SECTION 02900
LANDSCAPE PLANTING (non ball field areas)

PART 1 – GENERAL

1.1 The provisions of the Standard Specifications for Public Works Construction (SSPWC), latest Edition, Sections 212 and 308 apply except as modified herein.

a. Work Included in this Section:

Finish grading (fine).
Weed abatement.
Soil preparation.
Tree supports, trunk protectors, and root barriers.
Furnishing plants and planting.
Fertilizer, soil amendment.
Watering.
Project maintenance period.
Soils analysis.

b. Work not Included in this Section:

Rough grading.
Finish grading.
Irrigation system.
Natural Turf Ball field areas- Refer to section 02910 for all turf within ball fields.

c. Approvals:

All sprinkler work shall be inspected and approved before starting any work of this section, except that specimen trees shall be installed prior to beginning sprinkler work.

All turf areas shall be planted and all landscape planting shall be installed and approved prior to the commencement of the plant establishment period.

PART 2 – MATERIALS

a. Landscape Finish Grading:

Site topsoil material shall be used.

b. Tree Supports:

Stakes for trees shall be round, of Lodge Pole pine, made from the entire bole of the tree with bark removed and completely treated in a solution of pentachlorophenol. They shall be at least 2" or 2 2" in diameter, conically pointed at one end. 10" long tapered point and chamfered at the other end.

Ties shall be "Wonder Tree-Tie" or equal, black in color, install according to manufacturer's specifications.

c. Tree Trunk Protector:

Contractor shall supply and install an approved tree trunk protector device for trees in turf area only, equal to "Tree Boot".

d. Root Barrier:

Root barrier shall be installed on all planted trees within 5'-0" of concrete or asphalt paving. Contractor to supply and install "deep root" barrier by Deep Root Corp.: (415) 437-9700 or Shawtown Root Barrier by NDS: (800) 726-1994 or approved equal.

e. Plant Materials:

All plant material shall meet requirements in the Standard Specifications, Section 212-1.4. Plant list is on landscape plan. The planting plans are only accurate for planting location and quantities. The Contractor shall verify all quantities by plan check. The planting legend is accurate only for plant size. In the event of a discrepancy, the Contractor shall adjust the quantities of the smallest plant size specified in the legend to conform with the quantities required by the plan.

Plants not approved are to be removed from site immediately and replaced with suitable plants.

Inspection and approval of specimens required before delivery to site; all others on delivery. Agency may reject entire lot of plants represented by defective samples. Random samples will be inspected for root condition.

f. Soil Amendments and Fertilizer for Bid Purposes:

All turf and groundcover areas shall receive soil amendments per soil analysis recommendations. See specs. (Use the following quantity per 1,000 sq. ft. for bidding purposes).

1. 6 cubic yards nitrogen stabilized organic amendments.
2. 15 lbs. commercial fertilizer (6-20-20 either incorporated into the soil or incorporated into the hydromulch slurry as specified).
3. 20 lbs. of gypsum

or

1. 6 cubic yards nitrogen stabilized organic amendments
2. 200 pounds Gro-Power Plus (5-3-1) incorporated into the soil and 12 pounds Gro-Power Plus (5-3-1) incorporated into the hydromulch slurry as specified.

g. Bio Swale Growing Medium

All bio swale areas identified on plans shall receive mix as follows:

1. Coarse Sand: Washed Concrete Sand per ASTM C33
2. Lassenite Rotary Kiln Fired Pozzolan: ASTM 330 #14, ASTM C29 Dry Weight (37 pcf – 46 pcf, Specific Gravity 1.35 – 1.68, ASTM F 726-99 Absorbency 92-102%, ASTM F 1815 Capillary Porosity, Non-Capillary 17.7%, Saturated Hydraulic Conductivity 10.9 in/hr, Water Holding at 30 cm 62.1%.
3. Reed Sedge Peat Moss.

4. Tri C Humate blended at the rate of 4lbs per ton.
5. Tri C Endo 120 blended at the rate of 4lbs per ton.
6. Mix Proportions: 85% sand: 10% Lassenite Pozzolan: 5% Reed Sedge Peat Moss.
7. Blending; Material shall be blended prior to delivery by a twin screw pug mill of equal. Bucket blending is not equal.
8. Supplier: Gail Materials (951) 279-1095

h. Turf Seed Mixes:

All seed shall be fresh, clean, new crop seed, premixed by mechanical mixer to proportions specified. Seed shall be hydroseeded as recommended by the manufacturer. Turf mix: Triple Crown, Fescue Blend, available thru: Stover seed (800)621-0315. Seeding rate: 10-12 pounds per 1,000 square feet.

i. Sod:

See Section 02910 – Natural Turf Ballfields. During the Winter months (October – February), the hybrid bermuda sod shall be overseeded with perennial Rye Bright Star 2 @ 10 pounds per 1,000 s.f. Available through Turf Seed Inc tel # 800-247-6910 or equal.

j. Hydroseeding:

Native Grass in Bioswale Mix: S & S Seeds, (805)684-0436 or equal. Apply at 30 lbs per acre.

Species	Common Name	Bulk #'s/Acre
Distichlis spicata	**Salt Grass**	**2.0**
Deschampsia cespitosa	**Tufted Hair Grass**	**6.0**
Festuca idahoensis	**Idaho Fescue**	**6.0**
Leymus triticoides 'Rio'	**Creeping Wild Rye**	**8.0**
Lasthenia glabrata	**Yellowray Goldfields**	**2.0**
Lupinus bicolor	**Lupine**	**4.0**
Sisyrinchium bellum	**Blue-Eyed Grass**	**2.0**
	Total	**30.0**

k. Commercial Fertilizers:

Planting Tablets. Tightly compressed, long-lasting, slow-release fertilizer tablets weighing 21 grams, with a potential acidity of not more than 5% by weight and having an analysis of 20-10-5 derived from the sources listed in the following guaranteed analysis:

Guaranteed Analysis

Total Nitrogen 20.0%
Derived from urea-formaldehyde.
7.0% water soluble Nitrogen, 13.0% water insoluble Nitrogen
Available Phosphoric Acid 10.0%
Derived from calcium phosphate.
Soluble Potash 5.0%
Combined Calcium 2.6%
Derived from calcium phosphates.
Combined Sulfur 1.6%
Derived from ferrous and potassium sulfates.
Iron (expressed as elemental Fe) ..... .35%
Derived from ferrous sulfate.
Potential Acidity: 5% or 100 lbs. Calcium Equivalent per ton.

OR Planting Tablets. Gro-Power 7 gram tablets, or approved equal, tightly compressed, long-lasting, slow-release fertilizer tablets weighing 7 grams and having an analysis of 12-8-8 derived from the sources listed in the following guaranteed analysis:
(Available from Gro-Power 909/393-3744).

Guaranteed Analysis

Total Nitrogen 12.0%
Available Phosphoric Acid 8.0%
Soluble Potash 8.0%
Sulphur 3.5%
Iron 2.0%
Manganese ..... .05%
Zinc ..... .05%
Humic acids 4.0%

Fertilizer 6-20-20 XB (for turf & groundcover areas): Premium high performance pre-plant fertilizer compound having an N-P-K ratio of 6-20-20, and shall be derived from the sources listed in the following analysis in a high quality homogeneous pellet.

Guaranteed Analysis

Total Nitrogen 6.0%
Ammoniacal Nitrogen
Available Phosphoric Acid 20.0%
Soluble Potash 20.0%
Sulfur 5.5%
Iron (Fe) expressed as Elemental 1.5%
Potential Zinc 0.75%

OR Fertilizer 12-8-8 (for turf & groundcover areas): Gro-Power Controlled Release (3 to 4 month formulation) or approved equal. Fertilizer shall be a long-lasting, slow-release fertilizer compound having an N-P-K ratio of 12-8-8 and shall be derived from the sources listed in the following analysis:

Guaranteed Analysis

Total Nitrogen 12.0%
9.0% Slow release Nitrogen.
3.0% Urea Nitrogen

Available Phosphoric Acid 8.0%
Derived from Triple Super Phosphate.
Soluble Potash 8.0%
Derived from Compost and muriate of Potash.
Humus (composed organic and mineral matter) 25.0%
Humic Acid (derived from compost) 5.0%
Sulfur 7.0%
Iron (Fe) expressed as Elemental 2.0%
Manganese (expressed as elemental Mn) derived from Manganese Sulfate 05%
Zinc (expressed as elemental Zn) derived from Zinc Sulfate ..... .05%

Fertilizer 12-12-12 (for Plant Backfill): Fertilizer shall be rapidly soluble prills containing equal amounts of nitrogen, phosphorus, and potash plus sulfur and calcium and derived from the following sources:

Guaranteed Analysis

Total Nitrogen 12.0%
As Ammoniacal derived
Available Phosphoric Acid 12.0%
Soluble Potash 12.0%
Sulfur 15.0%

OR Fertilizer/soil conditioner 5-3-1 (for Plant Backfill): Gro-Power Plus or approved equal. Fertilizer/soil conditioner shall be a humus base fertilizer/soil conditioner derived from the following sources:

Guaranteed Analysis

Total Nitrogen 5.0%
Available Phosphoric Acid 3.0%
Soluble Potash 1.0%
Humus 50.0%
Humic Acids 15.0%
Iron 1.0%
Manganese ..... .05%
Zinc ..... .05%
Soil Penetrant 1.25%
Bacteria (common soil and airborne organisms) yeast and mold ..... 60,000 per 100 grams

Fertilizer 16-6-8: (for Maintenance) Fertilizer shall be a fertilizer compound having an N-P-K ratio of 16-6-8, and shall be derived from the sources listed in the following analysis in a high quality homogeneous pellet.

Guaranteed Analysis

Total Nitrogen 16.0%
Ammoniacal Nitrogen
Available Phosphoric Acid 6.0%
Soluble Potash 8.0%
Sulfur 16.0%
Iron (Fe) expressed as Elemental 1.5%
Potential Zinc 0.1%

Ammonium Sulfate: Conforming to the requirements of the Agricultural Code of the State of California.

Iron Sulfate: Ferric sulfate or ferrous sulfate in pelleted or granular form containing not less than 18.5% iron expressed as metallic iron, and shall be registered as an agricultural mineral with the State Department of Agriculture in compliance with Article 2, "Fertilizing Materials", Section 1030 of the Agricultural Code.

Soil Amendment: Standard Specifications Section 212-1.2.4 shall apply. Soil amendment shall be an organic wood base product, Type I, composted Redwood or Cedar only.

l. Shredded Wood Mulch:

Shredded Wood Mulch shall be a minimum of 2" thickness in all shrub and groundcover areas. Type: Forest Floor 0-2, Supplied by: Aguinaga Fertilization Products Phone 949-786-9558. or equal. Submit sample to landscape architect for approval prior to installation.

PART 3 – EXECUTION

a. Agronomic Soils Tests Prior to Amending Soil:

After completion of fine grading and prior to soil preparation, the Agency shall obtain agronomic soils tests for all planting and turf areas. A minimum of one sample per two acres of lawn shall be required. Tests shall be performed by an approved agronomic soils testing laboratory and shall include a fertility and suitability analysis with written recommendations for soil amendment, fertilizer, and chemical conditioner application rates for soil preparation, auger hole requirements, and maintenance and post-maintenance fertilization program for all areas.

The agronomic soils report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified herein or on the plans only when they exceed the specified minimums. Additional materials required by the soils report shall be paid for by Change Order.

b. Agronomic Soil Test After Amending Soil:

After the soil amendment procedure has been completed and prior to commencement of planting the Agency Representative will take one sample per two acres of turf of amended soil.

The Agency Representative shall deliver the samples to an approved agronomic soils testing laboratory for analysis and report. Costs of analysis and report shall be borne by the Contractor.

If any deficiencies are found, the elements required to be added to the planting areas to comply with these specifications shall be borne by the Agency. The additional soil testing costs to insure conformance will be borne by the Contractor.
After certification by the laboratory that amendment procedures have been complied with, the Contractor may proceed with planting.

Permissible limits of analytical deviation are as follows:

Items	Permissible Limits
Percentage organic matter	Plus or minus 20%
Mineral nutrients:	
available nitrate plus ammonic nitrogen	Plus or minus 20%

available phosphate phosphorus ..... Plus or minus 20%
available potassium..... Plus or minus 20%

c. Finish Grading:

Before any planting operations start in any area, all trash and deleterious materials on the surface of the ground shall be removed and disposed of. After completion of fine grading and prior to soil preparation, the Contractor shall adhere to the Agronomic Soils Test and Report recommendations as required, except for the minimums specified herein.

Turf areas shall be graded so that after cultivation, amendment and settlement, the soil shall be 1" below the top of curb or paving. All flow lines shall be maintained to allow for free flow of surface water. Displaced material which interferes with drainage shall be removed and placed as directed. Low spots and pockets shall be graded to drain properly.

All turf planting areas shall be cultivated until the soil is brought to a loose friable condition to a depth of 6". Remove all rocks and debris 1" or larger in size. Evenly distribute soil amendments, and thoroughly incorporate into upper 6" of soil with mechanical tiller.

All planting areas shall be finish graded per Standard Specifications, Section 308-2.4. Finish grades shall be so graded that required tolerances are met after settlement at the end of the project maintenance period.

d. Weed Abatement:

All weed growth in planting areas shall be removed. Common Bermuda grass found growing in areas not designated to be planted with Bermuda grass, shall be killed with an approved herbicide or fumigant with materials approved by the Agency.

Contractor shall irrigate for a minimum of twenty-one (21) days all banks and other areas that will be hydroseeded with plants other than turf to germinate existing weeds. Weeds shall be removed or killed by a contact herbicide to provide a complete kill. Soil surface shall be free of excessive vegetative material so that hydromulch is in contact with the soil surface.

e. Tree Supports:

All trees shall be supported at time of planting as called for on planting plan.

f. Planting:

All trees shall be planted, staked and tied as noted on drawings and in accord with U.C. Agricultural Extension Service Bulletin AXT-311. Plants shall be planted where shown on plans or as directed by Agency Representative.

Trees, shrubs and ground covers shall be planted before seeding.

Plant pits for container plants shall have vertical sides and shall be the size noted on drawings.

Backfill material for plant pits shall be a mixture as noted below. The materials shall be thoroughly mixed to the bottom of the pit so that they are evenly distributed and without clods or lumps. Backfill shall be so placed in the pits that the plant will be at its natural growing height and the backfill material will be level one inch below surrounding soil after settlement.

Amended backfill for plant holes shall be:

A. 6 parts by volume on site soil.
B. 4 parts by volume organic amendment.
C. 2 lbs. iron sulfate per cubic yard.
D. 1 lb. 12-12-12 commercial fertilizer per cubic yard or 17 lb. 5-3-1 Gro-Power).

Install 21 gram planting tablets as follows:

Size

1 gallon..... 1 tablet
5 gallon.....3 tablets
15 gallon.....5 tablets
24 inch box specimen and larger

Use one tablet for each 2 inch of tree trunk diameter or for each one foot of height. Sink tablets 6 to 8 inches deep evenly spaced around the drip line.

or

Install 5 gram planting tablets as follows:

Size

1 gallon..... 3 tablet
5 gallon.....8 tablets
15 gallon.....15 tablets
24 inch box specimen and larger
Use 4 tablets for each 2" of tree trunk diameter or for each one foot of height. Sink tablets 6 to 8 inches deep evenly spaced around the drip line.

Position the plant in the hole and backfill no higher than halfway up the rootball. Place the recommended number of tablets evenly around the perimeter of, and immediately adjacent to, the root ball at a depth which is between the middle and the bottom of the rootball. Complete the backfilling, tamp and water.

Before plants are transported to the planting area, they shall be properly pruned by thinning out to reduce damage by wind and to protect lateral growth.

No plants shall be transported to the planting area that are not thoroughly wet throughout the ball of earth surrounding the roots. Plants should not be allowed to dry out, nor shall any roots be exposed to the air except during the act of placement. Any plants that in the opinion of the Agency Representative are dry or in a wilted condition when delivered or thereafter, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.

g. Turf Installation:

Grade smooth all surfaces to be seeded. Soil surface shall be 1" below adjacent walks after settling. Roll lightly and fill in all soil depressions. Under mechanical seeding method incorporate 15 lbs./1,000 sq. ft. 6-20-20 in the upper 6" of soil.

or

Incorporate 200 lbs./1000 sq. ft. Gro-Power Plus 5-3-1 in the upper 6" of soil.

Soil shall be level, smooth and moist before seeding.

The seed bed shall be inspected by the Agency Representative to determine its suitability prior to seeding. The Contractor shall obtain such approval before seeding grass. No seeding shall be performed until all other construction operations have been completed, except by authorization of the Agency Representative.

All hydroseeded turf/Common Turf Areas within the Big League Dreams fence line (excluding parking lots) shall be established first at a minimum of 60 days prior to the date of substantially completion by the contractor. It is the goal of the owner to have the interior of the park completed for the grand opening. No seeding shall be performed until all other construction operations have been completed, except by authorization of the Agency Representative.

h. Sodding:

Sod shall be as specified on plan and shall be installed within 24 hours after harvesting.

Sod area shall be rolled lightly and watered to a depth of 6" the day prior to installing sod. Fill or regrade any areas as necessary. Lightly water again just prior to laying sod.

Sod shall be laid in staggered pattern, with tight joints and in the same direction each time. On slopes, install sod from the bottom up. Protect the newly laid sod by walking on boards as the installer moves upward, sod on slopes shall be pinned down with wooden pegs.

Roll sod with adequately weighted roller to smooth out sod bed.

Keep sod thoroughly moist to a depth of 6" until established. No foot traffic should be allowed for 2 to 3 weeks after installation.

i. Hydroseeding:

Slurry Mixtures, Binders, Mulch, pre-emergent etc: Shall be as recommended by manufacturer of seed of each seed mix. Follow manufacturers recommendations for installation.

After Planting: Apply adequate moisture to germinate seed. Best applied via several short durations. It is important to keep the seed moist, not wet.

Fertilize with 21-7-14 fertilizer 10-14 days after planting. Apply at the rate of 3# 1,000 sq. ft.

Do not apply any post-emergent herbicide for 45-60 days after planting

Evidence of compliance to these specifications, such as invoice or tag is required. Any changes or alterations must be approved

j. Jute Mesh Installation:

Install 48" wide X 225' rolls in accordance with the manufacturer's recommendations.

k. Watering:

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

Plants which cannot be watered efficiently with the existing water system shall be watered by means of a hose.

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

Apply water in sufficient quantities and as often as seasonal conditions require to keep the planted areas wet at all times, well below the root system of grass and plants.

All ground cover planting shall be immediately sprinkled to avoid drying out until the entire planted area is thoroughly watered and the soil soaked to the full depth of each plant hole.

All hydromulch and seeds should be kept damp at all times and irrigation should be adjusted accordingly. This normally would involve four to six watering periods daily; each watering period (ON) regulated to just dampen the mulch and seed, without creating runoff. Intervals between irrigations (OFF) should be judged by the length of the time mulch and seeds remain damp. Once mulch and seeds begin to dry out, the watering (ON) should be repeated.

l. Turf Mowing:

The turf shall be edged whenever necessary. The turf shall be mowed with a sharp mower before it exceeds 2" in height. The turf will be cut to not less than 1 2" and, during the period of maintenance, the turf will not be allowed to exceed 2" in height. Hybrid bermuda turf shall be cut using a reel type mower. A rotary type mower is not acceptable.

m. Project Maintenance:

Project maintenance consists of a minimum 30 day plant establishment period and a subsequent 60 day maintenance period, constituting a total minimum 90 day maintenance period.

The plant establishment period commences when all plants and all turf (grass) has been planted. The establishment period will continue until all turf areas have been mowed to the specified height at least once, but not less than 30 days.

Water turf until acceptance of work. The areas shall be kept moist, but not glistening wet, until time for the first cutting of turf. After first cutting, water turf to maintain a thriving condition. Any areas where the seeds fail to germinate satisfactorily shall be immediately reseeded. The Contractor shall maintain the turf areas until an even, close stand of turf is obtained.

Where sod has been installed, the Contractor shall topdress with Agency approved silica sand and roll as necessary to fill seams between sod strips and/or low points in order to produce a firm even stand of turf. The contractor shall repeat this process as necessary to achieve a uniform turf condition to the satisfaction of the Agency representative.

The establishment period shall be extended beyond the 30 day minimum at no cost to the County until all turf areas have been mowed to the specified height and a close stand of turf is attained to the satisfaction of the Agency Representative.

Project maintenance work shall commence after the Agency Representative has approved plant establishment and shall continue for 60 additional days.
Project maintenance work shall consist of applying water, fertilizing all areas, weeding, caring for plants, sweeping walks, litter pickup, and performing all general project maintenance.

The Contractor shall be responsible for detecting nutrient deficiencies and turf diseases and pests as soon as their presence is manifested. He shall take immediate action to identify the problem and shall immediately apply remedies. If the above and following conditions are not

complied with, the Contractor shall re-plant the grass and maintain the turf until a healthy, mature turf is re-established, and shall maintain that area for an additional 60 days at no additional cost to the Owner.

During the project maintenance period, all plants and planted areas shall be kept well watered and kept weed free at all times. Weeds, Dallas and Johnson grass, and Bermuda grass shall be removed and disposed of (except Bermuda grass will be allowed to remain in turf areas). Provide special attention for watering slopes planted to lawn on the windward and/or sunny side so that turf will adequately be watered at all times.

Immediately after the second cutting of turf, where trees occur in turf areas, the turf shall be turned under and neatly edged 18" away from the plants. The turf edges shall be maintained in a neat condition until acceptance of the work.

Workmen shall not be allowed to walk on turf areas unnecessarily before, during or after seeding operations. Turf areas that have been damaged or compacted shall be recultivated and reseeded at the Contractor's expense.

The Contractor shall provide supplemental feedings of fertilizer as required by the agronomic soils test to maintain a healthy turf and all other plantings including slope areas. Minimum requirement: 16-6-8 at 6.2 lbs. per 1000 s.f. 35 days after initial planting, and just prior to final inspection.

In order to carry out the project maintenance work the Contractor shall maintain a sufficient number of personnel and adequate equipment to perform the work herein specified from the time any planting is done until the end of the project maintenance period or until the final approval.

The Contractor may be relieved from maintenance work required in these special provisions when the project maintenance work has been satisfactorily completed.
Damage to planting areas shall be repaired immediately.

Contractor shall continue to pick up rocks that surface and are 1" or greater in diameter.

n. Replacement of Plants:

All plants that show signs of failure to grow at any time during the life of the contract, or those plants so injured or damaged as to render them unsuitable for the purpose intended, shall be immediately replaced in kind at the expense of the Contractor.

o. Tree Guarantee:

The Contractor shall guarantee all trees from disease or death and injury resulting from improper planting for a period of one year after final acceptance of the project.

The Contractor shall replace at no expense to the Agency as soon as possible plants that are dead or not in a vigorous, healthy growing condition. Replacement shall be of the same kind and size as originally specified and shall be planted as described on the drawings and in the specifications.

The Contractor shall not be held liable for loss of plant materials during the guarantee period due to lack of care, vandalism or accidental causes.

p. Inspections:

A written notice requesting an inspection should be submitted to the Agency Representative at least ten (10) days prior to the anticipated date. Prior to this inspection, the site must be thoroughly cleaned up and all excess material and debris removed.

The following inspections are required:

Prior to the start of the 90 calendar day plant establishment and project maintenance period, the Contractor will be required to have a complete inspection and approval of all landscape construction items.

At 30th calendar day.

At 60th calendar day.

At completion of the maintenance period.

q. Certification:

Written certifications required which are to be submitted to the Agency Representative upon delivery to the job site include:

Quantity of commercial fertilizer used.
Quantity of soil amendments.
Quantity of seed.
Quantity or iron sulfate.
Quantity of soil sulfur.
Quantity of agricultural gypsum.
Quantity of hydromulch materials.
Quantity of sod.
Quantity of shredded wood mulch.

END OF SECTION - 02900

SECTION 02910
NATURAL TURF FIELDS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Provide all equipment and materials, and do all work necessary to construct the surfaced drained natural turf baseball field system, complete as indicated on the Drawings and as specified.

1. Time requirements for completion of the work will be of essence. Work described herein requires special expertise and understanding of several diverse areas of construction, including soil science and sports turf management. Contractor must be pre-qualified by Architect and provide proof of completing three sand based sports field projects of similar scope in the past five years. Contractor must provide Sports Turf Consultant and Architect with references for review and acceptance.

B. The major portion of the work to be accomplished under this contract shall consist of a demolition, soil analysis and precise grading for control of surface and subsurface moisture content for an athletic field and a natural turf surface.

1 Base Bid: shall include applying Roundup to entire field, stripping the fields of all organic material including old sod and roots, and screening (6 inches) of the surface soil of stones greater than ½ inch and foreign debris. Grading the field as per the plans, amending the soil with sand and peat moss as required from soils testing by Guise & Associates, and applying big roll sod for turf. Maintain field until roots are 4 inches in depth and 90 days.

C. Basic Requirements:

1 The contractor shall furnish, install, and perform on the management of a complete natural grass athletic surface. The system shall be graded appropriate for the sports played on the field with adequate surface drainage per plans.

2. Services by the contractor shall include material submittals and technical specifications in sufficient detail for review and approval by the OWNER prior to commencement of work. Additionally, the contractor shall provide cut sheets on all pertinent materials.

3. Following completion of all work, the contractor shall provide recorded as-built drawings, a turf maintenance manual and all relevant owners' manuals for the manufactured components included in the project. Drawings shall indicate all surfaces and piping, and include grades and inverts.

1.02 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that may directly relate to work of this Section include, but are not limited to:

1 Section 02200, EARTHWORK; Excavation and backfill and establishing sub-grade elevations.

2. Section 02810, IRRIGATION SYSTEM.

3. Section 02900, LANDSCAPE PLANTING; Landscape lawn areas.

1.03 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Society for Testing and Materials (ASTM):

C 136	Sieve Analysis of Fine and Coarse Aggregates
E 11	Wire-Cloth Sieves for Testing Purposes

1.04 SUBMITTALS

A. Shop drawings of natural turf field system indicating dimensions and layout of field construction including lining, bases, with location and details of fences.

B. Design Consultants Review: Submit written statement, signed by Contractor and natural turf field system installer stating that the Drawings and Specifications have been reviewed by qualified representatives and that the contractors are in agreement that the materials and system to be used for natural turf field system meet the requirements of the specification and are of the highest standards. The Sports Turf Design Consultant for the project shall be Guise & Associates (G&A); contact Stephen H. Guise @ 714-231-1454.

C. Manufacturer's Data: Submit manufacturer's specifications and installation instructions for all products in the natural turf field system, including certifications and other data as may be required to show compliance with the Contract Documents.

D. Grade Acceptability: Submit a certified statement issued by general contractor of the natural turf field system materials and countersigned by the landscape contractor (applicator), attesting that all areas and surfaces designated to receive natural turf field have been inspected and found satisfactory for the reception of the Work covered under this Section; and are not in conflict with the "Guarantee" requirements. Application of natural turf field materials will be construed as acceptance of graded surface.

E. Statement of Supervision: Upon completion of the Work, submit a written statement signed by the Sports Turf Design Consultant stating that the work was installed in accordance with the contract documents, and that the installation is acceptable to the Architect.

1.05 QUALITY ASSURANCE

A. The contractor undertaking this project must show evidence of a thorough understanding of the system's design and operational components (physical, electrical, agronomic) and expertise in its construction requirements.

B. The natural turf field system contractor shall provide evidence indicating that the specified materials have been successfully installed to that shown and specified for this Project.

C. Installation of natural turf field system shall be done only after killing and demolition of existing turf, soil screening and soil amendments added, regraded, compacted, tested and surveyed for acceptance by Sports Turf Design Consultant. All concrete construction work if applicable must be completed prior to soils work. Damage caused to existing elements during construction shall be repaired before acceptance.

1.06 INSPECTION AND TESTING

A. Work will be subject to inspection at all times by the Sports Turf Design Consultant and the Architect. The Owner reserves the right to engage an independent testing laboratory to analyze and test materials used in the construction of the work. When directed by the Architect the contractor shall provide G&A access to the blended rootzone soil prior to delivery, for sample testing by the testing laboratory (Environmental Technical Services, Agronomist Mike DePew) and will make material analyses and report to the Architect whether materials conform to the requirements of this specification.

1. Cost of tests and material analyses made by the testing laboratory will be borne by the Owner when they indicate compliance with the specification and by the Contractor when they indicate non-compliance.

2. Testing equipment will be provided by and tests performed by the approved testing laboratory (*Environmental Technical Services, LC*). Upon request by the Architect, the Contractor shall provide such auxiliary personnel and services needed to accomplish the testing work and to repair damage caused thereby to the permanent work.

3. Gradation of granular materials shall be determined in accordance with ASTM C 136. Sieves for determining material gradation shall be as described in ASTM E 11.

B. Testing, analyses, and inspection required by the Contractor for his own information or guidance shall be at his own expense.

C. The Contractor shall engage *Environmental Technical Services, LC* as the testing agency to perform the following tests and analyses:

Material	Tests and Analysis Required
Rootzone sand	Mechanical analysis of soil and determination of pH and organic matter content, silt and clay content, and nutrient content. Recommendations shall be made by the testing agency as to the type and quantity of soil additives required to bring nutrient content, porosity, and pH to satisfactory levels for sodding.
Peat Moss	Determination of moisture absorption capacity, organic matter content, and pH.

1. Materials shall not be used in construction until the Architect and Sports Turf Design Consultant has reviewed test results.

2. All costs associated with testing shall be at the expense of the Contractor other than as specified in Section 1.06A-1.

3. This testing shall be performed on the existing topsoil, imported topsoil as required, turf sod and on any blended root zone mixture.

D. Root Zone Mixture Performance Testing: ASTM Test Methods for sand based putting greens and sports fields shall be used for the performance testing. Water retention shall be done at 30 cm tension. Tests shall determine compliance with specified mixing ratio and provide calibration data for the quality control program. Tests shall comply with the following criteria on a core compacted at 14.3 ft.-lbs/sq. in.

Saturated hydraulic conductivity 3 to 12 inches per hour

	(7.5 to 30 cm per hour)
Bulk density (g/cc)	1.3 to 1.65
Total Porosity	35 - 55%
Aeration porosity*	15 - 30%
Capillary porosity*	15 - 25%
Saturation percentage*	40 - 55%

* determined @ 30 cm tension

1. The root zone mixture shall have an organic matter content of 0.7% to 3% (as required to meet water retention specifications) with a variability of not more than ± 0.2% on a dry weight basis, as determined by Method 1 of ASTM F 1647. The sand-soil-peat or compost shall be mixed on-site to a uniform consistency.

2. Root zone mixture and depth shall be tested and approved by G&A prior to placement of sod on the field site.

1.07 GUARANTEE

A. Provide a written guarantee stating that all work executed under this section will be free from defects of material and workmanship for a period of one (1) year from date of Substantial Completion, and that any defects will be remedied on written notice at no additional cost to the Owner. The warranty shall be in writing and shall be signed by the Contractor. Guarantee shall include removal and replacement of materials as required to repair natural turf field system at no cost to the Owner.

1.08 PROJECT COORDINATION

A. Field installation may be one of several phases of construction to be undertaken by the general contractor. It is critical that the field contractor coordinate his efforts and requirements with the other contractors on site to assure a timely, cost-contained project.

PART 2 PRODUCTS

2.01 ACCEPTABLE CONSULTANT / TESTING LAB

A. Acceptable Sports Turf Design Consultant: Guise & Associates (G&A), contact Stephen H. Guise, 714-231-1454, email; steveguise@roadrunner.com. The testing lab and quality control agent: Michael DePew, Environmental Technical Services (ETS), 517-767-4507 or 517-227-1127, email; proturf@hotmail.com.

2.02 NATURAL TURF- (SOD)

A. Certified Turfgrass Sod: Superior sod grown from certified, high quality seed (stolons) of known origin or from plantings of certified grass seedlings or stolons. Sod shall be inspected by Sports Turf Design Consultant at the sod farm to assure satisfactory genetic identity and purity, overall high quality and freedom from noxious weeds as well as excessive quantities of other crop and weedy plants at time of harvest. All seed or original plant material in mixture must be certified. Turfgrass sod shall meet the published state standards for certification.

B. Sod shall be a specified "sand base" ¾" material for compatibility (bridging) with field soil, grown and available from local farms. Turf shall be a Hybrid Bermuda Grass (419, Tifway 2) from West Coast Turf, Palm Desert, California.

C. Strip Size: Sod shall be a minimum of one year established and big roll turf cut to the

supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be plus or minus 1/2 in. on width and plus or minus 5% on length. Thin turf, broken strips and torn or uneven ends, or stressed turf will not be accepted.

D. Time Limitations: Sod shall be harvested, delivered, and transplanted within an 18 hour period unless a suitable preservation method is approved by the Architect prior to delivery. Sod not transplanted within this period shall be inspected and approved by the sports turf consultant and architect prior to its installation.

E. Thatch: Sod shall be relatively free of thatch. A maximum of 1/2 in. (uncompressed) thatch will be permitted.

F. Diseases, Nematodes, and Insects: Sod shall be free of diseases, nematodes, and soil-borne insects. State Nursery and Plant Materials Laws require that all sod be inspected and approved for sale. The inspection and approval must be made by the State Agricultural Department, Office of the State Entomologist.

G. Weeds: Sod shall be 100% free of objectionable grassy and broad leaf weeds.

H. Sod supplier shall be West Coast Turf or equal, and must identify specific fields for harvest, inspection, and submit a fertility and management program schedule for 6 months prior to harvest.

2.03 DESIGN CRITERIA AND MATERIALS RECOMMENDATIONS

A. The major components of the system, as listed below, are minimum requirements and shall act to promote and maintain an adequate natural turf surface and playability during non-rain events.

2.04 DISCHARGE MAIN DRAIN

A. The sub-grade discharge line (storm drain) shall be a smooth double-walled HDPE manufactured by Advanced Drainage Systems, Inc., Columbus, Ohio or approved equal. Pipe lengths shall be connected using manufacturer's recommended couplers and installation method.

B. The main shall include the appropriate vertical fittings (Tee or Ell) to allow for connection into the storm drain system. The fittings shall be factory fabricated of the same HDPE pipe used for the sub-drain main (collector) and encapsulated in concrete as required.

2.05 GEOTEXTILE BARRIER

A. The geotextile barrier used to line the drainage trenches of the field to protect from contamination of the drainage gravel and pipes shall be an 8.5g non-woven fabric meeting AASHTO standards for Class B subsurface drainage soil filters, manufactured by ADS, Inc., #3300, or approved equal. The barrier shall be laid to conform to the sub-grades and shall be overlapped during construction to protect the gravel and re-opened to extend 12 inches on either side of the trench prior to the import of the 4" gravel drainage blanket.

2.06 SUBSURFACE DRAINAGE PIPE SYSTEM (MAIN/LATERAL DRAINS)

A. If required, collector and cross-field lateral drainage lines shall be 4"-10" ADS perforated flex pipe, manufactured by ADS, Inc., or approved equal. Lateral field drains shall be precisely micro-slotted** (without filter fabric sock) to preclude infiltration of the bird's eye drainage layer or root zone medium into the pipes.

2.07 ROOT ZONE SAND

A. Selection of the proper sand additive for root zone construction is critically important for drainage and the agronomic and athletic performance of a system. The field profile shall be 6" deep, constructed with a uniformly graded, clean, washed sand blended with peat moss having gradation characteristics as shown below.

PARTICLE SIZE CRITERIA FOR ROOTZONE SAND

USDA Particle Name	US Standard Sieve Number	Diameter of Particle in Millimeters	Allowable Range of Percent Retained	
Gravel	6	> 3.35	0	
Fine Gravel	10	2.00 - 3.35	0 - 20	<30 combined fine gravel +
Very Coarse Sand	18	1.00 - 2.00	0 - 20	very coarse sand fractions
Coarse Sand	35	0.05 - 1.00	> 60 combined	
Medium Sand	60	0.25 - 0.50	coarse plus medium sand fraction	
Fine Sand	100	0.15 - 0.25	< 5	
Very Fine Sand	270	0.05 - 0.15	< 5	
Silt		0.002 - 0.05	< 3	<15 combined very fine
Clay		<0.002	< 5	sand + silt + clay fractions

PHYSICAL PERFORMANCE CRITERIA FOR ROOTZONE SAND

FINENESS MODULUS: 1.5 - 2.5 AIR-FILLED POROSITY: 15% - 30%

UNIFORMITY COEFFICIENT: 2.5 - 3.5 TOTAL POROSITY: 35% - 55%

CAPILLARY POROSITY: 15% - 25% SATURATED HYDRAULIC CONDUCTIVITY: 7.5 cm - 30 cm per hour

B. The drainage gravel and rootzone sand and peat shall be "quality control" tested prior to and throughout the profile construction process by submitting a sample to E.T.S., the approved laboratory, for every 500 tons prior to delivery to the site. Sand that does not meet specifications shall be removed and replaced at the contractor's expense. Samples to be taken at suppliers location by Sports Turf Consultant.

2.08 PEAT MOSS

A. Peat moss shall be a horticultural grade sapric peat (Dakota reed sedge peat, supplied by Dakota Peat or equal) conforming to the following requirements:

1. Peat moss shall be a homogenous material free of decomposed colloidal residue lumps, roots, stones, and other foreign matter; and of such consistency that peat can be pass a 1/2 in. mesh and can be readily incorporated with the topsoil.

2. The pH shall not be less than 3.5 nor greater than 6.0 at 25 degrees C.

3. Organic matter content shall be not less than 90%, by weight, on an oven-dry basis.

4. Ash content shall not be more than 10%, by weight, on an oven-dry basis.

5. Moisture absorption capacity shall not be less than 800%, by weight, on an oven-dry basis.

6. A two-sectional mechanical screw 'Dakota Blender' supplied by Dakota Peat and

Equipment, or an equal blending company shall blend the Peat and sand.

2.09 LIMESTONE

A. Ground limestone if required by soils testing shall be an agricultural limestone containing a minimum of 85% total carbonates, by weight. Ground limestone shall be graded within the following limits:

Sieve Size	% Passing by Weight
No. 10	100
No. 20	90
No. 100	60

2.10 COMMERCIAL FERTILIZER

A. Starter fertilizer shall be HD Scotts Starter Fertilizer or approved equal.

B. Fertilizer shall conform to the following:

1. When applied as a topsoil amendment, fertilizer shall have an analysis that will deliver appropriate amounts of nitrogen, phosphorus, and potassium as required to remedy deficiencies revealed by testing the topsoil.

2. When used as a top dressing for the maintenance of sod, fertilizer shall conform to the following:

Constituent	% Present by Weight
Nitrogen (N)	10
Phosphorous (P	8
Potassium (K)	4

a. 50% of nitrogen shall be derived from natural organic source of ureaform.

b. Available phosphorus shall be derived from superphosphate.

c. Potassium shall be derived from muriate of potash containing 60% potash.

C. Fertilizer shall be delivered in manufacturer's standard container printed with manufacturer's name, material weight, and guaranteed analysis.

D. Fertilizers with N-P-K analysis other than that stated above may be used provided that the application rate per square foot of nitrogen, phosphorus, and potassium is equal to that specified.

2.11 SUPERPHOSPHATE

A. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes, and containing not less than 20% available phosphoric acid. The superphosphate shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any superphosphate, which becomes caked or otherwise damaged making it unsuitable for use, will be rejected.

2.12 BIRD'S EYE STONE DRAINAGE LAYER

A. The bird's eye stone drainage layer shall be ¼ to 1/8" minus cleaned washed stone installed in the trenches and over the sub-base below the 6" rootzone layer. The finish grade of the bird's eye stone drainage layer shall follow the rootzone finish grade. Its thickness may vary as long as the minimum depth exceeds a 4" depth over the drain line. Bird's eye stone shall meet USGA Green's Section guidelines for soil bridging, and tested with the approved sand rootzone by E.T.S., the approved soils laboratory.

PART 3 EXECUTION

3.01 GENERAL

A. Playing Surface: The playing surface shall be graded as shown on the drawings with a cross-slope of >1%. It shall be graded, water floated and finished with laser leveling equipment. All laboratory recommended pre-plant nutrients shall be applied according to laboratory instructions prior to installation of the sod.

B. Earthwork: The existing site shall be prepared per the plan details and specifications.

C. The area delimited by the playing surface shall be ripped and blended to 8 inches and uniformly compacted to a minimum of 85%, as determined by ASTM D-698-78. Sub-base must be surveyed to mirror surface grade tolerances prior to rootzone placement.

1. During all installation work, care must be taken to protect hardscape structures, liners, membranes and utilities. The OWNER shall be responsible for providing the contractor with surveys and blueprints identifying all underground structures and utility lines. Any unidentified obstructions shall be outside the responsibility of the landscape contractor.

2. If unsuitable bearing materials are found, excavation shall continue until suitable materials are encountered and excavated materials shall be replaced with acceptable fill. The OWNER shall pay removal and replacement of such material to the landscape contractor.

3.02 INSPECTION OF SUBGRADE

A. Prepared grade will be inspected by the Landscape Contractor and Architect. The Landscape Contractor, and Architect shall approve grade before installation of drainage, irrigation and the natural turf field system.

B. Pre-Installation Meeting: Prior to installation of natural turf field system and at the Architect's direction, meet at the Project site to review the material selections, installation procedures, and coordination of the Work with other trades. Meeting shall include the Architect, Sports Turf Design Consultant, General Contractor, Landscape / Subcontractor, and any other subcontractor whose work requires coordination with this work.

C. Sub-grade Discharge Main: The system's main discharge line shall be installed by the general contractor, prior to the main and lateral drain installations if required.

D. Grade Elevation tolerances are critical to uniform movement of water across the surface and ultimately to field performance. Grade shall be laser leveled, and certified. The Sub-surface and finished surface of the field is to be crowned at 1 % and shall not vary more than 1.0cm in any 10 linear meters.

E. The completed field soil shall be re-compacted by the field contractor to a uniform density. Care must be taken to assure that material placed over the main sub-grade discharge lines

is uniformly compacted and that all rock and sharp objects are buried below the top 6 inches designated as the Natural Turf field section.

3.03 DISCHARGE STORM DRAINAGE PIPE SYSTEM

A. Sub-grade discharge lines shall be installed as illustrated in the drawings. They shall be placed and properly sized and laser leveled to a 0.005% slope, with tolerances of +0.0cm/-1.5cm.

3.04 SUBSURFACE LATERAL DRAINAGE PIPE SYSTEM

A. Lateral-field drain lines shall be installed on approximately 20-foot centers and laid directly on 2 inches of gravel over the geotextile covered trench sub-grade. Connections to the subsurface discharge lines shall be made using manufacture's specified fittings. All drains shall be tested and accepted prior to rootzone placement.

3.05 NATURAL TURF FIELD SYSTEM

A. Natural turf field system shall be installed in strict accordance with architects recommendations and instructions including but not limited to sodding, sand/soil mixes, drainage pipe system, fabric, irrigation system, and abutting adjacent materials.

B. Once installed, the contractor shall plant with top quality, sod.

C. Post-installation management, including fertilizing, irrigating, mowing and applying fungicides and pesticides shall be the contractor's responsibility during the 90-day grow-in period. The grow-in period shall begin immediately following completion of the sod installation and last for up to twelve weeks, or until the Sports Turf Design Consultant is satisfied the turf has met the criteria for establishment. Established requires 4 inches of healthy white roots and uniform growth across the field.

3.06 PROTECTION

A. General Contractor shall advise the Architect of procedures required for protection of the finished natural turf field system during remainder of construction period so that surfacing will be undamaged at time of acceptance.

B. Upon completion of the natural turf field system, the Contractor shall be responsible for protection of the field surface for the remainder of the Contract or prior to acceptance and or use by the OWNER.

3.07 APPLICATION OF FERTILIZER AND CONDITIONERS

A. Fertilizer and conditioners shall be applied at the following rates:

1. Peat moss - as required to meet organic content specified.

2. Limestone - as required by test results of topsoil and root zone soil mixture.

3. Fertilizer - as required by test results of topsoil and root zone soil mixture or a minimum of 1 pound nitrogen of 16-6-8 monthly.

4. Phosphorus - as required by test results of topsoil and root zone soil mixture.

5. Superphosphate - as required by test results of topsoil and root zone soil mixture.

6. Sulfur - as required by test results of topsoil and root zone soil mixture.

B. Mixing with topsoil and root zone mixture:

1. Fertilizer and conditioners shall be spread over the entire turf areas at the application rates indicated above and watered into the field surface.

2. Materials other than fertilizers shall be uniformly and thoroughly mixed into the rootzone material by a calibrated soil blender, or other approved methods prior to delivery. Sand and Peat blending to be completed at Sand supplier's site in 500 ton stock piles for testing purposes.

3.08 SOD

A. Edges of the sodded areas shall be smooth, and all sodded areas shall conform to the design cross sections and grade. At edges adjacent to curbs, paved areas, etc., top surface of earth in sod shall be 1/2 in. below adjacent hard surface.

B. Sod shall be placed and all sodding operations completed within 18 hours following stripping from sod source bed.

C. Surface of completed sodded area shall be smooth. Sod shall be laid edge-to-edge, with tight-butted, staggered joints. Sod shall be carefully placed to insure that it is neither stretched nor overlapped. Immediately after laying, sod shall be pressed firmly into contact with sod bed by tamping or rolling, to eliminate air pockets. Following compaction, specified sand (Washed Plaster) shall be used to fill all cracks, excess sand shall be worked into grass with rakes or other suitable equipment. Sod shall not be smothered with excess fill soil.

D. Immediately after sodding operations have been completed, entire surface shall be compacted with a roller or other approved equipment weighing 100 to 160 lb./ft. of roller.

E. Completed sod shall immediately be watered sufficiently to uniformly wet the soil to at least 1 in. below the bottom of root zone layer and wash all soil from sod surface.

3.09 MAINTENANCE

A. Except as otherwise specified below, maintenance shall include all operations required to produce a professional soccer field, including but not limited to:

Fertilizing
Mowing
Replanting
Watering
Weeding
Topdressing
Rolling
Line Paint (at final acceptance)

B. Maintenance of sodded areas shall begin upon completion of sodding and shall continue for 90 days thereafter or until such time that the Owner accepts or occupies the field.

C. First mowing shall be done when average height of grass is 1 inch, with mower set to cut at a height of 3/4 inch. Subsequent mowing shall be made at not over 4 day intervals, with

the height of cut set at 3/4 inch. With prior permission of the Owner, mowing during periods of slow growth or dormancy may be spaced at greater intervals.

D. Weeds and growth other than varieties of grass named in grass seed formula shall be removed. Removal may be accomplished by use of suitable herbicides or by physical removal, in which case top growth and roots shall both be removed, and bare spots exceeding specified limits shall be reseeded.

END OF SECTION-02910

G&A 2009

SECTION 02960
ROCKWORK

PART 1 - GENERAL

A. Scope of Work:

1. Furnishing and installing natural stone/rock, veneer, paving and cobble groundcover where shown on drawings.

PART 2 - MATERIALS

A. Rock Cobble:

Rock cobble shall be rounded river rock selected for appearance and durability. Quality of stone shall meet the requirements of Section 200-1.6 of the Standard Specifications.

1. Product Name: Riverside Cobble, mfg: KRC Rock (760)744-1036 Color: light grays, very smooth and rounded rustic cobble. Size: (2" -4"), palletized. Geology: Granitic in origin

2. Approximate extent of rock cobble is shown on the drawings. Rockwork symbol on the drawings illustrates area of surface to be covered with rockwork. It does not indicate the actual number of rocks to be placed. Major rock sizes are indicated on drawings.

B. Rock Boulders:

Rock boulders shall be angular quarried rock selected for appearance and durability. Quality of stone meet the requirement of:

1. Product Name: " Artesian" #23BDR0176, mfg: KRC Rock, Ph 760-744-1036. Color: Rich gray base overlaid with a rust brown finish. Size: various from (3')(4')(5')(6'). Geology: Granitic in origin

2. Approximate extent of rock boulders shown on the drawings. Rockwork symbol on the drawings illustrates area of surface to be covered with rockwork. Major rock sizes are indicated on drawings.

C. Rock Flagstone Paving:

Flagstone Paving shall be angular quarried rock selected for appearance and durability. Quality of stone meet the requirement of:

1. Product Name: " Blackgold" , mfg: KRC Rock, Ph 760-744-1036. Color: rich tan and blackish gray tones. Size: varies. Thickness: min. 2"

2. Approximate extent of Flagstone Paving shown on the drawings. Rockwork symbol on the drawings illustrates area of surface to be covered with rockwork.

3. Flagstone shall meet all ADA requirements for acceptable lifting tolerances between stone and grout. Contractor shall be responsible for all unacceptable work, including, but not limited to, removing all unacceptable work, replacing material, installation of new work and any special inspection that may be required to meet ADA guidelines and specifications.

D. Stone Veneer:

Stone veneer shall be angular quarried natural rock selected for appearance and durability. Quality of stone shall meet the requirement of:

1. Product Name: McGregor Lake Thin Veneer, mfg: KRC Rock, product #: 12VNR2790, Ph 760-744-1036. Color: Dark Rustic bronze and earth tones, with a rust brown finish. Size: various

2. Provide complementing Thin Veneer Corners: McGregor Lake, mfg: KRC Rock, product #: 12VNR2657, ph. 760-744-1036.

3. Approximate extent of stone veneer shown on the drawings. Rockwork symbol on the drawings illustrates area of surface to be covered with rockwork. It does not indicate the actual number of rocks to be placed

E. Grout:

1. Grout shall conform to the requirements of Section 201-1 and shall be Class 560-C-3250 with 5 inch maximum slump. The concrete mixture shall be modified so that the quantity of coarse aggregate in the mix larger than pea gravel size is one-half the amount required for Class C P.C.C. as specified in Section 201-1.3.2 of the Standard Specifications.

2. Seeded pea gravel: 3/8" Birdseye Brown #45BLK0811, mfg: KRC Rock, ph. 760-744-1036, colors: dark browns with hints of yellow and grays.

2. Color shall match stone veneer. Submit colors to Landscape Architect for final approval before commencing work.

PART 3 - EXECUTION

A. Rock/Stone:

1. Rock shall be transported and handled in a manner to prevent scarring, chipping, flaking and breakage.

2. The Owner' s Construction Manager shall be notified 48 hours prior to placing of rock and will be present to provide direction during this operation. The Owner' s Construction Manager' s opinion concerning the aesthetic placement of boulders shall be final. No additional compensation will be allowed for operations required to satisfy the Construction Manager' s artistic judgment.

3. Rock boulders at the base of rock formations and at shoreline areas shall be buried at least 1/4 of their total mass, and shall be positioned to resemble natural occurrence.

4. Rock boulders shall have no sharp edges or protrusions exposed above subgrade.

5. Stacked boulders shall be placed so that no tilting or rocking of any boulder occurs. Boulders shall be firmly butted against each other, and wedged when possible.

6. All stacked boulders shall be firmly grouted together. All voids between rocks shall be filled. Surface of grouting shall be left rough.

7. Contractor shall coordinate off-haul and crane with rock manufacturer.

B. Sealer/Enhancer:

1. All stone shall be sealed with a low-gloss natural stone sealer specially formulated for use on natural stone. Sealer shall be non-yellowing acrylic that provides protection against oil, water and acid.

2. Sealer shall be a film forming, water based sealer.

3. Contractor shall provide Landscape Architect a finish color sample for final approval prior to commencing work. Sample can be on finish work in an inconspicuous area.

4. Contractor to follow all written manufacturer' s recommendation for applying, handling, preparation and coverage of product on all surfaces.

END OF SECTION 02960