

SECTION 312213 - EARTHWORK AND GRADING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Monterey Peninsula Regional Park District Bid Form.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for Earthwork and Grading as shown on the Drawings and as specified in this Section. The work includes but is not limited to:
 - 1. Finish grading and excavations
 - 2. Providing, processing, placement, and compaction of any fill materials necessary to meet the designed lines and grades.
- B. Related work includes but is not limited to:
 - 1. Stabilized DG Paving

1.03 STANDARDS AND DEFINITIONS

- A. Unless otherwise shown or specified, all materials and methods shall conform to the appropriate current sections of the State of California Department of Transportation Standard Specifications (DTSS) as they reasonably apply to this work, except for measurement and payment requirements.
- B. Applicable ASTM International Standards (latest revisions) as they apply to this work and related test methods, including:
 - 1. D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
- C. Relative compaction: is defined as the in-place dry density of the compacted soil divided by the laboratory compacted maximum dry density determined in accordance with ASTM D1557, expressed as a percentage.
- D. Finish Grade: is defined as the finished top surface of the soil after all grading and soil preparation activities, and prior to installation of DG.

1.04 QUALITY ASSURANCE

- A. No combination of high and low tolerances that compromise pavement cross-section shall be permitted. Final grades after compaction and/or excavation shall conform to the grades shown on the Drawings, with a maximum tolerance of 0.10 foot for non-paved areas and 0.05 foot for paved areas, plus or minus.
- C. Seasonal Limits: Do not place, spread, or roll fill material during unfavorable weather conditions. When work is interrupted by heavy rains, do not resume fill operations until field density tests indicate the moisture content and density of fill meet the specified requirements and approved by the Owners Representative.
- D. Unusual Conditions: In the event that any unusual soil conditions are encountered during grading operations, notify the Owners Representative immediately. Excavate and dispose of unsuitable material encountered below the natural grade as directed by the Owners Representative and paid for as Extra Work. Unsuitable material is defined in DTSS Section 19 Earthwork Clause 1.01B.

1.05 REVIEWS

- A. Notify the Owners Representative at each stage of the operation indicated below and allow such reasonable time to observe excavation and trenching, and for testing and inspection as the Owners Representative may require. Do not proceed with any portion of the work until authorization has been received from the Owners Representative.
 - 1. Site Preparation Review – Prior to any earthwork and grading.
 - 2. Preliminary Review-I - After all rough grading is complete and sub-grade is prepared.
 - 3. Each review shall be conducted only after all items pertaining to that review as noted above and in related Sections have been completed.

1.06 SPILLAGE AND DUST CONTROL

- A. Spillage: Prevent spillage when hauling on or adjacent to any public street or highway. In the event that such occurs, remove all spillage and sweep, wash, or otherwise clean such streets or highways as required by local City and County authorities and/or the State of California, and in compliance with applicable Best Management Practices (BMPs).
- B. Dust: Take all precautions needed to prevent a dust nuisance to adjacent public and private properties and to prevent erosion and transportation of soil to downstream of adjacent properties due to their work under this contract. Correct or repair any damage caused in this manner at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Fill Material: Selected on-site excavated/sub-soil material is considered suitable fill material for embankment construction, subject to prior approval by the Owners Representative.
- B. Inorganic on-site fill and sub-soil may be used as structural fill to achieve final grades, provided the fill contains no debris and is free of rocks or clods greater than 6-inches in maximum dimension, and no more than 15 percent by weight of rocks larger than 3-inches. Submit samples of any proposed imported fill to the Owners Representative for appropriate testing and approval no less than (5) five working days prior to the anticipated job site delivery. Fill material shall meet the following requirements:
 - 1. Have a sand equivalent greater than 20%
 - 2. Have not more than 15% passing the 200 sieve.
 - 3. Have an R-Value of not less than 50.
- C. Sand: for bedding and backfill for underground utilities including irrigation mainline and 1-inch water service line shall conform to the sieve analysis below:

Sieve Size:	Percent Passing
#30 (600 um)	at least 75%
#100 (150 um)	less than or equal to 5%
- D. Topsoil: the top layer of existing soil in planting areas, containing minerals and organic materials including humus. Depth of topsoil shall be taken to be 4-6 inches deep or as determined by the Owners Representative at the time of construction after clearing and grubbing. See Specification Section Site Clearing.
 - 1. Topsoil is a [] type.
 - 2. At turf areas topsoil starts below the grass root zone.
 - 3. At planting areas other than turf, topsoil starts below the mulch and organic matter layer.
 - 4. Soil underneath paving and aggregate base areas shall not be considered as top soil.
- E. Sub-soil: the remaining existing soil on the site after clearing & grubbing, after topsoil has been removed, and after all rocks over one cubic inch and all foreign debris and organic material have been removed.

PART 3 - EXECUTION

3.01 GENERAL

- A. Keep all excavations (including, pits, trenches, footings, etc.) entirely free from water. Protect excavations from rain or water from any source during construction. Use suitable pumping equipment or other means as required by the conditions. Continue pumping as necessary until the completion of the project. When operations are interrupted by unfavorable weather conditions, prepare areas by grading and compaction to avoid ponding and prevent surface drainage over fill slopes, in order to avoid erosion. Grading operations for erosion control shall be as approved by the Owners Representative. Once excavation and grading commence, do not allow surface drainage to flow onto adjacent properties.
- B. Provide satisfactory pollution and dust abatement and control measures continuously during the course of the work.
- C. Utilize reclaimed water, or dust palliatives, in compliance with the City's Water Conservation Ordinance.

3.02 SITE PREPARATION, EXCAVATION & GRADING

- A. Depressions, voids, or unsuitable material encountered shall be excavated to expose firm soil as directed by the Owners Representative. Backfill and compaction to design grade shall be approved by the Owners Representative. When earthwork or trenching conditions are determined by the Owners Representative to be unsuitable material, perform the work as defined in DTSS Section 19-2.02 Unsuitable Material.
- B. Excavation work shall include sloping and rounding tops and ends of excavations.

3.03 FILL PLACEMENT AND COMPACTION

- A. Place the fill in maximum 6-inch lifts (compacted layers) and compact the fill by mechanical means only. Fill shall be conditioned, at time of compaction, to 1% to 3% above the optimum moisture content of the soil.
 - 1. For non-porous paving, compact each lift to minimum 95% relative compaction.
 - 2. For porous paving, compact each lift to 90% relative compaction.
 - 3. Carry out and document field density tests to ensure proper compaction.
 - 4. The placement and spreading of fill materials and its processing and compaction of fill materials by flooding, ponding, or jetting shall not be permitted without the prior approval of the Owners Representative.

3.04 SUB-GRADE PREPARATION

- A. A minimum of 8-inches of the in-place sub-grade soil shall be scarified, moisture conditioned to 1%-3% above optimum value, and compacted to a relative compaction of at least 95% under all paving including decomposed granite, concrete slabs-on-grade, asphalt concrete pavements, and foundations/footings. This depth of densified soils is in addition to additional fill material required to bring the sub-grade to grade.
- B. Compact a minimum of 6-inch of sub-grade soil in all planting areas to maximum 85% relative compaction.
- C. All soft or wet sub-grade soil encountered during earthwork and grading should be stabilized prior to placement of fill and further construction. This may involve scarifying and air-drying of the soil, or excavation and replacement of the wet soil with dry soil. Obtain prior approval of proposed method of stabilization from the Owners Representative.

3.05 FINISH GRADING

Finish grade all areas, including those indicated to be planted on the Drawings, and remove all rocks and clods over one cubic inch. Grade all areas smoothly and uniformly. Repair all erosion damage during the construction period.

- B. Unless otherwise shown on the Drawings, all soil finish grades shall be one-inch (1") below finish surface of walks, pavements, and curbs.

3.06 UTILITY TRENCHES

- A. General: Trenching for underground piping, electrical conduits, etc. shall be done by the trade installing the pipe or conduit.
 - 1. See Specification Section Site Clearing for trenching within tree protection areas.
- B. Excavation: Excavate trenches to the depth required for laying pipe or conduit plus required allowance for bedding material under the pipe. Over excavated areas shall be brought back to proper grade with compacted bedding material.
 - 1. Excavate trenches wide enough to provide adequate working space to align and lay pipe or to construct the utility trench, make up and inspect joints, and allow placing and compaction of bedding material.
 - 2. The maximum trench width at the top of the pipe shall not exceed the pipe outside diameter plus 12- inches on each side of the pipe.
- C. Bedding and Backfill: Bedding shall extend upwards from the bottom of the trench to the extent shown on the Drawings.
 - 1. Bedding for underground utilities including irrigation and solid drain lines shall consist of sub-soil or sand as defined herein.
 - 2. In planting areas, sand bedding may be jetted or ponded into place and shall be compacted to equal that of the adjacent prepared sub-grade as specified herein. Mechanical compaction may be necessary to achieve this required density. If the bedding is jetted or ponded, the operation should be closely supervised and provisions should be made for the removal of excess water.
 - 3. Maintain near surface soils as uniform as possible with existing upper stratum soils when backfilling in planting areas.
 - 4. Compact backfill to equal that of the adjacent prepared sub-grade as specified herein.

3.07 EXCESS SOIL DISPOSAL

- A. All soil material shall be utilized on site.

END OF SECTION

SECTION 321546 - STABILIZED DG PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Monterey Peninsula Regional Park District Bid Form.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the installation of class 2 baserock and Stabilized Decomposed Granite (DG) Paving as shown on the Drawings and as specified in this Section.
 - 1. All references to DG paving shall apply to Stabilized DG paving, unless otherwise noted.
- B. Related work includes but is not limited to:
 - 1. Earthwork and Grading

1.03 STANDARDS & DEFINITIONS

- A. Unless otherwise shown or specified, all methods shall conform to the appropriate current sections of:
 - 1. The State of California Department of Transportation (CALTRANS) Standard Specifications, latest edition, except for measurement and payment requirements.
- B. Applicable ASTM International Standards (latest revisions) as they apply to this work and related test methods, including:
 - 1. C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - 2. D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 3. D2419 Test Method for Sand Equivalent Value of Soils and Fine Aggregate
- C. Relative compaction: is defined as the in-place dry density of the compacted soil divided by the laboratory compacted maximum dry density determined in accordance with ASTM D1557, expressed as a percentage.

1.04 QUALITY ASSURANCE

- A. Installer qualifications: provide evidence to indicate at least 3 years of successful experience in providing DG surfacing. Provide a list of three projects with Owner references and photos completed in the last 3 years.
- B. Single Source: Supply decomposed granite from a single source for the entire quantity required.
- C. Layout Review: Stake and layout all paving areas for review by the Owners Representative prior to excavation.
- D. Inspection: Notify the Owners Representative 24 hours prior to placement of any paving to inspect sub-grade and forms.
- E. Tolerances: Install the paving to the minimum thickness shown. Tolerances for subgrade and finished grade shall be as specified by the Standard Specifications, and no combination of high and low tolerances will be permitted.

1.05 SUBMITTALS

- A. Qualifications: as noted under Quality Assurance

- B. Headerboard information.

1.06 DELIVERY STORAGE AND HANDLING

- A. Deliver all binder materials in original, unopened packaging. Protect materials / aggregate from contamination with foreign matter. Store under waterproof cover and protect from dampness.

PART 2 - PRODUCTS

2.01 DECOMPOSED GRANITE

- A. Decomposed Granite: Provided by Owner.

2.02 BINDER

- A. Binder: Provided by Owner.

2.03 WATER

- A. Water: free from contaminants that would discolor or be deleterious to DG blended with binder surfacing. Verify source location with Owner.

2.04 PRE-EMERGENT

- A. General: Low VOC, liquid or granular pre-emergent with active ingredient as trifluarin, oryzalin, or oxadiazon.

2.05 HEADERBOARD

- A. Header board: redwood, grade conforming to "Standard Specifications for Grading of California Redwood Lumber," as published by the Redwood Inspection Service.
 1. Redwood grade: Merchantable Heart.
 2. Stakes: 2"x 4" redwood, 18" long minimum.
 3. Fasteners: hot dipped galvanized 16D nails.
 4. See the Drawings for installation and sizes.

2.06 BASEROCK

- A. Class 2 Baserock: Provided by Owner.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examine grading and subsoil conditions. Do not install DG surfacing when sub-base is wet at saturated field capacity, during rainy conditions or below 40 degrees F and falling.
- B. Excavation: Excavate to depth required so edges of DG surfacing will match adjacent grades and have a maximum cross slope as shown on the Drawings.
- C. Compaction: Compact subgrade per Earthwork and Grading specification.
- D. Preparation: Prior to installing paving install pre-emergent herbicide to sub-grade per manufacturer's recommendations.

- E. Pre-emergent Application #1: Comply with environmental control requirements of the authority / agency with jurisdiction over the site, for application. Apply per Manufacturer's instructions just prior to installation of the paving material. Take special care to ensure that pre-emergent is not applied to any areas which are to be planted. Maintain 12-inches of clearance from any planted edge. Do not apply pre-emergent to any areas that directly slope into drainage courses.
- F. Finished Surface: The finish grades of the paving shall conform to the lines, grades, and slopes on the Drawings. Edges of paving shall be flush with adjacent headers, concrete, or other paving. When work is complete, the surface must be smooth, compacted as specified, and uniform.
- G. Pre-emergent Application #3: Upon completion of spreading and compacting paving material, apply pre-emergent to entire paving surface.
- H. Place and compact aggregate baserock as specified in DTSS Section 26, to at least 95% relative compaction in accordance with ASTM D1557, and to a depth as noted on the Drawings. Verify grades to allow for DG paving.

3.02 STABILIZED DG INSTALLATION

- A. Mixing: Mix the materials per Manufacturer's recommendations in a drum type mixer on the job or a central mixing plant. In addition mix in granular pre-emergent (Application #2) per Manufacturer's recommendations.
 - 1. Provide the Owners Representative sufficient notice of intent to begin mixing so that the mixing and batching operation can be inspected
- B. Placement: Thoroughly moisten subgrade immediately prior to placing the Stabilized DG mixture. Place the mixture uniformly in layers no more than 2-inch thick. Deposit mixture in such a manner as to minimize the necessity for spotting, picking up or otherwise shifting the mixture. The mixture shall not be screeded off or finished by floating. No steel tooling of the mixture shall be done.
- C. Compaction: Compact the bottom layer of Stabilized DG to 90% relative compaction prior to the placement of the top layer. Compact the top layer of Stabilized DG to 90% relative compaction.
- D. Curing Do not allow traffic on Stabilized DG surfacing for a minimum of five (5) days after placement or until surfacing has fully cured.
- E. Protect Stabilized DG surfacing from damage until project completion. Repair damaged areas to match specified requirements.

3.03 HEADERBOARD

- A. Alignment and grade of edge restraints shall be staked and limited to accurately reflect the plan layout prior to commencing work. After approval by the Owners Representative, assemble edge restraints to form well-crafted and securely constructed lines.
 - 1. Use single lengths per side, cut pieces will not be permitted. Butt joints may be used only when the length of a continuous run exceeds the standard stock length of the edge restraint product.
 - 2. Butt joints shall be staked on either side close to the joint.
- B. Wood header board: straight-line joints less than three feet long; curved-line joints being laminated in a staggered pattern with ends no closer than eighteen inches.
 - 1. Do not stake boards on one side only, unless against paving.
 - 2. Stakes: maximum five feet on center at all ends, splices and joints.
 - 3. Splice all joints with 2 x 4 x 24" with top of splice plate 3/4" below top of header.
 - 4. Trim all stakes to 3/4" below top of header.
 - 5. Locate stakes at all ends, joints, and splices. Clinch over all nails.

3.04 CLEAN UP

- A. Waste Removal: remove all waste as a result of DG paving construction from the site and dispose of legally. Remove all excess DG from adjacent planting and other hard surfaces.

END OF SECTION

SECTION 329213 - HYDROSEEDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for hydroseeding naturalized areas as shown on the Drawings, and as specified in this Section.
- B. Related work includes but is not limited to:
 - 1. Earthwork and Grading
 - 2. DG Paving

1.03 QUALITY ASSURANCE

- A. Cellulose Fiber shall be certified to indicate that laboratory and field testing of the product has been accomplished and meets all requirements specified herein based on testing. Weight specifications from the supplier for this material shall refer only to air dry weight of the fiber material.
- B. Seed shall be delivered in original sealed packages bearing supplier's certificate – lab analysis for purity, germination, weed seed content, and inert material. Seed bags shall include manufacturer's tags in conformance with Federal Seed Act (FSA) and applicable state laws. Wet, moldy, or otherwise damaged seed will be rejected by the Owner's Representative.
- C. Seed Suppliers:
 - 1. Pacific Coast Seed
533 Hawthorne Place
Livermore, CA 94550
(925) 373-4417
www.pcseed.com
 - 2. Approved Equal.
- D. Fertilizers and manufactured amendments are to be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Materials which become caked or contaminated making them unsuitable for use will not be accepted.
 - 1. Fertilizers shall comply with the requirements of the Fertilizing Materials Inspection Program of the California Department of Food and Agriculture.
- E. Hydraulic equipment used for the application of the fertilizer, seed and slurry of prepared wood pulp is subject to approval by the Owners Representative.

1.04 SUBMITTALS

- A. Hydroseeding schedule
- B. Description of hydraulic equipment proposed to be used.
- B. Samples:
 - 1. Seeds: 4 oz sample of each seed species used, to be provided from the same batch that is to be used in the hydroseeding. Samples shall be labeled with the species botanical name and accompanied by the supplier's certificate.

2. Fiber: 4 oz sample – if not a pre-approved product as noted. For pre-approved products submit only product data sheet.
3. Tackifier / binder: 4 oz sample – if not a pre-approved product as noted. For pre-approved products submit only product data sheet.

1.05 REVIEWS

- A. See Specification Section Planting

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Naturalized Area Seed Mixes

1. Grass Mix-1A

<u>Botanical Name</u>	<u>Rate: lbs/acre</u>	<u>% Pure</u>	<u>% Germ</u>
Bromus carinatus	8	95	85
Eschscholzia californica 'Maritima'	2	95	85
Elymus glaucus	12	95	85
Elymus multisetus	6	95	85
Nassella pulchra	10	95	85
Sisyrinchium bellum	2	95	85
Total	40		

- B. Fiber: 100% virgin natural wood fiber mulch, free from synthetic paper or plastic materials, and atmospherically processed.
1. Fiber must disperse into a uniform slurry when mixed with water.
 2. Colored with a non-toxic, water-soluble green dye to provide a proper visual gauge for metering of material over ground surfaces.
 3. Manufactured in such a manner that after addition and agitation in slurry tanks with fertilizer, seed, water and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry; and that when hydraulically sprayed on the ground, the material will form a blotter-like ground cover impregnated uniformly with seed; and which after application, will allow the absorption of moisture and allow the rainfall to percolate to the underlying soil.
 4. Materials that inhibit germination or growth will not be permitted in the mixture.
 5. Pre-approved atmospherically processed wood products: Second Nature Wood Fiber by Profile Products.
- C. Fertilizer:
1. For naturalized areas: Biosol Forte 7-2-1 (N-P-K) as manufactured by Rocky Mountain Bio Products www.rockymtnbioproducts.com, and distributed by Pacific Coast Seed, Inc. Livermore, CA (925)373-4417.
- D. Tackifier/Binder: 100% psyllium fiber derived from the outer coating of the plantago seed. Available in powder form and packed in clearly marked bags stating the contents of each package. The tackifier will require no curing time, shall remain soft and rewettable, and shall not inhibit seed germination. All ingredients shall be biodegradable. Pre-approved products:
1. Ecology Control M-Binder by S&S Seeds, Inc, Carpinteria, CA (805)684-0436
 2. Plantago Binder by Northstar Impex Corpn. Moreno Valley CA (951)486-0441.
 3. Approved equal.
- E. Mycorrhizal Inoculant: for naturalized areas – AM 120 Standard by Reforestation Technologies International (RTI), Gilroy CA, (408) 848-9604

- F. Equipment: Use hydraulic equipment with a built-in agitation system and operating capacity sufficient to agitate, suspend and mix homogeneously the slurry mixture.
 - 1. Slurry distribution lines are to be large enough to prevent stoppage.
 - 2. Discharge line is to be equipped with a set of hydraulic spray nozzles capable of providing a continuous non-fluctuation discharge and delivery of the slurry in the prescribed quantities uniformly, without misses, waste, or erosion.
 - 3. Slurry tank with a minimum capacity of 500 gallons and mounted on a traveling unit which may be either self-propelled or drawn with a separate unit which will place the slurry tank and spray nozzle within sufficient proximity to the areas to be seeded so as to provide uniform distribution.
 - 4. If using equipment with smaller tank capacity then demonstrate to the Owners Representative that it has the necessary agitation system and sufficient pump capacity to spray the slurry in a uniform coat.

PART 3 - EXECUTION

3.01 GENERAL

- A. Carry out hydroseeding during a windless period using approved equipment and materials.
- B. Preparation of Surfaces: At the time of hydroseeding the surfaces shall be even and free of deleterious material and weeds and cultivated per Specification Section Soil Preparation. Ensure that soil is moist to a depth of at least 1/2".

3.02 MIXING

- A. With agitation system operation at part speed, add water to the tank, and establish good circulation. Add materials in such a manner that they are uniformly blended into the mixture. Add the seed first; then fiber. Do not add the fiber until the tank is at least one-third filled with water. Agitate the mixture at full speed when the tank is two-thirds to three-fourths full.
 - 1. Do not allow seed to remain in the seeder longer than one hour. Seed kept longer will be rejected by the Owners Representative, disposed of off-site, replaced at no additional cost to the Owner.
 - 2. A dispersing agent may be added, provided that documented evidence is furnished that the additive is not harmful to the mixture.
- B. Mixing / Application Rates per Acre: **USE ONE OR BOTH AS REQUIRED**

Naturalized Area (One-Stage Application)	
Fiber	2,000 lbs.
Seed	As specified above
Fertilizer: Biosol	600 lbs / 1200 lbs (SELECT ONE higher value for non-amended soils)
Tackifier/Binder	Per manufacturer's recommendations
Mycorrhizal Inoculant	60 lbs or per seed supplier recommendations
Water	As needed for application

3.03 APPLICATION

- A. Apply the hydroseed slurry within one hour of mixing, with a sweeping and arched technique with no slumping or shadowing to insure uniform coverage and to ensure that material is spread evenly at the required rate as noted above.
- B. Apply the hydroseed in one-stage as specified under Mixing in this Specification.

- C. Wherever possible, locate equipment outside of the hydroseeded areas to minimize compaction. Do not allow hydroseeding equipment on to bioretention areas. Take preventive measures to avoid damage to adjacent vegetation.

3.04 CLEAN-UP AND REPAIR

- A. Remove all trash, seed containers, and ancillary material in and adjacent to the hydroseeded areas on completion of hydroseeding and leave the work area in a neat and orderly manner.
- B. Following application and clean-up minimize all activity on the hydroseeded areas.
- C. Re-apply hydroseed according to this Specification, and at no additional cost to the Owner, to any bare spots prior to final acceptance by the Owners Representative.

END OF SECTION