ATTACHMENT A-6

Erosion Control Drawings
(*Item C.8 of Form C*)

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FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	10	50

WATER POLLUTION AND EROSION CONTROL NOTES

A. GENERAL:

1. See Special Provision Section 209 - Water Pollution and Erosion Control. Section 209 describes but is not limited to: submittal requirements; scheduling of a water pollution and erosion control conference with the Engineer; construction requirements; method of measurement; and basis of payment. In addition, Appendix A lists potential pollutant sources and corresponding BMPs used to mitigate the pollutants.

2. Follow the guidelines in the current HDOT Construction Best Management Practices Field Manual in developing, installing and maintaining the Best Management Practices (BMP) for the project. For any conflicting requirements between the Manual and applicable bid documents, the applicable bid documents will govern. Should a requirement not be clearly described within the applicable bid documents, the Contractor shall notify the Engineer immediately for interpretation. For the purposes of clarification under Note A.2, "applicable bid documents" include the construction plans, standard specifications, Special Provisions, Permits, and the NPDES Form C and Attachments.

3. Follow the guidelines in the Honolulu's City ∉ County "Rules Relating to Soil Erosion Standards and Guidelines" along with applicable Soil Erosion Guidelines for projects on Maui, Molokai, Kauai, and Hawaii.

4. The Engineer may assess liquidated damages of up to $27,500 for non-compliance of each BMP requirement and each requirement stated in Section 209 and special provisions, for every day of non-compliance. There is no maximum limit on the amount assessed per day.

5. The Engineer will deduct the cost from the progress payment for all citations received by the Department for non-compliance, or the Contractor shall reimburse the State for the full amount of the outstanding cost incurred by the State.

6. Install a rain gage prior to any field work including the installation of any site-specific best management practices. The rain gage shall have a tolerance of at least 0.05 inches of rainfall. Install the rain gage on the project site in an area that will not deter rainfall from entering the gage opening. Do not install in a location where rain water may splash into rain gage. The rain gage installation shall be stable and plumbed. Do not begin field work until the rain gage is installed and site-specific best management practices are in-place.

7. Submit Site-Specific BMP Plan to the Engineer along with a completed Site-Specific BMP Review Checklist within 30 calendar days of contract execution. The Site-Specific BMP Review Checklist may be obtained from http://www.stormwaterhawaii.com.

B. WASTE DISPOSAL:

1. Waste Materials
   Collect and store all waste materials in a securely lidded metal dumpster or roll off container with cover to keep rain out or loss of waste during windy conditions. The dumpster shall meet all local and State solid waste management regulations. Deposit all trash and construction debris from the site in the dumpster. Empty the dumpster weekly or when the container is two-thirds full, whichever is sooner. Do not bury construction waste materials onsite. The Contractor's supervisory personnel shall be instructed regarding the correct procedure for waste disposal. Post notices stating these practices in the office trailer, on a weatherproof bulletin board, or other accessible location acceptable to the Engineer. The Contractor shall be responsible for seeing that these procedures are followed. Submit the Solid Waste Disclosure Form for Construction Sites to the Engineer within 30 calendar days of contract execution. Provide a copy of all the disposal receipts from the facility permitted by the Department of Health to receive solid waste to the Engineer monthly. This should also include documentation from any intermediary facility where solid waste is handled or processed.

2. Hazardous Waste
   Dispose all hazardous waste materials in the manner specified by local or State regulations and by the manufacturer. The Contractor's site personnel shall be instructed in these practices and shall be responsible for seeing that these practices are followed.

3. Sanitary Waste
   Collect all sanitary waste from the portable units a minimum of once per week, or as required. Position sanitary facilities where they are secure and will not be tipped over or knocked down.

C. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES:

1. For projects with an NPDES Permit for Construction Activities, inspect at the following intervals. For construction areas discharging to nutrient or sediment impaired waters, inspect all control measures at least once each week and within 24 hours of any rainfall event of 0.25 inches or greater within a 24 hour period. For construction areas discharging to waters not impaired for nutrient or sediments, inspect all control measures weekly. Inspections are only required during the project's normal working hours. The discharge point water classification may be found in the SWPPP.

2. For projects without an NPDES Permit for Construction Activities, inspect all control measures weekly.

3. Maintain all erosion and sediment control measures in good working order. If repair is necessary initiate repair immediately and complete by the close of the next day if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance. When installation of a new erosion or sediment control or a significant repair is needed, install the new or modified control or complete the repair no later than 7 calendar days from the time of discovery. "Immediately" means the Contractor shall take all reasonable measures to minimize or prevent discharge of pollutants until a permanent solution is installed and made operational. If a problem is identified at a time in the day in which it is too late to initiate repair, initiation of repair shall begin on the following day.

4. Remove built-up sediment from silt fence when it has reached one-third the height of the fence. Remove sediment from other perimeter sediment control devices when it has reached one-half the height of the device.

5. Inspect silt screen or fence for depth of sediment, tears, to verify that the fabric is securely attached to the fence posts or concrete slab and to verify that the fence posts are firmly in the ground. Inspect and verify the bottom of the silt screen is buried a minimum of 6 inches below the existing ground.

6. Inspect temporary and permanent seeding and planting for bare spots, washouts and healthy growth.

7. Complete and submit to the Engineer a maintenance inspection report within 24 hours after each inspection.

8. Provide a stabilized construction entrance at all points of exit onto paved roads to reduce vehicle tracking of sediments. Include stabilized construction entrance in the Water Pollution, Dust, and Erosion Control submittals. Minimum length should be 50 feet. Minimum width should be 30 feet. Minimum depth should be 12 inches or as recommended by the soils engineer and underlain with geo-textile fabric. If minimum dimensions cannot be met, provide other stabilization techniques that remove sediment prior to exit. Clean the paved street adjacent to the site entrance daily or as required to remove any excess mud, cold-planed materials, dirt or rock tracked from the site. Do not hose down the street without containing or vacuuming wash water. Cover dump trucks hauling material from the construction site with a tarpaulin. Remove sediment tracked onto the street, sidewalk, or other paved area by the end of the day in which the the track-out occurs.

9. Include designated Concrete Washout Area(s) in the Water Pollution, Dust, and Erosion Control submittals.

10. Submit the name of a specific individual designated responsible for inspections, maintenance and repair activities and filling out the inspection and maintenance report.

11. Personnel selected for the inspection and maintenance responsibilities shall receive training from the Contractor. They shall be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

12. Contain, remove, and dispose slurry generated from saw cutting of pavement in accordance with approved BMP practices. Do not allow discharge into the drainage system or State waters.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER POLLUTION AND EROSION CONTROL NOTES

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: None Date: November 2014

SHEET No. N-06 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	11	50

WATER POLLUTION AND EROSION CONTROL NOTES (CON'T.)

C. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES (CONT.):

13. For projects with an NPDES Permit for Construction Activities, immediately initiate stabilizing exposed soil areas upon completion of earth-disturbing activities for areas where earth-disturbing activities have permanently or temporarily ceased. Earth-disturbing activities have permanently ceased when clearing and excavation within any area of the construction site that will not include permanent structures has been completed. Earth-disturbing activities have temporarily ceased when clearing, grading, and excavation within any area of the site that will not include permanent structures will not resume (i.e., the land will be idle) for a period of 14 or more calendar days, but such activities will resume in the future. Complete initial stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities. For construction areas discharging into nutrient or sediment impaired waters, complete initial stabilization within 7 calendar days after the temporary or permanent cessation of earth-disturbing activities. Classification of water at the discharge point may be found in the SWPPP.

14. For projects without an NPDES Permit for Construction Activities, complete initial stabilization within 14 calendar days after the temporary and permanent cessation of earth-disturbing activities.

D. GOOD HOUSE KEEPING BEST MANAGEMENT PRACTICES:

1. Materials Pollution Prevention Plan
   a. Applicable materials or substances listed below are expected to be present onsite during construction. Other materials and substances not listed below shall be added to the inventory.

Concrete	Detergents
Paints (enamel and latex)	Tar
Fertilizers	Petroleum Based Products
Cleaning Solvents	Wood

   b. Use Material Management Practices to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff. Make an effort to store only enough product as is required to do the job.

   c. Store all materials stored onsite in a neat, orderly manner in their appropriate containers and if possible under a roof or other enclosure.

   d. Keep products in their original containers with the original manufacturer's label.

   e. Do not mix substances with one another unless recommended by the manufacturer.

   f. Whenever possible, use a product up completely before disposing of the container.

   g. Follow manufacturer's recommendations for proper use and disposal.

   h. Conduct a daily inspection to ensure proper use and disposal of materials onsite.

2. Hazardous Material Pollution Prevention Plan
   a. Keep products in original containers unless they are not resealable.

   b. Retain original labels and safety data sheets (SDS) formerly material safety data sheets (MSDS).

   c. Dispose of surplus products according to manufacturers' instructions and local and State regulations.

3. Onsite and Offsite Product Specific Plan
   The following product specific practices shall be followed onsite:
   a. Petroleum Based Products:
   Monitor all onsite vehicles for leaks and perform regular preventive maintenance to reduce the chance of leakage. Store petroleum products in tightly sealed containers which are clearly labeled. Apply asphalt substances used onsite according to the manufacturer's recommendation.

   b. Fertilizers:
   Apply fertilizers used only in the minimum amounts recommended by the manufacturer and federal, state, and local requirements. Avoid applying just before a heavy rain event. Apply at the appropriate time of year for the location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth. Once applied, work fertilizer into the soil to limit exposure to storm water. Do not apply to storm conveyance channels with flowing water. Storage shall be in a covered shed or in an area where fertilizer will not come into contact with precipitation or stormwater. Transfer the contents of any partially used bags of fertilizer to a sealable plastic bin to avoid spills.

   c. Paints:
   Seal and store all containers when not required for use. Do not discharge excess paint to the drainage system, sanitary sewer system, or State waters. Dispose properly according to manufacturers' instructions or State and local regulations.

   d. Concrete Trucks:
   Washout or discharge concrete truck drum wash water only at a designated site as far as practicable from storm drain inlets or State waters. Do not discharge water in the drainage system or State waters. Disposal by percolation is prohibited. Clean disposal site as required or as requested by the Engineer.

4. Spill Control Plan
   a. Post a spill prevention plan to include measures to prevent and clean up each spill.

   b. The Contractor shall be the spill prevention and cleanup coordinator. Designate at least three site personnel who shall receive spill prevention and cleanup training. These individuals shall each become responsible for a particular phase of prevention and cleanup. Post the names of responsible spill personnel in the material storage area on a weatherproof bulletin board or other accessible location acceptable to the Engineer and in the office trailer onsite.

   c. Clearly post manufacturers' recommended methods for spill cleanup. Make site personnel aware of the procedures and the location of the information and cleanup supplies.

   d. Keep ample materials and equipment necessary for spill cleanup in the material storage area onsite.

   e. Clean up all spills immediately after discovery.

   f. Keep the spill area well ventilated. Personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

   g. Report spills of toxic hazardous material to the appropriate State or local government agency, regardless of the size. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302 occurs during a 24-hour period, the Contractor shall notify the Engineer as soon as the Contractor has knowledge of the discharge. The Engineer will notify the National Response Center (NRC) at (800) 424-8802, the Clean Water Branch during regular business hours at 586-4309, and the Hawaii State Hospital Operator at 247-2191 and the Clean Water Branch (DOH-CWB) via email at cleanwaterbranch@doh.hawaii.gov during non-business hours immediately. The Contractor shall also provide to the Engineer, within 7 calendar days of knowledge of the release, a description of the release, the circumstances leading to the release, and the date of the release. The Engineer will provide this information to the DOH-CWB. The Engineer will provide information to the NRC if requested.

E. PERMIT REQUIREMENTS:

1. A National Pollutant Discharge Elimination System (NPDES) Permit for Construction Activities of one acre or more of disturbed area is required for this project. If the Contractor requires extra land disturbance, including staging and storage areas, not covered by the NPDES permit obtained by the State, the Contractor shall be responsible for obtaining the required NPDES Construction Activities Permit using HDOT's latest Stormwater Pollution Prevention Plan (SWPPP) Template to cover this additional disturbed area. See Hawaii Administrative Rules Chapter 11-55, Appendix C for definition of land disturbance. The Contractor's attention is directed to the applicable NPDES Permit documents on the bid package compact disc.

2. Comply with all applicable State and Federal Permit conditions. Permits may include but are not limited to the following:
   a. NPDES Permit for Construction Activities

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER POLLUTION AND EROSION CONTROL NOTES

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: None Date: November 2014

SHEET No. N-07 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	12	50

WATER POLLUTION AND EROSION CONTROL NOTES (CON'T.)

F. SITE SPECIFIC REQUIREMENTS:

Each BMP below is referenced to the corresponding section of the HDOT Construction Best Management Practices Field Manual dated January 2008 and appropriate Supplemental Sheets. The Manual may be obtained from the HDOT Statewide Stormwater Management Program Website at http://www.stormwaterhawaii.com/resources under Construction Best Management Practices Field Manual. Supplemental BMP sheets are located at http://stormwaterhawaii.com/contractors/contractors_BMPmanual.aspx under Concrete Curing and Irrigation Water.

The requirements for Water Pollution, Dust, and Erosion Control submittals are included in Section 209 of the Hawaii Standard Specifications for Road and Bridge Construction dated 2005 and applicable Special Provisions. A list of pollutant sources and corresponding BMP used to mitigate the pollutants are included in Section 209 of the Special Provisions under Appendix A.

Follow the requirements below:

1. Protect all Drainage Inlets receiving runoff from disturbed areas (SC-2).

2. Contain on-site runoff using Perimeter Sediment Controls
   a. SC-1 Silt Fence
   b. SC-5 Vegetated Filter Strips and Buffers
   c. SC-8 Compost Filter Berm
   d. SC-13 Sandbag Barrier
   e. SC-14 Brush or Rock Filter
3. Control offsite runoff from entering construction area
   a. EC-8 Run-On Diversion
   b. SC-6 Earth Dike
   c. SC-7 Temporary Drains and Swales
4. Incorporate applicable Site Management BMP
   a. SM-1 Employee Training
   b. SM-2 Material Delivery and Storage
   c. SM-3 Material Use
   d. SM-4 Protection of Stockpiles
   e. SM-6 Solid Waste Management
   f. SM-7 Sanitary/Septic Waste Management
   g. SM-9 Hazardous Waste Management
   h. SM-10 Spill Prevention and Control
   i. SM-11 Vehicle and Equipment Cleaning
   j. SM-12 Vehicle and Equipment Maintenance
   k. SM-13 Vehicle and Equipment Refueling
   l. SM-14 Scheduling
   m. SM-15 Location of Potential Sources of Sediment
   n. SM-16 Preservation of Existing Vegetation
   o. SM-18 Dust Control

5. Contain pollutants within the Construction Staging/Storage Area BMP with applicable Perimeter Sediment Controls and Site Management BMP. Include a Stabilized Construction Entrance/Exit (EC-2) for all areas which exit onto a paved street. Restrict vehicle access to these points.

6. Manage Concrete Waste including installing a Concrete Washout Area (SM-5) and properly disposing of Concrete Curing Water (California Stormwater BMP Handbook NS-12 Concrete Curing).

7. Remove saw cut slurry and hydrodemolition water from the site by vacuuming. Provide storm drain protection and/or perimeter sediment controls during saw cutting and hydrodemolition work.

EROSION CONTROL/BEST MANAGEMENT PRACTICES NOTES

1. The Contractor, at his own expense, shall keep the project areas and surrounding areas free from dust nuisance. The work shall be done in conformance with air pollution control standards contained in Hawaii Administrative Rules: Chapter 11-60, "Air Pollution Control".

2. Measures to control erosion and other pollutants shall be in place before any grading work is initiated. These measures shall be properly constructed and maintained throughout the construction period of each site.

3. Construction shall be sequenced to avoid disturbance at all project sites at one time and minimize exposure time of the cleared surface area.

4. The Contractor shall observe and comply with the State Department of Health regulations regarding storm water discharge.

5. Inlet protection shall be implemented at all storm drain inlets and catch basins as indicated to prevent any sediment laden runoff from leaving the site. Inlet protection devices shall be removed during periods of above normal rainfall and replaced after the event has passed. For inlet protection details, see Sheet N-09.

6. The Contractor shall install fiber rolls as shown on plans.

7. Good housekeeping shall be utilized to ensure protection of roadways from mud, dirt, and debris.

8. The Contractor shall provide erosion control measures for their construction, staging, and storage areas and shall inspect and monitor his construction, staging, and storage areas to ensure that no non-storm water discharges are emitted. If such sources are identified the Contractor shall provide immediate mitigative measures.

9. No sediment laden runoff shall leave the site.

10. Water trucks shall be utilized to minimize the amount of airborne dust.

11. Contractor shall ensure the proper working order and conduct regular maintenance of all construction equipment. All construction equipment shall be serviced offsite and no oil or fuel shall be stored on the site.

12. The Contractor shall dispose of vegetation and equipment and hydraulic oils off-site and in accordance with County, State, and Federal regulations.

13. At the end of the grading operation, existing catch basins and drain inlets surrounding the project site shall be inspected and any accumulated sediment and debris found shall be removed. Flushing into the catch basins or drain inlets is prohibited.

14. Clearing and grubbing shall be held to the minimum necessary for grading and equipment operation.

15. Construction shall be staged and phased for large projects. Areas of one phase shall be stabilized before another phase is initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.

16. Storm water flowing toward the construction area shall be diverted by using appropriate control measures, as practical.

17. Water must be discharged in a manner that the discharge shall not cause or contribute to a violation of the basic water quality criteria as specified in the Hawaii Administrative Rules, Section 11-54-04.

18. All grading work shall be done in conformance with Chapter 14, Articles 13, 14, 15 and 16, as related to grading, soil erosion and sediment control, of the Revised Ordinances of Honolulu, 1990, as amended and applicable provisions of Chapter 54, Water Quality Standards and Chapter 55, Water Pollution Control, Title II, Administrative Rules of the State Department of Health.

19. The Contractor shall schedule construction during the dry weather periods and shall be prepared in case of rainfall events. The Contractor shall provide for temporary bypass or detention of storm water flows or other measures to avoid flooding of properties upstream or adjacent to the site.

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER POLLUTION AND EROSION CONTROL NOTES

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: None Date: November 2014

SHEET No. N-08 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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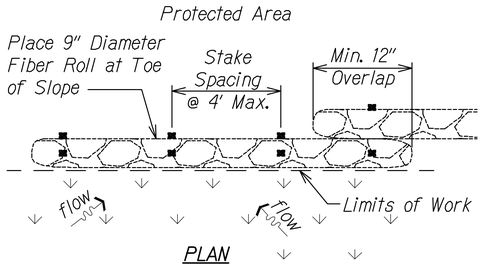
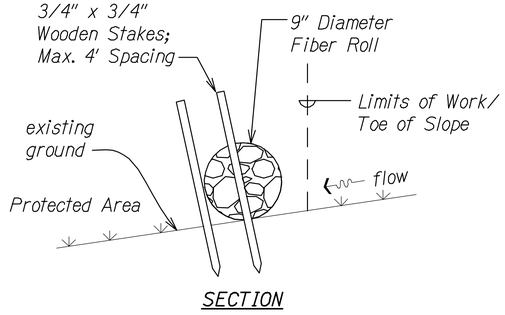


PLAN



SECTION

Note:
1. Fiber roll shall meet the requirements of the State Construction BMP Field Manual, SC-8 Compost Filter Berm.
2. Contractor shall remove debris behind fiber roll when it has reached one-half the height of the fiber roll.

FIBER ROLL DETAIL
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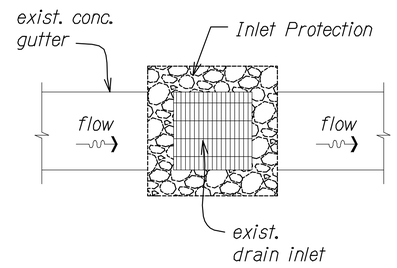

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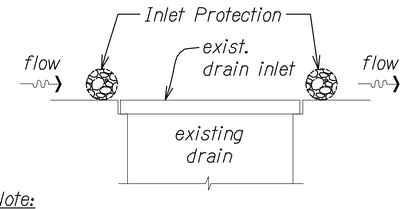

SECTION

Note:
Temporary inlet protection shall meet the requirements of the State Construction BMP Field Manual, SC-2 Storm Drain Inlet Protection.

DRAIN INLET PROTECTION
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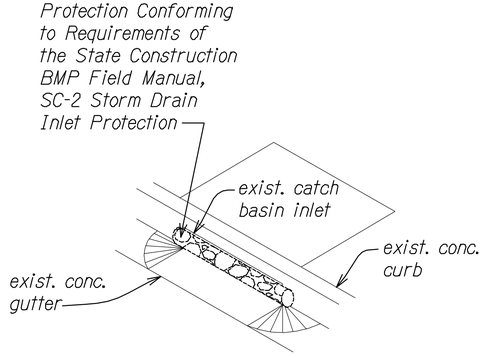

CATCH BASIN PROTECTION
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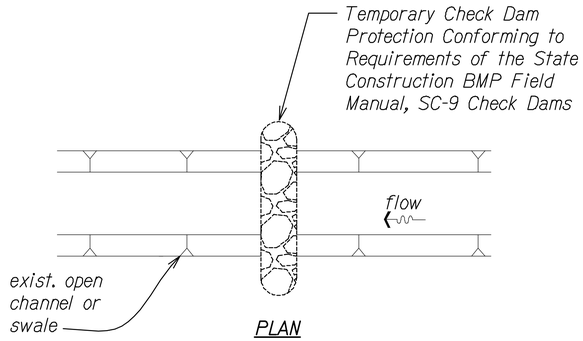

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CHECK DAM DETAIL
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HIGHWAYS DIVISION

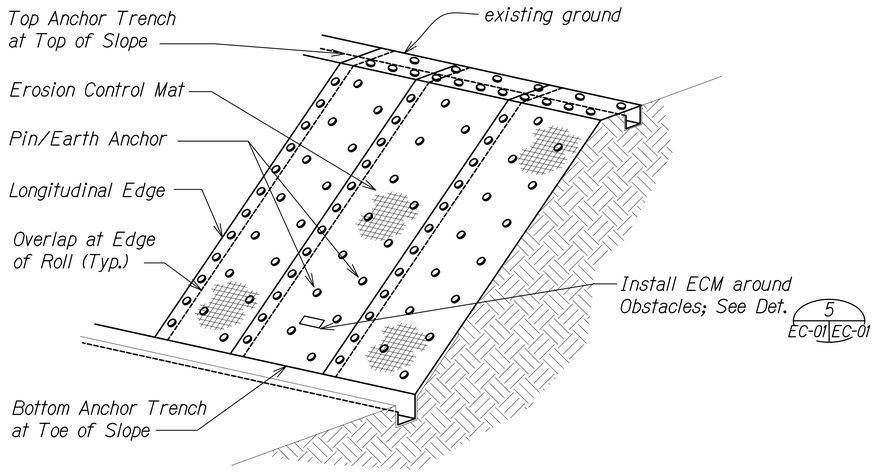
WATER POLLUTION AND EROSION CONTROL DETAILS

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: None
Date: November 2014

SHEET No. N-09 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	14	50



OVERVIEW OF EROSION CONTROL MATTING SYSTEM

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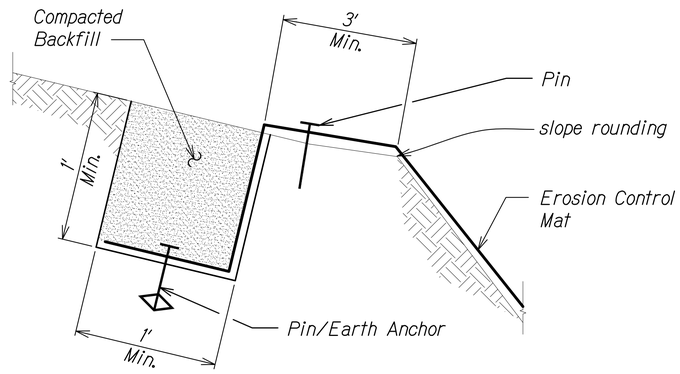

TOP ANCHOR TRENCH DETAIL

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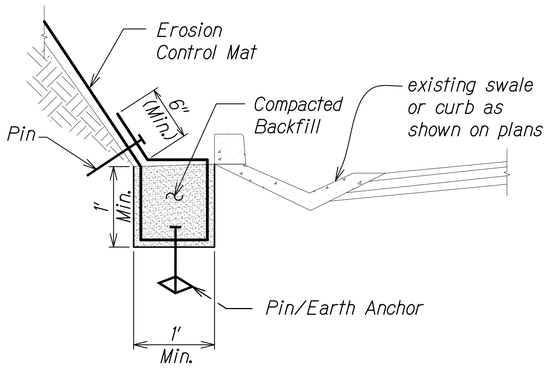

BOTTOM ANCHOR TRENCH DETAIL

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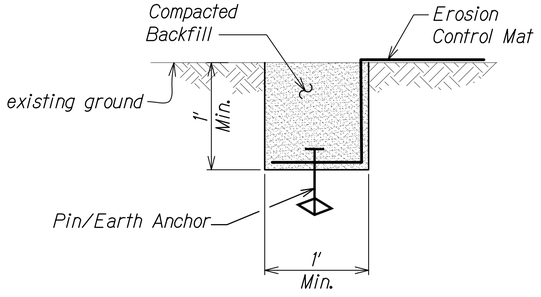

LONGITUDINAL EDGE TRENCH DETAIL

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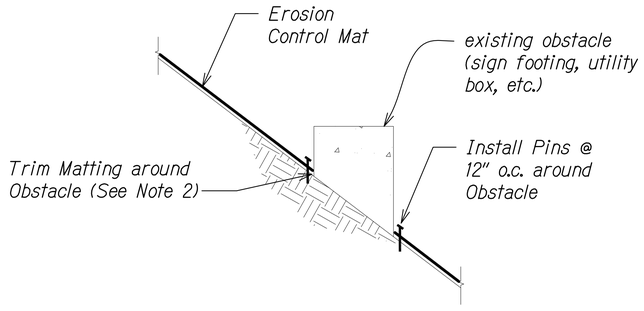

Notes:

1. Matting shall be placed and secured in direct contact with the finish grade.
2. Maximum gap between edge of trimmed matting and obstacle shall be 1 inch.
3. For installation of matting around existing trees, see Landscape drawings.

TYPICAL SECTION AROUND EXISTING OBSTACLES

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

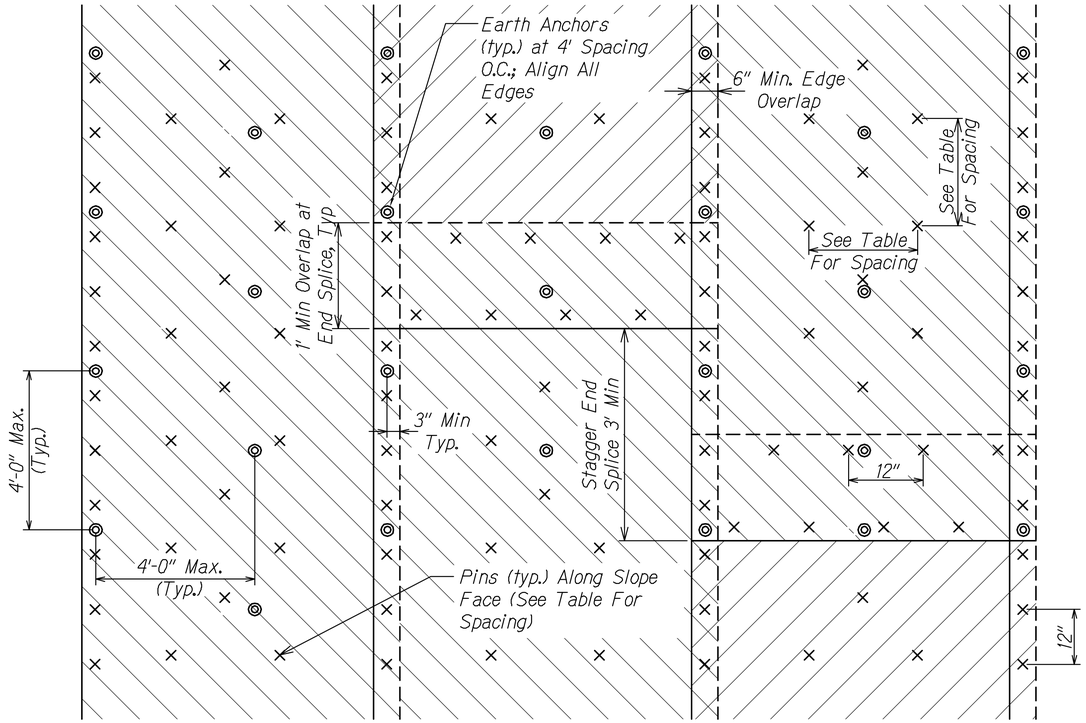
TYPICAL DETAILS
EROSION CONTROL MATTING

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: Not to Scale Date: November 2014

SHEET No. EC-01 OF 14 SHEETS

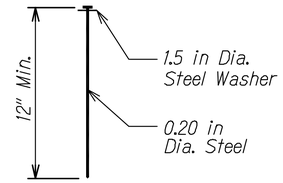
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	15	50



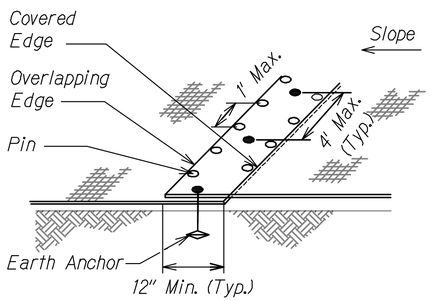
TYPICAL EROSION CONTROL MAT AND EARTH ANCHOR/PIN LAYOUT (1 EC-02 EC-02)
Scale: Not to Scale

Pin/Earth Anchor Spacing		
Fastener Type	Along Slope Face	Top, Bottom & Edge Trenches
Pin	1.5'	1'
Earth Anchor	4'	4'

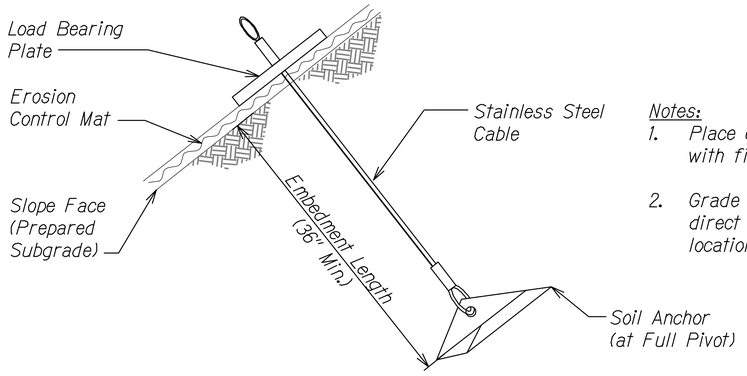
Notes:
1. Secure all erosion control mat edges with pins and earth anchors at the spacing indicated.
2. For slopes 3H:1V or flatter, no ECM required.
3. Earth anchors in trenches shall extend a minimum depth of 3' from the slope face.
4. The upper 4 rows of earth anchors shall extend a minimum depth of 10' from the slope face.
5. The remaining earth anchors shall be installed per row to alternating depths of 4' and 6' respectively.



PIN DETAIL (2 EC-02 EC-02)
Scale: Not to Scale



OVERLAP END DETAIL (3 EC-02 EC-02)
Scale: Not to Scale



EARTH ANCHOR DETAIL (4 EC-02 EC-02)
Scale: Not to Scale

Notes:
1. Place erosion control mat in direct contact with finish grade.
2. Grade and shave existing ground to allow direct contact of erosion control mat at all locations.

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

EC-43 EROSION CONTROL MATTING DETAILS.DWG 11/4/2014 10:45:45 AM

JASON H. LAU LICENSED PROFESSIONAL ENGINEER NO. 9360-C HAWAII USA
4/30/16 EXP. DATE
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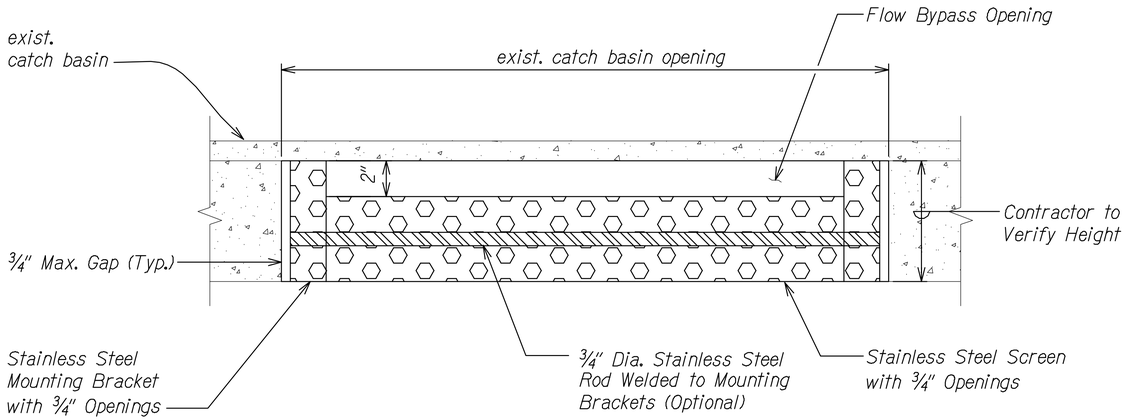
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DETAILS
EROSION CONTROL MATTING

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: Not to Scale Date: November 2014

SHEET No. EC-02 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	16	50



CATCH BASIN SCREEN DETAIL 1 EC-12 EC-03

Scale: Not to Scale

Notes:

1. The Contractor shall verify size of catch basin opening prior to fabricating catch basin screen.
2. Catch basin screen shall be a pivot-mounted automatic retractable screen with pins that allow for tension adjustment.
3. Install catch basin screen per manufacturer's recommendations.
4. The installed catch basin screen shall not protrude beyond the curb face into the roadway.

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LICENSED PROFESSIONAL ENGINEER
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

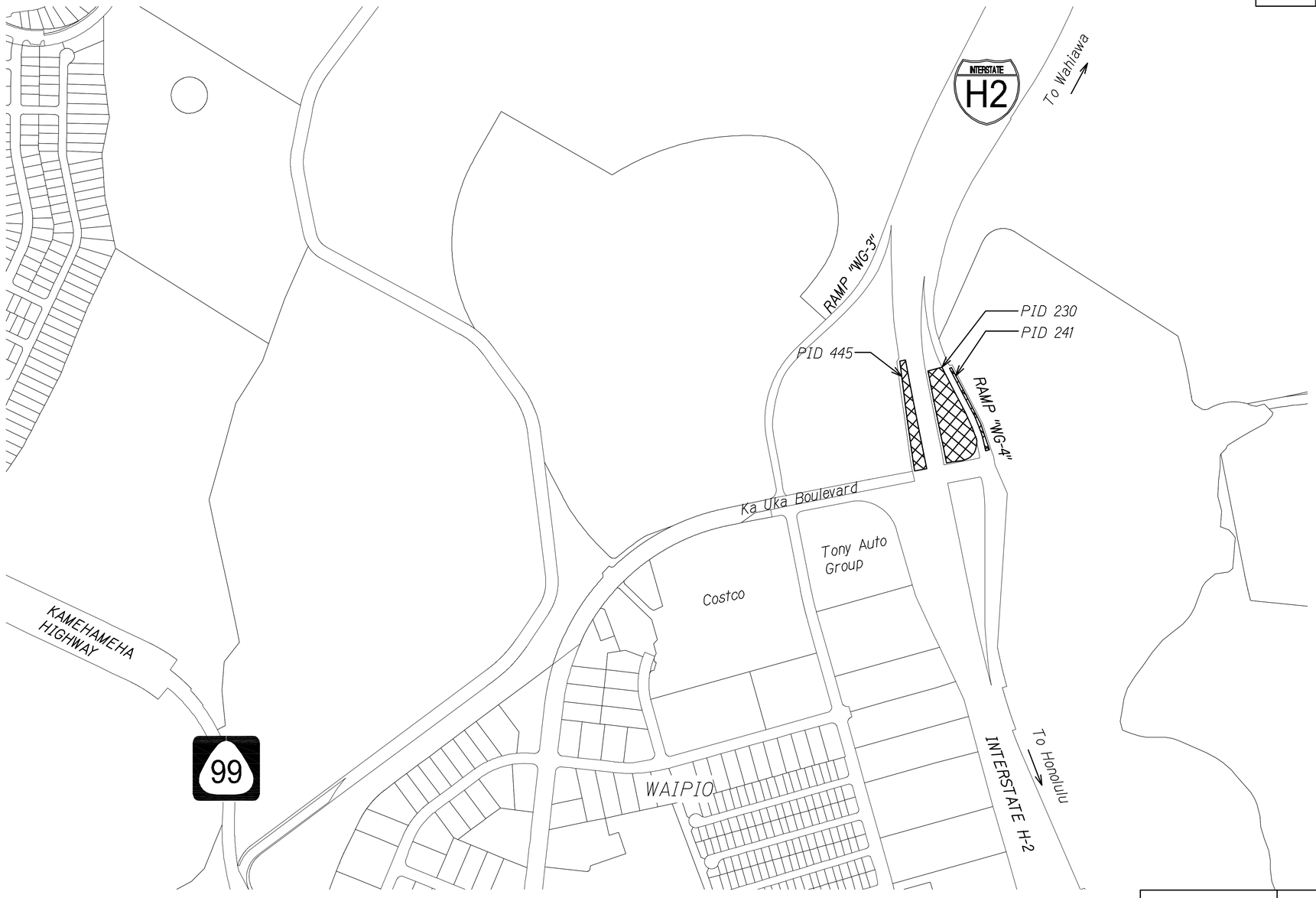
TYPICAL DETAILS
CATCH BASIN SCREEN

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: Not to Scale Date: November 2014

SHEET No. EC-03 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	17	50



ORIGINAL PLAN
NOTE BOOK
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GENERAL SITE PLAN.DWG 11/14/2014 2:53:39 PM

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL SITE PLAN
PID 230, 241, & 445
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: None Date: November 2014

SHEET No. EC-04 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	18	50

ORIGINAL PLAN

NOTE BOOK

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

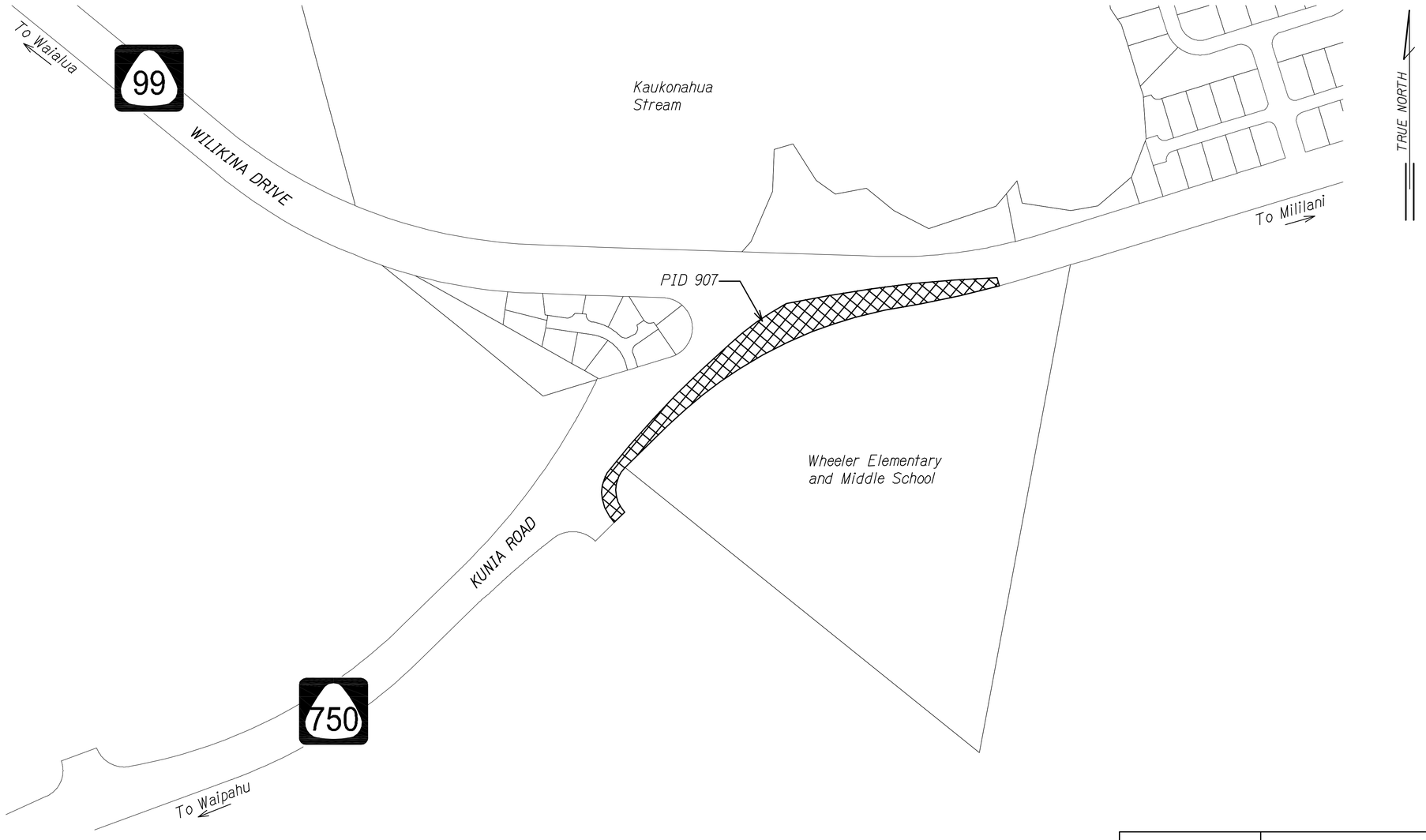
GENERAL SITE PLAN
PID 57 & 110

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: None Date: November 2014

SHEET No. EC-05 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	19	50



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NOTE BOOK
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HIGHWAYS DIVISION

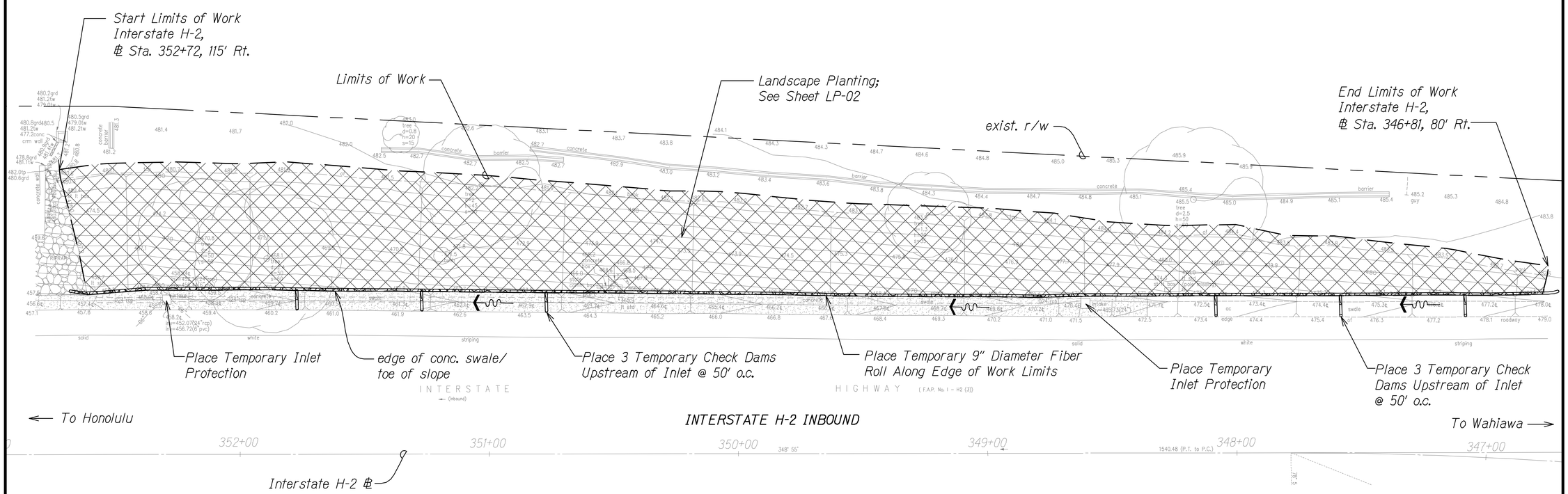
GENERAL SITE PLAN
PID 907
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: None Date: November 2014

SHEET No. EC-06 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	20	50

TRUE NORTH
Scale: 1" = 20'-0"



TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 445

Scale: 1" = 20'-0"

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ECP_PID 445.DWG 10/29/2014 10:33:30 AM

Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

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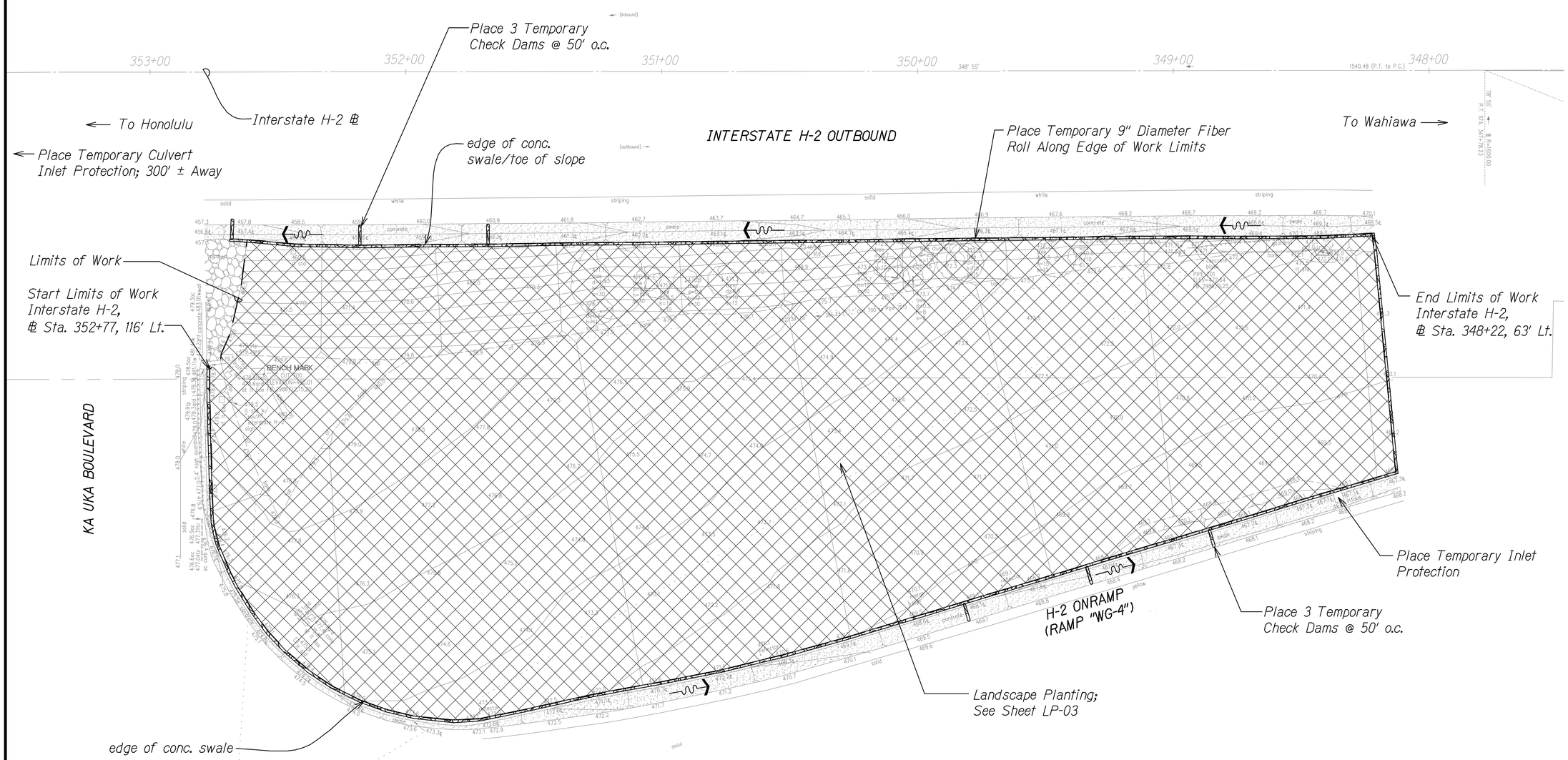
HIGHWAYS DIVISION

TEMP. EC AND PERMANENT BMP PLAN
PID 445
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20' Date: November 2014

SHEET No. EC-07 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	21	50

TRUE NORTH
Scale: 1" = 20'-0"



TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 230

Scale: 1" = 20'-0"

Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

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NOTE BOOK
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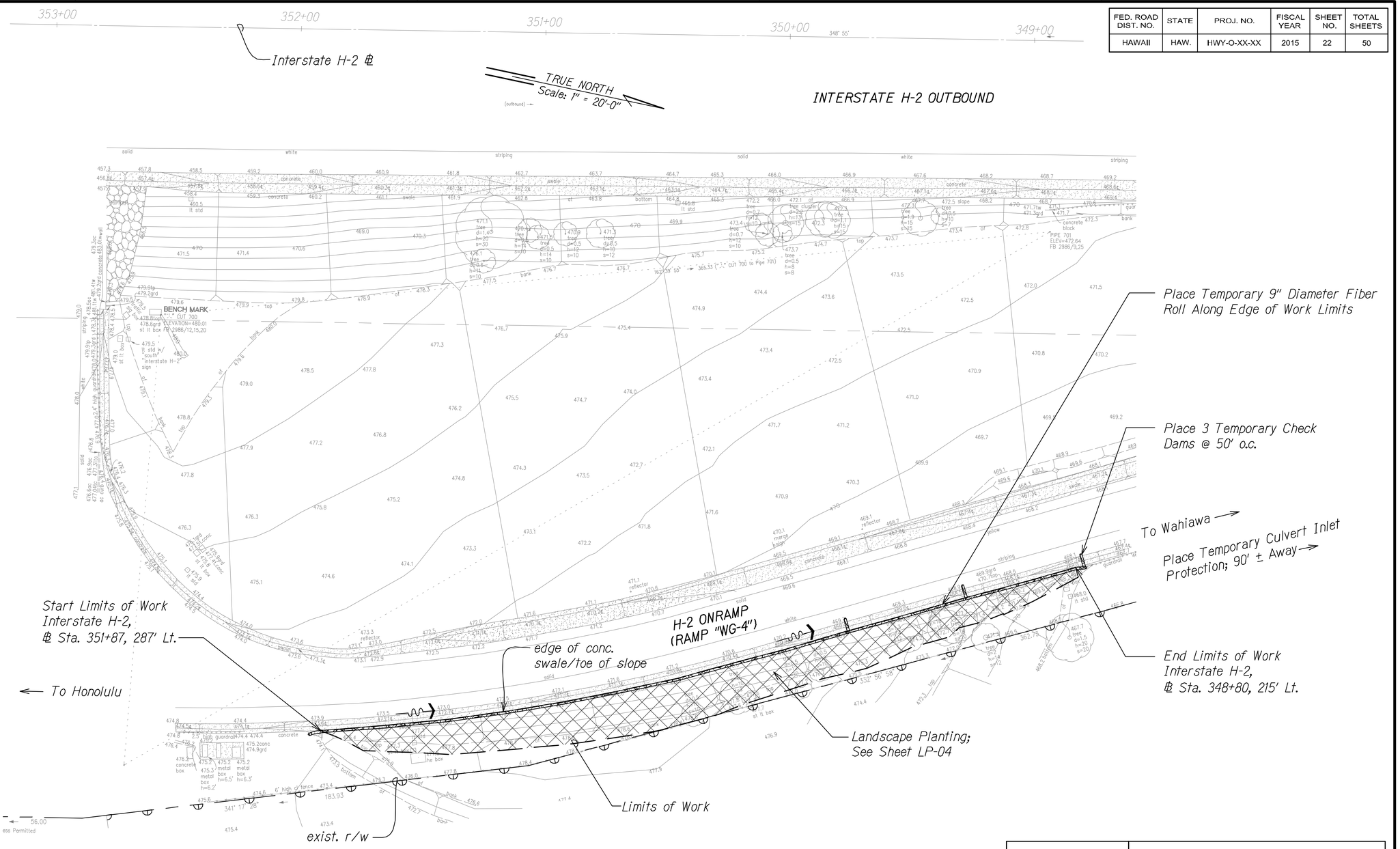
HIGHWAYS DIVISION

TEMP. EC AND PERMANENT BMP PLAN
PID 230
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20' Date: November 2014

SHEET No. EC-08 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	22	50



Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 241

Scale: 1" = 20'-0"

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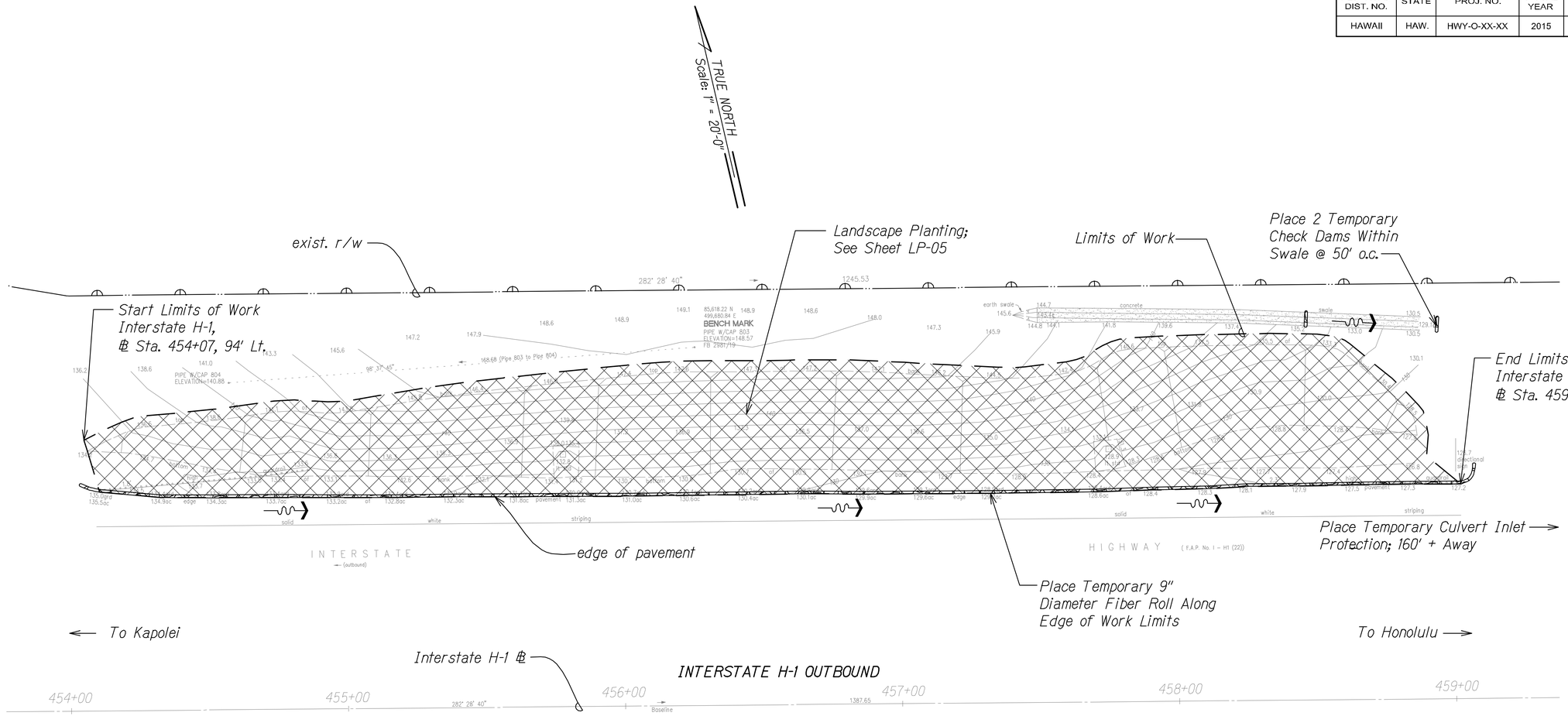
TEMP. EC AND PERMANENT BMP PLAN
PID 241
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20' Date: November 2014

SHEET No. EC-09 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	23	50



TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 57

Scale: 1" = 20'-0"

Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

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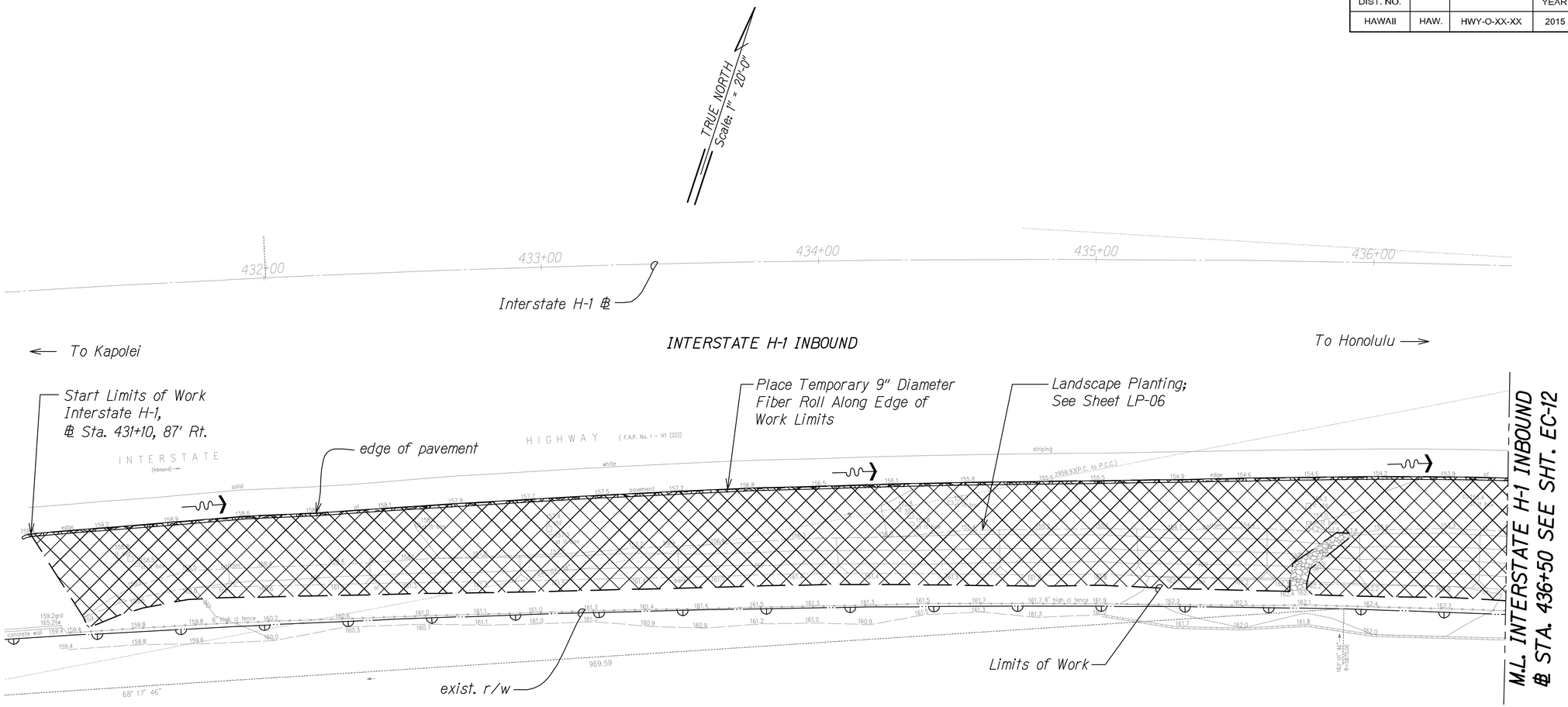
HIGHWAYS DIVISION

TEMP. EC AND PERMANENT BMP PLAN
PID 57
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20' Date: November 2014

SHEET No. EC-10 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	24	50



TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 110

Scale: 1" = 20'-0"

Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

ORIGINAL PLAN | NOTE BOOK | N

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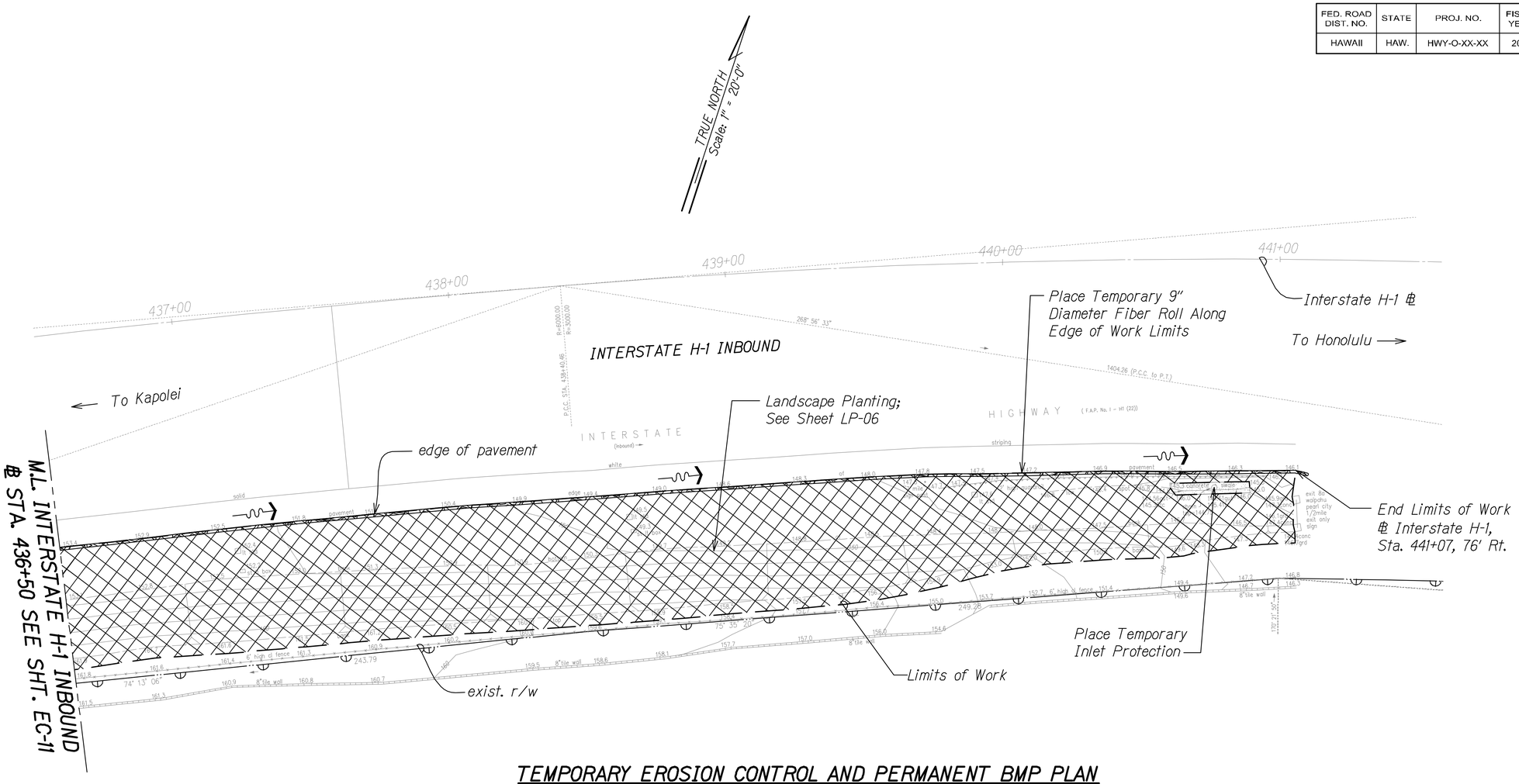
HIGHWAYS DIVISION

TEMP. EC AND PERMANENT BMP PLAN
PID 110
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20' Date: November 2014

SHEET No. EC-11 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	25	50



TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 110

Scale: 1" = 20'-0"

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NOTE BOOK
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DATE

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Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

JASON H. LAU
LICENSED PROFESSIONAL ENGINEER
NO. 9360-C
HAWAII USA
4/30/16
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STATE OF HAWAII
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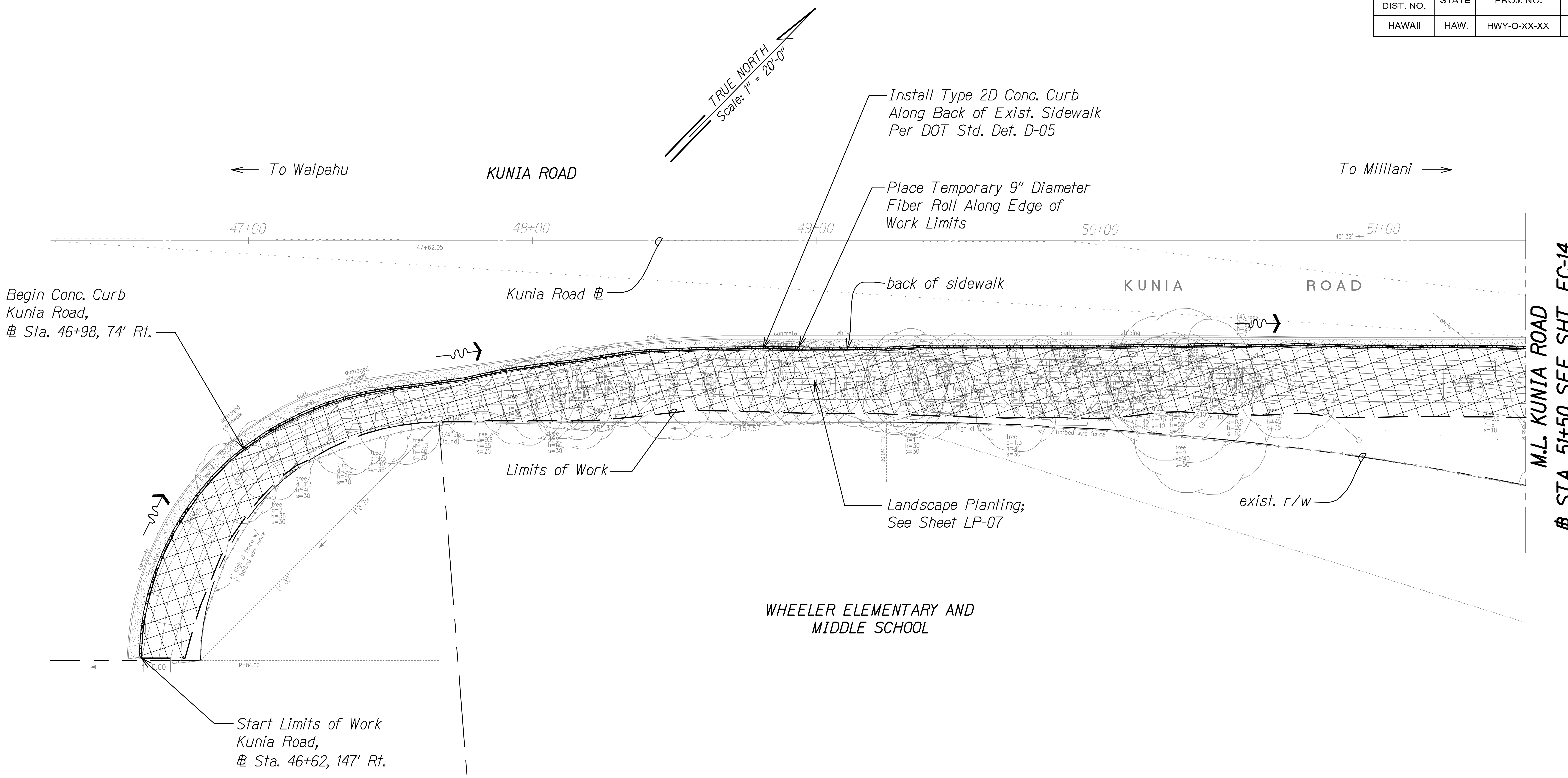
HIGHWAYS DIVISION

TEMP. EC AND PERMANENT BMP PLAN
PID 110
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20' Date: November 2014

SHEET No. EC-12 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	26	50



TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 907

Scale: 1" = 20'-0"

Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | NOTE BOOK No. | DATE

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

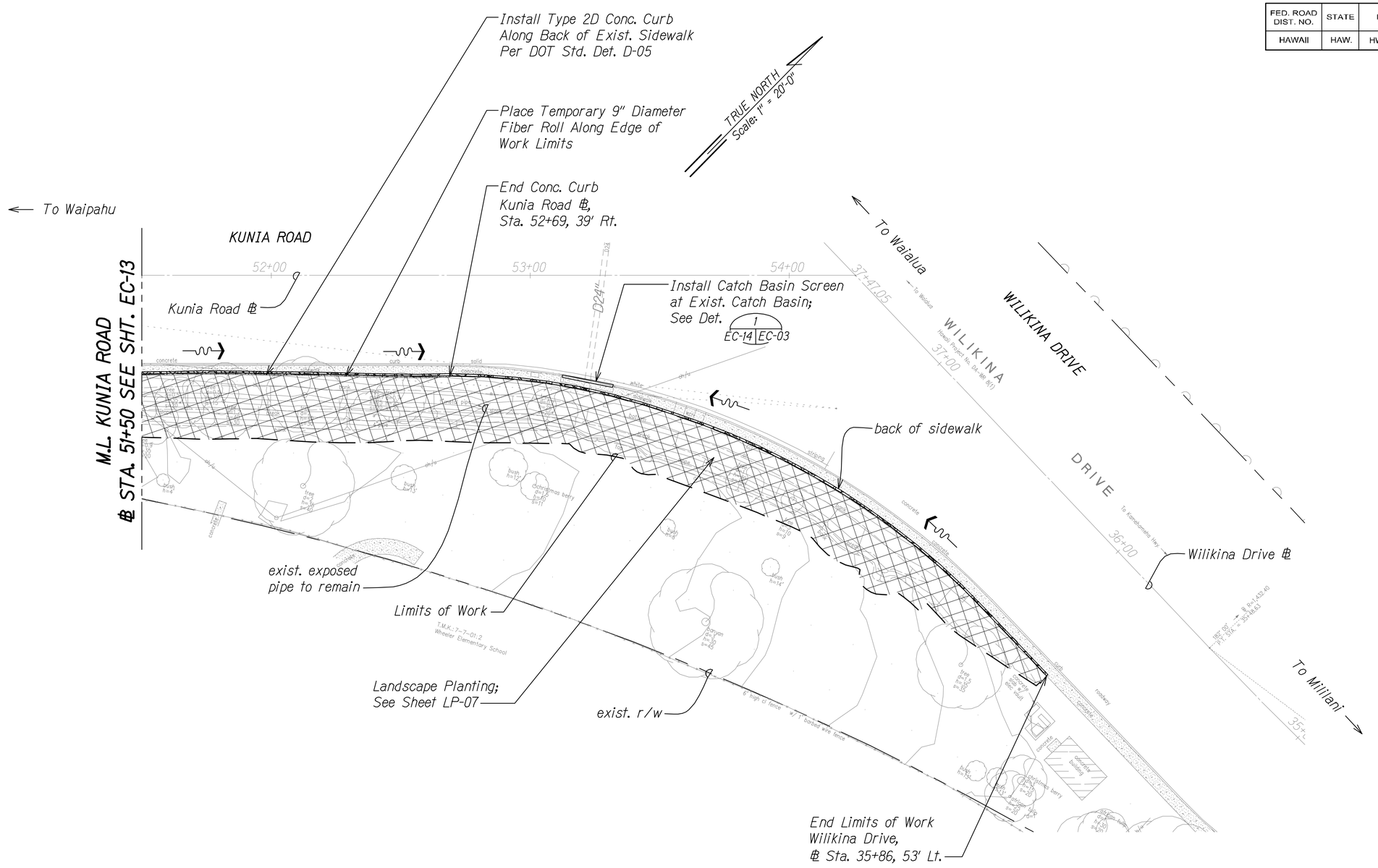
TEMP. EC AND PERMANENT BMP PLAN
PID 907

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: 1" = 20' Date: November 2014

SHEET No. EC-13 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	27	50



TEMPORARY EROSION CONTROL AND PERMANENT BMP PLAN
PID 907

Scale: 1" = 20'-0"

Notes:

1. For erosion mat details, see Sheets EC-01 & EC-02.
2. See Landscaping Drawings for tree protection and removal.

ORIGINAL PLAN
NOTE BOOK
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TEMP. EC AND PERMANENT BMP PLAN
PID 907
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20' Date: November 2014

SHEET No. EC-14 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	28	50

PLANT NOTES:

1. *Contractor shall field verify all plant quantities and dimensions prior to installation. Contractor shall determine quantities of plant materials to be provided. In all cases, Contractor shall install plant material on all areas affected by construction.*

2. *Contractor shall be responsible for locating and protecting existing utilities.*

3. *Prior to excavating tree, shrub, or ground cover holes, all tree and shrub planting locations shall be staked out by Contractor for acceptance by Engineer. Do not plant until ground has been prepared and site is neat, orderly, and the Engineer accepts site for planting.*

4. *Notify Engineer of any discrepancies in plant locations.*

5. *Notify Engineer 30 days prior to planting operations for acceptance of all plant material at place of growth. All plant material not accepted by the Engineer will be subject to rejection.*

6. *The Engineer will inspect plants at the place of growth and after delivery to the project.*

7. *Plants shall meet size indicated. Plants shall be straight and uniformly shaped, unless unique or special characteristics are specified, and shall be undamaged, sound, healthy, vigorous and free of disease and insect infestation. Plants not conforming to these requirements on delivery to the project and at the end of the plant establishment period will be rejected.*

8. *Contractor shall be solely responsible for the complete removal and damages resulting from planting any plant species listed on the Hawaii Department of Agriculture 'Noxious Weed Rules' as defined in the statute, Hawaii Administrative Rules 4:68:1 or the 'Federal Noxious Weed List' as defined in Title 7 of the Code of Federal Regulations (CFR), parts 360 and 361.*

9. *All tree work must adhere to American National Standard Institute (or ANSI) - a300 Tree Care Standards and ANSI-z133 safety standards for tree work. Work shall be contracted to arborists that has been certified in good standings as an ISA certified arborist for at least 5 years to assure that tree work is performed properly and trees are not damaged by practices such as topping, flush cuts, over-thinning, or climbing with spikes. Contractor shall submit a copy of the ISA arborist certification of good standing of 5 years to the Engineer minimum 7 days prior to tree pruning.*

10. *For the duration of construction within the drip line of trees to remain there must be: no changes, alterations or disturbance to the grade by adding fill, excavating or scraping except as noted on plans; no storage of construction material or equipment; no stockpiling of any construction material or any excavated material no disposal of any liquids (E.G. Concrete slurry, gas, oil, paint); no vehicular traffic, equipment or excessive pedestrian traffic, no attachment of any wires, ropes, lights, or any other such attachment other than those of protective nature to any tree to be preserved; and no cleaning of equipment or material under the canopy of any tree or group of trees to remain. For slopes flatter than 3H:1V, till top six-inches of soil to evenly incorporate fertilizer and amendments. For slopes steeper than 3H:1V, no tilling is required.*

11. *Representative samples of soil from project site shall be submitted to the University of Hawaii Agricultural Extension Service or laboratory acceptable to the Engineer for analysis of required soil amendments. Test results and fertilization schedule shall be presented to the Engineer for review and acceptance before placing planting soil or amending existing soil. Uniformly distribute fertilizer and amendments over planting areas as recommended by the soil analysis report. Till top six-inches of soil to evenly incorporate fertilizer and amendments.*

12. *Guy wires, flagging, stakes, windbreakers, etc. shall be maintained and replaced if necessary by the Contractor until the shrub is able to stand by itself. The Contractor shall remove and dispose of these items at the end of plant establishment period.*

13. *Any planting that obstructs sight distance, signs or traffic lights shall be relocated or removed as determined by the Engineer.*

14. *Provide water for all plant material for the duration of the project, including plant establishment period. Water trees, shrubs, ground cover and all grassed areas. Water for planting shall not cause erosion damage to the slopes. The Contractor shall be responsible for repairing any damage cause by the watering of plants. The Contractor shall gradually decrease the amount of water being provided to the plant material 8 weeks prior to final acceptance of plantings.*

15. *Temporary irrigation shall be provided and installed by the Contractor for the duration of the project. Refer to Specification Section 641.03(E) and 641.03(F). Temporary irrigation system shall be considered incidental to Specification Section 641 - Hydro-Mulch Seeding.*

LP-01_LANDSCAPE_NOTES.PNG 1/10/2014 3:56:6 PM

RUSSELL Y.J. CHUNG
LICENSED PROFESSIONAL LANDSCAPE ARCHITECT
No. 6076
HAWAII, U.S.A.

4/30/16
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

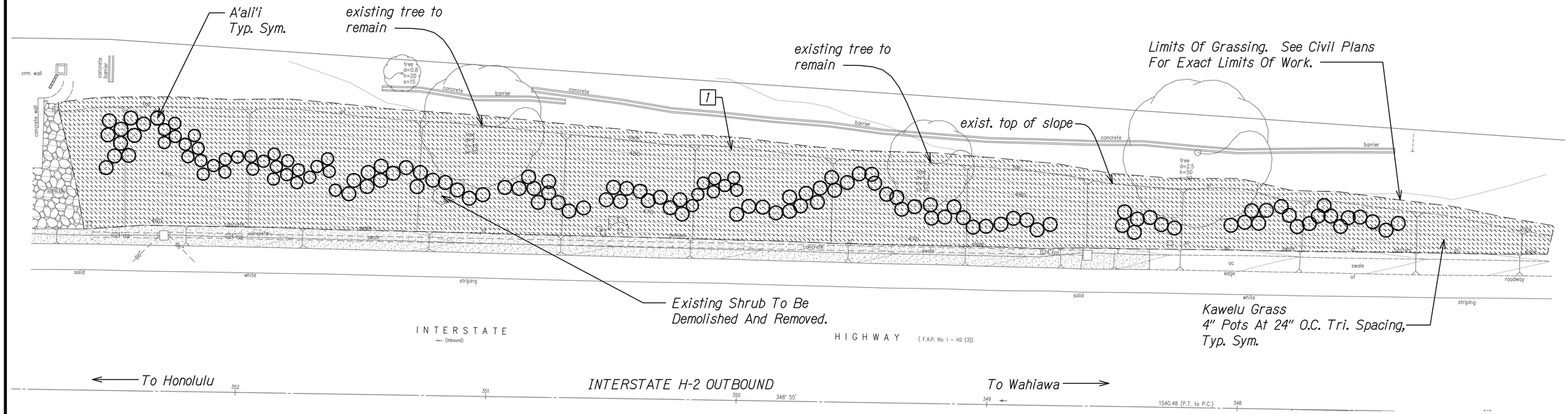
LANDSCAPE NOTES

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-X-XX-XX

Scale: None Date: November 2014

SHEET No. LP-01 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	29	50



PLANT SCHEDULE PID 445

SHRUBS	BOTANICAL NAME	COMMON NAME
○	*Dodonea viscosa*	A'ali'i

GROUND COVER	BOTANICAL NAME	COMMON NAME
▨	*Eragrostis variabilis*	Kawelu Grass

REFERENCE NOTES SCHEDULE PID 445

SYMBOL	DESCRIPTION
1	*Install erosion control matting on slopes greater than 3H:1V (see Civil plans). Install per manufacturer's instructions and recommendations. See Civil plans for details and project limits.*

NORTH

0 20 40 60 feet

SCALE: 1" = 20'

LANDSCAPE PLANTING PLAN PID 445

Scale: 1" = 20'-0"

RUSSELL Y.J. CHUNG
LICENSED PROFESSIONAL LANDSCAPE ARCHITECT
No. 6076
HAWAII, U.S.A.

4/30/16
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LANDSCAPE PLANTING PLAN PID 445

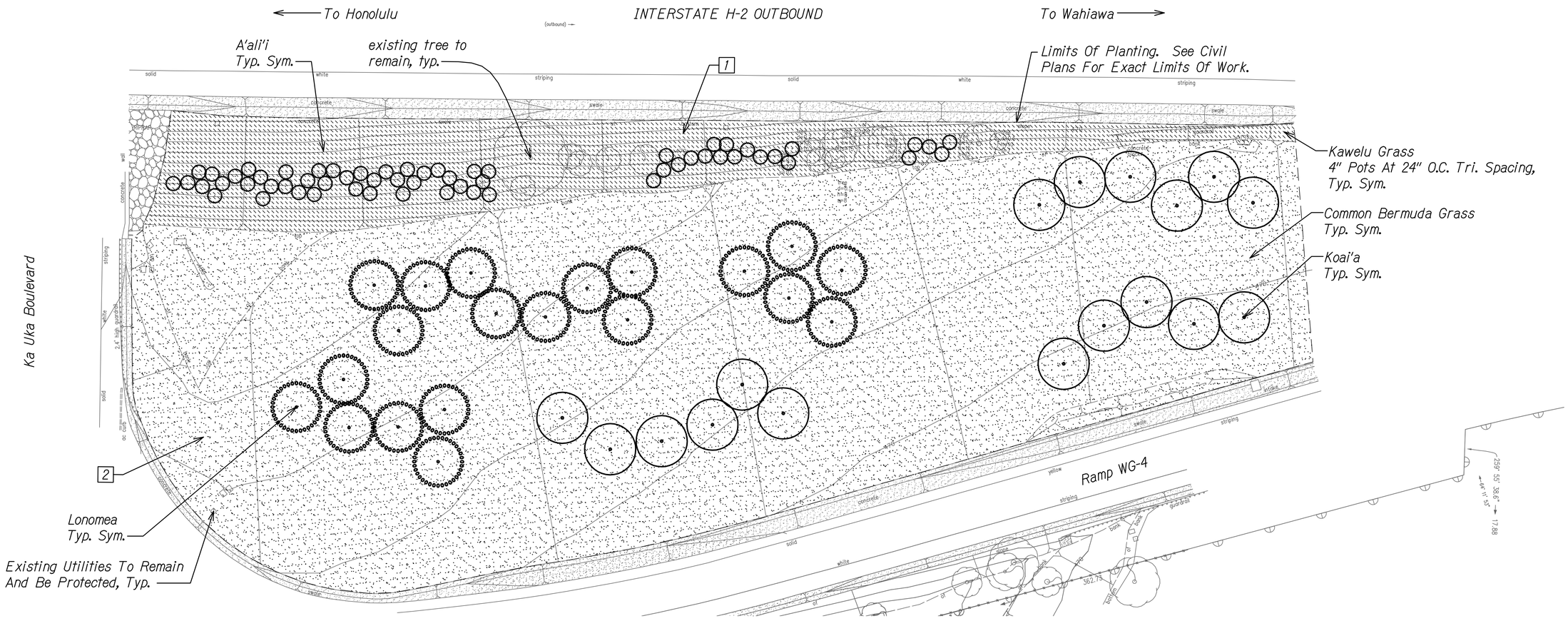
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: 1" = 20'-0" Date: November 2014

SHEET No. LP-02 OF 12 SHEETS

LP-02_SITE 01_PID 445.DWG 11/7/2014 3:56:13 PM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	30	50



PLANT SCHEDULE PID 230

TREES	BOTANICAL NAME	COMMON NAME
	Acacia koaia	Koai'a
	Sapindus oahuensis	Lonomea
SHRUBS	**BOTANICAL NAME**	**COMMON NAME**
	Dodonea viscosa	A'ali'i
GROUND COVER	**BOTANICAL NAME**	**COMMON NAME**
	Eragrostis variabilis	Kawelu Grass
HYDROSEED	**BOTANICAL NAME**	**COMMON NAME**
	Cynodon dactylon *Lolium multiflorum*	Common Bermuda Grass Annual Rye Grass

REFERENCE NOTES SCHEDULE PID 230

SYMBOL	DESCRIPTION
1	Install erosion control matting on slopes greater than 3H:1V (see Civil plans). Install per manufacturer's instructions and recommendations. See Civil plans for details and project limits.
2	Provide and incorporate 2" layer soil amendments to existing soil. Incorporate additional amendments as recommended by soil analysis. See specifications for additional soil preparation procedures.

LANDSCAPE PLANTING PLAN PID 230

Scale: 1" = 20'-0"

NORTH

0 20 40 60 feet

SCALE: 1" = 20'

LP-03_SITE 02_PID 230.DWG 11/07/2014 11:47:12 AM

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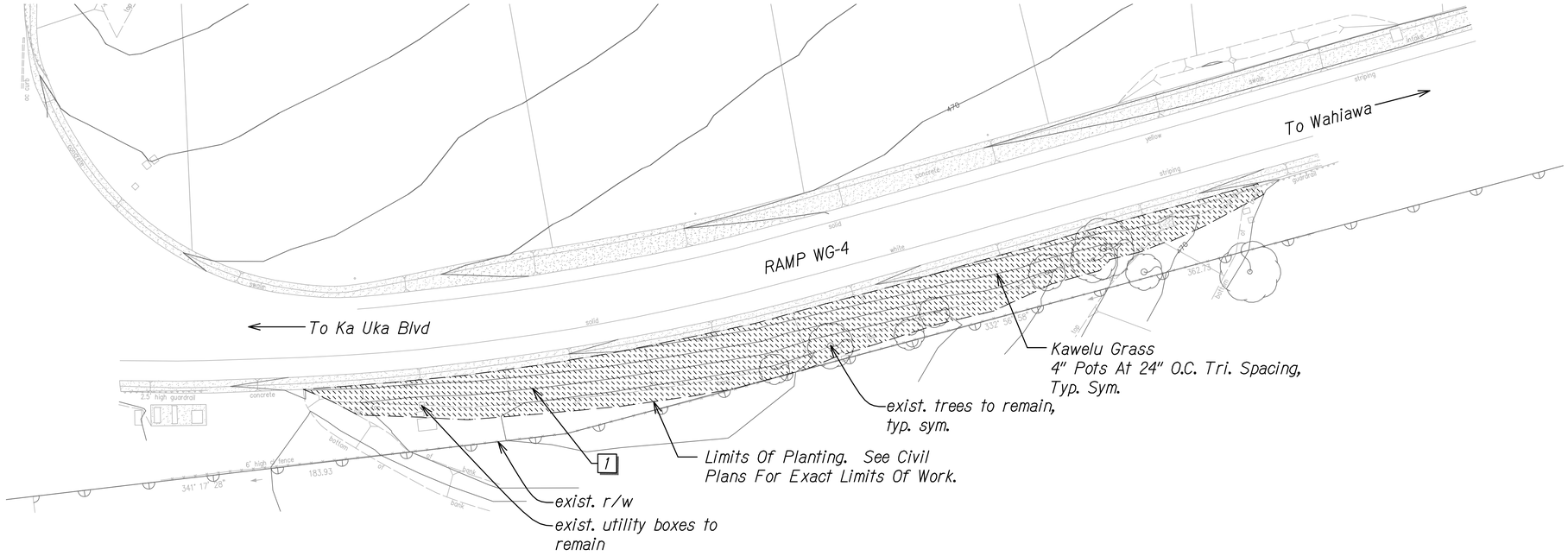
LANDSCAPE PLANTING PLAN PID 230

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: 1" = 20'-0" Date: November 2014

SHEET No. LP-03 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	31	50



PLANT SCHEDULE PID 241

GROUND COVER	BOTANICAL NAME	COMMON NAME
	Eragrostis variabilis	*Kawelu Grass*

REFERENCE NOTES SCHEDULE PID 241

SYMBOL	DESCRIPTION
1	*Install erosion control matting on slopes greater than 3H:1V (see Civil plans). Install per manufacturer's instructions and recommendations. See Civil plans for details and project limits.*

NORTH

0 20 40 60 feet

SCALE: 1" = 20'

LANDSCAPE PLANTING PLAN PID 241

Scale: 1" = 20'-0"

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HIGHWAYS DIVISION

LANDSCAPE PLANTING PLAN PID 241

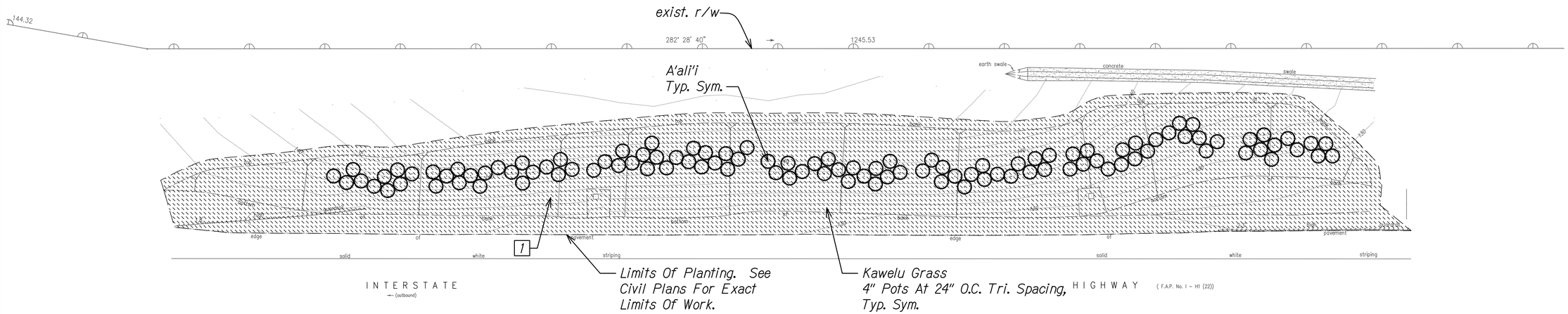
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: 1" = 20'-0" Date: November 2014

SHEET No. LP-04 OF 12 SHEETS

LP-04_SITE 01_PID 241.DWG 11/07/2014 11:50:44 AM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	32	50



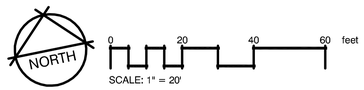
PLANT SCHEDULE PID 57

SHRUBS	BOTANICAL NAME	COMMON NAME
○	*Dodonea viscosa*	A'ali'i

GROUND COVER	BOTANICAL NAME	COMMON NAME
▨	*Eragrostis variabilis*	Kawelu Grass

REFERENCE NOTES SCHEDULE PID 57

SYMBOL	DESCRIPTION
1	Install erosion control matting on slopes greater than 3H:1V (see Civil plans). Install per manufacturer's instructions and recommendations. See Civil plans for details and project limits.



LANDSCAPE PLANTING PLAN PID 57
Scale: 1" = 20'-0"

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HAWAII, U.S.A.

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

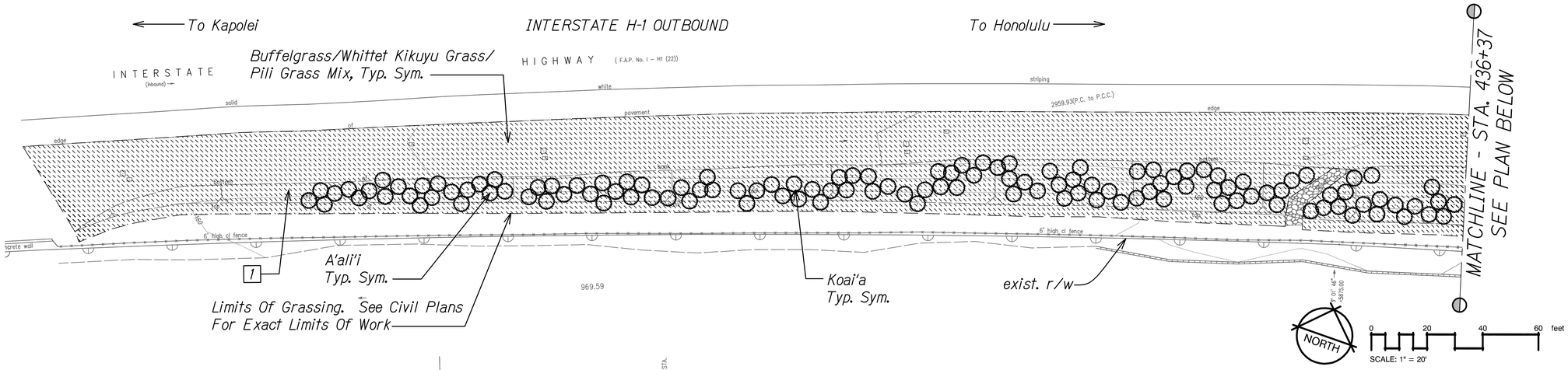
LANDSCAPE PLANTING PLAN PID 57

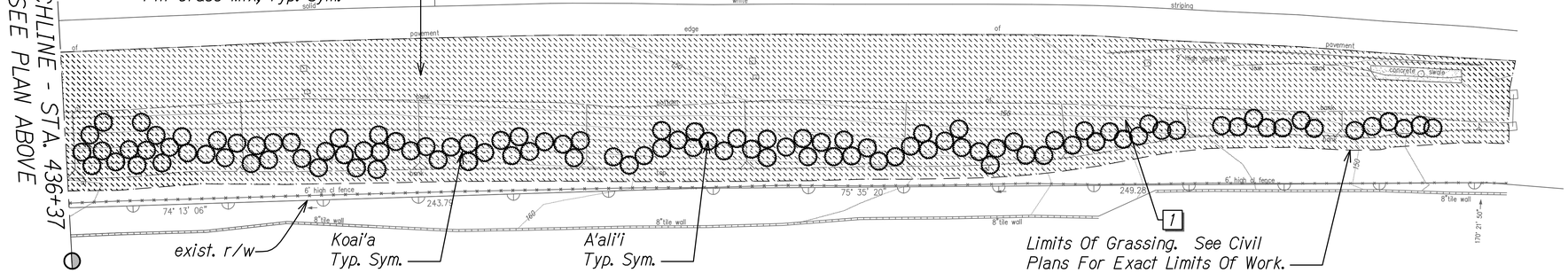
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20'-0" Date: November 2014

SHEET No. LP-05 OF 12 SHEETS

LP-05_SITE 04_PID 57.DWG 11/07/2014 02:25:59 PM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	33	50





PLANT SCHEDULE PID 110

TREES	BOTANICAL NAME	COMMON NAME
○	*Dodonea viscosa*	A'ali'i

GROUND COVER	BOTANICAL NAME	COMMON NAME
▨	*Eragrostis variabilis*	Kawelu Grass

REFERENCE NOTES SCHEDULE PID 110

SYMBOL	DESCRIPTION
1	*Install erosion control matting on slopes greater than 3H:1V (see Civil plans. Install per manufacturer's instructions and recommendations. See Civil plans for details and project limits.*

LANDSCAPE PLANTING PLAN PID 110

Scale: 1" = 20'-0"

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HAWAII, U.S.A.

4/30/16
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

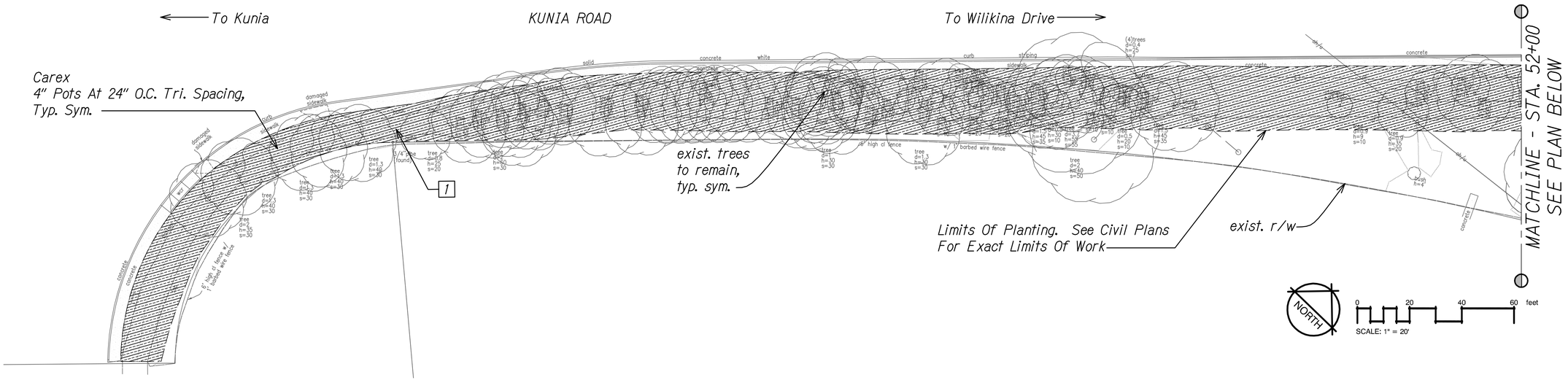
LANDSCAPE PLANTING PLAN PID 110

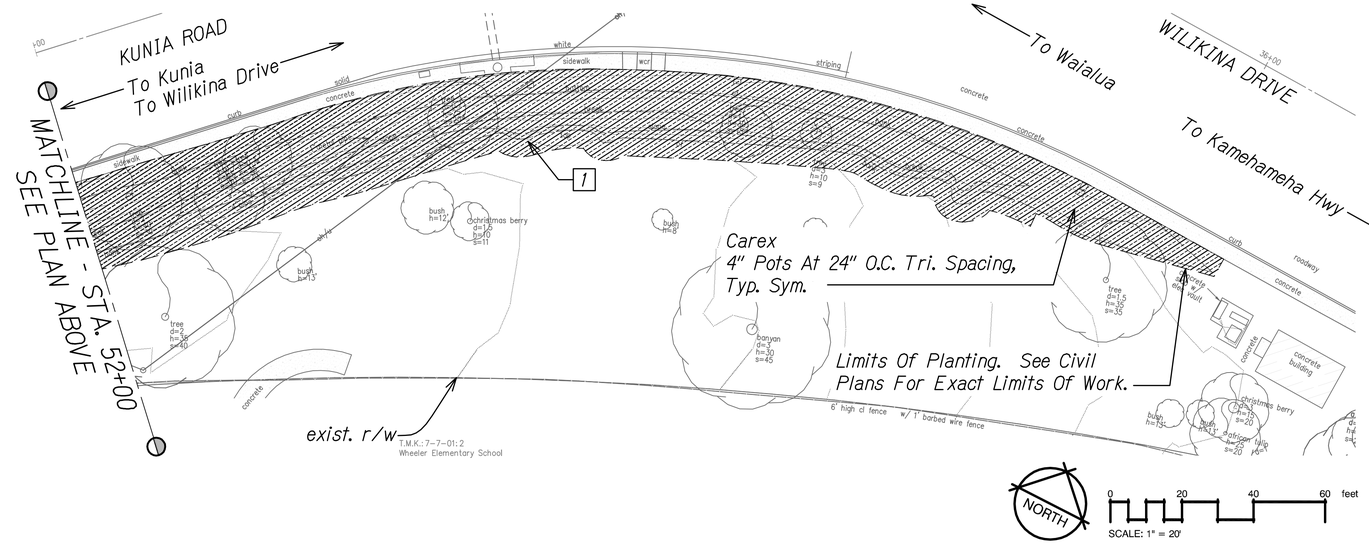
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20'-0" Date: November 2014

SHEET No. LP-06 OF 12 SHEETS

LP-06_SITE 05-PID 110.DWG 11/10/2014 10:04:11 PM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	34	50





PLANT SCHEDULE PID 907

HYDROSEED	BOTANICAL NAME	COMMON NAME
	Carex wahuensis	Carex

REFERENCE NOTES SCHEDULE PID 907

SYMBOL	DESCRIPTION
1	Install erosion control matting on slopes greater than 3H:1V (see Civil plans). Install per manufacturer's instructions and recommendations. See Civil plans for details and project limits.

LANDSCAPE PLANTING PLAN PID 907
Scale: 1" = 20'-0"

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No. 6076
HAWAII, U.S.A.

4/30/16
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LANDSCAPE PLANTING PLAN PID 907

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: 1" = 20'-0" Date: November 2014

SHEET No. LP-07 OF 12 SHEETS

LP-07_SITE 06_PID 907.DWG 11/01/2014 2:07:39 PM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	35	50

TREE PROTECTION ZONE:

1. All trees identified on the plans to be protected. All trees 24" caliper or greater (as measured at 4½ feet height) shall be protected. If trees other than those designated for removal are damaged beyond survival condition as determined by the Engineer, the Contractor shall remove such trees and replace with a tree of the same species and size and maintain for the duration of the construction or 12 months whichever is greater at no cost to the State.

2. The recommended tree protection zone should be located at the outer drip line of the canopy of the tree. However, the minimum protection zone around a tree should be at least 10 feet from the external surface of the tree's trunk. For all palms, the minimum protection zone should be at least 10 feet from the external surface of the palm's trunk.

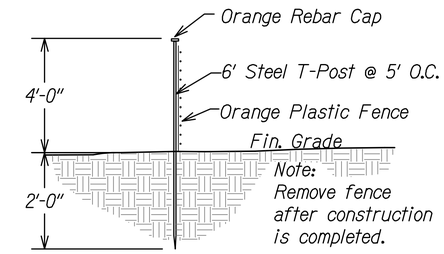
3. All underground utilities and irrigation lines should be routed outside of the tree protection zone. If utilities must traverse the tree protection zone, they shall be tunneled or bored at a depth of 4 feet or greater within the tree protection zone.

4. All protected trees shall be listed on the demolition, landscape, grading and utilities plans. If there is a discrepancy with all plans, Contractor shall contact Engineer immediately.

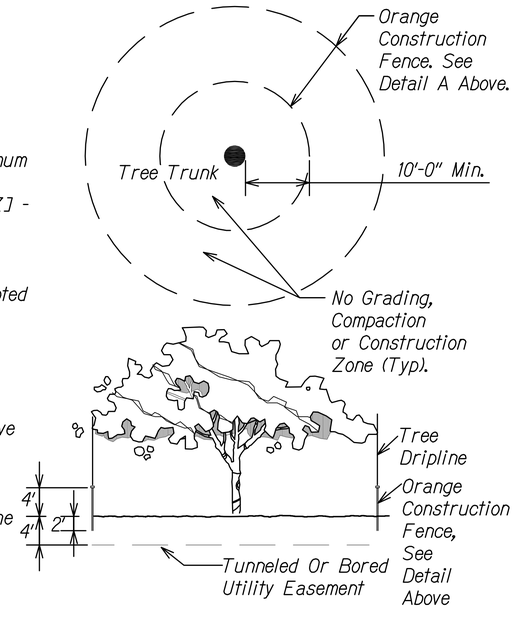
5. Protective fences shall be erected around trees identified on plan to remain and/or trees with a trunk diameter greater than 24 inches (as measured at a height of 4 ½ feet.) Protective fence shall be 4 feet high orange plastic mesh or approved equivalent supported on steel T-post a minimum of 6 feet long. Protective fence shall surround tree at a minimum of 10 feet from tree trunk with steel T-post at a minimum of 5 feet on center. Fence shall be installed prior to any demolition work and shall remain in place until site work is completed. Signs shall be posted on all four sides to read "TREE PROTECTION ZONE [TPZ] - NO GRADE CHANGE, STORAGE OR EQUIPMENT PERMITTED WITHIN TPZ."

6. For the duration of construction within the drip line of the trees to remain there must be:
   - No changes, alteration or disturbance to the grade by adding fill, excavating or scraping except as noted on plans;
   - No storage on construction materials or equipment;
   - No stockpiling of any construction materials or excavated materials;
   - No disposal of any liquids (e.g. concrete slurry, gas, oil, paint);
   - No vehicular traffic, equipment er excessive pedestrian traffic;
   - No attachment of any wires, ropes, lights or any other such attachment other than those of a protective nature to any tree to be preserved; and
   - No cleaning of equipment or material under the canopy of any tree or group of trees to be preserved

7. Auger tunneling, not trenching, shall be used where possible for utility placement within the drip line of the tree. If trenching is necessary it shall be hand dug within the drip line of the tree.



DETAIL A - ORANGE CONSTRUCTION FENCE
NOT TO SCALE



TREE PROTECTION
Scale: Not to Scale
1 LP-08 LP-08

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No. 6076
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4/30/16
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LANDSCAPE
DETAILS

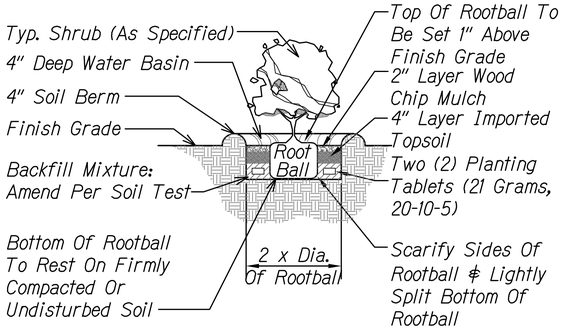
CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: As Shown Date: November 2014

SHEET No. LP-08 OF 12 SHEETS

LP-08_DETAILS_PHI.DWG 11/10/2014 2:09:8 PM

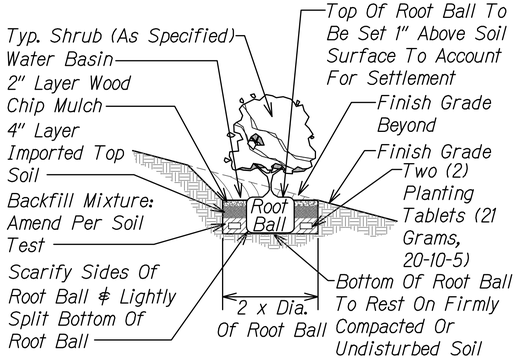
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	36	50

Notes:
1. Single stem shrubs shall be plumb. If shrub is leaning at the end of the plant establishment period, it shall be replaced at the contractor's expense.
2. Immediately after planting, water heavily to ensure soil settles around roots.



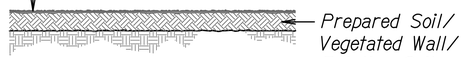
SHRUB PLANTING (1 / LP-09|LP-09)
Scale: Not to Scale

Notes:
1. Single stem shrubs shall be plumb. If shrub Is leaning at the end of the plant establishment period, it shall be replaced at the contractor's expense.
2. Immediately after planting, water heavily to ensure soil settles around roots.



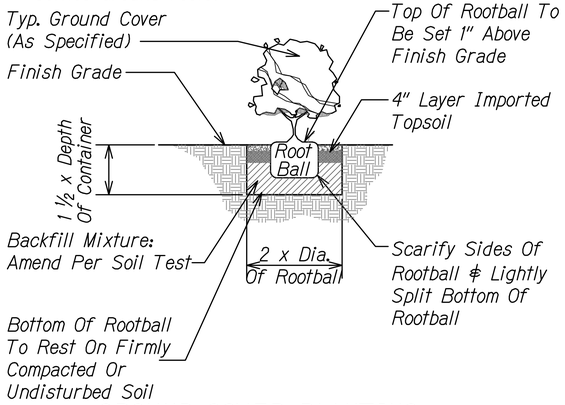
SHRUB PLANTING ON SLOPE (2 / LP-09|LP-09)
Scale: Not to Scale

Hydro Seed/Hydro Sprig:
Shall be specifically processed fiber containing no growth or germination inhibiting factors. It shall be such that after addition and agitation in the hydraulic equipment with seeds/sprigs, fertilizer, water, and other additives not detrimental to plant growth the fibers will form a homogeneous slurry when hydraulically sprayed on the soil or vegetated wall. The fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration. Complete coverage of the surface shall be attained.



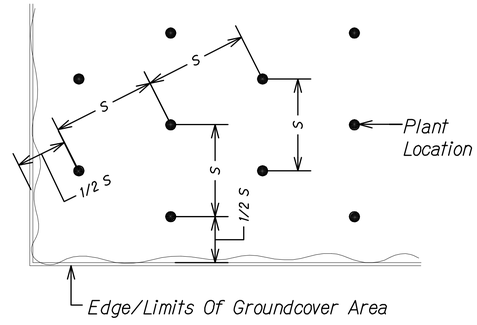
HYDRO-SEED/SPRIG DETAIL (3 / LP-09|LP-09)
Scale: Not to Scale

Notes:
1. Ground covers shall be plumb. If ground cover is leaning at the end of the plant establishment period, it shall be replaced at the contractor's expense.
2. Immediately after planting, water heavily to ensure soil settles around roots.



GROUND COVER PLANTING (4 / LP-09|LP-09)
Scale: Not to Scale

Note:
1. S = Spacing, (refer to plant list for spacing)
2. Use spacing layout for shrubs, groundcovers, and annuals



TRIANGULAR SPACING (5 / LP-09|LP-09)
Scale: Not to Scale

LP-09_DETAILS_PHUNG 11/11/2014 2:49:9 PM

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No. 6076
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4/30/16
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

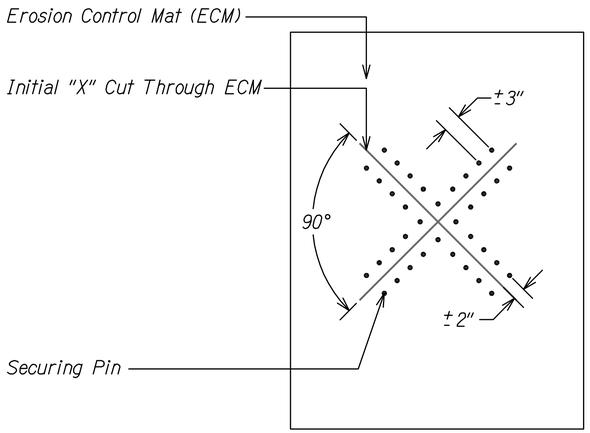
LANDSCAPE DETAILS

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: As Shown Date: November 2014

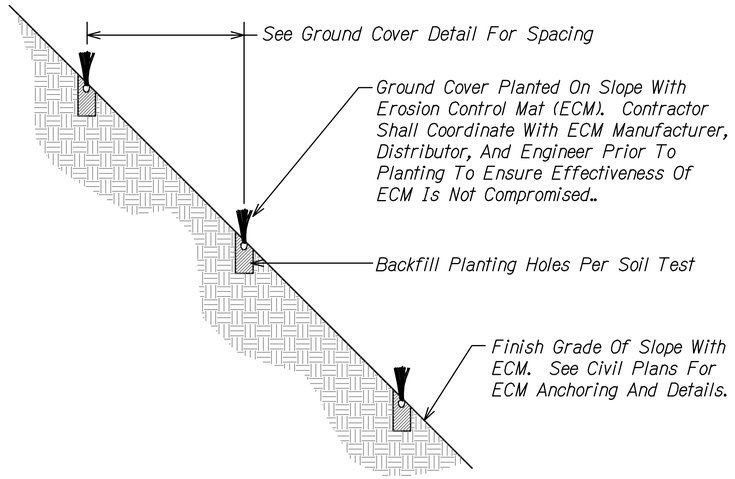
SHEET No. LP-09 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	37	50



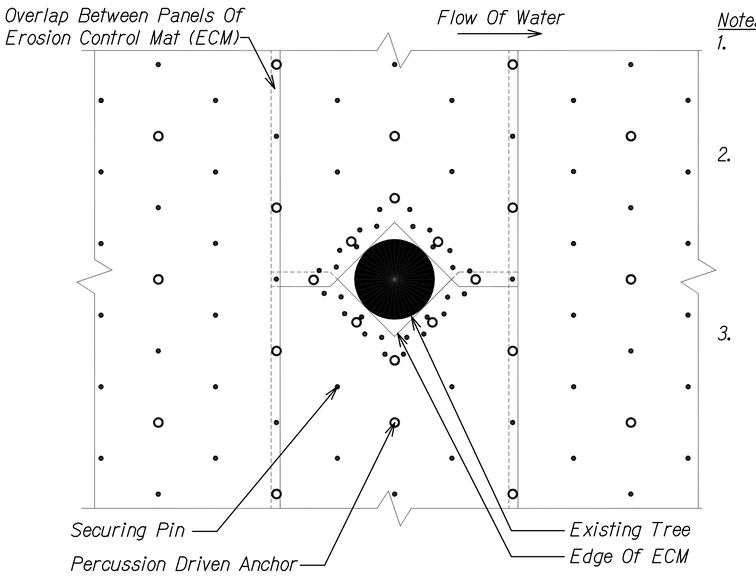
Notes:
1. Contractor Shall Cut An X-Shaped Opening In The Erosion Control Mat (ECM) To The Approximate Size Of The Anticipated Mature Trunk Diameter Of Shrub Or Ground Cover. Cut Opening Using Methods Approved Or Recommended By ECM Manufacturer.
2. Contractor Shall Remove Soil Material From X-Shaped Opening For Planting Pit.
3. After Placing Shrub Or Ground Cover In Planting Pit, Backfill Pit And Compact Soil. Secure ECM Flaps Back Down To The Soil With Securing Pins Per ECM Manufacturer's Recommendations.

TYPICAL PLANTING THROUGH ECM (1 LP-10|LP-10)
Scale: Not to Scale



TYPICAL SECTION

GROUND COVER PLANTING ON SLOPE (3 LP-10|LP-10)
Scale: Not to Scale



Notes:
1. Contractor Shall Join Overlapping Sections Of Erosion Control Mat (ECM) Using Methods Approved Or Recommended By The ECM Manufacturer.
2. Contractor Shall Shall Create An Opening Around The Circumference Of Each Existing Tree To Ensure ECM Maintains Direct Contact With The Ground Surface. Contractor Shall Create Opening In ECM Using Methods Approved Or Recommended By The Manufacturer.
3. Contractor Shall Secure ECM With Combination Of Pins And Percussion Anchors. Pin Placement May Require Modification In The Field Due To Root Location, Trunk Structure, Or Other Obstacles. Contractor Shall Install Additional Pins And/Or Anchors To Ensure ECM Maintains Direct Contact With Ground Surface. Refer To Erosion Control Plans For Pin And Anchor Placement.

TYPICAL ECM INSTALLATION AROUND EXISTING TREES (2 LP-10|LP-10)
Scale: Not to Scale

LP-10_DETAILS_PHUNG 11/07/2014 2:29:30 PM

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4/30/16
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LANDSCAPE DETAILS

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX
Scale: As Shown Date: November 2014

SHEET No. LP-10 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	38	50

PLANT SCHEDULE PID 445

SHRUBS	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
	Dodonea viscosa	A'ali'i	1 Gal		

GROUND COVER	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
	Eragrostis variabilis	Kawelu Grass	4" Pot	24"	Triangular Spacing Ensure No Conflict With ECM Pins And Anchors

PLANT SCHEDULE PID 230

TREES	BOTANICAL NAME	COMMON NAME	CONT	CAL	SIZE
	Acacia koaia	Koai'a	15 Gal	1" Cal	4'-6' Ht.
	Sapindus oahuensis	Lonomea	15 Gal	1" Cal	4'-6' Ht.

SHRUBS	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
	Dodonea viscosa	A'ali'i	1 Gal		

GROUND COVER	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
	Eragrostis variabilis	Kawelu Grass	4" Pot	24"	Triangular Spacing Ensure No Conflict With ECM Pins And Anchors

HYDROSEED	BOTANICAL NAME	COMMON NAME	CONT	REMARKS
	Cynodon dactylon Lolium multiflorum	Common Bermuda Grass Annual Rye Grass	Seed Seed	See specs for grass seeding rate

PLANT SCHEDULE PID 241

GROUND COVER	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
	Eragrostis variabilis	Kawelu Grass	4" Pot	24"	Triangular Spacing Ensure No Conflict With ECM Pins And Anchors

PLANT SCHEDULE PID 57

SHRUBS	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
	Dodonea viscosa	A'ali'i	1 Gal		

GROUND COVER	BOTANICAL NAME	COMMON NAME	CONT		
	Eragrostis varibilis	Kawelu Grass	4" Pot	24"	Triangular Spacing Ensure No Conflict With ECM Pins And Anchors

RUSSELL Y.J. CHUNG
LICENSED PROFESSIONAL LANDSCAPE ARCHITECT
No. 6076
HAWAII, U.S.A.

4/30/16
EXP. DATE

This work was prepared by me or under my supervision.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LANDSCAPE PLANT LIST

CENTRAL OAHU BEST MANAGEMENT PRACTICES
ERODED SLOPE REPAIRS, PHASE 1
Project No. HWY-O-XX-XX

Scale: As Shown Date: November 2014

SHEET No. LP-11 OF 12 SHEETS

LP-11_PLANT LIST_PHDWG 11/07/2014 2:46:05 PM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-XX-XX	2015	39	50

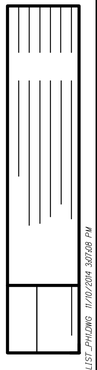
PLANT SCHEDULE PID 110

SHRUBS	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
○	*Dodonea viscosa*	*A'ali'i*	*1 Gal*		

GROUND COVER	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
▨	*Eragrostis variabilis*	*Kawelu Grass*	*4" Pot*	*24"*	*Triangular Spacing* *Ensure No Conflict With ECM* *Pins And Anchors*

PLANT SCHEDULE PID 907

GROUND COVER	BOTANICAL NAME	COMMON NAME	CONT	O.C.	REMARKS
▨	*Carex wahuensis*	*Carex*	*4" Pot*	*24"*	*Triangular Spacing* *Ensure No Conflict With ECM* *Pins And Anchors*



LP-12_PLANT LIST_PHLDWG 11/01/2014 3:07:08 PM

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ERODED SLOPE REPAIRS, PHASE 1
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SHEET No. LP-12 OF 12 SHEETS