

## SECTION 00320 GEOTECHNICAL REPORTS

### PART 1 – GENERAL

1.01 Geotechnical Reports. The following geotechnical report related to the project site has been prepared for the project:

- *Field Exploration, K-8 Campus, Hawaii Preparatory Academy, Waimea, Island of Hawaii, by Geolabs Hawaii, Inc., dated June 30, 2008.*
- *Geotechnical Engineering Exploration, Upper Campus Site Improvements, Hawaii Preparatory Academy, Waimea, Island of Hawaii, by Geolabs Hawaii, Inc., dated June 30, 2008.*

1.02 Inspection of Documents. Contract documents and additional references are available for viewing at Belt Collins Hawaii Ltd. For more information, contact:

- Walter Billingsley  
Belt Collins Hawaii Ltd.  
2153 North King Street, Suite 200  
Honolulu, Hawaii 96819  
Telephone (808) 521-5361; Fax (808) 538-7819

END OF SECTION

## SECTION 01015

### VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

This Section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for the project.

##### 1.02 RELATED SECTIONS: The following Sections contain requirements that relate to this Section:

- A. All sections in the Specifications with adhesive, sealant or sealant primer applications, and paints and coatings.
- B. LEED and LBC Submittal Requirements, Section 01330 – Submittals, paragraph 1.04, shall be followed.

##### 1.03 GENERAL REQUIREMENTS

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building Platinum rating and LBC Certification. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

##### 1.04 REFERENCES

- A. Rule 1168 – “Adhesive and Sealant Applications”, South Coast Air Quality Management District (SCAQMD) 2007/2008 Standards, State of California, [www.aqmd.gov](http://www.aqmd.gov)
- B. Rule 1113 - “Architectural Coatings”, South Coast Air Quality Management District (SCAQMD) 2007/2008 Standards, State of California, [www.aqmd.gov](http://www.aqmd.gov)
- C. Green Seal Standard GS-11- “Paints”, of Green Seal, Inc., Washington, DC, [www.greenseal.org](http://www.greenseal.org)
- D. Green Seal Standard GC-03- “Anti-Corrosive Paints”, of Green Seal, Inc., Washington, DC, [www.greenseal.org](http://www.greenseal.org)

### 1.05 VOC REQUIREMENTS FOR INTERIOR ADHESIVES

- A. The volatile organic compound (VOC) content of adhesives, adhesive bonding primers, or adhesive primers used in this project shall not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

### 1.06 GENERAL

- A. Unless otherwise specified below, the VOC content of all adhesives, adhesive bonding primers, or adhesive primers shall not be in excess of 250 grams per liter.
- B. For specified building construction related applications, the allowable VOC content is as follows:

1. Specialty Applications:	
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact Adhesive	80
Special Purpose Contact Adhesive	250
Structural Wood Member Adhesive	140
Sheet Applied Rubber Lining Operations	850
2. Substrate Specific Applications:	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

### 1.07 VOC REQUIREMENTS FOR SEALANTS

- A. The volatile organic compound (VOC) content of sealants, or sealant primers used in this project shall not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Sealants:	
Architectural	250
Other	420
2. Sealant Primer:	
Architectural – Nonporous	250

Architectural – Porous	775
Other	750

## 1.08 VOC REQUIREMENTS FOR PAINTS

### A. Paints and Primers:

Paints and primers used in non-specialized applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) shall meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

#### 1. Volatile Organic Compounds:

- a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Paints and Primers:

Non-flat: 150 g/l

Flat: 50 g/l

The calculation of VOC shall exclude water and tinting color added at the point of sale.

### B. Anti-Corrosive and Anti-Rust Paints

Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates shall meet the VOC limitations of the Green Seal Paint Standard GC-03, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

#### 1. Volatile Organic Compounds:

- a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Anti-Corrosive and Anti-Rust Paints:

250 g/l

The calculation of VOC shall exclude water and tinting color added at the point of sale.

END OF SECTION

## SECTION 01352

### SUSTAINABLE DESIGN REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

##### 1.02 SUMMARY

###### A. LEED and LBC - GENERAL REQUIREMENTS:

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building Platinum rating and Living Building Challenge (LBC) Certification. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED and LBC criteria.

###### B. Related Sections include the following:

1. Section 01015 – Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings
2. Section 01505 - Construction Waste Management

##### 1.03 DEFINITIONS

A. Certificates of Chain-of-Custody: Certificates signed by manufacturers certifying that 100% of wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria." Certificates shall include evidence that mill is certified for chain-of-custody by an FSC-accredited certification body.

B. LEED: The Leadership in Energy & Environmental Design rating system developed by the United States Green Building Council. LEED for Schools is the rating system used for this project.

C. Rapidly Renewable Materials: Materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials

include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, linoleum or wool.

- D. Regionally Manufactured Materials: For LEED, this refers to materials that are manufactured within a radius of 500 miles from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site. For LBC, the maximum distance for obtaining any materials for the project is 3000 miles, if a material is not available within this radius please provide statement in writing.
- E. Regionally Extracted, Harvested, or Recovered Materials: Materials that are extracted, harvested, or recovered and manufactured within a radius of 500 miles from the Project site.
- F. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
  - 1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
  - 2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

#### 1.04 LEED and LBC PROVISIONS

- A. The provisions to achieve a LEED Platinum rating and LBC Certification are integrated within the project construction documents and specifications. Contractors are specifically directed to the "LEED and LBC Performance Criteria" and "LEED and LBC Submittals" sections within each specification. Additional LEED and LBC requirements are met through aspects of the project design, including material and equipment selections, which may not be specifically identified as LEED and LBC requirements. Compliance with the requirements needed to obtain LEED and LBC prerequisites and credits will be used as one criterion to evaluate substitution requests.
- B. A LEED and LBC Scorecard, which summarizes the targeted LEED points and the LBC Prerequisites for this project, are included as attachments to this section. The scorecard is provided for the contractor's reference only.

#### 1.05 LEED and LBC SUBMITTALS

- A. Scope: LEED and LBC Submittals are required for all installed materials included under Divisions 2 through 14 of this specification. For these Divisions LEED and LBC Submittals are only required for field-applied adhesives, sealants, paints and coatings.
- B. Applicability: The extent of the LEED and LBC Submittals varies depending on the specification section; applicable LEED and LBC Submittals are listed under the

“LEED and LBC Submittals” heading in each section. The detailed requirements for the LEED and LBC Submittals are defined in Item C below.

- C. Detailed Requirements: Items 1-11 below define the information and documents to be provided for each type of LEED and LBC Submittal.
1. ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM (EBMCF): Information to be supplied for this form (blank copy included in Section 01330 - Submittals) shall include some or all of the following items, as identified in the LEED and LBC Submittal Requirements of each specification section:
    - a) Cost breakdowns for the materials included in the contractor or sub-contractor’s scope of work. Cost reporting shall include itemized material costs (excluding the contractor’s labor, equipment, overhead and profit).
    - b) The percentages (by weight) of post-consumer and/or post-industrial recycled content in the supplied product(s).
    - c) Identification (Yes/No) of materials manufactured within 500 miles of the project site **AND** containing raw materials harvested or extracted within 500 miles of the project site.
    - d) Confirmation that 100% of materials are manufactured within 3000 miles of the project site **AND** contain raw materials harvested or extracted within 3000 miles of the project site.
    - e) Volatile Organic Compound (VOC) content of all field-applied adhesives, sealants, paints, and coatings, listed in grams/liter or lbs./gallon.
    - f) Confirmation that 100% of wood products installed in the project are “FSC Certified”.
  2. EBMCF BACK-UP DOCUMENTATION: These documents are used to validate the information provided on the EBMCF (except cost data). For each material listed on the EBMCF, provide documentation to certify the material’s LEED and LBC attributes, as applicable:
    - a) Recycled content: Provide published product literature or letter of certification on the manufacturer’s letterhead certifying the amounts of post-consumer and/or post-industrial content.
    - b) Regional manufacturing **AND** Regional raw materials: Maximum Travel Distances

The project aims to acquire 20% of the total materials from within 500 miles for LEED and the following criteria applies for LBC:

**Zone 1 – maximum of 1000 miles:** Heavy, high density products that do not actively contribute to the building’s performance or occupant’s experience once installed (concrete, brick, stone, structural framing).

**Zone 2 – maximum of 3000 miles:** Medium-weight and density products that do not actively contribute to the building’s performance or occupant’s experience once installed. (wood products, furnishings, doors, sheetrock)

**Zone 3 – maximum of 3000 miles:** Light, low density products (insulation, carpet, fabrics, roofing) AND assemblies that actively contribute to the building's performance or occupant's experience once installed (HVAC equipment, plumbing fixtures, windows)

**Zone 4 - 7,000 miles:** Renewable Energy Technologies (defined as solar, thermal, or photovoltaic cells)

Provide published product literature or letter of certification on the manufacturer's letterhead indicating the city/state where the manufacturing plant is located, where each of the raw materials in the product were extracted, harvested or recovered and the distance in miles from the project site. Please alert Project Manager/ LEED consultant if products or materials cannot be obtained within described distances from the project, and provide written statement to be submitted as documentation.

1. If only some of the raw materials for a particular product or assembly originate within 500 miles of the project site, provide the percentage (by weight) that these materials comprise in the complete product and provide information stating that material could not be obtained within specified radius.
- c) VOC content: Provide Material Safety Data Sheets (MSDS) certifying the Volatile Organic Compound (VOC) content of the adhesive, sealant, paint, or coating products. VOC content is to be reported in grams/liter or lbs./gallon. If the MSDS does not show the product's VOC content, this information must be provided through other published product literature from the manufacturer, or stated in a letter of certification from the product manufacturer on the manufacturer's letterhead.
3. **PRODUCT CUT SHEETS:** Provide product cut sheets with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.
4. **CRI GREEN LABEL PLUS CERTIFICATION:** For carpets and carpet cushions, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the "Green Label Plus" IAQ testing program of the Carpet and Rug Institute of Dalton, GA.
5. **CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER RESINS:** For all composite wood, engineered wood and agrifiber products (including plywood, particleboard, and medium density fiberboard), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the products do not contain added formaldehyde resins.
6. **CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER LAMINATING ADHESIVES:** For all laminating adhesives used with composite wood, engineered wood and agrifiber products (e.g., adhesives used to laminate wood veneers to an engineered wood substrate), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the adhesive products do not contain urea-formaldehyde.
7. **FSC-CERTIFIED WOOD:**



Provide vendor invoices for each wood product stating that it has been harvested in accordance with the "FSC Principles and Criteria" for well-managed forests developed by the Forest Stewardship Council (FSC). Invoices shall include chain-of-custody (COC) certificate numbers and itemized costs for all certified products.

8. GREEN SEAL COMPLIANCE: Provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the following product types comply with the VOC limits and chemical component restrictions developed by the Green Seal organization of Washington, DC:
    - a. Topcoat paints: refer to Green Seal standard GS-11 (1<sup>st</sup> edition, May 1993)
    - b. Anti-corrosive and Anti-rust paints: refer to Green Seal standard GC-03 (2<sup>nd</sup> Edition, January 1997)
    - c. Aerosol Adhesives: refer to Green Seal standard GS-36 (1<sup>st</sup> edition, October 2000)
  9. HIGH ALBEDO PAVING AND WALKWAY MATERIALS: For paving and walkway materials made from concrete or brick provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying a minimum Solar Reflectance Index (SRI) value of 29. SRI values shall be calculated according to ASTM E 1980. Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance shall be measured according to ASTM E 408 or ASTM C 1371.
  10. MATERIALS RED LIST: Each subcontractor to provide confirmation that no materials listed in Materials Red List (MRL) will be employed in the project. See MRL at the end of this Section.
- D. The LEED and LBC Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the LEED Consultant for review. Incomplete or inaccurate LEED and LBC submittals may be used as the basis for rejection of products or assemblies. Incomplete or inaccurate LEED and LBC Submittals may be used as the basis for rejecting the submitted products or assemblies.
- E. LEED Action Plans
- Waste Management Plan and Waste Management Progress Report - Refer to Section 01505, Construction Waste Management for detailed submittal requirements.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION – Not Used

END OF SECTION 01352



# LEED for Schools Checklist

## Preliminary Assessment - May 28, 2008

Project Name: Hawaii Preparatory Academy - Energy Lab  
 Project Address: Kamuela, HI

Yes ? No

<b>13</b>	<b>2</b>	<b>1</b>	<b>Sustainable Sites</b>	<b>16 Points</b>	<b>Responsible Party</b>
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Y				Prereq 1	<b>Construction Activity Pollution Prevention</b>	Required	Civil Engineer
Y				Prereq 2	<b>Environmental Site Assessment</b>	Required	Civil Engineer
1				Credit 1	<b>Site Selection - Option 2</b>	1	Owner
	1			Credit 2	<b>Development Density &amp; Community Connectivity</b>	1	Inherent
			1	Credit 3	<b>Brownfield Redevelopment</b>	1	
1				Credit 4.1	<b>Alternative Transportation, Public Transportation Access - Option 2</b>	1	Inherent/ Owner
1				Credit 4.2	<b>Alternative Transportation, Bicycle Use</b>	1	Owner
1				Credit 4.3	<b>Alternative Transportation, Low-Emitting &amp; Fuel-Efficient Vehicles - Option?</b>	1	Owner
1				Credit 4.4	<b>Alternative Transportation, Parking Capacity - Option 2?</b>	1	Owner
1				Credit 5.1	<b>Site Development, Protect or Restore Habitat</b>	1	Arch./ Landscape Arch.
1				Credit 5.2	<b>Site Development, Maximize Open Space - Option 2</b>	1	Architect
1				Credit 6.1	<b>Stormwater Design, Quantity Control - Option 1</b>	1	Civil Engineer
1				Credit 6.2	<b>Stormwater Design, Quality Control</b>	1	Civil Engineer
1				Credit 7.1	<b>Heat Island Effect, Non-Roof - Option 1</b>	1	Arch./ Landscape Arch.
	1			Credit 7.2	<b>Heat Island Effect, Roof</b>	1	Architect
1				Credit 8	<b>Light Pollution Reduction</b>	1	Architect
1				Credit 9	<b>Site Master Plan</b>	1	Architect
1				Credit 10	<b>Joint Use of Facilities - Option 1</b>	1	Owner

Yes ? No

<b>7</b>			<b>Water Efficiency</b>	<b>7 Points</b>	<b>Responsible Party</b>
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1				Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1	MEP Engineer
1				Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1	MEP Engineer
1				Credit 2	<b>Innovative Wastewater Technologies</b>	1	MEP Engineer
1				Credit 3.1	Water Use Reduction, 20% Reduction	1	Architect
1				Credit 3.2	Water Use Reduction, 30% Reduction	1	Architect
1				Credit 3.3	Water Use Reduction, 40% Reduction	1	Architect
1				Credit 4	Process Water Use Reduction, 20% Reduction	1	MEP Engineer

<b>16</b>		<b>1</b>	<b>Energy &amp; Atmosphere</b>	<b>17 Points</b>	<b>Responsible Party</b>
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Y				Prereq 1	<b>Fundamental Commissioning of the Building Energy Systems</b>	Required	Commissioning Agent
Y				Prereq 2	<b>Minimum Energy Performance</b>	Required	Arch./ MEP Engr.
Y				Prereq 3	<b>Fundamental Refrigerant Management</b>	Required	MEP Engineer
10				Credit 1	<b>Optimize Energy Performance (2 pt minimum)</b>	2 to 10	Arch./ MEP Engr.
					14% New Buildings or 7% Existing Building Renovations	2	Arch./ MEP Engr.
					17.5% New Buildings or 10.5% Existing Building Renovations	3	Arch./ MEP Engr.
					21% New Buildings or 14% Existing Building Renovations	4	Arch./ MEP Engr.
					24.5% New Buildings or 17.5% Existing Building Renovations	5	Arch./ MEP Engr.
					28% New Buildings or 21% Existing Building Renovations	6	Arch./ MEP Engr.
					31.5% New Buildings or 24.5% Existing Building Renovations	7	Arch./ MEP Engr.
					35% New Buildings or 28% Existing Building Renovations	8	Arch./ MEP Engr.
					38.5% New Buildings or 31.5% Existing Building Renovations	9	Arch./ MEP Engr.
					42% New Buildings or 35% Existing Building Renovations	10	Arch./ MEP Engr.
3				Credit 2	<b>On-Site Renewable Energy</b>	1 to 3	
					2.5% Renewable Energy	1	Owner/ MEP Engr.
					7.5% Renewable Energy	1	Owner/ MEP Engr.
					12.5% Renewable Energy	1	Owner/ MEP Engr.
1				Credit 3	<b>Enhanced Commissioning</b>	1	Commissioning Agent
1				Credit 4	<b>Enhanced Refrigerant Management</b>	1	MEP Engineer
1				Credit 5	<b>Measurement &amp; Verification</b>	1	Owner/ MEP Engr.
			1	Credit 6	<b>Green Power</b>	1	

Yes ? No

continued...



# LIVING BUILDING CHALLENGE CREDITS

1. Responsible Site Selection	Requirements
<p>Not within 50 feet of Wetlands            Not on or adjacent to Sensitive Ecological Habitats such as Prime Dunes, Old Growth Forest or virgin prairie            Not on Prime Farmland            Not within 100-year floodplain</p>	<p>The building type category is "Laboratories/ Clean Rooms"             The climate zone category is "Tropics"</p>
2. Limits to Growth	
<p>Built on a greyfield or brownfield site            Exception: any site that has existing structures, extensive site disturbance or had at one time.</p>	<p>A greyfield is an obsolete shopping mall. This project would fall under the exception.</p>
3. Habitat Exchange	
<p>For each acre of development, an equal amount of land must be set aside as part of habitat exchange</p>	<ol style="list-style-type: none"> <li>1. signed letter from owner stating prereq has been met.</li> <li>2. Copy of site plan with site acreage marked</li> <li>3. A copy of receipt for the Habitat Exchange donation authorized by the Living Building Programs.</li> </ol>
4. Net Zero Energy	
<p>100% on-site renewable energy on a net annual basis</p>	
5. Materials Red List	
<p>Does not contain any of the "red list materials"<sup>1</sup> (See below)</p>	
6. Carbon Footprint	
<p>Accounts for embodied carbon footprint through a one-time carbon offset related to construction type</p>	<ol style="list-style-type: none"> <li>1. Letter from Architect showing carbon calculation</li> <li>2. Photographs showing basic building structure (wood-light frame)</li> <li>3. Letter from owner stating carbon offsets have been purchased</li> <li>4. A copy of receipt from acceptable carbon offset program (approximately \$4.30 to 5.50/ metric ton CO2)</li> </ol>
7. Responsible Industry	
<p>All wood FSC Certified or from salvaged sources</p>	
8. Appropriate Materials/ Service Radius	
<p>Materials and services must adhere to the Weight/ Distance List (see Red List Materials)</p>	<ol style="list-style-type: none"> <li>1. signed letter from owner stating prereq has been met.</li> <li>2. Summary of where renewable energy technologies are located and where manufactured.</li> <li>3. Summary of major building systems and where they came from.</li> <li>4. Letter from the Owner stating the consultant team met distance requirements</li> </ol>
9. Construction Waste	
<p>Construction waste must be diverted from landfills to the appropriate levels</p>	
10. Net Zero Water	
<p>100% of water use from captured precipitation or reused water            Exception to precipitation: water must be from potable sources and meet local requirements             Exception: cisterns may be topped off initial by utility water source</p>	<ol style="list-style-type: none"> <li>1. signed letter from owner stating prereq has been met.</li> <li>2. Photographs of key water systems</li> <li>3. Copy of water bill showing amount of water purchased if applicable.</li> </ol>
11. Sustainable Water Discharge	
<p>100% stormwater and building discharge handled on-site</p>	
12. Civilized Work	
<p>Every occupiable space has operable windows</p>	<ol style="list-style-type: none"> <li>1. Letter from Architect stating intent has been met.</li> <li>2. Floorplans for all floors and 2 building sections at 11x17 size</li> </ol>
13. Source Control	
<p>All buildings meet the stated guidelines for entryways, separate ventilation and interior finishes</p>	
14. Ventilation	
<p>Buildings meet air change rates stated in California Title 24</p>	<ol style="list-style-type: none"> <li>1. For natural vent: a. occupied spaces must be within 20ft from window and b. total operable area must be 5% of total floor area for each space.</li> </ol>
15. Design for Spirit	
<p>Celebrates culture, spirit and place appropriate to the function of the building</p>	<ol style="list-style-type: none"> <li>1. 2000 word essay by arch. Team that describes how the project meets intent with photos, diagrams and drawings</li> <li>2. 500 word testimonial by owner describing how building meets prereq</li> </ol>
16. Inspiration and Education	
<p>Educational materials about performance and operation of project are given to the public</p>	<ol style="list-style-type: none"> <li>1. signed letter from owner stating prereq has been met.</li> <li>2. Project web site created that educates people about project</li> <li>3. Interpretive signage placed around building</li> <li>4. Copy of Building Operations and Maintenance Manual and Video for building.</li> </ol>

### Prerequisite Five: Red List

This worksheet may be used to identify products that typically contain red-listed materials or chemicals. It should not be considered an exhaustive index, but a guide for documentation purposes.

Common Use Area	Replacement Option
<b>Formaldehyde</b>	
Composite wood products including: substrates (particleboard/MDF/HDF/OSB/plywood), cabinetry/architectural paneling, doors, flooring, glu-lam beams	Soy-based derivatives, polyvinyl acetate (PVA), methylene diphenyl isocyanate (MDI), solid wood, acrylic binder
Furniture	
Acoustic ceiling tile (coating for antimicrobial treatment)	
Fabric (finishes and treatments)	
Insulation	Alternate insulation material: cotton
<b>Halogenated Flame Retardants</b>	
Electrical wiring and assemblies	Polyolefin
Fabric	
<b>Polyvinyl Chloride (PVC)</b>	
Plumbing (piping and fittings)	Polyethylene (PEX), polypropylene, copper
Electrical wiring	Polyolefin
Window/door frames	Wood, metal-clad wood, aluminum
Fabric and wall coverings	Polyester, acrylic, nylon
Carpet (backing)	Jute (grasses), polyolefin, polyethylene, polypropylene
Resilient flooring	Linoleum, rubber, cork
Siding	Wood, fiber cement
Signage	Metal, acrylic
Roofing	Metal, fiber cement shingles, vegetated roof
Cabinetry	Soy-based derivative, metal, wood
<b>Mercury</b>	
Switches	
Flourescent lamps	LEDs, Low-mercury options
<b>Chlorinated Polyethylene / Chlorosulfonated Polyethylene</b>	
Geomembranes, roof membranes, electrical systems	

Common Use Area	Replacement Option
<b>Chlorinated Fluorocarbons (CFC) &amp; Hydrochlorofluorocarbons (HCFC)</b>	
Refrigerants (Mechanical/kitchen equipment), foam insulation (blowing agent), fire suppression systems, aerosol paints, adhesives/coatings	Hydrocarbon, oxygenated solvents, water, CO <sub>2</sub>
<b>Neoprene</b>	
Adhesives and sealants (e.g. furniture, roofing), gaskets (eg. window assemblies), electrical wiring	Silicone, Rubber
<b>Cadmium</b>	
Pigments in plastics, ceramics, glasses, enamels	
Assemblies that contain PVC (stabilizer)	
Metal coating/plating	Aluminum
Batteries	NiMH
<b>Polyurethane</b>	
Insulation (foam), roofing/gutter systems (caulk/sealants), coatings, plastics, fabrics, resins	Polyester-based, bio-based, PET, polyethylene, polypropylene, polyolefins
<b>Lead</b>	
Steel/iron assemblies, solder	Silver and other lead free solders
Roofing	
Assemblies that contain PVC (stabilizer)	
Pigments for coatings / glaze for ceramic tiles	
<b>Phthalates</b>	
Assemblies that contain PVC, electrical wiring, plasticizers including paints, rubber products, adhesives	Soybean oil, trimellitates, adipates, polyester

## SECTION 01420

### STANDARD REFERENCES

#### PART 1 – GENERAL

##### 1.01 SCOPE

- A. The following standard reference, hereafter referred to as the “Standard Specifications,” shall be applicable to this Project to the extent referenced.
1. *Standard Specifications for Public Works Construction*. Department of Public Works County of Kauai, City and County of Honolulu, County of Maui, County of Hawaii, of the State of Hawaii. September 1986.
  2. *Water System Standards*. Department of Water Supply, County of Hawaii, State of Hawaii, 2002.
  3. *Standard Specifications for Road and Bridge Construction*. State of Hawaii Department of Transportation, 2005.
  4. General Revisions to the Standard Specifications:
    - a. All references to method of measurement or basis of payment are not applicable.
    - b. Any deviation from these specifications, unless with written approval from the Engineer, is strictly prohibited.
  5. Modifications to the Standard Specifications are provided in the Technical Specification Sections.
- B. Standard Details. The *Standard Details for Public Works Construction*, Departments of Public Works, County of Kauai, City and County of Honolulu, County of Maui, County of Hawaii, of the State of Hawaii, September 1984, and the *Water System Standards*, Department of Water Supply, County of Hawaii, State of Hawaii, 2002, as amended, are by reference incorporated herein and made a part of these specifications. The term *Standard Details* used hereafter refers to the applicable Standard Details called out above. The Work embraced herein shall be done in accordance with the Standard Details.

**END OF SECTION**

**SECTION 01505  
CONSTRUCTION WASTE MANAGEMENT**

**PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work of this section.

1.02 DESCRIPTION

Work under this section includes, but is not limited to, demolition and salvage of utility appurtenances for reuse.

1.03 REQUIREMENTS OF THIS SECTION

- A. Waste Management Goals
- B. Waste Management Plan
- C. Progress Reports
- D. Project Meetings
- E. Management Plan Implementation

1.04 WASTE MANAGEMENT REQUIREMENTS

- A. The Owner has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible, and as stated here, shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.
- C. The Owner will seek LEED (Leadership in Energy and Environmental Design) certification for this Project at the Platinum Level, from the U.S. Green Building Council and Living Building Challenge Certification from the Cascadia Region Green Building Council. The documentation required here will be used for these purposes. LEED awards points for a variety of sustainable design measures on a project, one of which is the reuse and recycling of project waste. LBC requires that all prerequisites be met.

- D. DIVERSION REQUIREMENTS. All inert, divertible Project demolition and construction waste (by weight) shall be diverted from landfill. None of the waste can be incinerated. The following waste categories are to be included in the diversion plan for this project:
1. Soil, biomass, land clearing debris, rock and dirt - 100%  
Acceptable methods of diversion are-
    - a. Flash carbonization- This is a method used by Carbon Diversion, a company located in Maui, Hawaii. Flash carbonization transforms any type of organic waste into bio carbon. Bio carbon can then be used to produce energy. The reactors (pressurized containers), can be installed on the site, and leased for a short term period. They can process one ton of organic waste material per hour.
    - b. Composting, chipping and grinding materials to make them a usable medium. The resulting medium can be used on site for landscaping (instead of buying mulch) and soil amendment.
    - c. Clean green waste can be resold on the local market as salvaged material.
  2. Metals (e.g. banding, piping, rebar, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, brass, bronze) - 95%
  3. Cardboard, paper, packaging - 95%
  4. All others according to combined weighted average - 80%
    - a. Asphalt
    - b. Concrete and concrete blocks
    - c. Brick, tile and masonry materials
    - d. Untreated lumber
    - e. Plywood, OSB and particle board
    - f. Gypsum wallboard scrap
  5. Reuse items indicated on the Drawings and/or elsewhere in the Specification
- F. Recycling on the job, subject to the Commissioner's approval, is encouraged on the site itself, such as the crushing and reuse of removed sound concrete and stone. Include these categories in the Waste Management Plan.

#### 1.05 RELATED SECTIONS

- A. Requirements of the Special Provisions and the Division 1 sections apply to this section.
- B. Section 01600 Materials and Equipment
- C. Section 01780 Project Close-out
- D. Section 02220 Site Demolition
- E. Section 02230 Site Preparation



#### 1.06 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash debris and rubble resulting from construction, remodeling repair and demolition operations. Hazardous materials are not included.
- C. Diversion from Landfill: To remove, or have removed, from the site for recycling, reuse or salvage, material that might otherwise be sent to a landfill. Diversion from Landfill does not include using the material as alternative daily cover at a landfill site, nor does it include burning, incinerating or thermally destroying waste.
- D. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
- E. Recycle (recycling): To sort, separate, process, treat or reconstitute solid waste and other discarded materials for the purpose of redirecting such materials into the manufacture of useful products. Recycling does not include burning, incinerating or thermally destroying waste.
- F. Return: To give back reusable items or unused products to vendors.
- G. Reuse: To reuse excess or discarded construction material in some manner on the Project site.
- H. Salvage: To remove a waste material from the Project site for resale or reuse.
- I. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable and reusable material.
- J. Waste Management Plan: A project-related plan for the collection, transportation and disposal of waste generated at the construction site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill.

#### 1.07 REFERENCES, RESOURCES

The Owner encourages its contractors to seek information from websites and experts in salvage or recycling in order to minimize disposal costs. There are numerous opportunities to sell salvage, or to donate salvage and accrue tax benefits (which would accrue to the contractor); also there are outlets that will pick up, and in some cases buy recyclable materials. Examples of information resources are as follows:

- A. [www.usgbc.org](http://www.usgbc.org) Site of the United States Green Building Council, with a description of the LEED certification process and requirements for C&D waste recycling
- B. <http://www.epa.gov/epaoswer/non-hw/debris-new> Site of the U.S. Environmental Protection Agency that discusses construction and demolition waste issues, and links to other resources.

- C. <http://www.carbondiversion.com> - Carbon Diversion site which is located in Maui. It transforms waste into biocarbon. [lurvey@carbondiversion.com](mailto:lurvey@carbondiversion.com)
- D. <http://www.recyclinghawaii.com/> - Site of the a recycling company in Hawaii

#### 1.07 SUBMITTALS

- A. The Contractor for General Construction Work shall be responsible for the development and implementation of a Waste Management Plan for the Project. A sample Waste Management Plan is attached herein. All Prime Contractors shall assist in the development of that Plan, and collect, sort and deposit their waste and recyclable materials in accordance with the approved Plan.
- B. DRAFT WASTE MANAGEMENT PLAN. Within fifteen (15) calendar days after receipt of Notice to Proceed, or prior to any waste removal, whichever occurs sooner, the Contractor for General Construction Work shall submit to the Owner's Representative a Draft Waste Management Plan. The Draft Plan shall reference the LEED and LBC requirements stated in this document and contain the following:
  - 1. Estimate of the total proposed jobsite waste to be generated, including types and quantities.
  - 2. Proposed alternatives to Landfilling: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed destination for each material, and the projected amount by weight.
- C. FINAL WASTE MANAGEMENT PLAN. Within fifteen (15) calendar days of Owner's Representative's approval of the Draft Plan, the Contractor for General Construction Work shall submit a Final Waste Management Plan. It shall contain the following:
  - 1. Estimate of the total proposed jobsite waste to be generated, including types and quantities.
  - 2. Proposed alternatives to Landfilling: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed destination for each material, and the projected amount by weight.
  - 3. Materials handling procedures. A description of the means by which any waste materials identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with the requirements for acceptance by recycling processors to be utilized.
  - 4. List of documentation to be provided in Progress Reports.

#### 1.08 PROGRESS REPORTS

The Contractor for General Construction Work shall submit weekly, a Waste Management Progress Report, containing the following information:

- A. Project title, name of company completing report, and dates of period covered by the report
- B. Report on the disposal of all jobsite waste, by means of a Construction Waste Reporting Form, including:
  - 1. Recycled materials. For each material, provide the following:
    - a. Amount ( in tons or cubic yards)
    - b. Dates removed from the jobsite
    - c. Receiving Party
  - 2. Reused or salvaged materials. For each material, provide the following:
    - a. Amount ( in tons or cubic yards)
    - b. Description of intended or actual use
  - 3. Landfilled materials. Provide the following:
    - a. Amount ( in tons or cubic yards)
    - b. Dates removed from the jobsite
    - c. Identity of the transfer station or landfill
- C. Include legible copies of on-site logs, weight tickets and receipts. Receipts shall be from recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, recycling or disposal. If mixed construction and demolition waste is sorted off-site, provide a letter from the processor stating the average percentage of mixed C&D waste they recycle.
- D. Contractor shall save such original documents (as above) for the life of the project plus 2 year(s).

#### 1.09 PROJECT MEETINGS

Waste management plans and implementation shall be discussed at the following meetings:

- A. Pre-construction meeting
- B. Regular job-site meetings
- C. Contractor toolbox meetings

**PART 2 – PRODUCTS**

Not Used.

**PART 3 - EXECUTION**

3.01 WASTE MANAGEMENT PLAN EXECUTION

- A. The Contractor for General Construction Work shall be responsible for the provision of containers and the removal of all waste, non-returned surplus materials, and rubbish from the site in accordance with the Waste Management Plan.
  - 1. The Contractor for General Construction Work shall oversee and document the results of the Plan.
  - 2. The Prime Contractors shall be responsible for collecting, sorting, and depositing in designated areas, their waste, non-returned surplus materials, and rubbish, as per the Waste Management Plan.
  - 3. Monies received for recycling materials shall remain with the Contractor for General Construction Work.
  - 4. Monies received for salvaged materials shall remain with the Contractor for General Construction Work.
- B. Distribution. The Contractor for General Construction Work shall distribute copies of the Waste Management Plan and the Contractor Waste Reporting Form to each Prime Contractor, Subcontractor, Construction Manager, and Owner's Representative.
- C. Instruction. The Contractor for General Construction Work shall provide on-site instruction of appropriate separation, handling and recycling, salvage, reuse and return methods to be used by all parties in appropriate stages of the Project.
- D. Separation facilities. The Contractor for General Construction Work shall lay out a specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse and return. Each potential material shall be collected and stored to avoid being mixed with other materials. Recycling and waste bin areas are to be kept neat and clean, and clearly marked.

END OF SECTION

DDC - SAMPLE C&D WASTE MANAGEMENT PLAN  
June 2003

SAMPLE WASTE MANAGEMENT PLAN

A sample C&D Waste Management Plan appears on the following pages. It indicates the topics to be covered and the type of information that would be appropriate. Dummy information has been included to illustrate the Plan.

SAMPLE WASTE MANAGEMENT PLAN

*This is a Sample Waste Management Plan. You may use this as a guide in developing your own.*

Contractor: Very Best Construction Company

Prepared May 1, 2003 / Revised July 3, 2003

Project: Renovation/Addition to Big Building, Queens, N.Y.

Designated Recycling Coordinator: Joe Doe

Waste Management Goals

- This project will recycle, reuse or salvage at least 75%, by weight, of the waste generated on site.

Waste Prevention Measures

- Five large rooms on the 1<sup>st</sup> Floor, near the service elevator, have been designated for storage of delivered material and equipment until it is needed. These rooms are dry and lockable. Each Prime Contractor has been assigned one of these rooms.
- Reusable metal forms will be used for the concrete structural elements.
- Each major vendor will be sent a letter requesting their cooperation in planning for minimal or take-back packaging, and just-in-time delivery. The Recycling Coordinator will provide a draft letter to each Prime Contractor for their use.
- A mock-up of the ceiling, soffit, ductwork and lighting shown on detail xyz will be built for coordination and review before proceeding with this work.

Reuse and Salvage Items (Included on the chart below)

- The paneled doors from the existing offices will be reused per the documents.
- Excavation rock will be crushed and used as fill on site.
- Shelving removed from the library will be donated to Dick and Jane School

Communication Plan

- Waste prevention and recycling activities will be discussed at each job meeting.
- The recycling coordinator will give each contractor and subcontractor a copy of the Waste Management Plan, provide instruction in appropriate separation and handling procedures and show them the recycling areas.
- Prime contractors will be expected to make sure that their workers comply with the Waste Management Plan.
- All recycling containers will be labeled in English and Spanish, with acceptable / unacceptable materials posted. Each sign will have a representative picture of the materials to be recycled.
- If methods or container locations change during the course of the project, the Recycling Coordinator will notify each contractor and subcontractor in writing.

Contamination Prevention Measures

- Small roll-off containers convenient to work areas will be used; Very Best Contracting will periodically consolidate the contents in the appropriate dumpsters. Garbage containers for non-recyclable materials will be located adjacent to recycling containers.

DDC - SAMPLE C & D WASTE MANAGEMENT PLAN  
June 2003

- If any containers are near the driveway, they will be securely covered when not supervised.
- An eating area has been designated on site, and workers will not be permitted to eat elsewhere in the building.

Documentation to be Provided

- Recycling Reports; Weight tickets and receipts from companies listed below.
- Letter from Waste Corp., certifying the overall percentage of mixed C&D waste that they recycle.

**EXPECTED PROJECT WASTE, DISPOSAL/RECYCLING/REUSE AND HANDLING**

Demolition Phase

Material	Quantity	Percentage of material to be Recycled, Salvaged or Reused		
		%	Recycle/Salvage/Processing Company	On-Site Handling Procedure
Concrete			Recycle: XYZ Company	Deposit in concrete bin. Rebar OK
Ceiling tile			Recycle: Armstrong Industries	Collect on pallets, each floor
Steel/Metals			Recycle: NY Metals	Deposit in metals container
Paneled Wood Doors			Reuse per documents	Collect in room A; Protect until reused
Library Shelving			Salvage: Donate to Dick and Jane School	Remove in sections and store in room B for School pick-up
Mixed C&D waste	8 tons recycled 12 tons landfill	40%	Sort/Disposal: Waste Corp.	Deposit in general dumpster
Garbage/Other waste		0	Landfill	Deposit in container X

Construction Phase

Material	Quantity	Percentage of material to be Recycled, Salvaged or Reused		
		%	Recycle/Salvage/Processing Company	On-Site Handling Procedure
Excavated Rock			Reuse on site as fill	Collect for crushing by Inert Inc.
Cardboard packaging			Recycle: Tri-State Paper	Collect on each floor for bundling
Steel/Metals			Recycle: NY Metals	Deposit in metals container
Mixed C&D waste	4 tons recycled 6 tons landfill	40%	Sort/Disposal: Waste Corp.	Deposit in general dumpster
Garbage/Other waste		0	Landfill	Deposit in container X

Summary - Expected C & D Waste and Diversion Rate

Total C & D Waste	x Tons	Total waste expected to be generated in demo and construction
Total Recycled +	y Tons	Materials to be diverted from landfills, by salvage, reuse and recycling
Diversion Rate	y/x %	Percentage of project's waste expected to be diverted from landfills

This Plan has been prepared with the knowledge and cooperation of the demolition subcontractor, DDD Demo, and the other Prime Contractors on the project: EEE Electrical Contracting; MMM Mechanical; and PPP Plumbing Ltd.

Signed: \_\_\_\_\_, Very Best Construction Company July 1, 2003

## **SECTION 01520**

### **MOBILIZATION**

#### **PART 1 – GENERAL**

##### 1.01 SCOPE

Mobilization shall include but not be limited to the following principal items required for the proper performance and completion of the Work:

- A. Moving onto the site of all plant and equipment required for first month operations, including field office for Contractor.
- B. Installing temporary construction power, wiring, and lighting facilities.
- C. Establishing fire protection system.
- D. Developing construction water supply.
- E. Providing all on-site communication facilities.
- F. Providing on-site sanitary facilities and potable water facilities as specified.
- G. Arranging for and erection of work and storage yard.
- H. Obtaining all required permits.
- I. Posting all OSHA required notices and establishment of safety programs.
- J. Having the superintendent at the jobsite full-time.
- K. Submitting Preliminary Construction Schedule.

#### **PART 2 – PRODUCTS**

Not Used.

**END OF SECTION**

**SECTION 01550**  
**TRAFFIC CONTROL**

**PART 1 – GENERAL**

**1.01 SCOPE**

Work under this section consists of furnishing all labor, materials and equipment required to complete the traffic control as specified herein, including the following:

- A. Install construction signage, regulatory and warning traffic signs.
- B. Install traffic control devices, including cones, delineators, barriers and traffic barricades.
- C. Install temporary pavement markings and stripings.
- D. Provide flaggers or police officers, as required.

**PART 2 – PRODUCTS**

**2.01 MATERIALS**

All signs, traffic control devices, pavement marking and striping shall conform to the requirements of the Manual on Uniform Traffic Control Devices, 2003, as amended, Federal Highways Administration.

**PART 3 – EXECUTION**

**3.01 TRAFFIC CONTROL PLANS**

All traffic control plans shall conform to the Manual on Uniform Traffic Control Devices, 2003, as amended, Federal Highways Administration: Part 6 – Temporary Traffic Control.

**3.02 INSTALLATION**

- A. Traffic control devices shall be installed such that the sign or device farthest from the work area shall be placed first. The remaining traffic control devices shall then be placed progressively toward the work area.
- B. Cones or delineators shall be extended to a point where they are visible to approaching traffic.
- C. Regulatory and warning signs within the construction zone that are in conflict with the traffic control plans shall be removed or covered. All signs shall be restored upon completion of the work.
- D. Flaggers and/or police officers shall be in sight of each other or in direct communication at all times.
- E. All traffic lanes shall be a minimum of 10 feet wide.



- F. All construction warning signs shall be promptly removed or covered whenever the message is not applicable or not in use.
- G. The backs of all signs used for traffic control shall be appropriately covered to preclude the display of inapplicable sign messages (i.e., when the signs have messages on both faces).
- H. At the end of each day's work or as soon as the work is completed, all traffic control devices no longer needed to permit free and safe passage of public traffic shall be removed. Removal shall be in the reverse order of installation.

**END OF SECTION**

**SECTION 01570**  
**SOIL EROSION CONTROL**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Work under this section consists of temporary control measures as indicated, as stated in the Contract with Exhibits, as required by the County of Hawaii approved Soil Erosion Control Plan, as required in other sections, or as ordered by the Owner's Representative during the course of the work to control dust and to control water pollution through the use of berms, screens, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.
- B. Temporary erosion and siltation control measures as described herein shall be applied to any erodible material within this Project, including local material sources and work areas.
- C. The Contractor shall be responsible for removing all silt and debris resulting from his work and deposited in drainage facilities, roadways, neighboring lands, and other areas.
- D. All costs incurred in complying with the provisions of this section shall be borne by the Contractor. No separate payment will be made to the Contractor for measures required for environmental or soil erosion control during construction.

**1.02 RELATED SECTIONS**

- A. Requirements of the Special Provisions and the Division 1 sections apply to this section.
- B. Section 01352 - Sustainable Design Requirements.
- C. Environmental controls are specified in Section 01575.
- D. Composite turf mat reinforcement mat (TRM) for slope stabilization is specified in Section 02070 – Geosynthetics.
- E. Site grading is specified in Section 02300.
- F. Utility trenching and backfilling is specified in Section 02315.

**PART 2 – PRODUCTS**

**2.01 MATERIALS**

- A. Mulches may be bagasse, hay, straw, fiber mats, netting, wood cellulose, bark, wood chips, or other suitable material acceptable to the Engineer and shall be reasonably clean and free of noxious weed and deleterious materials.
- B. Slope drains may be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete, plastic sheets, or other material acceptable to the Engineer.

C. Grass shall be Kikuyu (Pennisetum Clandestinum) to provide a temporary cover that does not later compete with the permanent cover.

1. Seed for hydroseeding shall be “Whittet Variety” Kikuyu Grass (Pennisetum Clandestinum), certified, meeting the following requirements:

Pure Seed	95% minimum
Crop Seed	1% maximum
Weed	0.5% maximum
Inert Material	5% maximum
Germination	85% minimum

The seeds shall be applied at the rate of 15 pounds per acre (minimum) and within twelve (12) months of the date of the certified germination test.

D. Fertilizer

1. Fertilizer and soil conditioners shall be OMRI certified organic.

2. The Contractor shall be responsible to determine the proper fertilizer required in the hydro-mulch mix for the existing soil condition. The Contractor shall be responsible to decide the quantity and the analysis and ratio to ensure sufficient nutrients for the sustained growth of the grass.

E. Mulch shall be specially processed fiber 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. In every application, complete coverage of the soil shall be attained. Mulch shall be applied at the minimum rate of 1,500 pounds per acre.

### **PART 3 – EXECUTION**

**3.01** Earth material shall not be exposed until the Best Management Practices (BMPs) are installed and accepted by the Owner’s Representative. The Engineer has the authority to limit the surface area exposed by clearing and grubbing and to limit the surface area exposed by excavation, borrow and fill operations. Under no circumstance shall the exposed area exceed that allowed under County Code. The Owner’s Representative may also direct the Contractor to provide immediate, permanent, or temporary pollution control measures to prevent contamination of drainage channels and pipes, roads, neighboring lands, and other areas.

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

**3.03** Contractor shall incorporate all erosion control measures indicated, which may be modified as necessary to adjust to conditions that develop during construction.

**3.04** Contractor shall limit the surface area exposed by grubbing, stripping of topsoil, and grading to that which is necessary for to perform the next operation and which is within his capability and progress in keeping the finish grading, mulching, grassing, and other such pollution control measures current.

The grubbing of the vegetative root mat and stumps and the stripping of topsoil shall be confined within the limits of grading which can be actively and continuously prosecuted within fifteen (15) calendar days. The area to be graded shall be limited to the minimum area necessary to accommodate the Contractor's equipment and work force and shall not at any time exceed fifteen (15) acres without prior acceptance of the Owner's Representative.

Any area remaining bared or cleared for more than thirty (30) calendar days and which is not within the limits of active construction shall be remedied as directed by the Owner's Representative.

**3.05** Contractor shall, at the end of each work operation in any one day, shape the earthwork in such a manner as to control and direct the runoff of rainwater to minimize the erosion of soils. Contractor shall construct earth berms along the top edges of embankments or along any critical area within the project, such as along the property line with adjacent properties, streams, and water channels, to intercept any runoff. Temporary slope drains shall be provided to carry runoff from the top of cuts and fills. Temporary facilities for controlled discharges shall be provided for runoff impounded, directed, or controlled by project activities or by any erosion control measure employed.

**3.06** Cut slopes shall be shaped, topsoiled if necessary, and planted as the work progresses. Whenever major excavation is suspended or halted and the slope is bared for more than fifteen (15) consecutive days, the exposed surfaces shall be hydro-mulch seeded or protected as directed by the Owner's Representative at the Contractor's expense without cost to Owner.

Fill slopes shall be finished as specified and in accordance with the requirements outlined for cut slopes above.

**3.07** Construction of berms, cofferdams, or other such construction in or near the vicinity of waterways, including drainage swales, or other bodies of water shall be of approved materials.

**3.08** The temporary erosion and siltation control measures outlined in this section are minimum requirements and shall not preclude the provision of any additional measures which Contractor may deem necessary. Damages caused by the erosion of soils and the pollution of downstream areas shall be the responsibility of Contractor and all costs for repairing, correcting, replacing, and cleaning such damaged or polluted facilities shall be borne by Contractor.

**3.09** Grassing for erosion control can be undertaken by sprigging, matting or hydroseeding.

A. Sprigging or Matting

1. Ground Preparation: Prior to planting, the areas to be grassed shall be cleared of all unwanted plants (including their root systems), stones over three (3) inches in diameter, papers, trash and debris.

If the existing soil in the areas to be grassed is suitable for use as topsoil, the soil shall be scarified to a depth of six (6) inches from the finished surface and worked until it is of a uniform and loose texture.

Areas unsuitable for planting shall be finished with a 4-inch layer of topsoil, spread and graded to conform to the finish grade indicated.

2. Planting: Planting shall be by sprigging, matting, or other methods at the option of the Contractor. If planting is by sprigging or matting, the surface shall be rolled with a suitable lawn roller after planting has been completed.
3. Water shall be applied within the same day of planting in such quantities as to moisten the soil to the depth of the planted grass. Additional application shall be made so that the planted areas are continually kept damp to the grass depth and until the commencement of plant establishment work.
4. Fertilizer shall be applied at not less than the rate of 300 pounds per acre, 23 to 30 days after the grass has been planted.

#### B. Hydroseeding

1. Contractor shall begin hydroseeding operations after the areas prepared or designated for seeding have been accepted by Owner's Representative. Acceptance shall include observation of slopes to ensure provision has been made for the collection and disposal of surface water to protect planted areas from erosion. Acceptance shall not relieve Contractor of his responsibility to restore any damage to the slope or planted areas not yet accepted by Owner.
2. The hydroseeding equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and of applying the slurry to provide uniform coverage. Seed, fertilizer, and mulch mix shall be applied in one operation by approved hydraulic equipment.
3. Areas inaccessible to hydroseeding application shall be seeded, fertilized and mulched by hand methods.
4. Water shall be applied immediately following mulching in such quantities as to moisten the soil and mulch. Watering shall be continued in such manner, quantity, and frequency to ensure proper germination and growth and shall be done in a way that will prevent erosion and will not cause damage to the planted areas.
5. Plant Establishment
  - a. Grass areas shall be maintained for a minimum of 90 days after initial planting acceptance.
  - b. Planting areas are to be irrigated and fertilized as required to ensure active grass growth. Regulate irrigation as necessary to avoid erosion and gullyng.
  - c. As it becomes evident that the grass has not uniformly or properly established, replant the areas immediately with the same grass and quantity as specified for the initial planting and maintain as specified for 90 percent coverage of healthy, actively growing grass for approval during the final inspection.

**END OF SECTION**

## SECTION 01575

### ENVIRONMENTAL CONTROLS

#### PART 1 - GENERAL

##### 1.01 SCOPE

- A. With the exception of those measures set forth elsewhere in the Contract Documents environmental protection shall consist of the prevention of environmental pollution as the result of construction operations under the Contract. For the purpose of this section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utilization of the environment for aesthetic and recreational purposes.
- B. All costs incurred in complying with the provisions of this section shall be borne by the Contractor. No separate payment will be made to Contractor for measures required for environmental control during construction.
- C. Where the requirements of other specification sections are in conflict with this section, the more stringent requirement will govern.

##### 1.02 RELATED SECTIONS

- A. Requirements of the Special Provisions and the Division 1 sections apply to this section.
- B. Section 01015 – Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints, Coatings, Carpets and Wood Products.
- C. Section 01352 – Sustainable Design Requirements (LEED and LBC)
- D. Section 01505 – Construction Waste Management.
- E. Section 01570 – Soil Erosion Control.

##### 1.03 APPLICABLE REGULATIONS

In order to provide for abatement and control of environmental pollution arising from the construction activities of Contractor and his subcontractors in the performance of this Contract, the work performed shall comply with the intent of the applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement, including, but not limited to, the following regulations:

- A. State of Hawaii, Department of Health (DOH), Hawaii Administrative Rules, Title 11, Chapter 55, WATER POLLUTION CONTROL; Title 11, Chapter 54, WATER QUALITY STANDARDS.
- B. State of Hawaii, DOH, Hawaii Administrative Rules, Title 11, Chapter 59, AMBIENT AIR QUALITY; Title 11, Chapter 60, AIR POLLUTION CONTROL LAW.

- C. State of Hawaii, Occupational Safety and Health Standards, Title 12, Department of Labor and Industrial Relations, Subtitle 8, Division of Occupational Safety and Health, subparagraph 12-202-13, ASBESTOS; Environmental Protection Agency, Code of Federal Regulations Title 40, Part 61, NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS, and Subpart M, NATIONAL EMISSION STANDARDS FOR ASBESTOS; and U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Asbestos Regulations, Code of Federal Regulations Title 29, Part 1910, Subpart Z, Section 1910.1001.

## **PART 2 - PRODUCTS**

None.

## **PART 3 - EXECUTION**

### **3.01 AIR POLLUTION CONTROL**

- A. Emission: Contractor shall not permit or cause air pollution from mist, smoke, vapor, gas, odorous substances, particulate matter, or any combination thereof.
- B. Contractor shall not be allowed to operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments are made, as determined by the Owner's Representative.
- C. Dust: Contractor, for the duration of the Contract, shall maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within or without the Project limits free from dust which would cause a hazard to the work, or the operations of other contractors, or to persons or property. Industry accepted methods of stabilization suitable for the area involved, such as sprinkling or similar methods, will be permitted.
  - 1. Contractor shall keep dust within acceptable levels at all times, including nonworking hours, weekends and holidays.
  - 2. The method of dust control and all costs incurred therefore are the responsibility of Contractor. Chemicals or oil treating shall not be used. No exterior/dry sweeping permitted. Vacuuming, wet mopping, or wet or damp sweeping are acceptable.
  - 3. During loading operations, Contractor shall water down debris and waste materials to allay dust. The Contractor shall cover trucks hauling debris or fine materials as required by PUC regulation.
  - 4. Contractor is responsible for all damage claims.
- D. Burning shall not be permitted.

### **3.02 WATER POLLUTION CONTROL**

- A. NPDES Permit: Owner has applied for a Notice of Intent (NOI) for General Coverage under the National Pollutant Discharge Elimination System (NPDES), which is under review by the State Department of Health (DOH). The Contractor will be provided with a copy of the permit upon its issuance and shall be responsible for compliance with all conditions therein

- B. Wastes: Contractor shall not deposit at the site or in its vicinity, solid waste or discharge liquid waste, such as fuels, lubricants, bituminous waste, untreated sewage and other pollutants, which may contaminate the existing coastal or ground water. No discharge of wastewater into waterways or drainage systems, such as gutters and catch basins, shall be undertaken by Contractor unless treated to comply with Federal Environmental Protection Agency and State Department of Health (DOH) water pollution regulations.
- C. Spillages: Care shall be taken to ensure that no petroleum products, bituminous materials, or other deleterious substances, including debris, are allowed to fall, flow, leach, or otherwise enter existing coastal or ground water. Wherever trucks and vehicles leave the site and enter surrounding paved streets, Contractor shall minimize any material from being carried onto the pavement.
- D. Contractor shall take all necessary precautions to prevent the pollution of water resources from fuels, oils, bitumens, calcium chloride, herbicides, pesticides, chemicals or other harmful materials. Conduct operations so as to avoid siltation of coastal waters. Contractor shall perform no vehicle fueling or maintenance on the site except for construction vehicles used on site.
- E. Erosion: See Section 01570.

### **3.03 NOISE CONTROL**

Construction equipment shall be equipped with suitable mufflers to maintain noise within levels complying with applicable regulations. Contractor shall muffle all internal combustion engine-powered equipment to minimize noise, and properly maintain to reduce noise to acceptable levels. No loud music or other types of noise. The definition of loud or intrusive music or noise shall be at the sole discretion of Owner's Representative.

### **3.04 DISPOSAL**

- A. Construction waste, such as crates, boxes, building materials, pipes and other rubbish, shall be recycled, reused, or salvaged in accordance with the Construction Waste Management Plan.
  - 1. The Contractor shall haul away all non-recyclable debris and waste materials to a licensed off-site landfill area. During loading operations, Contractor shall water down debris and waste materials to allay dust.
  - 2. Other areas or methods proposed by Contractor for disposal of such waste will be approved only if Owner's Representative determines that their effect on the environment is equivalent to or less than those required herein.
  - 3. No burning or burying of debris and waste materials permitted on the Site.
  - 4. Disposal of organic materials will be on campus at a site designated by Owner's Representative. Chippable debris will be chipped on site by the Contractor and placed as directed by the Owner's Representative.
  - 5. Removal of wastes shall be a continuous ongoing operation. Wastes and debris shall not be allowed to accumulate in large open piles. No burning or burying of debris and



waste materials permitted on the project. Contractor shall haul away all unusable debris and waste materials to a licensed off-site landfill area.

6. The Contractor cleanup shall include the collection of all waste paper and wrapping materials and other objectionable materials, and removal as required. Frequent clean up to coincide with rubbish producing events.
- B. Contractor shall not use or dispose of any hazardous waste, hazardous material or hazardous substance, as those terms are defined in any Federal, State, or City and County laws, statutes, ordinances or regulations.
  - C. Windblown wastes and debris and wastes left by workers shall be collected by Contractor and disposed as described above. No rubbish shall be deposited on the site.

**END OF SECTION**

**SECTION 01660  
PRODUCT STORAGE AND HANDLING REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 HANDLING**

Provide equipment and personnel to handle products by methods to prevent soiling or damage.

- A. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
- B. Promptly return damaged shipments or incorrect orders to manufacturer.
- C. For materials or equipment to be reused or salvaged, use special care in removal, storage and reinstallation to insure proper function in completed work.

**1.02 STORAGE**

Store products in accordance with provisions of Article 9 – Construction Yard in the General Conditions, and periodically inspect to assure that stored products are undamaged and are maintained under required conditions.

**PART 2 - PRODUCTS - Not used**

**PART 3- EXECUTION – Not used**

**END OF SECTION 01660**

**SECTION 01780  
CLOSEOUT SUBMITTALS**

**PART 1 – GENERAL**

1.01 SUMMARY

The following items are prerequisite to substantial completion:

- A. As-built plans.
- B. Affidavit of published Notice of Completion.
- C. LEED and LBC documentation.

1.02 AS-BUILT PLANS

Maintain one (1) set of full-size Contract Plans at the job site, marking them in red to show all variations between the construction actually provided and that indicated or specified in the Contract Documents, including buried or concealed construction. Where a choice of material or method is permitted herein or where variations in scope of character of work from that of the original Contract are authorized, the Plans shall be marked to define the construction actually provided. Maintain and update plans on a daily basis. Stamp, sign, and date each sheet with the following stamp:

AS-BUILT DRAWINGS/SPECIFICATIONS

This certifies that the dimensions and details shown on this sheet reflect the dimensions and details, and specifications as constructed in the field.

\_\_\_\_\_  
CONTRACTOR'S NAME

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Final payment to the Contractor will not be made until approval of the As-Built Plans. On completion of the work, the marked-up drawings shall be delivered to the Owner for acceptance.

1.03 AFFIDAVIT OF PUBLISHED NOTICE OF COMPLETION

- A. Submit to the Owner's Representative a receipt from a local newspaper agency, indicating payment for publication of Notice of Completion in accordance with Hawaii Revised Statutes, Section 507-43 (and as amended).
- B. Submit to the Owner's Representative a copy of the published Notice of Completion from the newspaper it was published in.

- C. Submit to the Owner's Representative an affidavit from the Court Clerk, Third Circuit Court, State of Hawaii, indicating the Notice of Completion has been published in accordance with Hawaii Revised Statutes, Section 507-43 (and as amended).

#### 1.04 LEED AND LBC DOCUMENTATION

Submit to the Owner's Representative:

- a. Waste Management Progress Reports
- b. Contractor Construction Waste Reporting Forms
- c. Legible copies of certifications, receipts, and weight tickets required in accordance with Section 01352 – Sustainable Design Requirements

All documents shall be neatly bound in a 3-ring binder

#### **PART 2 – PRODUCTS**

Not used.

#### **PART 3 – EXECUTION**

##### 3.01 Review For Conformance to Contract Drawings:

The Owner's Representative shall review the as-built survey and the areas identified as non-conforming and shall specify corrective measures to be performed by the Contractor.

END OF SECTION

## **SECTION 02230**

### **SITE PREPARATION**

#### **PART 1 - GENERAL**

##### **1.01 SCOPE**

Provide all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this section, complete, as specified herein. The work includes, but is not limited to, the following:

- A. Examine all other sections for work related to those other sections and required to be included as work under this section.
- B. Grubbing including but not limited to the removal of tree stumps, large roots, buried logs, junk, and other objectionable materials at or below the ground surface to the limits indicated.
- C. Clearing including but not limited to removal of all materials, vegetation, debris, rubbish, and other unsuitable material; removing of trash piles and other obstructions interfering with the proposed work to the limits indicated.
- D. Demolition of all obstacles and obstructions, with removal and disposal of cleared materials.
- E. Abandonment, or demolition, and removal of underground utilities including, but not limited to, selected portions of existing utility lines and electricity systems.
- F. The Contractor shall procure all necessary permits and certificates that may be required in connection with this work and comply with all pollution control and safety regulations.

##### **1.02 LEED AND LBC REQUIREMENTS**

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building Platinum rating and Living Building Challenge (LBC) Certification. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED and LBC criteria.

##### **1.03 RELATED SECTIONS**

- A. Requirements of the Special Provisions and the Division 1 sections apply to this section.
- B. Refer to the local County Grading Ordinances.

- C. The work under this section is specified in the following section of the Standard Specifications:

Section 10 - Clearing and Grubbing

All references to measurement and payment shall be deleted.

- D. Section 01352 – Sustainable Design Requirements.
- E. Section 01505 – Construction Waste Management.
- F. Section 02300 – Earthwork.

#### **1.04 CONDITION AT SITE**

The Contractor shall visit the site, examine and note all existing conditions and extent of work involved for preparation of the site and clearing and grubbing.

### **PART 2 - PRODUCTS**

None.

### **PART 3 - EXECUTION**

#### **3.01 GENERAL**

- A. Maintenance of Traffic: The Contractor shall conduct operations with minimum interference to existing roadways. When necessary, the Contractor shall provide and erect barriers as required for safety and to facilitate the progress of the work in support, with special attention to protection of personnel.
- B. 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 Contract requirements, 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.
- C. Fires: No burning of fires of any kind will be allowed.
- D. Reference Points: Benchmarks, property pins and other survey points, shall be carefully maintained, but if disturbed or destroyed, shall be replaced by a registered Land Surveyor licensed in the State of Hawaii, at the Contractor's expense.
- E. Waste Materials: All waste materials resultant from operations under this section shall be recycled, reused, salvaged, or disposed of in accordance with the Construction Waste Management Plan. Non-recyclable waste material shall become the property of the Contractor and shall be removed from the project site and comply with all applicable government regulations in disposing of said waste material.

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

### **3.02 EXISTING UTILITY LINES**

- A. Existing underground lines indicated are shown from the best possible information available. Verify all utility line locations prior to start of any work. The existence of active underground utility lines within the construction area is not definitely known. Should any unknown line be encountered during excavation, the Contractor shall immediately notify the Owner's Representative of such discovery. The Owner's Representative shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Owner's Representative only as he deems necessary.
- B. All existing work and items which are required to be removed shall be removed in such manner that minimum damage and disturbance is caused to adjacent and connecting work. The Contractor shall be responsible for repairing and/or replacing all work which is damaged by these operations.
- C. Plug or cap all existing utilities to be abandoned and not interfering with the work. Remove and dispose of existing piping within the limits of work, unless otherwise directed by the utility system owner.
- D. Protect and retain all existing drainage structures within the construction area and adjoining properties. Stake and prominently flag so all concerned with the work can see.

### **3.03 CLEARING AND GRUBBING**

- A. Clearing and grubbing shall be in accordance with the requirements of Section 10 of the Standard Specifications. The Contractor shall clear the site and adjacent work areas within the limits of grading, removing rubbish, debris, shrubs, and other obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of other work included in this Contract.
- B. Vegetation and other organic debris material shall be stripped to the depth below existing grade required for its complete removal. Remove all logs and branches encountered in the course of the work.
- C. Disposal of organic materials will be on campus at a site designated by Owner's Representative. Chippable debris will be chipped on site by the Contractor and placed as directed by the Owner's Representative.
- D. The Contractor shall protect from injury and damage all surrounding roadways, walkways, trees, plants, and other existing facilities to remain 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 Owner.
- E. The use of proper equipment is the responsibility of the Contractor.

### **3.04 CLEANUP OF PREMISES**

- A. All materials and equipment indicated to be removed, except that to be reused in the work, shall become the property of the Contractor and shall be removed from the site. Materials or equipment may not be left on the site for the purpose of advertising for sale.
- B. Remove debris and unsuitable materials resulting from this work from the site and adjacent work areas as promptly as it accumulates to prevent a nuisance and as directed by the Owner's Representative.

**END OF SECTION**



## **SECTION 02300**

### **EARTHWORK**

#### **PART 1 – GENERAL**

##### **1.01 SCOPE**

Provide all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this section, complete, as specified herein. The work includes, but is not limited to, the following:

- A. Examine all other sections for work related to those other sections and required to be included as work under this section.
- B. Excavation, filling, backfilling, rough and finish grading, overhauling and stockpiling, and related items necessary to complete the site grading as indicated and specified herein.

##### **1.02 LEED AND LBC REQUIREMENTS**

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building Platinum rating and Living Building Challenge (LBC) Certification. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED and LBC criteria.

##### **1.03 RELATED SECTIONS**

- A. Requirements of the Special Provisions and the Division 1 sections apply to this section.
- B. The work under this section is specified in the following sections of the Standard Specifications:
  - Section 12 - Roadway Excavation
  - Section 50 - Soil PreparationAll references to measurement and payment shall be deleted.
- C. LEED and LBC requirements are specified in Section 01352 – Sustainability Design Requirements.
- D. Erosion control requirements are specified in Section 01570 – Soil Erosion Control.
- E. Composite turf reinforcement mat for slope stabilization is specified in Section 02070 – Geosynthetics.

- F. Clearing, grubbing, and demolition are specified in Section 02230.
- G. Earthwork for utilities is specified in Section 02315.

#### **1.04 ORDINANCES AND PERMITS**

The Contractor shall comply with all applicable ordinances and regulations and obtain the required permits. Acquisition of the permits and payment of all fees will be the responsibility of the Contractor. The Contractor shall also be responsible for compliance with the project's NPDES permit conditions, once issued by DOH.

#### **1.05 SOILS TESTING AND ANALYSES**

- A. The services of a Soils Engineer shall be hired by the Owner. A soil technician or Soils Engineer shall be present at the site to observe and monitor backfill operations, earthwork progress and to take density or visual observations as appropriate. Where low density test results are noted, the area shall be reworked by the Contractor and retested.
- B. If the field observation and test results, in the opinion of the testing personnel or Soils Engineer, indicate that the backfill and earthwork are not in general conformance to the intent of the plans and specifications, the discrepancy shall be reported to the Contractor for corrective action with the Owner's Representative notified.

#### **1.06 UNFORESEEN CONDITIONS BELOW GRADE**

Unforeseen soil conditions, such as voids or cavities, areas of soft soils and materials, seepage water, expansive soil pockets, and the like, may be encountered below or at existing grade. Corrective measures shall be made in the field as the conditions are detected in accordance with the requirements herein or as recommended by the Soils Engineer. These corrective measures shall be considered as incidental to the contract price.

#### **1.07 SUBMITTALS**

Submit representative sample of off-site material to be imported for fill to the Soils Engineer for testing, at least five days prior to hauling.

#### **1.08 REFERENCES**

Geotechnical Reports identified in Section 00320 – Geotechnical Reports.

### **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:
1. General Fill shall be excavated on-site material free of organics and deleterious materials with a maximum particle dimension of six (6) inches.
  2. Imported Fill shall be non-expansive select granular materials, such as crushed basalt and shall be free from organics and deleterious materials. The material shall be well-graded with a maximum particle dimension of six (6) inches. The material should contain less than 30 percent particles passing the No. 200 sieve. The material must be submitted and approved by the Soils Engineer prior to hauling to the job site.
  3. Structural Fill shall be General Fill or Imported Fill with a maximum particle dimension of three (3) inches.
- C. Materials excavated within the project boundary and which meet the requirements specified may be used as fill, unless otherwise indicated by the Soils Engineer during construction. Control of gradation and maximum size of individual fragments will be required through screening or other processing. Off-site borrow or on-site, rock crushing may be undertaken to provide fill materials as herein specified. Roots, tree branches, and other organic matter missed during clearing and grubbing shall be removed from the fill material. Generally, fill materials, unless otherwise specified, may consist of rock, gravel, sand or fine-grained, non-expansive soil, or a mixture thereof.
- D. Material that is expansive, spongy, subject to decay, or otherwise considered unsuitable shall not be used as fill.
- E. Crushed rock shall be on-site material or borrow conforming to ASTM C33, Table 2, No. 2 Gradation, having a minimum size of three quarters (3/4) inch and maximum size of three (3) inches.

### **PART 3 – EXECUTION**

#### **3.01 GENERAL**

- A. Excavation, embankment and grading shall comply with County Code as amended, and as specified herein.
- B. No excavation or fill placement shall be undertaken until the area has been cleared and grubbed in conformance to Section 02230.
- C. All earthwork shall be conducted under the intermittent observation of the Soils Engineer. Field density tests will be made as appropriate by the Soils Engineer. The Contractor shall coordinate his grading operations with the Soils Engineer and shall notify the Soils Engineer at least forty-eight (48) hours in advance for any compaction testing and observations required. The Soils Engineer shall be granted unrestricted access to the grading operations for the purpose of conducting observations, conducting testing or securing samples.
- D. Protection
  1. All excavation shall be protected and guarded against danger to life, limb and property.

2. Provide protection of persons and property in compliance with the Contract and applicable provisions of current State and Federal safety and health standards and acts, codes and ordinances.
  3. Carefully maintain benchmarks, monuments and other reference points. Replace as specified in Section 02230 if disturbed or destroyed.
  4. Locate and protect existing utilities. Notify the Owner's Representative of any conflict between proposed work and existing utilities or of any utilities found in the field that are not indicated.
  5. No soil shall be stockpiled in tree root zones.
- E. 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. In the event of damage to existing utilities, plant materials, construction or site improvements, immediately make repairs and replacements necessary to the acceptance of the Owner and at no additional cost.
- F. The Contractor shall at all times control the grading so that the ground is adequately sloped to prevent any water from flowing into adjacent properties, and open trench excavations. All excavations shall be kept free from standing water. The Contractor shall remove the water from the excavation to the extent required for completion of the work. Such dewatering shall be considered incidental to the work.
- G. Laying Out
1. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a surveyor licensed in the State of Hawaii and paid for by the Contractor. The Contractor shall erect and maintain slope stakes showing existing and required elevations.
  2. Contractor shall be responsible for property corners and grade stakes which are destroyed by his operations and for which re-staking is requested.
- H. Erosion control shall be the responsibility of the Contractor, who shall comply with all local laws and regulations regarding discharge of sediment from the project site. The Contractor shall provide all the temporary erosion, dust and siltation control measures shown in the plans and outlined in Section 01570 or as required by the Owner's Representative during construction.
1. As construction progresses and seasonal conditions dictate, more siltation control facilities may be required to ensure complete sediment control.
  2. It shall be the obligation and responsibility of the Contractor to address any new conditions that may be created by his activities and to provide additional facilities over and above the minimum requirements.

I. Control of Water Accumulation

1. Keep excavations free of standing water, pump or drain as required. Perform operations in a manner which continuously allows proper disposal of surface run-off and prevents accumulation of water potentially causing soft areas or impeding work. Before leaving at the end of each work day, perform such operations as may be necessary to minimize possible damage or work slowdown caused by rain.
2. The Contractor shall be responsible for design and permitting of all dewatering systems installed for the work.
3. Remove all water, including rainwater, encountered during the course of the work by use of pumps, drains, and other accepted methods. Discharge collected water to an area that will not result in erosion, creation of a nuisance in off-site areas, or surface water course pollution.
4. Prevent surface water from running into construction areas and provide temporary dams, curbs and ditches as may be required.
5. Acquisition of permits and approvals for discharge from dewatering operations shall be the responsibility of the Contractor. Discharge from dewatering operations shall not be drained directly onto the street or gutter. In areas where a storm drainage system has been installed, the discharge shall be conveyed to the nearest storm drain by the use of pipes or other suitable means. If necessary, the discharge shall be filtered or otherwise treated to comply with all applicable Federal, State and County regulations concerning water pollution prior to its release into waterways or drainage systems. Contractor is responsible for all dewatering permits and approvals.

**3.02 EXCAVATION**

A. General Requirements

1. Excavation shall be done so as to obtain the elevations indicated. Yielding areas, loose areas or cavities disclosed during scarification or compacting shall be over-excavated and backfilled with compacted with fill material.
2. Materials that meet the fill material requirements specified herein shall be stockpiled for later use as fill material. This material may also be excavated directly to fill at the Contractor's option.
3. Silty volcanic ash may be blended with granular soils to meet the fill material requirements specified herein.
4. Unsuitable subgrade soil such as organic materials, volcanic ash, mud, soft material and expansive soils, as determined by the Soils Engineer, shall be excavated and removed by the Contractor in accordance with the Construction Waste Management Plan.

B. Rough Grading

1. Excavation shall be made to the elevations and the form indicated, with finish grades and slopes cut true and straight in conformance with the Plans and Specifications.

2. Use care in making cuts so backfill or backforming will not be required in cut areas. Backfilled excavations taken to greater depth than required shall be filled per requirements of this section and Section 02230.
  3. Repair work due to over or careless excavation will be at the expense of the Contractor.
  4. Perform dewatering to keep the excavated areas free from standing water.
- C. Grade excavated subgrade area to reasonably true and even surfaces that conform to slopes and grades indicated. Make proper allowance for topsoils, base course and paving. Grade to uniform levels or slopes between points where grades are shown; round surfaces at abrupt changes of level.
- D. Over Excavation
1. Excavations for slabs or flatwork that are made deeper than indicated shall be backfilled with crushed aggregate base material that is brought to at least the optimum moisture and compacted to at least ninety-five percent (95%) of the maximum dry density.
  2. Excavations to greater depths than shown may be required by the Soils Engineer in order to reach satisfactory soil bearing conditions as determined through testing conducted. Such additional costs will be paid, provided the costs are reviewed and accepted by the Owner's Representative prior to the extra work being done.
    - a. Excavate, remove, and process spoils for use on-site in conformance with the Construction Waste Management Plan.
    - b. Obtain a ground survey of the area overexcavated adequate to determine quantity eligible for compensation. The Contractor shall determine the volume of material overexcavated and submit the ground survey and overexcavated volume to Owner's Representative for review and concurrence.
    - c. Backfill the overexcavation as specified herein.
- E. Finish subgrades in excavated and over-excavated areas shall be scarified to a minimum depth of eight (8) inches, moisture-conditioned to above the optimum moisture, and compacted to at least ninety (90) percent relative compaction. The compaction requirement shall be increased to a minimum of ninety-five (95) percent relative compaction under pavements

### **3.03 FILL AND BACKFILL**

#### **A. General Requirements**

1. Filling operations shall be performed so as to bring the fill area to the finished grades indicated with appropriate allowance for base course and paving.
2. After the ground surface that is to receive the fill has been cleared, it shall be scarified to a depth of eight (8) inches until it is uniform and free from ruts, hollows, hummocks, or other uneven features which may prevent uniform compaction.

- a. The scarified ground surface shall then be brought to at least the optimum moisture content, mixed as required, and compacted as specified below.
  - b. If rocky subgrade is exposed and scarification is not practical, then proof-roll the subgrade with a drum roller or similar heavy equipment a minimum of eight (8) passes to detect and collapse near surface cavities.
  - c. Yielding areas and cavities found during the site preparation shall be cleaned and backfilled with compacted fill material placed as herein specified.
3. Prior to placing fill, the ground surface to receive the fill shall be observed or tested by the Soils Engineer.
  4. All compaction shall be accomplished by power equipment appropriate to the nature of the fill material and capable of obtaining the specified level of compaction. Inaccessible places such as backfilling of trenches or areas next to vertical surfaces shall be compacted with the use of approved tampers or vibrators.
  5. All fill and backfill shall be compacted at a moisture content that is at or above the optimum moisture content as determined by ASTM D1557. At all times, it shall be the responsibility of the Contractor to employ such means as may be necessary to obtain a uniform moisture content throughout the material being compacted.
  6. Where shrinkage cracks are noted at ground surface after subgrade compaction the subgrade soil shall be scarified and recompacted.
- B. Placing, Spreading, and Compacting Fill Material
1. Fills shall be placed in lifts not exceeding eight (8) inches in loose thickness moisture conditioned to above the optimum moisture content and compacted.
  2. Compaction
    - a. When moisture content of the fill material is too dry, water shall be added until the moisture content is at least optimum. When the moisture content of the fill material is too wet, the fill material shall be aerated until the moisture content is sufficiently lowered to allow the minimum specified degree of compaction to be obtained, but not below the optimum moisture content.
    - b. After each layer of fill has been placed, mixed, and spread evenly, it shall be thoroughly compacted by use of the proper equipment to not less than ninety percent (90%) of the maximum dry density of the soil being compacted. Rolling of fills shall be accomplished while the fill material is at or above the optimum moisture content. Rolling of each layer shall be continuous over its entire area, and the roller shall make sufficient trips to ensure that the desired density has been obtained. Fills and backfills below road subgrade level shall be compacted to at least ninety-five percent (95%) of the maximum dry density.
    - c. Compaction shall be accomplished by using sheepfoot rollers, vibratory rollers, or other types of acceptable compaction equipment.

3. Testing

- a. The degree of compaction obtained in fills shall be determined by ASTM D2922 nuclear field density testing procedures and ASTM D1557 laboratory compaction testing procedures.
- b. Conventional compaction testing may be substituted by a number of equipment passes and visual observations if deemed appropriate by the Soils Engineer.

4. Recompanction

- a. Where test results or observations of the Soils Engineer 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.
  - b. The Contractor shall be responsible for placing and compacting 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 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 moisture content and the density of the fill surface are satisfactory.
5. 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.

C. Slopes and Final Grading

1. The Contractor will be required to obtain a minimum relative compaction of ninety percent (90%) of maximum dry density out to the finish fill slope face. Compaction shall be achieved by overbuilding the slope and cutting back to the compacted core with suitable equipment.
2. Excavation and embankment shall be finished with all slopes cut true and straight in accordance with the lines and grades indicated. All slopes, whether old or new, shall be maintained with true and smooth surfaces. Overbreaks 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 grassed by sodding or by hydroseeding or protected from erosion by other 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 Soils 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 indicated, no cut shall be excavated higher or steeper than that allowed by the County Code. If there are substantial discrepancies in the elevations of the existing ground at the top of 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 plans can be revised accordingly.
- c. The maximum engineered slope shall be two (2) horizontal to one (1) vertical unless otherwise recommended by the Soils Engineer.

### **3.04 FINISH GRADING**

- A. Fine grade to bring areas to required lines and grades.
- B. Slope finish grades to drain surface water as indicated. Generally, grade with uniform slope between points where elevations are given, or between such points and existing grades.
- C. Should settlement or wash out occur in graded or backfilled area prior to acceptance of the work, such areas shall be repaired and grades reestablished to the required elevations and slopes.

### **3.05 COMPLETION REQUIREMENTS**

- A. Cleanup: Leave entire graded portions of the site "rake clean."
- B. Disposal: Pick up and transport unsuitable, deleterious excess material and debris in accordance with the Construction Waste Management Plan.
- C. Suitable soil materials not required for construction of embankments under the project and non-usable materials such as mud, soft material, and expansive soils shall be disposed of in accordance with the Construction Waste Management Plan.

**END OF SECTION**

**SECTION 02315  
UTILITY TRENCH EXCAVATION AND BACKFILL**

**PART 1 - GENERAL**

**1.01 SCOPE**

Provide all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this section, complete, as specified herein. The work includes, but is not limited to, the following:

- A. Examine all other sections for work related to those other sections and required to be included as work under this section.
- B. Trenching and backfilling for utilities.

**1.02 LEED AND LBC REQUIREMENTS**

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building Platinum rating and Living Building Challenge (LBC) Certification. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED and LBC criteria.

**1.03 RELATED SECTIONS**

- A. Requirements of the Special Provisions and the Division 1 sections apply to this section.
- B. The work under this section is specified in the following sections:
  - Part III, Section 1.2 of the DWS Standards.
  - Section 11 - Trench Excavation and Backfill of the Standard Specifications
  - Section 15 – Crushed Rock
  - Section 28 – Subsurface DrainsAll references to measurement and payment shall be deleted.
- C. Section 01352 – Sustainability Design Requirements
- D. Section 01505 – Construction Waste Management
- E. Removal of unsuitable materials is specified in Section 02230.
- F. Earthwork is specified in Section 02300.

#### **1.04 SOILS TESTING AND ANALYSES**

- A. The services of a Soils Engineer shall be hired by the Owner. A soils technician or engineer shall be present at the site to observe and monitor trenching operations and to take density or take density tests or visual observations as appropriate.
- B. If the field observation and test results, in the opinion of the testing personnel or Soils Engineer, indicate that the utility line installation or trench compaction is not in general conformance to the intent of the Plans and Specifications, the discrepancy shall be reported to the Contractor for corrective action with the Owner's Representative notified.

#### **1.05 SUBMITTALS**

Submit gradation and certifications for all bedding and pipe cushion materials and intermediate backfill.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Bedding and backfill materials:
  - 1. Water and fire lines shall be in accordance with the DWS Standards.
  - 2. Drain lines shall be in accordance with Section 11 of the Standard Specifications.
    - a. Pipe bedding for 72-inch drain lines shall be crushed rock, ASTM C33 No.67 gradation.
    - b. Free draining granular materials shall be used for backfill up to 12 inches above the pipe.
    - c. The upper portions of the trench shall be backfilled with general or imported fill materials.
- B. Drainage aggregate filter material shall be ASTM No. 4 (1-1/2" to 3/8") crushed rock.
- C. Buried Warning and Identification Tape
  - 1. General: 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 on rolls, three (3)-inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

#### Warning Tape Color Codes

Yellow:	Electric
Blue:	Water Systems
Purple:	Non-Potable Water

(Fire Systems)

2. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be three thousandths (0.003) inch. Tape shall have a minimum strength of one thousand five hundred (1,500) pounds per square inch (psi) lengthwise, and one thousand two hundred fifty (1,250) psi crosswise, with a maximum three hundred fifty percent (350%) elongation.
3. Detectable Warning Tape for Non-metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be four thousandths (0.004) inch. Tape shall have a minimum strength of one thousand five hundred (1,500) psi lengthwise and one thousand two hundred fifty (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 three (3) feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.
4. Detection Wire for Non-Metallic Piping: Detection wire shall be insulated single strand, solid copper with a minimum diameter of 12 AWG.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION**

- A. Verify the locations of the underground utilities and other obstructions that may affect the work. Identify known underground utilities, stake and flag locations.
- B. Identify required lines, levels, contours and datum.

#### **3.02 TRENCH EXCAVATION AND BACKFILLING**

- A. General
  1. The Contractor shall do all necessary excavation to the depths indicated. All excavation shall be unclassified and shall be performed regardless of the material encountered. Unsuitable material encountered shall be removed as specified in Section 02230.
  2. The top edges of the trench shall be neatly cut along well-defined lines.
  3. The trench width below a level 2 feet above the top of the pipe shall not exceed 6 inches beyond the trench width specified, or shown. From a level two (2) feet above the top of the pipe to existing ground, the width of trench excavation shall extend as nearly vertical as practicable or be confined to the minimum work area required for construction and shall not extend beyond existing structures or utilities adjacent to the pipe alignment, unless otherwise authorized by the Owner's Representative.
  4. The Contractor shall be solely responsible for safety and shoring requirements of utility trench excavations.

5. Excavation for utility structures and appurtenances shall conform to the requirements of the Standard Specifications and DWS Standards as hereinabove specified.
- B. Perform excavation, placement and compaction of bedding and backfill material for water and fire lines and appurtenances in accordance with the DWS Standards.
- C. Perform excavation, and placement and compaction of bedding and backfill materials for drain lines and structures as indicated and specified in Section 11 of the Standard Specifications.
1. Place bedding material on a prepared trench foundation.
  2. Install and compact bedding in layers not exceeding eight (8) inches in loose thickness, with proper moisture control. Use uniform compaction techniques for all drain line trenches. The completed bedding layer shall be at least six (6) inches thick. Level the final grade by hand. Mounding of the bedding to achieve the pipe grade shall be prohibited.
  3. Place initial backfill in layers not exceeding eight (8) inches in loose thickness, with proper moisture control. Work material around pipe by hand and provide uniform support throughout the entire length. Extra care shall be taken around manholes, pipe crossings and service connections to avoid differential settlement of pipes. Place initial backfill to a minimum of six (6) inches above the pipe crown.
  4. Mechanically compact trench backfill to not less than 95 percent relative compaction. Where trenches are below pavement areas, the upper 3 feet of trench backfill below the pavement subgrade shall be compacted to a minimum of 95 percent relative compaction.
- D. The Contractor shall be responsible for protecting the pipe or structure while placing and compacting the backfill material.
- E. Over Excavation
1. Trench excavations that are made deeper than indicated shall be backfilled with crushed aggregate base material that is brought to at least the optimum moisture and compacted to at least ninety-five percent (95%) of the maximum dry density.
  2. Excavations to greater depths than shown may be required by the Soils Engineer in order to reach satisfactory soil bearing conditions as determined through testing conducted. Such additional costs will be paid, provided the costs are reviewed and accepted by the Owner's Representative prior to the extra work being done.
- F. Dewatering
1. Comply with the requirements for dewatering as specified in Section 02300.
  2. All excavations shall be kept free from water during the construction and backfilling of the utility structure.
  3. Perform operations in a manner which continuously allows proper disposal of surface run-off and prevents accumulation of water potentially causing soft areas of impeding

work. Before leaving after each work day, perform such operations as may be necessary to minimize possible damage or work slowdown caused by rain.

#### G. Safety

1. Provide barricades, construct fences or other means to fully protect the public and site personnel from injury and whenever directed by the Owner's Representative.
2. All open excavations shall be covered or barricaded during non-working hours. Traffic bearing covers shall be provided where applicable. All excavated material shall be piled or stored so that it does not obstruct vehicular traffic or pedestrian areas.
3. Crib and shore as necessary to retain excavations. Comply with the requirements of OSHA Chapter 132.
4. The Contractor shall properly sheet and brace all excavations to render it safe and secure from possible slides. All sheeting and bracing shall be considered as incidental to the excavation work and no direct payment will be made.

### 3.03 WARNING TAPE, TONING WIRE AND ELECTRONIC MARKERS

- A. Install buried warning and identification tape in accordance with manufacturer's recommendations except as modified herein. Unless otherwise indicated, bury tape twelve (12) inches below finished grade; under pavements and slabs, bury tape six (6) inches below top of subgrade.
- B. Bury detection wire directly above non-metallic piping at a distance not to exceed twelve (12) inches above the top of pipe. The wire shall extend continuously and unbroken from valve box to clean out or valve box. The ends of the wire shall terminate inside the valve box or clean out at each end of the pipe, with a minimum of three (3) feet of wire, coiled, remaining accessible. The wire shall remain insulated over its entire length.

### 3.04 TESTING AND INSPECTION

- A. The Contractor shall coordinate backfilling with testing of utilities. Testing shall be complete before final backfilling.
- B. The Soils Engineer shall perform testing of trench bedding and materials, and perform in-place density testing during the backfill operations.

### 3.05 FINISH OPERATIONS

- A. Grading: Finish to grades indicated within one tenth (0.1) of a foot and to drain water without ponding. Existing grades that are to remain, but have been disturbed by the Contractor's operations, shall be graded to restore existing elevations. Comply with the requirements of Section 02300.

- B. Disposal of Surplus Material

Excavated surplus material or material unsuitable for backfilling such as loose stones, rocks, boulders, or other material, shall be removed by the Contractor to an on-site location to be determined by the Owner's Representative. Materials shall be segregated and stockpiled.

Energy Lab  
Hawaii Preparatory Academy, Kamuela, HI  
FAI Project No. XXXX.XX

24 July 2008  
PROGRESS SET

**END OF SECTION**