DIVISION 2 – SITE CONSTRUCTION

SECTION 02050 – DEMOLITION AND REMOVAL

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. As specified in Section 01010.

1.02 GENERAL REQUIREMENTS

A. Provide all equipment, materials, tools, labor, etc., as required to perform all demolition, removal work, and clearing and grubbing of the construction area, complete, as indicated on the drawings and as specified herein, including careful removal and disposal of material.

B. The Contractor shall obtain and pay for all necessary permits for removal work prior to commencement of work.

1.03 JOB CONDITIONS

A. Condition of Existing Improvements: The Engineer assumes no responsibility for the actual conditions of items or portions of structures to be removed.

B. Interference with Adjacent Occupied Spaces: Maintain free and safe passage to and from occupied spaces. Provide temporary barricades and other forms of protection as required to protect the users from injury due to demolition and/or removal work.

C. Storage or sale of removed items on site will not be permitted.

D. Protection: Provide temporary barricades and other forms of protection as required to protect the general public from injury due to selective removal work and to maintain security.

1. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or elements to be removed, and adjacent facilities or work to remain.

2. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

3. Life safety procedures and provisions shall be in conformance with all applicable Federal, State, and County regulations, including OSHA.

E. Damages: Promptly repair damages caused to adjacent facilities or areas by removal work at no cost to the State.

F. Use of explosives will not be permitted.

G. Dust and Erosion Control: Contractor shall comply with the requirements of State of Hawaii, Department of Health.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. The Drawings show general information only. Contractor shall examine the site to determine exact existing conditions, character, extent of the work to be performed and demolition operations required to complete the new work. The Contractor shall exercise every precaution to preserve and protect existing improvements to remain or to be removed by others.

3.02 INSPECTION

A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions to document structure surfaces, equipment or surrounding properties which could be misconstrued as damaged as a result of the selective demolition work; file with Engineer prior to starting work.

3.03 EXISTING UTILITY LINES

A. The existence of underground utility lines other than those approximately shown is not definitely known. The Contractor shall be responsible for toning, probing, obtaining as-built drawings, etc., to determine existing utility locations prior to any demolition work. The Contractor shall promptly repair all damaged utilities at no cost to the State.

B. The Contractor shall serve proper notice and consult with the Engineer regarding any temporary disconnections of electrical or other utility lines in the area which may be required for the removal work, and all such lines where necessary shall be properly disconnected before commencing with the work.

3.04 DEMOLITION

A. All work shall be executed as indicated on the plans, with due consideration for all items to remain.

B. Limits of pavement removal shall be as shown on the plans or as directed by the Engineer. Saw cut along the excavation line to produce a uniform break line both vertically and horizontally. Remove paving so as to prevent spalling, cracking or other damage to adjacent paving which is to remain. The Contractor shall at his own expense remove and replace damaged pavement outside the limits of removal. Reuse of demolished concrete or asphalt paving, as rubble fill shall not be permitted.

C. The Contractor shall remove demolished material as specified in Section 202 of the “2005 Standard Specifications for Road and Bridge Construction”. Demolished material shall be disposed of in accordance with item entitled “3.07 DISPOSITION OF MATERIAL.”

D. Removal of existing signs, fences, gates, and railings shall include foundations below grade.

E. Any open trenches, holes, depressions and pits left open at the end of the working day shall be covered steel plates.

F. If unanticipated mechanical, electrical or structural elements which conflict with intended

function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to the Engineer in written, accurate detail. Pending receipt of directive from Engineer rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.05 REPAIR OF WORK

A. Damage resulting from removal work shall be repaired by the Contractor at his expense. The condition of all existing exposed surfaces shall be equal to or better than that that existed before the removal work. Where the method of repair work is not indicated or specified, the Contractor shall perform the repair work in accordance with the limits of generally accepted trade standards.

3.06 SALVAGE OF REMOVED ITEMS

A. The Contractor shall remove and stockpile/store all items as specified on the plans. All items not specified to be salvaged shall be disposed of in accordance with item entitled "3.07 DISPOSITION OF MATERIAL."

3.07 DISPOSITION OF MATERIAL

A. All materials resulting from removal work, except as indicated or specified otherwise, shall become the property of the Contractor and shall be removed from the limits of State property. Remove rubbish and debris from the jobsite daily, unless otherwise directed; do not allow accumulations inside or outside any buildings or roadways. The Contractor shall transport and legally dispose of materials off site. Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas.

B. If hazardous materials are encountered during demolition operations, comply with applicable State, Federal and local regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

C. Burning of removed materials is not permitted on project site.

3.08 CLEAN-UP AND REPAIR

A. Any disturbance to road beds, landscaped areas, concrete structures, etc., shall be restored to original condition. The Contractor shall take care to avoid damage to immediate and surrounding areas and protect property, vehicles, etc.

B. In landscaped areas, remove grass in a manner that will allow replacement close to its original condition. Use a drop cloth or similar ground cover at all times to contain and hold removal of earth, plantings, etc., whether on concrete, asphalt, lawn, and/or landscaped areas.

C. Any concrete, asphalt, or pavers removed shall be replaced in as close to original condition as possible, and within the limits of generally accepted trade standards. When regrassing is required, the grass used shall match the surrounding area.

D. The Contractor at his/her expense shall repair damage resulting from removal work. The condition of all existing exposed surfaces shall be equal to or better than that which existed before the removal work. Where the method of repair work is not indicated or specified, the Contractor shall perform the repair work in accordance with the limits of generally accepted trade standards.

E. Remove all evidence of demolition work and leave areas impacted by demolition work in clean and debris-free condition.

END OF SECTION

SECTION 02100 – SITE PREP

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. The work to be performed under this section shall include clearing the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of the other work included in this contract.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Maintenance of Traffic: The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, passsageways, and parking areas.

B. When necessary, the Contractor shall provide and erect barriers, signage, etc., necessary to control traffic, delineate “no-parking” areas, and ensure safety of the public and personnel and protect property and equipment.

C. Protection: Throughout the progress of the work protection shall be provided for all property and equipment, and temporary barricades shall be provided as necessary. Work shall be done in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, and the State of Hawaii’s Occupational Safety and Health Standards, Rules and Regulations.

D. Fire: No burning of fires of any kind will be allowed.

E. Reference Points: Bench marks, etc., shall be carefully maintained, but if disturbed or destroyed, shall be replaced as directed, at the Contractor’s expense.

F. Disposal: All materials resultant from operations under this Section shall become the property of the Contractor and shall be removed from the site. Loads of materials shall be trimmed to prevent droppings.

3.02 EXISTING UTILITY LINES

A. The existence of active underground utility lines within the construction area is not definitely known other than those indicated in their approximate locations on the Drawings. Should any unknown line be encountered during excavation, the Contractor shall immediately notify the Contracting Officer of such discovery. The Contracting Officer shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Contracting Officer only as deemed necessary.

3.03 CLEARING AND GRUBBING

A. The Contractor shall clear and grub in accordance with Section 02110 – Clearing and Grubbing.

3.04 CLEANUP OF PREMISES

A. Clean up and remove all debris accumulated from building operations from time to time as directed. Upon completion of the construction work and before final acceptance of the contract work, remove all surplus materials, equipment, scaffoldings, etc., and leave entire job site raked clean and neat to the satisfaction of the Contracting Officer.

END OF SECTION

SECTION 02110 – CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 SUMMARY

A. The work covered in this section shall consist of furnishing all labor, materials, equipment, tools and incidentals necessary for clearing and grubbing as shown on the plans and specified herein.

1.02 GENERAL REQUIREMENTS

A. Section 201 of "2005 Standard Specifications for Road and Bridge Construction", is hereby incorporated into and made a part of these specifications by reference unless otherwise modified hereinafter with the exception of paragraphs "Method of Measurement" and "Basis of Payment".

1.03 PERMITS AND FEES

A. The Contractor shall obtain and pay for all necessary permits required to perform this work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PROTECTION OF ITEMS TO REMAIN

A. The Contractor shall continually maintain adequate protection of trees, shrubbery, topographic features, archaeological sites, and all other items indicated to remain.

3.02 CLEARING AND GRUBBING

A. The Contractor shall clear the project limits of all vegetative material and obstructions necessary for the proper reception, construction, execution and completion of other work specified in this contract.

B. Within the grading limits and where indicated on the drawings, grub the entire ground surface of all grass, weeds, and plants down to at least 6 inches below the existing ground surface. Remove trees and roots to a minimum of 3 feet below existing ground level. Remove all large roots in excess of 2 inches in diameter and backfill and compact the resulting depression. All debris accumulated from this operation shall be completely removed from the premises by the Contractor according to paragraph 3.03 - DISPOSITION OF MATERIAL.

C. No excavation or filling shall be undertaken until area has been cleared and grubbed.

D. The Contractor shall protect from injury and damage all surrounding plants, pavements, buildings, utilities, etc., and shall leave all in as good a condition as at present. Any damage to existing improvements shall be repaired or replaced by the Contractor to the satisfaction of the Contracting Officer.

3.03 DISPOSITION OF MATERIAL

A. All materials resulting from the clearing and grubbing work, shall be removed from the limits of State property. Remove rubbish and debris from the jobsite daily, unless otherwise directed; do not allow accumulations inside or outside any buildings or roadways. The Contractor shall transport and legally dispose of materials off site. Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas.

B. If hazardous materials are encountered during the clearing and grubbing operations, comply with applicable State, Federal and local regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

C. Burning of removed materials is not permitted on project site.

3.04 INSPECTION AND APPROVAL

A. Prior to the construction of any new work, the Contractor shall inspect the area to be cleared and grubbed. The Contractor shall not proceed with new work until the clearing grubbing work has been approved by the Project Manager. Should the Contractor install any new work without the Project Manager's approval, the Project Manager may require the Contractor to remove the installed work for inspection and reconstruct at no additional cost to the State.

END OF SECTION

SECTION 02200 – EARTHWORK

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. As specified in Section 01010.

1.02 GENERAL REQUIREMENTS

A. Furnish all labor, materials, tools, and equipment necessary for site excavation, backfilling, rough and finish grading, and related items necessary to complete all work shown on the drawings and/or specified item.

B. Specifications for Public Works Construction, dated September 1986 is hereby incorporated into and made part of these specifications by reference unless otherwise modified hereinafter with the exception of paragraphs Method of Measurement and Payment.

1.03 WORK SPECIFIED IN OTHER SECTIONS

A. Demolition and removal as specified in SECTION 02050 – DEMOLITION AND REMOVAL.

1.04 ORDINANCES AND PERMITS

A. The Contractor shall comply with all applicable ordinances and regulations and obtain the required permits. All grading work shall comply with Chapter 10 of the Hawaii County Code, as amended.

B. The Contractor shall comply with the provisions of Chapter 11-55 Water Pollution Control and Chapter 11-54 Water Quality Standards of the Hawaii Administrative Rules, Department of Health, State of Hawaii.

1.05 EXISTING UTILITY LINES

A. The existence of active underground utility lines within the construction area is not definitely known other than those indicated in their approximate locations on the drawings. Should any unknown line be encountered during excavation, the Contractor shall immediately notify the Engineer of such discovery. The Engineer shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Engineer only as he deems necessary.

1.06 LAYOUT OF PROJECT

A. The Contractor shall verify all lines, levels, elevations and improvements indicated on the drawings before any excavation begins. All lines and grades shall be verified by a Surveyor or Civil Engineer licensed in the State of Hawaii. Any discrepancy shall be immediately brought to the attention of the Engineer and any change shall be made in accordance with his instruction. Commencement of clearing and grubbing operations shall be construed to mean that the Contractor agrees that the existing grades and improvements are essentially correct as shown. The Contractor shall not be entitled to extra payment if existing grades and improvements are in error after his verification thereof, or if he fails to report the discrepancies before proceeding with any work whether within the area affected or not.

1.07 DOCUMENTS

A. The Contractor shall have the following documents available for the use of the Engineer at the job site:

1. Grading Ordinance (Chapter 10 of the Hawaii County Code).

2. Hawaii Administrative Rules, Chapter 11-55 Water Pollution Control and Chapter 11-54 Water Quality Standards, Department of Health, State of Hawaii

3. ASTM D1557.

4. Grubbing or Grading permit from the County of Hawaii, if required.

5. Hawaii Standard Specifications for Road and Bridge Construction, dated 2005 with the latest applicable amended sections.

PART 2 – PRODUCTS

2.01 MATERIALS

A. All materials excavated shall be considered to be unclassified and shall be paid for as such, whether earth, boulders, solid rock, concrete, steel, rubbish, wood, or other materials.

B. Fill and Backfill Material

1. Yard fill: Yard fill shall be used for all areas where no concrete or A.C. pavement is to be constructed. Fill materials shall be non-expansive soil, free from debris, perishable or combustible materials, sod, and stones larger than 6 inches in maximum dimension and shall have a plasticity index not greater than 20. Any rock shall be well distributed in earth or other fine material with all voids filled and shall not be placed within 3 feet of the finished grade.

   In the event that insufficient amount of yard fill is delivered from earthwork operations, the Contractor shall import the necessary materials without any additional cost to the State. Such imported materials shall be subject to approval of the Engineer and shall meet the requirements as specified for the materials.

2. Structural fill: Structural fill shall be used in areas where new concrete or A.C. paving is to be constructed and shall be non-expansive, granular, well-graded material with a 3 inch maximum particle size and less than 20 percent by weight passing the No. 200 sieve. The fill material shall be free from clumps of soil, organic debris, adobe or other deleterious matter.

   The plasticity index for that portion of soil passing the #40 sieve shall not be greater than 10. The CBR shall not be less than 25. Recycled asphalt pavement shall not be used as structural fill.

3. Materials excavated within the project boundary may be used as a source of fill provided that they are processed to meet gradation requirements herein.

C. Temporary geotextile silt fencing shall have the following properties:

1. Geotextile shall be a woven fabric made of polypropylene fibers.

2. Minimum Roll Width: 3 ft.

3. Grab Tensile Strength: 100 lbs. (ASTM D-4632)

4. Elongation: 15% (ASTM D-4632)

5. Mullen Burst Strength: 275 psi (ASTM D-3786)

6. Coefficient of Water Permeability: 15 gal/min/SF

7. Trapezoidal Tear Strength: 50 lbs. (ASTM D-4533)

8. Puncture Strength: 60 lbs. (ASTM D-4833)

PART 3 - EXECUTION

3.01 GENERAL

A. No excavation or filling shall be undertaken until the area has been cleared and grubbed.

B. Install temporary erosion, dust and siltation control measures as shown on the drawings or ordered by the Engineer. Remove temporary measures after permanent erosion control measures have been established.

C. All excavation shall be protected and guarded against danger to life, limb and property.

D. Shoring, cribbing and lagging, as required to safely preserve the excavations and earth banks from damages resulting from the work shall be provided and installed by the Contractor.

E. The Contractor shall at all times control the grading around building areas so that the ground is adequately sloped to prevent any water from flowing into building areas and open trench excavations. All excavations shall be kept free from standing water. The Contractor shall do all pumping and draining that may be necessary to remove water to the extent required in carrying on the work. The Contractor shall obtain the NOI (Notice of Intent) permit from the State Department of Health for any dewatering activities.

Lowering or rising of water table in areas where ground settlement or other detrimental effects may be induced is expressly prohibited. In such areas, the excavated spaces shall be sealed prior to the pumping of water or other approved means employed by the Contractor. The Contractor shall be responsible for disposal of the pumped liquids. Water from dewatering and other construction operations shall not be discharged directly into the storm drainage system. The method of discharge shall comply with Department of Health Regulations.

Construction equipment which requires water in their operation shall not be used in the vicinity or within the building area without the approval of the Engineer.

F. Caution shall be exercised in all excavation work adjacent to existing trees which are to remain. All exposed fibrous and branch type roots shall be carefully pruned or saw-cut to the

extent required for excavation work. Every effort shall be taken to preserve the existing trees and to minimize damage to said trees.

G. The Contractor shall use the best management practices to reduce the amount of soil erosion resulting from the grading work.

The work areas and haul roads, including roadways leading to the project site, shall be continuously watered to prevent the generation of dust. Granular materials shall be spread over all unpaved haul routes. A 12-inch thick layer of 2 to 3-inch coarse aggregate shall be installed at delivery access points to reduce tracking mud onto public roadways.

All truck tires shall be free of mud before leaving the job site and entering a public roadway. The Contractor will clean all roads of mud and dirt resulting from his operations at no additional cost to the State.

H. The areas not covered by concrete or A.C. pavements shall be graded to conform to finish contours with allowance for topsoil if applicable.

I. Laying Out

1. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a surveyor or a civil engineer licensed in the State of Hawaii, at the Contractor's expense. The Contractor shall be solely responsible for their accuracy. The Contractor shall erect and maintain substantial batterboards showing construction of lines and levels.

2. Should any discrepancies be discovered in the dimensions given in the plans, the Contractor shall immediately notify the Engineer before proceeding any further with the work.

3. The Contractor shall be responsible for re-establishing property corners or survey control points which are destroyed by his operations.

3.02 EXCAVATION

A. General Requirements

1. Excavation shall be done so as to obtain the elevations called for on drawings, allowing for fill, grading, and drainage away from buildings.

2. Usable Materials as approved by the Engineer shall be stockpiled (for later use as fill material) in a location designated by the Engineer. Crushing basalt fragments may be necessary prior to reuse in compacted fills. This material may also be excavated directly to fill at the Contractor's option, provided that the materials conform to the requirements of the intended use as specified hereinbefore and sub grade preparation requirements have been met in the fill areas.

3. Non-usable Material such as mud, soft material, and expansive soils and excess materials shall become the property of the Contractor and shall be disposed of outside the project boundary limits at locations that have been approved by the Engineer.

4. Blasting as a means of excavation shall not be permitted.

5. Unsuitable subgrade soil, as determined by the Engineer shall be excavated and removed by the Contractor.

B. Structural Excavation

1. As specified by Section 206 of the "2005 Standard Specifications for Road and Bridge construction" except as modified herein.

3.03 FILL AND BACKFILL

A. General Requirements

1. Filling operations shall be performed so as to bring the entire project area to the finished grades shown on the drawings, allowing for concrete slab, or A.C. paving and base course.

2. At the time of compaction, the moisture content of fill and backfill material shall be such that the relative compactions specified can be obtained with the compacting equipment being used. At all times, it shall be the responsibility of the Contractor to employ such means as may be necessary to obtain a uniform optimum moisture content throughout the material being compacted.

3. Soft or loose soils that do not readily compact should be excavated and replaced with compacted structural fill at no cost to the State. All surface clayey silt/volcanic ash material shall be removed to the basalt or gravel strata prior to placement of the yard or structural fill.

4. All areas to receive fill shall be scarified, moisture conditioned to near optimum moisture content and compacted to a minimum of 95 percent relative compaction as determined by ASTM D1557 for a minimum depth of eight (8) inches.

5. In areas with gravelly material, the exposed gravelly material should be scarified to a depth of 6 inches and recompacted to a minimum of 95 percent compaction, as determined by ASTM D 1557, prior to placement of the fill.

6. All fill slopes shall be at 2:1 or flatter as shown on plans.

B. Yard Fill

1. Yard fill shall be placed in layers, 8 inches or less in compacted thickness, and compacted to 90 percent of maximum density as determined by the ASTM D1557 procedure.

C. Structural Fill for Pavement Areas

1. Structural fill shall be placed in layers, 8 inches or less in loose thickness, moisture conditioned to near optimum moisture content, and compacted to at least 95 percent of maximum density as determined by ASTM D1557 procedure.

D. Structural Backfill

1. Structure backfill shall be placed as specified in Section 206 of the "2005 Hawaii Standard Specifications for Road and Bridge construction".

E. Placing, Spreading, and Compacting Fill Material

1. When moisture content of the fill material is below optimum, water shall be added until the moisture content is optimum to ensure that the proper compaction can be obtained. When the moisture content of the fill material is above optimum, the fill material shall be aerated until the optimum moisture content is obtained.

2. Recompaction: Where test results indicate that the moisture content of the fill is not suitable, or that insufficient compaction has been obtained, the fill shall be reconditioned and recompacted prior to placing additional fill material.

   The Contractor shall be responsible for placing and compacting approved fill material in accordance with these Specifications. If the Contractor fails to meet the compaction requirements, he shall stop hauling or reduce his rate of haul, furnish additional spreading, watering and/or compaction equipment as may be required, or make any other adjustments necessary to produce a satisfactory compacted fill. When the work is stopped by rain, filling shall not resume until the Engineer has verified that the moisture content and the density of the fill surface are satisfactory.

3. During construction, all fill surfaces shall be sloped to provide positive surface drainage and to prevent ponding of water. If it appears that rain is imminent, the Contractor shall roll the surface with smooth rollers or rubber-tired equipment to seal the surface against excessive infiltration of water. Temporary surface drains and ditches shall be provided by the Contractor as necessary to expedite runoff and to prevent erosion.

F. Slopes and Final Grading

1. The Contractor will be required to obtain a minimum relative compaction of 95 percent of maximum dry density out to the finish fill slope face. Fill slopes shall be constructed by over-building and cutting-back to the finished grades to expose a well-compacted surface.

2. Excavation and embankment shall be finished with all slopes cut true and straight, in accordance with the lines and grades shown in the drawings. All slopes, whether old or new, shall be maintained with true and smooth surfaces. Over breaks shall be trimmed smoothly and neatly. The tops and ends of all slopes shall be flared and rounded.

3. All cut and fill slopes shall be protected from erosion by approved methods immediately upon their completion.

4. Cut Slopes

   a. If any conditions not anticipated, such as perched water, seepage, lenticular or confined strata of a potentially adverse nature are encountered during grading, these conditions shall be analyzed by the Engineer and recommendations shall be made to treat these problems. The Contractor shall halt the grading work in such areas until the recommendations are made.

   b. Unless otherwise specified in the drawings, no cut shall be excavated higher or steeper than that allowed by the County Ordinances. If there are substantial discrepancies in the elevations of the existing ground at the top of the slope which could result in a higher or steeper slope or could affect the location of the toe of slope, the Contractor

shall immediately inform the Engineer of such conditions, so that the drawings can be revised accordingly.

c. Cut slopes shall be 2H:1V or flatter, unless otherwise recommended by the Engineer.

3.04 GRADING TOLERANCES

A. All graded surfaces shall be finished to within 0.10 feet from the grades and cross sections indicated on the plans.

3.05 PROTECTION

A. Protect benchmarks, property monuments, fences, and roads.

B. Protect any above and below grade utilities that are to remain.

C. Protect newly graded surface from traffic and erosion; keep areas free of trash and debris. Repair and re-establish grades in settled, rutted, and eroded area.

D. Repair all damages caused by and resulting from construction activities in accordance with the requirements these specifications and as directed by the Engineer.

3.06 MEASUREMENT

A. Excavation shall be measured for payment by the cubic yard unless specified otherwise in the proposal. The quantity shall be computed based on the average-end-area method and center line distance. Where it is impractical to measure quantities of excavation by the average-end-area method, the Engineer shall use the best method to obtain an accurate estimate.

B. Excavation for unsuitable material below the established grade shall be measured by the cubic yard by cross-sectioning.

C. The original position of the ground surfaces shall be as shown on the plans unless either the Engineer or the Contractor demonstrates that the profiles or cross sections are erroneous before the original ground is disturbed.

D. The measurement shall include the volume of material involved in excavating and grading the roadway prism, embankments, slopes, rounding the tops and ends of cut slopes, widening of cuts as directed, excavating and removing slides and potential slide areas, and loosening and breaking of boulders or ledge rock within 6 inches below the roadway prism in cut sections whether the material is removed or not.

E. No measurement shall be made for the volume of material involved in overshooting or excessive blasting, excavating beyond the designated lines and grades, and incidental work necessary to complete the roadway prism. Unless a bid item is included in the proposal, hauling shall not be measured for payment, but compensation shall be considered as included in the bid price for roadway excavation.

3.07 PAYMENT

A. Unless specified otherwise in the special provisions and/or proposal, payment shall be made at the unit price bid per cubic yard for the quantity of roadway excavation as measured

above. Payment shall be full compensation for furnishing the necessary equipment, tools, labor and materials to complete the roadway excavation.

3.08 CLEAN UP

A. Clean up and remove all debris accumulated from construction operations from time to time, when and as directed by the Engineer. Upon completion of the construction work and before final acceptance of the work, remove all surplus materials, equipment, etc., and leave entire job site clean and neat.

END OF SECTION

SECTION 02225 – TRENCHING, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. As specified in Section 01010.

1.02 GENERAL REQUIREMENTS

A. This section covers the requirements for trenching, backfilling and compacting for utilities.

B. The Work under Section is specified in the following documents:

1. Section 11 – Trench Excavation and Backfill of the County of Hawaii Department of Public Works (DPW) Standard Specifications. All references to measurement and payment do not apply.

2. Comply with Hawaii Gas requirements for installation of the gas system.

1.03 WORK SPECIFIED IN OTHER SECTIONS

A. Earthwork as specified in SECTION 02200 – EARTHWORK

B. Water line utility as specified in the SECTION 02665 – WATER SYSTEM

C. Sewer line utility as specified in the SECTION 02530 – SANITARY SEWER

1.04 SUBMITTALS

A. Submit in accordance with SECTION 01300

B. Shoring and Sheeting Plan (Shop Drawings and Diagrams): Describe materials of shoring system to be used. Indicate whether or not components will remain after filling or backfilling. Provide plans, sketches, or details along with calculations by a professional engineer registered in Hawai'i. Indicate sequence and method of installation and removal.

1.05 PERMITS

A. Obtain necessary permits required from applicable agencies. All permit fees will be considered incidental to work and a separate payment shall not be made.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

A. Bedding and backfill materials for drain lines shall be in accordance with Section 11 of the DPW Standard Specifications. Bedding and backfill for electrical conduits shall be as indicated and specified in the electrical plans.

B. Select/Cushion material for sewer and drain lines shall be sand, graded crushed rock (commonly known as "rock sand") or excavated granular or sandy material, provided that all

rocks or lumps of material over one inch in its longest dimension have been removed. Select material shall be free from salt, ashes, refuse, organic material or other material, which, in the opinion of the Engineer, is unsuitable.

C. All material to be used as select/cushion material backfill shall be approved by the Engineer. If in the opinion of the Engineer the excavated material does not meet the grading requirements of select material, the Contractor shall be required to screen the material prior to its use as select/cushion material backfill.

D. Ordinary material used in the upper portion of the backfill from one foot above the top of the pipe to the surface of the ground or subgrade of the road shall not contain stone, rock or other material larger than six inches in its longest dimensions. No wood, vegetable matter or other material which, in the opinion of the Engineer, is unsuitable, shall be included in the backfill. No "adobe" or other materials determined to be deleterious by the Engineer shall be included in the backfill. Material shall conform to SECTION 02200 – EARTHWORK as applicable.

E. The Contractor shall obtain the approval of the Engineer of all backfill material.

2.02 BURIED WARNING AND IDENTIFICATION TAPE

A. Polyethylene plastic and metallic core or metallic-faced, acid and alkali resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape in rolls, 3-inches minimum width, color coding as stated below for the intended utility with warning and identification imprinted in bold black letters continuously and repeatedly over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing is to be permanent, unaffected by moisture or soil.

1. Drainage/Sewer Systems: Green

B. Warning tape for metallic piping shall be acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1,500 pounds per square inch (psi) lengthwise, and 1,250 psi crosswise, with a maximum 350 percent elongation.

C. Detectable warning tape for non-metallic piping shall be polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1,500 psi lengthwise and 1,250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.03 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to approval of the Engineer.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINISH ELEVATION AND LINES

A. All material excavated from trenches shall be considered unclassified, whether consisting of earth, lava, soft rock, decomposed rock, solid rock, boulders or coral. The trench shall be so dug that the pipe can be properly installed to the alignment and grade specified. Excavation shall commence at the point directed by the Engineer and shall be carried on in an orderly manner. No jumps or spaces will be permitted unless approved by the Engineer. Before proceeding with any excavation under asphaltic concrete and concrete pavements, the Contractor shall cut the edges of the excavation with a power saw to insure a neat cut along the pavement.

B. Trench Widths

1. The widths of trenches for all pipes and appurtenances shall be as shown on the Drawings.

2. Increases in widths over those shown due to sheeting, bracing or other necessities of construction, may be made by the Contractor with the approval of the Engineer, but no additional compensation will be allowed for such extra width.

C. Trench Depths

1. In general, trench depths for all pipes and appurtenances shall be as shown on the Drawings.

2. Where necessary, the Engineer reserves the right to raise or lower the grade or to change alignments from those shown on the Drawings.

D. Excavation Below Grades

1. Any part of the trench excavated below grade by the Contractor shall be corrected with select material, thoroughly compacted in place at no cost to the State.

3.03 PROCEDURES

A. Utilities

1. All excavated areas shall be toned prior to excavation.

2. Unless shown to be removed, protect lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost of the State.

3. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.

4. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the State.

5. Expose existing utilities to confirm clearances as initial trenching work. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.

6. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

B. Protection of Persons and Property

1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.

2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

3. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. During the period of construction, the Contractor shall protect the public against mud, dust and similar nuisances and shall take steps to abate such nuisances.

D. Convenient access to buildings along the line of work shall be maintained and temporary approaches shall be provided and kept in order. Temporary bridges for pedestrian traffic shall have handrails securely fastened to them. Handrails shall be free from any projecting nails, splinters and rough edges.

E. Storing of excavated material alongside the trench shall be done in such a manner as not to obstruct traffic. Whenever, in the opinion of the Engineer, proper storage of excavated material cannot be made alongside the pipe trench, the material shall be hauled away from the work site. If the excavated material meets the requirements for backfill material and proper storage cannot be made alongside the pipe trench, the material shall be stockpiled at convenient locations for later use in backfill.

F. Surplus Material

1. Unless otherwise specified in the Plans or Specifications, or ordered by the Engineer, surplus excavated material shall become the Contractor's property and shall be removed from the work site and disposed of at no cost to the State.

3.04 TRENCHING

A. Provide sheeting and shoring necessary for protection of the Work, undermining of existing facilities and for the safety of personnel.

1. Prior to backfilling, remove all sheeting

2. Do not permit sheeting to remain in the trenches except when, in the opinion of the Engineer, field conditions or the type of sheeting or methods of construction such as use of concrete bedding are such as to make removal of sheeting impracticable. In such cases, the Engineer may permit portions of sheeting to be cut off and remain in the trench.

B. Excavation

1. Short sections of a trench may be tunneled if, in the opinion of the Engineer, the conduit can be installed safely and backfill can be compacted properly into such tunnel.

2. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects at no additional cost to the State, as directed by the Engineer.

3. When the void is below the subgrade for the utility bedding, use select materials and compact to the relative density directed by the Engineer, but in no case to a relative density less than 95%.

4. When the void is below the subgrade for the utility bedding, use select materials and compact to the relative density directed by the Engineer, but in no case to a relative density less than 95%.

5. Excavating for Appurtenances

   a. Excavate for cleanouts and similar structures to a distance sufficient to leave at least 12-inches clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.

   b. Overdepth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel or lean concrete as directed by the Engineer, and at no additional cost to the State.

C. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.

D. Cover

1. Provide a minimum cover over the top of the pipe as indicated on the drawings.

2. Where the minimum cover is not provided, jacket the pipes in concrete as indicated. Provide concrete with a minimum 28-day compressive strength of 2500 psi.

E. Buried Warning and Identification Tape: Install tape in accordance with manufacturer's recommendations except as modified herein. Bury tape six-inches below the top of subgrade under pavements and slabs.

3.05 BEDDING

A. Provide bedding as indicated on the Drawings.

3.06 BACKFILLING

A. General

1. All backfill material shall be placed in the trench by hand or by approved mechanical methods. The compaction of backfill material shall be done by tamping with hand tools or

approved pneumatic tampers, by using vibratory compactors, by puddling if the backfill material can be suitably drained, or by any combination of the three. The method of compaction shall be approved by the Engineer and all compaction shall be done to the satisfaction of the Engineer.

2. When removal of unsuitable excavated material creates a shortage of backfill material, the Contractor shall, at no cost to the State, furnish material as specified in this section in the amount required to complete the backfill.

3. When backfill material is delivered by trucks, the material shall not be dumped directly into the trench, but the fall of the material shall be broken at the edge of the trench. The backfill material shall then be deposited by hand or by approved mechanical methods.

4. Ensure that no damage is done to structures or their protective coatings.

B. Backfilling Around Pipe

1. Select material shall be used to backfill the trench from its bottom to one foot above the pipe. Prior to the laying of the pipe, the select/cushion material cushion shall be deposited in the trench and shall be leveled off, compacted, and shaped to obtain a smooth compacted bed providing firm, uniform bearing along the laying length of the pipe.

2. After the pipe is installed, but prior to testing the line, select material shall be deposited in the trench evenly on both sides and along the full length of the pipe in 6-inch maximum loose lifts. If necessary, additional select material can be deposited over the center of each length of pipe to prevent undue movement during testing of the line. Ensure that initially placed material is tamped firmly under pipe haunches. The bell holes at the pipe joints shall not be backfilled at this time.

3. The pipeline shall then be tested. After the pipeline has passed the test, the Contractor shall backfill the bell holes with select material. The select material, which had been previously deposited over the pipe trench, shall be leveled and compacted.

C. Backfilling to Grade

1. From an elevation one foot above the top of the pipe to grade, the backfill material shall be placed in layers not to exceed 12-inches in loose lifts, each lift shall be compacted to a relative density not less than 95%

2. If the trench section is flooded, no further backfill shall be placed for two (2) days. After this period, the backfill shall again be thoroughly compacted to a relative density of not less than 95% by a method and with equipment approved by the Engineer.

3.07 FIELD QUALITY CONTROL

A. The Engineer will inspect and approve open cuts and trenches before installation of utility piping or structures, and will make the following tests:

1. Assure that trenches are not backfilled until all relevant tests have been completed;

2. Check bedding for proper layer thickness and compaction;

3. Verify that test results conform to the specified requirement, and that sufficient tests are performed;

4. Assure that defective work is removed and properly replaced.

END OF SECTION

SECTION 02530 – SANITARY SEWER

PART 1 – GENERAL

1.01 SUMMARY

A. Furnish all labor, materials, equipment and tools to install and to construct exterior sanitary sewer piping, manholes, connections and other appurtenances.

1.02 GENERAL REQUIREMENTS

A. The Work under this Section is specified in the following documents unless modified hereinafter:

1. Section 21 – PVC Sewer Pipe and Appurtenances and Section 23 – Sewer Manholes of the County of Hawaii Department of Public Works (DPW) Standard Specifications. All references to measurement and payment do not apply.

2. County of Hawaii Plumbing Code

B. The Contractor shall have the following documents available for the use of the Contracting Officer at the jobsite:

1. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, September 1986, County of Hawaii.

2. STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, September 1984, County of Hawaii.

1.03 WORK SPECIFIED IN OTHER SECTIONS

A. Utility trenching, backfill and compaction as specified in SECTION 02225 – TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES.

1.04 SUBMITTALS

A. Submit in accordance with SECTION 01300 – SUBMITTALS.

B. Certificates: The Contractor shall furnish the Project Manager affidavits and descriptive literature from the manufacturers of pipe and fittings, cast iron castings, cleanout, and manhole rungs furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of this specification.

C. Submit shop drawings for: Precast concrete manhole structures.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Sanitary Sewer Pipes: Exterior sewer pipes shall be polyvinyl chloride (PVC) pipe conforming to ASTM D 3034 SDR 35 or schedule 40. Joints shall be bell and spigot with

elastomeric gaskets conforming to ASTM D3212. Joints shall be water-tight. PVC pipe is defined in Section 21 of the Standard Specifications for Public Works Construction.

B. Sewer Manholes: Precast reinforced concrete riser units and cones shall conform to ASTM C-478. Sewer manholes are defined in Section 23 of the Standard Specifications for Public Works Construction.

C. Cast Iron Frames and Covers: Cast iron frames and covers shall conform to the requirements for Gray Iron Casting, ASTM Designation A48, Class No. 30. Covers shall be lettered with “SANITARY SEWER” to denote sewer service. The bearing faces of the frame and covers shall be machined and fitted together to prevent rocking. All casting shall be thoroughly cleaned and painted with one coat of approved bituminous paint before leaving the shop.

D. Manhole Rungs: Manhole rungs shall be galvanized wrought iron or galvanized steel. Wrought iron shall meet the requirements of AASHTO M-100. The steps shall be the size, length and shape shown on the County of Hawaii STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION.

E. Retro-reflective Sheeting: All signs shall have Type III or IV Retro-Reflective Sheeting backgrounds and direct applied legends conforming to Section 750.01, paragraph (A) of the “Standard Specifications for Road and Bridge Construction, 2005". Colors shall be as specified on the plans and shall conform to the central values and tolerance limits specified in the MUTCD.

PART 3 – EXECUTION

3.01 LOCATION OF UTILITY LINES

A. The Contractor shall be responsible for precisely laying out the sewer lines shown on the drawings. The existence of active underground utility lines within the construction area is not definitely known other than those indicated in their approximate locations on the drawings. Should any unknown line be encountered during excavation, the Contractor shall immediately notify the Project Manager of such discovery. The Project Manager shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Project Manager only as he deems necessary.

B. Prior to the actual work of constructing the sewers, the Contractor shall tone, excavate and expose all utility facilities which will be crossed by the new sewers and verify their elevations with respect to the new sewer grades. Elevations for inverts of existing sewers shall be verified at all points of connection with existing sewers.

C. Should the actual elevation of any existing utility show a possible discrepancy which may affect the alignment and grade of the new sewer, the Contractor shall immediately notify the Project Manager of his findings and shall not proceed with the sewer construction until authorized to do so by the Project Manager.

D. 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 line. Any damage to

existing lines resulting from the Contractor's operations shall be immediately repaired and restored as approved by the Project Manager at the Contractor's expense.

3.02 TRENCH EXCAVATION AND BACKFILL

A. Trench excavation and backfill shall be done in accordance with SECTION 02225 – TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES.

3.03 INSTALLATION

A. Installation of sewer pipes to the required line and grade and construction of the appurtenant structures, shall be in accordance with the drawings, the County's STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, and STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION as hereinbefore amended with respect to measurement and payment.

B. Laying and Installing Pipe

1. After the trench has been excavated to a depth of 6 inches below the pipe barrel, the trench bottom shall be brought up to grade by backfilling with cushion material.

2. The Contractor shall provide the necessary mason's line and supports to insure installation of the pipe to line and grade. The Contractor's facilities for lowering the pipe into the trench shall be such that neither the pipe nor the trench will be damaged or disturbed. The pipe invert shall be a smooth and uniform line over the length of pipe between drainage structures.

3. The pipe shall be laid upgrade and shall rest firmly on the prepared bedding or cushion material so that its entire length will have full bearing. No blocking of any kind will be permitted. No pipe shall be laid directly on solid rock or on boulders. Ledge rock or boulders shall be removed to provide the specified bedding thickness.

4. Install pipe as specified in the Section 21 of the County's STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

C. Sewer Manholes

1. Construct sewer manholes in accordance with Section 23 of the STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

D. Placement and Treatment of Castings, Frames and Fittings

1. All castings, frames and fittings shall be placed in the positions indicated on the plans or as directed by the Project Manager, and shall be set true to line and to correct elevation. If frame or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and positioned before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

2. When frames or fittings are to be placed upon previously constructed masonry, the bearing surface or masonry shall be brought true to line and grade and shall present an even bearing surface in order that the entire face or back of the unit will come in contact

with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed and approved by the Project Manager. All units shall be set firm and secure.

3. After the frames or fittings have been set in final position and the concrete or mortar has been allowed to harden for 7 days, then the covers shall be installed. Covers shall lay flat in their frames and shall not rock under any condition.

E. Installation of Rungs: The rungs shall be installed in accordance with the County's STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, and STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION.

3.04 RESTORE PAVEMENTS AND OTHER IMPROVEMENTS

A. All trenches within pavements shall be repaved in accordance standard DPW Specifications Section 38 - RESTORING PAVEMENTS AND OTHER IMPROVEMENTS shall apply. All striping and pavement markings shall be repainted in their entirety should any portion of the stripe or markings need repainting.

B. All trenches within yard areas shall be covered with 6 inches of topsoil and the area regrassed in accordance with Section 02920 – LAWNS AND GRASS.

C. All curbs, gutters, sidewalks, and other miscellaneous improvements removed or damaged by the work shall be reconstructed.

3.05 FINAL INSPECTION

A. At the time of final inspection of the work performed under the contract, the sewers covered by this section shall be complete in every respect and operating as designed. All surplus materials of every character resulting from the work of this section shall have been removed. Sanitary sewers shall be free from dirt rocks, sand, silt, debris or other obstructions. Any defects discovered in the sewers subsequent to this inspection shall be corrected prior to final acceptance.

END OF SECTION

SECTION 02665 – WATER SYSTEM

PART 1 – GENERAL

1.01 GENERAL CONDITIONS

A. As specified in Section 01010.

1.02 GENERAL REQUIREMENTS

A. The following construction standards, with certain modifications as hereinafter specified, are hereby incorporated into and made a part of these specifications by reference and shall be applicable to all work performed by the Contractor under this section.

1. "Water System Standards", dated 2002 of the Department of Water Supply, County of Hawaii, as amended. Paragraphs relating to Measurement and Payment in the Sections are not applicable to the project.

2. Specific sections of the "Standard Specifications for Public Works Construction", Department of Public Works, County of Hawaii, September 1986 (hereinafter referred to as "DPW Standard Specifications") as amended, with deletion of subsections relating to measurement and payment in all sections incorporated herein and further modifications to such sections as hereinafter provided.

3. Specific sections of the “Hawaii Standard Specifications for Road and Bridge Construction, 2005", Department of Transportation, Highways Division, as amended and as it pertains to construction within the right-of-way, is hereby incorporated into and made part of these specifications. Paragraphs relating to Measurement and Payment in the Sections are not applicable to the project.

1.03 WORK DESCRIPTION

A. The work to be performed under this section shall consist of furnishing all labor, materials, equipment, tools and incidentals necessary to install exterior water system as indicated on the Plans and specified herein.

1.04 SUBMITTALS

A. Certificates:

1. The Contractor shall furnish to the Engineer affidavits and descriptive literature from the manufacturers of pipe, pipe coating, fittings, valves, cast iron castings, backflow preventer, pressure regulating valve and other appurtenances furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of this section. Certificate of disinfection shall also be submitted to the Engineer.

B. Shop Drawings:

1. Submit shop drawings for:

a. Meter Boxes

b. Meter Box Covers

C. The Contractor shall have the following documents available for the use of the State's inspector at the jobsite:

1. Water System Standards, dated 2002 of the Department of Water Supply, County of Hawaii, as amended.

2. AWWA Standard C600.

3. AWWA Standard C651.

1.05 COORDINATION WITH OTHER SECTIONS

A. Trench Excavation and Backfill specified in Section 02200-EARTHWORK.

1.06 DEPARTMENT OF WATER SUPPLY CHARGES

A. The Department of Water Supply "Water System Facilities Charges", if any, shall be paid directly to the Department of Water Supply by the Owner.

B. The Contractor shall pay for all charges for the water meter installation and inspection by the Department of Water Supply.

1.07 EMERGENCY NOTIFICATIONS

A. The Contractor shall notify the Department of Water Supply and the Engineer of all water system shut downs 72 hours in advance.

B. In addition, the Contractor shall notify the Fire Department 72 hours in advance if any fire hydrant is to be shut off.

PART 2 – PRODUCTS

2.01 MATERIALS

A. All materials shall be in accordance with the appropriate sections of Division 200 of the Water System Standards listed below:

1. Ductile Iron Pipe, Fittings
and Special Castings .....Section 202

2. Valves and Appurtenances .....Section 205

3. Meter Box and Valve Box Covers and Frames .....Section 207

4. Service Lateral and Appurtenances .....……..Section 208

5. Pre-Molded Filler, Crushed Rock, Pipe Cushion, Backfill Material and Bricks .....……..Section 209

6. Brass Products .....…….....……Section 211

7. Miscellaneous …….Section 212

B. Water pipe 3" in diameter and smaller for water lines shall be Copper Water Tube Type K, soft temper, conforming to ASTM Designation B-88. Solder-joint fittings shall be cast bronze or wrought copper conforming to ANSI B-16. Solder shall be 1/8" diameter, 95% Tin-5% Antimony and shall not contain any lead.

C. The Backflow Preventer shall operate on a reduced pressure principle to prevent back-siphonage and back pressure backflow of water into the potable water supply. The device shall consist of a pressure differential relief valve located in a zone between two positive seating check valves. The relief valve shall contain a separate means whereby free air will enter the zone, and contained water will be discharged to atmosphere when the valve is fully open. The assembly shall include two tightly closing shut-off valves before and after the device, test cocks and a protective strainer upstream of the No. 1 gate valve. The device shall be suitable for service in either cold or hot water (to 210°F) and shall meet the requirements of ASSE Std. 1013; AWWA Std. C506-78 or USCFCC Manual for Cross Connection Control. The backflow preventer shall be pre-approved for use by the Department of Water Supply.

D. Pressure regulator shall be a Watts Series U5B, or approved equal, designed for a maximum pressure of 300 psi. The setting of the valve shall be adjustable in the range of 25 to 75 psi.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall be responsible for precisely laying out the various exterior utility lines shown on the Contract Drawings as provided elsewhere in these Specifications. The location shown on the Contract Drawings 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 Drawings. The Contractor shall tone, locate and carefully expose all existing utilities crossing the new water line prior to the installation of the water line.

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 Engineer at the Contractor's expense.

3.02 EQUIPMENT

A. All equipment necessary and required for the proper construction of the water lines shall be on the project, in first class working condition, and approved by the Engineer before construction is permitted to start.

B. The Contractor shall provide hand tampers and pneumatic tampers to obtain the required compaction of the pipe bed and the backfill, as specified.

3.03 TRAFFIC CONTROL

A. Traffic warning and construction signs shall be installed, and detours provided as required when working in roadways. The Contractor shall provide, install, and maintain all other necessary signs, lights, flares, barricades, markers, cones, and other protective facilities and shall take all necessary precautions for the protection and the convenience and safety of the public traffic. All such protective facilities and precautions to be taken shall conform with the "Rules and Regulations Governing the Use of Traffic Control Devices at Work Sites on or Adjacent to Public Streets and Highways" adopted by the Director, Department of Transportation, and the U.S. Federal Highway Administration "Manual on Uniform Traffic Control Devices for Streets and Highways, Part VI – Temporary Traffic Control", dated 2009.

B. All detour plans shall be submitted to the Engineer for approval prior to implementation of the detour. Advance notification of changes in traffic patterns shall be provided to users as directed by the Engineer.

3.04 TRENCH EXCAVATION AND BACKFILL

A. The Contractor shall do all necessary trench excavation to the depth required by the plans, including the excavation for pipe cushion. The excavation shall be done in accordance with the "Water System Standards", dated 2002 of the Department of Water Supply, County of Hawaii and Section 02200 - EARTHWORK.

B. When unsuitable material is encountered at the excavation the Contractor shall be responsible for hauling and disposing of the material and filling the excavation with crushed rock cushion material.

3.05 INSTALLATION

A. All work shall be in accordance with the appropriate Sections of Division 300 of the WATER SYSTEM STANDARDS.

B. Concrete reaction blocks shall be provided at all bends and plugged ends in accordance with the WATER SYSTEM STANDARDS for ductile iron pipes. The minimum bearing area shall be for Class 250 pipe and Type B soil condition for pipes located within volcanic ash soils or Type F condition for pipes located within the basalt stratum.

3.06 DETECTION OF WATER LINES

A. Warning and Identification Tape:

1. Provide warning and identification tape for both non-metallic and metallic water lines.

2. The warning and identification tape shall be buried directly above the center-line of the utility pipe, approximately 12" below the finish grade. Where the utility pipe is under pavements and slabs, the tape shall be buried approximately 6" below the top of the subgrade.

3.07 DETAILS

A. Standard Details shall be in accordance with Section 403 of the WATER SYSTEM STANDARDS or as shown on the plans.

3.08 CONNECTING, TESTING, CHLORINATION

A. The new lines shall be installed, but not connected until pressure testing and disinfecting is completed. Connecting shall be done at the discretion of the Department of Water Supply. Pressure testing and, flushing of valves and mains shall be carried out in accordance with the "Water System Standards". The Contractor shall submit the results of such test to the Engineer for approval. All charges for services by the Department of Water Supply shall be paid for by the Contractor.

B. The shut-off of water service shall be done during the working hours. The Department of Water Supply and the Engineer shall be notified 72 hours in advance of any shut-off of the water service. The Contractor shall notify the Fire Department of any shut-off involving existing fire hydrants.

C. Disinfection of Water Lines

1. Flush out water lines to remove foreign matter. After flush water runs clear, disinfect the lines with chlorine in accordance with AWWA Standard C651, pertaining to methods, concentrations, and contact times. Flush out until residual is reduced to 0.3 ppm. Submit to the Engineer a certificate of completion for this work from a contractor experienced and licensed to do disinfecting work.

2. Obtain two water samples from selected points and submit them to a licensed laboratory for bacteriological testing. Water shall meet Federal water purity standards. Submit to the Engineer a laboratory report or a certification of satisfactory completion of disinfection. All costs of testing shall be borne by the Contractor. Notify the Engineer in writing if the County Water Supply to the site exceeds maximum permissible limits for coliform content.

3.09 RESTORE PAVEMENTS AND OTHER IMPROVEMENTS

A. All trenches within pavements shall be repaved in accordance standard DPW Specifications Section 38 - RESTORING PAVEMENTS AND OTHER IMPROVEMENTS shall apply. All striping and pavement markings shall be repainted in their entirety should any portion of the stripe or markings need repainting.

B. All trenches within yard areas shall be covered with 6 inches of topsoil and the area regrassed in accordance with Section 02920 – LAWNS AND GRASS.

C. All curbs, gutters, sidewalks, and other miscellaneous improvements removed or damaged by the work shall be reconstructed.

3.10 FINAL INSPECTION

A. At the time of final inspection of the work performed under the contract, the water system shall be complete in every respect and operating as designed. All surplus materials in every character resulting from the work of this section shall have been removed. All defects discovered in the utilities subsequent to this inspection shall be corrected prior to final acceptance.

END OF SECTION

SECTION 02740 – ASPHALTIC CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. As specified in Section 01010.

1.02 GENERAL REQUIREMENTS

A. The work to be performed under this section shall consist of furnishing all labor, materials, equipment, tools and incidentals necessary to construct the asphalt pavement structure as shown on the plans and as specified herein.

B. The work under this Section is specified in the following sections of County of Hawaii Department of Public Works (DPW) Standard Specifications, unless modified hereinafter. All references to measurement and payment do not apply:

1. Section 29 – Subgrade.

2. Section 31 – Aggregate Base Course.

3. Section 33 – Asphalt Surface Treatment.

4. Section 34 – Asphalt Concrete Pavement.

5. Section 35 – Asphalt Concrete Resurfacing.

1.03 WORK SPECIFIED IN OTHER SECTIONS

A. Earthwork specified in SECTION 02200 – EARTHWORK.

B. Pavement markings specified in SECTION 02761 – PAVEMENT MARKINGS AND SIGNAGE.

1.04 SUBMITTALS

A. Submit in accordance with SECTION 01300 – SUBMITTAL PROCEDURES.

B. Product Data, Reports: The Contractor shall furnish the affidavits and data from the supplier for the following:

1. Design Mix for asphalt concrete pavement.

2. Base Course Material.

3. Sub-base Course Material.

C. Certificates: Testing laboratory accreditation data.

D. Certificates: Certification that the specified herbicides were applied at the specified application rate over the entire sub-grade to be paved.

1.05 SAMPLING AND TESTING

A. The Contractor shall retain and pay for an independent soil testing laboratory with at least one Licensed Civil Engineer specializing in Geotechnical Engineering to provide monitoring and testing services. The soil testing laboratory shall be accredited by the American Association of State Highway and Transportation Officials (AASHTO) or the American Association for Laboratory Accreditation and shall be accredited in the tests required under this contract. The soil testing laboratory shall meet the requirements of ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.

   The Contractor shall furnish for approval, a copy of the Certificate of Accreditation and Scope of Accreditation and latest directory of the accrediting organization for accredited laboratories. The scope of the laboratory's accreditation shall include the test methods required by the Contract. The Contractor shall submit certified test results in accordance with Section 01330 – SUBMITTAL PROCEDURES. All test results must be approved before the Contractor can proceed with placing subsequent layers or material.

B. Density tests shall be taken to determine whether the specified levels of compaction are being consistently attained. Testing shall be done as indicated, with a minimum of one test for each material.

   1. Sub-Grade: One Compaction test per lift of subgrade for this project, where basalt rock is not exposed.

   2. Aggregate Base: One compaction test per lift of aggregate base for this project.

   3. Aggregate Sub-Base: One compaction test per lift of aggregate sub-base for this project.

C. Compaction and thickness testing for asphaltic concrete paving shall be performed at a rate of one test per lift for this project. Sampling shall be as specified in Section 34 the "Standard Specifications for Public Works Construction".

PART 2 – PRODUCTS

2.01 MATERIALS

A. Materials shall conform to the below-listed sections of the "Standard Specifications for Public Works Construction" except as amended in the plans and/or specifications herewith.

1. Subgrade	Section 29
2. Aggregate Base Course, 1 1/2-inch maximum	Section 31
3. Prime Coat for Pavement	Section 33
4. Tack Coat for Pavement	Section 33
5. Asphalt Concrete Pavement	Section 34

B. Aggregate Base Course shall have a minimum CBR value of 85.

C. Herbicides

1. Pre-paving vegetation destruction herbicide shall be Roundup by Monsanto or accepted equivalent.

2. Pre-emergence control herbicide shall be Treflan by Elanco Products Company, or accepted equivalent.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

A. The sub-grade shall be prepared and compacted in accordance with SECTION 02200 – EARTHWORK and the requirements of the DPW Standard Specifications. Soil tests shall be made at the sub-grade level and the final pavement structure verified or modified as necessary.

B. Apply pre-paving herbicide to all new pavement or gravel road areas. Application shall not be made immediately after heavy rains or when rain is forecasted within the next 48 hours. The herbicide shall be applied in accordance with the manufacturer's recommended procedures and rates. Perform two herbicide applications at least three days apart.

3.02 PAVEMENT INSTALLATION

A. Asphalt concrete shall be as indicated on the plans and shall be constructed in accordance with Section 34 of the "Standard Specifications for Public Works Construction". Aggregate base course shall be compacted to a minimum 95% compaction as determined by ASTM D1557, and constructed in accordance to Section 31 of the "Standard Specifications for Public Works Construction".

B. Demolition and removal of existing pavement is indicated on the plans and specified in SECTION 02050 – DEMOLITION AND REMOVAL.

C. Prior to placement of the base course, the subgrade shall be scarified to a depth of about 8 inches, moisture conditioned to above the optimum moisture content, and recompacted to a minimum of 95 percent relative compaction. In areas where dense clinker materials or basalt rock formations are exposed, the subgrade should be proof-rolled with a minimum 10-ton vibratory roller or similar heavy equipment for a minimum of six passes to help detect and collapse near surface cavities in lieu of scarification and compaction.

D. New asphalt concrete shall be in accordance with the plans.

E. Prime coat shall be applied as specified in Section 33 of the "Standard Specifications for Public Works Construction".

F. Pavement smoothness for the finished surface shall be true to grade and cross section, free from depressions and grainy spots, and of uniform texture. It shall not vary more than 1/8 of an inch over 10 feet.

G. Surface tolerance for the finished surface of the asphalt concrete pavement shall be within 0.04 foot above or below the theoretical grade.

H. Low or defective areas shall be corrected by cutting out the faulty areas and replacing with new materials. Skin patching for correcting low areas will not be permitted.

3.02 CLEAN UP AND REPAIR

A. Any existing asphaltic concrete pavements including roads and walkways that have been damaged by construction activities shall be repaired to the original condition and to the satisfaction of the Engineer. Damage done by the heavy equipment, especially on roads not stable for such equipment, shall be repaired to the original condition and to the satisfaction of the Engineer. Concrete curbs and sidewalks that have been cracked or damaged by the Contractor's equipment or delivery trucks shall be reconstructed.

B. Repair work may consist of asphalt concrete resurfacing, scarifying and removing the existing pavement and reconstructing a new pavement of equivalent thickness, and reconstruction of concrete curbs and sidewalks.

END OF SECTION

SECTION 02761 - PAVEMENT MARKINGS AND SIGNAGE

PART 1 – GENERAL

1.01 GENERAL CONDITIONS

A. As specified in Section 01010.

1.02 GENERAL REQUIREMENTS

A. The work shall consist of furnishing all labor, materials, and equipment, and installing complete in place pavement striping, pavement markings, and traffic signage in accordance with the plans and specifications.

B. Pavement striping, pavement markings, and traffic signage shall conform to the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways", as amended and the "Hawaii Standard Specifications for Road and Bridge Construction, 2005" as amended.

C. Unless otherwise specified, all signs shall conform to the latest editions and amendments of the following:

1. Manual on Uniform Traffic Control Devices and Highways (MUTCD).

2. Standard Highway Signs.

3. AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaries, and Traffic Signals.

1.03 WORK SPECIFIED IN OTHER SECTIONS

A. Asphalt concrete pavement specified in SECTION 02740 – ASPHALTIC CONCRETE PAVEMENT

1.04 SUBMITTALS

A. Submit in accordance with SECTION 01300 – SUBMITTALS.

B. Submit for approval the manufacturer's certificates of compliance and data sheets for all materials herein specified.

C. Submit shop drawings of all non-standards traffic signs for approval by the Engineer prior to fabrication. When required, signage shop drawings shall include a detailed representation of each sign with dimensions. Drawings shall not be reproduction of contract drawings. Include details for attaching signs to their supports. The Contractor may propose alternate means of fabricating or installing signs but these proposals must have the approval of the Engineer and meet the intent of these specifications.

D. Submit warranty and product information for retroreflective sheeting material.

E. Submit a traffic control plan for approval prior to beginning any work.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Traffic paint shall conform to Section 755.01 of the “Hawaii Standard Specifications for Road and Bridge Construction, 2005”, as amended. Include blue paint for accessible striping.

B. Pavement markers shall conform to Section 755.02 of the “Hawaii Standard Specifications for Road and Bridge Construction, 2005”, as amended.

C. Adhesives for pavement markers shall conform to Section 755.03 of the “Hawaii Standard Specifications for Road and Bridge Construction, 2005”, as amended.

D. Sign Backing: Sign panel backing shall be either sheet aluminum, or extruded aluminum panels, and shall conform to Section 750.01, paragraph (B) of the “Standard Specifications for Road and Bridge Construction, 2005".

E. Retro-reflective Sheeting: All signs shall have Type III or IV Retro-Reflective Sheeting backgrounds and direct applied legends conforming to Section 750.01, paragraph (A) of the “Standard Specifications for Road and Bridge Construction, 2005". Colors shall be as specified on the plans and shall conform to the central values and tolerance limits specified in the MUTCD.

F. Steel Sign Supports: Steel Sign Supports shall be Square Tube Posts, channel posts, or structural steel members and shall conform to Sections 750.02 and 750.04 of the “Standard Specifications for Road and Bridge Construction, 2005," respectively.

G. Sign Fasteners-Steel Sign Supports: Sign fasteners to steel sign supports shall conform to Section 750.03 of the “Standard Specifications for Road and Bridge Construction, 2005."

H. Zinc Coating: Zinc coatings shall be as specified in Section 501.03 paragraph (G) of the “Standard Specifications for Road and Bridge Construction, 2005."

I. Zinc Paint: Primer coat shall consist of zinc oxide-zinc dust paint conforming to Federal Specifications MIL-E-15145. DFT shall be 1.5 mils.

J. Concrete for sign posts shall be Class 2500.

PART 3 – EXECUTION

3.01 PAVEMENT MARKING AND STRIPING CONSTRUCTION REQUIREMENTS

A. The installation of all striping and pavement markers shall be done in accordance with Section 629.03 of the “Hawaii Standard Specifications for Road and Bridge Construction, 2005", as amended, unless specified otherwise in the contract documents.

B. Layout of pavement markings, striping, and delineators shall be done by the Contractor and approved by the Engineer prior to any installation work.

C. The Contractor shall verify all existing conditions and controlling dimensions before ordering or fabricating any of the work.

D. Existing pavement markings not incorporated into the final traffic pattern shall be removed. Removal of existing pavement markings shall be done in accordance with Section 629.03D of the “Hawaii Standard Specifications for Road and Bridge Construction, 2005", as amended.

E. Before application of the markings, the portion of the roadway surface in the work area shall be thoroughly cleaned of all dust, dirt, curing compound, grease, oil, moisture, loose or unsound layers and any other material that would adversely affect the bond of the markings.

F. No markings shall be applied when moisture or foreign matter is present on the surface to be marked, or when wind conditions are such as to cause dust to be deposited on the prepared areas or to prevent satisfactory application of the marking.

G. All stripes and segments of stripes shall present a clean-cut, uniform, and workmanlike appearance. All markings which fail to have a uniform, satisfactory appearance shall be corrected by the Contractor at his expense.

H. Traffic striping which fails to meet the requirements specified herein or is marred or damaged by traffic or from other causes shall be corrected at the Contractor’s expense.

I. Unless specified otherwise, pavement markings shall be thermoplastic extrusion.

3.02 SIGN REFLECTORIZED BACKGROUND APPLICATION

A. All backgrounds shall consist of the specified retro-reflective sheeting. The application of this sheeting whether heat-activated or pressure sensitive, and the preparation of the application surface shall be in strict accordance with the manufacturer’s instructions.

B. The Contractor shall use the best technique possible to obtain a flat uniform background under day or night conditions. Colors shall be uniform. Lap or butt joints will not be permitted unless specifically approved by the Engineer. Manufacturer splices within a given roll shall be allowed. All edges and splices shall be coated with an edge sealer recommended by the Manufacturer.

3.03 SIGN REFLECTORIZED LEGEND APPLICATION

A. The term “Legend” as used herein is defined as all word messages and symbol designs contained on the sign that serve the purpose of conveying a specific message. Borders, when used, are also included as part of the legend.

B. Legends shall be cut out of the specified retro-reflective sheeting. Letter and symbol size, style, and placement shall conform to the layout shown on the drawings and as approved on the shop drawings. Legends shall be direct applied to the reflectorized background on the sign panels. Application technique shall be in strict accordance with the manufacturer’s recommendations.

C. Edges of applied legend shall be sealed with a sealer recommended by the manufacturer.

3.04 SIGN INSTALLATION

A. Prior to installation of any sign the Contractor shall perform his own inspection to examine the areas and conditions under which the signage is to be installed. Should any condition be found unsuitable, no work shall be done until the unsatisfactory conditions have been corrected. Proceeding with work will imply acceptance of the conditions by the Contractor.

B. Locate all signs as specified in the contract drawings and mark with stakes or tags. The Contractor shall take all necessary precautions to avoid conflicts with existing utilities. Field adjustments shall be made as necessary to avoid conflicts with existing utilities, structures, etc., at no additional cost to the State.

C. The Contractor shall position sign panels per the Manufacturer's specifications to ensure maximum retro-reflectivity and minimum glare.

D. During storage, transportation, and installation, the complete sign unit shall be fully protected. Signs installed shall be clean and in first-class condition. The sign faces and finished backs shall be protected from damage.

E. The Contractor shall mount the sign panels with the specified hardware compatible to the system and as shown in the Contract drawings.

F. Hot-dip zinc-coat all exposed surfaces of post type sign supports after fabrication as specified in Section 2.01. Zinc coating shall also be applied to the inner portion of tubular steel posts and the upper ten (10) inches of anchor bolts.

3.05 CLEAN-UP AND REPAIR

A. Any disturbance to roadbeds, landscaped areas, brick pavers, etc., shall be restored to original condition. Take care to avoid damage to immediate and surrounding areas and protect property, vehicles, etc.

B. In landscaped areas, remove grass in a manner that will allow replacement close to its original condition. Use a drop cloth or similar ground cover at all times to contain and hold removal of earth, plantings, etc., whether on concrete, asphalt, lawn and/or landscaped areas.

C. Any concrete, asphalt, or brick pavers removed shall be replaced in as close to original condition as possible, and within the limits of generally accepted trade standards.

D. All areas of work shall be completely cleaned. Any damages shall be corrected at the Contractor's expense.

END OF SECTION

SECTION 02920 – LAWNS AND GRASSES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes grass planting materials, installation and maintenance procedures.

B. Furnish all labor, materials, equipment and tools for grass planting as specified herein. Grass shall be planted in areas indicated on the plans and as listed below:

1. All existing grassed areas that are damaged by construction operations.

2. All graded areas within the project limits except those areas where concrete or asphalt surfacing is specified.

C. The following sections cover work related to this work:

1. Section 02200 - EARHTWORK

2. Section 02530 – SANITARY SEWER

3. Section 02665 – WATER SYSTEM

1.02 CODES AND STANDARDS

A. Perform work in accordance with all applicable laws, codes and regulations required by authorities having jurisdiction over such work and provide for all inspections and permits required by Federal, State and Local authorities in furnishing, transporting and installing materials.

1.03 SUBMITTALS

A. Substitutions: The Substitutions of grass will not be permitted unless authorized in writing by the Contracting Officer.

B. Construction Schedule: At the pre-construction meeting, provide a written projected planting schedule noting the estimated completion date, number of working days required and any special coordination requirements.

C. Selection and Ordering Plant Material (Schedules): Submit a request for review and documentation to the Contracting Officer at least one month prior to the start of work under this Section that all grass seed has been ordered.

D. Imported Screened Soil (Product Data, Reports):

1. After the Contract is awarded, furnish the source of the imported screened soil to the Contracting Officer.

2. Take representative soil samples from the proposed source area. Submit samples to the University of Hawaii Agricultural Extension Service (or other approved laboratory) for analysis for required soil amendments and fertilizers.

3. Submit test results and schedule of fertilizers and soil conditioners as recommended by the soil analysis to the Project Manager for review.

4. Include in the bid Proposal the cost of all fertilizer, labor and equipment required to place, amend and fine grade the soil.

1.04 JOB CONDITIONS

A. Acceptance of Previous Work: Inspect and accept the condition of the site relative to this Section before commencing with the work covered herein. If not acceptable, notify the Project Manager in writing. By proceeding with the work under this Section, the Landscape Contractor indicates his acceptance of all previous related work.

B. Meet on Site: Prior to commencing work, meet with the Project Manager and all other concerned parties on the site to review the work under this Section. Request this meeting one week prior to the desired meeting time.

C. Underground Utilities and Obstructions: Verify the location of all underground utilities and other obstructions that may affect the work. Any obstructions encountered shall be reported to the Project Manager. Repair all damages to any known utility line or other underground obstruction at Landscape Contractor's expense. Report damage to any unknown utilities to the Project Manager.

D. Protection

1. Provide necessary safeguards and exercise caution against injury or defacement of existing site improvements. Prevent vehicles of any kind from passing over sidewalk, curbs, etc., unless adequate protection is provided.

2. Be responsible for any damage resulting from landscape grassing operation. Repair all damage to return the area to the previous condition at Landscape Contractor's expense.

E. Clean Up: Keep all areas of work clean, neat and orderly always during the period of the Contract. Clean all construction areas at the end of each day.

F. Samples and Tests: The Project Manager reserves the right to take and evaluate samples of materials for conformity to the Specifications at any time. Furnish samples upon request by the Project Manager. Rejected materials shall be immediately removed from the site at the Landscape Contractor's expense.

G. Pre-Maintenance Review and Final Review

1. At the completion of all landscape planting operations and prior to the beginning of the formal maintenance period, the Pre-Maintenance Review shall be held. At the completion of the formal maintenance period, the Final Review shall be held.

2. Request these reviews of the Project Manager five (5) working days prior to the completion of the work in order that a mutually agreeable time for the review may be arranged.

3. The State of Hawaii, Landscape Contractor and the Project Manager shall be present at the review.

4. At the time of the review, the Landscape Contractor shall have all the areas under the contract free of weeds, dead leaves and trash, neatly cultivated and raked. At the Final Review, all lawns shall be neatly cut, and all clippings removed.

5. If, after the Pre-Maintenance Review, the State of Hawaii and Project Manager are of the opinion that all work has been performed in accordance with the Drawings and Specifications, written notice of preliminary acceptance will be given. This report will note any items which must be corrected, and state the date of commencement and completion of the formal maintenance period.

6. If, after the Final Review, the State of Hawaii and Project Manager are of the opinion that all work has been performed in accordance with the Drawings and Specifications, written notice of acceptance and completion of the Project will be given. If all or certain portions of the work are not acceptable under the terms and intent of the Drawings and Specifications, a reasonable amount will be retained and the final payment and formal maintenance period for the unacceptable work and any related items shall be extended at no cost to the State of Hawaii until the defects in the work have been corrected and the work is accepted by the County of Hawaii and the Project Manager.

1.05 WARRANTY

A. Plant Material:

1. Grass furnished or relocated under this Section shall be warranted in writing, for a period of one year from the date of final acceptance against improper installation, defective, unsound or diseased conditions that may appear.

2. Upon receipt of written notice from the Project Manager of the death of any warranted grass during the warranty period, the subject grass shall be promptly replaced with the same species as originally planted. Replacement shall be subject to all the requirements of the Specifications.

3. When the grass is replaced, advise the Project Manager, in writing, of the necessary establishment maintenance which must be performed. If this information is not provided, the Landscape Contractor will be liable for the total cost of replacement should the replaced grass die.

4. The expense of replacement shall be borne by the Landscape Contractor if replacement is necessary during the maintenance period, or shall be evenly shared by the State of Hawaii and the Landscape Contractor if replacement is necessary after the maintenance period but during the remainder of the warranty period.

5. The Landscape Contractor shall not be held liable for loss of grass after the final acceptance due to vandalism, acts of God or accidents. The Landscape Contractor must show that the grass has been maintained properly.

B. Special Warranty

1. All grass furnished under this Section shall be warranted as to species, hybrid, and/or variety specified.

2. If after acceptance of the project, any warranted grass proves to be of a different species, hybrid, and/or variety not initially determinable, replace that plant with new grass of the originally specified species, hybrid, and/or variety. The new plant shall meet the quality standards, be subject to the warranty, and be installed according to the specifications.

3. The Project Manager will determine the nonconformance of the grass, and notify the Landscape Contractor in writing of the required replacement work. All materials and work shall be at the expense of the Landscape Contractor. All work shall be completed within 15 working days from the date of the Project Manager's letter.

C. Liability: The liability under the warranty shall include the repair of damage to the work of other contractors, or damage to the State of Hawaii's property caused by the failure of the work performed under this section. All the provisions of this Section apply to work performed to satisfy the requirements of the warranty.

PART 2 – PRODUCTS

2.01 TOPSOIL

A. Topsoil texture and physical properties shall be conducive to proper plant growth. Soils with high proportions of silt and clay shall not be accepted. Topsoil shall not be screened subsoil. Topsoil shall contain enough quantities of nutrients to support normal plant growth in accordance with the soil analysis recommendations. Topsoil shall be free of deleterious substances, weeds, rocks, gravel and debris.

2.02 ORGANIC SOIL AMENDMENT

A. Organic amendments shall be brown, gray, or black in color; composted, well-rotted and stabilized, recycled green waste material passed through a 1/2-inch screen. It shall be free of live seeds, cuttings, fungus, spores and foul odor. It shall also not contain treated or painted woods, metals, rubbish, resins, tannin or other materials that are harmful to plant growth and shall not have a foul odor. Nitrogen shall be mixed into the material at a rate of 2-pounds of actual nitrogen per cubic yard.

B. Organic soil amendment shall be Screened Composted Greenwaste, by Big Island Hauling, Inc.; Organic Soil Conditioner, by Siteone Landscape, inc.; or accepted equal.

2.03 FERTILIZER

A. N-K-P and amendments as recommended by the soil analysis, paid by the contractor. Uniform in composition, free-flowing and suitable for application with approved equipment, delivered to the site in unopened containers, each fully labeled, conforming to the applicable fertilizer laws, and bearing the name or mark of the manufacturer.

2.04 PRE-PLANTING HERBICIDE

A. The Department of Education's Auxiliary Services Branch maintains a list of approved products. No products containing Glyphosate are on the approved list.

2.05 GRASS

A. Grass shall be like existing and approved by the State. Grass planting shall be by hydro-

mulching.

B. Grass seeds shall be fresh and hulled. Grass seed shall be delivered to the site in unopened, sealed containers, labeled with the brand name and percent purity. Labeling shall indicate that the seeds passed a certified germination test no more than 12 months prior to use.

C. Nomenclature: Names of grass shall conform with names generally accepted in the local nursery trade, and as interpreted by the Contracting Officer.

2.06 MULCH MATERIAL

A. Mulch shall be specially processed fiber Weyerhaeuser Silva-Fiber Plus, containing no growth or germination inhibiting factors. It shall be such that after addition and agitation in the hydraulic equipment with seed, fertilizer, water and other additives not detrimental to plant growth, the fibers will form a homogeneous slurry. When hydraulically sprayed on the soil, the fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration to the underlying soil.

2.07 WATER

A. Unless noted otherwise, water will be readily available to the Landscape Contractor at no expense to the Landscape Contractor. Costs for irrigation system and connection to water system shall be borne by the Landscape Contractor.

PART 3 - EXECUTION

3.01 PROTECTION OF EXISTING TREES

A. Protect and maintain existing trees “to remain” for the duration of the Contract.

3.02 CLEARING

A. Clear all planting areas of existing vegetation not specified to remain and all other debris and foreign material considered a hindrance to planting operations and/or unsightly in appearance.

3.03 PRE-PLANTING WEED CONTROL

A. Apply pre-planting selective herbicide to all visible weeds, before and after soil placement.

3.04 TOPSOIL

A. Provide an even 6” layer of topsoil mix over all planting areas. Soil shall be premixed off the site with fertilizers and soil conditioners as recommended by the soil analysis. Notify the Project Manager at least 5 working days before this work is to be done.

3.05 FINE GRADING

A. Adjust the finish grading with topsoil as necessary. Grades shall be smooth and even on a uniform plane with no abrupt changes or pockets. Verify the surface drainage of all planting areas, and notify the Project Manager of any discrepancies, obstructions, or other conditions considered detrimental to proper execution of the work.

B. Landscape work shall be tied to existing conditions and controls such as existing trees and

landscape features, utility lines, pavement and curbs, etc. Finished grades shall be in proper relationship to such controls. Adjust all new work as necessary to meet the conditions and fulfill the intention of the drawings.

C. After the initial settlement, the finish grade shall be lower than adjacent walks, curbs and headers by ½".

D. Immediately prior to planting operation all planting areas shall be cleaned of weeds, debris, rocks over ¼" in diameter and clumps of earth that will not break up.

3.06 SOIL AND DRAINAGE CONDITIONS

A. Notify the Project Manager in writing of all soil or drainage conditions encountered during planting operations which the Landscape Contractor considers detrimental to the growth of plant material. Include a cost proposal for the correction of the problem for approval before proceeding with the work.

3.07 GRASSING

A. Notify the Contracting Officer at least 5 working days before planting of grass.

B. Prior to grassing, entire planting surface shall be moist, even, sooth and free of rocks.

C. Hydro-Mulching of grass seed. This work shall consist of furnishing and applying grass seed, fertilizer and mulch by hydro-mulching.

1. The seeds shall be applied at the rates indicated on the drawings.

2. Mulch shall be applied at a rate of 3,100 lb./acre minimum. In every application, complete and uniform coverage of the soil shall be attained.

3. The hydro-mulching equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and to apply the slurry to provide uniform coverage. Seed, fertilizer and mulch mix shall be applied in one operation by hydraulic equipment made specifically for this use. The equipment shall have a built-in agitation system with a capacity enough to keep the mix in uniform distribution until pumped from the tank. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with hydraulic discharge spray nozzles which provide a uniform distribution of the slurry.

4. Areas inaccessible to hydro-mulching application shall be hand seeded or hand sprigged and fertilized by approved hand methods.

5. Water grass areas immediately after grassing and keep moist as needed for optimum plant growth. Apply water for short periods to prevent erosion or gullying.

3.08 FERTILIZER APPLICATION

A. The Landscape Contractor shall notify the Project Manager at least 5 working days before the application of fertilizer.

B. The first application of fertilizer shall be applied with the hydro-mulch operation.

C. The succeeding applications of fertilizer shall be applied once per month during the maintenance period.

3.09 MAINTENANCE

A. General: The Landscape Contractor shall be responsible for the proper care of the grassed areas. Maintenance shall include watering, weeding, mowing, repairing, regrassing and protection. Maintenance shall continue for 90 days after the commencement of the formal maintenance period or until the approval of the final review. Lawns shall be inspected weekly for disease or insect damage.

B. Watering: After planting of seeds, the ground shall be watered as deemed necessary by the Landscape Contractor to establish a healthy growth. Watering shall be done in a manner that will prevent erosion due to the application of excessive quantities of water, and the watering equipment shall be of a type that will prevent damage of the finish surface.

C. Weeding: Keep planting areas free of weeds and undesirable grasses through daily weeding if required. Remove the entire root system. Dispose of all weeds in appropriate trash containers. Weeds shall not be allowed to grow and propagate seeds. Large holes caused by weeding shall be filled with imported soil mix and raked level.

D. Mowing: Grass shall be mowed to a height of ¾" whenever the height of grass becomes 1-1/4" with a Jacobsen PGM 22 or accepted equal.

E. Repairing and Regrassing:

1. When any portion of the surface becomes gullied or otherwise damaged and grass has failed to grow, such areas shall be repaired with imported soil mix and replanted with grass. Any area of one foot square or more in which grass has failed to grow after 30 days of maintenance shall be regrassed.

2. Low spots in lawn areas shall be dressed with light layers of the specified soil to provide uniformly smooth lawn surfaces. Lightly compact soft lawn areas to provide firm lawn surfaces throughout.

3. As it becomes evident that certain lawns have not uniformly or properly established, replant the areas immediately with the same plants and quantity as specified for 100% coverage of healthy, active growing grass for approval during the final review.

F. Grass Coverage: All grass areas shall have 100% coverage, weed free, and mowed to ¾" at the end of the project.

END OF SECTION