- A. Electric power to operate the controller is existing at the controller locations except as noted on the Construction Drawings. Service wiring to the controller cabinet shall be furnished by the irrigation contractor.

1.14 WATER FOR TESTING

- A. The Owner shall furnish all water necessary for testing, flushing and jetting.

1.15 EXTRA EQUIPMENT

- A. Supply as part of this contract the following tools:
 1. Two sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.
 2. Two keys for the automatic controller
 3. The above mentioned equipment shall be turned over to the Owners Representative at the conclusion of the project. Before final inspection can occur, evidence that the Owner has received this material must be shown to the Owner's Representative.

1.16 SLEEVES AND ELECTRICAL CONDUITS

- A. Sleeves and electrical conduits will need to be installed as noted on the Construction Drawings. Contractor shall be responsible for timely placement of all sleeves and conduits at no additional cost to the Owner.

1.17 PROGRESS MEETINGS

- A. Contractor shall attend all progress meetings as requested by the Owner's Representative during installation and as needed to keep work progressing.

1.18 LOCATING UNDERGROUND FACILITIES

- A. All mainlines shall have a purple #18 insulated tracer wire securely attached to it at 8' oc and shall have 12" of tracer wire accessible above grade at the termination and be securely attached at that point.
- B. All lateral irrigation lines greater than 2" in diameter shall have a purple #18 insulated tracer wire securely attached to it at 8' oc and shall have 12" of tracer wire accessible above grade at the termination and be securely attached at that point.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Unless otherwise noted on the plans, all materials shall be new and unused. This irrigation system has been designed around the irrigation components herein stated and as shown on the plan. Any changes of brand name, trade name, trademarked, patented articles, or any other substitutions will be allowed only by written order as outlined in Section 1.06.

2.2 EQUIPMENT

A. PVC Pressure Mainline Pipe Fittings

1. Pressure mainline piping shall be Schedule 40 PVC for 1" to 2 ½" sizes and PVC Class 200 SDR 21 for 3" or larger sizes.
2. Pipe shall be made from NSF approved type I, grade I PVC compound conforming to ASTM specification D - 2241. Piping up to and including 3" size shall be SDR solvent weld. Pressure mainline piping 4" size and larger to be gasket pocket type as manufactured by the Swanson Company or equal, and shall conform to ASTM F-477.
3. PVC solvent weld fittings shall be Schedule 80k, Type I NSF approved conforming to ASTM test procedure D2466 (for sizes up to and including 3") and shall be as manufactured by Spears, Lasco or Dura.
4. Solvent cement and primer for PVC solvent-weld pipe and fittings shall be Red Hot Blue Glue and Christy's Purple Primer. Manufacturer's installation requirements shall be strictly adhered to.
5. All PVC pipe shall bear the markings showing the Manufacturer's name, Nominal pipe size, Schedule or class, Pressure rating in psi, National Sanitation Foundation (NSF) approval and Date of extrusion.
6. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable IPS schedule and NSF seal of approval.

B. PVC Non-Pressure Lateral Piping

1. Non-pressure buried lateral line piping shall be PVC class 200 with solvent weld joints for sizes 3/4" and greater.
2. Pipe shall be made from NSF approved, Type I, Grade II PVC compound conforming to ASTM resin specifications D1784. All pipe shall meet requirements set forth in Federal Specification PS-22-70, for the appropriate standard dimension ratio (SDR).
3. PVC Solvent weld fittings shall be Schedule 40, Type I NSF approved conforming to ASTM test procedure D2466 as manufactured by Spears, Lasco or Dura.

C. Galvanized Pipe & Fittings

1. Where indicated on the drawings and on the details, use galvanized steel pipe ASA Schedule 40 mild steel screwed pipe.
2. Fittings shall be medium galvanized screwed beaded malleable iron. Galvanized couplings may be merchant coupling.
3. All galvanized pipe and fittings installed below grade shall be painted with two coats of Koppers # 50 Bitumastic (except swing joint assembly).

D. Backflow Preventer

1. Backflow Preventer shall be a reduced pressure type of the size shown on the project plans.

F. Gate Valves

1. Brass ball valve similar to those manufactured by Watts or Nibco.

F. Valve Boxes

1. A box shall be provided for all valves and equipment as detailed on the project plans.
2. Valve boxes shall be made of high-strength, plastic suitable for turf irrigation purposes.
3. Boxes shall be suitable in size and configuration for the operability and adjustment of the valve. Box shall be rectangular in shape and be sufficiently large to allow easy access, maintenance and repair of the equipment contained therein.
4. All valve box covers shall be imprinted with "irrigation".
5. Valve boxes shall be colored green when located in turf areas, and colored tan when located in areas of inorganic ground cover or desert seed, and colored purple when utilized for reclaimed water systems.
6. Boxes for valves shall have a locking or bolt down cover.
7. Box shall be as manufactured by Ametek, Dura or Carson.
8. Only one remote control valve/gate valve assembly shall be installed per valve box.
9. Extension sections will be used as appropriate to the depth of piping.

G. Quick Coupling Valves and Wire Splices

1. Box shall be a 9" diameter round, plastic valve box.

H. Electric Control Valves

1. Valve shall be of size indicated on Drawings Valves shall be as indicated on the drawings.

I. Control Wire

1. Control wire shall be UF-UL listed, color coded copper conductor direct burial size 14. Tape control wires to side of main line every 10 feet. Where control wire leaves main or lateral line, bury a minimum of 24" deep. Use 3M DBY waterproof wire connectors at splices and locate all splices within valve boxes. Use white or gray color for common wire and other colors for all other wire. Each common wire may serve only one controller. Do not use black on any 24V circuit. One extra control wire shall be run from panel continuously from valve to valve throughout system controlled by that controller, similar to common wire for use if a wire fails. Wire shall be different color than all other wires and shall be marked in control box as an extra wire.

J. Irrigation Controller

1. Electric and Battery Automatic Controllers shall be of the sizes and model shown on the plans. If no size is given, the clock shall have a minimum of 2 stations more than the number of valves shown on the irrigation plans.

3.4 WATER SUPPLY

- A. Irrigation system shall be connected to the new water mainline at the approximate location shown on the drawings. Contractor is responsible for minor changes caused by actual site conditions and tap locations.

3.5 EXCAVATION AND BACKFILL

A. Trenching

1. Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trenching excavation shall follow the layout as approved by the Owner's Representative in the field. If the bottom of a pipe trench excavation is found to consist of rock, caliche, or any other material that, be reason of its hardness or sharpness, cannot be excavated to give a uniform bearing surface, said rock or other material shall be removed for at least three (3) inches below the specified trench depth and refilled to the specified trench depth with sand or other approved shading material.

B. Burial of Pipe

1. Depth of Pipe shall be as shown on the construction details

C. Backfilling

1. The trenches shall not be backfilled until all the required tests are performed. Trenches shall be carefully backfilled in 8" lifts with the excavated materials, less any stone or clods of earth larger than 1/2" in any dimension. Backfill shall be mechanically compacted in landscape areas to a dry density equal to adjacent undisturbed soil. Backfill shall conform to adjacent grades without dips, sunken areas, humps or other surface irregularities. Backfilling shall not be performed while trenches or backfill material is in a wet or muddy condition.
2. A fine granular material backfill will be initially placed on all lines to a depth of 3" over the top of the pipe. No foreign matter or particles larger than 1/2" in any one dimension will be permitted in this backfill. Existing site soil that conforms to this gradation requirement may be used for this initial backfill.
3. Flooding of trenches will be permitted only with approval of the Owner's Representative.
4. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn or planting, or other construction are necessary, the Contractor shall make all required adjustments without cost to the owner. Contractor shall also make repairs or replacements to any item damaged by settlement of trenches or irrigation equipment, whether said item was part of the original scope of construction or not.
5. All buried private landscape irrigation lines greater than 2" in diameter shall have a purple #18 insulated tracer wire securely attached to it at 8' o.c. and shall have 12" of tracer wire accessible above grade at the termination and be securely attached at that point.
6. All buried mainline irrigation lines shall have a purple #18 insulated tracer wire securely attached to it at 8' o.c. and shall have 12" of tracer wire accessible above grade at the termination and be securely attached at that point.

D. Trenching and backfill under paving

1. Trenches located under areas where paving, asphaltic concrete or concrete will be installed shall be backfilled with sand for a depth of 3" below the bottom of the pipe (or sleeve) and 3" above the top of the pipe (or sleeve). and compacted to 90% compaction or the required subgrade compaction for that area (whichever is greater), using manual or mechanical tamping devices. All trenches shall be left flush with the adjoining grade. The Contractor shall set in place, cap, and pressure test all piping under paving prior to the paving work.
2. Provide for a minimum cover of 18" between the top of the pipe and the bottom of the aggregate base for all pressure and non-pressure piping installed under asphaltic concrete paving.

E. Assemblies

1. Routing of irrigation lines as indicated on the drawings is diagrammatic. Install lines and various assemblies to conform with the details shown on drawings and in accordance with the manufacturer's recommendations.
2. Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.
3. Install all assemblies specified herein in accordance with respective detail. In absence of detail drawings or specifications pertaining to specific items required to complete work, perform such work in accordance with best standard practice with the prior approval of the Owner's Representative.
4. PVC pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before installation. Installation and solvent-welding methods shall be recommended by the pipe and fitting manufacturer. Primer shall be used on all solvent weld joint. No solvent weld joint shall be submitted to water pressure until curing for 24 hours minimum.
5. On PVC to metal connections, the Contractor shall work the metal connections first. Teflon paste shall be used on all threaded PVC to PVC joints, and on all threaded PVC to metal joints. Light wrench pressure is all that is required. Where threaded PVC connections are required, use threaded PVC adapters into which the pipe may be welded. Teflon tape shall not be accepted.
6. Gasket pocket pipe and fittings shall be assembled in strict accordance with the manufacturer's recommendations. Only recommended lubricant will be permitted.

G. Concrete thrust blocks

1. Installed at specific locations per manufacturer's recommendations and instructions. Thrust blocks shall be installed for main lines at all changes in direction, tees, and gate valves.

H. PVC Pipe Installation:

1. Piping shall be snaked in the trench to allow for thermal expansion and contraction.
2. After all curing of solvent weld joints and after having received the approval of the Owner's Representative, the mainline shall be filled. Extreme care will be taken to slowly fill the piping while releasing entrapped air at the ends of the main line.
3. All lines shall have a minimum clearance of six inches from each other, and from lines of other trades. This clearance shall not supersede any clearance required by local, regional or national building, health or safety codes. Parallel lines shall not be installed directly over one another.
4. Manufacturer's installation recommendations shall be strictly adjured to.

I. Flushing of System

1. After all new irrigation lines and risers are in place and connected, all necessary diversion work has been completed, and prior to installation of sprinkler, heads, the control valves shall be opened and a full head of water used to flush out the system.
2. Sprinkler shall be installed only after flushing of the system has been accomplished to the complete satisfaction of the Owner's Representative.

I. Temporary Repairs

1. The Owner reserves the right to make temporary repairs as necessary to keep the irrigation system equipment in operating condition. The exercise of this right by the Owner's Representative shall not relieve the Contractor of his responsibilities under the terms of the guarantee as herein specified.

J. Pressure Regulator

1. Install in a valve box in conformance with the project details.

K. Emitter Assembly

1. The emitter and distribution tubing shall be assembled using the manufacturer's recommended tools and accessories.

3.7 MAINTENANCE

- A. The entire irrigation system shall be under full automatic operation for a period of seven days prior to planting.
- B. The Owner's Representative reserves the right to waive or shorten this operation period.
- C. Contractor shall provide job maintenance of the entire irrigation system and shall continue until job acceptance by the Owner. Maintain all system components and assure proper watering of all plants. Repair all leaks and replace any defective components. After all landscape and irrigation operations are complete and in conformance with the contract documents, the Owner shall grant provisional acceptance.
- D. Following provisional acceptance, the Contractor shall provide job maintenance for **180 days** consisting of all items covered under maintenance. Following the **180 day maintenance period**, the Owner shall grant final job acceptance after verifying all work and system components are in conformance with the Contract Documents.

3.8 CLEANUP

- A. Cleanup shall be made as each portion of work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage sustained to the work of others shall be repaired to the original conditions acceptable to the Owner's Representative.

3.9 FINAL OBSERVATION PRIOR TO ACCEPTANCE

- A. The Contractor shall operate each system in its entirety for the Owner's Representative at the time of final observation. Any items deemed not acceptable shall be reworked to the complete satisfaction of the Owner's Representative.
- B. The Contractor shall show evidence to the Owner's Representative that the owner has received all accessories, charts, record drawings, and equipment as required before final observation can occur.

3.10 OBSERVATION SCHEDULE

- A. Contractor shall be responsible for notifying the Owner's Representative in advance for the following observations according to the time indicated:
 - Pre-job conference - 7 days
 - Pressure supply line installation and testing - 48 hours
 - Automatic controller installation - 48 hours
 - Control wire installation - 48 hours
 - Lateral line and sprinkler installation - 48 hours
 - Coverage test - 48 hours
 - Final observation - 7 days
- B. When the inspections have been conducted by other than the Owner's Representative, show evidence and by whom these inspections were made.
- C. No observation shall commence without as-built drawings.
 - 1. In the event the Contractor calls for an observation without as-built drawings, without completing previously noted corrections, or without preparing the system for observations, he shall be responsible for reimbursing the Owner's Representative at the hourly rate in effect at the time of the observation, portal to portal (plus transportation cost) for the inconvenience. No further inspections will be scheduled until this charge has been made. Delays in schedules caused by Contractor's non payment of these charges shall not be grounds for extension of the construction schedule.

END OF SECTION 02 811

SECTION 02 842 - BICYCLE RACKS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To

1. Furnish and install bicycle racks as indicated on Drawings.

B. Related Sections

1. General Conditions and Division 01 apply to this Section.

1.2 SUBMITTALS

A. Product Data, Shop Drawings and Samples

1. Submit six copies of product information for review and approval.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Approved Manufacturers

1. BR2-4 by Function First Bike Security, Tucson, Arizona Brandir Manufacturing
2. Others as approved by Architect prior to bidding. See Section 01 630.

B. Materials

1. All Standard units shall be made from 1.25" (1 5/8" o.d.) Schedule 40 steel pipe, hot dipped galvanized after fabrication.

PART 3 - EXECUTION

3.1 ERECTION, INSTALLATION AND APPLICATION

- ##### **A. Install in accordance with manufacturer's recommendations in a concrete base below grade and as indicated on the project details.**

END OF SECTION 02842

SECTION 02 870 - TABLES AND BENCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To

1. Furnish and install concrete benches as indicated on the project Drawings.

B. Related Sections -

1. General Conditions and Division 01 apply to this Section.

1.2 SUBMITTALS

A. Product Data, Shop Drawings and Samples

1. Submit six copies of product information for review and approval.

PART 2 - PRODUCTS

2.1 PRODUCTS

- ##### A. Park bench to be installed as called out on plans.

PART 3 - EXECUTION

3.1 INSTALLATION AND APPLICATION

- ##### A. Install in accordance with manufacturer's recommendations using an approved epoxy compound to secure benches to the concrete slab.
- ##### B. Install benches in accordance with the layout provided in the project Drawings.

END OF SECTION 02 870

SECTION 02 934 - HYDROSEED

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Furnish and install hydroseed as described in these specifications and on the Contract Documents.

1.3 QUALITY ASSURANCE

- A. All work under this section shall be done by a licensed landscape contractor with a minimum of 5 years experience.

1.4 SEQUENCING

- A. Do not commence work of this Section until work of Sections 02 811, and 02 950 has been completed and approved.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Seed mixes shall be as listed on the project plans.
- B. Fertilizer shall be commercially produced, pelleted granular form ammonium phosphate 16-20-0 (N-P-K) by weight, delivered to site in fully labeled bags in accordance with the State Fertilizer Laws.
- C. Mulch shall be composted ground or shredded fir or pine bark or shavings, max. pH 7.5, 85% passing a one-quarter inch screen, hygroscopic or containing a wetting agent, 1% min. nitrogen stabilized.
- D. Soil Sulfur shall be granular or prilled agricultural grade, 99.5% sulfur.
- E. Tacking Agent shall contain a plantago organic muciloid base, with the active ingredient comprising 70-80% of the agent. The plantago organic muciloid base shall meet the following standards:

Moisture	Less than 9%
Ash	Less than 3%
Swell Volume	40 ml/gr
Muciloid purity	75%

PART 3 - EXECUTION

3.1 PROTECTION

- A. Take care and precautions in work to avoid conditions which will create hazards. Post signs or barriers as required.
- B. Provide adequate means for protection from damage through excessive erosion, flooding, heavy rains, etc. Repair or replace damaged areas.

3.2 SURFACE PREPARATION

- A. Check to assure that the existing grade is within 0.1 feet of required subgrade.
- B. Loosen area 4 inches deep with a ripper, maximum spacing of 10". Cuts shall be made horizontal to the existing slope so as not to encourage the creation of rivulets by slope drainage.
- C. Dampen thoroughly, to leach salts from the soil.
- D. Remove all rocks, roots and other foreign materials 2" and larger in diameter, after cultivation.
- E. Soil amendments shall be thoroughly mixed in suspension with the seed so that application will be at the following rates:

Mulch	1800 lbs./acre
Fertilizer	300 lbs./ acre
Soil Conditioner - Gro-Power or equal	20 lbs./1000 SF
Tacking Agent	Per Manufacturer's recommendation for specific slope
- F. The slurry mix shall be applied so that the seed and amendments are applied at the previously specified rates.
- G. The slurry mix shall be applied so as to form a blotter-like cover, uniformly impregnated with seed.

3.3 ESTABLISHMENT

- A. Seed mix shall be watered regularly for a minimum two week period.
- B. Seed mix shall receive supplemental water until a vegetative stand with a minimum of one perennial seeded species per square foot has rooted, developed true leaves, and is in a state of positive growth and the interspace area between perennial species has a minimum of one annual or perennial plant in any stage of development or growth other than seed.

END OF SECTION 02 934

SECTION 02 950 - TREES, PLANTS, & GROUND COVER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Furnish and install landscaping plants as described in Contract Documents.

1.3 SUBMITTALS

- A. Submit technical data on soil amendments.

1.4 QUALITY ASSURANCE

- A. All work shall be performed by a licensed landscape contractor with a minimum of 5 years experience.

1.5 SEQUENCING

- A. Do not plant trees until major construction operations are completed.
- B. Do not plant trees until the irrigation system is complete and functional.

1.6 WARRANTY

- A. Guarantee furnished trees to live and remain in healthy condition for 180 days minimum from date landscape installation is accepted as complete.

1.7 OWNER'S INSTRUCTIONS

- A. Provide written instructions on maintenance requirements after the 60 day maintenance period.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Plants
 1. Conform to requirements of Plant List and Key on Drawings and to "Horticultural Standards" of American Association of Nurserymen as to kind, size, age, etc.
 2. Nomenclature - Plant names used in Plant List conform to "Standardized Plant Names" by American Joint Committee on Horticultural Nomenclature except in cases not covered. In these instances, follow custom of nursery trade. Plants shall bear a tag showing the genus, species, and variety of at least 10% of each species delivered to site.
 3. Plants shall be sound, healthy, vigorous, free from plant disease, insect pests or their eggs, noxious weeds, and have healthy, normal root systems. Container stock shall be well established and free of excessive root-bound conditions.
 4. Do not prune plants or top trees prior to delivery.

5. Plant materials shall be subject to approval by Architect as to size, health, quality, and character.
 6. Bare root trees are not acceptable.
 7. Provide plant materials from a licensed nursery.
 8. Plant materials larger than those specified may be supplied with approval of Architect, if the material complies in all other respects and if the material is at no additional cost to the Owner.
 9. Plant materials shall be symmetrical or typical for variety and species.
- B. Planting Mix shall consist of a mixture of two parts site soil and one part mulch..
 - C. Planting Tablets shall be 21 gram Agriform (20-10-5).
 - D. Tree Stakes shall be minimally sized: 2" x 2" x 8'0" Fir or 2" diameter x 8' long Lodgepole Pine stakes unless otherwise noted on the Landscape Plan.
 - E. Tree Staking Ties shall be 16 ga. wire with new rubber hose or strap to protect tree.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check and verify dimensions and quantities before proceeding with any work under this section. Report variations between Drawings and site to Architect before proceeding with work of this Section.
- B. Verify quantities shown on Drawings, they are provided for convenience only and are not guaranteed. Contractor shall be responsible for all planting indicated on Drawings unless indicated otherwise.

3.2 PROTECTION

- A. Take care and precautions in work to avoid conditions which will create hazards. Post signs or barriers as required.
- B. Provide adequate means for protection from damage through excessive erosion, flooding, heavy rains, etc. Repair or replace damaged areas.

3.3 EXCAVATION

- A. Layout individual tree locations and areas for multiple plantings. Stake locations and outline areas. Secure Architect's approval before planting. Make minor adjustments as may be requested.
- B. If underground obstructions are encountered in excavation of tree holes, Architect will select alternate locations.
- C. Excavate holes in accordance with the sizes shown on the Contract Documents.
- D. Roughen sides and bottom of excavations.
- E. Fill hole with good, tamped planting mix (backfill mix) sufficient to bring plant to proper elevation after watering and settling.

- F. In heavy clay soils or where hard pan exists, auger 8 inch hole 6 feet deep or through hard pan. Fill bottom half of hole with crushed rock and top half with amended topsoil.
- G. Fill hole with water and verify that water drains away within two hours so there will be no drainage problem after tree or shrub is planted. Inform Architect in writing if water does not drain properly. Do not plant trees or shrubs in holes that do not properly drain.

3.4 PLANTING

- A. Plant immediately after removing plant from container.
- B. Place trees and shrubs in holes so, after watering and settling and in relation to finished grade, plant shall be equal to the grade around the plant in the container.
- C. Cut off broken or frayed roots in a neat, even manner in accordance with accepted horticultural practice.
- D. Center plant in hole and backfill with specified planting mix making ring of mounded soil around the hole's perimeter to form watering basin. Do not backfill with soil in a muddy condition.
- E. Add fertilizer tablets in plant pit as follows:
 - One Gallon Shrub - 1 tablet
 - 5 Gallon Shrub/Tree - 3 tablets
 - 15 Gallon Tree - 4 tablets
- F. Settle by firming and watering to bring ball down to proper level, just slightly higher than surrounding soil.
- G. Thoroughly water trees and shrubs immediately after planting with the automatic irrigation system.
- H. Install tree stakes in accordance with the Construction Details.
- I. Space groundcovers evenly to produce a uniform effect, staggered in rows and intervals shown.

END OF SECTION 02 950

SECTION 02 952 - INERT MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Treat areas designated to receive decomposed granite with pre-emergent herbicide.
- B. Furnish and Place Decomposed Granite in areas designated to receive decomposed granite.

1.3 CONDITIONS

- A. Examine related work and surfaces before starting work on this Section. Report to the Owner's Representative, in writing, conditions which will prevent proper provision of this work. Beginning work of this Section without reporting unsuitable conditions to the Architect constitutes acceptance of conditions by Contractor. Any required removal, repair, or replacement shall be done at no additional cost to the Owner.

1.4 SUBMITTALS

- A. Submit samples of the inert materials and copies of labels of any pre-emergent herbicides to the Architect for approval prior to beginning work under this section.
- B. Submit quantity invoices or bills of lading for verification of volumes and quantities of material prior to construction for approval by the Architect. Omission of verification will constitute grounds for non-acceptance of any material or procedure.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Decomposed Granite for landscape areas shall be size indicated on plans, color to be submitted to the Owner's Representative for review and approval.
- B. Pre-Emergent Herbicide shall meet all applicable local, State and Federal environmental and labeling laws. Under no conditions shall a soil sterilant be used on the site. Product shall be Surflan.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Remove all weeds and debris from the areas designated for decomposed granite.
- B. Verify subgrade elevations are accurate to allow the addition of 2" of material in landscape areas. If grade is too high, excavate and remove material.

- C. Verify subgrade elevations are accurate to allow the addition of 3" of material in warning track areas. If grade is too high, excavate and remove material.
- D. Smooth subgrade and remove all rocks, clods, roots or other debris larger than 1/2" in diameter.
- E. Apply pre-emergent herbicide in conformance with the manufacturer's instructions.

3.2 INSTALLATION IN LANDSCAPE AREAS

- A. Install decomposed granite to a depth of 2".
- B. Rake, dampen and compact granite with a 200 lb. roller.
- C. Re-apply pre-emergent herbicide in accordance with the manufacturer's instructions.

3.4 CLEAN UP

- A. Upon completion of the work, remove all excess material, equipment and waste to the satisfaction of the Architect.

END OF SECTION 02 952

SECTION 02 970 - LANDSCAPE AND IRRIGATION MAINTENANCE

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. The work shall consist of furnishing all labor, tools, motorized and non-motorized equipment, vehicles, appliances, materials, permits, insurance, and taxes as necessary to execute complete grounds maintenance of the entire park project. The work shall include, but not necessarily be limited to, the following work:
1. Litter Control
 2. Weed Control
 3. Pest and Disease Control
 4. Rodent Control
 5. Irrigation System Maintenance
 6. Plant Replacement
 7. Pruning
 8. Grass Cutting and Turf Establishment
 9. Sweeping and Washing of Sidewalks, Curbs, Paving, Tables and Benches.
 10. Cleaning and Raking of Planting and Field Areas
 11. Temporary Protection

1.2 MAINTENANCE PERIOD

- A. The maintenance period shall be one hundred eighty (180) days from substantial completion of the project.

1.3 MAINTENANCE ACTIVITY

- A. Maintenance shall be performed a minimum of one time per week. Work which the Contractor fails to do when necessary during the maintenance period may be performed by others as directed by the Owner's Representative, the cost to be borne by the Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials for irrigation and landscaping maintenance shall be as specified in the irrigation and landscaping sections, respectively. Materials shall not be used until they have been approved by the Owner's Representative who shall have the power to condemn any material or defective workmanship.

PART 3 - EXECUTION

3.1 TREE SUPPORTS

- A. Maintain tree support ties, hoses, guy wires, tree stakes and wires which maintain upward and proper support of the trees. Protect the trees from wind and storm damage. Allow for movement of the trunks to encourage strong growth of trunks.

3.2 LITTER REMOVAL AND CLEAN UP

- A. All litter and dead vegetation which is loose shall be removed from the entire project site at intervals not to exceed seven (7) calendar days.
- B. Contractor shall clean concrete curbs, sidewalks, and other paving by sweeping and hosing down as necessary on a weekly basis.
- C. Contractor shall clean picnic tables, benches, etc. by hosing down as necessary on a weekly basis.

3.3 WEED CONTROL

- A. Weed control shall be provided over the entire project site through the use of herbicides and manual labor, which method or methods shall be at the discretion of the Contractor. Grass type weeds and other weeds which spread by underground roots shall be permanently eradicated by the use of translocating herbicides, such as 'Round-Up'.
- B. Herbicides employed during the term of the maintenance period shall not cause the extermination of any landscape plant nor have detrimental side effects.
- C. No chemical shall stain or cause to stain, nor cause damage to any portion of the site or improvements, including landscape plant material. If staining or damage occurs, requisite repairs or replacements shall be made by the Contractor at his expense.
- D. A record shall be kept of all chemical applications noting the date applied, location of application, rate of application, whether pre-emergent or post-emergent, and method of application. A copy shall be submitted to the Owner's Representative at the end of the maintenance period.
- E. Applications of chemicals shall be in such a manner so as not to cause injury to the personal health of anyone working on the site, observing, or passing by. Care shall be taken such that no puddles or pools of water which contain toxic amounts of chemicals remain after completion of operations. Chemicals shall not be allowed to fall on or translocate to other areas of the site.
- F. Chemicals shall be approved by the EPA for the intended use and applied in strict accordance with EPA guidelines and the manufacturer's instructions, Chemicals shall be applied by an individual with proper training and possessing the required licenses and certifications for applying herbicides and other chemicals in the State of Arizona.

3.4 PEST AND DISEASE CONTROL

- A. All landscape plants and turf grass shall be provided protection which shall include, but not be limited to, eradication or control of insects, mites, fungi, and non-fungus diseases through the application of appropriate insecticides, miticides, and fungicides, which shall in form be sprays or dusts, all necessary to maintain plants in a healthy and vigorous growing condition.
- B. All insecticides, fungicides, and miticides employed during the term of the Contract shall not cause extermination of any landscape plant material, nor cause damage to the growth characteristics such that the plants will not be able to recover in a normal manner.

- C. All precautionary provisions of paragraph "Weed Control" shall apply to the application of pest and disease control chemicals.

3.5 PRUNING AND GRASS CUTTING

- A. Pruning of plants shall be done in a manner which preserves the plant's natural growth characteristics and appearance. No shearing will be required or allowed.
- B. Trees shall be pruned to remove suckers and low branching, to maintain tree branching above 6' in the sight visibility triangles, and to promote safety. Trees shall be pruned up to allow clear access for pedestrians on sidewalks. Dead or diseased branches shall be removed at their point of origin.
- C. Shrubs and accent plants generally will not require any pruning. Pruning shall only be done to remove dead, diseased, or damaged branches and to control branches which are substantially longer than the main portion of the plant or that create a hazard.
- D. Grass shall be cut in turf areas where reseeding is to be done. The first mowing shall not be attempted until the turf grass is firmly rooted and secure in place. The contractor shall guarantee work covered by these specifications to the extent that all turf grass shall be uniform in color, leaf texture and shoot density and shall be reasonably free of weeds, diseases or other visible imperfections during the project establishment period.

3.6 INERTS

- A. Decomposed granite areas shall be raked to maintain a finished appearance where disturbed. Replace decomposed granite which is removed, damaged or otherwise no longer suitable for the use in which it was intended.
- B. Raked earth areas shall be raked to maintain a finished appearance where disturbed.

3.7 PLANT REPLACEMENT

- A. All landscape plant material determined by the Owner's Representative to possess health or vigor insufficient to develop a normal plant habit shall be replaced by the Contractor within ten (10) calendar days after receipt of notification.
- B. Replacements shall be of the same genus, species, and variety and of the same size as originally provided. Such replacements shall be at the expense of the Contractor and be subject to the approval of the Owner's Representative.
- C. Replacement at the Contractor's expense shall be occasioned due to causes beyond the control of the Contractor such as, but not limited to, vandalism, and unseasonably severe either conditions. Contractor shall repair damaged areas due to circumstances beyond the Contractor's control, after submitting request for change order and obtaining approval for same from the Owner's Representative.
- D. Following replacement, regardless of nature, the immediate and adjacent areas shall be left "broom clean" and in such appearance as prior to the aforementioned operations.

3.8 IRRIGATION

- A. Irrigation shall be operated at programmed intervals as necessary to maintain good color and sturdy growth of all plant material and turf.
- B. Precautions shall be taken to avoid soil erosion by the irrigation system. Soil eroded by the irrigation system shall be replaced with topsoil conforming to the landscape specifications.
- C. The entire irrigation system shall be maintained by the Contractor to insure balanced and necessary watering. This maintenance shall include, but not be limited, to the following:
 - 1. Removal of sand and debris causing restriction within the emitter orifices.
 - 2. Flushing of drip system filters and the reclaimed water filter at the irrigation point-of-connection as required to remove debris.
 - 3. Necessary timing adjustments to the automatic controller(s), as provided within the mechanism of the equipment.
 - 4. Adjustment of turf sprayheads to maintain efficient, uniform application of water to turf areas.
 - 5. Adjusting sprayheads to minimize overspray onto adjacent paved surfaces and other non-turf areas.
 - 6. Repair or replacement of damage caused by the Contractor. All such repairs or replacements shall be subject to the approval of the Owner's Representative.

3.9 RODENT CONTROL

- A. Rodents, especially burrowing rodents, shall be controlled on the entire project site by the Contractor, using methods approved by the Owner's Representative. Control methods shall safeguard the public from tripping and falling hazards from rodent burrows, rodent spread diseases, etc.

3.10 CONTRACTOR'S RESPONSIBILITY

- A. This Contractor shall be bound by all requirements of the General Conditions and Specifications which in any way apply to his work.
- B. The Contractor shall not be held responsible for any damages effected on or within the project site due to vehicular or non-vehicular, accidental or malicious causes by the public, or an "Act of God". It shall be the responsibility of the Contractor to inform the Owner's Representative of any damage due to the aforementioned causes as soon as detected.

3.11 INSPECTIONS

- A. The Owner's Representative, accompanied by the Contractor, will inspect the site at least six times during the maintenance period and at its expiration; and at other times when deemed necessary by the Owner's Representative or Contractor. When, in the opinion of the Owner's Representative, the methods being used to control or eradicate pests and weeds or perform other maintenance functions are unsatisfactory, the Contractor shall immediately modify his methods, as directed by the Owner's Representative. Final acceptance of the project shall be granted after satisfactory completion of the Maintenance period.

END OF SECTION 02 970