

DETENTION BASIN RESTORATION  
SPECIFICATIONS  
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## DIVISION 2 - SITE WORK

### SECTION 02100 – GRUBBING

#### PART 1 – GENERAL

1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.

#### 1.02 WORK INCLUDED

- A. Furnish all labor, materials, equipment and tools necessary to accomplish all grubbing work as indicated on the plans and as specified herein.
- B. It shall be the responsibility of the Contractor to examine the project site and determine for himself the existing conditions.
- C. Obvious conditions of the site existing on the date of the bid opening shall be accepted as part of the work, even though they may not be clearly indicated on the plans and/or described herein or may vary therefrom.
- D. All debris of any kind accumulated from grubbing shall be disposed of off-site weekly and the whole area left clean. The Contractor shall be required to make all necessary arrangements related to the proposed place of disposal.
- E. Burning onsite will not be permitted.

#### PART 2 – PRODUCTS (NOT USED)

#### PART 3 – EXECUTION

3.01 SEQUENCE OF WORK: All sequence of work shall be subject to the approval of the Construction Manager.

#### 3.02 PROTECTION

- A. Adequate precautions shall be taken before commencing and during the course of the work to insure the protection of life, limb and property.
- B. The Contractor shall protect from damage all surrounding structures, trees, plants, grass, walks, pavements, utility boxes, etc. Any damages will be repaired or replaced by the Contractor to the satisfaction of the Construction Manager.

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3.03 PERMITS: The Contractor shall apply for and obtain the necessary permits prior to the commencement of work. The Contractor shall pay for all fees.

3.04 BARRICADE: Erect temporary barricade to prevent people and animals from entering the project area, to the extent as approved by the Construction Manager. Such barricades shall not be less than 5'-0" in height. The extent of barricades may be adjusted as necessary with the approval of the Construction Manager. This work shall be accomplished to the satisfaction of the Department and at no extra cost to the Department. Barricades shall be removed upon completion of work and job site premises left clean.

3.05 MAINTAINING TRAFFIC

A. The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, etc.

B. When necessary, the Contractor shall provide, erect and maintain lights, barriers, etc., as required by traffic and safety regulations with special attention to protection of life.

3.06 CONSTRUCTION LINES, LEVELS AND GRADES

A. The Contractor shall verify all lines, levels and elevations indicated on the plans before any grubbing, excavation or construction begins. Any discrepancy shall be immediately brought to the attention of the Construction Manager and any change shall be made in accordance with his instruction. The Contractor shall not be entitled to extra payment if he fails to report the discrepancies before proceeding with any work whether within the area affected or not.

B. All lines and grades shall be established by a Surveyor licensed in the State of Hawaii.

3.07 CLEARING AND GRUBBING

A. The Contractor shall clear off and remove from 12 feet around the entire exterior of perimeter fence (excluding the areas to the west of the West Detention Basin within the Ko'oloa'ula Housing Lot 3, and to the east of the East Detention Basin between the top of the basin and the Low Density Apartments #2 (HHFDC) Lot 5), all rubbish, trees, stumps, large roots, buried logs, garbage and boulders.

B. The Contractor shall grub and remove up to 8 inches from the entire area within the area to be graded, all grass and weeds, stumps, large roots, buried logs, garbage, boulders and other unsuitable material. Where soft wet soils are encountered, light equipment should be used.

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- C. Any stumps and roots larger than 3 inches in diameter shall be removed to a depth not less than 18 inches below the original grade level. Fill voids with general fill to maintain indicated grade.
  - D. No excavation or filling shall be undertaken until area has been grubbed.
- 3.08 CONTRACT ZONE LIMITS: The Contract Zone Limits shown on the plans indicate only in general the limits of the work involved. The Contractor, however, is required to perform any and all necessary and incidental work which may fall outside of these demarcation lines.
- 3.09 VERIFICATION OF EXISTING GRADES: Verify existing grades, inverts, and improvements before any grubbing work is done. Immediately bring to the attention of the Construction Manager any discrepancy and make any changes in accordance with his instructions. Starting of grubbing operations will be construed to mean that the Contractor agrees that the existing grades, inverts, and improvements are essentially correct as indicated. No extra compensation will be allowed if existing grades, inverts, and improvements are in error after verification thereof or if he fails to report the discrepancies before proceeding with any work.
- 3.10 CLEAN-UP: Clean up and remove all debris accumulated from construction operations from time to time, when and as directed by the Construction Manager. Upon completion of the construction work and before final acceptance of work, remove all surplus materials, equipment, etc., and leave entire job site clean and neat.

END OF SECTION

SECTION 02210 – SITE EARTHWORK

PART 1 – GENERAL

1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.

1.02 WORK INCLUDED: Furnish all labor, materials, services, equipment and related items necessary to excavate, fill, remove, transport, stockpile and dispose of all materials within the limits of the project required to construct the site work improvements in accordance with these specifications, dimensions, sections and details shown on the plans, and the approval of the Department.

1.03 RELATED WORK IN OTHER SECTIONS

Trench Excavation and Backfill.....Section 02221  
Temporary Soil Erosion Control.....Section 02270

1.04 SUBSURFACE SOIL DATA: Subsurface soil investigations have been made at the project site. A copy of the complete report entitled “Preliminary Geotechnical Exploration Report – Proposed East Kapolei Phase II Development Study Area I, Honouliuli, Ewa, Oahu, Hawaii,” dated May 2007, prepared by PSC Consultants LLC is available for reference only.

1.05 PROTECTION

A. Erosion Control: The Contractor shall incorporate into his work schedule the Temporary Erosion Control Measures and the Permanent Erosion Control procedures indicated on the plans and as specified in the contract.

B. Dust Control: Every effort shall be made by the Contractor to keep dust to a minimum. Spraying the ground with water or other means of control shall be used wherever possible. The Contractor shall have an adequate supply of water for moisture conditioning of fill material.

Without limiting the generality or applicability of other indemnity provisions of the contract, the Contractor agrees that he shall indemnify and hold harmless the Department from and against all suits, actions, claims, demands, damages, costs and expenses (including but not limited to attorney’s fees) arising out of any damage to any property whatsoever or injury to any person whomsoever, in any way caused or contributed to by dust from the Contractor’s operations.

C. Existing Utilities and Work Areas: The Contractor shall be responsible for the protection of existing surface and subsurface utilities and poles within and abutting the project site, trench excavations and other work areas.

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- D. Finished Grades and Subgrades: All subgrades shall be kept moist until covered by subbase or base course. All finished grades shall be kept moist until covered by landscaping or other permanent groundcover. Where shrinkage cracks are noted after compaction of the subgrade or finished grade, the subgrade or finished grade shall be rescarified, moisture-conditioned to above the optimum moisture content, and recompacted to the specified requirement at no additional cost to the Department. During construction, the Contractor shall properly grade and maintain all excavated surfaces to provide positive drainage and prevent ponding of water. In the event that ponding of water caused softening of the subgrades, the Contractor shall remove the soft soils and shall backfill the excavation with select granular fill and compact, as specified, at no additional cost to the Department.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

- A. General Fill: On-site material excavated from within the project limits meeting the requirements for embankment may be utilized as fills. This excavated material shall be used as general fill for embankment, and the remainder disposed of properly off site.
- B. Imported Borrow: Additional general fill material needed for general filling shall consist of imported borrow materials that have the same general properties as on-site material described above.
- C. Crushed Rock: Conform to Section 15 of the DPW Standard Specifications.

### 2.02 GRASSING

- A. General Description: The Contractor shall provide all materials, equipment, and labor necessary to complete the work. Slope control planting shall consist of hydro-mulch seeding with vegetative cuttings as required, fertilizing graded and disturbed areas, and shall include continuous care and maintenance in accordance with these specifications.
- B. Materials
1. Seed: Grass seed for hydro-mulching shall be freshly improved and hulled Bermuda grass (cynodon dactylon). Seed quality shall have a minimum purity of 97 percent, minimum germination of 85 percent and weed content not exceeding ½ percent.

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2. Fertilizer: Commercial fertilizer generally used for hydro-mulching shall be 13-34-10 pelletized fertilizer or equal during the grassing operation and the maintenance period. However, it shall be the responsibility of the Contractor to decide the analysis and ratio, quantity, method and frequency of application to insure sufficient nutrients for the sustained growth of the grasses specified.
3. Mulch: Mulch for hydro-mulching shall be specially processed fiber containing no growth or germination inhibiting components. After addition and agitation in the hydraulic equipment with fertilizers, grass seed, water and other additives not detrimental to plant growth, the fibers shall form a homogeneous slurry. When hydraulically sprayed on the soil, the fiber shall form a blotter-like groundcover which readily absorbs water and allows infiltration to the underlying soil. Mulch shall be applied at the minimum rate of 1,500 pounds per acre.
4. Water
  - a. The Contractor shall furnish and pay for all water required for planting and during period of maintenance.
  - b. The Contractor shall furnish all labor, materials and equipment necessary to install all temporary water lines, valves, etc., and upon completion of the work shall remove all such equipment.

C. Planting Methods

1. Soil Preparation
  - a. The top layer of soil on the slope face shall be fertile and shall permit a normal growth of grass. It shall be free of extraneous materials harmful to plant growth.
  - b. Slope areas incapable of supporting plant growth shall have topsoil spread and be compacted prior to grassing operations.
  - c. The soil profile shall be wetted to a depth of 4 to 6 inches.
2. Fertilizing: Apply fertilizer evenly onto the soil surface at the minimum rate as required by analysis.
3. Planting by Hydro-Mulching
  - a. Broadcast stolons at a minimum rate of 4 bushels per 1,000 square feet.

- b. Apply the seed, fertilizer and mulch with approved hydraulic equipment using seed at a minimum rate of 3 pounds per 1,000 square feet and mulch at a minimum rate of 1,500 pounds per acre.
- c. Areas inaccessible to hydro-mulching applications shall be seeded, fertilized and mulched by approved hand methods.

D. Maintenance

- 1. Initial: Maintenance shall commence simultaneously with hydro-mulching operations and includes watering, fertilizing, mowing, insect and disease control and protection.
- 2. Watering
  - a. After planting, the ground shall be continuously kept moist for the first 14 days.
  - b. When the grass begins to cover, reduce the frequency of watering and increase the length of the watering period.
  - c. Watering shall be done in a manner that will prevent erosion due to excessive application of water. Watering equipment shall be of a type that will prevent damage to the planted areas.
  - d. The Contractor shall repair erosion caused by excessive rainfall or watering, at no cost to the Owner.
- 3. Mowing: Grass shall be mowed and not taller than 1-inch in height.
- 4. Inspect and Disease Control: Regular inspections shall be made; if required, suitable insecticide or fungicide treatment shall be applied.
- 5. Protection: Planted areas shall be protected against traffic by providing proper safeguards as needed. Repair and replant damaged areas promptly.
- 6. Repair: The Contractor shall replant and fertilize areas failing to show sufficient growth to produce a satisfactory stand of grass at the time of final inspection.

- E. Acceptance: Maintenance of the plant material shall continue for 90 calendar days and/or until 95 percent minimum plant coverage is uniformly established and the work is approved and accepted by the Construction Manager and the City.

PART 3 – EXECUTION

3.01 MASS GRADING

- A. Notification of Schedule: The Construction Manager shall be notified by the Contractor after clearing and grubbing and before any fill is placed and also at least two weeks in advance before grading operations are scheduled to begin. Further, the Contractor shall advise the Construction Manager of the proposed overall schedule for earthwork operations.
- B. General: All cuts and fills to be constructed shall be in accordance with the approved plans. Contractor shall ensure that grades are attained as indicated on the plans.
- C. Supervision: At all times, the Contractor shall have a responsible field superintendent on the project in full charge of the work with authority to make decisions. He shall cooperate with the Construction Manager in carrying out the work. Any instructions given to field superintendent by the Construction Manager shall be considered to have been given to the Contractor personally.
- D. Rainy Weather: No fill shall be placed, spread or rolled during unfavorable weather. When the work is interrupted by rain, operations shall not be resumed until field tests by the Construction Manager indicate that conditions will permit satisfactory results.
- E. Unforeseen Conditions: If unforeseen or undetected soil conditions such as soft spots, existing utility trenches, structure foundations, voids or cavities, boulders, seepage water or expansive soil pockets, etc. are encountered, the Contractor at his sole expense shall make all necessary corrective measures in the field as such conditions are detected.

- 3.02 UNSUITABLE EXCAVATED MATERIAL: The Contractor shall remove from the site all unsuitable excavated material unless specified otherwise by the Construction Manager. The unsuitable material not containing organic material shall be hauled and disposed of offsite. Unsuitable material containing organic material shall be disposed of offsite, unless otherwise specified.

Removal, including hauling and disposal, of the unsuitable material will not be paid for directly, but shall be considered incidental to the project.

END OF SECTION

SECTION 02270 – TEMPORARY SOIL EROSION CONTROL

PART 1 – GENERAL

- 1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.
  
- 1.02 WORK INCLUDED: Submit three (3) sets of the erosion control materials for approval by the Engineer. Furnish all labor, materials, services, equipment and related items necessary to implement the temporary erosion control measures, submitted separately, as required by these specifications and as ordered by the Engineer during the life of the contract to control water pollution through the use of berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.
  - A. Temporary erosion and siltation control measures as described herein shall be applied to any erodible material within this project, including local material sources and work areas.
  
  - B. The Contractor shall be responsible for providing the necessary erosion control measures which are shown on the plans or which may be ordered by the Engineer. All grading operations shall be performed in conformance with the applicable provisions of the “Water Pollution Control and Water Quality Standards” contained in the “Public Health Regulations,” State Department of Health.
  
  - C. The Contractor shall be responsible for promptly (next day after storms) removing all silt and debris resulting from his work and deposited in drainage facilities, roadways, neighboring lands, and other areas.

1.03 RELATED WORK IN OTHER SECTIONS

Site Earthwork .....Section 02210

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Mulches: To be bagasse, hay, straw, fiber mats, netting, wood cellulose, bark, wood chips, or other suitable material acceptable to the Engineer and shall be reasonably clean and free of noxious weeds and deleterious materials.
  
- B. Slope Drains: To be constructed of fiber mats, plastic sheets, or other materials acceptable to the Engineer.

- C. Catch Basin Inlet Filters: “True Dam” sediment filter (by Dandy Products, Inc.) or approved equal.

PART 3 – EXECUTION

3.01 TEMPORARY EROSION CONTROL

- A. The Construction Manager has the authority to limit the surface area exposed by clearing and grubbing and to limit the surface area exposed by excavation, borrow and fill operations. The Construction Manager may also direct the Contractor to provide immediate, permanent, or temporary pollution control measures to prevent contamination of streams, drainage channels and pipes, roads, neighboring lands, and other areas.

Except for specified measures which may be shown on the plans, the Contractor shall determine the appropriate erosion control measures to use. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, and slope drains, and the use of temporary mulches, mats, and grassing, or the construction and use of other control devices or methods as necessary to control erosion.

- B. The Contractor shall incorporate all erosion control measures shown in the plans. The erosion controls may be modified as necessary to adjust to conditions that develop during construction. All modifications are subject to approval by the Engineer.
- C. The Contractor shall limit the surface area exposed by grubbing, stripping of topsoil, and grading to that which is necessary for him to perform the next operation and which is within his capability and progress in keeping the finish grading, mulching, grassing, and other such pollution control measures current.

The grubbing of the vegetative root mat and stumps and the stripping of topsoil shall be confined within the limits of grading which can be actively and continuously prosecuted within 15 calendar days. The area to be graded shall be limited to the minimum area necessary to accommodate the Contractor’s equipment and work force and shall not at any time exceed 15 acres, unless otherwise stated on plans, without prior approval of the Construction Manager.

Any area remaining bared or cleared for more than 10 calendar days and which is not within the limits of active construction shall be immediately hydro-mulch seeded or remedied as directed by the Engineer at the Contractor’s expense without cost to the Department. All areas where finish grading has been completed shall be grassed within three calendar days after the completion of grading for that area.

- D. The Contractor shall, at the end of each work operation in any one day, shape the earthwork in such a manner as to control and direct the runoff to minimize the erosion of soils. He shall construct earth berms along the top edges of embankments or along the property line with adjacent properties, streams and water channels, to intercept any runoff. Temporary slope drains shall be provided to carry runoff from the top of cuts and fills. Temporary facilities for controlled discharges shall be provided for runoff impounded, directed, or controlled by project activities or by any erosion control measure employed.
- E. Cut slopes shall be shaped, topsoil added if necessary, and planted as the work progresses. In no case shall the exposed surface be greater than 15 feet in height. Whenever major excavation is suspended or halted and the slope is bared for more than 15 consecutive days, the exposed surfaces shall be hydro-mulch seeded or protected as directed by the Engineer at the Contractor's expense without cost to the Department of Hawaiian Home Lands.
- Fill slopes shall be finished as specified and in accordance with the requirements outlined for cut slopes above.
- F. Construction of berms, cofferdams, or other such construction in or near the vicinity of streams, ponds, waterways, or other bodies of water shall be with approved materials.
- G. The temporary erosion and siltation control measures outlined in these specifications are minimum requirements and shall not preclude the provision of any additional measures which the Contractor may deem necessary. Damages caused by the erosion of soils and the pollution of downstream areas shall be the responsibility of the Contractor and all costs for repairing, correcting, replacing and cleaning damaged or polluted facilities shall be borne by the Contractor.

END OF SECTION

## SECTION 02444 – CHAIN-LINK FENCING

### PART 1 - GENERAL

- 1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.
- 1.02 WORK INCLUDED: This Section includes the reinstallation of salvaged fencing and connection to the existing perimeter fence. Work shall be governed by Section 54 – Chain-Link Fence of the DPW Standard Specifications.
- 1.03 GENERAL REQUIREMENTS
- A. Submittals: Submit the following in accordance with the Special Conditions.
1. Shop Plans: Submit shop plans for approval.

### PART 2 - PRODUCTS

- 2.01 MATERIALS: All new, with physical and chemical characteristics equal to or better than those required herein.
- A. Fabric: Steel chain-link fabric. The top edge of all fence fabric shall be knuckle finished and the bottom shall be barbed salvage.
- B. Posts and rails: The base material for the manufacture of steel pipe used for posts, braces, top rail braces, top rail, and gate frames shall conform to ASTM A120. Sizes of posts, rails and braces shall be called for in the DPW Standard Specifications or as indicated on the plans.
- C. Fittings, Wires, and Rods: All fittings and hardware shall be galvanized. Couplings shall be of the outside sleeve type and at least 7 inches long. Tension wires shall be at least 7-gage galvanized coil spring wire. Ties to fasten the fabric to posts, rails and gate frames shall be not less than 12-gage galvanized steel.
- Truss of tension rods used in trussing gate frames and line posts adjacent to end corner, slope, or gate posts shall be adjustable 3/8-inch galvanized steel rod.
- D. Repair of Galvanized Surfaces: All surfaces cut, broken, burned, or abraded shall be coated with “Galvalloy,” “Galvicon,” or an approved equal.
- E. Concrete for footings shall be “Class B” as specified in Section 39-Portland Concrete Cement of the DPW Standard Specifications.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Line posts shall be spaced at not more than 10-foot intervals and shall be placed vertically plumb.
- B. All posts shall be set in Class “B” concrete footing as shown on the plans. The top of the footings shall be crowned ½-inch high to drain water away from the post.
- C. End, corner, slope, and gate posts shall be braced to the midpoint of the nearest line post or posts with horizontal braces used as compression members and line posts trussed from the brace back to the bottom of the end, corner, slope or gate post with 3/8-inch rods with turnbuckles. Change in line or grade where the angle of deflection is 30 degrees or more shall be considered as corner and slope points, respectively; and corner or slope posts shall be installed at these points. Unless specified, all fences shall be installed with top rail and bottom tension wire.

- 3.02 CLEANUP: Clean up and remove all debris accumulated from construction operations from time to time, when and as directed by the Construction Manager. Upon completion of the construction work and before final acceptance of work, remove all surplus materials, equipment, etc.

END OF SECTION

SECTION 02721 – STORM DRAINAGE SYSTEM

PART 1 – GENERAL

1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.

1.02 WORK INCLUDED: Furnish all labor, materials, tools, equipment and related items necessary to complete, in place, the storm drainage system in conformity with the dimensions, profiles, sections, and details shown on the plans. Work relating to drainpipes and drainage structures shall be governed by the following sections of the DPW Standard Specifications:

Trench Excavation and Backfill.....	Section 11
Crushed Rock.....	Section 15
Drainpipes.....	Section 24
Drain Manholes.....	Section 25
Portland Cement Concrete.....	Section 39
Concrete Structures.....	Section 40
Reinforcing Steel.....	Section 48

1.03 CONTRACTOR SUBMITTALS

A. Manufacturer’s certificates that pipe material was sampled, tested and inspected along with test results.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Riser and Outlet Pipe: Galvanized corrugated metal pipe (12 gage), AASHTO A36, Type 1

- 42- and 48-inch diameter pipes shall have 2-2/3” x 1/2” corrugations.
- 72-inch diameter pipes shall have 3” x 1” corrugations.

B. Filter Rock: No. 1 and No. 4 crushed rock for detention basin riser and outlet pipe

C. Materials for the storm drainage system shall be in accordance with the sections of the DPW Standard Specifications noted hereinbefore or as noted.

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STORM DRAINAGE SYSTEM

### PART 3 – EXECUTION

- 3.01 INSTALLATION: Install the storm drainage system in accordance with the sections of the DPW Standard Specifications noted hereinbefore.
- 3.02 The Contractor shall be responsible for precisely laying out the storm drain line shown on the contract plans. The locations shown on the contract plans of the various existing utility lines which the new lines are to cross over or under or connect to were determined on the basis of the best information available; however, no assurance can be provided that the actual locations will be precisely as shown on the contract plans.
- 3.03 In performing all work, the Contractor shall exercise due care and caution necessary to avoid any damage to and impairment in the use of any existing utility lines. Any damage inflicted on existing lines resulting from the Contractor's operations shall be immediately repaired and restored as directed by the Construction Manager at the Contractor's expense.

END OF SECTION

## DIVISION 4 - MASONRY

### SECTION 04410 – GROUTED RUBBLE PAVING

#### PART 1 - GENERAL

1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.

#### 1.02 DELIVERY, STORAGE AND HANDLING

- A. Mortar and Grout Materials: Portland cement, masonry cement, mortar cement, lime and admixtures shall be stored in such a manner as to prevent deterioration or contamination with foreign matter. Cement which has become caked, partially set or otherwise deteriorated, or any material which becomes damaged or contaminated, shall be rejected.

#### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Paving stones shall be clean, durable, free from seams or other imperfections. When tested under AASHTO Test Method T96, it shall show a wear not to exceed 50%. It shall have a minimum specific gravity of 2.4. The paving stones shall be at least 1/8 cubic foot in volume and have a minimum unit weight of 155 pounds per cubic foot.

Stones generated from on-site grading operations shall be initially used as long as it conforms to the criteria hereinabove. If on-site grading operations do not generate an adequate quantity of stones for the grouted rubble paving work, stones shall be obtained from the designated borrow site or shall be imported as required if stones are not available at the designated borrow site. Stones to be used for this purpose shall be approved by the Geotechnical Engineer.

- B. Mortar or grout shall consist of one part cement to three parts fine aggregate and shall meet the requirements as provided in DPW Standard Specifications Section 39 "Portland Cement Concrete."
- C. Hydrated lime shall conform to the ASTM C207, Type S. Hydrated lime shall be added to the mortar and the quantity shall not exceed the recommendations of the manufacturer.

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- D. Water used in mixing mortar or grout shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to either the mortar or reinforcement. Non-potable water shall not be used.
- E. Weep Holes: PVC pipe, Schedule 80. ASTM D1785.
- F. Filter Fabric: Mirafi N140 or approved equal.

### PART 3 - EXECUTION

3.01 GENERAL: The Contractor shall use stones that are available from on-site grading operations. Stones shall be of the shape and size shown on the plans and grouted in place.

3.02 BEDDING: Excavate in accordance to DPW Standard Specifications Section 13 “Structure Excavation and Backfill.” Free foundation bed of brush, trees, stumps, roots, debris and other objectionable materials, and dress to smooth surface.

Compact bed until relative compaction is not less than 90 percent and finish to smooth surface. Prior to laying stones, provide 3-days’ notice to Construction Manager for inspection of foundation bed. Begin laying stones only after foundation is acceptable to the Construction Manager.

Moisten bedding material with water. Wet stones before laying.

The proportioning of materials for grout shall be by volume and done in such manner that the specified proportions can be controlled and accurately maintained. Fine aggregate shall be measured in a damp loose condition. Mixing shall be by a mechanical batch mixer for at least 5 minutes for grout, but for not more than 10 minutes. Hand mixing shall be permitted only for small batches of 3 cubic feet or less.

3.03 STONES: Stones shall be placed in a manner to produce a well-graded mass of rock with minimum practicable percentage of voids and shall be constructed to the lines and grades shown on the plans.

Weep holes 3 inches in diameter shall be provided in the walls at approximately 8-foot centers. Filter material conforming to the requirements of Section 28 “Subsurface Drains” and wrapped in filter fabric. At least 2 cubic feet in volume shall be placed at each weep hole.

Wet stones before laying them in a full bed of grout having stiff consistency. Stones shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the filter material. Placement shall begin at the bottom of the areas to be covered and continue up slope. Use selected stones and shape roughly to make joints

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GROUTED RUBBLE PAVING

between 1/4 inch and 1/2 inch in width. Subsequent loads of material shall be placed against previously placed material in such a manner as to ensure a relatively homogenous mass. The finished grouted rubble paving shall be free from objectionable pockets of small stones and clusters of larger stones. Finish surfaces shall not deviate more than 3/8 inch with a 10-foot straightedge. Placing stones in layers will not be permitted. Placing stones by dumping it at the top of the slope and pushing it down the slope will not be permitted. No equipment shall be operated directly on the completed stone protection system. The Contractor shall maintain the stone protection until accepted by the Construction Manager and any material displaced prior to acceptance and due to the Contractor's negligence shall be replaced at not cost to the State.

- 3.04 GROUTING OF STONES: Grout shall be batched and mixed in sufficient quantities to prevent cold joints. Rock shall be flushed with water to remove fines from the rock prior to placing the grout. Rock shall be kept moist just ahead of the actual placing, but no flowing or standing water shall be present during the grouting operation.

Grout placement shall not be permitted when weather conditions prevent proper placement.

Grout placed on nearly level areas may be placed on one course. On slopes, the grout shall be placed in two (2) courses in successive lateral strips approximately 10 feet in width starting at the toe of the slope and progressing to the top. The flow of the grout shall be directed with brooms, spades or baffles to prevent it from flowing excessively along the same path and to assure that all intermittent spaces are filled. Sufficient barring shall be done to loosen tight pockets of stones and otherwise aid the penetration of grout so that all voids shall be filled and the grout fully penetrates the stones. All brooming shall be uphill and after the grout has stiffened, the entire surface shall be rebroomed to eliminate runs, to fill voids caused by sloughing, and to remove grout from the top surface and pockets or depressions of the upper stones.

Beginning immediately after placement and continuing for at least 7 days, all grout shall be cured and protected from premature drying, mechanical damage and exposure to rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available at the site. After completion of any strip or panel, no workman or other load shall be permitted on the grouted surface for a period of 24 hours. Exposed surfaces shall be kept continuously moist for the entire period, or until curing compound is applied.

- 3.05 MEASUREMENT AND PAYMENT: Grouted rubble paving shall be measured for payment by the square foot. Payment for grouted rubble paving shall be made at the unit price bid and shall be full compensation for furnishing all materials, tools, equipment, and labor to construct the work, including bedding excavation and preparation, weep holes and wrapped filter material.

END OF SECTION

EAST KAPOLEI II

INCREMENT IIC SUBDIVISION

IFB-22-HHL-017

DETENTION BASIN RESTORATION 04410-3

GROUTED RUBBLE PAVING

## DIVISION 5 - METALS

### SECTION 05500 - STEEL FABRICATIONS

#### PART 1 - GENERAL

1.01 GENERAL CONDITIONS: The General Conditions and Special Provisions preceding these specifications shall govern this section of the work.

1.02 WORK INCLUDED: This Section includes but is not limited to:

- A. Anti-vortex plate and trash rack.
- B. Miscellaneous steel angles, plates, pipes, bars and tubing not specified elsewhere.

#### 1.03 GENERAL REQUIREMENTS

- A. Reference Specifications: Unless otherwise indicated, the “Specification for the Design, Fabrication and Erection of Structural Steel for Buildings” of the American Institute of Steel Construction (AISC) and the American Welding Society (AWS) Standard Code shall govern the work.
- B. Coordinate with other trades so that all inserts and attachments are properly set and that adequate provision is made for embedding this work, where required, in the concrete and rough stone work.
- C. Submittals: Submit the following in accordance with the Special Provisions.
  - 1. Prequalification of “or approved equal” materials.
  - 2. Shop Plans: Submit shop plans for approval.

#### PART 2 - PRODUCTS

2.01 MATERIALS: All new, with physical and chemical characteristics equal to or better than those required herein.

- A. Steel: ASTM A36 and A283, new, straight and true; manufactured by reputable mills.
- B. Paint for Shop Priming and Field Touch-Up of Non-Galvanized Steel: Zinc Chromate-Iron Oxide Primer, Fuller #621-04, Sinclair #15, or approved equal.
- C. Cold Galvanizing Compound for Shop and Field Touch-Up of Galvanized Ferrous Metal Work: The ZRC Chemical Products Co. “ZRC Compound,” applied in strict accordance with manufacturer’s specifications.

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STEEL FABRICATIONS

## 2.02 FABRICATION AND WORKMANSHIP

- A. Insofar as possible, fit and shop assemble the work, ready for installation. Fabricate and erect all work square, plumb, straight and true. Provide all supports and anchors required for proper installation. Perimeter fence shall be fabricated in as large sections as possible and hot-dip galvanized after fabrication.
- B. Connections: Weld, unless otherwise indicated. Make joints and intersections accurately in true planes.
- C. Welding: Use the referenced AWS Standards for general procedure, with all welders certified for the classification of work involved. Grind all exposed welds smooth.
- D. Painting
  - 1. Shop paint all ferrous metal work except zinc-coated surfaces and work to be embedded in concrete or mortar. Do not coat surfaces to be welded closer than three inches from the weld, prior to welding. Thoroughly dry and clean surfaces; then paint in a workmanlike manner, with all joints and crevices coated thoroughly. Prior to assembly, paint all surfaces which will be concealed or inaccessible after assembly.
    - a. Cleaning: Remove all scale, rust, dirt, grease and other deleterious materials prior to coating.
    - b. Priming: As soon as possible after cleaning, prime coat all exposed surfaces to a uniform dried film thickness of not less than 1.5 mil, Damaged coating shall be promptly repaired with the primer.
  - 2. Field Painting: After installation, clean welds, bolts, and abraded portions and give an additional spot coat of the same materials. Leave the entire work in condition to receive the finish paint, or to provide complete protection of exposed metal if finish painting is not required.
- E. Galvanizing: Where so specified, galvanize ferrous metal items using ASTM A123 hot dip process, to an average weight of not less than 2.0 ounces per square foot of surface (coating thickness 0.0034”) with no individual specimen having less than 1.8 ounces (coating thickness 0.0030”).
  - 1. In the event of doubt of compliance with the weight of zinc coating, test the weight of the coating using test method ASTM A90.

2. Repair of Galvanizing: Where damaged by welding after galvanizing, or by any other cause in shop or field, clean surfaces thoroughly by wire brushing or other approved means, then touch up with the specified cold galvanizing compound. Prepare surfaces, apply material and fuse onto the surface in accordance with manufacturer's instructions. Repair shall provide protection equal to the original coating.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Assemble and install shop fabricated work plumb, square and unwarped. Movable parts shall operate smoothly upon completion. Galvanizing repaired after welding as specified above.
- B. Protect finish metal surfaces installed in contact with stone, concrete or non-compatible metals with a heavy coat of asphalt or zinc chromate paint, unless specified otherwise.
- C. Finished work shall be complete in every detail, strong and rigid, neat in appearance, free from defects, and acceptable to Construction Manager.
- D. Clean all surfaces after installation and leave free of all oil, grease and dirt.

- 3.02 CLEANUP: Clean up and remove all debris accumulated from construction operations from time to time, when and as directed by the Construction Manager. Upon completion of the construction work and before final acceptance of work, remove all surplus materials, equipment, etc.

END OF SECTION