SECTION 02300
EARTHWORK

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.

B. The provisions of Standard Specifications for Public Works Construction (SSPWC), latest Edition, Sections 200, 300 and 301, apply except as modified herein.

C. The "Geotechnical Investigation Report" for Perris Valley Big League Dreams Sports Park Perris, California prepared by Converse Consultants, Project No. 07-81-368-01, and dated October 30, 2008, is bound in these specifications at the end of this section and is hereby made a part of same. All recommendations and requirements shall be carefully followed. (Also called "Soils Report.")

1.2 SUMMARY

A. This Section includes the following:

1. Rough grading as shown on the plans, including, but not limited to overexcavation, imported fill, placement and compaction as called for in the Soils Report.
2. Finish grading of the site as shown on the plans.
3. Excavation and backfill for all footings, structures, walls, etc. and compaction as called for on the plans and in the Soils Report.
4. Soil compaction as required.
5. Soil testing as required.
6. Protective measures.
7. Dust and noise abatement.
8. Engineered fill under structures
9. Obtaining construction water.

B. Related Sections include the following:

1. Division 1 Section "Construction Progress Documentation and Photographic Documentation" for recording preexcavation and earthwork progress.
2. Division 1 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
3. Division 2 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
4. Division 2 Section "Tree Protection and Trimming" for protecting and trimming trees to remain.
5. Division 2 Section "Dewatering" for lowering and disposing of ground water during construction.
6. Division 2 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
7. Division 2 Section "Subdrainage" for drainage of play ground area.

8. Division 2 Section "Lawns and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.
9. Division 2 Section "Exterior Plants" for planting bed establishment and tree and shrub pit excavation and planting.
10. Division 3 Section "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
11. Divisions 2, 15, and 16 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.

1.3 UNIT PRICES

A. Unit prices for earthwork are included in Division 1 Section "Unit Prices."

1.4 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: As defined by Section 400-1 of the SSPWC.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

A. Shall be submitted to the Architect for review and approval in accordance with SubSection 2-5.3 of the SSPWC. The Contractor shall allow 10 working days for review by the Architect.

B. Product Data: For the following:

1. Plastic warning tape as required by Eastern Municipal Water District Standards.
2. Geotextile.
3. Rock.

C. Material Test Reports: From Soils Engineer as required per Section 3.20.

D. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit to Architect before any earthwork begins.

1.6 QUALITY ASSURANCE

A. Preexcavation Conference: Conduct conference at Project Site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.
3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active before any work.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations or at the direction of the Soils Engineer.

B. Satisfactory Soils: As determined by the Soils Report and Soils Engineer.

C. Unsatisfactory Soils: As determined by the Soils Report and Soils Engineer.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

2. Unsuitable soils, large rocks or boulders, broken concrete/asphalt and other deleterious material may be buried on site if the location, depth and method of burial is approved by the Soils Engineer and Agency Representative. Only material that can not be accepted for on-site disposal shall be removed from the site by the Contractor. All labor and materials associated with the removal of unsuitable materials shall be considered included in the price bid for Unclassified Excavation and no additional compensation will be allowed.

D. Topsoil Material: The best on-site topsoil throughout the project area shall be removed to a depth of six inches (6") from all construction areas as determined by the Soils Engineer. The stripped material shall be stockpiled in such locations as may be available at or near projected grades and protected from erosion. Topsoil shall be the best on-site soil with all rocks one inch (1") and larger removed.

Topsoil shall be a minimum of six inches (6") depth in all turf areas, unless otherwise specified.

Topsoil placement is not required on non-turf slopes or planting areas unless noted otherwise.

Should the Contractor choose to import topsoil from off-site (Class A topsoil) per SubSection 212-1.1.2 of the SSPWC, as an alternative to that specified on the plans or these specifications, the cost of import of topsoil, stockpiling of import topsoil, placement of import topsoil and the removal and legal disposal of excess topsoil (on-site soil) created by importing top soil is considered included in the price bid for topsoil and no additional compensation will be allowed.

1. Areas to receive topsoil shall be ripped twelve inches (12") deep and surface rock one inch (1") and larger removed before placing topsoil

E. Base Material: Shall conform to the requirements of Section 200-2.2 and 200-2.4, of the SSPWC and the Soils Report. Percentage of wear and grading shall conform to SubSections 200-2.2.1 and 200-2.2.2 of the SSPWC. Maximum size aggregate shall be 3/4 inch.

F. Fill Material: Fill shall be placed in level layers not to exceed six inches (6") in depth and mechanically compacted using optimum amount of moisture to achieve a 90% minimum degree of compaction.

2.2 GEOTEXTILES

1. Subsurface Drainage Geotextile as recommended by the Soils Report.
2. Separation Geotextile as recommended by the Soils Report.

2.3 ACCESSORIES

1. Detectable Warning Tape: As required by the Eastern Municipal Water District.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," plans and the SWPPP during earthwork operations.

D. Contractor shall make arrangements with the Eastern Municipal Water District, to obtain construction water

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project Site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Explosives are not allowed.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

B. Rough Grade: The site shall be graded to the limit lines, elevations, sections and details as shown on the plans with such allowances as may be required for the construction of walks, parking areas, game courts and other intended site improvements. Tolerance for rough grading is 1/10th of a foot, plus or minus vertically and horizontally on all sub-grades for all building pads, paved areas, game courts, ball fields, etc. and other intended site improvements. At all other areas, functional use and appearance shall be the governing factors as determined by the Landscape Architect.

C. Excavation: Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. The Contractor shall make all necessary excavation for footings and slabs and do

any additional excavation necessary to provide ample room for installation of concrete forms where required.

Footings may be poured in trenches against undisturbed soil where approved by the Soils Engineer.

Bottom of excavations shall be level, free from loose material and brought to the indicated or required levels in undisturbed earth. All excavations shall be kept free from standing water. The Contractor shall do all pumping or draining that may be necessary in carrying on the work.

Should excavations for footings, through error, be excavated to a greater depth than indicated or required, such additional depth shall be filled with concrete, as specified for footings, at the Contractor's expense. Excavations that have been dug wider than required shall be formed to conform with plans and specifications. Filling with concrete can only be accepted with the approval of the Agency Representative.

Any excess soil generated from excavation for footings, AC and base, concrete flatwork, sanitary sewer system, domestic water system, storm drain system, etc. shall be legally disposed of offsite by the contractor at no additional cost to the Agency.

Payment for removing and legally disposing of excess soil generated from footings, AC and base, concrete flatwork, sanitary sewer system, domestic water system, storm drain system, etc. is considered included in the price bid for items of work and no additional compensation will be allowed.

D. Finish Grading: Finish grades as shown on the plans shall slope to drain without water pockets or irregularities and shall conform to the intent of all plans and sections - after thorough settlement and compaction of the soil. Finish grades shall meet all existing or established controls of sidewalks, curbs and walls and shall be of uniform slope and grade between points of fixed elevations or elevation controls and from such points to established grades. Tolerance for finish grading is 1/10 foot, plus or minus, adjacent to fixed elevations or gradients. At all other areas, functional use and appearance shall be the governing factor.

The finish grades at the intersection of the infield and outfield or soccer field shall be field adjusted and dragged as necessary to the satisfaction of the Agency representative prior to planting turf.

Payment for finish grade as required on the plans and in these specifications is considered included in the unit price bid for the various items of work and no additional compensation will be allowed.

E. Backfilling: After the foundations and walls have been placed, forms removed, and concrete or masonry work approved, the excavation shall be backfilled with earth to the required grade.

Select site material shall be used for backfill and shall be free from large stones and clods. Material shall be approved by the Soils Engineer.

Backfill shall be deposited in layers of six inches (6") thickness.

Layers of backfill shall be moistened with water, the amount to be rigidly controlled to insure optimum moisture conditions for the type of fill material used. Excess water causing saturated earth beneath footings will not be permitted.

Backfill shall be compacted by suitable means to 90% density.

All trenches for other work shall be backfilled in accordance with this section, and tested at the discretion of the Soils Engineer.

Payment for backfill is considered included in the unit price bid for the various items of work and no additional compensations will be allowed.

F. Protective Measures: All excavations shall be protected and guarded against danger of life, limb and property at all times. Trench excavation protection shall be in accordance with applicable sections of the SSPWC and CALOSHA requirements.

Existing improvements and trees within contract limits or areas of activity shall be properly protected in accordance with Sections 4 and 5 of the SSPWC.

Payment for protection measures is considered included in the various bid items of work and no additional compensations shall be allowed.

G. Dust and Noise Abatement: Dust and noise abatement will be in accordance with applicable sections of the SSPWC, Agency's Dust and Noise Abatement requirements for construction projects and the Regional Air Quality Management District (AQMD) requirements and will be enforced at all times. During the entire period of construction, site areas shall be kept sprinkled.

H. Work Hours and Inspection: Work hours, work days, holidays, weekend work, overtime work and inspections are specified in the General Provisions.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. This section is applicable for pipes and conduit less than 4 inches in nominal diameter (ID).

B. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line if required by Architect.

C. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 6 inches each side of pipe or conduit.

D. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 4 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.7 QUALITY CONTROL

A. Survey: The Agency will provide the necessary control for the survey required for the construction of the project. However, the Contractor, will be responsible for the accuracy of surveying adequate for construction; however, the task of surveying itself shall be performed under the direction of a licensed Land Surveyor or Professional Engineer, whom is authorized to practice land surveying, retained or provided for by the Contractor.

B. Conflicts: In the event of conflict between the requirements of this Specification Section, the Standard Specifications, and the Soil Report, the document highest in precedence shall control. The precedence shall be:

1. Soils Report.
2. Specification Section 02200.
3. SSPWC.

C. Trenching: Trenching for sanitary sewer system, storm drain system, domestic water service, site dry utilities and irrigation mains and laterals shall not commence until rough grading for the entire site has been substantially completed and confirmed with Agency Representative (also see pertinent utility sections).

D. Certification:

Rough Grade: Upon completion of the Rough Grade within the project site the Contractor will provide One (1) time a Rough Grade Certification survey to the Agency. This survey's intent is to confirm that rough grading as performed by the Contractor for those areas receiving aggregate base, asphalt concrete, PCC concrete, special paving, curb and/or gutter, building pads, etc. have been completed in substantial conformance with the approved plans and these specifications. If it is found that indeed the rough grading for these areas has been completed in substantial conformance with the approved plans and these specifications, a Notice of Rough Grade Completion for these areas will be issued by the Agency with a copy to the Contractor.

If it is found that the rough grading of any or all of these areas has NOT been completed in substantial conformance with the approved plans and these specifications, the Contractor will be issued a Notice of Correction for those areas of concern. Prior to proceeding with any other work within any area of concern, the Contractor will correct any error or omission. Upon completion of this work, the Contractor will provide a subsequent rough grade certification survey. All subsequent rough grade certification surveys performed will be paid for by the Contractor.

Precise/Fine Grade: Upon completion of Precise/Fine Grading of the project site, the Contractor will provide one (1) time a Precise/Fine Grade Certification survey to the Agency. This survey's intent is to confirm that precise/fine grading has been completed in substantial conformance with the approved plans and these specifications. The precise/fine grade certification is to include all finish surfaces as well as those graded areas as called for on the approved plans and in these specifications. If it is found that all precise/fine grades have been completed in substantial conformance with the approved plans and these specifications, a Precise/Fine Grade Completion will be issued by the Agency with a copy to the Contractor.

If it is found that the Precise/Fine Grading has NOT been completed in substantial conformance with the approved plans and these specifications, the Agency will issue a Notice of Correction to

the Contractor. This Notice of Correction will outline all areas in which the work completed by the Contractor does NOT meet the Agency's requirements in accordance with the approved plans and these specifications. The Contractor will be directed to make all corrections and notify the Agency when this is done at which time the Contractor will perform a subsequent Precise/Fine Grade Certification survey on those areas corrected by the Contractor. It should be noted that all subsequent precise/fine grade certification survey's performed will be paid for by the Contractor.

Payment for all initial Certification Survey's will be at the cost of the Contractor. No additional compensation or time will be allowed.

3.8 SUBGRADE INSPECTION

A. Notify Inspector when excavations have reached required subgrade.

B. If Soils Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

D. Reconstruct subgrades damaged by temperatures, rain, accumulated water, or construction activities, as directed by Architect or Soils Engineer, without additional compensation.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill in accordance with the plans, appropriate Sections of the SSWPC and the Eastern Municipal Water District Standards.

B. Backfill voids per Eastern Municipal Water District Standards while installing and removing shoring and bracing.

C. Place and compact final backfill to final subgrade elevation.

D. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs as required by Eastern Municipal Water District Standards.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill on surfaces that are muddy.
2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials per Section 306-1 of the SSPWC and the Eastern Municipal Water District Standards.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials per Section 306-1 of the SSPWC and the Eastern Municipal Water District Standards.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within tolerances provide in section 3.4 :

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.15 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Division 2 Section "Subdrainage."

B. Subsurface Drain: Place subsurface drainage per Soils Report.

3.16 FIELD QUALITY CONTROL

A. Agency will engage a qualified independent geotechnical engineering testing firm (Soils Engineer) to perform field quality-control testing. The Soils Engineer selected by the Agency shall be present at the site during the earthwork activities relating to stripping (clearing and grubbing), excavation, backfill and compaction, and filling of the site. Contractor shall give a minimum of 48 hours notice to the Soils Engineer before commencing any grading operations or required testing. Upon completion of the earthwork and grading the Soils Engineer shall submit a compaction report to the Agency certifying the Contractor's compliance with the plans, specifications, soils reports, and grading ordinance in placing all fills and backfills. The Soils Engineer shall conduct all specified tests to insure compliance. The Soils Engineer shall also test, identify and make recommendations on other site and imported fill materials as specified in this section. Number and location of soils tests to be at the discretion of the Soils Engineer to assure uniformity and compliance with the plans, specifications and Agency grading ordinance.

B. At a minimum tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

C. When the Soil Engineer reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

D. The cost of services of the Soils Engineer, specified field density and maximum density tests, compaction reports and certificates of compliance, shall be borne by the Agency. All costs for retesting made necessary by failure of contractor to meet grading requirements shall be borne by Contractor.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300