



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

STAFF SUBMITTAL

COMMISSION ON WATER RESOURCE MANAGEMENT

November 20, 2013
Honolulu, Hawaii

Application for Stream Channel Alteration Permit (SCAP.3645.3)
Mākaha West Golf Course Improvements
Mākaha and West Mākaha Streams, Mākaha, O‘ahu
(TMKs: (1) 8-4-002:053, 055, and 067)

APPLICANT:

Micah Kane
Pacific Links Hawaii, LLC
700 Bishop Street, Suite 1701
Honolulu, HI 96813

LANDOWNER:

Hawaiian Golf Properties, LLC
700 Bishop Street, Suite 1701
Honolulu, HI 96813
TMKs: (1) 8-4-002:053, 055, and 067

SUMMARY OF REQUEST:

Pacific Links Hawaii, LLC applied for a Stream Channel Alteration Permit (“SCAP”) (SCAP.3645.3) to construct five tee boxes (holes #3, #7, #8, #16 and #17) adjacent to Mākaha and West Mākaha Streams, including the grubbing of existing vegetation, installation of fill for new golf holes, finish grading, stream bank protection with soil gripper bag walls, and stream bank revegetation with native plants and trees (“Makaha West”).

LOCATION: See Exhibits 1 and 2.

BACKGROUND:

Applicant Pacific Links Hawaii, LLC (“Pacific Links”) proposes to construct a new 18-hole championship golf course on the existing Mākaha West Golf Course property in Mākaha Valley, O‘ahu. The applicant expected that benefits from the new golf course include economic opportunities, employment and stimulus to the Mākaha Valley area and Wai‘anae coast residents, influx of visitors to the west side of O‘ahu, restoration of the Mākaha Stream by removing invasive plants, restoration of the forest areas in the Mākaha Valley, and planting of native plants.

On August 21, 2012, the Commission received a SCAP application from Wilson Okamoto Corporation (“WOC”) on behalf of the applicant. Due to a lack of specific site information, plans, and diagrams, WOC resubmitted a revised SCAP application with detailed plans and site photos on October 23, 2012.

On November 19, 2012, the applicant’s representatives, U.S. Fish and Wildlife Service (“USFWS”), and Commission staff conducted a site visit.

On December 7, 2012, Commission staff met with USFWS staff and WOC to discuss concerns raised by USFWS.

On January 30, 2013, WOC certified that based on the pending approval of the Conditional Letter of Map Revision for the Makaha West Golf Resort Club that no existing structures are located in areas that would be impacted by the increased base flood elevations.

On February 26, 2013, Commission staff met with WOC to discuss concerns raised by USFWS and the University of Hawaii, Environmental Center (UH-EC). WOC indicated that they have an ongoing discussion with USFWS to address concerns and anticipate meeting with UH-EC to address their concerns.

On February 27, 2013, Commission staff received WOC’s formal response to USFWS comments.

On March 20, 2013 Commission staff received WOC’s formal responses to UH-EC and the Department of Land and Natural Resources, Division of Aquatic Resources (“DAR”).

DESCRIPTION:

Mākaha Stream is a 6 mile long stream that runs perennially in the upper reaches (above 500 ft. elevation) and intermittent in the lower reaches. The Mākaha watershed encompasses 7.5 square miles. Approximately 70-percent of the upper watershed and surrounding steep slopes are classified Conservation. There is little agricultural use. The remaining area of Mākaha is classified and zoned urban (residential). Recent surveys show that the stream supports a limited number of endemic stream organisms, including ‘opae kala‘ole (*Atyoida bisulcata*) and ‘o‘opu nākea (*Awaous guamensis*) in the middle reaches. Three native damselflies (*Megalagrion hawaiiense*, *Megalagrion nigrohamatum nigrolineatum*, and *Megalagrion oceanium*), including two listed as endangered, have also been observed in the headwaters and upper reaches of Mākaha Stream.

The Makaha West Project area encompasses both Mākaha and West Mākaha Streams. The work within the top of the stream bank includes grubbing of existing shrubs, trees, weeds, stream clean-up and clearing, installation of fill for new golf hills, finish grading, wall, stream bank protection, nine (9) new cart bridges with concrete footings and wood piers, access roads for maintenance, relocation of overhead electrical lines to underground conduits, and installation of new utility poles and cart paths (Exhibits 3, 4, 5 and 6).

Materials used within the stream channel include fill soil, base course rock, concrete, rocks/boulders from existing site for new soil gripper bag walls and stream bank protections, sand/soil growing material, sand, native plants, native trees and new golf turf grass.

Approximately 59 acres will be graded. Approximately 19 acres will be grubbed. The total area of disturbance is 70 acres (Exhibit 3). The project area will be grubbed and cleared of invasive tree and brush species for floodplain restoration. The new golf turf grass will cover approximately 700,000 square feet. About 35,200 cubic yards will be excavated. The estimated fill will be 148,500 cubic yards.

The applicant anticipates that some cobbles, boulders and rocks will be removed from the stream bank boundaries and reused in other areas of the golf course. Some boulders will be crushed and used to fill other areas of the golf course. The clearing and grubbing will remove invasive plant and tree species. The mulch will be donated to community groups and removed by truck off-site. The existing grass and topsoil removed from the clear and grub operation will be grinded and reused in other areas of the golf course. The project will reuse as much existing material generated from the project site as possible.

The contractor will install all erosion control measures prior to any construction activities and will remain in place until all upstream work is completed or grown in (Exhibits 4A, 4B, 4C, and 4D). The mass grading contractor will use heavy earthmoving equipment to excavate, move, fill and shape the course grading to design of golf layout.

There are nine new cart bridges to be installed within the top of stream bank area (Exhibits 5 and 6). Bridge crossings will be constructed for minimal impact of existing topography and streamflow. Bridges will consist of timber spans ranging from 20 to 60 linear feet. Concrete footers will be installed with 10-inch and 12-inch timber piling utilized to support 10-foot wide timber cart bridges at required elevations to minimize any flow restriction. Heavy timber stringers will be used for 20-foot spans and glue laminated beams will be utilized to clear span all ordinary high water mark ("OHWM") stream crossings. Concrete footers will be placed a minimum of 2 feet outside of the OHWM boundary. Footers will be installed parallel to designated boundary to insure maximum flow. Construction of footers and timber bridges will be conducted in corridor adjacent to bridge structures utilizing track type excavator and crane.

The bridge installation sequence is as follows: 1) Pour concrete footers with embedded metal bracket to receive piling base; 2) Install two 10-inch piles for 20-foot bridge sections and three 12-inch piling at longer spans as primary supports for bridge structure; and 3) Install 10x10 or 12x12 timber pile caps to piling to receive bridge stringers and decking.

For fill on the golf course, wall construction of the "Gripper Wall System" will consist of approximately 10,500 linear feet, averaging 5 feet in height. Stream bank scour protection of approximately 1,100 linear feet and an average of 4 feet in height will be constructed. See Exhibits 7 and 9. Exhibit 8 consists of existing conditions photographs of the Project Area.

The Project activities within the stream channel and floodplain is expected to take 3 to 4 months. It will start upon completion of all permitting requirements.

ANALYSIS:

Agency Review Comments:

City and County of Honolulu, Department of Planning and Permitting (“DPP”):

1. This project is not located within the Special Management Area (“SMA”) and not subject to SMA use permit requirements.
2. The grading plans shall be approved by DPP prior to applying for a grading permit.
3. The applicant is processing a Conditional Letter of Map Revision (“CLOMR”) through the Federal Emergency Management Agency (“FEMA”) for proposed changes to the floodplain. Until the CLOMR is granted by FEMA, DPP will not issue construction/grading approvals for the project.

Department of Health, Clean Water Branch:

1. Any project and its potential impacts to State waters must meet the following criteria:
 - a. Anti-degradation policy (Haw. Admin. Rules Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
 - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
 - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. A Section 401 Water Quality Certification (“WQC”) is not required because the U.S. Army Corps of Engineers (“USACE”) has informed the DOH-CWB in its letter of November 28, 2012 that “... we have determined that the project will not involve the placement or discharge of fill material below the delineated OHWM of the Mākaha and West Mākaha Stream. Accordingly, our previous determination remains valid; no DA permit is required...”
3. A National Pollutant Discharge Elimination System (“NPDES”) permit for storm water discharges associated with construction activity is required. The DOH-CWB has issued a Notice of General Permit Coverage on July 25, 2012 (File No. HI R10E121) that authorizes the storm water discharges associated with construction activities.
4. All discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State’s Water Quality Standards.

Department of Land and Natural Resources (“DLNR”), Division of Aquatic Resources:

1. The proposed project is not expected to have a significant impact on the aquatic resources in this area. The concrete footers for the cart bridges are outside of the OHWM boundary and not expected to restrict stream flows.
2. The West Mākaha Stream is a tributary of Mākaha Stream which is perennial. The Mākaha Stream is usually dry in the lower reaches, but does provide habitat for two species of native macrofauna in the upper reaches. These include native fish species *Awaous guamensis* and the native crustacean *Atyoida bisulcata* (ref. DAR Aquatic Resources Database, Oct. 6, 2006).

WOC Response: *The Mākaha stream channel alignments will not be altered or changed during golf course construction. PLH has obtained a maintenance permit for the streams from the USACE. Annual maintenance including removal of sediment, large tree branches, brush, and debris will be performed within the stream and floodplain to maintain the stream’s flow capacity.*

3. The recruitment, migratory and reproductive natures of the native macrofauna are dependent on the connection to the ocean and because of this, the stream channel bottom in the proposed project area should be maintained as natural as possible. Also, the following mitigation measures should be implemented during the construction to minimize the potential for erosion, siltation and pollution of the aquatic environment:
 - a) Lands denuded of vegetation should be planted or covered as quickly as possible to prevent erosion;
 - b) Scheduling site work (particularly the excavation and construction) during periods of minimal rainfall; and,
 - c) Prevent construction materials, petroleum products, debris and landscaping products at the construction site and staging areas from falling, blowing or leaching into the aquatic environment.

WOC Response: *The three mitigation measures listed will be addressed and performed through installation of BMP measures and documented in the Erosion Control Report.*

DLNR, Engineering Division:

1. The project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zones X, XS, D, AE and AE Floodway (AEF).
2. The project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulation (44CFR), whenever development within a Special Flood Hazard Area is undertaken.

DLNR, Land Division: No objections.

DLNR, Division of State Parks: No objections.

University of Hawaii, Environmental Center (UH-EC)

1. Mākaha stream has undergone dramatic change over the last century as the result of water resource development for irrigation and municipal purposes. Given the historic situation, it may be useful to consider the feasibility of installing a continuous flow measuring device at entrance to Glover Tunnel to better quantify tunnel outflow and its impact on base streamflow. Such monitoring would help to assess freshwater availability in Mākaha valley and aid long-term stream restoration plans and actions.

WOC Response: Glover Tunnel is owned and operated by the Board of Water Supply (BWS) and not by PLH, project and land owner. PLH receives non potable water through an existing water meter from the BWS distribution water line from an earth reservoir supplied by Glover Tunnel and this water is used to irrigate the Mākaha West golf course. PLH pays BWS for this water.

2. Along these lines, we note that DLNR's October 2012 Progress Report on the Mākaha Valley Flood Study states that "a study focused specifically on Mākaha Valley is vital to identify specific recommendations for the control of storm drainage to reduce recurring flooding to residences and businesses in the area," and the study "will address ... [a]ny other issues deemed necessary or relevant by the chairperson of the board of land and natural resources."

WOC Response: The Mākaha West Golf Course renovations project proposes to build three new golf holes within the existing Mākaha Stream floodplain. A hydrologic and hydraulic analysis of the 100yr and 500yr storm events resulted in flood waters entering and exiting the project site from the proposed golf course project to be the same values as the existing condition. The model storm events indicate that the proposed golf course project does not increase the stream flow, velocity, or water elevations exiting downstream of the project property line. Since the project is designed to keep the grading and work outside of the ordinary high water mark of the stream, there will be no change, alteration, or rerouting of the alignment of the existing stream.

3. The 2008/2010 State Water Quality Monitoring and Assessment Report indicates that marine open coastal waters at Mākaha Beach do not achieve state water quality criteria for nitrate+nitrite nitrogen, ammonia nitrogen, chlorophyll a, and turbidity. However, the report does not contain information about Mākaha and West Mākaha streams, indicating a lack of readily-available data for assessing their achievement of conventional water quality criteria. Therefore, it may be useful for the applicant, the Commission, and others to consider how the proposed alteration could provide additional data that would support a more comprehensive evaluation of stream water quality, instream use protection, pollutant loading dynamics, marine water quality, and watershed health in the Makaha region. Moreover, it would be useful for the applicant to describe how the proposed stream channel alteration would contribute to the reduction of pollutant loads, the

improvement of water quality, and the recovery of ecosystem health in marine receiving waters.

WOC Response: PLH would consider water quality testing of the stream and share the data. The testing constituents and frequency of testing shall be determined as part of the golf course annual maintenance program for the streams. PLH has developed irrigation, fertilizer and pesticides BMP reports and protocols for the new golf course.

4. The narrative description of the proposed alteration is somewhat difficult to decipher without detailed inspection of the accompanying design sheets, drawings, and plans. In order to facilitate the review and decision process, it may be useful for the applicant to more carefully distinguish between work that would occur within the stream channel (CWRM jurisdiction) and other work, and to clearly summarize [the following]:

WOC Response:

- *No existing streambed will be touched by new construction per USACE direction and all construction work shall remain outside the OHWM boundaries as shown on the plans.*
- *The total length of bank/wall to be installed is approximately 10,500 linear feet.*
- *The average height of wall installed or bank protection is approximately 4 feet.*
- *There will be no alteration of stream channels.*
- *The volume of new fill material within the flood plain is approximately 111,000 cubic yards; the existing Mākaha West Golf Course had three holes of golf totaling approximately 1,016,471 square feet of golf course within the flood plain and approximately 40,000 cubic yards of fill within the flood plain.*
- *The Gripper bag walls length is approximately 10,500 linear feet, average height is approximately 4 feet, width is approximately 3 feet.*
- *The CRM bank protection length is approximately 1,000 linear feet, average height is approximately 2 feet, width is approximately 3 feet.*
- *No rocks will be removed the stream bed.*
- *The amount of rock removed from stream banks is unknown because the amount of existing rock is unknown. The area to be grubbed within the floodplain is approximately 19 acres.*
- *No hydrologic changes will be made to the stream; existing drainage basins are to be maintained and current sheet flow down gradient will be maintained by golf course design.*
- *The project has performed a CLOMR for FEMA with extensive hydraulic modeling performed on the stream. The Mākaha West Golf Course renovations project proposes to build three new golf holes within the existing Mākaha Stream floodplain. A hydrologic and hydraulic analysis of the 100-year and 500-year storm events resulted in flood waters entering and exiting the project site from the proposed golf course project to be the same values as the existing condition. The model storm events indicate that the proposed golf course project does not increase the stream flow, velocity, or water elevations exiting downstream of the project property line.*

- *There will be no construction work within the stream channel, bed and within the OHWM boundaries.*
 - *The construction estimated time within the flood plain is 3-4 months.*
5. In terms of temporary water needed during the actual stream alteration, Section B-2 (g) states that "Water will be provided from existing [Honolulu Board of Water Supply] BWS fixtures on site. Non potable water will be provided by exi[s]ting connection to BWS non potable Glover Tunnel." However, a permanent source of irrigation water for the proposed golf course is not explicitly described. Glover Tunnel has been the source of irrigation water for this same golf course since at least 1969. It would be helpful to know if the applicant plans to continue using freshwater from Glover Tunnel for all future irrigation needs. If Glover Tunnel will be the long-term source of freshwater for irrigation, what will be done with surplus flow, if any, from Glover Tunnel? Does the applicant plan to return any surplus to the stream? Will it be returned to the BWS? Since outflow from Glover Tunnel is non-potable, for what non-potable purpose(s) is excess flow currently used?

WOC Response: BWS supplied potable water will be used to supply restrooms, halfway house, clubhouse and maintenance building. PLH has obtained a well development permit to drill one non-potable underground well from the Commission. The well has been drilled. The project plans to drill two additional underground non-potable wells for golf course irrigation. Current discussion with the Commission and BWS to close out well #1 permit and move forward on the future two well permits are on-going. The use of BWS Glover Tunnel non-potable water to irrigate the golf course is another alternative source of water. All comments concerning operations of Glover Tunnel water should be addressed to BWS.

6. The application does not address the restoration of streamflow as a component of stream restoration. It would be helpful to know if the applicant plans to restore streamflow adjacent to the golf course, especially considering that the water to irrigate the golf course is essentially derived from streamflow diversions further up the valley. How would native vegetation planted within the stream channel be irrigated?

WOC Response: The Mākaha Golf Course project will not adversely impact streamflow or is in a position to restore the streamflow. The golf course's irrigation sources are BWS Glover Tunnel and onsite wells drawing water from the alluvial mud which covers the valley floor. The draft by onsite wells is from groundwater more than 200 feet below the stream invert. This water is not now and has never been a contributor to streamflow. Use of these wells cannot and will not reduce streamflow.

Glover Tunnel does not intercept stream flow. It is a long and relatively shallow development tunnel that intercepts groundwater. Whether or not this intercepted groundwater would have ultimately surfaced in the stream at some downstream location is not known but seems unlikely. The tunnel water that is not used for golf course irrigation and/or future community use is spilled back into the stream. At the location of

the golf course, all of this water has been lost to seepage and the streambed is dry. Golf course irrigation water supply originates from an earth reservoir located above the golf course and discharge piping supplied to the golf course irrigation system.

The primary cause of reduced streamflow is the pumping by BWS wells toward the back end of the valley. These wells tap into high level groundwater compartments which used to feed the stream. The water levels in these compartments are now drawn down below the stream invert and no longer feed into the stream.

PLH plans to maintain the flood plain and streambed of non-native plants and trees, and create an annual maintenance plan for the stream to remove/reduce debris load, weeds and brush from the stream. Currently, PLH has a maintenance permit from USACE to remove debris from the streambed. New native vegetation planned for the floodplain (Buffalo grass) will be planted with no irrigation system.

7. If the Commission issues a permit for the proposed alteration, it may be useful to share the application information (e.g. location and basic construction specifications) with the Hawaii National Hydrography Dataset (“NHD”) Partnership, so that the hydrologic and engineering features and events associated with the proposed alteration can be properly incorporated into the NHD.

WOC Response: *PLH is willing to share construction documentation with the NHD.*

U.S. Army Corps of Engineers (USACE):

1. On May 25, 2012, a No Permit Required letter was issued. This determination was based on conceptual plans and an OHWM delineation submitted by the landowners authorized agents, WOC and AECOS, Inc., based on a review of the project plans provided and further clarification provided by WOC, USACE has determined that the project will not involve the placement or discharge of fill material below the delineated OHWM of the Mākaha and West Mākaha Streams. Accordingly, the previous USACE determination remains valid; no DA permit is required (File no. POH-2011-00334).

U.S. Fish and Wildlife Service (USFWS):

1. The work includes extensive site grading, construction of “gripper walls”/ berms, supports for bridges and vegetation clearing along the banks, stream channel and floodway of the stream and tributary. A taro lo‘i and reservoir for irrigating the golf course are also planned to be constructed in currently upland areas. Although all work is proposed to be above ordinary high water in the stream, many of these activities could disrupt stream function by disconnecting the stream from its floodplain, narrowing or constraining flow capacity in the stream, and destabilizing the stream channel and banks. Raising the floodplain elevation as proposed may also reduce its functional capacity. Any of these impacts may also cause erosion, sedimentation or flooding problems up- or downstream.

WOC Response: While there is no doubt that construction activities in the watershed (grading and grubbing) have the potential for enhancing erosion and contributing to water quality degradation in a stream, the project as proposed will comply with all standard BMPs to prevent or minimize such disruptions in stream function. Mākaha Stream in the project area flows only infrequently during wet season freshets, so most construction activities outside the OHWM will not have any impact on stream function. No construction is contemplated that would disconnect the stream from its floodplain or constrain normal stream flows (all structures are outside the OHWM), or destabilize the stream channel.

The proposed work within the Mākaha Stream top of bank does include creation of sediment basins above Hole No. 15 and just below Hole No. 3; however, grading work will not be extensive nor disruptive to stream functions. There will be clearing and grubbing of non-native plants and revegetation (with appropriate native plants where appropriate) along and above the stream banks in areas as needed to stabilize any construction-disturbed ground near the stream. The existing stream alignment will not be changed. Further, flood calculations undertaken for the CLOMR (floodway alterations) show that the post condition stream water surface level does raise due to any proposed fill within the floodplain but any rise will remain within PLH property with no effect on adjoining lots.

2. Review of impacts to floodplain function is also subject to Executive Order 11988, where federal action agencies are directed to discourage development in floodplains. However, until and unless there is a federal nexus established with this proposal, it is important to inform the applicant's consultants of our concerns, and to recommend to the applicant that they consult with State Dept. of Forestry and Wildlife regarding potential endangered species impacts.

WOC Response: The applicant has consulted with the USACE regarding this matter and has received a letter informing it that no USACE permit will be required for the project. The applicant is in consultation with the USFWS pursuant to Section 7 of the Endangered Species Act, and will abide by, and implement all measures that are included in the USFWS concurrence letter. A federal nexus exists here as related to the CLOMR application before the FEMA.

3. USFWS does not object to the plan for revitalizing this historically cleared and long-unmanaged site for the proposed development. However, the following concerns and recommendations are provided to assist the applicant in avoiding and minimizing impacts to native, threatened and endangered species.
 - a. USFWS recommends the golf course design be modified to preserve stream and floodplain function and to avoid and minimize impacts to the maximum extent practicable. Re-evaluating certain design features of the project will help to: 1) retain channel structure and complexity; 2) reduce erosion and sedimentation; 3) reduce flooding; 4) avoid creating or obstructing potential migratory pathways for native

stream species, for example if bridges get clogged with stream bed boulders or other debris; and 5) maintain the stream and tributary connection to the floodplain. The following avoidance and minimization measures may also protect the project area and downstream properties from flood damage, reducing the amount of site grading, berms/gripper walls and bridging and could substantially reduce project costs.

WOC Response: The majority of the area is an existing golf course and not a "long-unmanaged site." The proposed design components were reevaluated and redesigned in several iterations to minimize impacts on the stream and associated floodplain. For example, a proposed cart bridge foundation base was reduced in size and debris deflectors incorporated to prevent clogging with stream debris at the bridge. The owner is committed to regular cleanup of debris deposited in the stream channel and on the floodplain to reduce the potential of any stream-clogging material reaching areas downstream from the golf course.

- b. Avoid regrading the floodplain to the maximum extent practicable. The golf course does not appear to be planned to be compatible with existing, rolling site grade topography. Extensive cutting, filling and regrading within the floodplain is proposed, some of which may raise the current elevation of the floodplain and reduce flood storage capacity. For example, the proposed 3rd tee is only a few feet higher and within approximately 50 feet of the stream bank. At this site and throughout the golf course, there are other planned features that are possibly too close to the stream and will require grading to raise the elevation of the floodplain to protect them. The hazard of the proximity of the stream could be vastly reduced by repositioning the location of several course features that could be removed from immediately flood prone areas, which would also reduce the need for such an extensive (and expensive) network of berms and flood plain re-grading.

WOC Response: The proposed grading with the floodplain will result in no additional impact from floods beyond the property line. Redesign of the golf course is not focused on removing "existing, rolling site grade topography." Golf course design involves a reliance on natural features, including stream features, as important to combining an enjoyable ambiance and appropriate challenges to the users of the course. The suggestion that the owner should simply move a tee or some other feature to some greater distance from the stream overlooks both the artistry of designing a world-class facility and the engineering/hydrological calculations undertaken to insure that the design does not adversely impact on floodplain functions. No construction is proposed within the stream channel or that would change the existing stream alignment. Walls and/or fill proposed for locations above stream banks will be used to protect the owner's assets and appropriately direct flood flows during exceptional flood episodes.

- c. Avoid extensive bridging of Mākaha stream and tributary with associated supports or abutments. Additional impacts to land (floodplain) that has not already been cleared could result from proposed development of golf greens on the mauka side of the stream and tributary, resulting in the need for several bridges proposed to span across

both channels. It is not clear if hydraulic modeling has been accomplished to show that the height of the bridges over the stream and tributary can accommodate anticipated flood stages. Supports for these bridges and stream bank armoring throughout the project could also constrain flood flows and cause head cuts or stream incision.

WOC Response: Hydrological analysis of proposed fill within the floodplain shows no impact on neighboring properties. If hydraulic analysis was performed with proposed cart bridges that cross the floodplain. The results showed full clearance of the lowest bridge structural member to meet the 100-year flood event water surface elevation.

- d. Where possible, minimize removal of existing established vegetation from river banks and the stream channels. These established plants, although predominately non-native invasive species, currently function to stabilize the stream banks and river bed, reducing downstream sedimentation from flood events. This vegetation also provides shade and temperature moderation for the stream waters; important to native species that may access the channel in flood conditions. There are several areas, for example the proposed new 8th hole where historic fill is exposed on the eroded river bank. These exposed banks may be proposed to be armored with stone but it is recommended to use a more bio-engineered approach such as laying back the slope of the bank and planting with vegetation that could provide shade, or using alternative erosion control materials that will not harden the stream bank in a patch-work manner and impact adjacent or opposite stream banks.

WOC Response: Removal of vegetation from stream banks would be minimized or even avoided in most places. In some areas, however establish vegetation (trees) might be removed and/or replaced to open up views. Shade and temperature moderation are desirable things in a wetted stream reach, but WOC points out that this stream is mostly characterized by a wide bed of normally dry stones. Therefore, changes contemplated to the watershed close to or above the banks are unlikely to have any impact on stream conditions during infrequent freshets. Further, it is clearly in the interest of the developer to reduce erosion and excessive stream meandering by appropriate solutions such as planting and armoring. Laying back slopes and planting are not always appropriate to addressing stream erosion, but certainly are among options that are being considered.

4. The applicant is advised to request a species list for the project area from USFWS. Clearing large trees on extensive areas of the site within the stream, on the banks, tributary, planned golf greens, etc. could impact endangered Hawaiian Hoary Bat, and construction and operation of a proposed taro producing wetland and the proposed irrigation reservoir (in what are now dry, unvegetated areas) for the golf course and amenities may attract endangered Hawaiian waterbirds. It should be noted that five Hawaiian stilts were observed loafing in defunct, lined golf course ponds. To ensure conservation and protection of endangered species throughout the site for the life of the project, the applicant should be advised to coordinate with USFWS and also with the

State Habitat Conservation Plan (“HCP”) coordinator under DOFAW. Early coordination is essential to developing an HCP to coincide with your planned construction and operation timeline.

WOC Response: *The applicant is in consultation with the USFWS pursuant to Section 7 of the ESA, and will abide by, and implement all measures that are included in the USFWS concurrence letter. Furthermore, the applicant is in consultation with DOFAW and will implement whatever conditions result from that consultation.*

5. USFWS supports the restoration of native vegetation for the development and at the appropriate planning stage may be able to provide technical assistance with regard to lowland dry forest species that could be planted.

Hawaii Revised Statutes (HRS) Chapter 343, Environmental Review

Environmental Assessment (EA) Triggers. In accordance with HRS §343-5(a), the applicant’s proposed action does not trigger an EA because the project is located on private land in the urban land use district, and will not use state or county funds.

Staff Review

Mākaha and West Mākaha Streams are intermittent streams that are often dry in the mid-reaches located in the Project area. Flood issues are addressed through the City and County of Honolulu DPP and FEMA’s CLOMR process.

Water quality concerns are addressed by the Department of Health’s Clean Water Branch through the NPDES permit for stormwater discharges.

The Department of Land and Natural Resources’ Division of Aquatic Resources recognizes that the proposed project is not expected to have a significant impact on the aquatic resources.

The concerns raised by the University of Hawaii’s Environmental Center have been addressed. Comments related to the watershed should be addressed in wider watershed planning initiatives.

WOC addressed USFWS’s concerns while also recognizing that many concerns are outside the Commission’s jurisdiction. Endangered species concerns are reviewed with FEMA and WOC.

RECOMMENDATION:

Staff recommends that the Commission:

APPROVE a Stream Channel Alteration Permit (SCAP.3645.3) to construct five tee boxes (holes #3, #7, #8, #16 and #17) adjacent to Mākaha and West Mākaha Streams, including the grubbing of existing vegetation, installation of fill for new golf holes, finish grading, stream bank protection with soil gripper bag walls, and stream bank revegetation with native plants

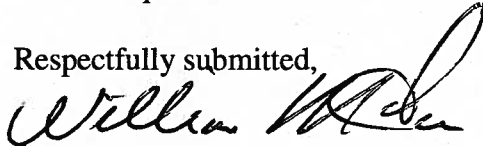
and trees at Mākaha West Golf Course, Mākaha, O‘ahu (TMKs: (1) 8-4-002:053, 055, and 067)

SUBJECT TO the Standard Conditions in Exhibit 10;

BUT NOT ISSUE the SCAP UNTIL

The Applicant obtains a “Conditional Letter of Map Revision” (“CLOMR”) from the Federal Emergency Management Agency (“FEMA”) for proposed changes to the floodplain. Until FEMA grants a CLOMAR, the City and County of Honolulu Department of Planning and Permitting (“DPP”) will not issue construction grading approvals for the project. DPP granted approval for the original design specifications stated in the SCAP application dated August 21, 2012. If FEMA requires material changes to the original design specifications, the Commission will conduct further review before the SCAP is actually issued in order to determine if any additional conditions are required.

Respectfully submitted,



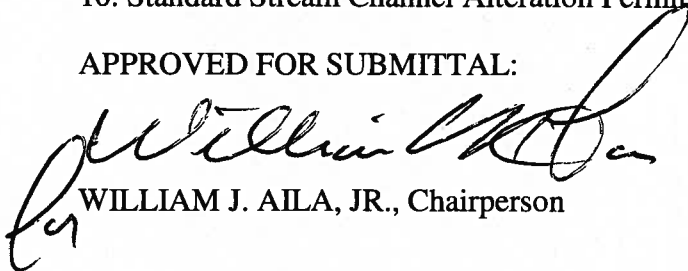
WILLIAM M. TAM

Deputy Director

Exhibits:

1. Project Location Map
2. Aerial Photograph Map
3. General Plan Map
4. A - Erosion Control Plan, Section 1
B - Erosion Control Plan, Section 2
C - Erosion Control Plan, Section 3
D - Erosion Control Plan, Section 4
5. Bridge Elevation Plan
6. Bridge Structure Sections
7. Gripper System Stream Bank Sections at Various Locations
8. Existing Condition Photographs
9. Gripper Wall System
10. Standard Stream Channel Alteration Permit Conditions

APPROVED FOR SUBMITTAL:



WILLIAM J. AILA, JR., Chairperson

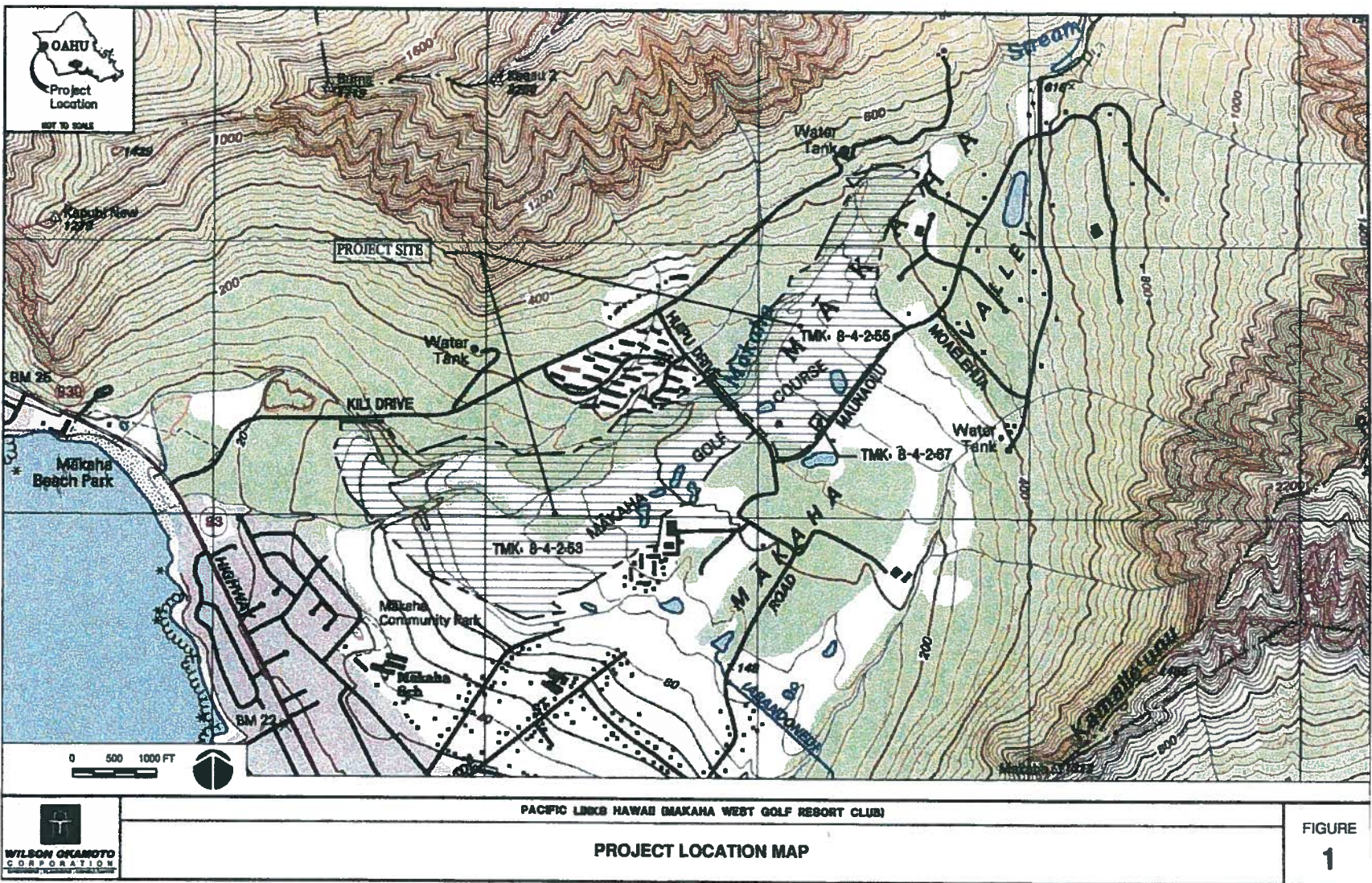


EXHIBIT 1

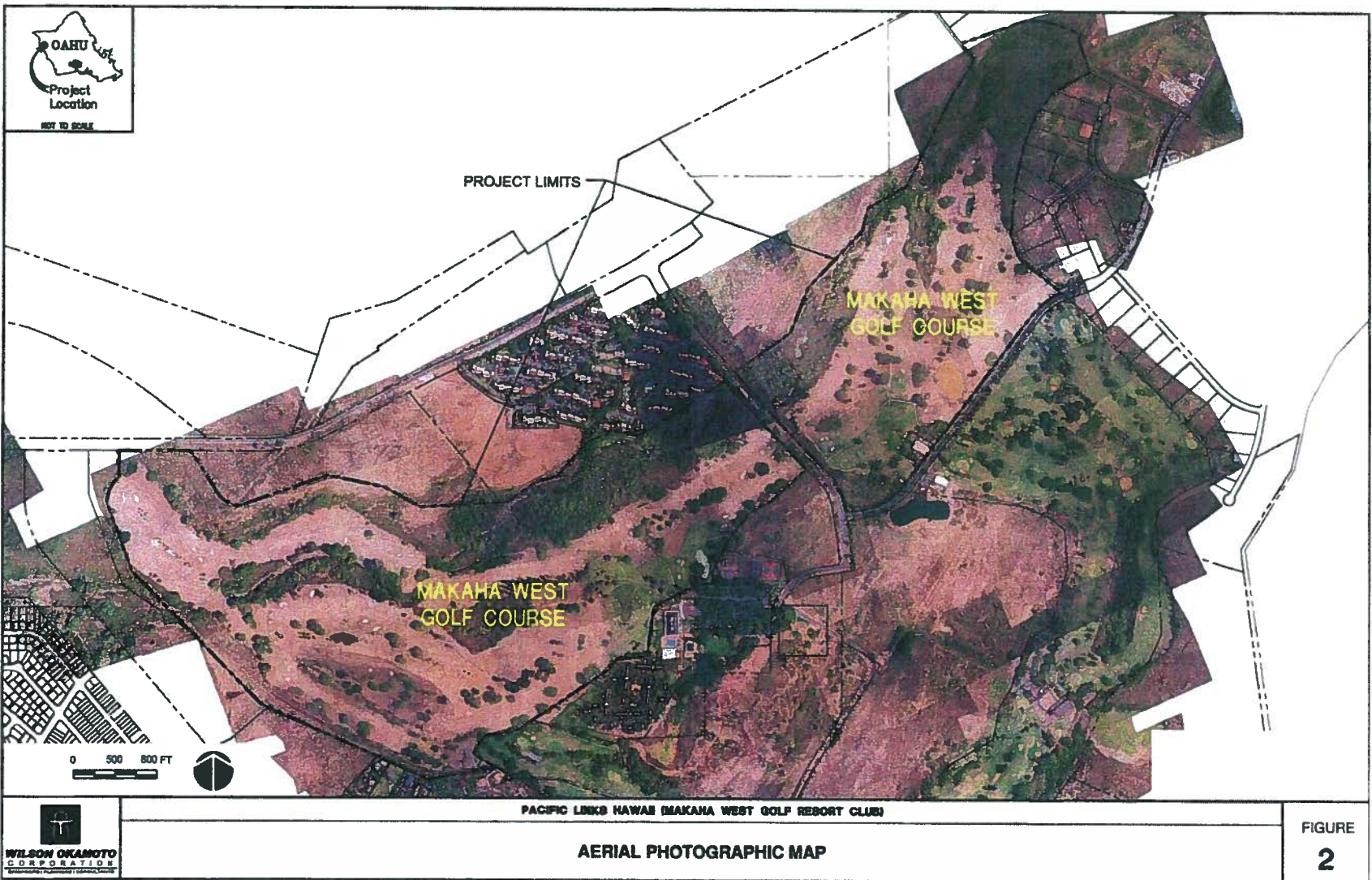
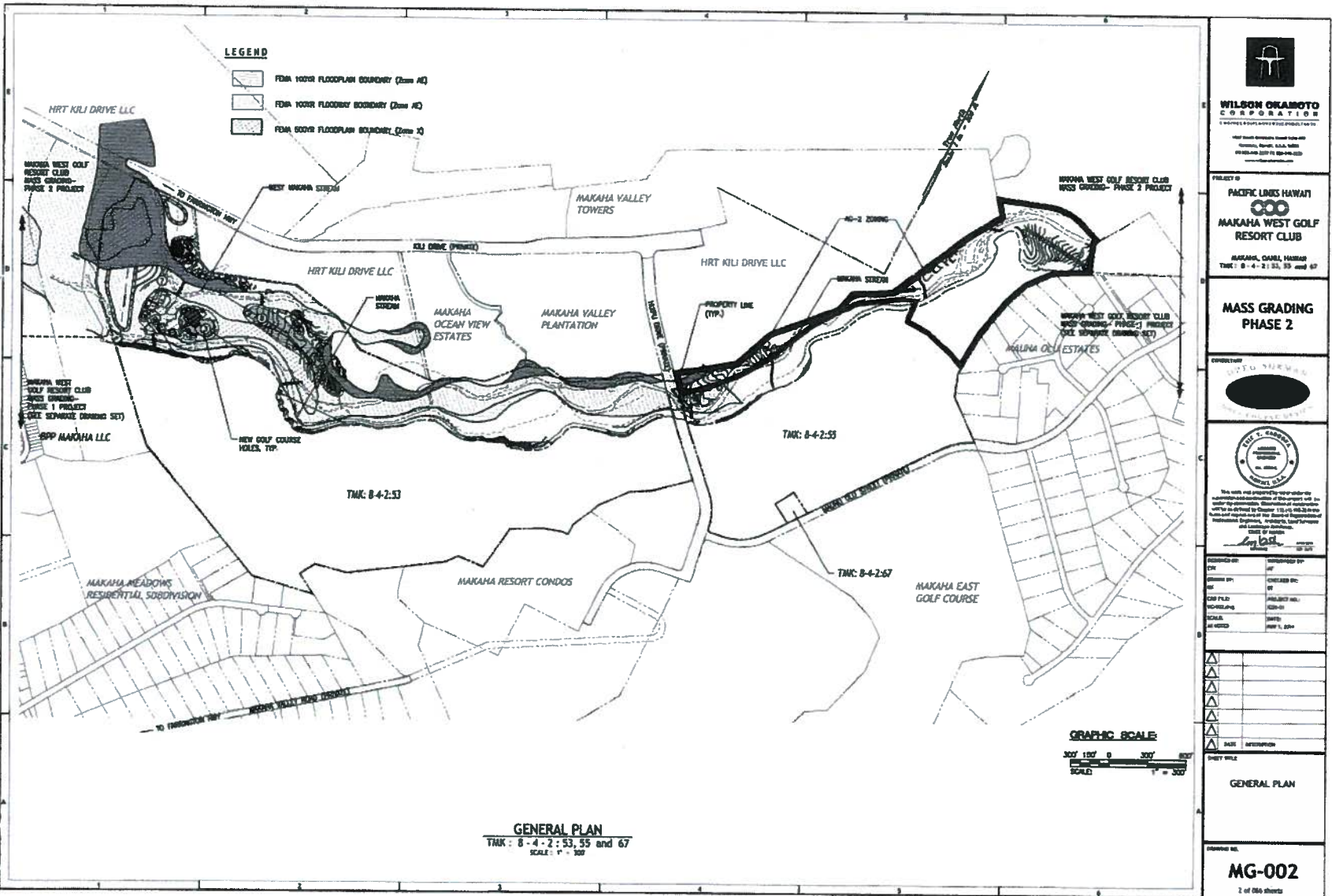


EXHIBIT 2



GENERAL PLAN
TKM: 8-4-2: 53, 55 and 67
SCALE: 1" = 300'

EXHIBIT 3

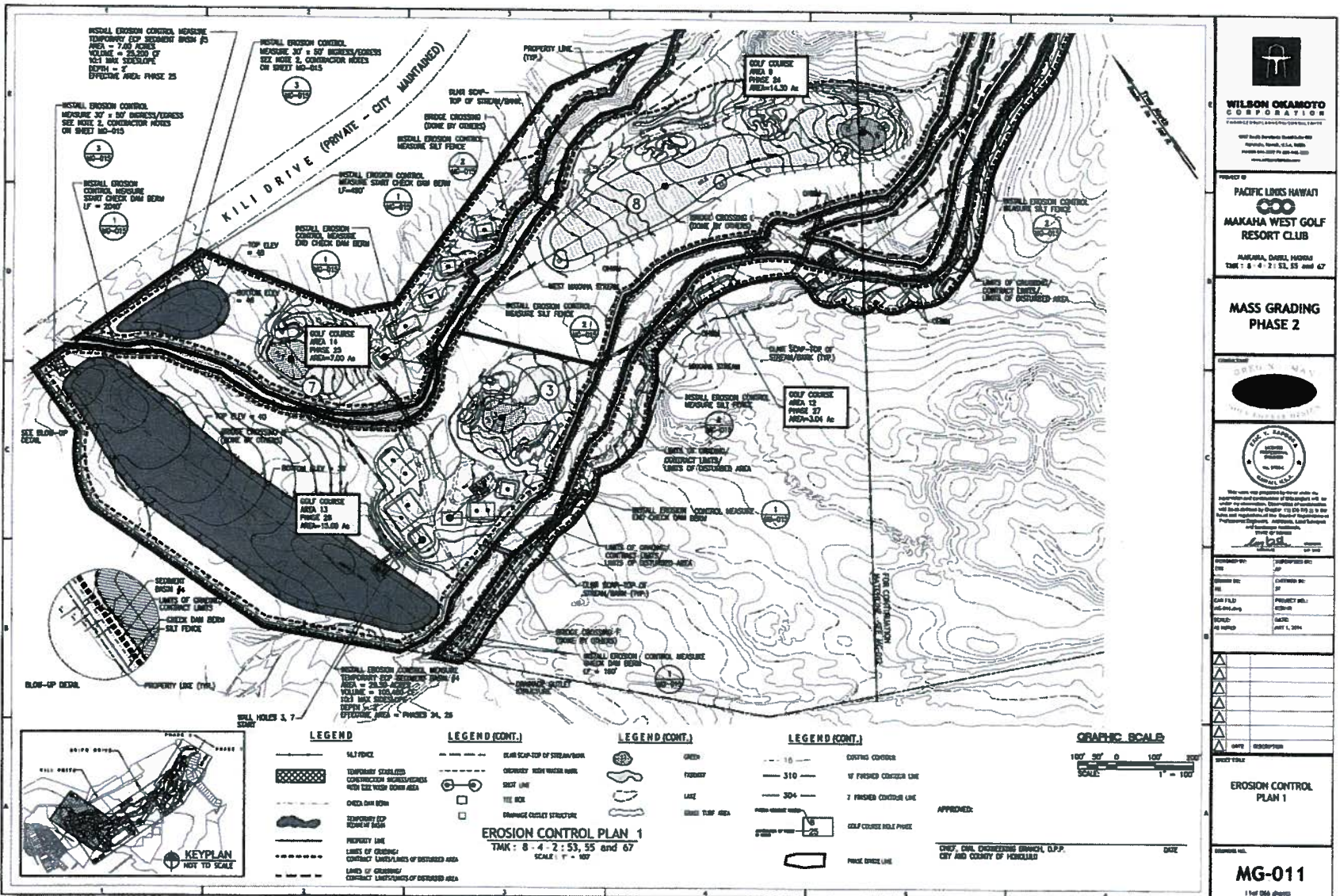



EXHIBIT 4A



WILSON OKAMOTO CORPORATION
1001 South Kalia Avenue, Suite 200
Honolulu, Hawaii, U.S.A. 96813
Tel: 808-551-2000 Fax: 808-551-2001
www.wilsonokamoto.com


PROJECT #

PACIFIC LINKS HAWAII


MAKAHA WEST GOLF RESORT CLUB

MAKAHA, OAHU, HAWAII
TRK: 8-4-2: 53, 55 and 67

MASS GRADING PHASE 2



GREEN SOURCE
THE GREENING COMPANY



CIVIL ENGINEERING BRANCH, D.P.P.
CITY AND COUNTY OF HONOLULU

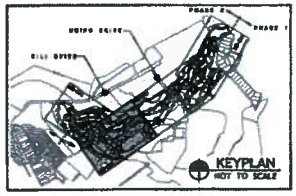
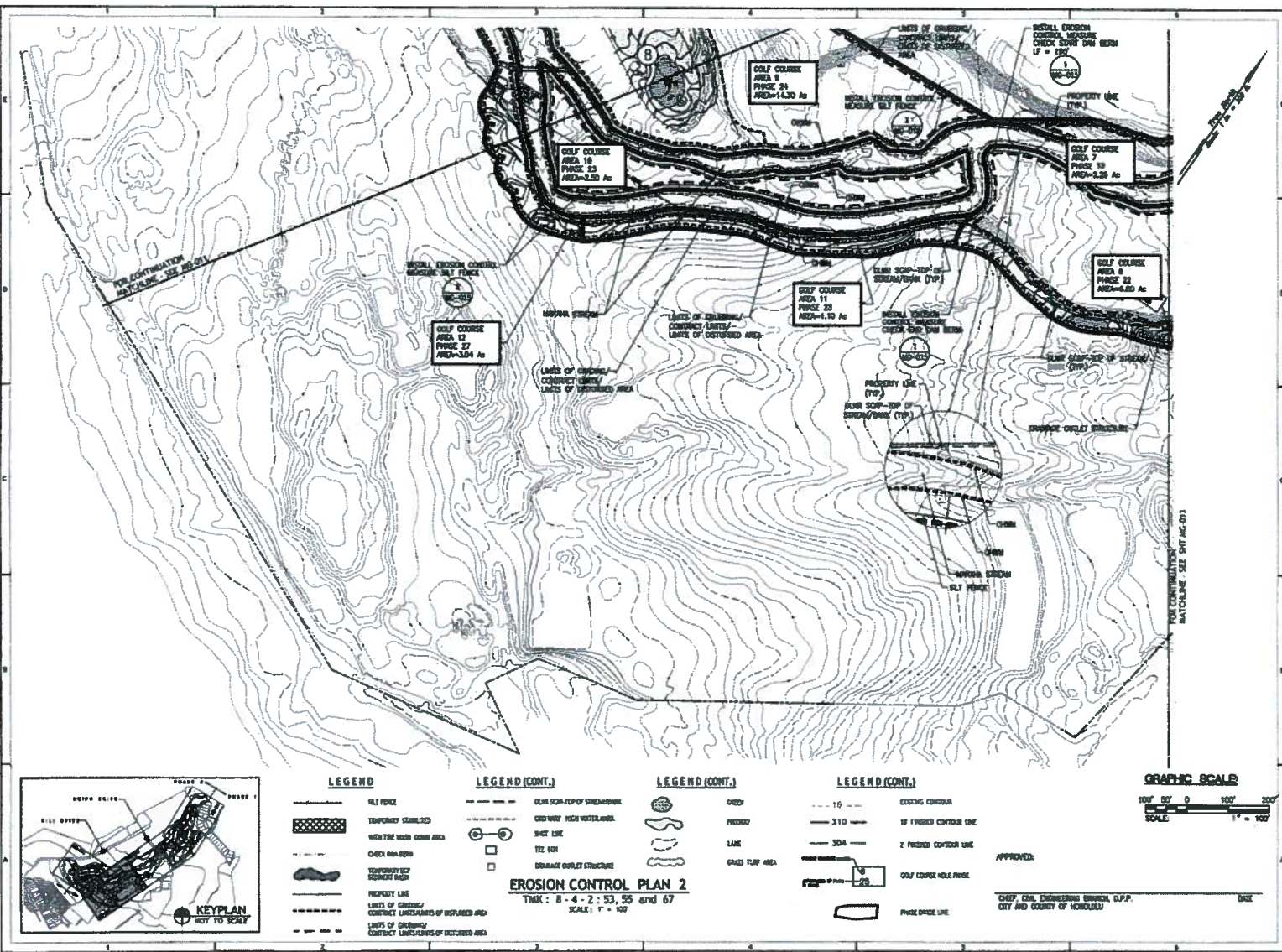
This work was prepared by one or more of the registered professional engineers and/or professional land surveyors who are members of the Board of Registration for Professional Engineers, Architects, and Land Surveyors of the State of Hawaii.

DATE OF ISSUE: NOV 1, 2014

| | |
|---------------------|------------------------|
| DESIGNED BY: EVA | SUPERVISED BY: J.P. |
| DRAWING NO.: | PROJECT NO.: |
| DATE: | PROJECT TITLE: |
| SCALE: | DATE OF ISSUE: |
| BY: | DATE: |
| DATE: | DATE: |

EROSION CONTROL PLAN 2

MG-012
12 of 048 sheets




- | | | | |
|---|---|--|--|
| <p>LEGEND</p> <ul style="list-style-type: none"> SILT FENCE TEMPORARILY SEALED AREA WITH THE TRUCK DRIVE AREA CHECK DAM BASIN TEMPORARILY E27 SEDIMENT BASIN PROPERTY LINE LIMITS OF GRADING/CONSTRUCTIVE LIMITS OF DISTURBED AREA | <p>LEGEND (CONT.)</p> <ul style="list-style-type: none"> CLEAN SCAR-TOP OF STREAM/DRAIN CHECK DAM TILT BOX DRAINAGE OUTLET STRUCTURE <p style="text-align: center;">EROSION CONTROL PLAN 2 TRK: 8-4-2: 53, 55 and 67 SCALE: 1" = 100'</p> | <p>LEGEND (CONT.)</p> <ul style="list-style-type: none"> GRASSY PAVED LAKE GRASSY TURF AREA | <p>LEGEND (CONT.)</p> <ul style="list-style-type: none"> 10' FINISHED CONTOUR LINE 2' FINISHED CONTOUR LINE GOLF COURSE HOLE PHASE PHASE GRADE LINE |
|---|---|--|--|



APPROVED:

CHIEF, CIVIL ENGINEERING BRANCH, D.P.P.
CITY AND COUNTY OF HONOLULU




WILSON OKAMOTO CORPORATION
CORPORATE HEADQUARTERS
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PROJECT ID:
PACIFIC LINKS HAWAII
MAKAHA WEST GOLF RESORT CLUB
MAKAHA, OAHU, HAWAII
TRK : 8 - 4 - 2 : 53, 55 and 67

MASS GRADING PHASE 2

CONSULTANT:
CS&S ENGINEERING
1000 KALIA ROAD, SUITE 1000
HONOLULU, HAWAII 96813



GARY L. GARCIA
Professional Engineer
No. 10084
State of Hawaii

This work was prepared by me or under my direct supervision and I am a duly licensed professional engineer in the State of Hawaii. I am not providing any professional services in any other state or country. I am not providing any professional services in any other state or country. I am not providing any professional services in any other state or country.

| | |
|---------------------|-------------------------|
| DESIGNED BY: EIN | SUPERVISED BY: EIN |
| DRAWN BY: EIN | CHECKED BY: EIN |
| DATE: 11/20/13 | PROJECT NO.:SCAP 3645.3 |
| SCALE: AS SHOWN | DATE: 11/20/13 |

APPROVED:

CHIEF, CIVIL ENGINEERING DIVISION, U.S.P.S.
CITY AND COUNTY OF HONOLULU

EROSION CONTROL PLAN 3

MG-013
1 of 104 sheets

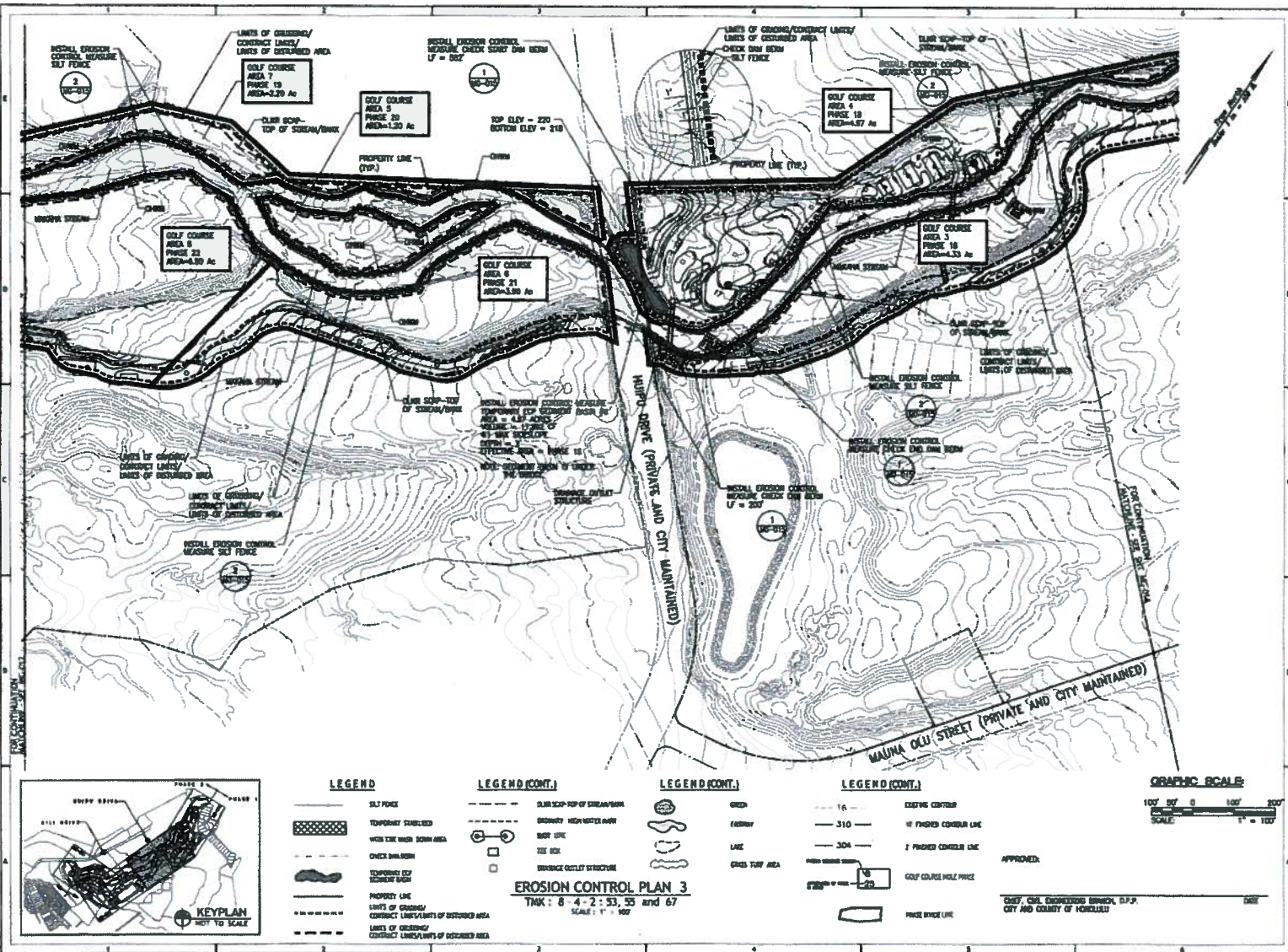


EXHIBIT 4C
20

WILSON OKAMOTO
C O R P O R A T I O N
1145 KUPA HANAU DRIVE SUITE 402
HONOLULU, HAWAII 96819
808-535-9199
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PROJECT #
**PACIFIC LINES HAWAII
MAKAHA WEST GOLF
RESORT CLUB**
MAKAHA, OAHU, HAWAII
TRAK : B-4-2-53, 55 and 67

**MASS GRADING
PHASE 2**

PAU SUBMITTAL

MAKHA WEST GOLF COURSE

THIS WORK IS PREPARED BY ME OR UNDER MY SUPERVISOR AND REPRESENTS THE PROJECT FOR THE OWNER. MY PROFESSIONAL RESPONSIBILITY AND LIABILITY ARE LIMITED TO THE SCOPE AND CONTENT OF THE INFORMATION PROVIDED AND THE ASSUMPTIONS MADE BY ME OR UNDER MY SUPERVISOR. I AM NOT PROVIDING ANY GUARANTEE OR WARRANTY FOR THE RESULTS OF THE WORK. THIS DOCUMENT IS NOT BEING PREPARED FOR THE PURPOSE OF CONSTRUCTION.

DATE OF APPROVAL: 11/20/13

PREPARED BY: [Signature] DATE: 11/19/13
CHECKED BY: [Signature] DATE: 11/19/13
DATE ASSESSED: 11/19/13
SCALE: 1" = 100'

APPROVED: [Signature] DATE: []

PROJECT NO.: []
SHEET NO.: 1 of 1

PROJECT TITLE: **EROSION CONTROL PLAN 4**

DRAWING NO.: **MG-014**

1489 088 sheets

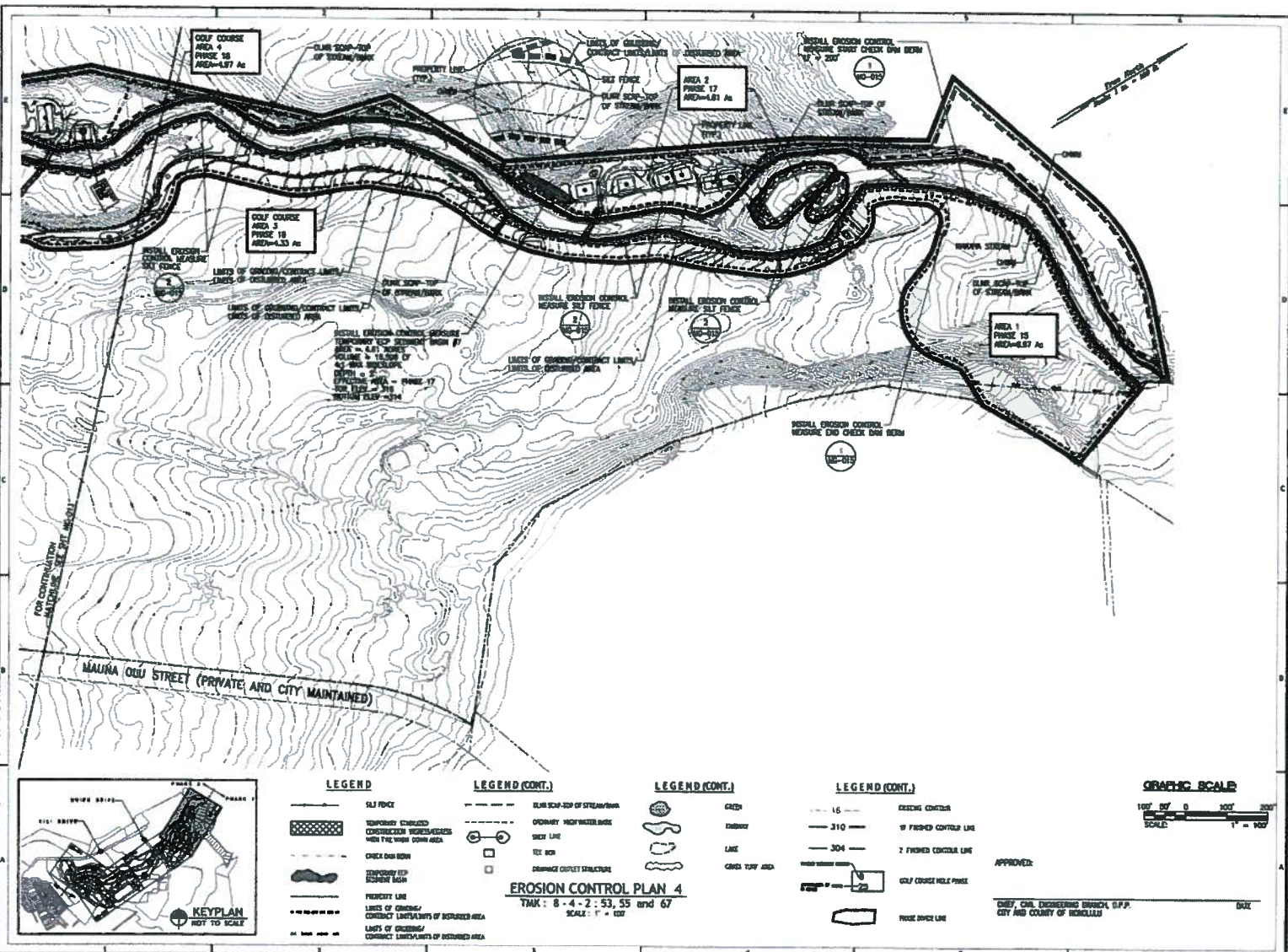


EXHIBIT 4D



BRIDGE BUILDERS USA, INC.
1401 NORTH CANTON ROAD
PUEBLO, COLORADO 81004
PROJECT NO. 248

Makaha West Golf Course
Makaha, Oahu, HI

SCALE: 1" = 10'-0"

5-1

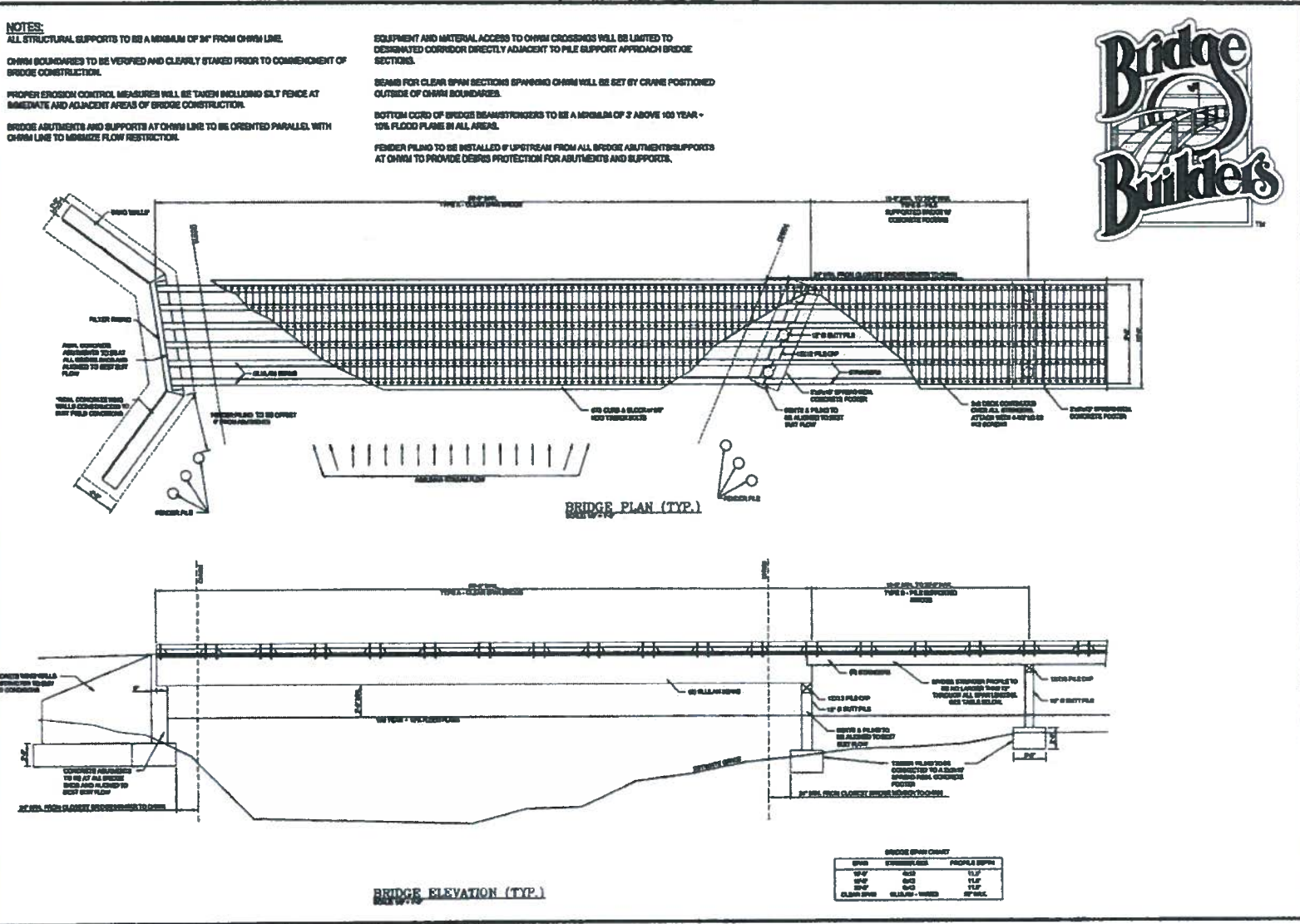
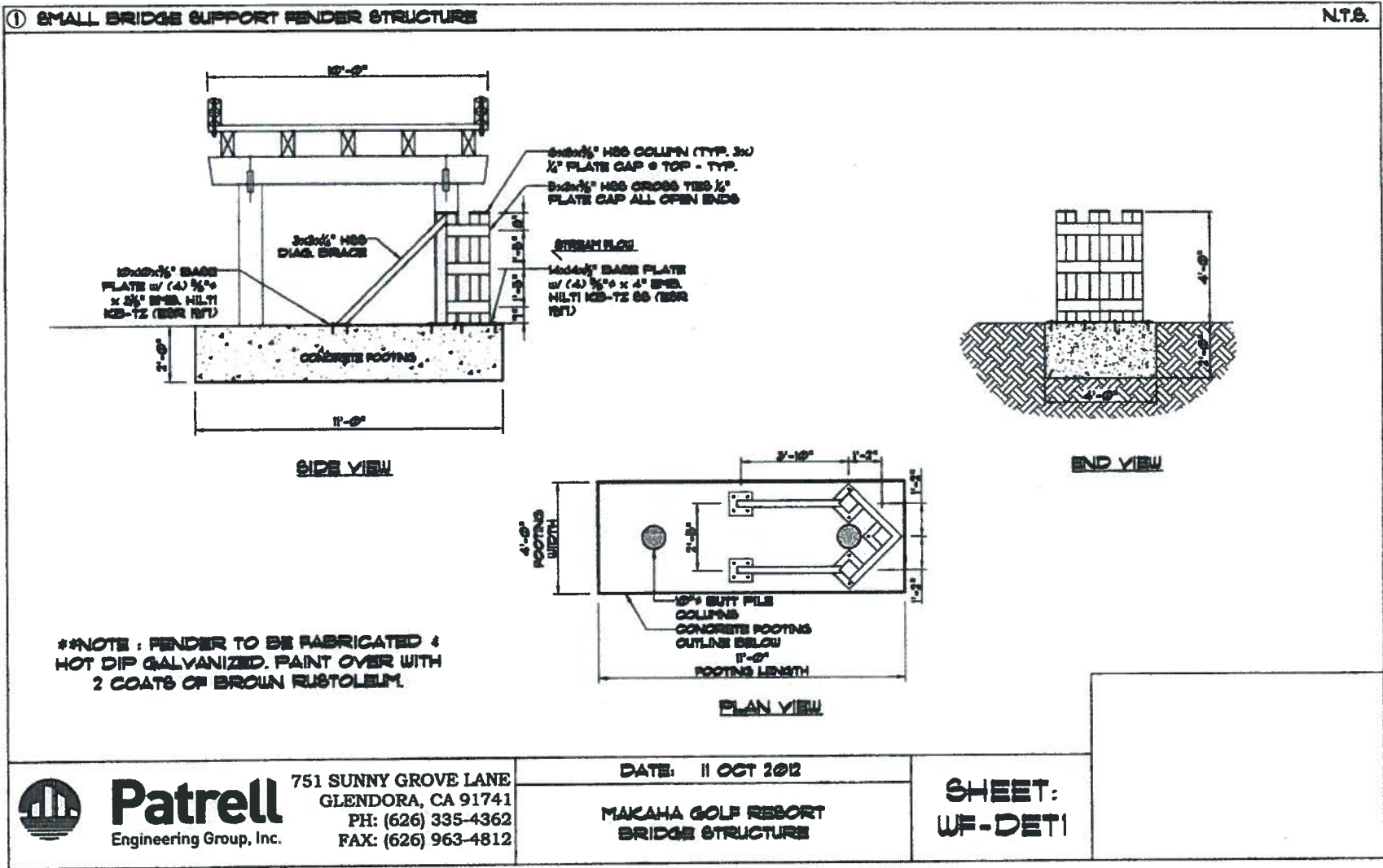


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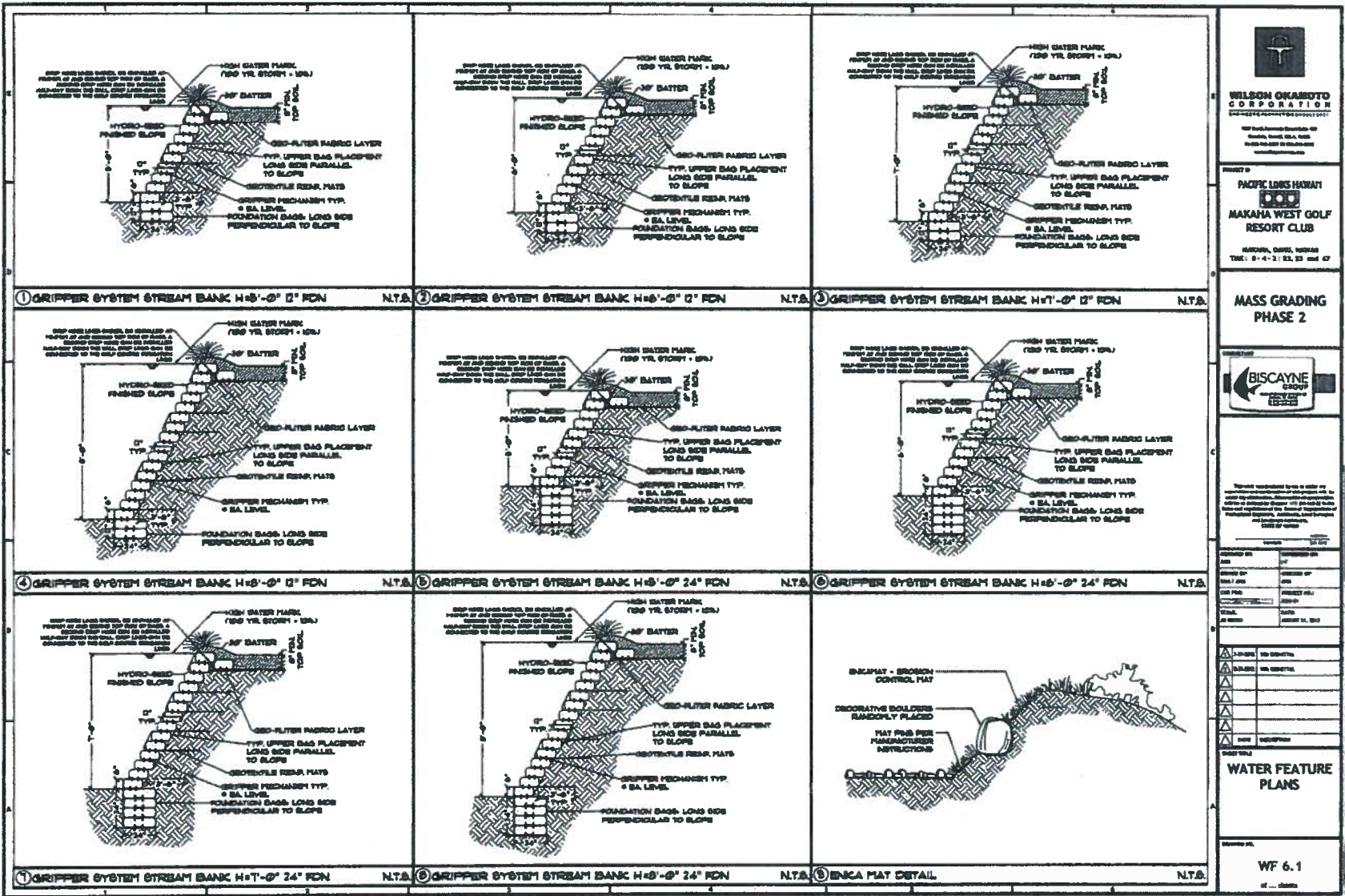
Patrell
Engineering Group, Inc.

751 SUNNY GROVE LANE
GLEN DORA, CA 91741
PH: (626) 335-4362
FAX: (626) 963-4812

DATE: 11 OCT 2012

MAKAHA GOLF RESORT
BRIDGE STRUCTURE

SHEET:
WF-DET1



WILSON OKAMOTO CORPORATION
1001 West Avenue, Suite 400
Coral Gables, Florida, U.S.A. 33134
Tel: 305-442-0000 Fax: 305-442-0001
www.wilsonokamoto.com

PACIFIC LOGS HARANI
MAKAHA WEST GOLF RESORT CLUB

REVISION, CHECK, REVISION
DATE: 01-11-2013, 03, 05 and 07

MASS GRADING PHASE 2



These plans represent a site or part of a site and are prepared by Biscayne Group, Inc. based on information provided by the client. Biscayne Group, Inc. does not warrant the accuracy, completeness, or timeliness of the information provided. The client is responsible for the accuracy, completeness, and timeliness of the information provided.

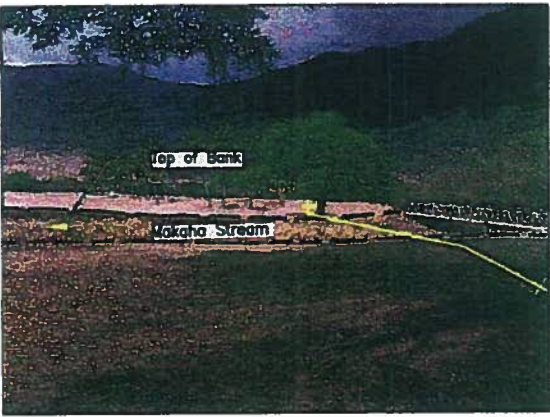
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| DATE: | 03/11/2013 |
| DESIGNED BY: | WJ |
| CHECKED BY: | WJ |
| DATE: | 03/11/2013 |
| PROJECT NO.: | 030000 |
| DATE: | 03/11/2013 |

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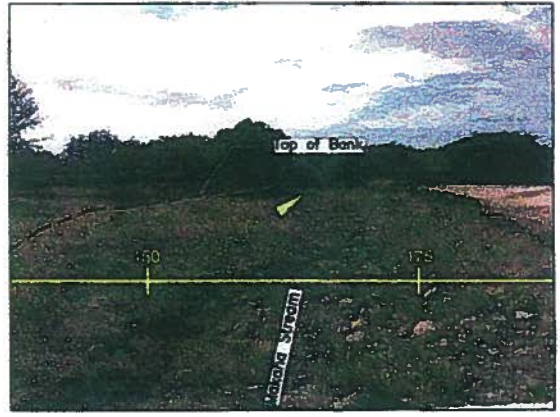
WATER FEATURE PLANS

WF 6.1
of ... sheets

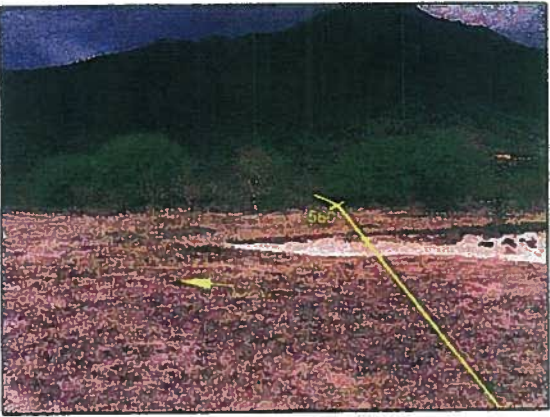
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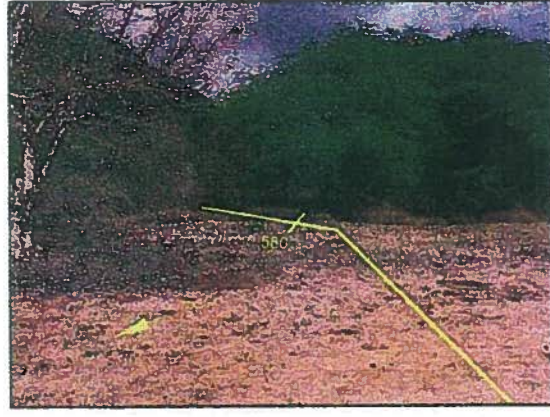
FACING NORTH



FACING EAST



FACING NORTH



NORTH END

NOTE: STATION 0+00 STARTS AT SOUTH END OF CROSS-SECTION

PACIFIC LINKS HAWAII (MAKAHA WEST GOLF RESORT CLUB)

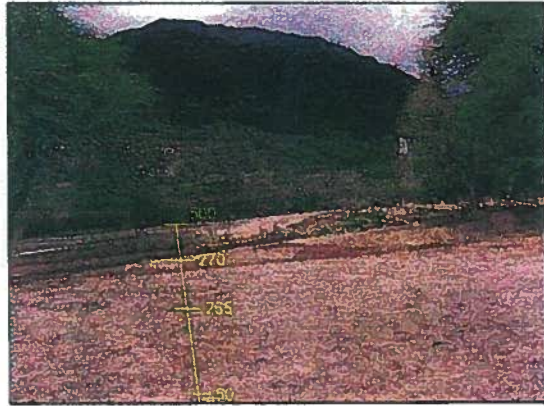
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FIGURE
9-1

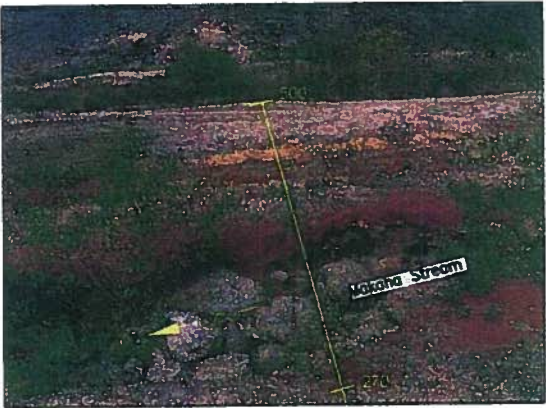




ALIGNMENT 0+30 FACING NORTH



ALIGNMENT 0+50 FACING NORTH



ALIGNMENT 2+70 FACING NORTH



ALIGNMENT 3+71 FACING NORTH

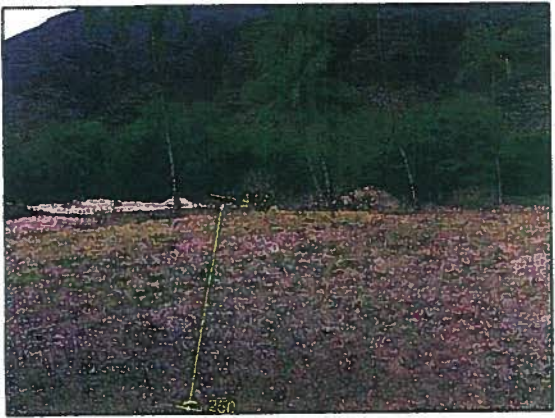
NOTE: STATION 0+00 STARTS AT SOUTH END OF CROSS-SECTION

PACIFIC LINKS HAWAII (MAKAHA WEST GOLF RESORT CLUB)



EXISTING CONDITION PHOTOGRAPHS CROSS-SECTION 45+91.83

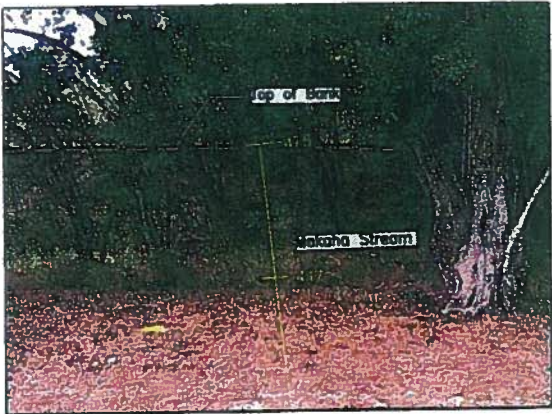
FIGURE
9-2



ALIGNMENT 1+60 FACING NORTH WEST



ALIGNMENT 2+47 FACING NORTH WEST



ALIGNMENT 4+17 FACING NORTH WEST



ALIGNMENT FACING NORTH WEST

NOTE: STATION 0+00 STARTS AT SOUTH END OF CROSS-SECTION

PACIFIC LINKS HAWAII (MAKAHA WEST GOLF RESORT CLUB)



**WILSON OKAMOTO
CORPORATION**
ENGINEERS | PLANNERS | CONSULTANTS

EXISTING CONDITION PHOTOGRAPHS CROSS-SECTION 97+32.03

**FIGURE
9-3**



FACING WEST, LOOKING DOWNSTREAM



FACING SOUTHWEST



FACING SOUTHWEST



FACING SOUTHWEST

NOTE: FIGURE DISPLAYS APPROX. CROSS-SECTION LOCATION

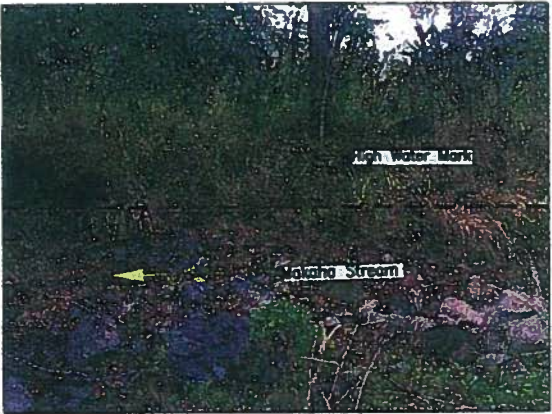
NOTE: STATION 0+00 STARTS AT SOUTH END OF CROSS-SECTION

PACIFIC LINKS HAWAII (MAKAHA WEST GOLF RESORT CLUB)



EXISTING CONDITION PHOTOGRAPHS CROSS-SECTION 109+29.46

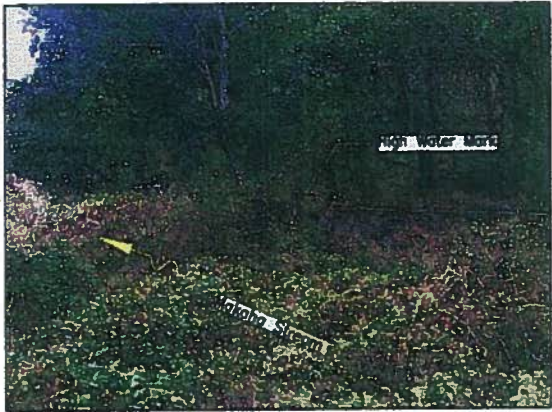
FIGURE
9-5



LOOKING AT LEFT BANK



LOOKING AT RIGHT BANK



LOOKING DOWNSTREAM AT RIGHT BANK



LOOKING DOWNSTREAM AT LEFT BANK

NOTE: FIGURE DISPLAYS APPROX. CROSS-SECTION LOCATION



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PACIFIC LINKS HAWAII (MAKAHA WEST GOLF RESORT CLUB)

EXISTING CONDITION PHOTOGRAPHS CROSS-SECTION 113+89.14

**FIGURE
 9-6**

Gripper Wall System

What is the "Gripper System"?

The "Gripper System" is a Fully Engineered, Cost Effective, Labor Reducing, Structurally Superior, Environmental Solution, which is stronger than concrete block, rock and traditional hardscapes. Any plant that will grow in the environment where the project is located will grow in the "Gripper System" bar none.

The "Gripper System" is the most advanced evolution of technology for "Terra Wall" applications that is available in the industry today. The Terra Wall has many forms and the term is used loosely, commonly known as Mechanically Stabilized Earth (MSE) Walls, Reinforced Soil Slopes (RSS), Slope Stabilization, River Bank Stabilizations and any type of Retaining Wall to include vertical applications. We have seen them all fit the term.

Cost effective, is synonymous with the Gripper System, with cost savings up to 30% or more over traditional building methods, while providing a truly "Green", fully engineered solution. Ask us how! (email us)

What about permit approvals?

In-water applications are often challenging and are extremely difficult to obtain permitting for, especially when structural solutions are the only answer but as traditional hardscapes are being approved less and less, by the National, State and Local Agencies. Owners of projects, whether commercial, government or private, are being faced with the prospect of providing an environmental solution without the drawbacks of hardscapes such as Rip-Rap, concrete blocks or concrete retaining walls. What do they do?

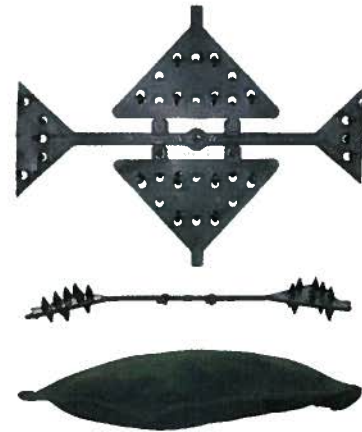
The Gripper System bridges this gap!

We have been approved for every job we have been submitted for, which is a testament that we have been able to achieve the balance point between public and private interest by addressing both sets of issues and diminishing the points of concession for both sides!

It is, Totally Green! Completely Structural! Fully Engineered!

The Gripper System is a complete environmental system, which, consist of an ecology bag (non-woven geotextile cloth), our patented "Gripper" interlocking connector, and a zip-tie. The ecology bag can be customized for each specific application or our standard size bag holds approximately 1 cubic foot of soil. The soil in the ecology bag is typically a mixture of 70% sand and 30% topsoil.

We are able to achieve, with our Gripper System and improved construction techniques, shear and pull out strengths exceeding 3,500 lbs per bag. Providing significantly superior strength to competitive products.



Our expertise allows us to work successfully with:



How much does it cost to reengineer a slope because of water?

Virtually nothing, the Superior Hydrostatic Properties of the Gripper System reduces construction time because our system is the drain field, eliminating the need for expensive engineering that addresses the hydrology issues and the labor to install traditional drainage systems. For areas where there is significant water flow on a slope, the composition of the bags is simply changed, with the addition of rocks, for the bags in that specific area, allowing the water to flow as it normally does while fully securing the slope and stopping erosion.

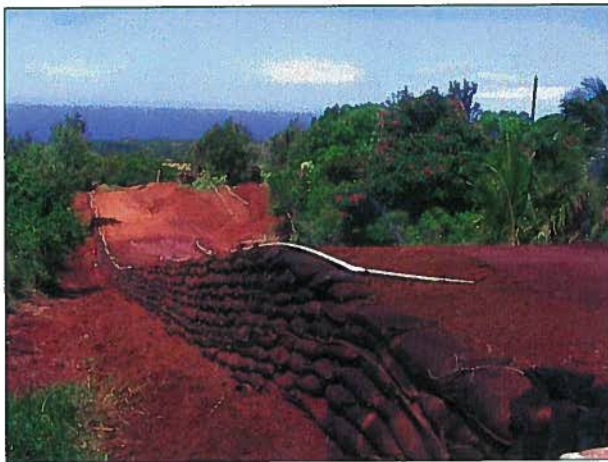
We are able to achieve, with our Gripper System and improved construction techniques, shear and pull out strengths exceeding 3,500 lbs per bag. Providing significantly superior strength to competitive products.

What does it take to build a "Gripper System" wall?

The Gripper System is constructed using standard labor. The cost of labor and the constructability of the Gripper System is comparable or better than competitive systems, whether hardscapes or softscapes. We provide on-site Quality Control for a per diem price that ensures your structure is constructed correctly and efficiently securing a superior finished project. Though the system is straight forward, there are building techniques we impart that greatly improve the efficiency and productivity of the installation with the end result achieving the highest quality bio-engineered system in the market today.

As each row of bags are placed tightly in a continuous row from end-to-end, a layer of Grippers are interconnected and placed on top, spanning the entire row from end-to-end, providing continuous connection strength. This system is fully patented with U.S., World and NATO patents issued. Whether a government agency, large contractor, or private homeowner, the "Gripper System" can be implemented to achieve a fully vegetated environmental solution spanning a wide variety of applications whether large or small.

Examples of bare and early vegetated Gripper Wall.



Courtesy of Maverick Solutions, LLC, <http://www.maversol.com> (visited May 9, 2013).

STANDARD STREAM CHANNEL ALTERATION PERMIT CONDITIONS
(Revised 9/19/07)

1. The permit application and staff submittal approved by the Commission at its meeting on November 20, 2013, shall be incorporated herein by reference.
2. The applicant shall comply with all other applicable statutes, ordinances, and regulations of the Federal, State and county governments.
3. The applicant, his successors, assigns, officers, employees, contractors, agents, and representatives, shall indemnify, defend, and hold the State of Hawaii harmless from and against any claim or demand for loss, liability, or damage including claims for property damage, personal injury, or death arising out of any act or omission of the applicant or his successors, assigns, officers, employees, contractors, and agents under this permit or related to the granting of this permit.
4. The applicant shall notify the Commission, by letter, of the actual dates of project initiation and completion. The applicant shall submit a set of as-built plans and photos of the completed work to the Commission upon completion of this project. This permit may be revoked if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The proposed work under this stream channel alteration permit shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Commission upon showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Commission no later than three (3) months prior to the date the permit expires. If the commencement or completion date is not met, the Commission may revoke the permit after giving the permittee notice of the proposed action and an opportunity to be heard.
5. Before proceeding with any work authorized by the Commission, the applicant shall submit one set of construction plans and specifications to determine consistency with the conditions of the permit and the declarations set forth in the permit application.
6. The applicant shall develop site-specific, construction best management practices (BMPs) that are designed, implemented, operated, and maintained by the applicant and its contractor to properly isolate and confine construction activities and to contain and prevent any potential pollutant(s) discharges from adversely impacting state waters. BMPs shall control erosion and dust during construction and schedule construction activities during periods of low stream flow.
7. The applicant shall protect and preserve the natural character of the stream bank and stream bed to the greatest extent possible. The applicant shall plant or cover lands denuded of vegetation as quickly as possible to prevent erosion and use native plant species common to riparian environments to improve the habitat quality of the stream environment.
8. In the event that subsurface cultural remains such as artifacts, burials or deposits of shells or charcoal are encountered during excavation work, the applicant shall stop work in the area of the find and contact the Department's Historic Preservation Division immediately. Work may commence only after written concurrence by the State Historic Preservation Division.