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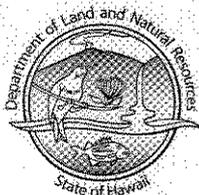


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STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
OFFICE OF CONSERVATION AND COASTAL LANDS

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

REF:OCCL:DH

CDUA: OA-3507

**MEMORANDUM**

MAY 12 2009

TO: Katherine Puana Kealoha, Director  
Office of Environmental Quality Control

FROM: Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands

SUBJECT: Final Environmental Assessment (FEA) for After-The-Fact (ATF) Conservation District Use Application (CDUA) OA-3507 for Erosion Control for Subject Parcel TMK: (1) 2-5-014:012, Tantalus, Island of Oahu

The Department has reviewed the Final Environmental Assessment (FEA) for After-The-Fact (ATF) Conservation District Use Application (CDUA) OA-3507 for Erosion Control for Subject Parcel TMK: (1) 2-5-014:012, Tantalus, Island of Oahu. The Draft Environmental Assessment (DEA) for the project was published in the September 8, 2008 issue of the Environmental Notice.

The FEA is being submitted to OEQC. We have determined that this project will not have significant environmental effects, and have therefore issued a FONSI. Please publish this notice in OEQC's upcoming May 23, 2009 Environmental Notice.

We have enclosed four copies of the FEA and CDUA OA-3507 for the project. The OEQC Bulletin Publication Form is attached. Comments on the draft EA were sought from relevant agencies and the public, and were included in the FEA.

Please contact Dawn Hegger of our Office of Conservation and Coastal Lands staff at 587-0380 if you have any questions on this matter.

Enclosures

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## I. INTRODUCTION: FINAL ENVIRONMENTAL ASSESSMENT

**Project Name:** Erosion Control & Slope Stabilization Project  
Wichman Residence, Tantalus

**Proposing Agency:** Department of Land and Natural Resources (DLNR)  
Office of Conservation and Coastal Lands

**Approving Agency:** Department of Land and Natural Resources (DLNR)  
Office of Conservation and Coastal Lands

**Project Location:** 123 Kalaiopua Place  
Tantalus Residential Community  
Honolulu, Hawaii  
Tax Map Key: (1) 2-5-14: 012

**Property Owner:** Charles R. Wichman

**Applicant:** Charles R. Wichman

**SLU Classification:** Conservation, Limited Subzone

### Anticipated Determination of Environmental Assessment:

A Finding of No Significant Impact (FONSI) is expected for the project.

## II. SUMMARY OF PROPOSED ACTIONS

### A. Project Purpose and Need

The Applicant, Charles R. Wichman, owner of Tax Map Key: (1) 2-5-14:012, is proposing to repair and stabilize the slope below his driveway in order to prevent loose soils from eroding and blocking Kalaiopua Place roadway, thereby obstructing the neighboring residents from accessing their properties.

The Applicant has lived at this location since 1966. The home on this property was built in 1952. The Applicant accesses his property via a private concrete driveway that comes off of Kalaiopua Place (a County owned road). The private concrete driveway runs parallel to and above lower Kalaiopua Place. At the location of the proposed slope repair and stabilization project the driveway is approximately 30 feet above the County road (see SLOPE REPAIR PLAN, Exhibit 6). The slope between the driveway and the County road is steep and is covered with various forms of non-native vegetation. Several sections of the adjacent slopes are supported by rock retaining walls that were presumably built when the driveway and home were constructed in 1952.

The proposed erosion control and stabilization project is now required due to several factors which have each contributed to the current situation. These factors are described below.

In July 2005, a storm with high winds and heavy rains hit Oahu and a large kukui tree growing near the top of the slope, adjacent to the Applicant's driveway was uprooted. The tree slid down the slope taking down power and telephone lines with it and blocking lower Kalaiohua Place. The situation was exacerbated by a landslide of dirt that was dislodged when the root system of the tree was ripped out. The loosened dirt also slid down the slope and blocked lower Kalaiohua Place.

The blockage of Kalaiohua created an immediate crisis, as the residents living at the lower end of this small County road could not get in and out of their homes except by walking over the landslide and the fallen tree. Emergency City & County road crews eventually responded and cleared the debris. Utility crews also restored both power and telephone service.

Over the next six months the slope began to heal itself where the landslide had occurred. New volunteer vegetation started to fill in over the large erosion scar. Then, in early 2006, the area received an unprecedented 60 inches of rain (January to March). Simultaneously, feral pigs, which are abundant in the area, began digging up the new vegetation on the slope creating a very unstable situation. Unsuccessful efforts to keep the feral pigs out of the area resulted in the slope becoming more unstable. During this period, on a regular basis, eroding dirt slid down onto lower Kalaiohua Place, forcing the elderly residents to personally shovel the dirt off the road so that they could maintain access to and from their homes.

In May 2006, as an emergency measure, the Applicant hired a contractor to construct a rock wall to prevent any more dirt from the Applicant's property from accumulating on lower Kalaiohua Place below. The wall was constructed prior to obtaining permits due to the pressing nature of the situation. There was a real sense of urgency and the Applicant felt that it was their responsibility to start with construction as quickly as possible to ensure continued access for the residents on lower Kalaiohua Place. The mason retained by the Applicant to build the rock wall assured the Applicant that the work being done would meet all structural and engineering guidelines of the County building codes so that an After-The-Fact (ATF) building permit could be obtained if necessary. The mason also assured the Applicant that the various stages of the project would be photo-documented to further assist with an ATF permit if necessary.

In June 2006, the Applicant was notified by the City and County (C&C) that the wall, which had been constructed, required a building permit. However, when the contractor was asked for construction plans for the wall, he was unable to produce any. Furthermore, he did not have any digital images of how the wall had been constructed. When a physical inspection of the wall by the County took place, it was determined that the wall had not been built to County code and would therefore have to be removed.

The C&C then issued a cease and desist order and requested that an engineered set of plans be prepared and submitted for permitting. However, while the C&C required that the wall be removed, they also understood the need to retain the unpermitted wall until such time that a properly permitted wall could be built since the temporary wall had proven effective at controlling soil erosion from blocking lower Kalaiohua Place.

In July 2006, the Applicant retained Hawaiian Engineering Group Inc. (HEGI) to develop a plan to stabilize the slope and remedy the permit violation. HEGI determined that the slope failure was resulting from fill material that had been deposited on the slope when the road was initially constructed in 1952. The solution that HEIG proposed was to encapsulate this non-native fill material with a concrete gunnite shell and to "nail" it to the underlying volcanic

cinders. This design solution was not only cost-prohibitive but was totally incompatible aesthetically with the very natural setting that occurs along Kalaiopua Place. A massive concrete wall with protruding anchor bolts would have given this beautiful mountain landscape a very industrial look and would have irreparably altered the environment of the project area.

The Applicant shared the HEIG plan with the neighbors living on Kalaiopua Place and they all felt that the plan would be an environmental disaster that would ruin the natural beauty of the neighborhood. As a result, the Applicant asked HEIG to come up with alternative design solution. However, after a year of drawn-out discussions and negotiations, it became clear that HEIG was unwilling to develop an alternative engineering solution that would be more compatible with the natural setting.

In September 2007, the Applicant retained Wagner Engineering Services, Inc. (Wagner) to replace HEIG as the project engineer with the intent of developing an alternative manner of slope stabilization. After researching several design options, and consulting with D.A Evans, Inc., a soils engineer (Appendix 3), Mr. Brian M. Hennessy, P.E. of Wagner Engineering informed the Applicant that they felt confident that they could come up with a design solution that would stabilize the slope and allow for a landscape element that would be far more compatible with the existing natural character of the slope.

The Applicant is seeking a Board Permit for the proposed SLOPE REPAIR PLAN developed by Wagner Engineering as depicted in Exhibit 6 attached hereto. The Wagner plan proposes to demolish and remove the entire length of the existing, unpermitted rock wall at the base of the slope adjacent to Kalaiopua Place and to replace it with a new engineered CRM rock wall of a similar length and a lesser height (to a maximum height of 36"). The new CRM rock wall will act as an erosion control barrier between the slope above and the adjacent Kalaiopua Road at the base of the slope. The instability of the slope will be addressed by removing the loose fill that was apparently deposited on the slope in 1952 when the Wichman driveway was originally excavated. With the removal of the loose fill, the slope will be taken down to the underlying native cinders, which, according to the soils engineers' reports, are a stable substrate (see Appendix 3). Approximately 118 yards of loose fill will be excavated and hauled off to be properly disposed of. Thereafter the slope will be stabilized with a long-term erosion control blanket and the reestablishment of permanent vegetation.

**Note on Final EA** – The SLOPE REPAIR PLAN provided in the Draft EA has been revised in the Final EA. In response to comments received from the City and County of Honolulu's Department of Planning & Permitting (DPP) during the Draft EA comment period, the plan was revised by Wagner Engineering to reflect additional geotechnical analysis provided by the soils engineer, D.A. Evans, Inc.

In general terms, the plans have been amended as follows:

- 1) The Traffic Control Plan (sheet C-2) has been revised to accurately depict the one-lane character of Kalaiopua Place.
- 2) The existing CRM rock wall at the base of the slope (adjacent to Kalaiopua Place) is to be demolished and removed in its entirety to be replaced with a new, engineered CRM wall as per Wagner's design.
- 3) A detailed cross section has been included for the proposed new CRM wall.
- 4) The proposed new CRM wall will minimally encroach into the Kalaiopua Right of Way where it ties into existing rock walls at either end of the project area. The Applicant

understands therefore, that the new CRM wall will require a Surface Encroachment Agreement with the City & County.

## **B. Project Description and Location**

### **Project Location**

Kalaiohua Place is a small one-lane road located on Tantalus just above the City of Honolulu. This small road is at the very top of Tantalus Drive where it turns into Round Top Drive (see Location Map, Exhibit 2). It is about a 15-minute drive from Makiki Pumping Station which is where Round Top Drive begins.

The actual Project Area is a small section of the slope on the mauka side of lower Kalaiohua that measures approximately 57 feet long by 24 feet wide. The total project area is approximately 1,400 sq. ft. It is bordered on the top by the Applicant's concrete driveway and on the bottom by the asphalt paved Kalaiohua Place.

### **Project Description**

A thorough review of the situation by both soil and civil engineers has indicated that the failure of the slope in the project area is a result of the surface of the slope being composed of fill material that was deposited there from the original road cut that was made to create the private driveway in 1952. Over the past 50 years, this fill material was stabilized by the lush vegetation that grew upon it.

When the large kukui tree was uprooted in 2005 it exposed the underlying fill material to the eroding effects of the rain. Subsequently, feral pigs further destabilized the slope by digging up new volunteer re-growth vegetation. The result of these disturbances is that the original fill material is eroding and slumping down onto lower Kalaiohua Place.

After researching several design options, in December 2007, Mr. Brian M. Hennessy, P.E. of Wagner Engineering Services Inc (Wagner) advised the Applicant that he felt confident that Wagner could come up with a design solution that would stabilize the slope and allow for a landscaping element that will be more compatible with the look of the existing the slope along Kalaiohua Place.

The design solution that has been developed by Mr. Hennessy *"is to remove, by excavation, the old fill material which for the most part remains along and under the edge of the Wichman concrete driveway."* Mr. Hennessy spoke with a grading contractor who felt that it would be feasible for a small excavator to sit on the Wichman driveway and excavate the slope below (a portion of the excavation work will likely have to be done by hand as well). The total excavation will be approximately 118 cubic yards.

The SLOPE REPAIR PLAN, which is shown in Exhibit 6, indicates that a total of 118 cubic yards of the original fill will need to be excavated and hauled off site by the contractor. The total graded area is estimated at only 1,400 square feet. The erosion control wall that was built by the Applicant in 2006 without permits will be demolished and replaced with a new engineered CRM wall of a similar length to a maximum height of 36". The construction plans dictate erosion control steps that will prevent further sedimentation and erosion during construction.

### **C. Schedule**

The Applicant is nearing completion of the Conservation District Use Application (CDUA) process as administered by the State DLNR, Office of Conservation and Coastal Lands (OCCL). This Final EA is an integral step in the CDUA process. It is anticipated that the Board of Land & Natural Resources (BLNR) will approve a Conservation District Use Permit (CDUP) in May or June of 2009.

Immediately following approval of the CDUP, the Applicant will submit construction plans to the City and County of Honolulu's Department of Planning & Permitting (DPP) for review for consistency with the DPP's slope hazard and engineering requirements. In response to comments received by the DPP during the Draft EA comment period, supplemental soils studies have been conducted under the direction of the project engineer, in order to reevaluate the soil conditions of the slope. It is anticipated that a final building permit set will be submitted to the DPP for review and approval in June or July of 2009. Reconstruction of the rock wall and associated grading will occur shortly thereafter, following the issuance of all required City & County permits.

### **D. Funding Sources**

The Applicant will fund this project.

## **III. SUMMARY DESCRIPTION OF THE AFFECTED ENVIRONMENT**

### **A. General**

Tantalus is a small, rural community that exists within the Forest Reserve mauka of the City of Honolulu. It is a close-knit community with an active community association. There are several important recreational hiking trails on the mountain. The winding road that climbs the mountain is a favorite for both residents and tourists alike providing fantastic views of the city of Honolulu during both day and night.

Kalaiohua Place is a small one-lane road located at the very top of Tantalus Drive where it turns into Round Top Drive. It is about a 15 minute drive from Makiki Pumping Station which is where Round Top Drive begins. The actual Project Area is a small section of the slope on the mauka side of lower Kalaiohua that measures approximately 57 feet long by 24 feet wide for a total area of approximately 1,400 sq. ft. It is bordered on the top by the Applicant's concrete driveway and on the bottom by the asphalt paved Kalaiohua Place, a County roadway.

### **B. Flora**

There are no native species growing or living in the project area on the subject property. The forest surrounding the project area is dominated by alien vegetation, much of which was planted in the watershed reforestation projects in the early 1900s. The vegetation that currently exists in the project area includes Ape *Alocasia macrorrhiza*, Blue Ageratum *Ageratum conyzoides*, Jasmine *Jasminum multiflorum*, Yellow Ginger *Hedychium flavescens*,

Shell ginger *Alpinia speciosa*, Avocado *Persea americana*, Bracken Fern *Pteridium aquilinum*, red and green Ti *Cordyline terminalis*, Epipremnum *Epipremnum pinnatum*, White Thunbergia *Thunbergia fragrans*, and grassy weeds.

The State Office of Hawaiian Affairs (OHA) has recommended that the Applicant utilize native plant species to revegetate the project area. The Applicant will therefore give preference to the use of the following plant species in revegetating the slopes:

#### **Shrubs**

- Kului - *Nototrichium* spp.
- Naupaka - *Scaevola teccada*
- Ti - *Cordyline fruiticosa*
- Akia - *Wilkstroemia* spp.

#### **Groundcovers**

- Iliee - *Plumbago* spp.
- Nehe - *Lipochaea* spp.

#### **Ferns**

- Amau - *Sadleria cyathioides*
- Kupukupu - *Nephrolepis cordifolia*
- Palapalai - *Microlepia strigosa*

However, the Applicant submits that the primary goal of plant selection for the project is to select plants whose root structure and compatibility with the damp, upland environment of Tantalus will help to stabilize the slope. Native plants will be used if they help to achieve this goal, otherwise common introduced plants may be used if they provide a more stable slope condition.

### **C. Fauna**

There are no native fauna that inhabit or visit the project area. Avian species commonly encountered are all introduced species common to lowland area across Hawai'i. These include Japanese white-eye (*Zosterops japonicus*), common myna (*Acridotheres tristis*), red-crested cardinal (*Paroaria coronata*), and house sparrow (*Passer domesticus*). Feral cats and feral pigs are common visitors to the project area and the feral pigs are a major contributor to the need for the project. No State or Federal Listed Threatened or Endangered species inhabit or utilize the project area.

### **D. Cultural Resources:**

To the best of the Applicant's knowledge, there are no historic, archeological or cultural sites within or near the project area. See attached *Archaeological Assessment and Cultural Impact Evaluation in Support of the Kalaiopua Place Road Improvements Projects*, which is adopted from the City & County's Environmental Assessment for work done on the Kalaiopua Place Roadway.

As mentioned earlier, the project area is a steep slope situated between the Applicant's driveway and the County owned Kalaiopua Place roadway below. The project area has been

disturbed by both the construction of the County road in the mid 20<sup>th</sup> century and the Applicants driveway in 1952.

In a their comment letter, dated October 2, 2008, the State Historic Preservation Division, concurs that there are “*no known archaeological resources located within the project area.*” The Applicant understands and agrees that should historic resources, including human skeletal remains, be encountered during construction activities, that all work in the vicinity of the find(s) shall cease and that the find(s) shall be protected from any additional disturbance. In such event the SHPD shall immediately be contacted to assess the situation.

#### **E. Sensitive Habitat**

There are no Critical Habitats or wetlands located on the project area.

#### **F. Other Uses**

The project area is only used as a landscape area between the Kalaiopua Place and the Applicant’s driveway.

### **IV. SUMMARY OF MAJOR IMPACTS**

#### **A. Positive Impacts**

**Slope Stabilization.** The most significant impact from the proposed project is the repair and stabilization of the slope that occurs in the project area. Currently the soil in this area continues to slump with heavy rains causing potential sedimentation into the valley below the project area.

**Increased Security and Public Welfare.** Currently the residents who use lower Kalaiopua to access their homes are subject to the risk of future landslides that could block their access when dirt from the project area is deposited on the road. The proposed project will eliminate this risk and increase their welfare and security.

#### **B. Negative Impacts**

No significant negative impacts are anticipated as result of the proposed project. The following is a list of possible negative impacts that can be mitigated by the implementation of best management practices during the proposed project.

**Increased Sedimentation.** The reconstruction of a properly engineered CRM rock wall at the base of the slope will provide an enduring solution to mitigate future erosion threats and sedimentation impacts. The use of a silt fence during construction will eliminate the possibility of increased sedimentation during excavation, construction and revegetation.

**Increased Noise.** There will be a short-term increase in noise as a result of the proposed project. However, the contractor will abide by the County noise abatement regulations and will carry out their work within allowable work hours.

**Air quality.** The proposed project is not anticipated to have any noticeable short-term or long-term impact on air quality.

**Compatibility with the surrounding environment.** The Applicant has spent over 2 years seeking an engineering solution that is compatible with the surrounding environment. The proposed project has the strong support of the residents using lower Kalaiopua as it will be completely compatible with the surrounding environment.

**Resident Access.** The proposed project will result in a temporary blockage of the one-lane lower Kalaiopua Place. However, discussions with the impacted neighbors indicate that this will not cause an undue inconvenience so long as road closures are temporary and are only conducted between the hours of 9:00 AM and 3:00 PM Monday through Friday. Impacted residents will be given at least 48-hours notice prior to anticipated blockage of Kalaiopua Place.

**Public Services.** The proposed project will have no significant impact on any of the public services provided by the State or County governments. There is a potential for the project to require access on the narrow one-lane lower Kalaiopua Place to be restricted during parts of the work day, however this will not impact any of the public services provided to the residents on the road for an extended time.

## **V. PROPOSED MITIGATION MEASURES**

The above listed potential negative impacts can be avoided or mitigated by the following measures.

**Best Management Practices.** Best Management Practices (BMPs) including the use of silt control fencing, attention to weather forecasting and rain threats, communication with neighbors, and safety signage will all help to eliminate any negative impacts that could result from the proposed project.

**Temporary Continued Use of Existing Erosion Control Wall.** During excavation of the loose fill from the slope, retention of the existing, unpermitted rock wall will provide an effective barrier to mitigate the impact of increased sedimentation onto the Kalaiopua Place. Over the past two years the unpermitted wall has proven its effectiveness at preventing soil from eroding off of the slope and obstructing Kalaiopua Place. Once the loose fill from the upper slope is removed, the existing wall will be demolished and reconstructed in accord with the design developed by Wagner Engineering.

**Limited Road Blockage.** It may become temporarily necessary to restrict access to lower Kalaiopua Place during parts of the workday. However, discussions with the affected residents indicate that this should not pose an undue hardship so long as closures are only conducted

between the working hours of 9:00 AM and 3:00 PM Monday through Friday. The Applicant will ensure that its Contractor(s) agrees to this condition and that neighboring residents are provided with a minimum of 48-hours advance notice of anticipated road obstructions.

## **VI. ALTERNATIVES CONSIDERED**

### **Alternative A: No Action**

Under this alternative, the emergency erosion control wall built in 2006 without permits will have to be removed. No further action would then be taken. As a result, increased soil erosion and sedimentation would most likely occur. This option has been rejected, as it is unsafe for the residents on lower Kalaiopua Place.

### **Alternative B: Stabilization of the Slope via Concrete Encapsulation**

In July 2006, the Applicant retained Hawaiian Engineering Group Inc. (HEGI) to come up with a plan to stabilize the slope. HEGI produced a design solution that they felt would address the problem. HEGI determined that the slope failure was resulting from the original fill material that had been deposited on the slope with the Applicant's driveway was initially constructed in 1952. The solution that HEIG proposed was to encapsulate the loose fill material with a concrete shell and "nail" the shell and the fill to the underlying cinders with long steel soil-bolts.

While this design solution met the County building and engineering codes and would achieve the goal of stabilizing the slope, it was soundly rejected by the Kalaiopua community for being totally incompatible aesthetically with the natural setting that occurs along the rest of Kalaiopua Place. A massive concrete wall with protruding anchor bolts would have given this beautiful mountain landscape an industrial look and irreparably harmed the setting of this area.

## **VII. ANTICIPATED DETERMINATION**

Based on the above environmental assessment it is concluded that the proposed project to repair and stabilize the slope on Tax Map Key: (1) 2-5-14:012 will not have any significant adverse impacts on the environment. In fact, the proposed project will result in less soil erosion through a developed engineering solution that is compatible with the site and surrounding environment. As a result, it is anticipated that a 'Finding of No Significant Impact' (FONSI) will be issued by the accepting agency.

## VIII. FINDINGS AND REASONS SUPPORTING THE DETERMINATION

The environmental impacts of the proposed slope repair and stabilization project on Tax Map Key: (1) 2-5-14:012 have been evaluated in relation to the thirteen significance criteria listed in the Guidebook for the State Environmental Review Process. The criteria and the effects this project will have are listed below:

**1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.**

The proposed 1,400 sq. ft. slope repair and stabilization project will not result in the loss or destruction of any natural or cultural resources.

**2. Curtails the range of beneficial uses of the environment.**

The proposed slope repair and stabilization project will not curtail the range of beneficial uses of the environment.

**3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revision thereof and amendments thereto, court decisions, or executive orders.**

The proposed slope repair and stabilization project does not conflict with the State's long-term environmental policies and goals that promote understanding and protection of Hawai'i's natural resources.

**4. Substantially affects the economic, social welfare, and cultural practices of the community or State.**

The proposed slope repair and stabilization project does not negatively impact either the economic or social welfare, or the cultural practices of the community or State.

**5. Substantially affects public health.**

The proposed slope repair and stabilization project will not substantially impact public health. In fact, the project will result in a safer environment for the residents living on lower Kalaiohua Place.

**6. Involves substantial secondary impacts, such as population changes or effects on public facilities.**

No impacts on population or public facilities will result from the proposed project.

**7. Involves a substantial degradation of environmental quality.**

This project will cause no degradation of environmental quality.

**8. Is individually limited but has considerable effect upon environment or involves a commitment for larger actions.**

This project is very small and does not involve a commitment to larger actions.

**9. Substantially affects a rare, threatened, or endangered species or its habitat.**

The proposed project will not adversely impact any endangered species or its habitat.

**10. Detrimentally affect air or water quality or ambient noise levels.**

The proposed project will have no significant increase in noise level and will have not impact on water or air quality.

**11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, and estuary, freshwater, or coastal waters.**

This project is not located in an environmentally sensitive area and will not negatively affect an environmentally sensitive area or damage a flood plain, tsunami zone, beach, erosion-prone area, or geologically hazardous land.

**12. Substantially affect scenic vistas and view planes in County or State plans or studies.**

The proposed project will not impact a scenic vista or view plane and has been designed to be compatible with the surrounding area.

**13. Requires substantial energy consumption.**

No additional energy consumption is expected as a result of this project.

**IX. PERMITS, VARIANCES AND APPROVALS REQUIRED**

**A) City and County of Honolulu**

- **Grading Permit** – Category 4
- **Engineer's Soils Report** – Per Section 14-14.2(d)(1) ROH
- **Engineer's Slope Hazard Report** - Per Section 14-14.2(d)(2) ROH
- **Building Permit** – for proposed rock wall

B) **Surface Encroachment** – In the interim period, since the CDUA and Draft EA were filed in July of this year, it has been determined that the existing unpermitted rock wall at the base of the slope (adjacent to Kalaiohua Place) will need to be demolished and replaced with a new, engineered CRM wall. The new proposed wall will minimally encroach into the Kalaiohua Place Right-of-Way where it connects to existing rock walls at either end of the project area. The Applicant acknowledges the Surface Encroachment agreement requirement, which is noted in the DPP's letter dated September 19, 2008 and attached hereto in Appendix 4. The Applicant will work with the DPP to address this condition.

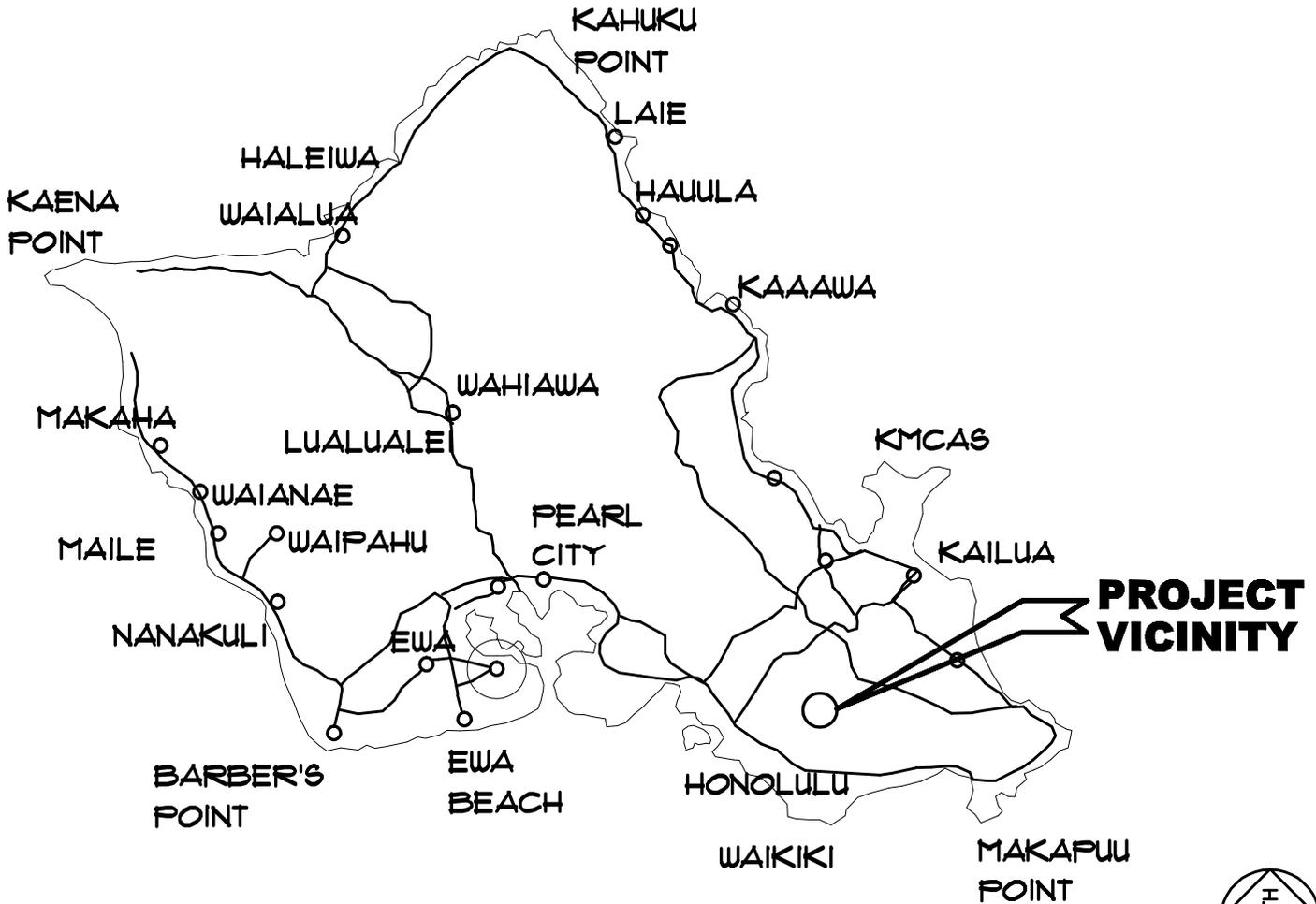
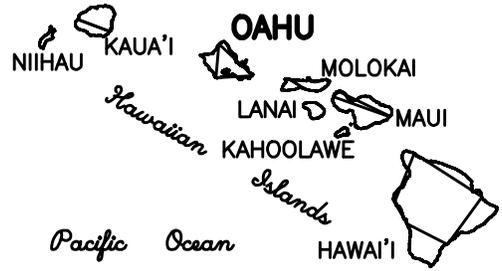
## **X. EA PREPARATION**

This Final Environmental Assessment was prepared primarily by:

Chipper Wichman  
3535 Papalina Rd.  
Kalaheo, HI 96741  
PH (808) 332-7324 (ext. 201)  
Email: Wichman@ntbg.org

## **XI. REFERENCES CITED**

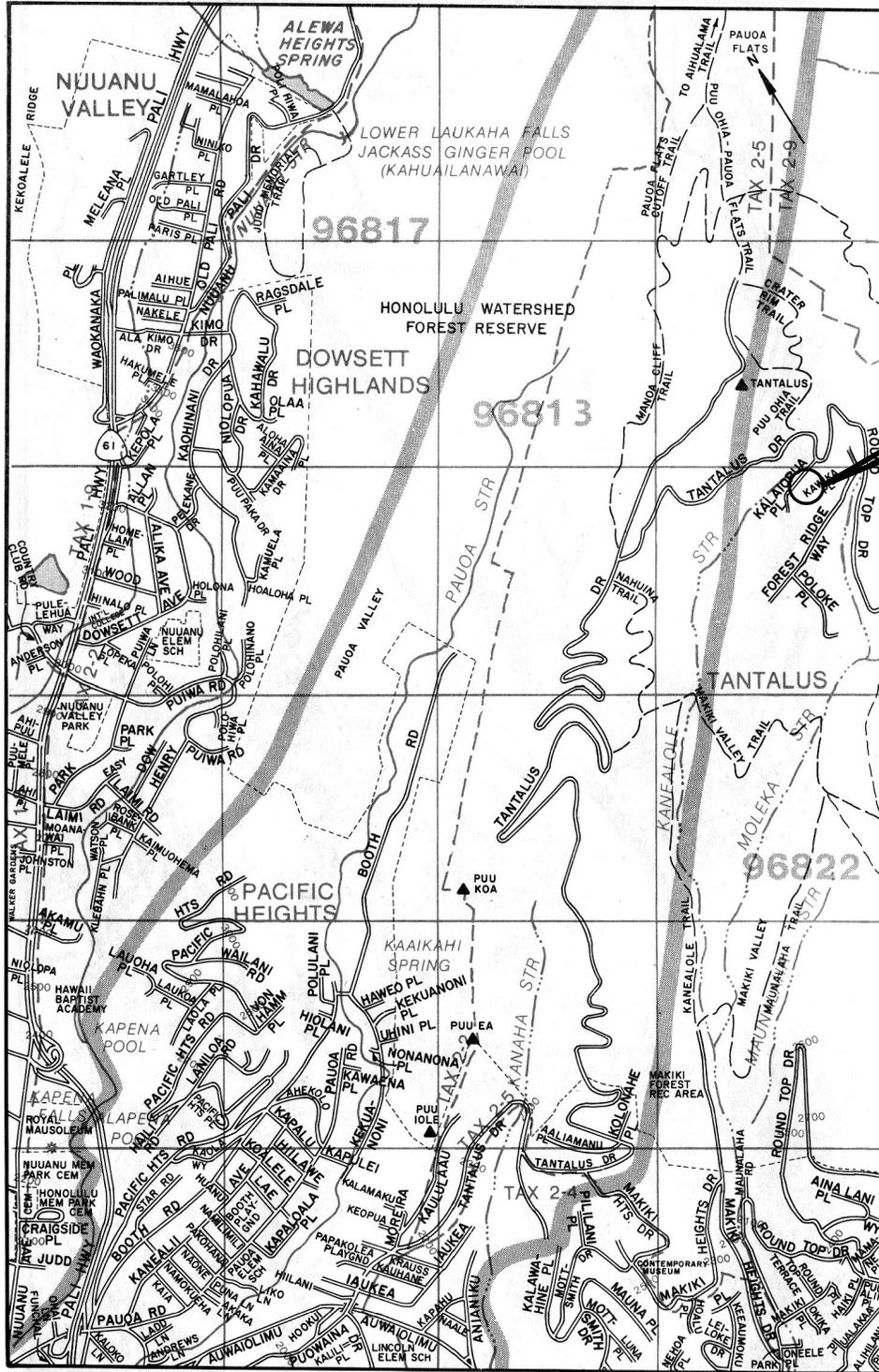
Wagner, W.L., Herbst, D.R., and Sohmer, S.H. 1999. Manual of the Flowering Plants of Hawai'i--Revised Edition. Honolulu, HI: University of Hawaii Press and Bishop Museum Press. 1853p.



# ISLAND OF OAHU

## VICINITY MAP

WICHMAN RESIDENCE - EROSION CONTROL & SLOPE STABILIZATION PROJECT  
123 KALAIOPUA PLACE  
HONOLULU, OAHU, HAWAII'1 TMK (1) 2-5-14:12



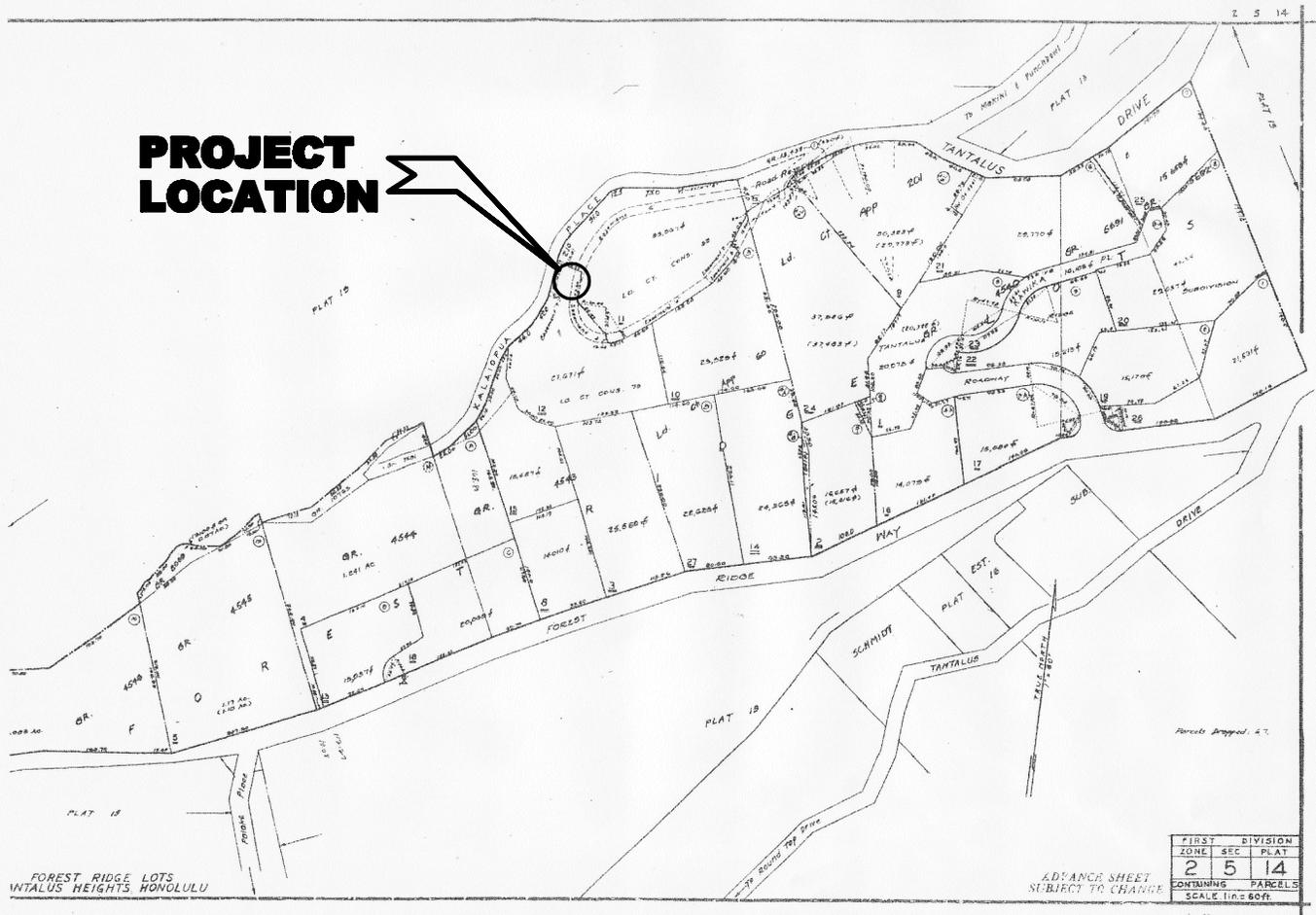
**PROJECT  
LOCATION**



# LOCATION MAP

**WICHMAN RESIDENCE - EROSION CONTROL & SLOPE STABILIZATION PROJECT**

**123 KALAIOPUA PLACE  
HONOLULU, OAHU, HAWAII TMK (1) 2-5-14:12**

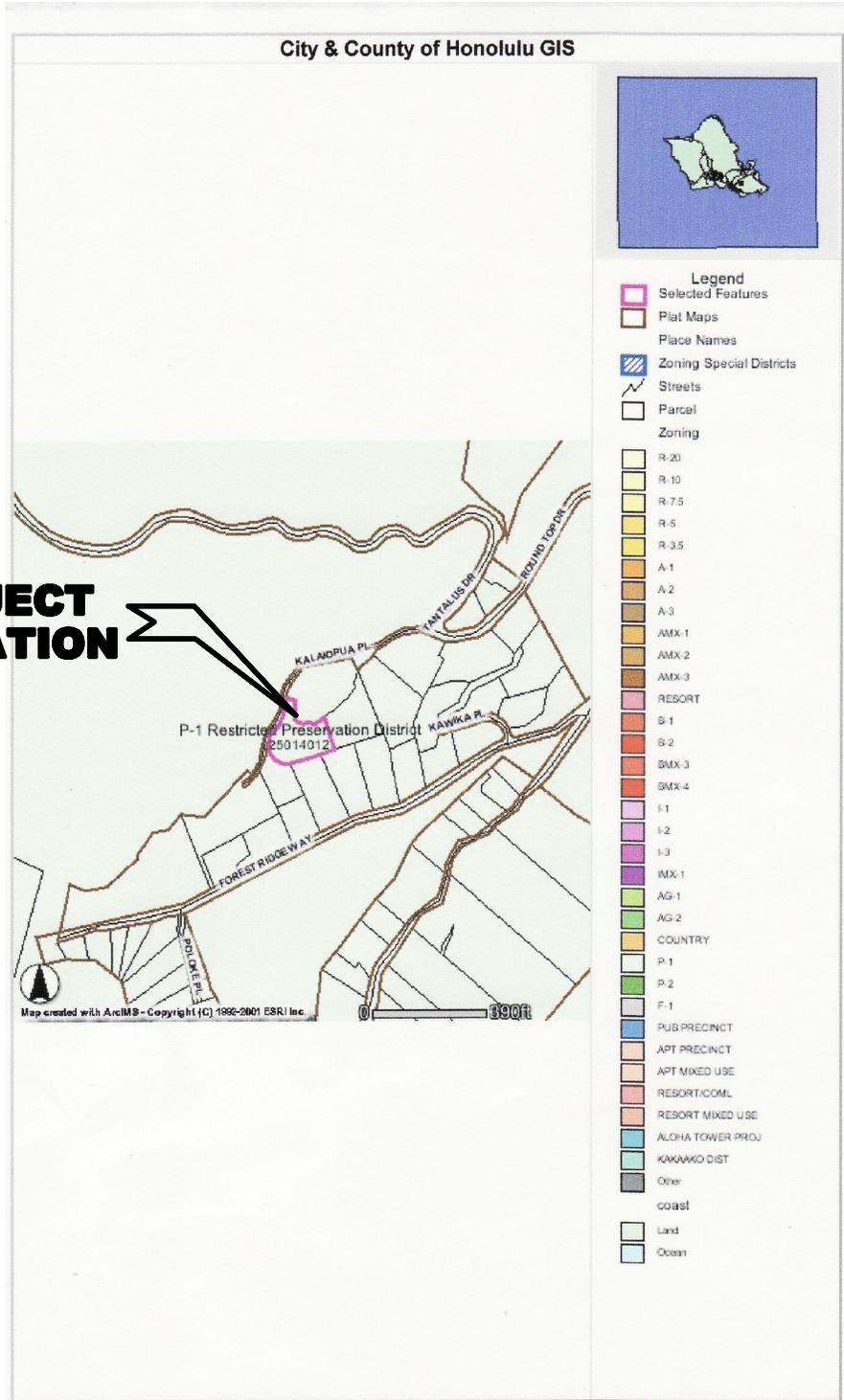


# TAX MAP KEY (1) 2-5-14:12

WICHMAN RESIDENCE - EROSION CONTROL & SLOPE STABILIZATION PROJECT

123 KALAIOPUA PLACE

HONOLULU, OAHU, HAWAII TMK (1) 2-5-14:12



# ZONING MAP

WICHMAN RESIDENCE - EROSION CONTROL & SLOPE STABILIZATION PROJECT

123 KALAIOPUA PLACE

HONOLULU, OAHU, HAWAII TMK (1) 2-5-14:12



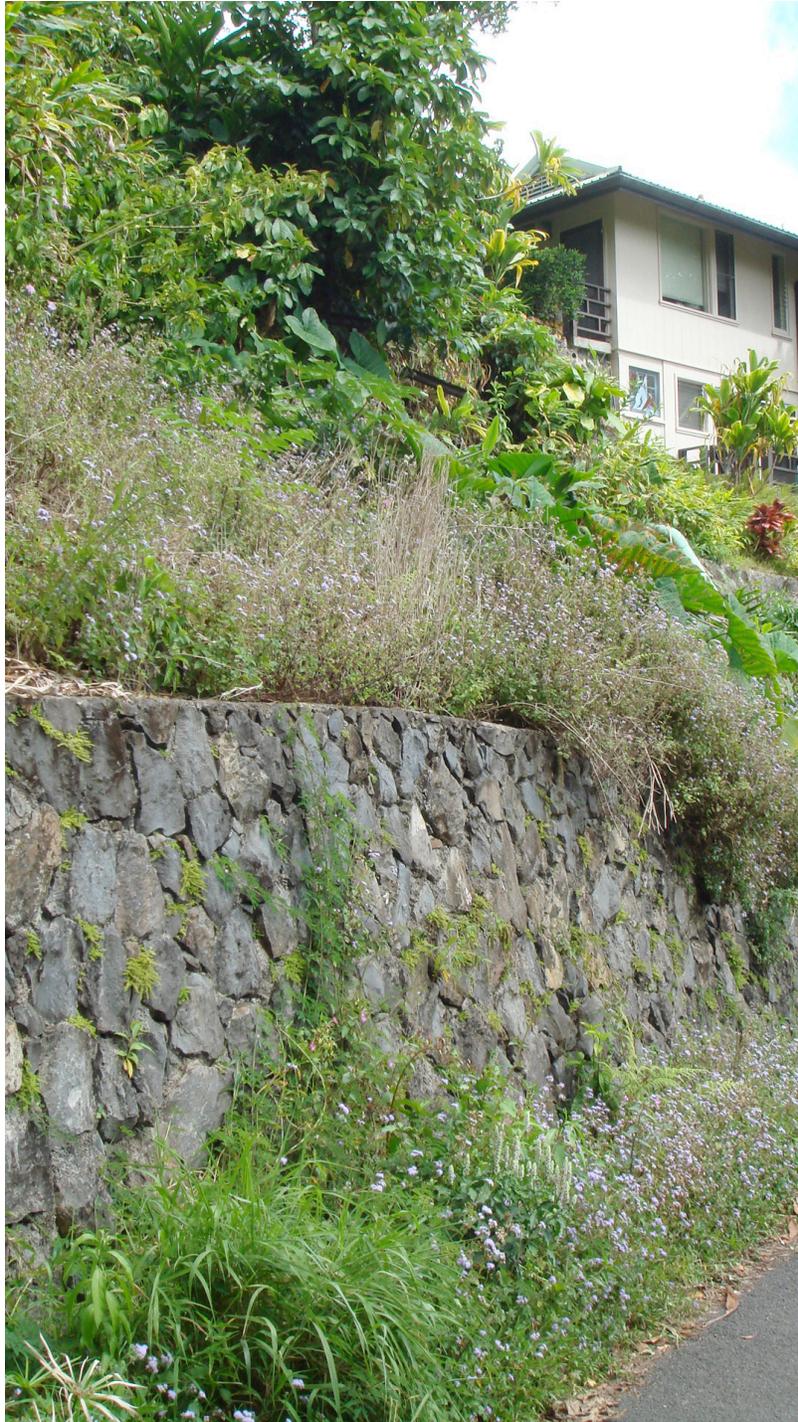
**Photo 1** – Existing Re-vegetated Slope Between Kalaiopua Place & Applicant’s Driveway (Above)



**Photo 2** – Existing Slope with Kalaiopua Place Pictured Below

### **Site Photos**

Wichman Residence – Erosion Control & Slope Stabilization Project  
123 Kalaiopua Place  
Honolulu, Oahu, Hawaii    TMK (1) 2-5-14: 012



**Photo 3** – Existing Rock Wall - - to be reduced in height to 59” Max  
(Wichman Residence in Background, Kalaiopua Place in Foreground)

### **Site Photos**

Wichman Residence – Erosion Control & Slope Stabilization Project  
123 Kalaiopua Place  
Honolulu, Oahu, Hawaii    TMK (1) 2-5-14: 012



**CONSTRUCTION NOTES**

- ALL APPLICABLE CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1926 AND STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1924, AS AMENDED, OF THE DEPARTMENT OF PUBLIC WORKS, CITY AND COUNTY OF HONOLULU AND THE COUNTIES OF KAUAI, MAUI, AND HAWAII.
- THE UNDERGROUND PIPES, CABLES OR DUCTLINES KNOWN TO EXIST BY THE ENGINEER FROM HIS SEARCH OF RECORDS ARE INDICATED ON THE PLANS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND DEPTHS OF THE FACILITIES AND EXERCISE PROPER CARE IN EXCAVATING IN THE AREA. WHEREVER CONNECTIONS OF NEW UTILITIES TO EXISTING UTILITIES ARE SHOWN ON THE PLANS, THE CONTRACTOR SHALL EXPOSE THE EXISTING LINES AT THE PROPOSED CONNECTIONS TO VERIFY THEIR LOCATIONS AND DEPTHS PRIOR TO EXCAVATION FOR THE NEW LINES.
- NO CONTRACTOR SHALL PERFORM ANY CONSTRUCTION OPERATION SO AS TO CAUSE FALLING ROCKS, SOIL OR DEBRIS IN ANY FORM TO FALL, SLIDE OR FLOW INTO EXISTING CITY DRAINAGE SYSTEMS, OR ADJOINING PROPERTIES, STREETS OR NATURAL WATERCOURSES. SHOULD SUCH VIOLATIONS OCCUR, THE CONTRACTOR MAY BE CITED AND THE CONTRACTOR SHALL IMMEDIATELY MAKE ALL REMEDIAL ACTIONS NECESSARY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER QUALITY AND WATER POLLUTION CONTROL STANDARDS CONTAINED IN HAWAII ADMINISTRATIVE RULES, TITLE II, CHAPTER 54, WATER QUALITY STANDARDS, AND TITLE II, CHAPTER 55, WATER POLLUTION CONTROL, AS WELL AS CHAPTER 14 OF THE REVISED ORDINANCES OF HONOLULU, AS AMENDED. BEST MANAGEMENT PRACTICES SHALL BE EMPLOYED AT ALL TIMES DURING CONSTRUCTION.
- THE CONTRACTOR SHALL NOTIFY THE CIVIL ENGINEERING BRANCH, DEPARTMENT OF PLANNING AND PERMITTING, AT 168-8084 TO ARRANGE FOR INSPECTIONAL SERVICES AND SUBMIT FOUR (4) SETS OF APPROVED CONSTRUCTION PLANS SEVEN (7) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION WORK.
- CONFINED SPACE
  - FOR ENTRY BY CITY PERSONNEL, INCLUDING INSPECTORS, INTO A PERMIT REQUIRED CONFINED SPACE AS DEFINED IN 29 CFR PART 1910.146(b), THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING:
    - ALL SAFETY EQUIPMENT REQUIRED BY THE CONFINED SPACE REGULATIONS APPLICABLE TO ALL PARTIES OTHER THAN THE CONSTRUCTION INDUSTRY, TO INCLUDE, BUT NOT LIMITED TO, THE FOLLOWING:
      - FULL BODY HARNESSES FOR UP TO TWO PERSONNEL.
      - LIFELINE AND ASSOCIATED CLIPS.
      - INGRESS/EGRESS AND FALL PROTECTION EQUIPMENT.
      - TWO-WAY RADIOS (WALKIE-TALKIES) IF OUT OF LINE-OF-SIGHT.
      - EMERGENCY (ESCAPE) RESPIRATOR (10 MINUTE DURATION).
      - CELLULAR TELEPHONE TO CALL FOR EMERGENCY ASSISTANCE.
      - CONTINUOUS GAS DETECTOR (CALIBRATED) TO MEASURE OXYGEN, HYDROGEN SULFIDE, CARBON MONOXIDE AND FLAMMABLES (CAPABLE OF MONITORING AT A DISTANCE AT LEAST 20-FEET AWAY).
      - PERSONAL MULTI-GAS DETECTOR TO BE CARRIED BY INSPECTOR.
    - CONTINUOUS FORCED AIR VENTILATION ADEQUATE TO PROVIDE SAFE ENTRY CONDITIONS.
    - ONE ATTENDANT/RESCUE PERSONNEL TOPSIDE (TWO, IF CONDITIONS WARRANT IT).
- PURSUANT TO CHAPTER 6E, HRS, IN THE EVENT ANY AIRCRAFTS OR HUMAN REMAINS ARE UNCOVERED DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL IMMEDIATELY SUSPEND WORK AND NOTIFY THE HONOLULU POLICE DEPARTMENT, THE STATE DEPARTMENT OF LAND AND NATURAL RESOURCES-HISTORIC PRESERVATION DIVISION (642-8015). IN ADDITION, FOR NON-CITY PROJECTS, THE CONTRACTOR SHALL INFORM THE CIVIL ENGINEERING BRANCH, DEPARTMENT OF PLANNING AND PERMITTING (168-8084), AND FOR CITY PROJECTS, NOTIFY THE RESPONSIBLE CITY AGENCY.
- FOR PROJECTS ADJUTING STATE HIGHWAYS' RIGHTS-OF-WAY, THE OWNER OR HIS AUTHORIZED REPRESENTATIVE SHALL NOTIFY THE STATE DEPARTMENT OF TRANSPORTATION, HIGHWAYS DIVISION, OAHU DISTRICT, DRAINAGE DISCHARGE UNIT AT 831-6793 FOR AN ASSESSMENT OF STATE HIGHWAYS PERMIT REQUIREMENTS.
- FOR BENCH MARK, SEE SHEET C-3.

**GRADING NOTES**

- ALL GRADING WORK SHALL BE DONE IN ACCORDANCE 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 SOILS REPORT BY DAVIES & MOORE DATED MAY 30, 1971.
- NO CONTRACTOR SHALL PERFORM ANY GRADING OPERATION SO AS TO CAUSE FALLING ROCKS, SOIL OR DEBRIS IN ANY FORM TO FALL, SLIDE OR FLOW INTO ADJOINING PROPERTIES, STREETS OR NATURAL WATERCOURSES. SHOULD SUCH VIOLATIONS OCCUR, THE CONTRACTOR MAY BE CITED AND THE CONTRACTOR SHALL IMMEDIATELY MAKE ALL REMEDIAL ACTIONS NECESSARY.
- THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST MISTING. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL STANDARDS CONTAINED IN THE HAWAII ADMINISTRATIVE RULES, TITLE II, CHAPTER 601, AIR POLLUTION CONTROL.
- THE UNDERGROUND PIPES, CABLES OR DUCTLINES KNOWN TO EXIST BY THE ENGINEER FROM HIS SEARCH OF RECORDS ARE INDICATED ON THE PLANS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND DEPTHS OF THE FACILITIES AND EXERCISE PROPER CARE IN EXCAVATING IN THE AREA. WHEREVER CONNECTIONS OF NEW UTILITIES ARE SHOWN ON THE PLANS, THE CONTRACTOR SHALL EXPOSE THE EXISTING LINES AT THE PROPOSED CONNECTIONS TO VERIFY THEIR LOCATIONS AND DEPTHS PRIOR TO EXCAVATION FOR THE NEW LINES.
- ADEQUATE PROVISIONS SHALL BE MADE TO PREVENT SURFACE WATERS FROM DAMAGING THE CUT FACE OF AN EXCAVATION OR THE SLOPED SURFACES OF A FILL. FURTHERMORE, ADEQUATE PROVISIONS SHALL BE MADE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE SITE.
- ALL SLOPES AND EXPOSED AREAS SHALL BE SOODED OR PLANTED AS SOON AS FINAL GRADES HAVE BEEN ESTABLISHED. PLANTING SHALL NOT BE DELAYED UNTIL ALL GRADING WORK HAS BEEN COMPLETED. GRADING TO FINAL GRADE SHALL BE CONTINUOUS, AND ANY AREA WITHIN WHICH WORK HAS BEEN INTERRUPTED OR DELAYED SHALL BE PLANTED.
- FILLS ON SLOPES STEEPER THAN 5:1 SHALL BE KEYED.
- THE CITY SHALL BE INFORMED OF THE LOCATION OF THE BORROW/DISPOSAL SITE FOR THE PROJECT WHEN THE APPLICATION FOR A GRADING PERMIT IS MADE. THE BORROW/DISPOSAL SITE MUST ALSO FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCES.
- NO GRADING WORK SHALL BE DONE ON SATURDAYS, SUNDAYS AND HOLIDAYS AT ANY TIME WITHOUT PRIOR NOTICE TO THE DIRECTOR, D.P.P., PROVIDED SUCH GRADING WORK IS ALSO IN CONFORMANCE WITH THE COMMUNITY NOISE CONTROL STANDARDS CONTAINED IN THE HAWAII ADMINISTRATIVE RULES, TITLE II, CHAPTER 46, COMMUNITY NOISE CONTROL.
- THE LIMITS OF THE AREA TO BE GRADED SHALL BE FLAGGED BEFORE THE COMMENCEMENT OF THE GRADING WORK.
- ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER QUALITY AND WATER POLLUTION CONTROL STANDARDS CONTAINED IN HAWAII ADMINISTRATIVE RULES, TITLE II, CHAPTER 54, WATER QUALITY STANDARDS, AND TITLE II, CHAPTER 55, WATER POLLUTION CONTROL, AND IF APPLICABLE, THE NPDES PERMIT FOR THE PROJECT.
- WHERE APPLICABLE AND FEASIBLE THE MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY EARTH MOVING PHASE OF THE GRADING IS INITIATED.
- TEMPORARY EROSION CONTROLS SHALL NOT BE REMOVED BEFORE PERMANENT EROSION CONTROLS ARE IN-PLACE AND ESTABLISHED.
- TEMPORARY EROSION CONTROL PROCEDURES SHALL BE SUBMITTED FOR APPROVAL PRIOR TO APPLICATION FOR GRADING PERMIT.
- IF THE GRADING WORK INVOLVES CONTAMINATED SOIL, THEN ALL GRADING WORK SHALL BE DONE IN CONFORMANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS.
- BUILDING PERMIT FOR RETAINING WALLS SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF GRADING WORK ON SITE.
- FOR NON-CITY PROJECTS, THE CONTRACTOR SHALL NOTIFY THE CIVIL ENGINEERING BRANCH, D.P.P. AT 168-8084 TO ARRANGE FOR INSPECTIONAL SERVICES AND SUBMIT THREE (3) SETS OF APPROVED CONSTRUCTION PLANS SEVEN (7) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION WORK. FOR CITY PROJECTS, THE CONTRACTOR SHALL COORDINATE INSPECTIONAL SERVICES WITH THE RESPONSIBLE CITY AGENCY.
- PURSUANT TO CHAPTER 6E, HRS, IN THE EVENT ANY ARTIFACTS OR HUMAN REMAINS ARE UNCOVERED DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL IMMEDIATELY SUSPEND WORK AND NOTIFY THE HONOLULU POLICE DEPARTMENT, THE STATE DEPARTMENT OF LAND AND NATURAL RESOURCES-HISTORIC PRESERVATION DIVISION (642-8015). IN ADDITION, FOR NON-CITY PROJECTS, THE CONTRACTOR SHALL INFORM THE CIVIL ENGINEERING BRANCH, D.P.P. (168-8084), AND FOR CITY PROJECTS, NOTIFY THE RESPONSIBLE CITY AGENCY.
- FOR ALL PROJECTS, WHICH WILL DISTURB ONE (1) ACRE OR MORE OF LAND, THE CONTRACTOR SHALL NOT START CONSTRUCTION UNTIL A NOTICE OF GENERAL PERMIT COVERAGE (NGPC) IS RECEIVED FROM THE DEPARTMENT OF HEALTH, STATE OF HAWAII, AND HAS SATISFIED ANY OTHER APPLICABLE REQUIREMENTS OF THE NPDES PERMIT PROGRAM. ALSO, FOR NON-CITY AND OTHER NON-GOVERNMENTAL AGENCY PROJECTS, THE CONTRACTOR SHALL PROVIDE A WRITTEN COPY OF THE NGPC TO THE PERMITTING AND INSPECTION SECTION, CIVIL ENGINEERING BRANCH, D.P.P., AT LEAST SEVEN (7) CALENDAR DAYS BEFORE THE START OF THE CONSTRUCTION. FOR CITY OR OTHER GOVERNMENTAL PROJECTS, THE CONTRACTOR SHOULD PROVIDE A WRITTEN COPY OF THE NGPC TO THE APPROPRIATE CITY DEPARTMENT OR GOVERNMENTAL AGENCY PER THEIR REQUIREMENTS.
- ALL GRADING AND CONSTRUCTION WORK SHALL IMPLEMENT MEASURES TO ENSURE THAT THE DISCHARGE OF POLLUTANTS FROM THE CONSTRUCTION SITE WILL BE REDUCED TO THE MAXIMUM EXTENT PRACTICABLE AND WILL NOT CAUSE OR CONTRIBUTE TO AN EXCEEDANCE OF WATER QUALITY STANDARDS.
- NON-COMPLIANCE TO ANY OF THE ABOVE REQUIREMENTS SHALL MEAN IMMEDIATE SUSPENSION OF ALL WORK, AND REMEDIAL WORK SHALL COMMENCE IMMEDIATELY. ALL COSTS INCURRED SHALL BE BILLED TO THE VIOLATOR. FURTHERMORE, VIOLATORS SHALL BE SUBJECTED TO ADMINISTRATIVE, CIVIL AND/OR CRIMINAL PENALTIES.
- FOR BENCH MARK, SEE SHEET C-3.

**TEMPORARY DUST CONTROL MEASURES**

- THE GRADED OR PROJECT SITE THAT IS CLEARED OF VEGETATION SHALL BE KEPT DAMP WITH WATER CONTINUOUSLY FOR SEVEN (7) DAYS A WEEK. AT THE END OF EACH DAY, THE SITE SHALL BE SUFFICIENTLY DAMPENED WITH WATER ON A CONTINUAL BASIS SO THAT THE SITE WILL REMAIN MOISTENED DURING THE NIGHT.
- THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS SO THAT EXCAVATION EMBANKMENT, AND IMPORTED MATERIAL SHALL BE DAMPENED WITH WATER ON A CONTINUAL BASIS TO PREVENT DUST PROBLEMS.
- IN APPLYING FOR A GRADING PERMIT, THE CONTRACTOR SHALL SUBMIT PLANS, SCHEDULES AND/OR WRITTEN MEASURES WHICH PROVIDES FOR DUST CONTROL. THE DUST CONTROL MEASURES SHALL CONTAIN POSITIVE STATEMENTS WHICH REQUIRE ACTIONS OR WORK THAT PREVENT DUST PROBLEMS. NO PERMITS WILL BE ISSUED UNLESS THE COUNTY IS ASSURED THAT DUST AND EROSION PROBLEMS WILL BE MINIMIZED.

**TEMPORARY EROSION CONTROL MEASURES**

- TEMPORARY VEGETATIVE COVER SHALL BE PLANTED WITHIN A PERIOD OF 30 CALENDAR DAYS AFTER THE SITE HAS BEEN GRADED OR BARED OF VEGETATION OR IF THE SITE WILL BE SUSPENDED FOR MORE THAN 30 CALENDAR DAYS.
- TEMPORARY VEGETATIVE COVER SHALL CONSIST OF 40 LBS. COMMON RYE GRASS SEED PER ACRE, 400 LBS. PER ACRE 10-10-10 OR EQUIVALENT FERTILIZER WORKED INTO THE SEED BED BEFORE PLANTING. TEMPORARY SPRINKLER SYSTEM IS TO BE INSTALLED CONCURRENTLY WITH ALL PLANTINGS. PLANTING AND MAINTENANCE OF GRASS SHALL CONFORM TO THE HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, CONSTRUCTION, 2005" AND ITS AMENDMENTS.

**PERMANENT EROSION CONTROL MEASURES**

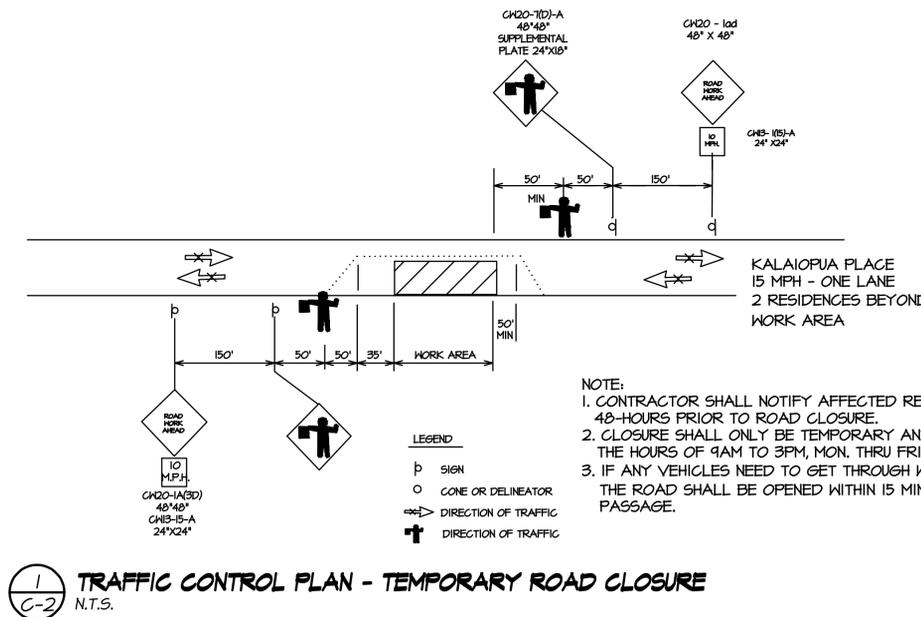
- THE CONTRACTOR SHALL GRASS THE ENTIRE PROJECT SITE, EXCEPT PAVED AREAS WITH BERMUDA GRASS SPRIGS. THE GRASS SHALL BE PLANTED, FERTILIZED, AND MAINTAINED IN ACCORDANCE WITH THE HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005" AND ITS AMENDMENTS.
- THE CONTRACTOR SHALL GRASS ALL EXPOSED AREAS THAT HAVE BEEN CONSTRUCTED TO FINAL GRADES WITHIN A PERIOD OF 30 CALENDAR DAYS.
- IN LIEU OF GRASS SPRIGS (NOTE 1), THE CONTRACTOR MAY USE HYDROMULCH WITH SEEDINGS.
- IN ACCORDANCE WITH CHAPTER II-601, AIR POLLUTION CONTROL, TITLE II, STATE ADMINISTRATIVE RULES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT EFFECTIVE CONTROL MEASURES ARE PROVIDED TO MINIMIZE OR PREVENT ANY VISIBLE DUST EMISSION CAUSED BY THE CONSTRUCTION WORK FROM IMPACTING THE SURROUNDING AREAS INCLUDING THE OFF-SITE ROADWAYS USED TO ENTER/EXIT THE PROJECT. THESE MEASURES INCLUDE BUT ARE NOT LIMITED TO THE USE OF WATER WAGONS, SPRINKLER SYSTEMS, DUST FENCES, ETC.
- IN ACCORDANCE WITH CHAPTER II-55, WATER POLLUTION CONTROL AND CHAPTER II-54, WATER QUALITY STANDARDS, TITLE II, STATE ADMINISTRATIVE RULES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT THE BEST MANAGEMENT PRACTICES (BMP) TO MINIMIZE OR PREVENT THE DISCHARGE OF SEDIMENTS, DEBRIS AND OTHER WATER POLLUTANT INTO STATE WATERS ARE PROVIDED AT ALL TIMES.
- IN ACCORDANCE WITH CHAPTER II-58, SOLID WASTE MANAGEMENT CONTROL, TITLE II, STATE ADMINISTRATIVE RULES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT GRUB MATERIAL, DEMOLITION WASTE AND CONSTRUCTION WASTE GENERATED BY THE PROJECT ARE DISPOSED OF IN A MANNER OR AT A SITE APPROVED BY THE STATE DEPARTMENT OF HEALTH. DISPOSAL OF ANY OF THESE WASTES BY BURNING IS PROHIBITED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL APPLICABLE PERMITS FROM THE DEPARTMENT OF HEALTH INCLUDING BUT NOT LIMITED TO NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES), NOTICE OF INTENT AND GENERAL PERMIT FOR STORM WATER, HYDROSTATIC TEST AND DEWATERING DISCHARGES PRIOR TO COMMENCING CONSTRUCTION. NPDES PERMIT SHALL BE REQUIRED PRIOR TO GRADING OR GRUBBING WORK OVER AN AREA OF ONE ACRE OR MORE.
- THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM THIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COST INCURRED FOR ANY NECESSARY REMEDIAL ACTION BY THE COUNTY ENGINEER SHALL BE PAYABLE BY THE CONTRACTOR.
- BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE EMPLOYED AT ALL TIMES TO THE MAXIMUM EXTENT PRACTICABLE TO PREVENT DAMAGE BY SEDIMENTATION, EROSION OR DUST TO STREAMS, WATERCOURSES, NATURAL AREAS AND THE PROPERTY OF OTHERS.

**ENGINEER'S NOTICE TO CONTRACTOR**

- CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND ENGINEER HARMLESS FROM AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.
- ALL UNDERGROUND UTILITIES OR STRUCTURES, REPORTED OR FOUND ON PUBLIC RECORDS, ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT. THE OWNER, BY ACCEPTING THESE PLANS OR PROCEEDING WITH THE IMPROVEMENTS HEREON, AGREES TO ASSUME LIABILITY AND HOLD THE ENGINEER HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED OR INDICATED ON PUBLIC RECORDS, OR THOSE CONSTRUCTED AT VARIANCE WITH REPORTED OR RECORDED LOCATIONS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHERS FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER OF ALL UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK.
- THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS.

**CONSTRUCTION NOTES FOR TRAFFIC CONTROL PLAN**

- THE PERMITTEE SHALL MAKE ADJUSTMENTS AT INTERSECTIONS, DRIVEWAYS, BRIDGES, STRUCTURES, ETC. TO FIT FIELD CONDITIONS.
- CONES OR DELINEATORS SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
- TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SUCH THAT THE SIGN OR DEVICE FARTHEST FROM THE WORK AREA SHALL BE PLACED FIRST. THE OTHERS SHALL THEN BE PLACED PROGRESSIVELY TOWARD THE WORK AREA.
- REGULATORY AND WARNINGS SIGNS WITHIN THE CONSTRUCTION ZONE THAT ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLANS SHALL BE REMOVED OR COVERED. ALL SIGNS SHALL BE RESTORED UPON COMPLETION OF THE WORK.
- FLAGGERS AND/OR POLICE OFFICERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES.
- WHEN REQUIRED BY THE ISSUING OFFICE, THE PERMITTEE SHALL INSTALL A FLASHING ARROW SIGNAL AS SHOWN ON THE TRAFFIC CONTROL PLANS.
- ALL TRAFFIC LANES SHALL BE A MINIMUM OF 10 FEET WIDE.
- ALL CONSTRUCTION WARNINGS SIGNS SHALL BE PROMPTLY REMOVED OR COVERED WHENEVER THE MESSAGE IS NOT APPLICABLE OR NOT IN USE.
- THE BACKS OF ALL SIGNS SHALL BE PROMPTLY REMOVED OR COVERED TO PRECLUDE THE DISPLAY OF INAPPLICABLE SIGN MESSAGES (I.E., WHEN SIGNS HAVE MESSAGES ON BOTH FACES), WHENEVER THE MESSAGES IS NOT APPLICABLE OR NOT IN USE.
- AT THE END OF EACH DAY'S WORK OR AS SOON AS THE WORK IS COMPLETED, THE PERMITTEE SHALL REMOVE ALL TRAFFIC CONTROL DEVICES NO LONGER NEEDED TO PERMIT FREE AND SAFE PASSAGE OF PUBLIC TRAFFIC. REMOVAL SHALL BE IN REVERSE ORDER OF INSTALLATION.
- REPLACE PERMANENT PAVEMENT MARKINGS AND TRAFFIC SIGNS UPON COMPLETION OF EACH PHASE OF WORK.
- POLICE OFFICER/FLAGMEN SHALL BE PRESENT AT ALL TIMES.



**EXHIBIT 6 - SHEET 2 OF 3  
REDUCED - NOT TO SCALE**



**Brian M. Hennessey**  
Licensed Professional Engineer  
Certificate No. 9322-C EXP. 4/30/10

**SLOPE REPAIR PLAN  
WICHMAN RESIDENCE  
123 KALAIOPUA PLACE  
AT TANTALUS, HONOLULU, OAHU, HAWAII  
CONSTRUCTION NOTES**

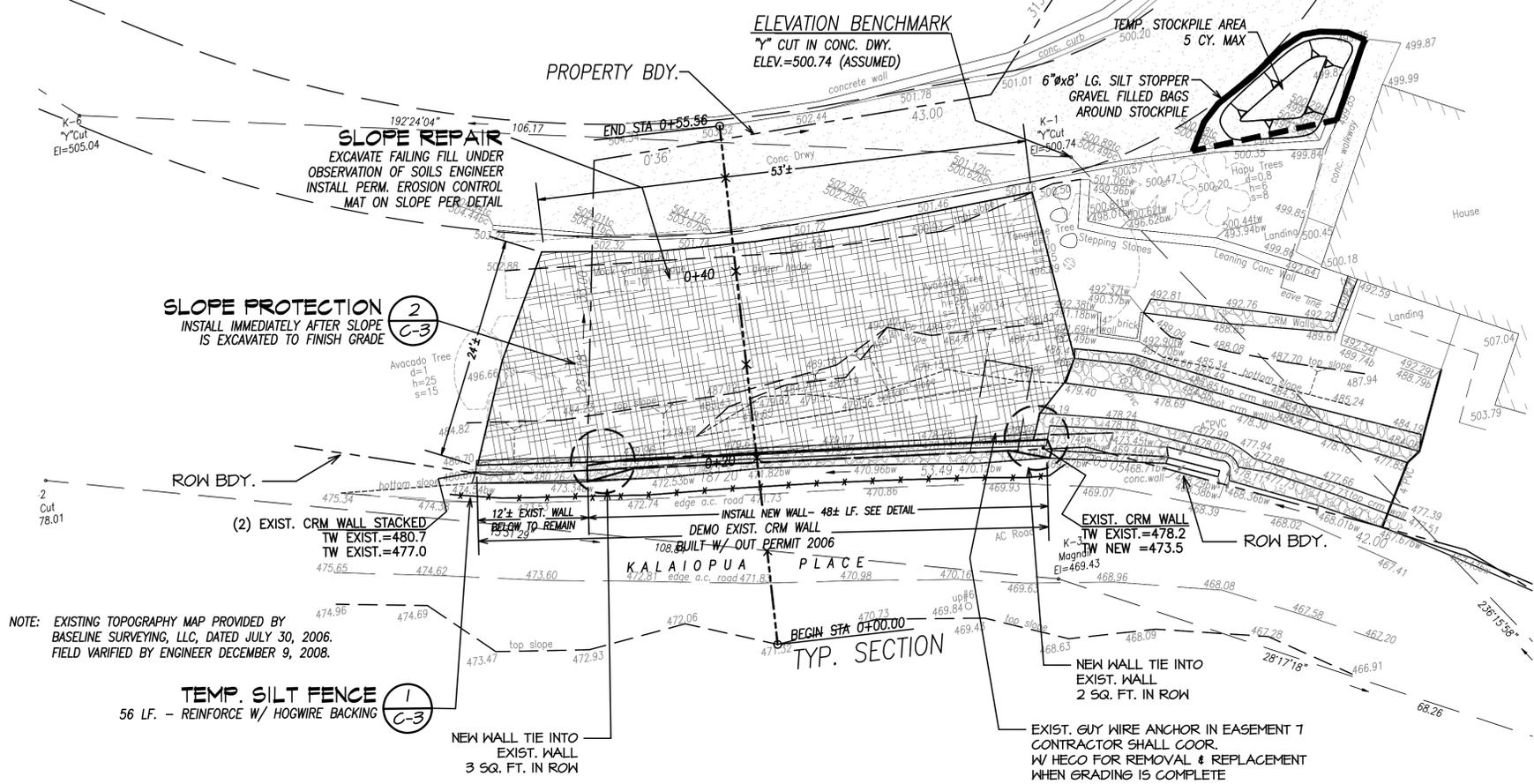
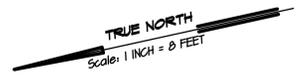
**SHEET  
C-2**

No.	Date	Revision Description	By	App'd

Wagner Engineering Services, Inc.  
P.O. Box 851 Hanalei, HI 96714 (808) 826-1256

APRIL 16, 2009

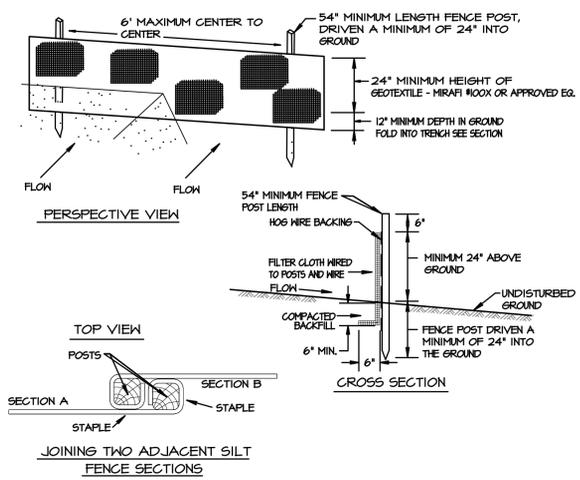
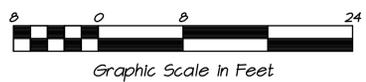
PROJECT NO. 4513      TMK: (1)2-5-14:12



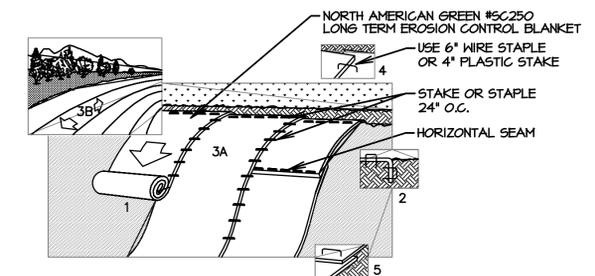
NOTE: EXISTING TOPOGRAPHY MAP PROVIDED BY BASELINE SURVEYING, LLC, DATED JULY 30, 2006. FIELD VARIFIED BY ENGINEER DECEMBER 9, 2008.

**SLOPE REPAIR PLAN**  
SCALE: 1"=8'

**ESTIMATED EARTHWORK**  
EXCAVATION - 118 CY.  
GRADED AREA - 1,400 SF.

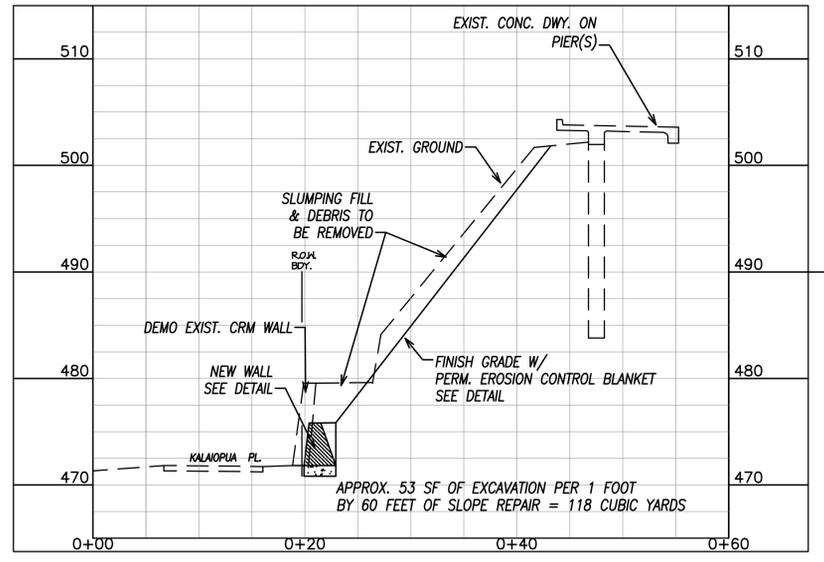


**1**  
C-3  
TEMP. SILT FENCE  
N.T.S.



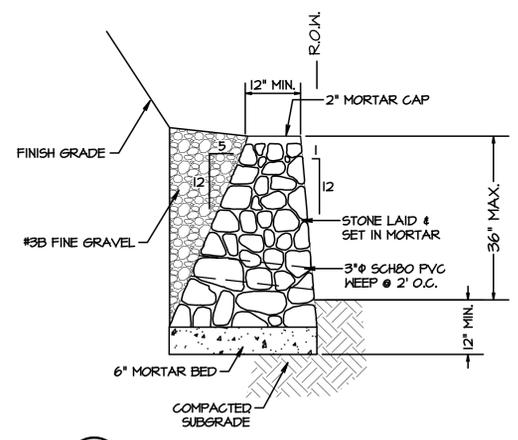
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER, AND SEED PER PERMANENT EROSION CONTROL NOTES ON SHEET C-2.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL THE BLANKETS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED OR STAKED WITH APPROXIMATELY 2" OVERLAP.
5. WHEN BLANKETS MUST BE SPUN DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 4" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.

**2**  
C-3  
SLOPE PROTECTION  
N.T.S.



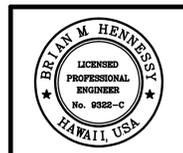
**TYPICAL SECTION**  
SCALE: 1"=8' H 1"=8' V

APPROX. EXCAVATION CALC.  
53 SF/FT FAILING FILL x 60 FT = 3180 CF (118 CY)



**3**  
C-3  
CRM WALL  
N.T.S.

**EXHIBIT 6 - SHEET 3 OF 3  
REDUCED - NOT TO SCALE**



This work was prepared by me or under my supervision.  
Brian M. Hennessy  
Licensed Professional Engineer  
Certificate No. 9322-C-EXP. 4/8/10

**SLOPE REPAIR PLAN  
WICHMAN RESIDENCE**  
123 KALAIOPUA PLACE  
AT TANTALUS, HONOLULU, OAHU, HAWAII  
**SLOPE REPAIR PLAN**

No.	Date	Revision Description	By	App'd

**Wagner Engineering Services, Inc.**  
P.O. Box 851 Hanalei, HI 96714 (808) 826-7256  
PROJECT NO. 4513      TMK: (1)2-5-14:12      APRIL 16, 2009

**SHEET  
C-3**