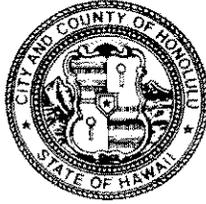


DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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HONOLULU, HAWAII 96813
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JEREMY HARRIS
MAYOR



RECEIVED TIMOTHY E. STEINBERGER, P.E.
DIRECTOR

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WW.P 04-0038

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

January 27, 2004

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Notice of Determination – Finding of No Significant Impact
Pohakupuna Road Sewer Line Reconstruction and Ewa Beach
Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36

The City and County of Honolulu, Department of Design and Construction has reviewed the responses to comments related to the Draft Environmental Assessment received during the 30-day public comment period that began on December 8, 2003. The agency has determined that this project will not have significant environmental effects and has issued a Finding of No Significant Impact. Please publish this notice in the February 8, 2004 edition of *The Environmental Notice*.

We have enclosed the following items for your review:

- (1) One copy of the OEQC Environmental Notice Publication Form;
- (2) Four copies of the Final EA.

The following information is provided in accordance with the requirements for a Notice of Determination:

Identification of Applicant

Haseko (Ewa), Inc.

Identification of Accepting Agency

Department of Design and Construction (DDC), City and County of Honolulu

Determination

Finding of No Significant Impact (FONSI)

Reasons Supporting Determination

This determination is based on the significance criteria listed in Section 11-200-12 of the Environmental Impact Statement Rules:

Reasons Supporting Determination

This determination is based on the significance criteria listed in Section 11-200-12 of the Environmental Impact Statement Rules:

1. The proposed project will not involve an irrevocable commitment to loss or destruction of any natural or cultural resources.
2. The proposed project will not curtail the range of beneficial uses of the environment. The project will be located within City and County parcels and easements, designated for wastewater facilities.
3. The proposed project will not conflict with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.
4. The proposed project is will not have a substantial negative effect on the economic or social welfare of the community or state. The project will not have a long term impact on employment or economics. The impact on social welfare will be positive since the proposed project will enhance wastewater service for the community.
5. The proposed project will not substantially affect public health (in a negative manner). Rather, the project will provide a means to minimize potential public health concerns due to overload of the Ewa Beach WWPS during peak wet weather flows.
6. The proposed project does not involve substantial secondary impacts, such as effects on public facilities (in a negative manner). Rather, it will increase capacity of the sewer system to serve planned development of lands in conformance with the County General Plan and the Ewa Development Plan.
7. The proposed project does not involve a substantial degradation of environmental quality. Instead, the proposed project will aid in preserving environmental quality by minimizing the potential for wastewater spills or overflows at the Ewa Beach WWPS.
8. The proposed project does not have a considerable cumulative effect upon the environment, and no larger commitments are required for the proposed sewer system.

Ms. Genevieve Salmonson, Director
January 28, 2004
Page 3

9. The proposed project will not substantially affect rare, threatened, or endangered species, or their habitat since there are none present within the project site.

10. The proposed project will not detrimentally affect air or water quality or ambient noise levels. These potential impacts and mitigation measures have been addressed in the appropriate sections of the EA.

11. The proposed project will not affect, nor is it likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

12. The proposed project is will not substantially affect scenic vistas or viewplanes identified in county or state plans or studies. Most of the project will be constructed underground, at ground level or within existing facilities.

13. The proposed improved sewer line will not require substantial additional energy. The upgraded pump station will consume more energy, with consumption based on flows.

Should you have any questions, please contact Ms. Colette Sakoda of Environet, Inc. at 732-8602, or Mr. Carl Arakaki of the Department of Design and Construction, Wastewater Division at 523-4671.

Sincerely,



re Timothy E. Steinberger, P.E.
Director

cc: Environet, Inc. (Consultant)
Carl Arakaki, DDC

**2004-02-08 FONSI
POHAKUPUNA SEWER RECONSTRUCTION &
EWA BEACH WASTEWATER PUMP STATION UPGRADE**

FEB 8 2004

FILE COPY

FINAL ENVIRONMENTAL ASSESSMENT

for

**Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach
Wastewater Pump Station**

Ewa, Oahu, Hawaii

Applicant:

Haseko (Ewa), Inc.
820 Mililani Street, Suite 820
Honolulu, Hawaii 96813

This environmental document has been prepared pursuant to Chapter 343, HRS

Prepared by:
Environet, Inc.
2850 Paa Street, Suite 212
Honolulu, Hawaii 96819

January 2004

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EXECUTIVE SUMMARY

Haseko (Ewa) Incorporated, is proposing to rehabilitate and expand part of an existing City and County of Honolulu's (City) sewer system serving the Ewa Beach Community. The current sewer system, known as the Ewa Interceptor Sewers, has experienced substantial deterioration over 20 years. Sanitary sewer overflows are becoming frequent issues due to structural corrosion. This sewer line is located on Pohakupuna Road and is divided into Ewa Interceptor (East) and Ewa Interceptor (West). The interceptors terminate at the City's Ewa Beach Wastewater Pump Station (WWPS) where the sewage is pumped via force main to the City's Honouliuli Wastewater Treatment Plant.

Haseko (Ewa), Inc. is in the process of planning an advanced sewer system to serve the nearby Ocean Pointe development, and has proposed to help reconstruct and expand the Ewa Interceptor (West) to provide increased capacity to serve current and future growth in both the Ewa Beach community as well as the Ocean Pointe development. This would offer a cost-effective, long-term design solution and substantially decrease the fiscal stress on the City and County's resources.

After evaluation of various alternatives to correct the existing problem, as well as possible expansion of the sewer system to provide increase capacity for projected flows in 2005, the Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Project was created. This project proposes to upgrade the Ewa Beach Wastewater Pump Station (WWPS) and replace the Ewa Beach Interceptor (West), thus increasing the capacity of the existing sewer system serving the Ewa Beach community and the Ocean Pointe development.

The reconstruction will consist of improvements to the existing Ewa Beach Wastewater Pump Station facility and the replacement of 3,400 linear feet of sewer line, 36-inches in diameter, along the Ewa Beach Interceptor (West) and replacement of twelve sewer manholes. The new sewer line will be installed using microtunneling methods and will run from the intersection of Papipi Road and Pupū Street towards the northeast along Papipi Road, then to the intersection of Papipi Road and Pohakupuna Road, and ending near the intersection of Pohakupuna Road and Ihipehu Street where the new interceptor would enter the City's Ewa Beach Wastewater Pump Station. Relocation of 280-feet of existing waterline along Papipi Road will be required as part of the proposed project. Details of the relocation are discussed in Section 3.1.1.

The Draft Environmental Assessment (DEA), a preliminary document prepared because the project is located on City and County of Honolulu property, was published in the December 8, 2003 issue of the OEQC Environmental Notice for a 30-day public review period. The DEA reflects the efforts made to determine whether the project has any potentially significant environmental impacts. After a review of the DEA by various governmental agencies and other interested organizations, followed by a formal comment period, either the proposing agency or approving agency will determine whether an Environmental Impact Statement (EIS) will be required.

Formal responses were prepared to all comments received during the public review period. Based on the findings and on written comments received on the DEA, the Department of Design and Construction (DDC) has concluded that an EIS is not required and that a Finding of No Significant Impact (FONSI) is appropriate at this time. Short-term impacts such as traffic disruption, dust and noise generation can be expected as a result of construction activity. These impacts can be mitigated by strict adherence to applicable guidelines set by the State of Hawaii Department of Health (DOH). Affected school, residents, Department of Transportation Services (DTS) and Oahu Transportation Services, Inc. (OTS) will be notified in advance of the start of construction. The contractor will also implement traffic control by police and/or trained construction flagmen during construction. Two-way traffic will be maintained at all times during construction, and a minimum of one travel lane will be kept open at all times.

SUMMARY INFORMATION

**CHAPTER 343, HAWAII REVISED STATUTES (HRS)
FINAL ENVIRONMENTAL ASSESSMENT**

Project Name: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Project

Applicant: HASEKO (Ewa), Inc.
820 Mililani Street, Suite 820
Honolulu, Hawaii 96813

Approving Agency: City and County of Honolulu
Department of Design and Construction
650 South King Street
Honolulu, Hawaii 96813

Prepared by: Environet, Inc.
2850 Paa Street, Suite 212
Honolulu, Hawaii 96819

Anticipated Determination: Finding of No Significant Impact (FONSI)

Project Description: The proposed project will replace a deteriorating 24-inch sewer line with a new 36-inch sewer line and increase the size and capacity of the Ewa Beach Wastewater Pump Station from its existing 9 MGD capacity to 18 MGD.

Project Location: Ewa, Oahu, Hawaii. (See Figure 1-1)

Tax Map Key: 9-1-09, 11, 27, 28, 29, 30, and 36

State Land Use Commission Designation: Urban

County (LUO) Zoning Designation: Residential R-5

1.0 INTRODUCTION

1.1 Background

The existing sewer system serving the Ewa Beach community was built in the early 1980's and has experienced substantial deterioration over the years. Sanitary sewer overflows are becoming frequent issues with the old sewer system known as the Ewa Interceptor Sewers. This sewer line is located on Pohakupuna Road and is divided into Ewa Interceptor (East) and Ewa Interceptor (West). Structural deterioration is evident in both sewers, and the City and County of Honolulu has been planning to rehabilitate the aging sewer pipes to prevent further problems.

In February of 2003, a Draft Environmental Assessment was prepared for the City and County's project to eliminate both wet and dry weather sanitary sewer overflows by correcting structural deficiencies in only the deteriorated sections of both the Ewa Interceptor (East) and Ewa Interceptor (West). Project planners realized this proposal while draining fiscal resources to present a short-term solution would not handle the projected sewer flows generated as early as 2005 by a growing Ewa Beach community.

At this time, Haseko (Ewa), Inc. is in the process of planning an advanced sewer system to serve their Ocean Pointe development, and has proposed to help reconstruct and expand the Ewa Interceptor (West) to provide increased capacity to serve current and future growth in both the Ewa Beach community as well as the Ocean Pointe development. This would offer a cost-effective, long-term design solution and substantially decrease the fiscal stress on City and County's resources.

The Ocean Pointe development (formerly known as Ewa Marina) is an integrated residential, recreational and commercial community located in Ewa, Oahu. The original conceptual sewer master plan for the development, which has been conceptually approved by the City and County of Honolulu, Department of Planning and Permitting (DPP), Ocean Pointe Offsite Sewer Master Plan (Limtiaco, 2002) has undergone revisions to address increased flow from the Ocean Pointe Development to the Ewa Beach Wastewater Pump Station (WWPS) (Revised Conceptual Sewer Master Plan for Ocean Pointe Development-Ewa Beach Sewer System, Honolulu, Ewa, Oahu, Hawaii, August 2003). Areas that can be serviced by an on-site gravity sewer system within the older neighborhoods and the ongoing Ocean Pointe development were identified, to compensate for the conceptual increased flow. The resulting design proposal was Haseko (Ewa), Inc.'s Revised Conceptual Sewer Master Plan for Ocean Pointe Development-Ewa Beach Sewer System. This master plan would provide the basic facilities and upgrade of the existing Ewa Beach sewer system to meet the community's long-term wastewater collection and transport needs.

In this Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Project, Haseko (Ewa), Inc., proposes to upgrade the Ewa Beach WWPS and replacing the Ewa Beach Interceptor (West) increasing the capacity of the existing sewer system serving the Ewa Beach community and the Ocean Pointe Development. The proposed action should eliminate existing wet and dry weather sanitary sewer

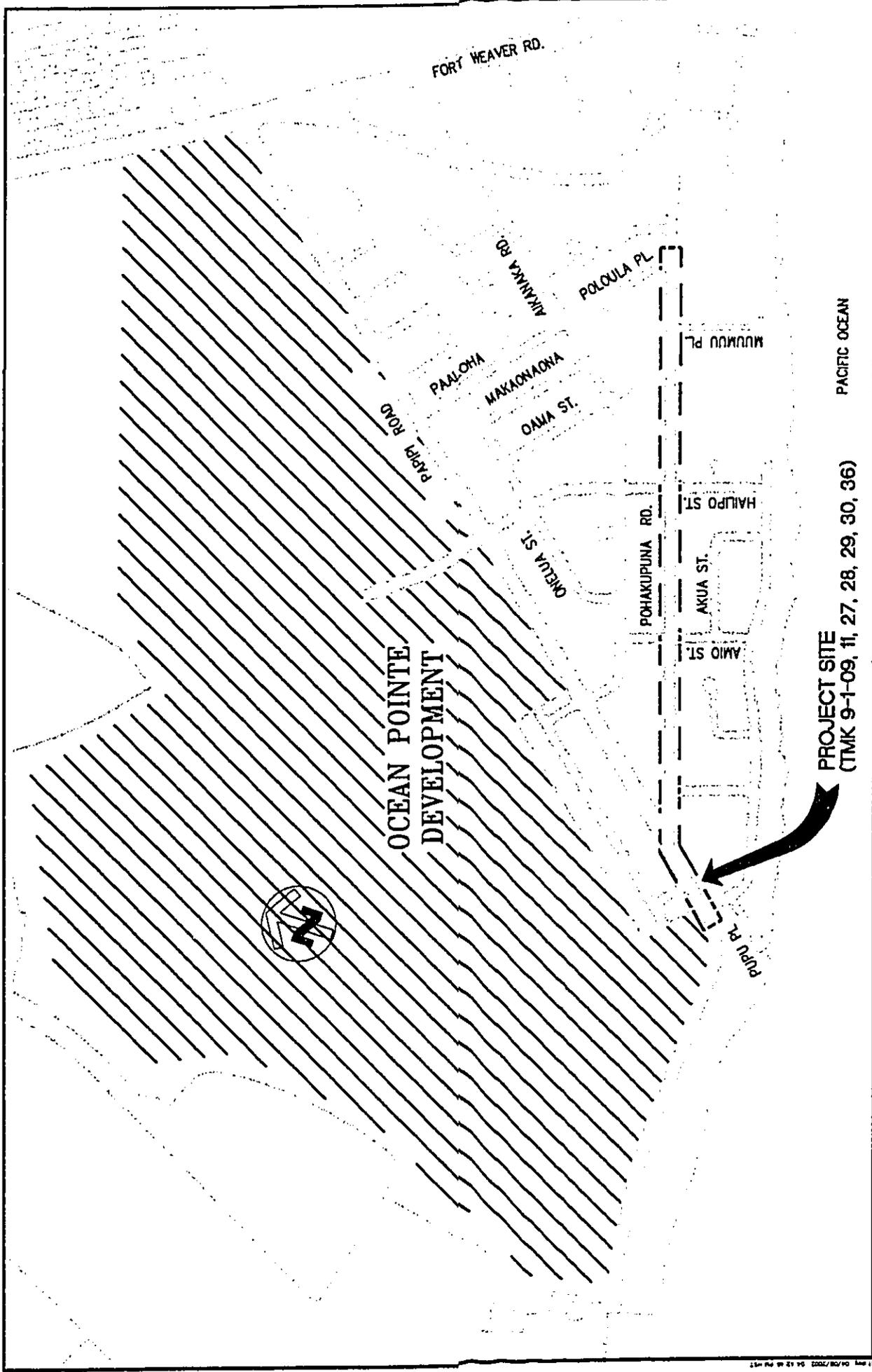
overflows as well as provide maximum sewer service for flow projections through year 2020, as described in the Final West Mamala Bay Facilities Plan, December 2001.

The reconstruction will consist of improvements to the existing Ewa Beach Wastewater Pump Station facility, replacement of 3,400 linear feet of sewer line 36-inches in diameter along the Ewa Beach Interceptor (West) and replacement of twelve sewer manholes. The existing Ewa Beach Interceptor (West) sewer line will be abandoned in place. At the request of the City and County of Honolulu, Department of Design and Construction (DDC), the abandoned sewer line will be cut and filled with lean concrete/flowable fill. The new sewer line will be installed using microtunneling methods and will run from the intersection of Papipi Road and Pupu Street northeast along Papipi Road, then to the intersection of Papipi Road and Pohakupuna Road, and end near the intersection of Pohakupuna Road and Ihipehu Street, enter the City and County of Honolulu Ewa Beach Wastewater Pump Station (Figure 1-1). Connection of the new sewer line into the existing sewer system is discussed in detail in Section 2.2.2. This will involve the extension of the existing 8-inch header through the existing drop manholes to new drop manholes on the 36-inch sewer. Relocation of 280-feet of existing waterline along Papipi Road will also be required as part of the proposed project and is discussed in detail in Section 3.11. The waterline relocation will be funded by Haseko as part of the project, and will take place before microtunneling commences. Costs for extending and connecting the 8-inch header and waterline relocation are included in the cost estimate.

The construction for the proposed Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Project will be coordinated and timed to occur simultaneously with the City and County of Honolulu's Vision Project known as the "Sidewalk Improvement Project at Ewa Beach (SIPEB)." The SIPEB is a separate endeavor, which happens to overlap with the project area of the Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Project. In particular, traffic, noise, and dust impacts would be minimized by coordinating the staging, mobilization and actual construction work simultaneously. Refer to Section 3.11 pertaining to details of the sidewalk improvement project.

1.2 Project Location

The subject site is located in the Ewa district on the southwest shore of the island of Oahu, Hawaii. It generally runs parallel to the coast along Pohakupuna Road with the Pacific Ocean to the south. North of the project site are residential subdivisions, including Ocean Pointe. East of the project site are the existing subdivisions and the Pacific Tsunami Warning Center. Oneula Beach Park and the proposed marina at Ocean Pointe are west of the project site. A vicinity and a location map are provided in Figures 1-1 and 1-2 for reference. While the project does at a few locations extend into the Special Management Area (SMA), the City and County of Honolulu, Department of Planning and Permitting has issued a letter confirming that the project is not defined as a development as is thus exempt from the need for a Special Management Permit.



PROJECT SITE
 (TMK 9-1-09, 11, 27, 28, 29, 30, 36)

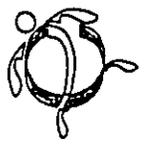
PACIFIC OCEAN

Project No: P03-013
 Drawn By: J.EY
 Date: URS, September 2003

Reconstruct Pohakupuna Road Sewer Line
 and Upgrade Ewa Beach Wastewater Pump Station

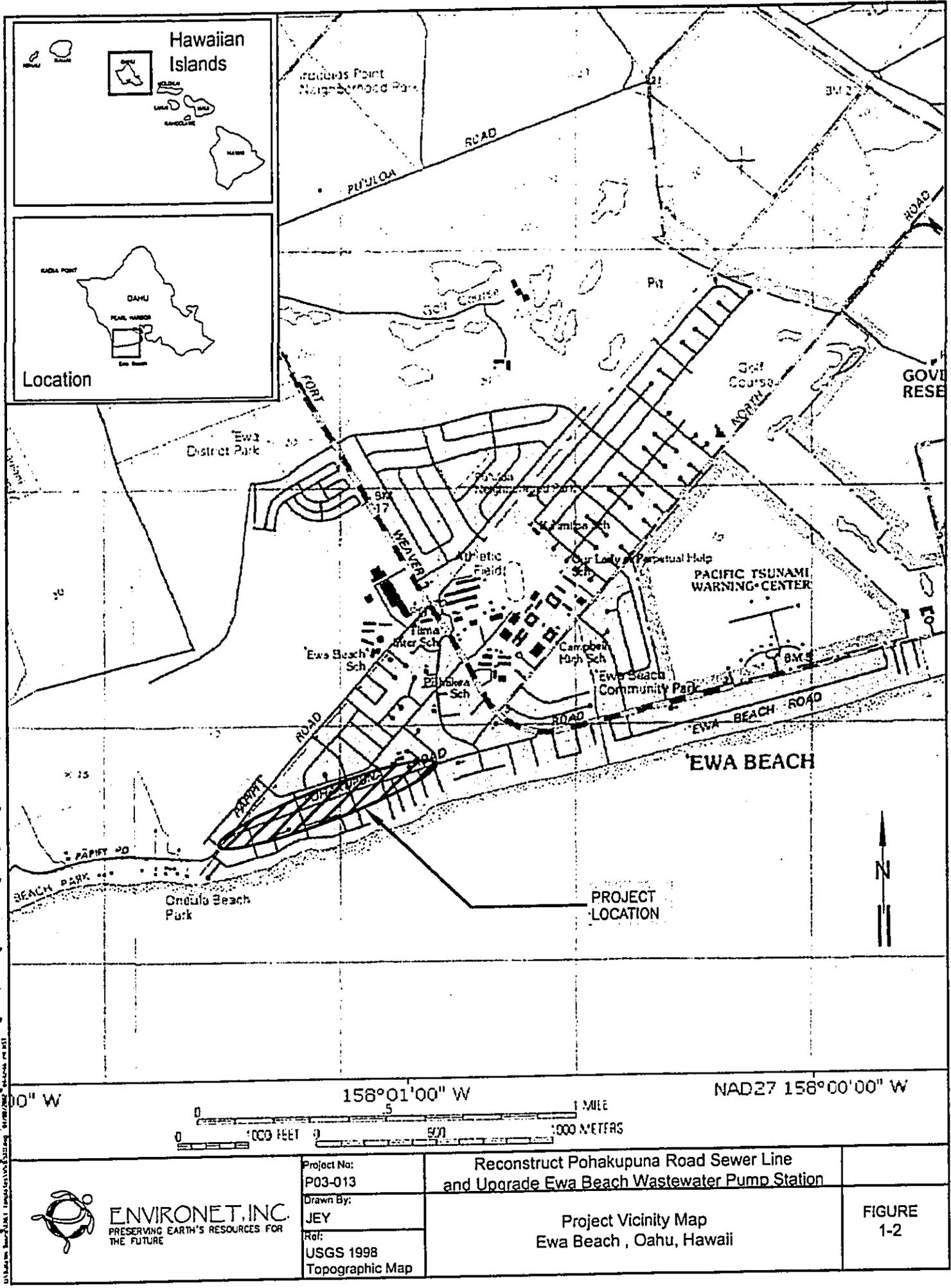
Project Location Map
 Ewa Beach, Oahu, Hawaii

FIGURE
 1-1



ENVIRONET, INC.
 PRESERVING EARTH'S RESOURCES FOR
 THE FUTURE

RECEIVED AS FOLLOWS



ENVIRONET, INC.
PRESERVING EARTH'S RESOURCES FOR THE FUTURE

Project No:
P03-013
Drawn By:
JEY
Ref:
USGS 1998
Topographic Map

Reconstruct Pohakupuna Road Sewer Line
and Upgrade Ewa Beach Wastewater Pump Station

Project Vicinity Map
Ewa Beach, Oahu, Hawaii

FIGURE
1-2

2.0 PROJECT DESCRIPTION

2.1 Purpose and Need

The purpose of the project is to upgrade the deteriorating existing sewer system, making it structurally sound, and create increased capacity to meet the community's long-term wastewater collection and transport needs. The upgrades are based on utilizing maximum available capacity of the downstream Ewa Beach WWPS force main. Upgrades proposed for the current Ewa Beach WWPS will increase capacity of the pump station from 9.22 MGD to 18 MGD. A proposed larger relief line of 36-inches will be installed parallel to the existing 24-inch Ewa Interceptor Sewer (West) as a replacement. The old sewer line will be abandoned and the new enhancement line will increase current allocations of 2.25 MGD to accommodate a maximum peak flow of 9.79 MGD from the Ocean Pointe development. The City and County's projected future flow model for the area is 3.67 MGD by year 2005, and with the 9.79 MGD increase, this proposal accommodates projected future flows by year 2005.

Built in the 1980s the existing sewer system serving the Ewa Beach community has experienced substantial deterioration over the years. In addition to structural corrosion, hydraulic capacity of sections of the sewer main are inadequate for projected future flows based on anticipated development described in the City's Development Plan Maps. The need to correct existing sewer deficiencies and increase capacity is required to prevent possible damages to the surrounding environment, potential costly repairs, and the possible imposition of fines and penalties in the event of a spill or overflow. Haseko (Ewa), Inc. is currently in the process of planning an advanced sewer system to serve its new Ocean Pointe development, and has proposed to reconstruct and expand the service area of the existing sewer system.

Environmental review in accordance with HRS Chapter 343 is required for the proposed project because of the use of City and County of Honolulu land and road rights-of-way. This trigger involves the DDC, which is responsible for the review and acceptance of the offsite sewer rehabilitation project design. Consistent with guidance provided in Section 11-200-4(b) of the Hawaii Administrative Rules (HAR), DDC was identified as the appropriate accepting agency.

2.2 Technical Considerations

2.2.1 Ewa Beach Wastewater Pump Station (WWPS) Improvements

Haseko (Ewa), Inc. is proposing to upgrade the capacity of the existing Ewa Beach Wastewater Pump Station (WWPS) from 9.22 MGD to 18 MGD. Essentially this will allow for an increase from current allocations of 2.25 MGD to a maximum of 9.79 MGD in sewer flow from Ocean Pointe.

The Ewa Beach Wastewater Pump Station pumps the wastewater through a 30-inch force main to an 84-inch gravity sewer interceptor that flows to the Honouliuli Wastewater Treatment Plant. The following are proposed upgrades for the WWPS:

- 1 Replace existing pump sets with larger-capacity pumps, motors, and drives
- 2 Replace piping, fittings, and flow meter.
- 3 Expand 1st floor to accommodate new electrical cabinets.
- 4 Demolish and rebuild new generator room to accommodate larger generator.
- 5 New flow tube box .
- 6 New CMU wall fronting Pohakupuna Road approximately about 3 ft closer to the street.
- 7 New CMU wall along back and side property lines to replace chainlink fence.
- 8 New ventilation fan and ducts.
- 9 Revise bathroom for improved accessibility.

As mentioned above, an enhanced generator will be necessary to complement the increased capacity of the new sewer system. The upgrades will bring electricity usage from an existing load of 270 kVA with one pump to that of 545 kVA with the additional 2 pumps in operation.

The proposed upgrades to the existing structure will extend the facility by approximately 5 feet toward the rear of the property to accommodate the additional motor control panels, and approximately 7 feet at the front to accommodate a larger standby generator and accompanying acoustical dampening devices. With the proposed expansion, the improvements do not extend beyond the existing property limits. The proposed upgrades include dampening devices, which are a significant improvement over the existing noise reduction equipment currently provided at the station. In addition to noise reduction, no foreseeable odor increases should arise, as no improvements are proposed to the existing wet well with the exception of additional level controls.

2.2.2 Replacement of Sewer Manholes

The City and County of Honolulu standards require a sewer manhole every 350 feet for 36-inch pipelines. A total of twelve (12) manholes on the new sewer line will need to be replaced from the west end of Papipi Road to the tie-in fronting the pump station to accommodate the City's manhole location and spacing requirements (Figure 1-1). All manholes will be City and County standard sewer manholes with Type SB frames and covers.

Connection of the proposed sewer line to the existing sewer system involves the extension of existing laterals currently feeding into an 8-inch header running near the makai edge of pavement along Pohakupuna Road. The 8-inch header currently connects to the 24-inch sewer via three (3) drop manholes. The 8-inch header will be extended through the existing drop manholes to new drop manholes on the 36-inch sewer. The existing drop manholes on the 24-inch sewer will be filled and abandoned (sewer lines cut and plugged). Costs for extending and connecting the 8-inch header are included in the cost estimate.

2.2.3 Microtunneling

Microtunneling will result in minimal need for repaving in the proposed project. However in the event repaving is necessary, the contractor will be required to comply with HRS 103D-407 regarding use of recycled glass in paving materials, and all feasibly applicable state and county laws and regulations. As part of the installation of the new sewer alignment, an existing 280-foot section of waterline must be relocated prior to construction. The waterline is located along the makai end of Papipi Road and is to be moved from the mauka side to the makai side of the public Right-of-Way (ROW), in order to provide room for the new sewer alignment. Plans for the waterline relocation are available in Appendix A. The waterline relocation will be funded by Haseko (Ewa), Inc. as part of the project, and will take place before microtunneling commences.

The existing Ewa Beach Interceptor (West) sewer line will be abandoned and replaced by 3,400 linear feet of sewer line 36-inches in diameter along the Ewa Beach Interceptor (West) in place. At the request of the City and County of Honolulu, DPP, the existing sewer line will be cut and filled with lean concrete/flowable fill to be abandoned in place. The new sewer line will be installed using microtunneling methods with general geotechnical considerations briefly discussed in this section, including subsurface investigation, recommended equipment, and proper disposal of drilling related waste. Information for this section is drawn from a geotechnical report entitled Draft Report Geotechnical Investigation for Gravity Sewer Installation by Microtunneling Methods, Ocean Pointe Offsite 36-Inch Sewer, Ewa Beach, Oahu, Hawaii, September 2003. Detailed information regarding microtunneling methods is available in the report.

Anticipated Ground Conditions

A thorough subsurface investigation is necessary in the design phase to identify the geologic and ground water conditions along the new sewer alignment. Accurate knowledge and anticipation for existing conditions at the site is crucial to identifying the appropriate microtunneling equipment to facilitate the Microtunneling Boring Machine (MTBM) for the project that will minimize loss of ground and surface settlement. Important physical properties need to be evaluated to minimize loss of surface settlement, ground, slurry losses, and any potential damage to existing utilities, buildings, and streets. The six categories in Table 2-1 below describe general ground behavior in soft soil conditions:

Firm Ground	A heading may be advanced several feet or more without immediate support. Hard clays and cemented sand or gravel generally falls into this category.
Squeezing Ground	Squeezing ground conditions are analogous to plastic flow, and the soil is observed to advance slowly into the tunnel excavation without any signs of fracturing. Squeezing occurs without an increase in the water content or a volume change in the soil and is governed by the soil strength in comparison to the overburden pressure. Squeezing ground may include soft to medium stiff or stiff clays depending on the overburden pressure at the tunnel depth.
Swelling Ground	A condition where the ground absorbs water, increases in volume, and expands slowly into the tunnel. This may occur in highly over-consolidated clays that exhibit high volume change characteristics upon wetting.

Raveling Ground	After excavation, material above the tunnel or in the upper part of the working face tends to flake off and fall into the heading. In fast raveling ground, the process starts within a few minutes; otherwise, the ground is slow raveling. Slightly cohesive sands, silts, and fine sands gaining their strength from apparent cohesion typically exhibit this type of behavior. Very stiff fissured clays may be raveling material also.
Running Ground	Cohesionless, dry soils run from any unsupported vertical face until a stable slope forms at the natural angle of repose (i.e. approximately 30 to 35 degrees). Running ground consists of dry cohesionless materials, such as clean loose sand or gravel.
Flowing Ground	If seepage develops at the working face, raveling or running ground is transformed to flowing ground, which advances like a viscous fluid in to the heading. Silt, sand or gravel below the water table without a high enough clay content to develop significant cohesion will be flowing type soils.

Reference: Terzaghi, 1950

The new sewer alignment area consists of saturated, very loose to medium dense sands and gravels, which will exhibit flowing ground conditions. Prior to excavation, this must be controlled with special microtunneling equipment or stabilized. Soft clays are also identified along the new sewer alignment and may cause potential squeezing ground conditions. Improving strength or stability of ground or special microtunneling equipment must be utilized to minimize loss of ground, as flowing and squeezing ground conditions can lead to significant loss of tunnel heading, resulting in surface settlement that could damage existing utilities and structures.

The interface between the interbedded coral limestone layers and the underlying granular materials create a mixed face condition. This situation requires experienced and skillful MTBM operator(s) and careful steering procedures to keep specified line and grade tolerances from deflecting the microtunneling machine off line and grade. Generally, these conditions also frequently cause excessive removal of the flowing sands while the MTBM excavates hard obstructions, which causes chimney effects and sinkhole occurrence at the ground surface. Anticipated ground conditions at the four tunneling zone are summarized in Table 2-2 below.

Drive Number	Anticipated Ground Conditions
1	Squeezing and Flowing to Raveling
2	Flowing to Raveling
3	Raveling to Flowing
4	Raveling to Flowing

(URS, 2003)

Microtunneling Equipment Considerations

A closed-faced MTBM with the capability to provide a positive stabilizing pressure at the tunnel face is recommended for this project, specifically, a slurry MTBM is highly recommended. With the anticipated site and subsurface conditions presented earlier in

this Section, an MTBM with a pressurized face capability can control both flowing and squeezing ground conditions. This would eliminate the need for dewatering along the pipeline alignment. With the required drive lengths for this project, a slurry MTBM can provide positive counterbalancing of the hydrostatic pressures. This involves maintaining face stability by applying a positive pressure at the tunnel face with a recirculating slurry system, balancing the soil and groundwater pressures and preventing loss of ground. With proper operation, this type of microtunneling equipment can minimize loss of ground at the heading and reduce surface settlement without the need for dewatering.

The slurry MTBM necessary for this project must have an articulate, steerable, closed-face design, and the capability to handle anticipated mixed face conditions and geotechnical conditions. The following are additional equipment requirements necessary for the construction of this project:

- Remotely controlled microtunneling system
- Laser guidance system
- Lubrication injection system
- Automated slurry transportation system (capable of coordinating volume of material excavated with rate of pipe installation to avoid over-excavation and loss of ground)
- Seals capable of withstanding at least 25 feet of hydrostatic head
- Back-flush capabilities to avoid clogging of the slurry system
- MTBM and cutterhead capable of excavating coral deposits with UC strengths up to 8,000 psi.

To avoid face instability and potential loss of ground, careful monitoring of machine penetration rate, face pressures, and line-and-grade of the drives during construction will prevent deviations exceeding specified tolerances. During drilling, the MTBM will tend to deflect in different directions when encountering various types of materials. When encountering harder materials from the springline to the crown (or on one side of the machine or the other) with very loose or very soft materials at the invert, the MTBM will tend to deflect downward or sideways. Vice versa, the machine will tend to deflect upward when harder materials are encountered at the first invert. Appropriate grouting may be required to provide uniform transition from harder materials to the very loose or very soft soils.

The presence of saturated loose to medium dense sands and gravels less than 4 pipe diameters above the crown of the sewer (particularly in the vicinity of the Borings B-1 and B-10, Figure 2-1) may cause formation of sinkholes, excessive ground settlement, ground heave, or fracturing of the ground during microtunneling. It is important to closely monitor and control the pressure applied to the tunnel face and other

microtunneling controls to avoid these possibilities, which may result in damage to public streets and private properties.

Safety and Stability of Open Excavations

Five bore pits will be excavated for the project, each measuring approximately 20'x40'. Shoring will be implemented to support the walls of the pits and prevent possible cave-in, as well as minimize the amount of water seepage into the pit. The use of vibratory hammers to install or remove sheet pilings used to fortify open cut excavations is prohibited.

Muck and Slurry Disposal

With the length of the pipeline, it is recommended that the microtunneling machine have a recirculating slurry muck transportation system to support continuous disposal during drilling. In addition, materials with low specific gravity present in the alignment may not settle out rapidly in a cascading tank type of slurry separation system. Therefore, a slurry separation plant may be required. The selection of appropriate slurry separation systems will be subject to noise level restrictions and noise generating separation equipment should be assumed to be useable only during the hours allowed by the applicable permits.

Waste products resulting from microtunneling and shaft excavations, such as slurry and muck, will be removed from the site and properly disposed of at an acceptable facility. The Contractor has two options for handling muck and slurry deposits from microtunneling. First option is the selection, design, and implementation of a solids control facility on site, with the understanding that if contaminated soils or groundwater are encountered, the City will be notified immediately and materials will be handled, tested, and disposed of in accordance with Federal, State, and local regulations.

The second option is the transportation of muck and slurry from microtunneling operations to approved staging areas where the deposits will be dewatered or pumped into trucks in accordance with current Federal, State, and local regulations for disposal.

Discharge of Treated Dewatering Effluent

Dewatering requirements are not going to be as extensive as a traditional open trench excavation, however for microtunneling, some dewatering will be necessary in the construction of the jacking and receiving pits to provide dry work areas in the excavated pits. The Contractor is responsible for following the Department of Health approved National Pollutant Discharge Elimination System (NPDES) permit and utilizing an appropriate filtering system. Settling box(es) will be implemented to filter groundwater taken out of excavated areas prior to its discharge into nearby drainage structures.

2.3 Socio-Economic Considerations

Implementation of the proposed project will create an immediate economic impact by providing temporary work for the duration of the project. Other short-term impacts will be generated by construction activities, including temporary disruption of the surrounding neighborhood streets and land uses. Even with the use of Best Management Practices

(BMP), some existing residential, commercial, and recreational uses in and near the project area may be affected by traffic inconveniences, as well as air and noise pollution.

Long-term impacts include circumventing eminent sewer disasters that could occur with the existing deteriorating sewer system and preventing sanitary overflows and other costly sewer capacity problems. The upgraded sewer system will also provide increased capacity to serve current and future growth in the Ewa Beach community.

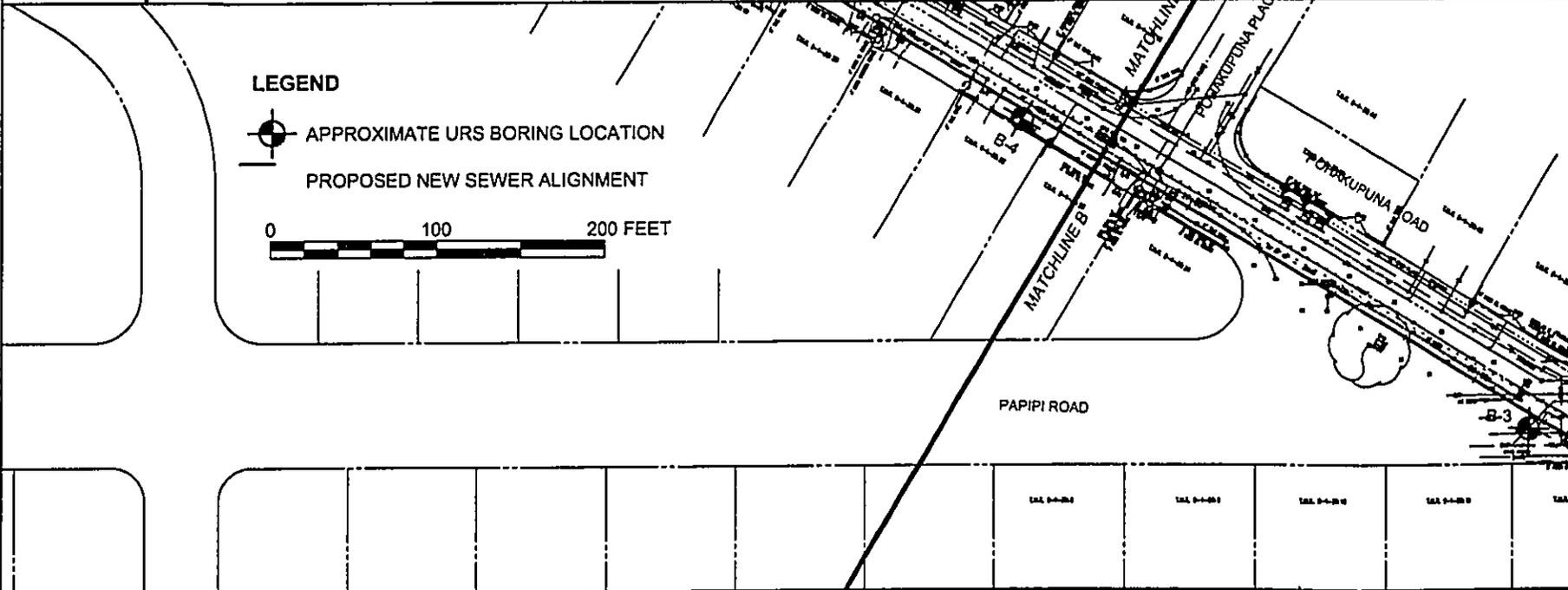
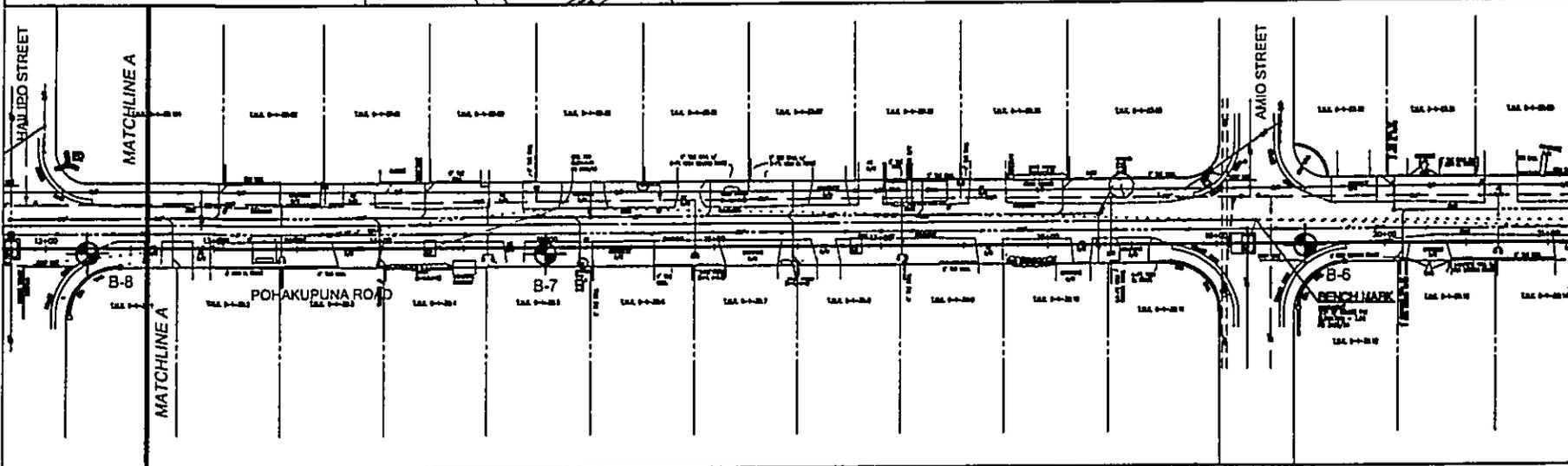
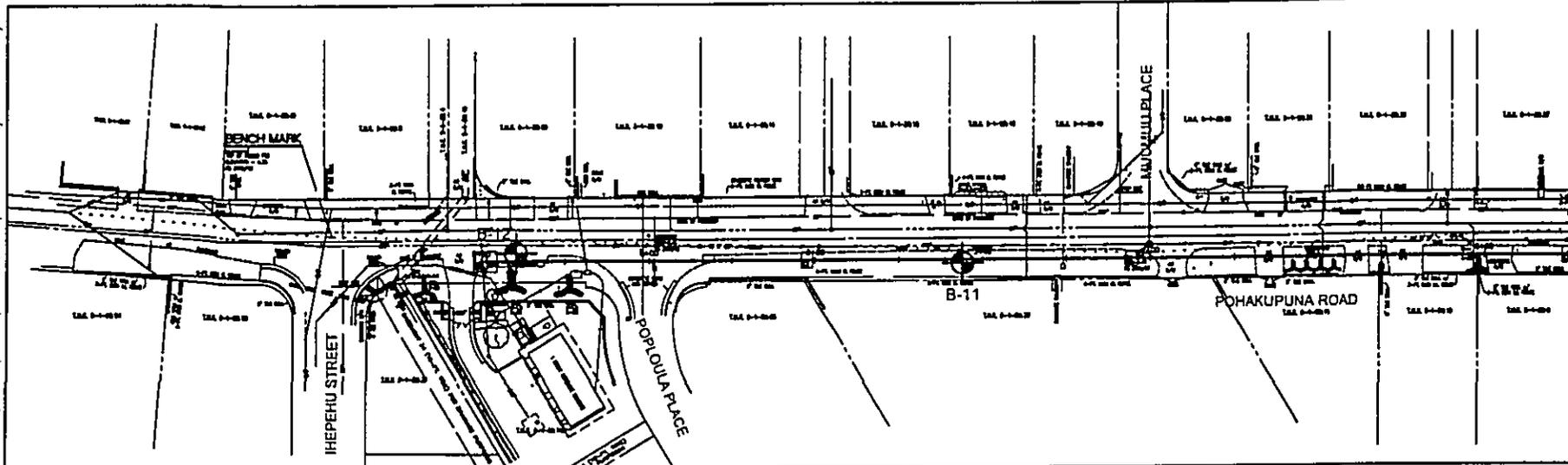
2.4 Environmental Considerations

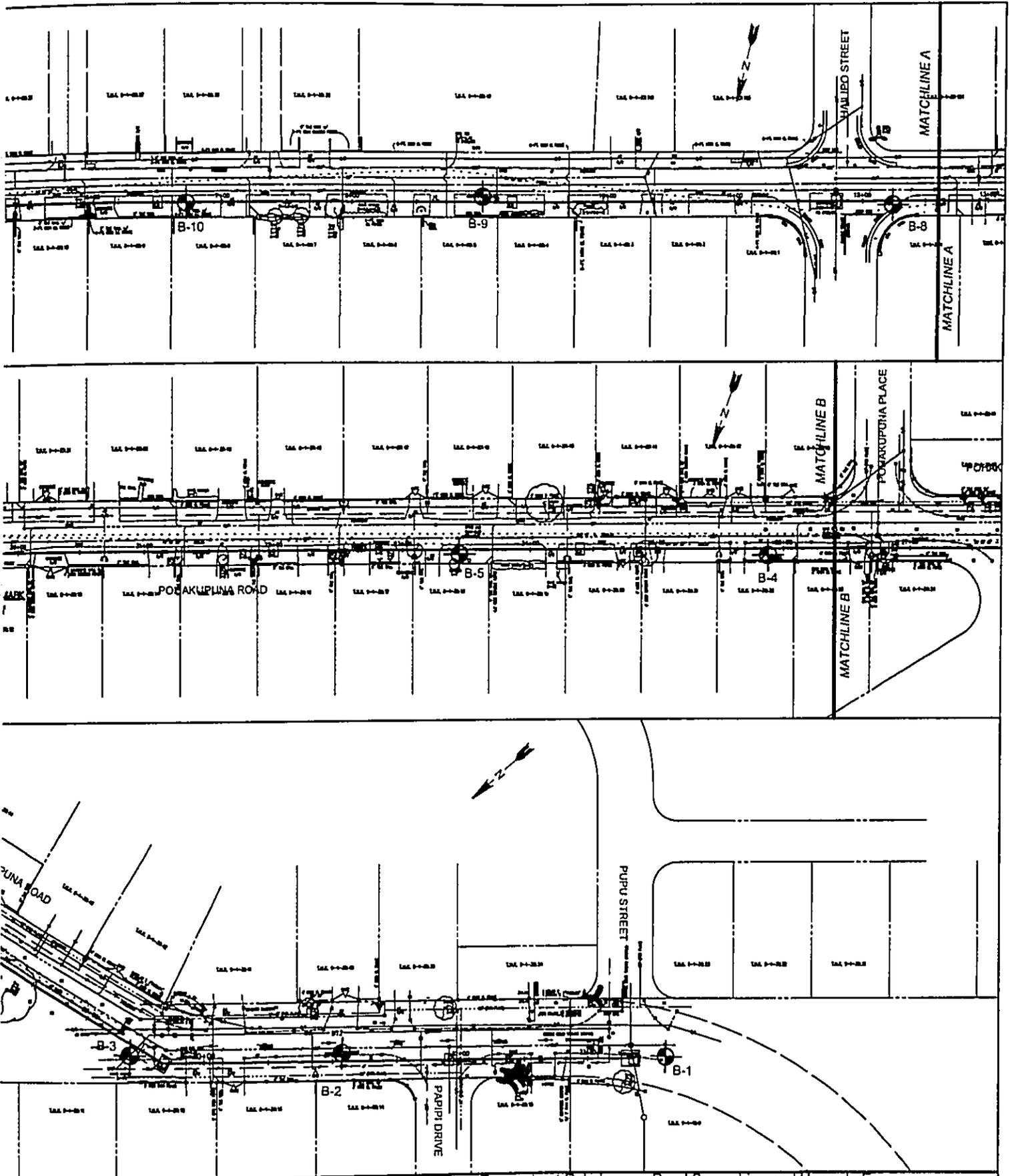
Construction activities may cause short-term impacts including air and noise pollution, and possible traffic congestion due to temporary road closures. Best Management Practices (BMP) guidelines and mitigation measures will be utilized to minimize adverse environmental impacts to comply with applicable regulations and will be discussed in detail in subsequent sections.

No adverse long-term impacts are foreseeable as the proposed project is the replacement and expansion of an existing sewer system within a highly urbanized location. Positive long-term impacts include enhanced sewer system capabilities to support planned future growth in the Ewa Beach community.

2.5 Project Schedule and Cost

Construction is expected to commence in March 2004 and be completed by approximately November 2004. Total project costs are estimated to be \$15.4 million, including replacement of the Ewa Interceptor (West), with \$10.3 million for microtunneling and \$5.1 million for upgrades to the existing Ewa Beach Wastewater Pump Station (WWPS).





Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station



Project No.
P03-013
Drawn By:
JEY
Ref:
URS
September, 2003

Site Location and Approximate Boring Locations

FIGURE
2-1

3.0 AFFECTED ENVIRONMENT

3.1 Topography

The project area is relatively level to gently sloping with existing ground surface elevations varying from about 5 to 8 feet above MSL. The new sewer line generally runs along Papipi and Pohakupuna Roads, which are surrounded by one and two story residential family houses. Overhead utilities along Papipi and Pohakupuna Roads include telephone, streetlight, and electrical lines.

3.2 Geology and Soils

The island of Oahu consists of two eroded volcanic ranges - the Waianae and the Koolau. These ranges have long, narrow ridges shaped by wind and water erosion. Lava flowing from these ranges are thin, basaltic and typically slope between six and fifteen degrees away from their summits. A gentle sloping plain called the Schofield plateau connects the two ranges. This plain consists of lava flows, clay ash deposits, residual tuffs and alluvial to colluvial sediments. Roughly 50,000 years ago, a series of volcanic eruptions took place, consisting of about 30 separate events. These volatile eruptions were named the Honolulu Volcanic Series, spewing cinders, ash, and lapilli.

The project area is located near the southern ocean edge of the Ewa Plain, on the southern fringe of the Island of Oahu. A map of the regional geology of the project area is shown in Figure 3-1. The microtunneling alignment is located in an area which appears to be underlain primarily by sediments and sedimentary rock formation deposited in a marine, reef, and back-reef environment. This marine-coral reef-lagoonal environment is highly complex, consisting of coral reef limestone masses and layers intertwined with coralline detritus layers, and mixed with lagoonal silts and clays. Vertical and lateral variations of this deposit mixture is highly variable and in all directions. In addition, the degree of cementation within these deposits will also change with time, spurred by changes in the environment.

Analyses of the subsurface conditions are based on a geotechnical report entitled Draft Report Geotechnical Investigation for Gravity Sewer Installation by Microtunneling Methods, Ocean Pointe Offsite 36-Inch Sewer, Ewa Beach, Oahu, Hawaii, September 2003.

Geotechnical information indicates that the project area is underlain by a complex sequence of marine-coral reef-lagoonal deposits. A mixture of carbonate-clastic formations, migrating shorelines, and the formation of erosional basins or channels has been caused by fluctuations in sea level that took place when the Honolulu Volcanic Series was deposited.

Geologic deposits along the new sewer alignment consist mainly of calcareous coral reef deposits, a type of "coralline deposit that includes cemented coralline rock ledges and wave-worked coral detritus, and silty sandy coralline gravel and cobble with boulder-sized chunks, local coral reef ledges, and lagoonal clays and silts" (URS, 2003). Back-

reef basins and shallow channels appear to have clay and silt deposits, most likely from lower sea level episodes in the past.

3.3 Flora and Fauna

The project site is located in a highly developed residential area. No known threatened or endangered species of flora or fauna exist within the project site. Residential landscaping typically consists of grass lawns, native plants and trees. Domestic animals such as dogs and cats can be found in the neighborhood.

3.4 Flood Hazard

The project site lies within Zone A, area inundated with 100-year flood. Zone A designation is considered to be within the City and County's flood fringe district. Figure 3-2 shows the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map for reference.

3.5 Seismicity

Level of seismic activities can generally be measured by two scales, the Richter Magnitude Scale (RMS) and the Modified Mercalli Intensities Scale (MMIS). Seismologists use the RMS to convey the level of seismic energy released by earthquakes. However, an earthquake with its unique magnitude can have various effects depending on distance, ground/soil conditions, construction standards, and other factors. Therefore, MIS is a different scale utilized to convey the different intensity estimates of an earthquake.

In Honolulu, Oahu, eight earthquakes have been documented with Modified Mercalli Intensities (MMI) greater than V between 1861 and 1981 (Cox, 1986a and 1986b).

After the 1948 Oahu earthquake (Furumoto et al., 1990), the island was assigned a MMI of VI. A MMI of VII corresponds to a horizontal acceleration of approximately 0.13g.

According to the Uniform Building Code (UBC), the island of Oahu is located in earthquake zone 2A with a design horizontal acceleration of 0.15g. This acceleration is intended to correspond to a probability of exceedence of 10 percent or less during a time interval of 50 years.

3.6 Water Resources

The project site is about 800 feet mauka of the southwest coast of Oahu. There are no existing streams or wetlands in the project area.

Groundwater was encountered at 4 to 7 feet below existing ground surface (about Elevation +2.5 feet to Elevation +0.5 feet) through exploratory borings completed along the new sewer alignment. The invert of the new sewer line is understood to be located between approximately Elevation -17 feet and Elevation -20 feet. Fluctuation of ground water level at the site must be factored in, as various factors including tidal influence, rainfalls, and other nearby construction activities may significantly alter the reported ground water level.

3.7 Climate and Air Quality

Climate

Temperature ranges between 70° F to 90° F from winter to summer. Average rainfall is less than 20 inches with low monthly rainfall during the months of May through July, and high rainfall from around December to January. The project area is in a coastal location, and strongly influenced by the ocean, which supplies moisture to the air and regulates temperature, providing minimal variability of temperature and humidity throughout the year. Situated on the leeward side of the island between two major mountain ranges, the project area receives constant warming air removed of moisture passing over the mountains.

Air Quality

Ambient concentrations of air pollution are regulated by both national and State ambient air quality standards (AAQS). Air quality in the project area is good due to low emission levels and the presence of tradewinds or on-shore breezes. The major factor affecting air quality in the area is vehicular traffic.

Pollutants relevant to the project are those related in large measure to motor vehicles, which have historically constituted a major source of air pollution. The Hawaii State Dept. of Health operates a network of nine air quality monitoring stations at various locations on Oahu. The Kapolei station monitors air quality parameters for the Ewa Beach project area. Potential pollutants of concern to the project are particulate matter (PM) and carbon monoxide (CO). Particulate matter includes dust, soot, smoke, and liquid droplets. Particulate matter of less than 10 microns in diameter (PM-10) is monitored at Kapolei. Between 1996-1998, there were no recorded exceedances at the State or national AAQS.

Carbon monoxide (CO) which is a colorless, odorless and tasteless gas produced by the incomplete combustion of fossil fuels, is monitored at the Kapolei station. The majority of CO emissions are generated by motor vehicles. During the same 1996-1998 period, no exceedances of the State or national AAQS were recorded either.

Nitrogen oxide (NOx) emissions emanate predominantly from industrial point sources, although construction equipment and vehicles are diesel-powered, and will emit relatively high levels of NOx in comparison to gasoline-powered equipment.

3.8 Noise

Properties adjacent to the proposed project site are mostly residential uses, zoned for R-5 (Single Residential Uses). Applicable State Department of Health (DOH) noise limits are currently 55 dBA during daytime, and 45 dBA during nighttime along the boundaries of the Ewa Beach Wastewater pump station. The existing pump station is currently operating within the limits of the DOH noise regulation.

3.9 Historic, Cultural and Archaeological Resources

A records review conducted by the State Historic Preservation Division (SHPD) of the project area indicates no known historic sites along Pohakupuna Road. A letter from

SHPD is available for reference in Appendix B. A letter received from the Office of Hawaiian Affairs (OHA) dated December 18, 2003 states that no historic or cultural remains are expected to be found during microtunneling activities (refer to Appendix B).

With respect to cultural practices and resources, records from a Conservation District Use Permit (CDUP) hearing conducted before the Board of Land and Natural Resources in April 2000 indicate that Ewa Beach was at one time a gathering place on "clam days" for residents from as far as central Oahu (Oshima Chun Fong & Chung LLP, Final Supplemental Environmental Assessment, Ocean Pointe Master Plan (Revised), June 2001). Past and present activities focus on the ocean with shoreline fishing, limu picking, and diving. However, such activities are known to have occurred at or in the vicinity of Oneula Beach Park, a City and County facility located nearly one mile west of the project site. In recognition of these shoreline activities, the Board of Land and Natural Resources (BLNR) gave the developer conditional CDUA approval in April 2000, provided reasonable access to the shoreline was assured (ibid).

Testimony from an Ewa Beach resident of 32 years indicates that no cultural activities unique to Ewa Beach have taken place in the immediate vicinity of the project site. A fisherman and diver with over 30 years in the waters off Ewa Beach, stated that (the project) will not change any landscape feature that will be seen from the ocean. "No landmarks or lights will be disrupted," said Tim Tucker, former Ewa Beach Neighborhood Board chair. "Besides, any fisherman out here knows that Campbell High School football field lights serve as the key landmarks for Ewa Beach." It should also be noted that the proposed construction site cannot be seen from the ocean.

3.10 Land Use

The project site is located within the State Land Use Urban District according to the State Land Use Commission as well as the Special Management Area (SMA) (Figure 3-3 and Figure 3-4). Land uses along the new sewer line are predominantly residential. Most of the buildings along Papipi and Pohakupuna Roads are one- and two-story single-family houses. The project site is designated R-5 (residential) by the City and County's Land Use Ordinance (LUO).

The proposed upgrades to the existing Ewa Beach Wastewater Pump Station (WWPS) will extend the facility by approximately 5 feet toward the rear of the property to accommodate the additional motor control panels, and approximately 7 feet at the front to accommodate a larger standby generator and accompanying acoustical dampening devices. With the proposed expansion, the structure still remains outside of the existing property setbacks.

The City and County of Honolulu's Vision Project proposes to improve sidewalk areas along Pohakupuna Road and Makule Road, which overlaps with the proposed project location. The sidewalk improvement is a separate endeavor, but will be coordinated to occur at the same time as the Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Project. The goal is to minimize construction impacts, such as traffic, noise, and dust by staging, mobilizing and coordinating

construction work simultaneously. Please refer to Section 3.11 for additional details pertaining to the sidewalk improvement project.

3.11 Infrastructure Systems and Utilities

Traffic

Pohakupuna, Papipi and Aikanaka Roads are City and County road rights-of-way that predominantly serve the Ewa Beach residential community. These local roads also serve as access to the City and County's Oneula Beach Park. The City Bus provides public transportation services to the area along Pohakupuna Road (No. 421 City Shuttle).

Utilities

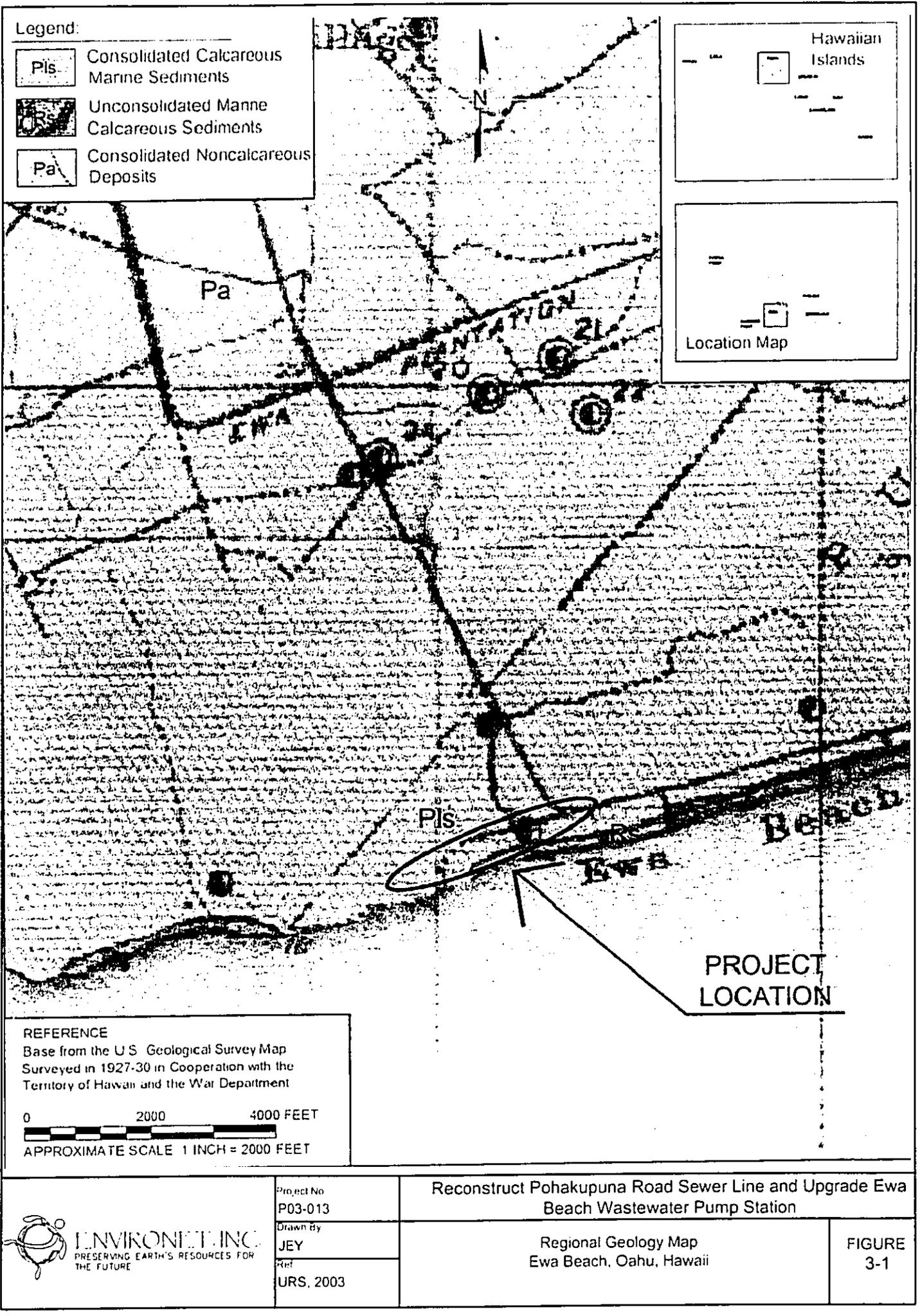
Overhead utilities that run along Papipi and Pohakupuna Roads include telephone, streetlight, fiber optic cable, and electrical lines. The Board of Water Supply and The Gas Company also service the Ewa Beach community, and these utilities are underground within the rights-of-way.

The proposed project calls for the relocation of an existing 280' of waterline along Papipi Road (at the makai end) to be moved from the mauka side to the makai side of the public Right-of-Way, in order to provide room for the new sewer alignment. Plans for the waterline relocation are available in Appendix A. Preliminary and pre-final drawings of the waterline relocation have been submitted to the City & County of Honolulu, Board of Water Supply (BWS) in October and November respectively. Comments from BWS were given in verbal format in a design performance meeting held early December. The waterline relocation will be funded by Haseko as part of the project, and will take place before microtunneling commences.

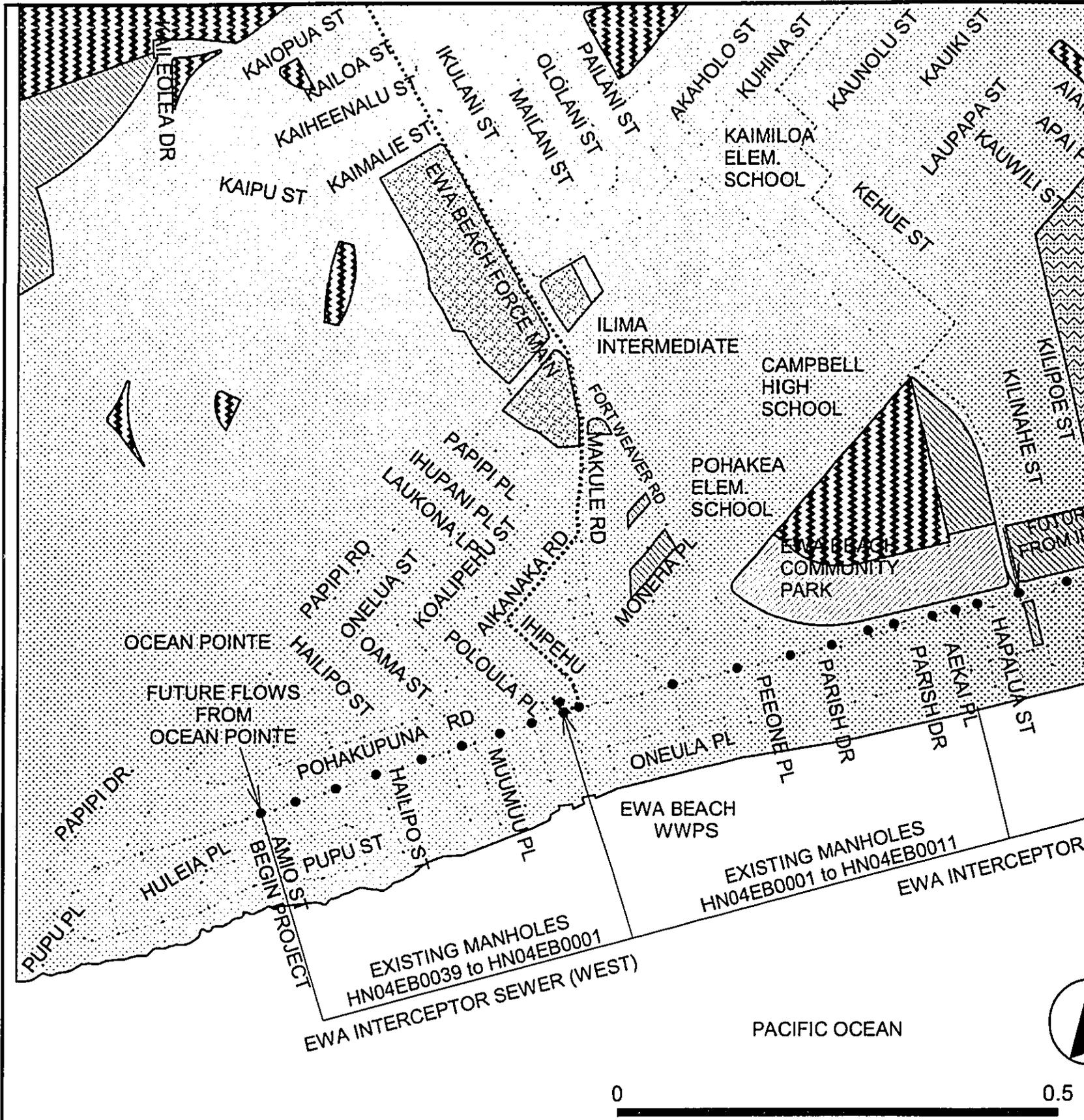
Other Projects

The construction for the proposed project will occur at the same time as the City and County of Honolulu, Sidewalk Improvement Project at Ewa Beach (SIPEB) to minimize traffic, noise, and dust impacts. SIPEB is a completely separate project to construct sidewalk improvements along Pohakupuna Road and Makule Road. Improvements consist primarily of at-grade asphalt generally located along the north shoulder of Pohakupuna Road, from Papipi Road to Makule Road, and the east shoulder from Makule Road to Fort Weaver Road. The project is expected to take 128 calendar days for completion.

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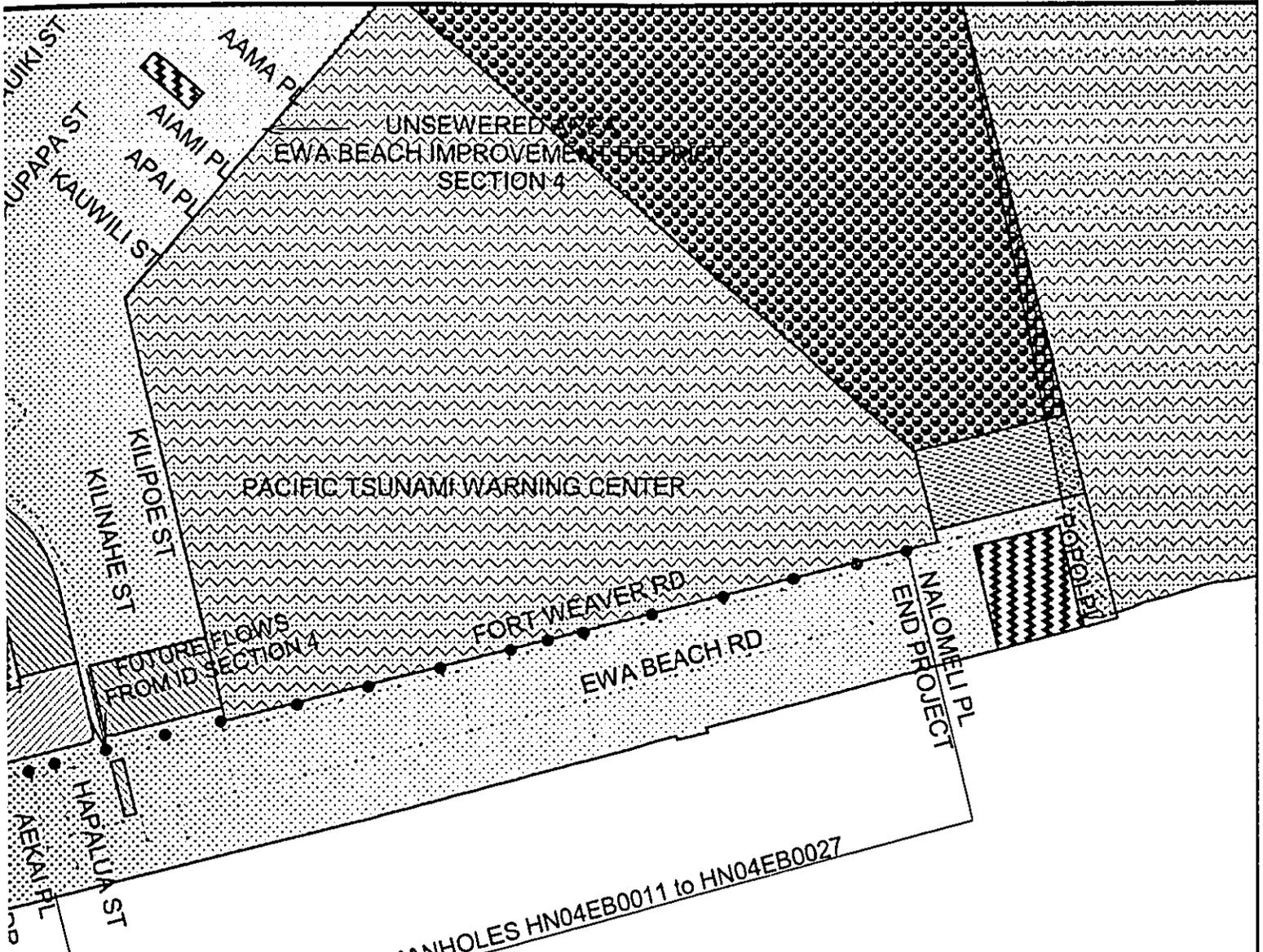


	Project No P03-013	Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Regional Geology Map Ewa Beach, Oahu, Hawaii		FIGURE 3-1
	Drawn by JEY URS, 2003			



PREPARED BY : ENVIRONET INC. 11/18/03

SOURCE: PARK ENGINEERING, 2003



ZONING LEGEND

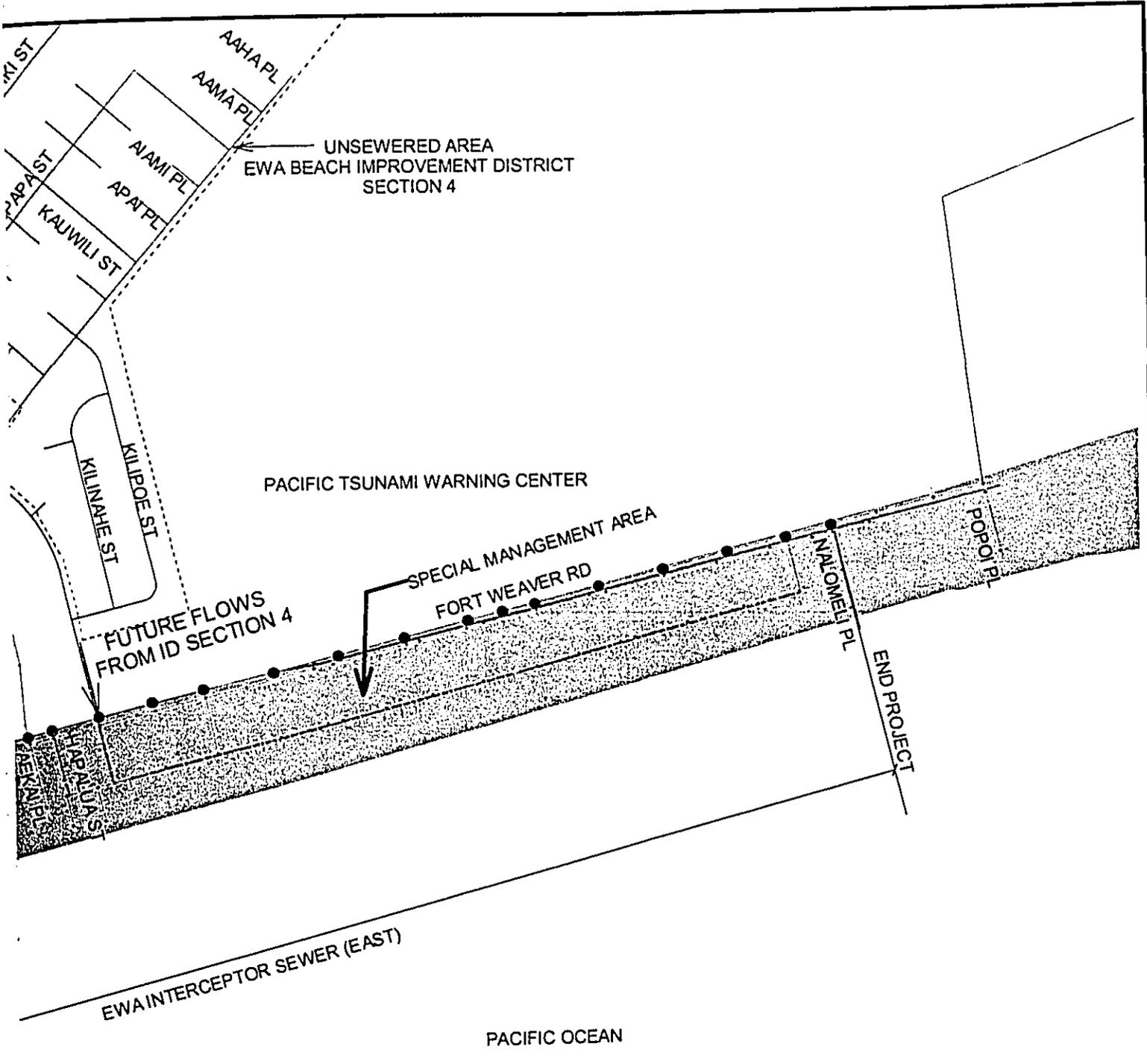
-  A-1 Apartment
-  A-2 Apartment
-  Ag-1 Restricted
-  Ag-2 Restricted
-  B-1 Neighborhood Business
-  B-2 Community Business
-  C Country
-  F-1 Military and Federal
-  P-2 General
-  R-5 Residential

**RECONSTRUCT POHAKUPUNA ROAD
SEWER LINE
AND UPGRADE EWA BEACH
WASTEWATER TREATMENT
PUMP STATION
PROJECT NO. P03-013
ZONING MAP
FIGURE 3-3**



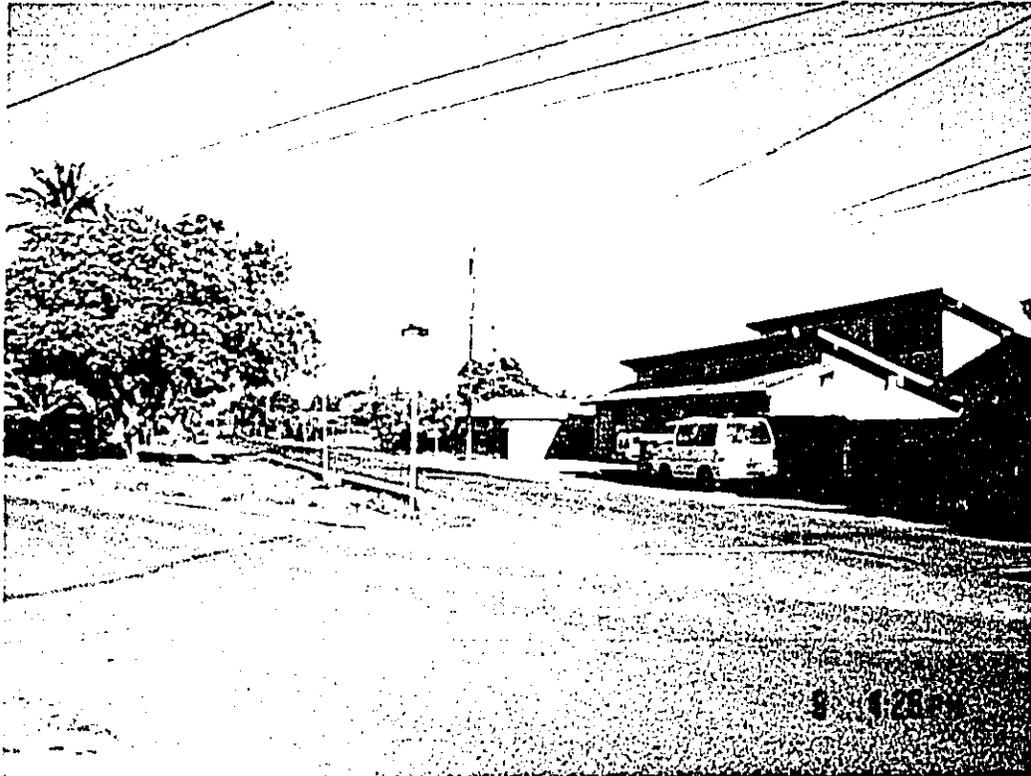
0.5 Miles



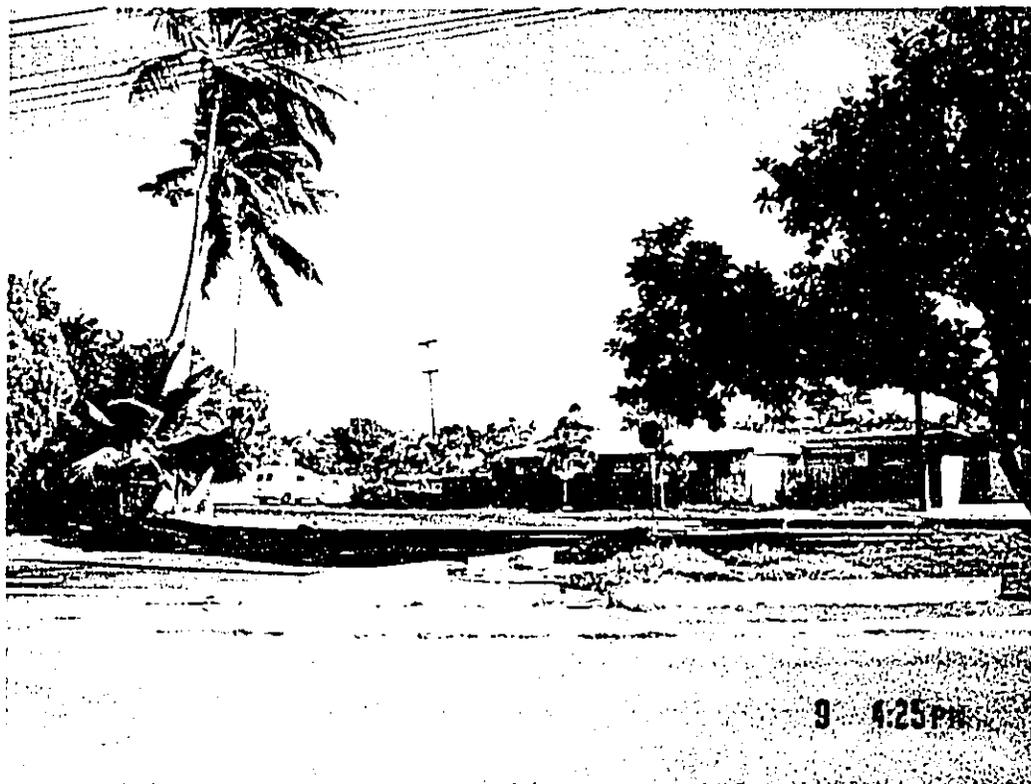


RECONSTRUCT POHAKUPUNA ROAD
SEWER LINE
AND UPGRADE EWA BEACH
WASTEWATER TREATMENT
PUMP STATION
PROJECT NO. P03-013
SPECIAL MANAGEMENT AREA MAP
FIGURE 3-4

Figure 3-5: Papipi Road and Pohakupuna Road Boring Location



Looking East at intersection of Papipi Road and Pohakupuna Road.



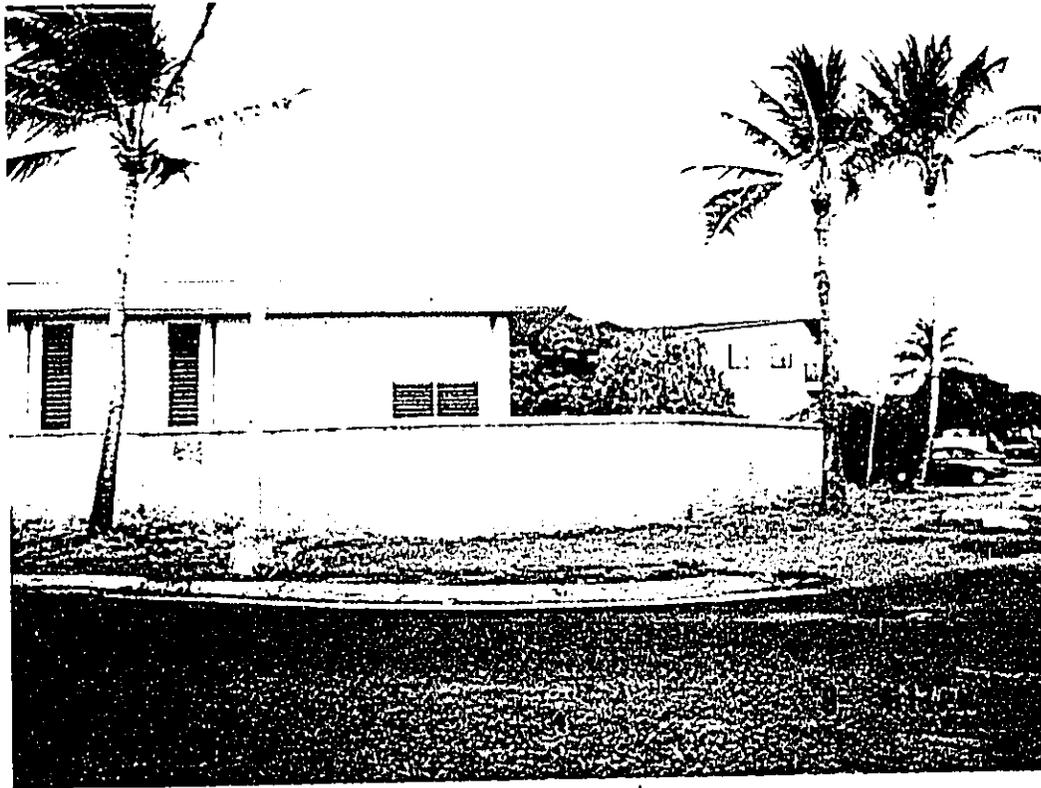
Looking West at intersection of Papipi Road and Pohakupuna Road.

Figure 3-6 Hailipo Road and Pohakupuna Road Boring Location



Intersection of Hailipo Road and Pohakupuna Road.

Figure 3-7: Poloula Road and Pohakupuna Road Boring Location



Ewa Beach pump station.



Looking West on Poloula Road and Pohakupuna Road.

4.0 POTENTIAL IMPACTS AND MITIGATION

Project impacts are expected to be short-term because the primary activity involved in this project is construction and installation of the new sewer line within the City and County's rights-of-way and structural improvements within the existing Ewa Beach WWPS property. This section focuses on the anticipated effects of the work related to construction activities and necessary mitigation measures associated with these impacts. No adverse long-term impacts are anticipated. The project is expected to result in the long-term benefit of providing necessary wastewater collection and transport infrastructure improvements to meet the needs of a growing Ewa Beach community.

4.1 Topography

The new sewer line is planned to be installed within the Papipi and Pohakupuna Road rights-of-way, and will not impact the existing topography of the area in the long term, as the proposed project is located underground. Improvements to the existing Ewa Beach WWPS are not expected to impact the existing topography of the City and County property either.

4.2 Geology and Soils

Geology and soils will not be impacted by the proposed project, as conditions will be restored upon completion of the sewer line installation.

4.3 Flora and Fauna

The project site is located in a highly developed residential area. No known threatened or endangered species of flora or fauna live within the project site. Therefore, construction of the proposed project will not have adverse impacts on wildlife habitats.

4.4 Flood Hazard

The sewer line replacement portion of the project is an underground utility and upon completion, the sewer line will be underground and no appurtenant above ground fixtures along the existing corridor will exceed four feet in height. Changes proposed to the Ewa Beach WWPS, which include replacement of a chain link fence with a CMU wall at the back (north) property line and extending the front of the building three feet forward (south), are not expected to be affected by 100-year floods. The project, upon completion, will not be impacted by 100-year flood events.

4.5 Seismicity

On Oahu, the largest documented earthquake occurred in 1948, with its epicenter located within 25 miles of the southern coast off Oahu. The magnitude was 4.6 to 4.8 on the Richter scale. Using empirical equations (Cox, 1986b), an earthquake with Richter magnitude of 5 can generate a maximum peak bedrock acceleration at the project site of between 0.10g to 0.15g. Peak ground accelerations will also vary depending on factor such as distance from the earthquakes epicenter, depth of bedrock, and the influence of soils above the bedrock. The project is not expected to result in increased vulnerability to

seismic activity. And no adverse impacts are expected as a result of the sewer line construction and installation activities.

4.6 Water Resources

All roadside construction projects that involve excavation have the potential, if unmitigated, for excess sediment discharge from soil erosion during and after excavation and construction. Such discharges may impact natural watercourses, such as coastal waters and water quality. Contaminants associated with heavy equipment and other sources during construction may also affect receiving ocean water.

Construction, however, will not alter existing drainage patterns or have any water requirements. No adverse impacts are expected on existing coastal waters when the contractor adheres to strict Best Management Practices (BMPs) regarding construction activities.

BMPs will be strictly enforced by HASEKO on its contractor. To avoid impacts to water quality, implementable plans such as the following will be specified during the design phase:

- Development of plans that will specify soil erosion and sedimentation BMPs for areas in which construction may result in substantial surfaces of bare slopes or denuded areas.
- Development of plans to remove the disposal of unused materials and excess fill in an authorized receiving area within the Ocean Pointe development staging area.
- Development of a plan, as necessary, incorporating BMPs that minimize sediment, construction materials, waste materials, or toxic substances falling or washing into coastal waters.

In addition, during construction groundwater control will be implemented to prevent flowing ground conditions and excessive loss of ground by microtunneling using pressurized face equipment. With the size of the proposed pipeline and the highly variable, mixed soil/rock conditions, balancing of the hydrostatic pressure using pressurized face tunneling equipment is necessary. Appropriate pressurized face microtunneling equipment can safely maintain face stability, with minimal need for dewatering or ground improvement. Compared to open trench excavation, this method will require significantly less dewatering, minimizing amount of sediment laden water to be filtered prior to discharge into nearby drainage structures.

4.7 Climate and Air Quality

Climate

Climate will not be impacted by the proposed project.

Air Quality

Operation of construction vehicles is expected to temporarily contribute carbon monoxide pollutants in the vicinity of the area. Through the implementation of Best Management Practices, the Contractor will be responsible for adherence to County and State rules and

regulations governing air quality impacts, and proper maintenance of all construction equipment and vehicles to minimize pollutant exhaust emissions.

Release of dust and dirt can be prevented by requiring the contractor to periodically wet down the work area, stabilize the surfaces of any stockpiled materials, and the treatment of unpaved roads with dust suppressants. This will help control escape of fugitive dust beyond the construction site. A Dust Control Management Plan in compliance with Hawaii Administrative Rules 11-60.1-33 will be implemented by the Contractor to control fugitive dust during construction. At minimum, the plan shall include the following:

- a. Addressing different phases of construction to adequately minimize dust-generating materials and activities.
- b. Adequate water source for dust control prior to start of construction on site.
- c. Dust control at key locations to minimize exposure to public, including shoulders, project entrances, and access roads.
- d. Addressing dust control measures to accommodate weekend, after hours, and also prior to daily start-up construction activities.
- e. Control of dust from hauling of debris and materials away from project site for disposal.

4.8 Noise

Construction equipment such as trucks, backhoes, compactors, pumps, generators, and pavers will create intermittent noise during construction. The noise impact is short-term, as the construction is estimated to be approximately 4 weeks in duration. The Contractor is delegated the responsibility to comply with the Administrative Rules of the Department of Health, Chapter 11-46, on "Community Noise Control." Mitigation measures include the use of Best Management Practices detailed in the plans and specifications, which would include housing equipment units, use of noise barriers and/or insulation to control noise levels at all times. A Community Noise permit will control maximum permissible sound levels generated by all construction related activities.

Possible long-term noise resulting from the enhanced sewer system is the upgraded generator, required to handle the increase in capacity to serve future developments in the surrounding area. An acoustical and insulation report by Y. Ebisu and Associates recommend the following mitigation measures to minimize potential noise impacts.

- 1 Exterior wall and roof of generator room to be properly insulated, and with the exception of required openings, all cracks and voids are to be sealed.
- 2 Interior wall of generator room to be treated by fiberglass for additional noise insulation.
- 3 Exterior double door to be located on East wall of generator building.
- 4 Air intake and discharge openings are to be installed with silencers.
- 5 Installation of engine exhaust mufflers.
- 6 Engine generator mounts to minimize vibration.

The existing 8' tile wall in the front and south boundary of the pump station will be extended to the northern boundary to preserve privacy for existing residents, located mauka of the pump station.

The recommended mitigation measures include dampening devices, which are a significant improvement over the existing noise reduction equipment currently provided at the station. These upgrades should be able to maintain and possibly decrease the projected noise levels from the upgraded generator at or below the current DOH noise level standards. Details of the proposed mitigation materials and installation are available in Appendix C.

4.9 Historic, Cultural and Archaeological Resources

The project will have no effect on historic sites. However, the contractor shall immediately stop work in the area and contact the State Historic Preservation Division (SHPD) if cultural deposits or burials are uncovered during construction activities. Work will not resume until SHPD has determined disposition of the remains.

The project would not result in adverse impacts on any cultural practices or resources including public beach access, fishing, or diving. Ewa Beach has evolved into an active residential suburban community.

4.10 Land Use

The proposed project is in compliance with all applicable State land use regulations pertaining to State Land Use Urban district. As noted above in Part 1.2, the project at certain points enters an SMA area. The City Department of Planning and Permitting has noted that the project does not constitute "development" and is thus exempt from the requirement of an SMA permit. (Letter from the Department of Planning and Permitting to Colette M. Sakoda, dated November 19, 2003 is attached hereto as Exhibit A. Upon completion, the sewer line will be underground and no appurtenant above-ground fixtures along the existing corridor will exceed four feet in height.

Construction activities shall be conducted within the hours allowed for construction under State law, which are 7:00 a.m. to 6:00 p.m. Monday through Friday, and Saturdays from 9:00 a.m. to 6:00 p.m. Due to the location of the microtunneling bore pits at five intersections along Pohakupuna Road, access into and out of several properties may be adversely affected. However, private driveways are not expected to be blocked. Travelling in the makai direction, automobiles will not be able to pass through the intersections of Pohakupuna Road/Hailipo Street and Pohakupuna Road/Amio Street during work hours. However, a traffic lane will at all times be kept open to enable residents in automobiles to access their properties.

Roadways and intersections will be restored to their pre-construction conditions upon closure of the bore pits once installation of the new sewer line is completed. Provided microtunneling activities commence in early March 2004, project completion is expected to be around November 2004.

Advance notice to schools and residents within affected areas will be circulated in at least two different ways:

- Informational flyers would be mailed to residents prior to start of actual construction;
- Contractor visit neighborhood residents, door-to-door, before the start of construction; and,
- Design engineers and the Contractor will present updates at regularly scheduled Ewa Neighborhood Board meetings prior to and during construction.

Construction work will not begin until Ewa Beach residents have been given advance notice. Further, traffic impacts on local roads will be alleviated by strict enforcement of a traffic control plan by off-duty police officer and/or trained construction flagmen during construction. Plans include maintaining access for the City Bus as well.

The City and County of Honolulu, Sidewalk Improvement Project at Ewa Beach (SIPEB) will coincide with the Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Project. As the SIPEB project boundaries overlap with the proposed project location, this joint endeavor will eliminate future construction inconveniences to the Ewa Beach Community by constructing both projects at the same time. The goal is to minimize construction impacts, such as traffic, noise, and dust by staging, mobilizing and coordinating construction work simultaneously. Please refer to Section 3.11 for additional details pertaining to the sidewalk improvement project.

4.11 Infrastructure Systems and Utilities

Traffic

The main impact to traffic flow will be along Pohakupuna Road, as vehicles will be diverted around construction areas. The Contractor is responsible for compliance with all City and County of Honolulu traffic control regulations. Mitigation measures include advance notice to schools within affected areas, as well as working with the Honolulu Police Department (HPD), (District 8, Captain George Yamamoto) to coordinate traffic control by police and/or trained construction flagmen. Two-way traffic will be maintained at all times during construction, and a minimum of 1 travel lane will be kept open at all times.

Utility Service Disruption

Due to underground activities during construction, water, gas, electricity, and telephone services may be temporarily disrupted for safety reasons. The Contractor is responsible for protecting all existing utility lines within the project area and to return utility services to the community when construction activities are completed. The proposed project calls for the relocation of an existing 280' of waterline along Papipi Road (at the makai end) to be moved from the mauka side to the makai side of the public Right-of-Way, in order to provide room for the new sewer alignment. Plans for the waterline relocation are available in Appendix A. Preliminary and pre-final drawings of the waterline relocation have been submitted to the City & County of Honolulu, Board of Water Supply (BWS) in October and November respectively. Comments from BWS were given verbally during a

design performance meeting in early December. The waterline relocation will be funded by Haseko (Ewa), Inc. as part of the project, and will take place before microtunneling commences.

Public Safety and Convenience

The Contractor will be responsible for the installation and maintenance of all necessary signs, lights, flares, barricades, markers, cones, and other protective facilities and equipment. The Contractor must take all necessary precautions for the protection, convenience, and safety of the general public. There will be five bore pits total, two jacking pits and three receiving pits. Approximately 20'x 40' each, the bore pits will have the 40' length side parallel with Pohakupuna Road. Due to the location of the bore pits on Amio Street and Hailipo Street, these streets will require partial closure at their intersections with Pohakupuna Road during construction hours for approximately four weeks. Access along Pohakupuna between Hailipo and Amio Streets may be limited to one lane. However, access to all driveways is not expected to be restricted.

Emergency Vehicle Access

Certain roadways will be strategically blocked during construction periods for public safety. All blockades will be specified in the construction traffic control plans, and the Fire and Police Departments operating in the district of the proposed project will be apprised of emergency vehicle access to these areas. The Contractor will be responsible for providing ample clearance in or adjacent to construction zones to allow emergency vehicles to enter and exit area during emergency situations. And any and all disruptions to the fire hydrant system will be reported to Honolulu Fire Department (HFD).

5.0 ALTERNATIVES TO PROPOSED ACTION

5.1 No Action

The current sewer system is experiencing structural corrosion and hydraulic capacity issues. Sections of the sewer main are inadequate for projected future flows based on anticipated development in the City's Development Plan Maps. Reoccurring wet and dry weather sanitary sewer overflows are a result of the current sewer conditions, and a 'no action' alternative will exacerbate the current problem. Along with predicted growth within the Ewa Beach community and Ocean Pointe, the additional sewer capacity issue must be addressed to avoid costly and inconvenient problems for both the government and the local community in the future.

5.2 City and County of Honolulu, Fort Weaver Road Reconstructed Sewer Project

The Fort Weaver Road Reconstructed Sewer project resulted from the City and County's evaluation of the existing gravity sewer systems serving the Ewa Beach community. These sewers are known as the Ewa Interceptor Sewers East and West. The public infrastructure improvement proposed for this project consisted of replacing deteriorated portions of the existing sewer lines and manholes in Pohakupuna at a cost of approximately \$8.25 million. The implementation of this project would serve to eliminate existing wet and dry weather sanitary overflows caused by structural corrosion of the existing sewer line, but would not be able to address conceptual increased flow by year 2005.

The HASEKO (Ewa), Inc. proposal to upgrade the existing Ewa Beach Wastewater Pump Station (WWPS) and the Ewa Beach Interceptor (West), would address the rehabilitation of the west part of the deteriorated sewer system, in addition to upgrading the system to service future projected flow increases beyond year 2005. The upgrades are based on making maximum use of the available capacity of the downstream Ewa Beach WWPS force main. These improvements will allow future flows from Ocean Pointe to increase to 9.79 MGD, well beyond the amount currently in the City and County's future flow model of 3.67 MGD. This would offer a cost-effective, long-term design solution and substantially decrease fiscal stress on the City and County's resources.

5.3 Trenching vs. Microtunneling Construction Methods

Trenching is considered one of the most hazardous construction operations, as workers are directly exposed to possible cave-in and/or exposure to existing utility lines in the ground. The process of trenching leaves open channels sensitive to disturbances such as vibrations, rain, and other environmental conditions that would lead to a cave-in. It requires numerous safety measures to be taken such as sloping, benching, shielding, or shoring to minimize possible cave-in of trenches. In addition, open trenches are a visual disturbance to surrounding communities, as well as safety hazards.

Microtunneling, on the other hand, utilizes remotely controlled Microtunnel Boring Machine (MTBM) combined with a pipe jacking technique to directly install pipelines underground without the necessity of having workers underground. This method allows for installation without major disruption to the surrounding community by avoiding the need to have long stretches of open trench for pipe laying. Although trenching may be more cost effective in comparison to microtunneling, disruptions created by trenching can amount to considerable costs in the long run. Microtunneling is a safer option as workers and the public are not directly exposed to hazardous conditions. Typical microtunneling methods have been used to install pipes from twelve inches to twelve feet in diameter. It is currently the most accurate pipeline installation method with line and grade tolerances of one inch or less as the industry standard.

For the purpose of this project, microtunneling is particularly well-suited, as the project location is an urban environment where major disruption of business, traffic and other utilities is not acceptable for residential, commercial, and safety reasons. The following are reasons microtunneling should be utilized for this project:

- Reduced disruption of the community.
- Reduced liability for personal injury and property damage.
- Increased worker safety.
- Reduced dewatering requirements.
- Precise installation.
- Faster and more efficient than conventional tunneling.

6.0 NECESSARY PERMITS AND APPROVALS

6.1 *City and County of Honolulu*

The following are Permits required by the City and County of Honolulu:

- Building Permit – Department of Planning and Permitting
- Grading, Grubbing, Excavation and Stockpiling Permit – Department of Design and Construction
- Street Usage Permit – Department of Transportation Services

The following are approvals required by the City and County of Honolulu:

- Department of Design and Construction
- Department of Environmental Services
- Flood Determination in General Flood Plain District – Department of Planning and Permitting (Letter of Determination from U.S. Army Corps of Engineers dated November 4, 2003 included in Appendix B)

6.2 *State of Hawaii*

The following permits are required by the State of Hawaii:

- NPDES Permit for Construction Related Discharges – Department of Health

The following approvals are required by the State of Hawaii:

- Air Pollution Control – Department of Health
- Community Noise Control – Department of Health
- Wastewater Systems – Department of Health

7.0 PUBLIC INVOLVEMENT AND AGENCY CONSULTATION

Pre-assessment consultation letters were sent to Federal, State, and County agencies for review. A summary of consultations with agencies and the Ewa Neighborhood Board are provided in Appendix B.

The project DEA was published in the December 8, 2003 edition of the OEQC Environmental Notice for a 30-day public review period. The comment period ended January 7, 2004. Comment letters, applicant response letters as and a summary of comments received are included in the same Appendix.

8.0 DETERMINATION

This Environmental Assessment is part of the environmental review process meeting requirements of Chapter 343, Hawaii Revised Statutes. The potential effects of the proposed project are evaluated in this document are based on the significance criteria in section 11-200-12 (Hawaii Administrative Rules, revised in 1996). The potential environmental effects of the proposed project and consultation with government agencies have resulted in an anticipation of a Finding of No Significant Impact (FONSI). The following is a summary of the potential effects of the action.

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

Development of the proposed project will not impact natural or cultural resources, as the project site is located in a developed area and the ground has been previously disturbed by the existing sewer line. Consultation with the USFWS and SHPD indicates that no known endangered or threatened species, as well as cultural resources were identified at the project site. Correspondence with USFWS and SHPD are available in Appendix B for reference.

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

The proposed project will be compatible with the existing uses of the surrounding area and will have minimal disturbance to the community as it is located underground.

3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in chapter 344 HRS.

The proposed project is consistent with the State's long-term environmental policies as well as the State's Land Use Plan.

4. Substantially affects the economic or social welfare of the community or State.

Short-term construction related activities may result in negative impacts, as well as positive economic impact from cash infusion during implementation of the project. Long-term adverse effects are not foreseeable, as the economic and social welfare of the community should return to existing condition.

5. Substantially affects public health.

Short-term construction related activities will not impact public health, as they are temporary in nature. In addition, construction activities will be regulated by State standards to minimize noise, dust, and exhaust emissions.

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

The proposed project does not directly result in secondary impacts, and will only increase capacity of the sewer system to serve planned development of lands in conformance with the County General Plan and the Ewa Development Plan.

7. Involves a substantial degradation of environmental quality.

The proposed project is located underground, therefore the environmental quality of the surrounding area will be preserved.

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

The proposed project does not have any cumulative effect upon the environment, and no larger commitments are required for the proposed sewer system.

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

Pursuant to consultation with USFWS, there are no known rare, endangered, or threatened species or habitat associated with the project site. The area has been urbanized and the new sewer alignment has undergone significant disturbance over the years for roadway use.

10. Detrimentally affects air or water quality or ambient noise levels.

Negative effects on environmental quality will be short-term due to construction and be limited to the areas adjacent to the project. These short-term impacts will be mitigated to meet project plan and specification regulations.

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

According to letter from the City and County of Honolulu DPP (Appendix B), the proposed project is situated within an SMA area (Figure 3-4), however is exempt from SMA requirements because it is an underground utility. The pump station is not in the SMA. The sewer line, upon completion, will be underground and no appurtenant above ground fixtures along the existing corridor will exceed four feet in height.

The project site is located in a Special Flood Hazard area designated for 100-year floods (Figure 3-4). With the proposed sewer line improvement to be located completely underground, the project will not affect environmentally sensitive areas.

12. Substantially affects scenic vistas and view planes identified in county or states plans or studies.

The proposed sewer line replacement portion of the project is located completely underground, and the pump station is above ground, but visual aesthetics of the surrounding community will not be adversely impacted by the implementation of the improved sewer system. Changes to the structure on the pump station site should not affect any views.

13. Requires substantial energy consumption.

Energy consumption will consist of short-term construction activities, in which diesel or gas powered equipment will be used. Once completed, the improved sewer system itself will not consume energy. The upgraded pump station will consume more energy. Consumption will be based on flows.

9.0 REFERENCES

<http://www.microtunneling.com/education/Papers/nds9502.htm>

City and County of Honolulu, Final West Mamala Bay Facilities Plan dated December 2001

The Limtiaco Consulting Group, Ocean Pointe Offsite Sewer Master Plan, June 2002.

The Limtiaco Consulting Group, Revised Conceptual Sewer Master Plan for Ocean Pointe Development-Ewa Beach Sewer System, Honouliuli, Ewa, Oahu, Hawaii, August 2003.

Oshima Chun Fong & Chung LLP, Final Supplemental Environmental Assessment, Ocean Pointe Master Plan (Revised), June 2001.

ParEn Inc., dba Park Engineering, Draft Environmental Assessment for Fort Weaver Road Reconstructed Sewer, Ewa, Oahu, Hawaii, February 2003.

URS, Draft Report Geotechnical Investigation for Gravity Sewer Installation by Microtunneling Methods, Ocean Pointe Offsite 36-Inch Sewer, Ewa Beach, Oahu, Hawaii, September 2003.

Appendix A:
90% Construction Drawings
(Limtiaco Consulting Group)

DEVELOPMENT SEWER

PREFINAL

HU, HAWAII
27, 28, 29, 30, 36

RED FOR:
(EWA), INC.

RED BY:



CONSULTING GROUP
SUITE 1605
HAWAII 96814

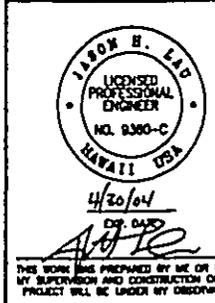
(PROPOSED PUBLIC SEWER)

OVALS		INDEX OF DRAWINGS	
		SHEET NO.	DWG. NO. DESCRIPTION
		1	T-1 TITLE SHEET
		2	T-2 GENERAL NOTES
		3	T-3 GENERAL NOTES
		4	T-4 GENERAL NOTES, ABBREVIATIONS, AND LEGEND
		5	C-1 GENERAL SITE PLAN
		6	C-2 SEWER PLAN AND PROFILE: STA 0+00 TO 8+00
		7	C-3 SEWER PLAN AND PROFILE: STA 8+00 TO 16+50
		8	C-4 SEWER PLAN AND PROFILE: STA 16+50 TO 25+00
		9	C-5 SEWER PLAN AND PROFILE: STA 25+00 TO END
		10	C-6 DETAILS - 1
		11	C-7 DETAILS - 2
		12	C-8 REPAVING PLAN
		13	TC-1 TRAFFIC CONTROL PLAN - PHASE 1
		14	TC-2 TRAFFIC CONTROL PLAN - PHASE 2
		15	S-1 NOTES AND SMH PLANS
		16	S-2 TYPICAL SMH SECTIONS
		17	S-3 TYPICAL SMH PLANS
		18	G-1 SHAFT AND TRENCH DETAILS
		19	G-2 LATERAL EARTH PRESSURE AND MICROTUNNELING DETAILS
		20	G-3 INSTRUMENTATION DETAILS
		21	G-4 INSTRUMENTATION DETAILS

DATE

DATE

DATE



OCEAN PONTE DEVELOPMENT OFFSITE SEWER

RECEIVED AS FOLLOWS

VERIZON HAWAII TELEPHONE GENERAL NOTES

1. THE CONTRACTOR SHALL OBTAIN AN EXCAVATION PERMIT AND TONING REQUEST FROM VERIZON HAWAII'S EXCAVATION PERMIT SECTION, LOCATED AT 3239 UALENA STREET, THIRD FLOOR, TWO WEEKS PRIOR TO THE START OF CONSTRUCTION. HOURS OF BUSINESS ARE 7:00 AM TO 10:45 AM AND 11:30 AM TO 2:45 PM, MONDAY THROUGH FRIDAY, EXCEPT HOLIDAYS.
2. FOR UNDERGROUND CABLE LOCATING AND MARKING, FIVE (5) WORKING DAYS ADVANCE NOTICE IS REQUIRED. THREE (3) WORKING DAYS ADVANCE NOTICE IS REQUIRED FOR ANY INSPECTION BY A DESIGNATED REPRESENTATIVE.
3. THE LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION AND SHALL MAINTAIN PROPER CLEARANCES WHENEVER CONSTRUCTION CROSSES OR IS IN CLOSE PROXIMITY OF VERIZON HAWAII FACILITIES. THE CONTRACTOR SHALL VERIFY THEIR LOCATIONS AND SHALL BE LIABLE FOR ANY DAMAGES TO VERIZON HAWAII FACILITIES. ANY DAMAGES SHALL BE REPORTED IMMEDIATELY TO VERIZON HAWAII'S REPAIR SECTION AT #611 (24 HOURS) OR TO THE EXCAVATION PERMIT SECTION AT 840-1444 (NORMAL WORKING HOURS, MONDAY THROUGH FRIDAY, EXCEPT HOLIDAYS).
4. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS NOT TO DAMAGE EXISTING CABLES OR DUCTS. A VERIZON HAWAII INSPECTOR OR DESIGNATED REPRESENTATIVE IS REQUIRED TO BE AT ANY JOB SITE WHENEVER THERE WILL BE A BREAKAGE INTO OR ENTRY INTO ANY STRUCTURE THAT CONTAINS VERIZON HAWAII FACILITIES. TEMPORARY CABLE AND DUCT SUPPORTS SHALL BE PROVIDED WHEREVER NECESSARY.
5. THE CONTRACTOR SHALL NOTIFY VERIZON HAWAII'S INSPECTOR OR DESIGNATED REPRESENTATIVE A MINIMUM OF 72 HOURS PRIOR TO EXCAVATION, BRACING OR BACKFILLING OF VERIZON HAWAII'S STRUCTURES OR FACILITIES.
6. WHEN EXCAVATION IS ADJACENT TO OR BENEATH VERIZON HAWAII'S EXISTING STRUCTURES OR FACILITIES, THE CONTRACTOR SHALL:
 - A. SHEET AND/OR BRACE THE EXCAVATION TO PREVENT SLIDES, CAVE-INS OR SETTLEMENTS TO ENSURE NO MOVEMENT TO VERIZON HAWAII'S STRUCTURES OR FACILITIES.
 - B. PROTECT EXISTING STRUCTURES AND/OR FACILITIES WITH BEAMS, STRUTS OR UNDERPINNING WHILE EXCAVATING BENEATH THEM TO ENSURE NO MOVEMENT TO VERIZON HAWAII'S STRUCTURES OR FACILITIES.
7. THE CONTRACTOR SHALL BRACE ALL POLES OR LIGHT STANDARDS NEAR THE NEW SEWERLINE, WATERLINE OR MANHOLE DURING HIS OPERATIONS.

CONSTRUCTION NOTES FOR GAS FACILITIES

1. THE GAS COMPANY GAS PIPELINES IN THE PROJECT AREA ARE PLASTIC COATED AND CATHODICALLY PROTECTED. THE CONTRACTOR SHALL BE EXTREMELY CAREFUL WHEN WORKING NEAR THESE GAS PIPELINES.
2. WRITTEN CLEARANCES MUST BE OBTAINED FROM THE GAS COMPANY, MAPS AND RECORDS DEPARTMENT, 515 KAMAEKE STREET, AT LEAST FIVE (5) WORKING DAYS PRIOR TO STARTING EXCAVATION NEAR THESE GAS PIPELINES.
3. SINCE GAS LINE LOCATIONS ON FIELD MAPS ARE APPROXIMATE, THE CONTRACTOR, AFTER OBTAINING WRITTEN CLEARANCE, SHALL CALL USA NORTH A MINIMUM OF TWO (2) WORKING DAYS BEFORE STARTING EXCAVATION TO ARRANGE FOR FIELD LOCATION OF THE EXISTING GAS PIPELINES. THE TELEPHONE NUMBER IS 1-800-227-2800.
4. THE CONTRACTOR SHALL EXCAVATE AND BACKFILL AROUND GAS PIPELINES IN THE PRESENCE OF A REPRESENTATIVE OF THE GAS COMPANY. ALL BACKFILL WITHIN SIX INCHES OF ANY GAS PIPELINE SHALL BE SELECT CUSHION MATERIAL APPROVED BY THE GAS COMPANY.
5. FOR RELOCATION OF ANY GAS PIPELINE, THE CONTRACTOR SHALL NOTIFY THE GAS COMPANY FIVE (5) WORKING DAYS BEFORE STARTING WORK. THE TELEPHONE NUMBER IS 594-5574. THE CONTRACTOR SHALL PROVIDE THE NECESSARY EXCAVATION AND BACKFILL, OBTAIN TRAFFIC PERMITS, AND RESTORE PAVEMENT, SIDEWALKS, OR OTHER FACILITIES. ANY RELOCATION OF GAS FACILITIES SHALL BE DONE BY THE GAS COMPANY AND PAID FOR BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL NOTIFY THE GAS COMPANY IMMEDIATELY AFTER ANY DAMAGE HAS BEEN CAUSED TO EXISTING GAS PIPELINES, COATINGS, OR ITS CATHODIC PROTECTION DEVICES. THE TELEPHONE NUMBER IS 535-5933, 24 HOURS A DAY. THE CONTRACTOR SHALL BE LIABLE FOR ANY DAMAGE TO THE GAS COMPANY FACILITIES. REPAIR WORK ON SUCH DAMAGE SHALL BE DONE BY THE GAS COMPANY, WITH PAYMENT FOR THIS WORK TO BE BORNE BY THE CONTRACTOR.
7. MINIMUM VERTICAL AND HORIZONTAL CLEARANCE BETWEEN THE GAS PIPELINES AND OTHER PIPELINES, CONDUITS, DUCTLINES, OR OTHER FACILITIES SHALL BE 12 INCHES. ADEQUATE SUPPORT AND PROTECTION FOR GAS PIPELINES EXPOSED IN THE TRENCH SHALL BE PROVIDED BY THE CONTRACTOR AND APPROVED BY THE GAS COMPANY.
8. THE CONTRACTOR SHALL WORK IN AN EXPEDITIOUS MANNER IN ORDER TO KEEP THE UNCOVERED GAS PIPELINES EXPOSED FOR AS SHORT A PERIOD OF TIME AS POSSIBLE.

MECHANICAL/ELECTRICAL DESIGN AND ENGINEERING DIVISION NOTES

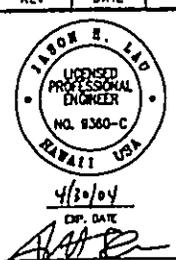
1. THE CONTRACTOR SHALL NOTIFY THE JOINT POLE COMMITTEE TWO (2) WEEKS IN ADVANCE OF ANY RELOCATION OF UTILITY POLE(S) THAT MAY BE NECESSARY.
2. THE CONTRACTOR SHALL NOTIFY THE MECHANICAL/ELECTRICAL DESIGN AND ENGINEERING DIVISION, DEPARTMENT OF DESIGN AND CONSTRUCTION, THREE (3) WORKING DAYS PRIOR TO COMMENCING WORK ON THE STREET LIGHTING SYSTEM (PHONE: 527-5002).
3. THE STREET LIGHTING SYSTEM SHALL BE KEPT OPERATIONAL DURING CONSTRUCTION. ANY RELOCATION REQUIRED SHALL BE APPROVED BY THE MECHANICAL/ELECTRICAL DESIGN AND ENGINEERING DIVISION, DEPARTMENT OF DESIGN AND CONSTRUCTION, AND PAID FOR BY THE CONTRACTOR.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO THE EXISTING STREET LIGHTING FACILITIES. ANY AND ALL DAMAGES TO THESE FACILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OR HER COST IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY AND COUNTY OF HONOLULU.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO THE CITY'S EXISTING COMMUNICATIONS FIBER OPTIC CABLE SYSTEM. ANY AND ALL DAMAGES TO THESE FACILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OR HER COST IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY AND COUNTY OF HONOLULU.

TRAFFIC NOTES FOR WORK ON CITY AND COUNTY STREETS

1. A PERMIT SHALL BE OBTAINED FROM THE DEPARTMENT OF TRANSPORTATION SERVICES BEFORE WORK ON ANY PORTION OF A PUBLIC STREET OR HIGHWAY MAY BEGIN. CONSTRUCTION TRAFFIC CONTROL PLANS APPROVED BY THE DEPARTMENT OF TRANSPORTATION SERVICES AND/OR THE DEPARTMENT OF PLANNING AND PERMITTING MUST BE PROVIDED WHEN APPLYING FOR THE PERMIT.
2. THE CONTRACTOR SHALL PROVIDE, INSTALL, AND MAINTAIN ALL NECESSARY SIGNS AND OTHER PROTECTIVE FACILITIES, WHICH SHALL CONFORM WITH THE "HAWAII ADMINISTRATION RULES GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORK SITES ON OR ADJACENT TO PUBLIC STREET AND HIGHWAYS" ADOPTED BY THE DIRECTOR OF TRANSPORTATION, AND THE CURRENT U.S. FEDERAL HIGHWAY ADMINISTRATION'S "PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES - STANDARDS AND GUIDES FOR TRAFFIC CONTROLS FOR STREET AND HIGHWAY CONSTRUCTION, MAINTENANCE, UTILITY, AND INCIDENT MANAGEMENT OPERATIONS."
3. WORK ON ANY CITY STREET AREA MAY BE PERFORMED ONLY BETWEEN THE HOURS OF 8:30 A.M. TO 3:30 P.M., MONDAY THROUGH FRIDAY, UNLESS OTHERWISE PERMITTED BY THE DEPARTMENT OF TRANSPORTATION SERVICES.
4. DURING WORKING HOURS, THE CONTRACTOR SHALL PROVIDE FOR THROUGH TRAFFIC. DURING NON-WORKING HOURS, ALL TRENCHES SHALL BE COVERED WITH A SAFE NON-SKID BRIDGING MATERIAL AND ALL LANES SHALL BE OPEN TO TRAFFIC.
5. AS REQUIRED BY THE DEPARTMENT OF TRANSPORTATION SERVICES, THE CONTRACTOR SHALL PROVIDE AN OFF-DUTY POLICE OFFICER TO CONTROL THE FLOW OF TRAFFIC.
6. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THESE RIGHTS-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY.
7. WHERE PEDESTRIAN WALKWAYS EXIST, THEY SHALL BE MAINTAINED IN PASSABLE CONDITION OR OTHER FACILITIES FOR PEDESTRIANS SHALL BE PROVIDED. PASSAGE BETWEEN WALKWAYS AT INTERSECTIONS SHALL LIKEWISE BE PROVIDED. TEMPORARY SAFE PEDESTRIAN PASSAGEWAYS SHALL ALSO BE PROVIDED AROUND THE CONSTRUCTION SITE IN CONFORMANCE WITH THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES.
8. CONTRACTOR SHALL REFERENCE TO THE APPROVAL OF THE DEPARTMENT OF TRANSPORTATION SERVICES AND THE DEPARTMENT OF PLANNING AND PERMITTING, ALL EXISTING TRAFFIC SIGNS, POSTS AND PAVEMENT MARKINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR SHALL REPLACE OR REPAIR ALL TRAFFIC SIGNS, POSTS AND TRAFFIC MARKINGS DISTURBED BY HIS/HER ACTIVITIES.
9. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PLANNING AND PERMITTING, AT 523-4881 ONE (1) WEEK PRIOR TO ANY WORK TO BE DONE ON SIGNS, POSTS, AND PAVEMENT MARKINGS.
10. NO MATERIAL AND/OR EQUIPMENT SHALL BE STOCKPILED OR OTHERWISE STORED WITHIN STREET RIGHTS-OF-WAY EXCEPT AT LOCATIONS DESIGNATED IN WRITING APPROVED BY THE DEPARTMENT OF TRANSPORTATION SERVICES.
11. KASEKO (EWA) INC. SHALL ENSURE THAT THE CONTRACTOR INSTALLS THE CONSTRUCTION TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE MUTCD AND HAWAII ADMINISTRATION RULES AS SPECIFIED IN TRAFFIC NOTE #2.

TRAFFIC SIGNALS AND TECHNOLOGY DIVISION NOTES

1. THE CONTRACTOR SHALL NOTIFY THE TRAFFIC SIGNALS AND TECHNOLOGY DIVISION, DEPARTMENT OF TRANSPORTATION SERVICES, THREE (3) WORKING DAYS PRIOR TO COMMENCING WORK ON THE TRAFFIC SIGNAL SYSTEM (PHONE: 523-4589).
2. THE TRAFFIC SIGNAL SYSTEM SHALL BE KEPT OPERATIONAL DURING CONSTRUCTION. ANY RELOCATION REQUIRED SHALL BE APPROVED BY THE TRAFFIC SIGNALS AND TECHNOLOGY DIVISION, DEPARTMENT OF TRANSPORTATION SERVICES, AND PAID FOR BY THE CONTRACTOR.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO THE EXISTING TRAFFIC SIGNAL FACILITIES, INCLUDING BUT NOT LIMITED TO THE TRAFFIC SIGNAL FIBER OPTIC CABLE SYSTEM, AND INTERCONNECT SYSTEM. ANY AND ALL DAMAGES TO THESE FACILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS COST IN ACCORDANCE WITH THE REQUIREMENTS OF THE TRAFFIC SIGNALS AND TECHNOLOGY DIVISION.

REV	DATE	DESCRIPTION	NO. SHTS	APPR
				
THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 615 PEEBLES STREET, SUITE 100 • HONOLULU, HAWAII 96814 PHONE: (808) 944-7778 • FAX: (808) 944-7338				
OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII				
GENERAL NOTES				
DRAWN BY: JHL		DES BY: JHL	CHECKED BY: CPL	
SCALE:		DATE: NOV. 2003		

RECEIVED AS FOLLOWS

PUBLIC HEALTH SAFETY AND CONVENIENCE NOTES

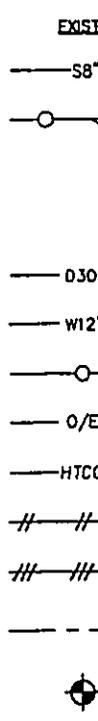
1. CONTRACTOR SHALL OBSERVE AND COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS REQUIRED FOR THE PROTECTION OF PUBLIC HEALTH, SAFETY AND ENVIRONMENTAL QUALITY.
2. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL KEEP THE PROJECT AND ITS SURROUNDING AREAS FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH. THE CITY SHALL REQUIRE SUPPLEMENTARY MEASURES IF REQUIRED.
3. 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.
4. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, MARKERS, CONES, AND OTHER PROTECTIVE FACILITIES AND SHALL TAKE ALL NECESSARY PRECAUTIONS FOR THE PROTECTION, CONVENIENCE AND SAFETY OF THE PUBLIC.
5. THE CONTRACTOR'S ATTENTION IS DIRECTED TO CHAPTER 48, PUBLIC HEALTH REGULATIONS, DEPARTMENT OF HEALTH, STATE OF HAWAII, "COMMUNITY NOISE CONTROL," IN WHICH MAXIMUM PERMISSIBLE NOISE LEVELS HAVE BEEN SET. IF THE CONSTRUCTION WORK REQUIRES A PERMIT FROM THE DIRECTOR OF HEALTH, THE CONTRACTOR SHALL OBTAIN A COPY OF CHAPTER 48 AND BECOME FAMILIAR WITH THE NOISE LEVEL RESTRICTIONS AND THE PROCEDURES FOR OBTAINING A PERMIT FOR THE CONSTRUCTION ACTIVITIES. APPLICATION AND INFORMATION ON VARIANCES ARE AVAILABLE FROM THE ENVIRONMENTAL PROTECTION AND HEALTH SERVICES DIVISION, 1250 PUNCHBOWL ST., HONOLULU, HI 96813 OR BY TELEPHONE (586-4576).

BEST MANAGEMENT PRACTICES (BMPs):

1. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY TRENCHING IS INITIATED. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
2. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY.
3. ALL STORM DRAIN INLETS WHICH MAY RECEIVE RUNOFF AS A RESULT OF THE CONSTRUCTION WORK SHALL USE AN INLET PROTECTION DEVICE.

ABBREVIATIONS

AC	ASPHALTIC CONCRETE	MB	MAILBOX
ARV	AIR RELIEF VALVE	MH	MANHOLE
B	BOTTOM	MISC.	MISCELLANEOUS
BC	BOTTOM OF CURB	MON	MONUMENT
BFP	BACKFLOW PREVENTER	O.C.	ON CENTER
BW	BOTTOM WALL	O/E	OVERHEAD ELECTRIC LINE
BWS	BOARD OF WATER SUPPLY	O/S	OFFSET
CATV	CABLE TV	PAVT	PAVEMENT
CB	CATCH BASIN	PL	PLACE
CH	CHORD	RD	ROAD
C	CENTERLINE	ROW	RIGHT-OF-WAY
CL	CHAIN LINK	RT	RIGHT
CMU	CONCRETE MASONRY UNIT	S	SEWER OR SLOPE
COMM.	COMMUNICATION	SDMH	STORM DRAIN MANHOLE
CONC.	CONCRETE	SGMH	SIGNAL MANHOLE
CRM	CONCRETE RUBBLE MASONRY	SL	STREET LIGHT
D	DIAMETER OR DRAIN	SLB	SIGNAL LIGHT BOX
DET.	DETAIL	SLP	SIGNAL LIGHT POLE
DI	DRAIN INLET OR DUCTILE IRON	SMH	SEWER MANHOLE
DIA	DIAMETER	SN	SNH
DMH	DRAIN MANHOLE	SP	STREET POLE
DPW	DEPARTMENT OF PUBLIC WORKS	SPR.	SPRINKLER
DWY	DRIVEWAY	ST	STREET
E/ELEC	ELECTRIC	STA	STATION
ELEV	ELEVATION	STD.	STANDARD
EMH	ELECTRIC MANHOLE	S/W	SIDEWALK
EOP	EDGE OF PAVEMENT	T	TOP OR TELEPHONE
EP	ELECTRIC POLE	TC	TOP OF CURB
EQ	EQUAL	TCB	TRAFFIC CONTROL BOX
EXIST	EXISTING	TMH	TELEPHONE MANHOLE
FA	FIRE ALARM	TMK	TAX MAP KEY
FAB	FIRE ALARM BOX	T O/H	TELEPHONE OVERHEAD
FH	FIRE HYDRANT	TP	TOP PIPE
FM	FORCE MAIN	TS	TOP STEM OR TRAFFIC SIGNAL
FRP	FIBERGLASS REINFORCED PIPE	TSCB	TRAFFIC SIGNAL BOX
G	GAS	TSCB	TRAFFIC SIGNAL CONTROL BOX
G	GRATE INLET	TSL	TRAFFIC SIGNAL LIGHT
GMH	GAS MANHOLE	TSP	TRAFFIC SIGNAL POST
GND.	GROUND	TV	TOP VALVE
GP	GUY POLE/GUARD POST	TW	TOP OF WALL
GR	GUARD RAIL	TYP	TYPICAL
GV	GATE VALVE	UB	UTILITY BOX
H	HEIGHT	UE	UNDERGROUND ELECTRIC
HECO	HAWAIIAN ELECTRIC COMPANY	UP	UTILITY POLE
HEMH	HAWAIIAN ELECTRIC COMPANY MANHOLE	W	WATER
HTB	HAWAIIAN TELEPHONE COMPANY BOX	WM	WATER METER
INV.	INVERT	WMH	WATER MANHOLE
ICV	IRRIGATION CONTROL VALVE	WV	WATER VALVE
LAT	LATERAL	WMH	WATER VALVE HAND HOLE
LF	LINEAR FOOT	WWF	WELDED WIRE FABRIC
LP	LIGHT/LAMP POLE		
LT	LEFT		



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SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
—S8"—	—S8"—	SEWER LINE W/ SIZE
		SEWER MANHOLE AND LATERAL
		SEWER MANHOLE W/ LIMITS OF PIT EXCAVATION
—D30"—		DRAIN LINE W/ SIZE
—W12"—	—W12"—	WATER LINE W/ SIZE
		WATER VALVE
—O/E—		OVERHEAD ELECTRICAL LINE
—HTCO—		TELEPHONE LINE
///-///-///		SEWER LINE TO BE ABANDONED
///-///-///		WATER LINE TO BE ABANDONED
---		PROPERTY LINE AND/OR RIGHT-OF-WAY
		SOIL BORING LOCATION AND ID

1E

SIGNAL

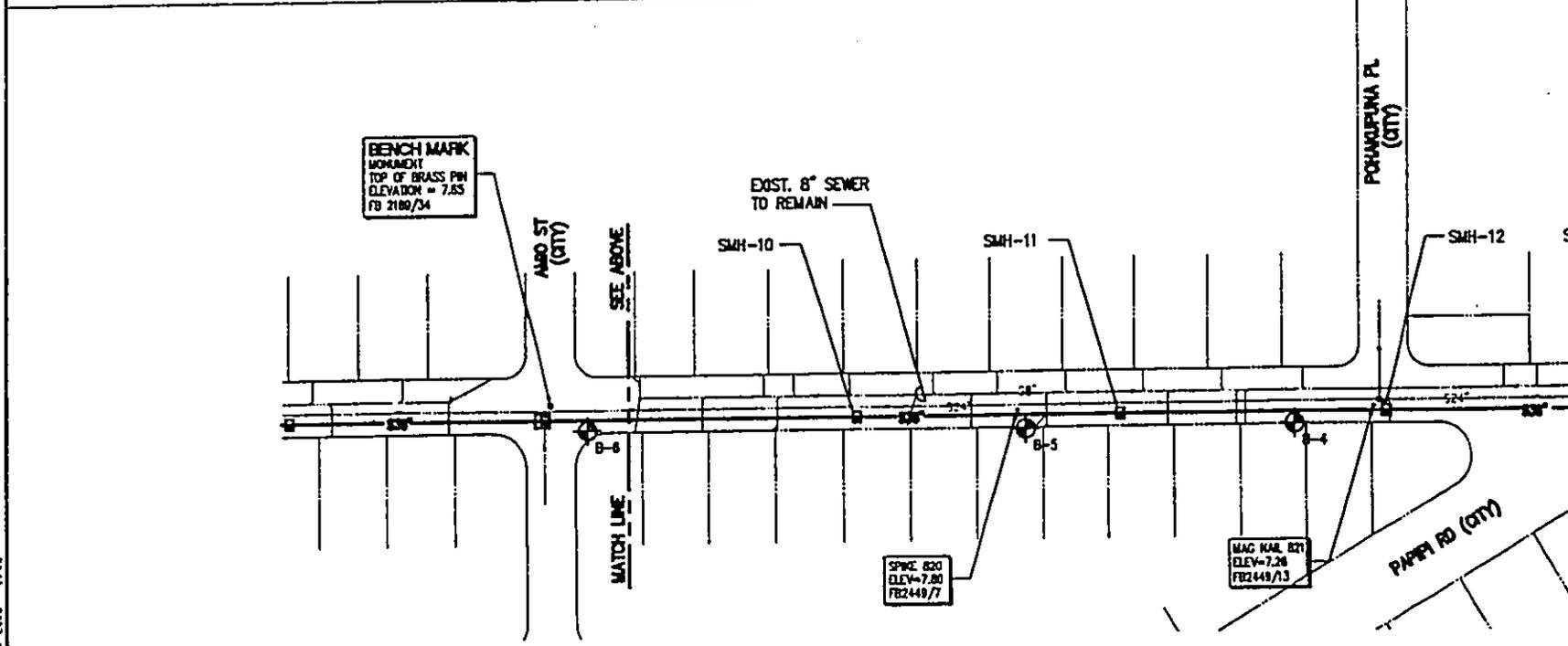
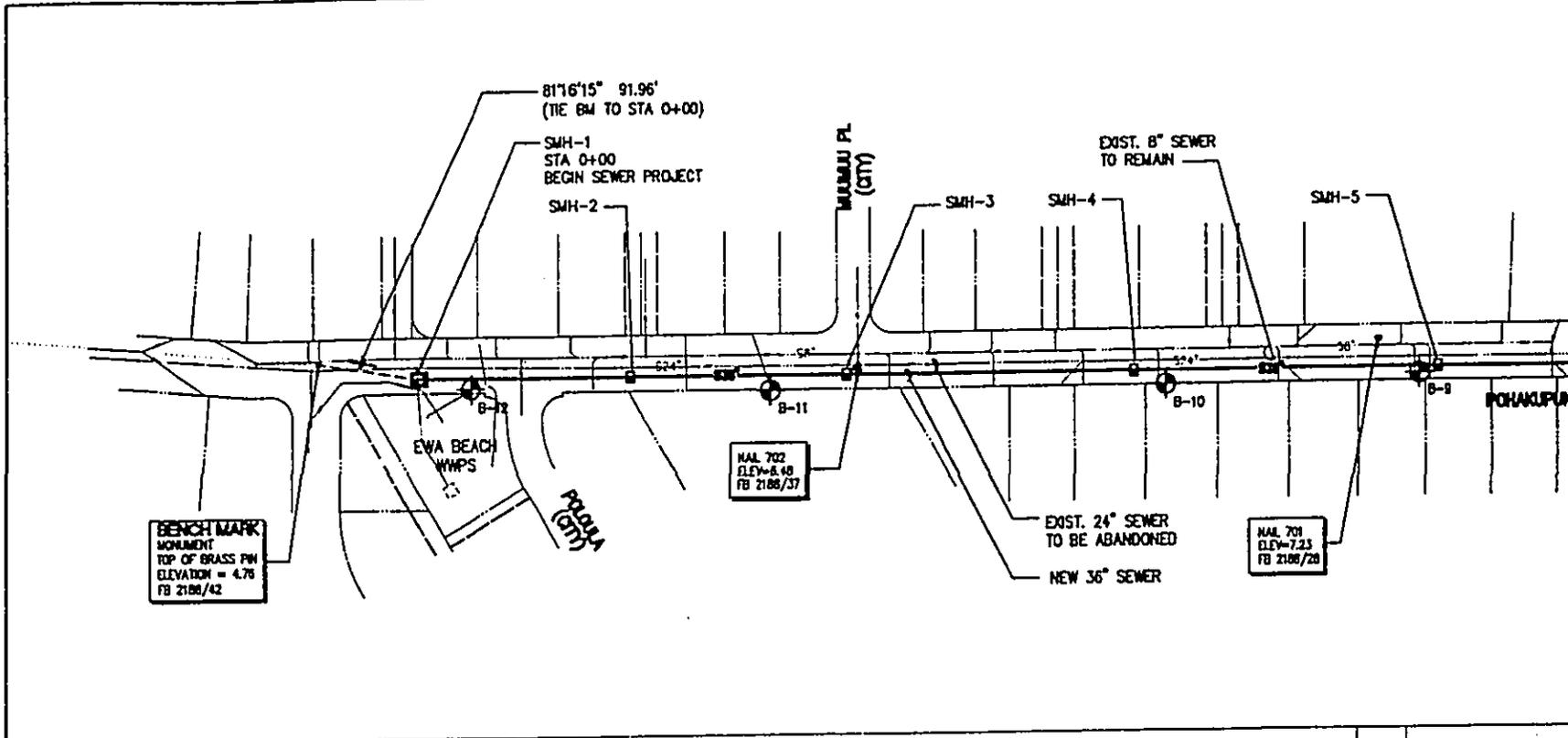
ROL BOX

DC

SOLE

REV	DATE	DESCRIPTION	NO. SHTS	APPR				
		THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 145 PUNAH STREET, SUITE 100 • HONOLULU, HAWAII 96814 PHONE: (808) 796-7778 • FAX: (808) 796-7241						
		OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII						
		GENERAL NOTES, ABBREVIATIONS, AND LEGEND						
DESIGNED BY: <i>JHL</i> DATE: 4/12/04		DRAWN BY: <i>JHL</i>		CHECKED BY: <i>CPL</i>				
SCALE:		DATE: NOV. 2003						
DRAWING T-4		SHEET 4 OF 100		<table border="1"> <tr> <td>FILE</td> <td>POCKET</td> <td>FOLDER</td> <td>NO.</td> </tr> </table>	FILE	POCKET	FOLDER	NO.
FILE	POCKET	FOLDER	NO.					

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LEGEND	
—S24"—	EXISTING SEWER AND SIZE
—S36"—	PROPOSED SEWER AND SIZE
- - - -	PROPERTY LINE
⊕ B-1	BORING LOCATION AND ID

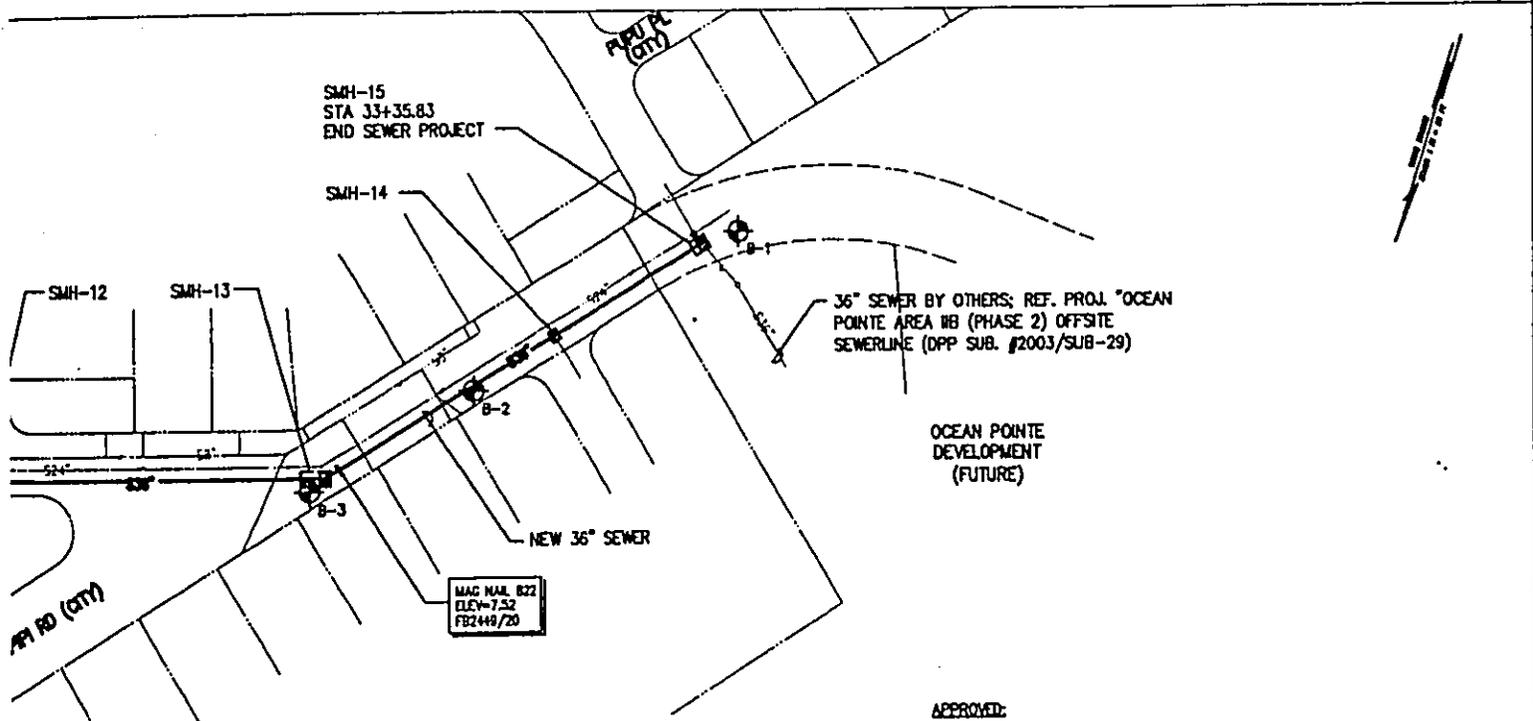
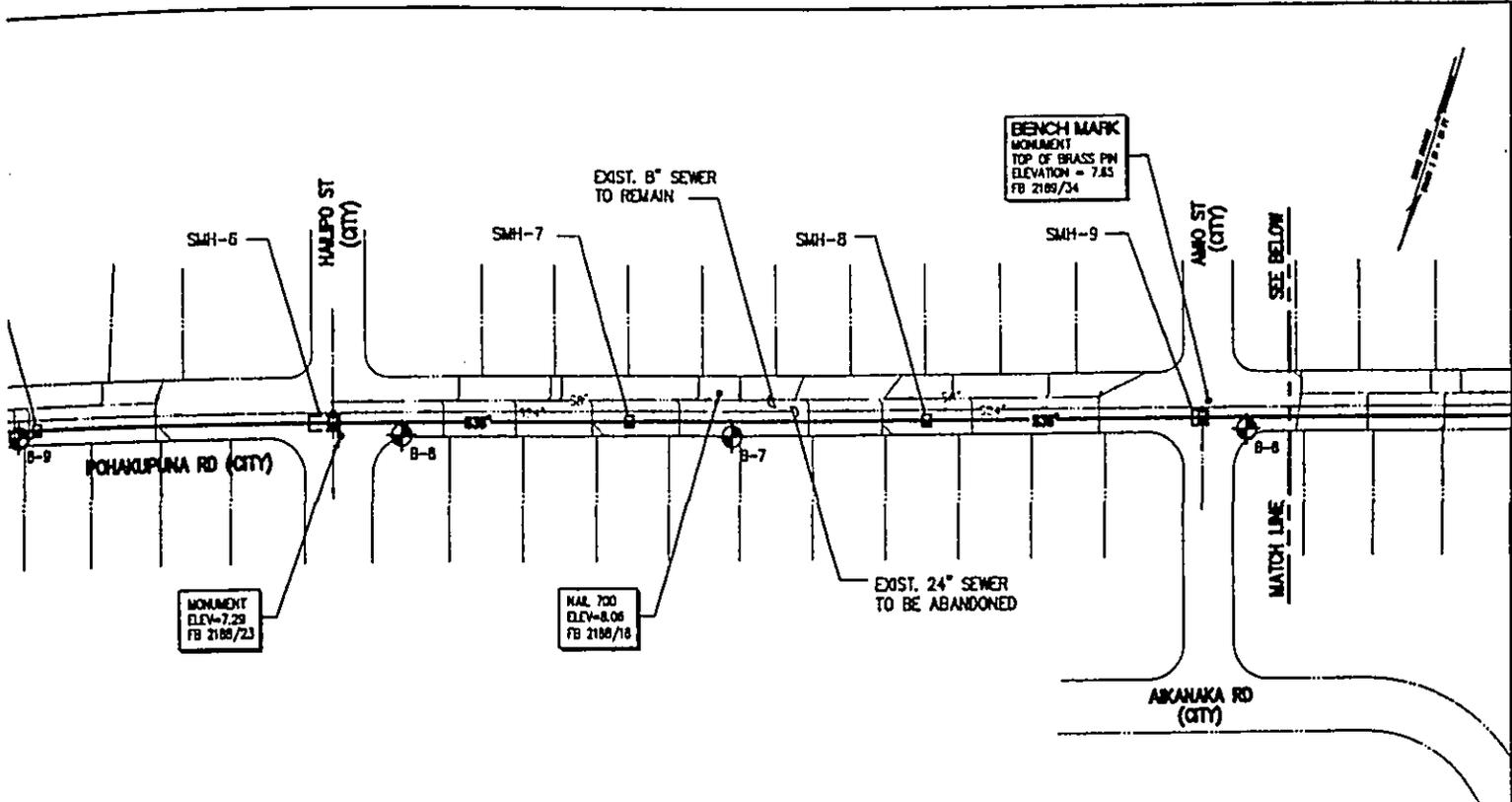
*NOTE: PROJECT LOCATED WITHIN FLOOD ZONE "A".

GENERAL SITE PLAN
SCALE: 1" = 80'

TMK: 9-1-09, 11, 27, 28, 29.

44 - Coastal Projects P2121411 pohaku@hawaii.gov - Fri, 21 Nov 2003 - 1906

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APPROVED:

CHIEF, WASTEWATER BRANCH, DPP

DATE

L SITE PLAN

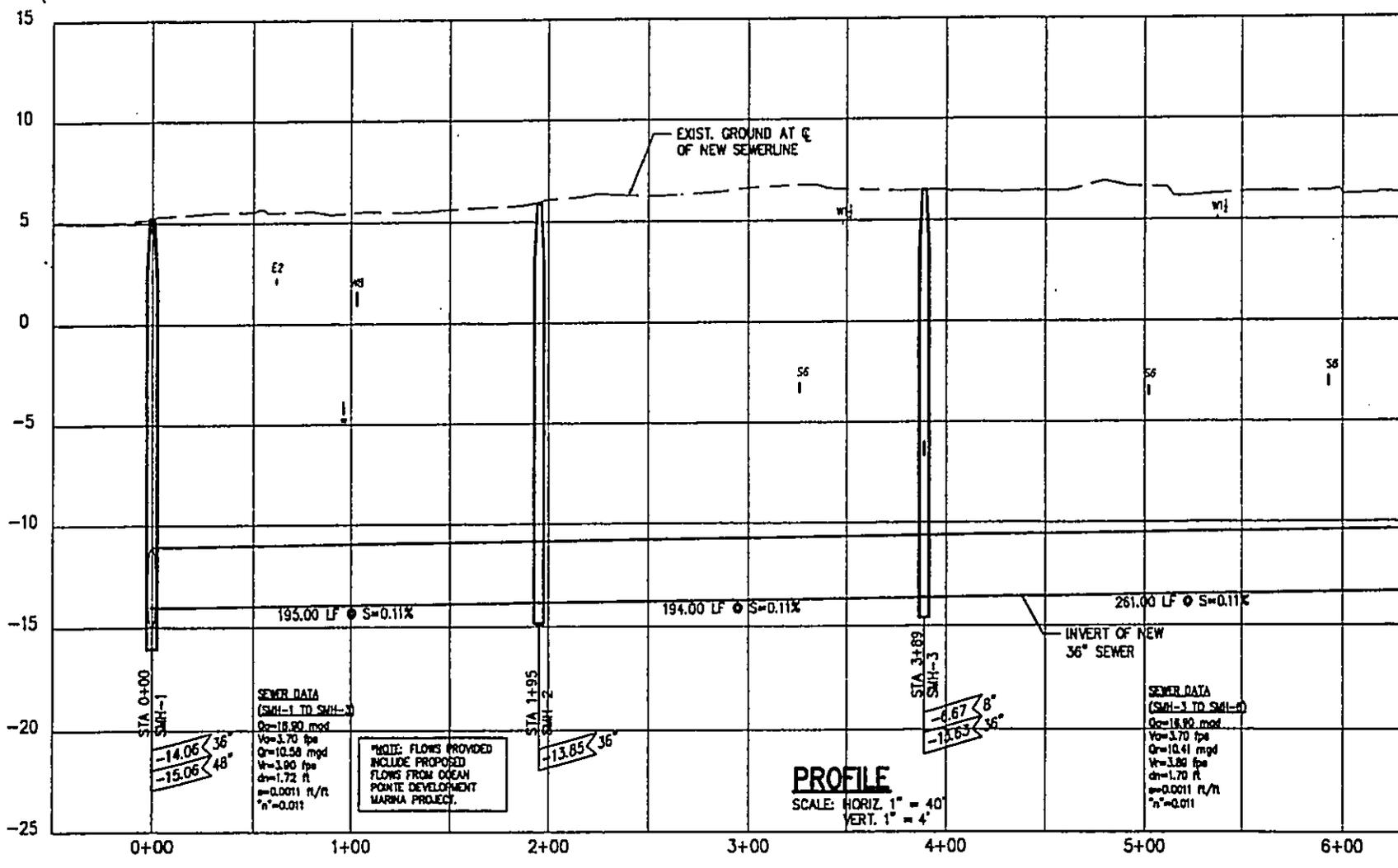
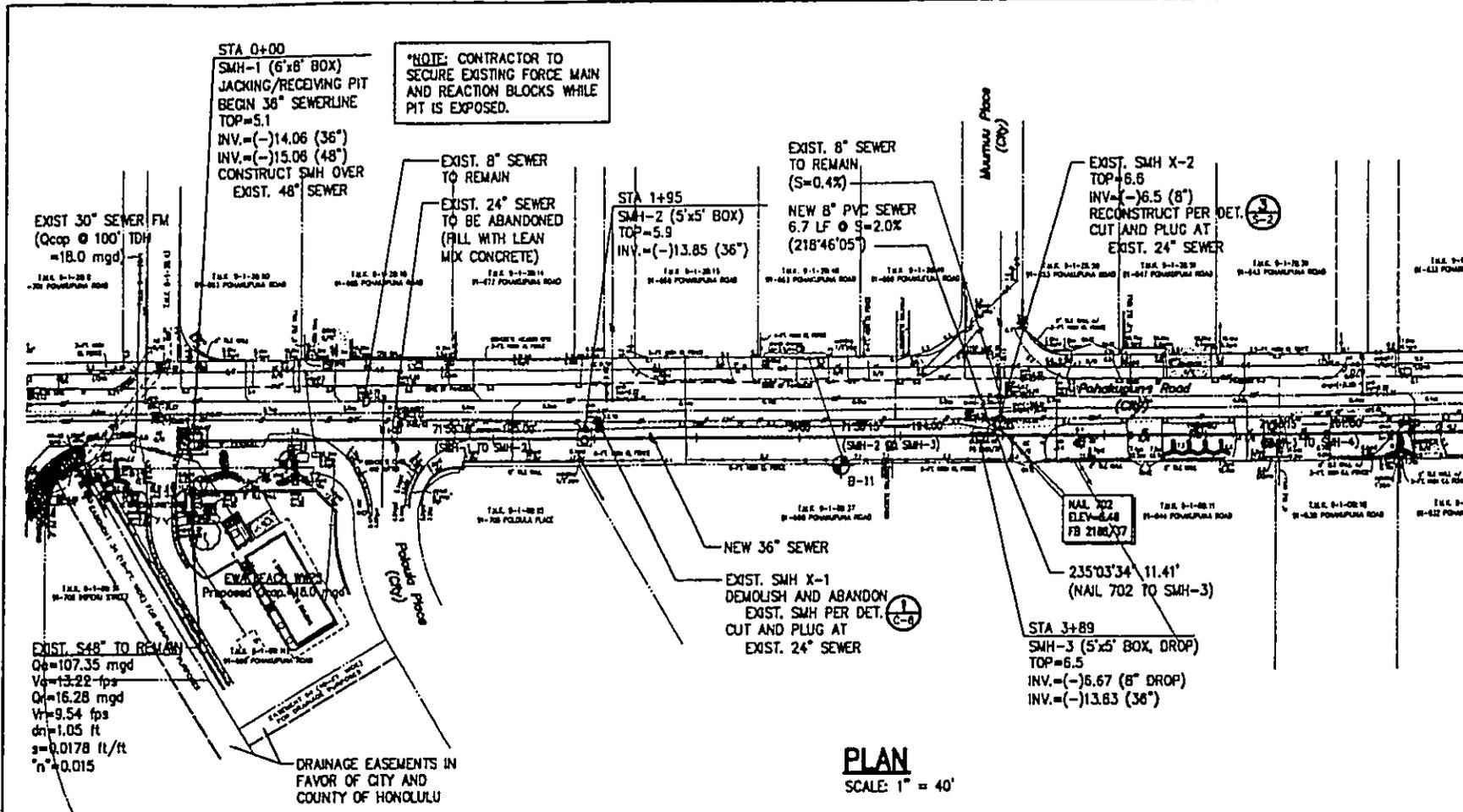
- 0
1. 27. 28. 29. 30. 36

GRAPHIC SCALE



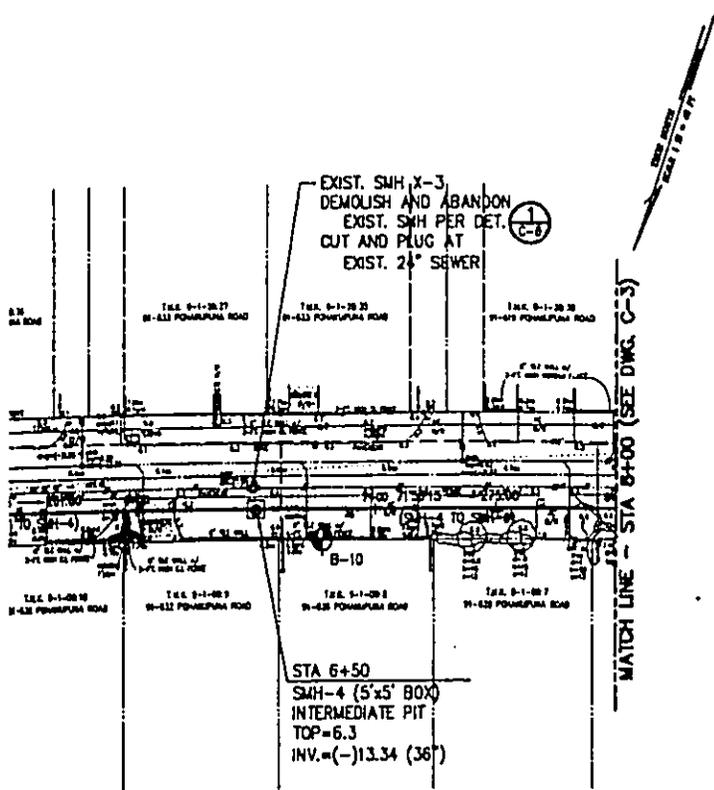
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 <p>THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 433 PIPER STREET, SUITE 300 • HONOLULU, HAWAII 96814 PHONE: (808) 596-7799 • FAX: (808) 596-7794</p>				
<p>OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII</p>				
<p>GENERAL SITE PLAN</p>				
DRAWN BY: JRL		DES BY: JRL	CHECKED BY: CFL	
SCALE: AS SHOWN		DATE: NOV. 2003		

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JKL - Calland Projects - 26V2111 PDMXUPMVA\des\BASTEP000.dwg - Thu, 22 Nov 2000 - 2:33:37

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SEWER NOTES:

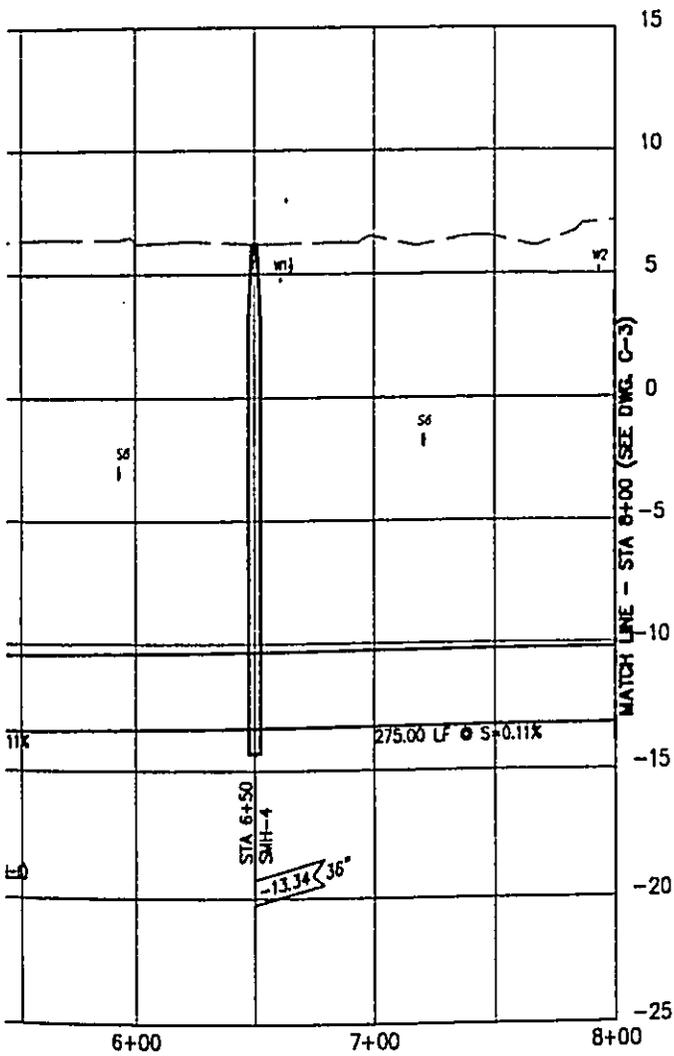
1. REFERENCE PROJECTS FOR EXISTING SEWERS:
8" SEWER: "EWA BEACH SEWERS, SECTION 1, ID NO. 529" (JOB W20-84)
24" SEWER: "EWA INTERCEPTOR SEWER (WEST)" (JOB W8-80)
2. THE 36" SEWER LINE SHALL BE INSTALLED BY MICROTUNNELING AND SHALL BE CORROSION-RESISTANT (REINFORCED CONCRETE PIPE WITH PVC LINER, POLYMER CONCRETE PIPE, OR FIBERGLASS REINFORCED PIPE). THE CONTRACTOR SHALL DETERMINE THE PIPE MATERIAL BASED UPON HIS EVALUATION OF THE UNDERLYING SOILS CONDITION.
3. MICROTUNNELING PIT LOCATIONS SHOWN ARE BASED ON ASSUMED JACKING LENGTHS OF 400± LINEAR FEET. CONTRACTOR TO DETERMINE ACTUAL PIT LOCATIONS AND JACKING LENGTHS BASED UPON HIS EVALUATION OF THE UNDERLYING SOILS CONDITION.
4. THE 8" SEWER LINES SHALL BE INSTALLED BY OPEN-CUT TRENCHING. THE CONTRACTOR SHALL VERIFY ALL INVERTS PRIOR TO INSTALLATION AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
5. THE CONTRACTOR SHALL INSTALL PLASTIC LINERS IN ALL NEW SEWER MANHOLES IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

REPAVING NOTES:

1. FOR A.C. PAVEMENT RESTORATION AT MICROTUNNELING PIT LOCATIONS AND AT ABANDONED/RECONSTRUCTED SEWER MANHOLE LOCATIONS, SEE DET. B
C-7

SMH #	SIZE, TYPE *	HEIGHT	CONNECTIONS
1	6'x8' BOX	20.2'	36", 48"
2	5'x5' BOX	18.8'	36"
X-1	STD. (ABANDON)	---	---
3	5'x5' BOX, DROP	20.1'	8", 36"
X-2	STD., DROP (RECONSTRUCT)	13.1'	8"
X-3	STD. (ABANDON)	---	---
4	5'x5' BOX	18.8'	36"

* SIZE LISTED INDICATES INTERIOR DIMENSIONS



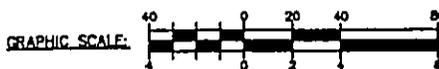
APPROVED:

CHIEF, WASTEWATER BRANCH, DPP

DATE

CHIEF, CIVIL ENGINEERING BRANCH, DPP

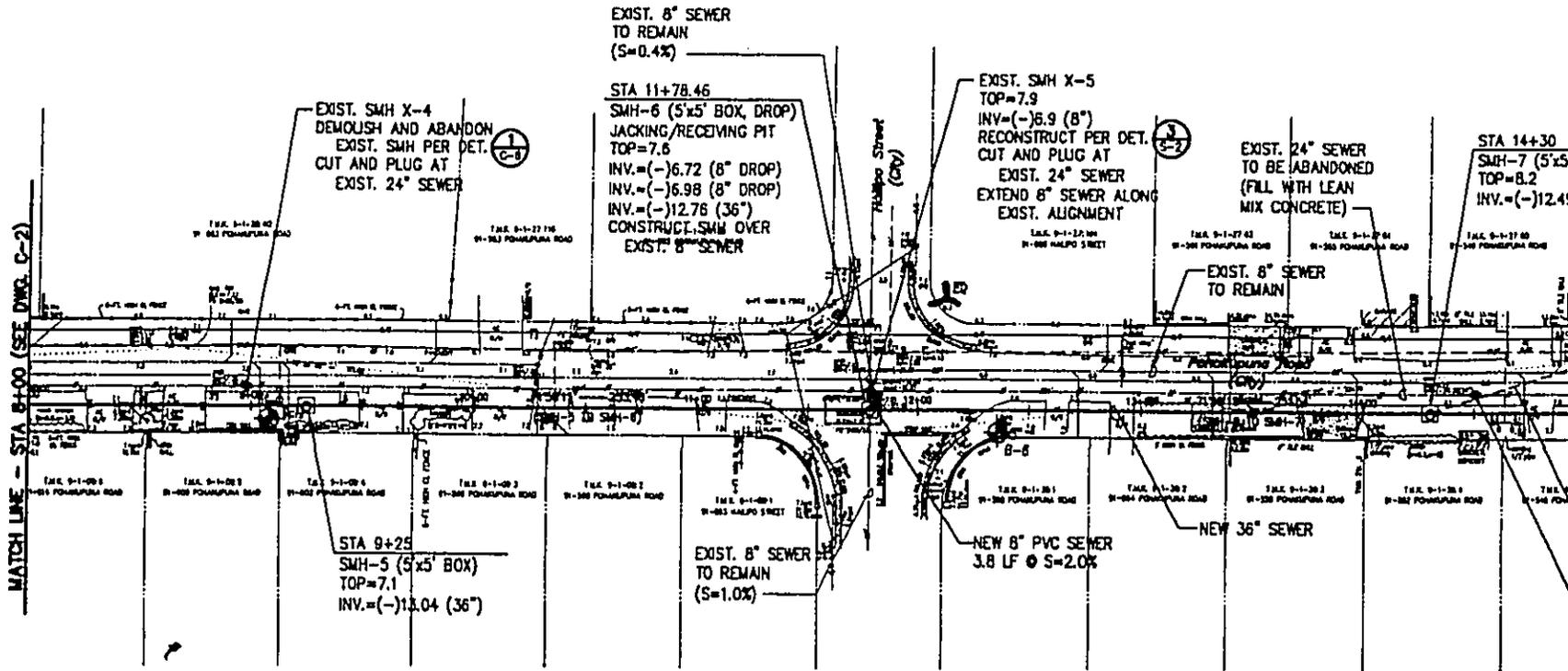
DATE



(PROPOSED PUBLIC SEWER)

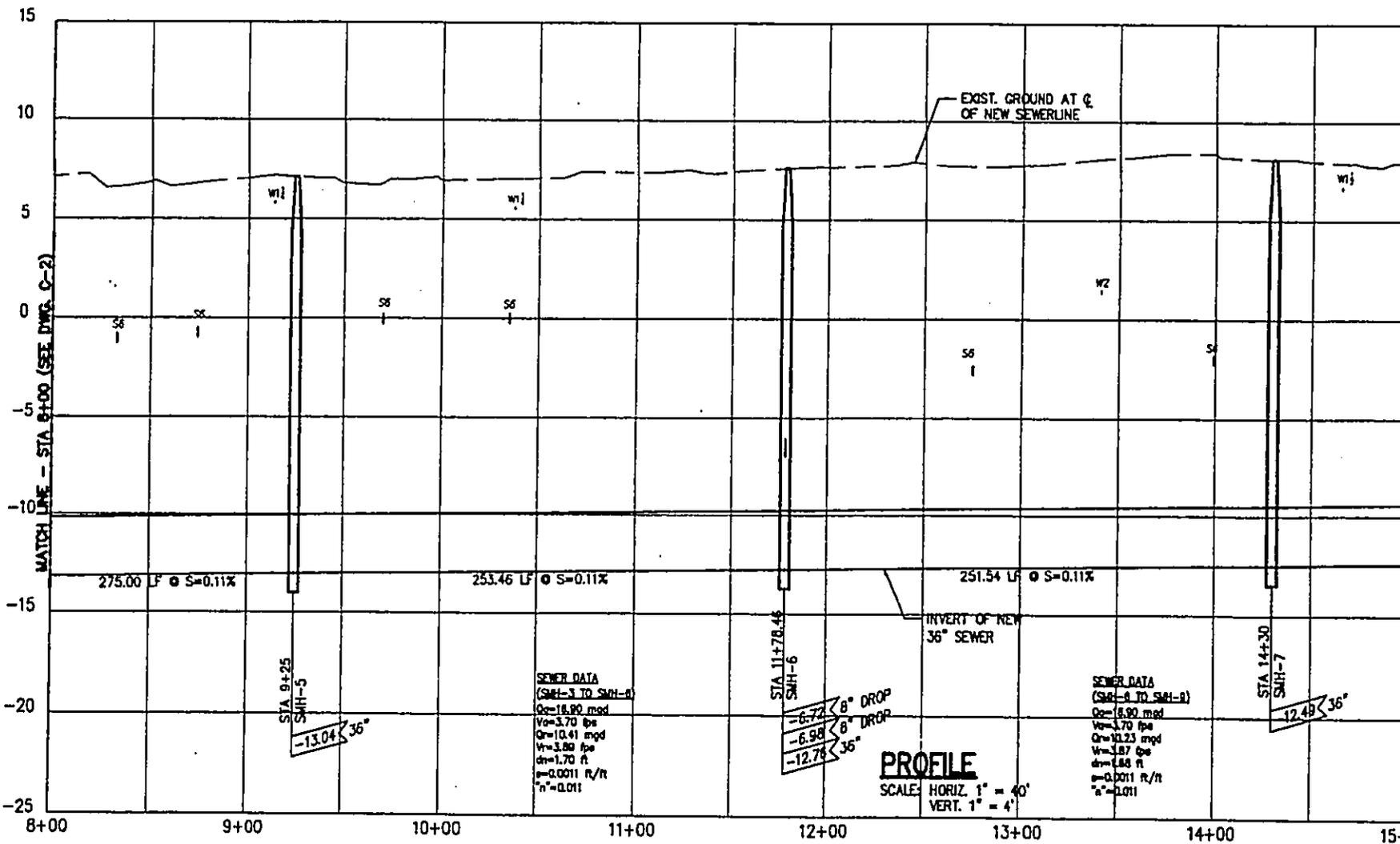
REV	DATE	DESCRIPTION	NO. SHTS	APPR
<p>THE LIMITACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 423 PEECH STREET, SUITE 1000 - HONOLULU, HAWAII 96813 PHONE (808) 944-7776 • FAX (808) 944-7341</p>				
<p>OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII</p>				
<p>SEWER PLAN AND PROFILE STA 0+00 TO 8+00</p>				
DRAWN BY: JRL		DES BY: JRL	CHECKED BY: CPL	
SCALE: AS SHOWN		DATE: NOV. 2003		

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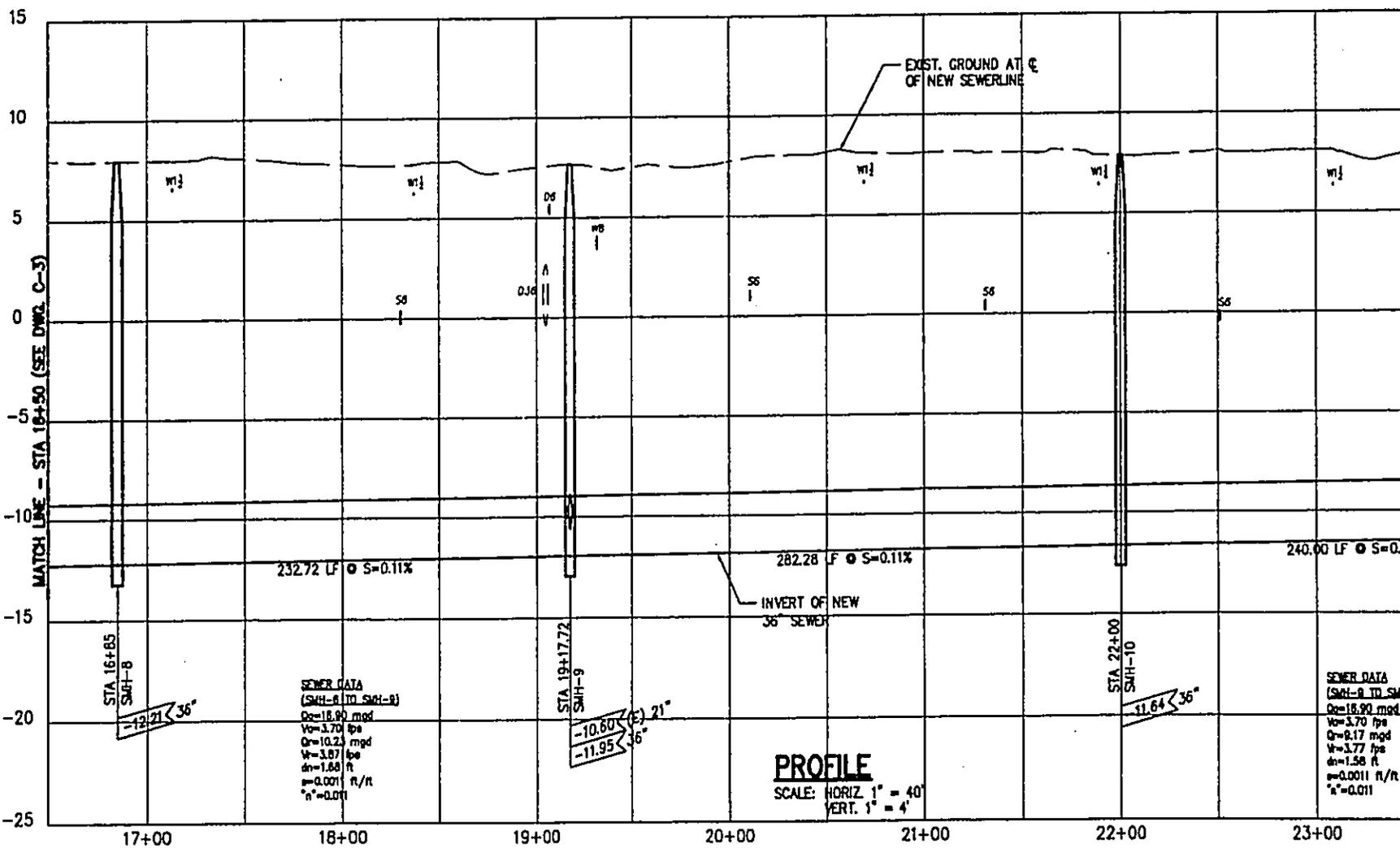
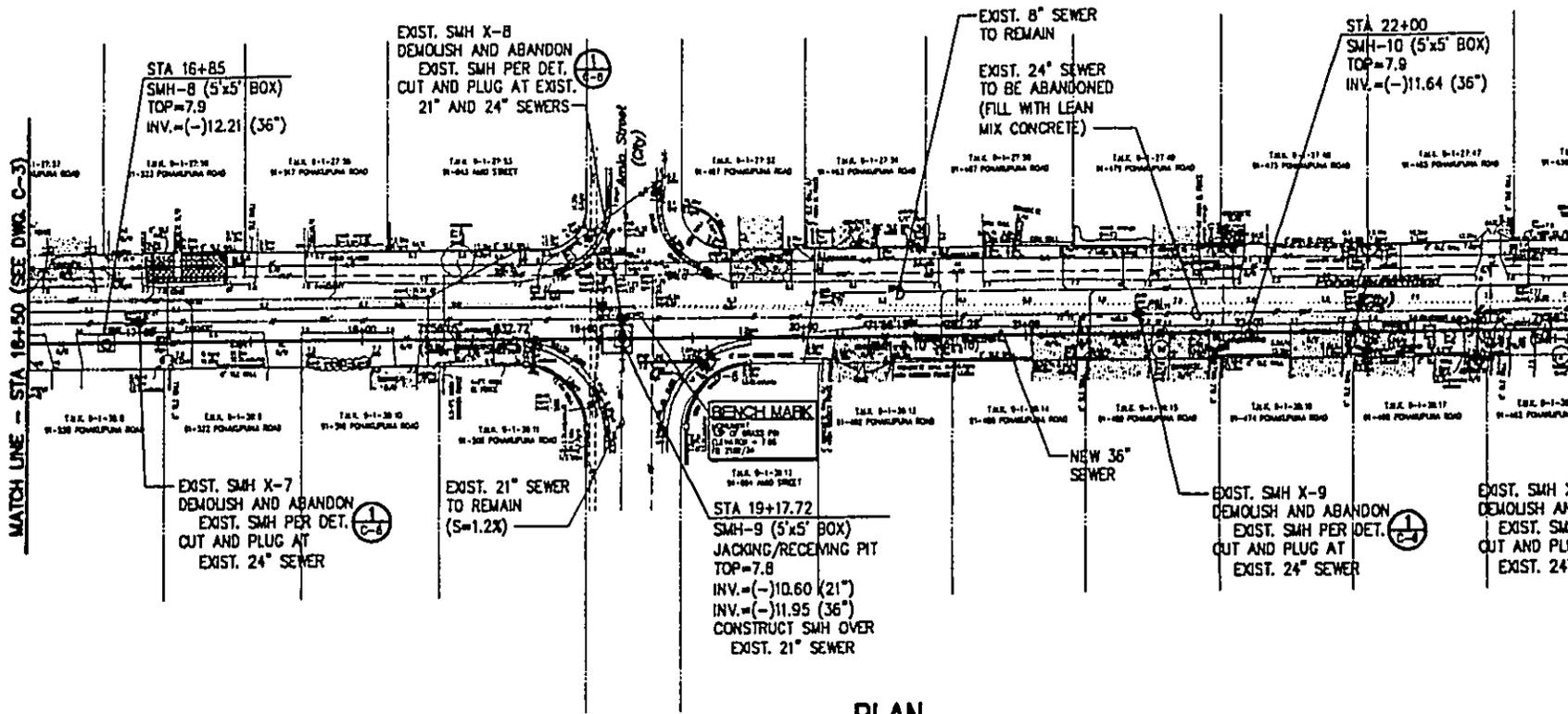


PLAN

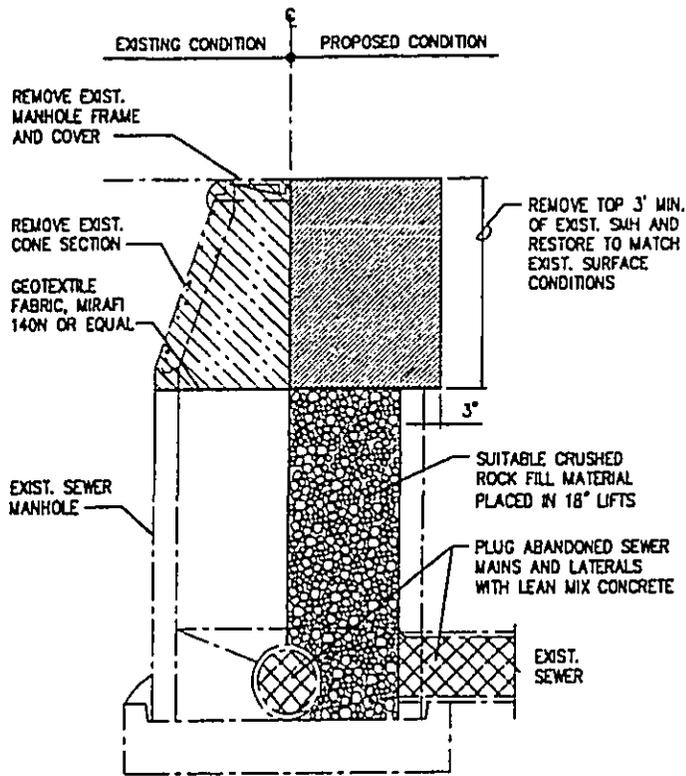
SCALE: 1" = 40'



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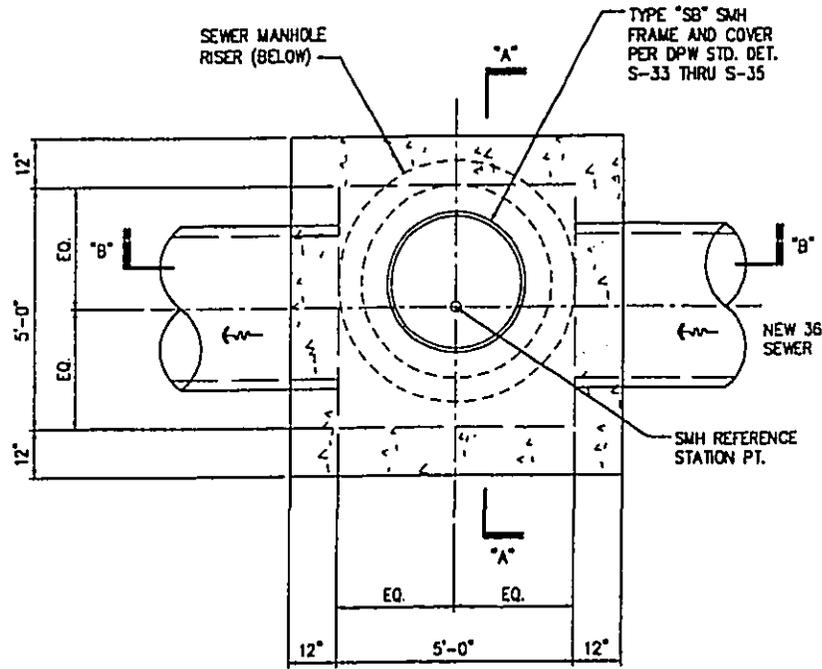


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1 TYPICAL ABANDON-IN-PLACE SMH DEMOLITION DETAIL

1
C-6 NOT TO SCALE



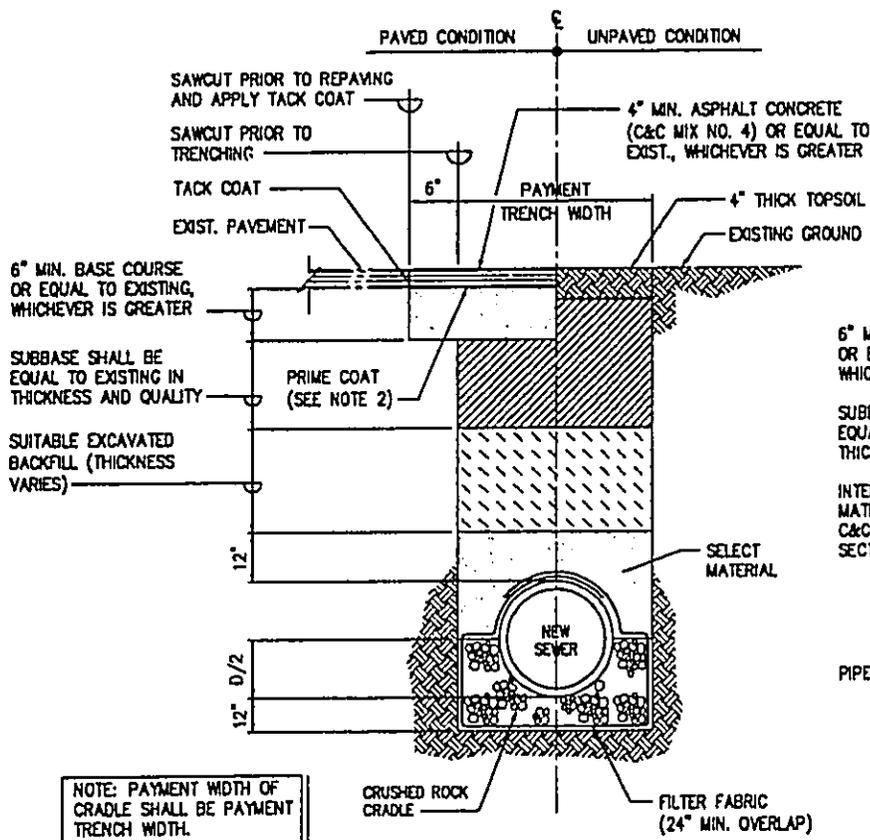
PLAN

SEWER MANHOLE NOTES:

1. PER DISCUSSIONS WITH ENV/CSM, MANHOLE RUNGS ARE NOT REQUIRED.
2. SEE STRUCTURAL DWGS. FOR REINFORCEMENT DETAILS.

2 TYP. SEWER MANHOLE DETAIL

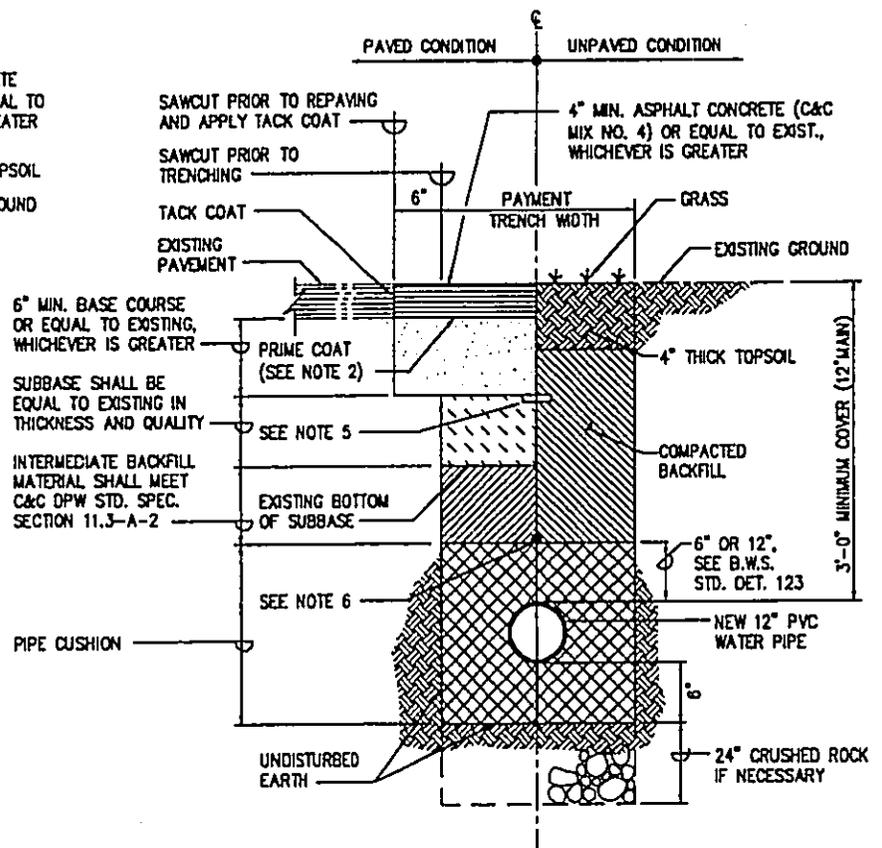
2
C-6 NOT TO SCALE



NOTE: PAYMENT WIDTH OF CRADLE SHALL BE PAYMENT TRENCH WIDTH.

(FOR OPEN-CUT INSTALLATION OF 8" SEWER ONLY) SEWERLINE TRENCH RESTORATION DETAIL

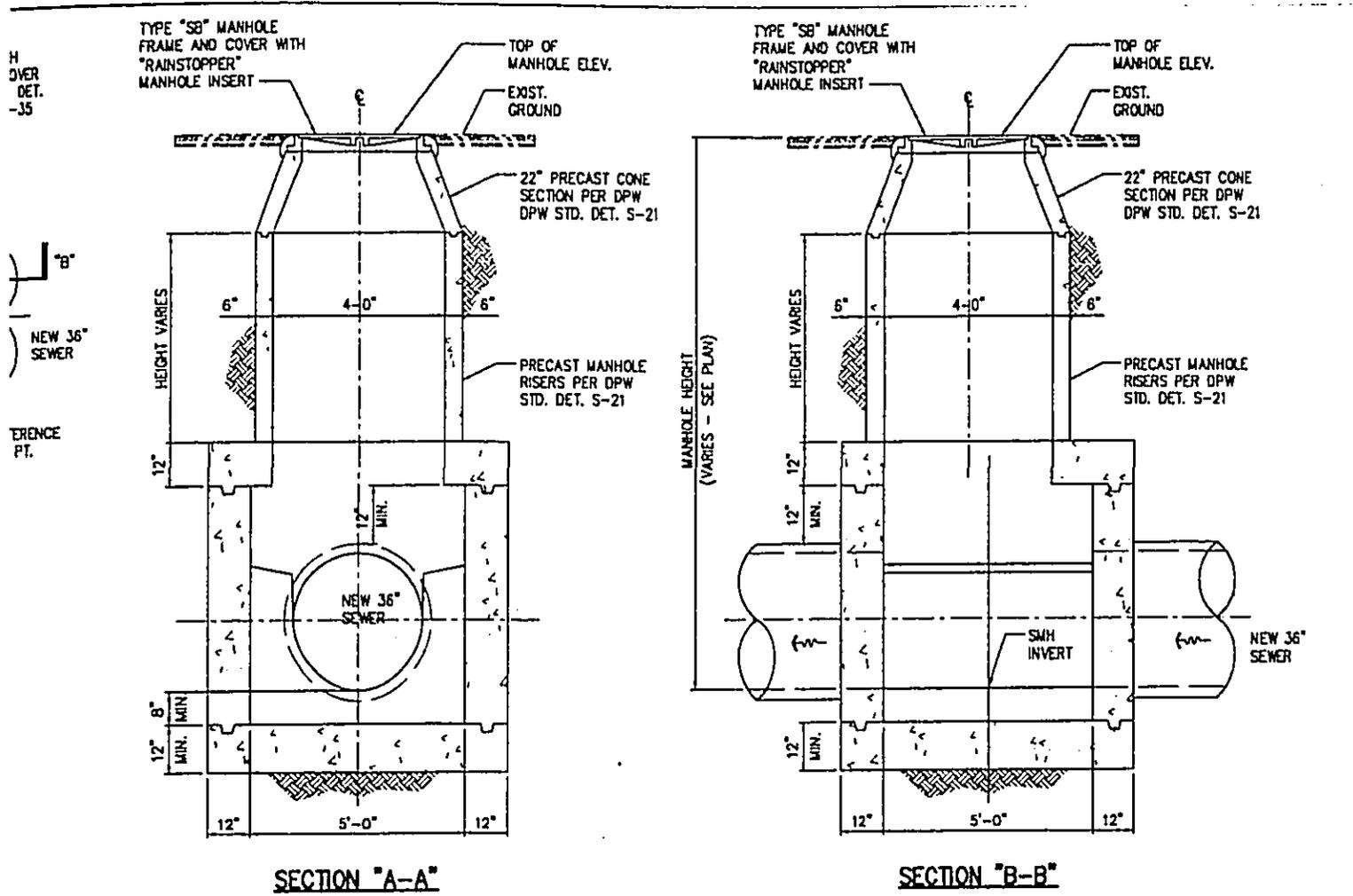
3
C-6 NOT TO SCALE



4 WATERLINE TRENCH RESTORATION DETAIL

4
C-6 NOT TO SCALE

RECEIVED AS FOLLOWS



TRENCH RESTORATION NOTES:

1. PAVEMENT STRUCTURE SHALL BE EQUAL OR BETTER THAN EXISTING IN THICKNESS AND QUALITY.
2. FOR ROAD GRADES 0% TO 7.99% AND PRIME COAT IS NOT AVAILABLE, NONE REQUIRED. IF PRIME COAT IS AVAILABLE, USE PRIME COAT. FOR ROAD GRADES GREATER THAN 7.99%, PRIME COAT IS REQUIRED.
3. FOR ROAD GRADES 8.00% TO 11.99%, 4" ASPHALT TREATED BASE SHALL BE USED IN LIEU OF THE 6" BASE COURSE.
4. REMOVE AND RECONSTRUCT A.C. PAVEMENT TO EDGE OF EXST. ROADWAY IF LESS THAN 2'-0" FROM EDGE OF TRENCH.
5. FOR WATERLINE TRENCH ONLY, INSTALL 4 MIL THICK NON-METALLIC, BLUE-COLORED WARNING TAPE 6" WIDE OVER CENTERLINE OF THE PIPE AND BELOW THE BASE COURSE ALONG THE ENTIRE LENGTH OF TRENCH. TAPE SHOULD BE MARKED WITH "CAUTION WATER LINE BURIED BELOW". PAYMENT FOR THE FURNISHING SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR THE PIPE.
6. FOR WATERLINE TRENCH ONLY, INSTALL NO. 8 GA COPPER TONING WIRE OVER CENTERLINE OF PVC PIPES AT 2'-6" MAXIMUM FROM FINISH GRADE.
7. TRENCHED AREAS SHALL BE COLD-PLAINED AND REPAVED PER DET. 5
C-7

APPROVED:

CHIEF, WASTEWATER BRANCH, DPP

DATE

CHIEF, CIVIL ENGINEERING BRANCH, DPP

DATE

(PROPOSED PUBLIC SEWER)

NON

CONCRETE (C&C)
EQUAL TO EXST.,
GREATER

CLASS

EXISTING GROUND

THICK TOPSOIL

PACKED
FILL

6" OR 12",
SEE B.W.S.
STD. DET. 123

NEW 12" PVC
WATER PIPE

24" CRUSHED ROCK
IF NECESSARY

ION DETAIL

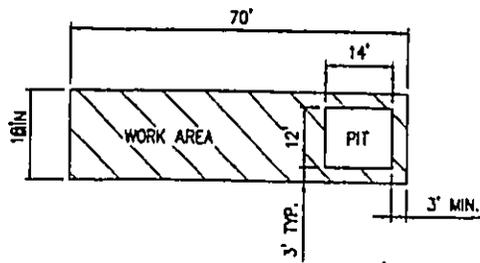
REV	DATE	DESCRIPTION	NO. SHTS	APPR
				
THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 455 PETER STREET, SUITE 1400 • HONOLULU, HAWAII 96814 TELEPHONE (808) 955-7700 • FAX (808) 955-7702				
OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII				
DETAILS - 1				
DRAWN BY: JHL		DES BY: JHL		CHECKED BY: CPL
SCALE: AS SHOWN		DATE: NOV. 2003		

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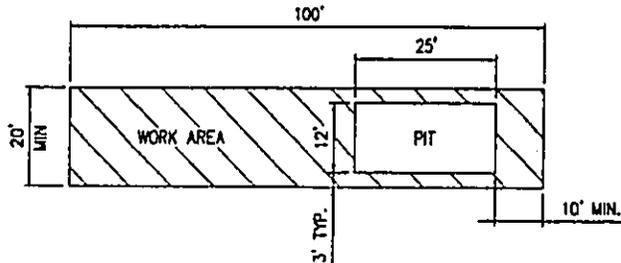
SAWCUT PRIOR TO EXCAVATION



- 6" MIN. BASE COURSE OR EQUAL TO EXISTING, WHICHEVER IS GREATER
- SUBBASE SHALL BE EQUAL TO EXISTING IN THICKNESS AND QUALITY
- SUITABLE EXCAVATED BACKFILL (THICKNESS VARIES)



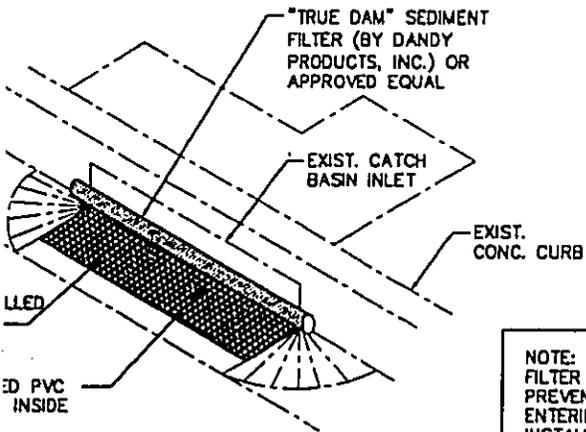
RECEIVING PIT



JACKING PIT

7 TYP. MICROTUNNELING PIT WORK AREAS
C-7 NOT TO SCALE

CATCH BASIN PROTECTION DETAIL



NOTE: CONTRACTOR SHALL INSTALL SEDIMENT FILTER DEVICES AT CATCH BASIN INLETS TO PREVENT SOIL OR DEBRIS IN ANY FORM FROM ENTERING THE DRAINAGE SYSTEM. COST FOR INSTALLATION OF FILTERS SHALL BE INCIDENTAL TO TRENCH EXCAVATION.

CATCH BASIN PROTECTION DETAIL
NOT TO SCALE

APPROVED:

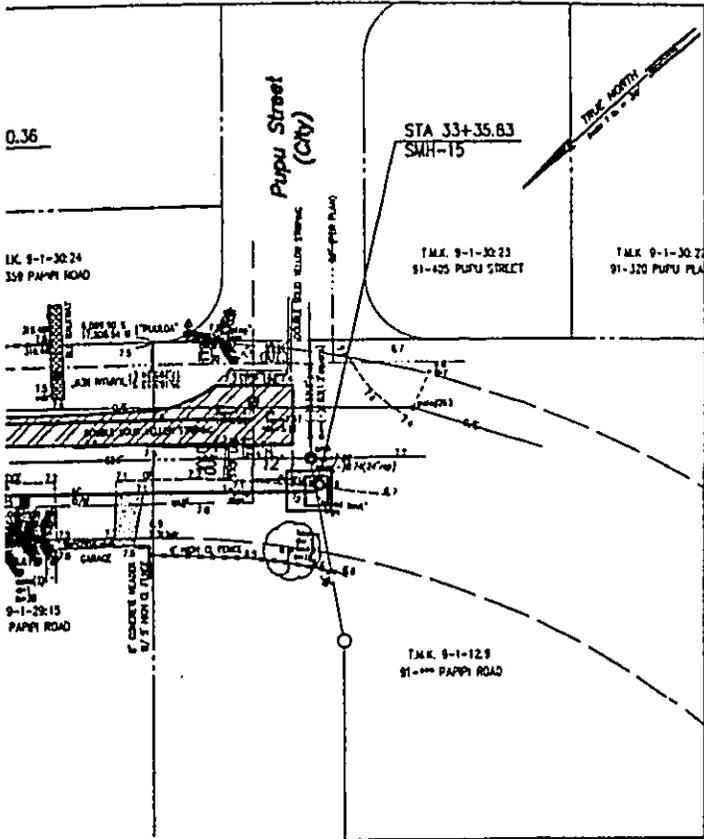
CHIEF, WASTEWATER BRANCH, DPP DATE

CHIEF, CIVIL ENGINEERING BRANCH, DPP DATE

(PROPOSED PUBLIC SEWER)

REV	DATE	DESCRIPTION	NO. SHTS	APPR
OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII				
DETAILS - 2				
DRAWN BY: JHL		DES BY: JHL		CHECKED BY: CPL
SCALE: AS SHOWN		DATE: NOV. 2003		

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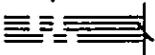
GENERAL REPAVING NOTES:

1. THE LIMITS OF REPAVING SHOWN APPLY TO LONGITUDINAL TRENCHING FOR INSTALLATION OF NEW 12-INCH WATER LINE ONLY. THE 36-INCH SEWER LINE SHALL BE INSTALLED USING MICROTUNNELING CONSTRUCTION METHODS.
2. THE REPAVING PLAN INDICATES LIMITS OF COLD PLANING/REPAVING FOLLOWING THE INSTALLATION OF NEW 12-INCH WATER LINE WITHIN A.C. ROADWAYS.
3. SEE PLAN/PROFILE SHEETS FOR LOCATION OF ALL STRIPING AND PHYSICAL OBJECTS (MANHOLE COVERS, VALVE COVERS, STREET MONUMENTS, ETC.) THAT NEED TO BE RECONSTRUCTED OR REPLACED.
4. SERVICE LATERALS, MICROTUNNELING PITS, ABANDONED/RECONSTRUCTED MANHOLE LOCATIONS, AND SEWER CONNECTION LOCATIONS ARE TO BE PAVED TO TRENCH/PIT RESTORATION WIDTH LIMITS.
5. FOR TYPICAL COLD PLANING/REPAVING DETAIL, SEE DET. 5
C-7
6. AT REPAVING LIMITS, PROVIDE SMOOTH RIDING CONNECTION TO MATCH EXISTING PAVEMENT PER DETAIL ON THIS SHEET.

NG PAVEMENT
O REMAIN

- PROVIDE SMOOTH
RIDING CONNECTION

- EXIST. A.C.
PAVEMENT



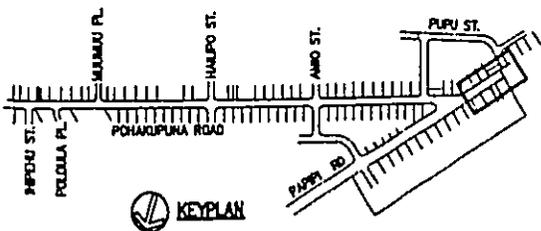
- TACK COAT

DETAIL

APPROVED:

CHIEF, CIVIL ENGINEERING BRANCH, DPP

DATE



REV	DATE	DESCRIPTION	NO. SHTS	APPR

WILSON H. LOO
LICENSED PROFESSIONAL ENGINEER
NO. 9380-C
HAWAII, USA
11/29/04
DATE

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING
445 FITCH STREET, SUITE 2000 • HONOLULU, HAWAII 96813
PHONE: (808) 262-7700 • FAX: (808) 262-7301

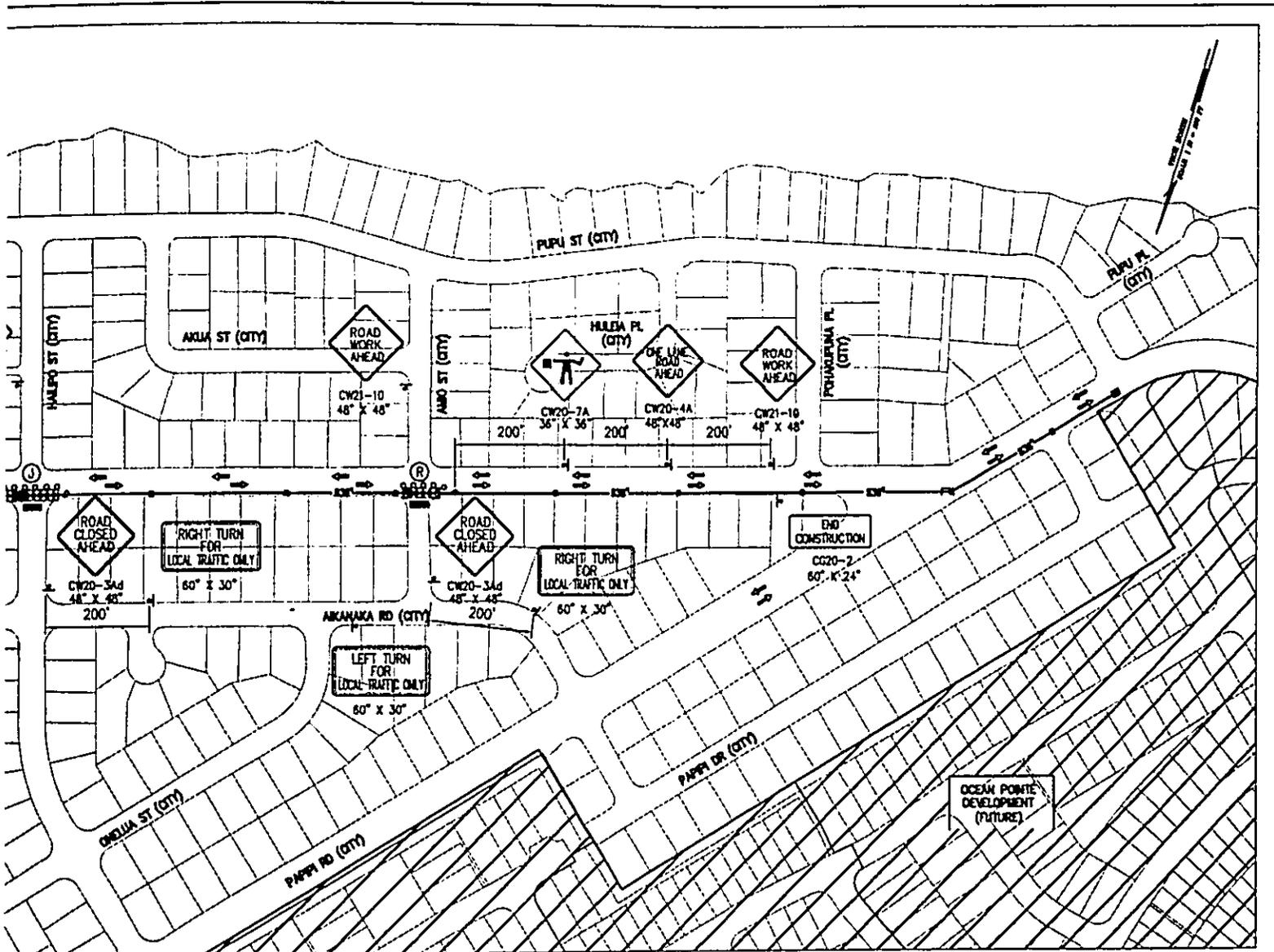
OCEAN POINTE DEVELOPMENT
OFFSITE SEWER
EWA, OAHU, HAWAII

REPAVING PLAN

DRAWN BY: JHL
DES BY: JHL
CHECKED BY: CPL

SCALE: AS SHOWN
DATE: NOV. 2003

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AN - PHASE 1



REMOVE PERMANENT PAVEMENT MARKINGS AND TRAFFIC SIGNS UPON COMPLETION OF EACH PHASE OF WORK.

WORK ZONE TRAFFIC CONTROL DEVICES SHALL COMPLY WITH THE "STATEWIDE GUIDE FOR WORK ZONE TRAFFIC CONTROL DEVICES" DATED SEPTEMBER 13, 2000.

REMOVE EXISTING, FADED, OR OBLITERATED PAVEMENT MARKINGS THAT ARE NECESSARY FOR SAFE TRAFFIC FLOW IN THE CONSTRUCTION AREA WITH TEMPORARY PERMANENT MARKINGS BEFORE OPENING THE ROADWAY TO PUBLIC TRAFFIC EACH PHASE.

TRAFFIC CONES AND DELINEATORS SHALL BE A MINIMUM OF 18 INCHES IN HEIGHT WITH A BROADENED BASE AND MAY BE MADE OF VARIOUS MATERIALS TO WITHSTAND IMPACT WITHOUT DAMAGE TO THEMSELVES OR TO VEHICLES. 28 INCHES SHOULD BE THE MINIMUM HEIGHT OF CONES DURING HOURS OF DARKNESS.

TRAFFIC CONES AND DELINEATORS SHALL BE REFLECTORIZED OR EQUIPPED WITH REFLECTIVE DEVICES FOR MAXIMUM VISIBILITY DURING NIGHT TIME USE.

IF AN AREA WHERE TRAFFIC DOES NOT SELF REGULATE EFFECTIVELY WITHIN CITY MAINTAINED RIGHT-OF-WAY, A POLICE OFFICER WILL BE EMPLOYED TO REGULATE TRAFFIC.

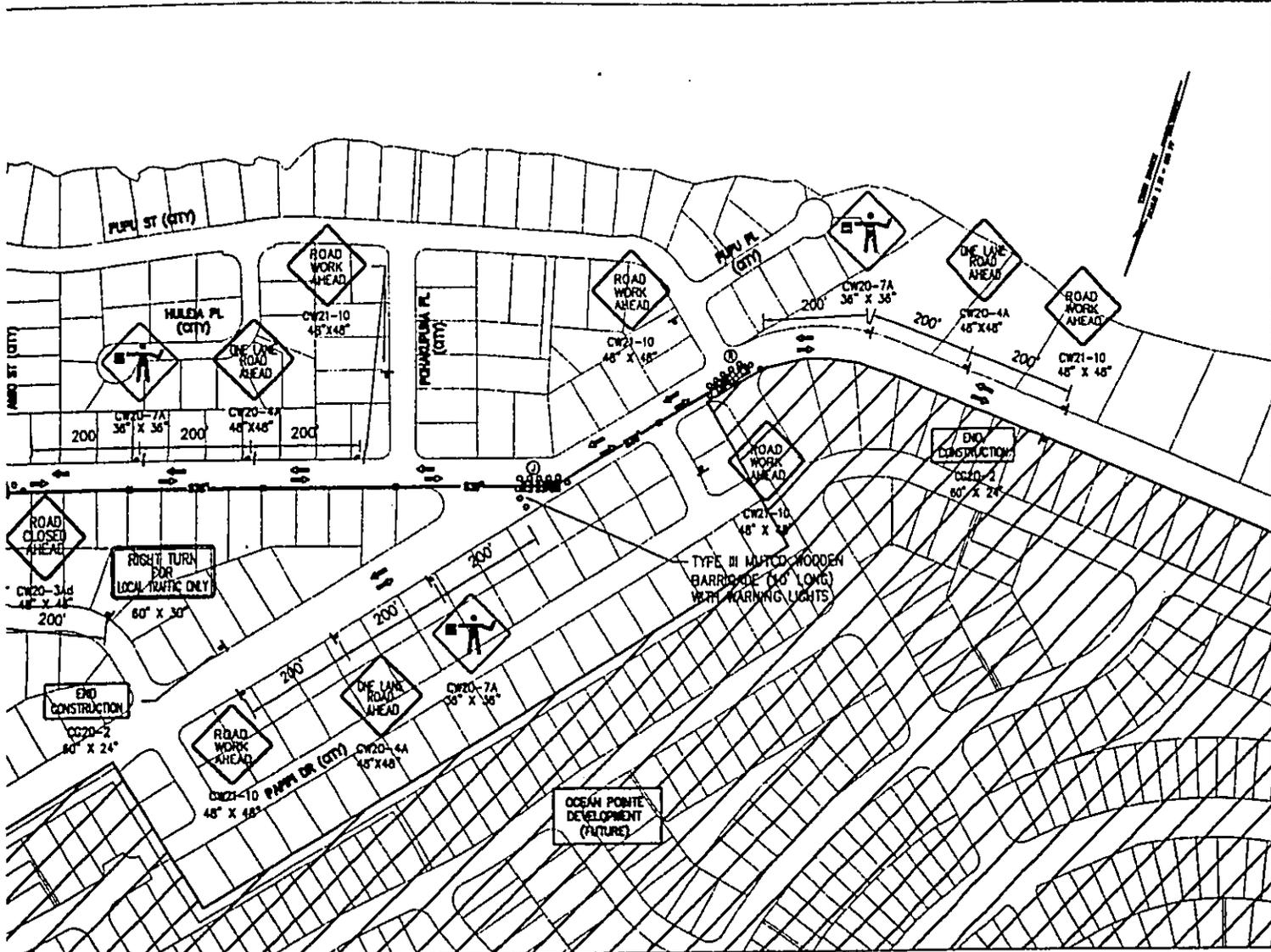
TYPICAL LAYOUT FOR TRAFFIC CONTROL DEVICES AT MICROTUNNELING PIT LOCATIONS, SEE DETAIL ON SHEET TC-2.

OAHU TRANSIT AUTHORITY NOTE:
 THE CONTRACTOR SHALL NOTIFY OAHU TRANSIT SERVICES, INC., (OTS) EDWARD F. FENNER (848-4571) OR LOWELL TOM (848-4578), TWO WEEKS PRIOR TO THE START OF CONSTRUCTION, INFORMING THEM OF LOCATION, SCOPE OF WORK, PROPOSED CLOSURE OF ANY STREET OR TRAFFIC LANES, AND THE NEED TO RELOCATE ANY BUS STOP.

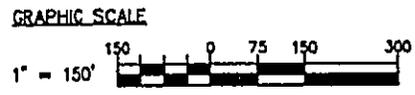
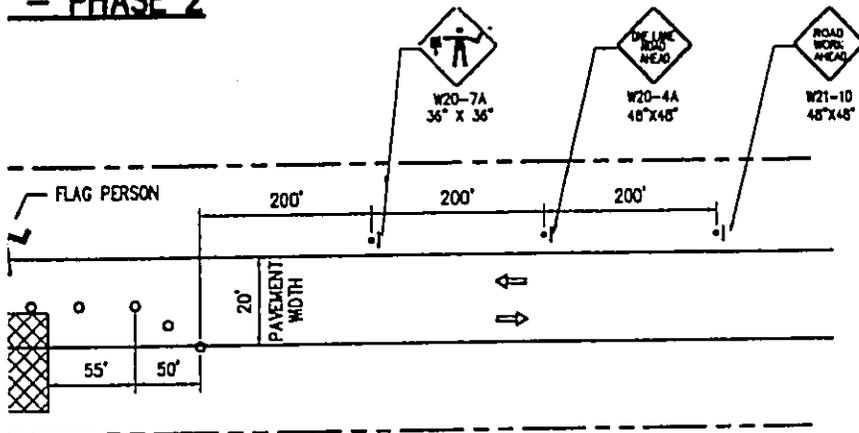
APPROVED: _____ DATE _____
 CHIEF, TRAFFIC REVIEW BRANCH, DPP

REV	DATE	DESCRIPTION	NO. SHEETS	APPR
		THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 415 PULASKI STREET, SUITE 1407 • HONOLULU, HAWAII 96813 PHONE: (808) 594-7700 • FAX: (808) 594-7341		
		OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII		
		TRAFFIC CONTROL PLAN - PHASE 1		
		DRAWN BY: JHL SCALE: AS SHOWN	DES BY: JHL	CHECKED BY: CPL DATE: NOV. 2003

RECEIVED AS FOLLOWS



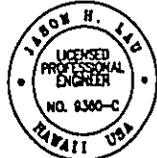
- PHASE 2



APPROVED: _____
 CHIEF, TRAFFIC REVIEW BRANCH, DPP _____ DATE _____

**CONTROL DEVICES
 AT WORK AREAS**

REV	DATE	DESCRIPTION	NO. SHTS	APPR
OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA, OAHU, HAWAII				
TRAFFIC CONTROL PLAN - PHASE 2				
DRAWN BY: JAL		DES BY: JAL		CHECKED BY: CPL
SCALE: AS SHOWN		DATE: NOV. 2003		



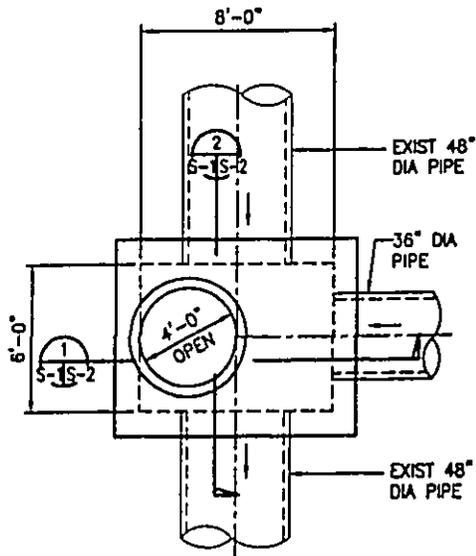
4/8/04
 JAL
 JAL

RECEIVED AS FOLLOWS

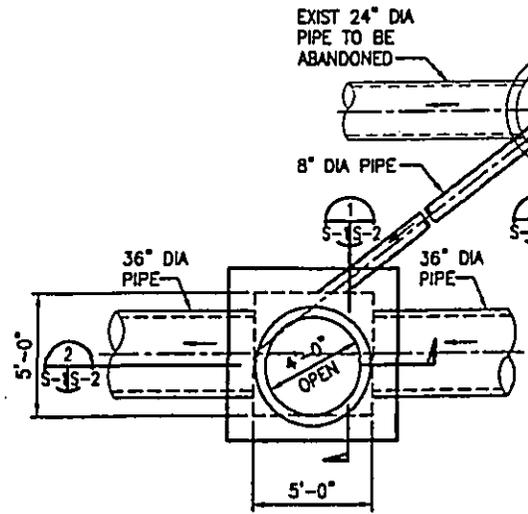
NOTES:

1. MINIMUM CONCRETE 28-DAY COMPRESSIVE STRENGTH FOR REINFORCED CONCRETE RETAINING WALLS: CLASS AAA-S (4000 PSI).
2. REINFORCING STEEL: NEW STOCK DEFORMED BARS CONFORMING TO ASTM A-615, GRADE 60.
3. CONCRETE COVER OVER REINFORCING BARS UNLESS OTHERWISE NOTED:

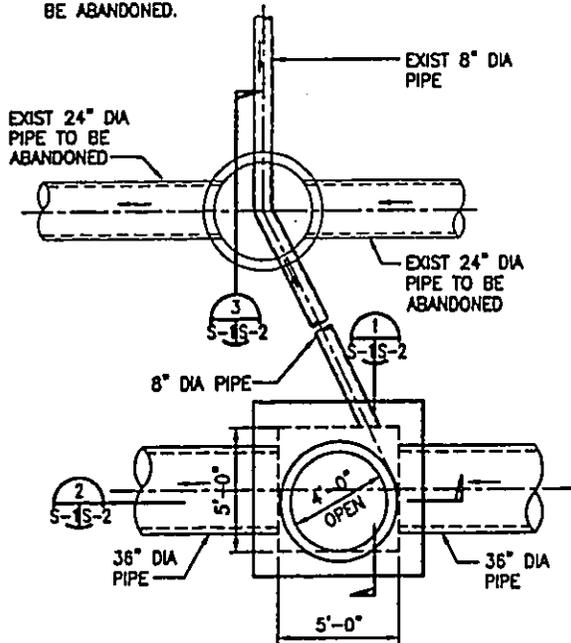
A. TYPICAL	2"
B. CONCRETE IN CONTACT WITH SEWAGE OR SEWAGE GASES	3"
4. DOWELS SHALL BE THE SAME SIZE AND SPACING AND SHALL BE IN THE SAME PLANE AS THE BARS TO WHICH THEY ARE SPLICED UNLESS OTHERWISE NOTED ON THE PLANS.
5. SPLICES AND EMBEDMENT LENGTHS SHALL BE A MINIMUM OF 48 BAR DIAMETERS UNLESS OTHERWISE NOTED ON THE PLANS.
6. REINFORCING BENDS AND HOOKS SHALL CONFORM TO ACI 318-99.
7. ALL WORK SHALL CONFORM TO APPLICABLE PORTIONS OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1988" OF THE DEPARTMENT OF PUBLIC WORKS, CITY AND COUNTY OF HONOLULU AND "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1984" AS AMENDED, OF THE DEPARTMENT OF PUBLIC WORKS, CITY AND COUNTY OF HONOLULU, UNLESS OTHERWISE NOTED IN THE PLANS.
8. THE CONTRACTOR SHALL VERIFY ALL CONTRACT DOCUMENTS, DIMENSIONS, LOCATION OF UTILITIES PRIOR TO STARTING WORK AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR INCONSISTENCIES.
9. LEAN MIX CONC SHALL BE CLASS B-S (2500 PSI).
10. SEE  FOR TYPICAL DETAIL FOR PIPE PLUG AT PIPES TO BE ABANDONED.



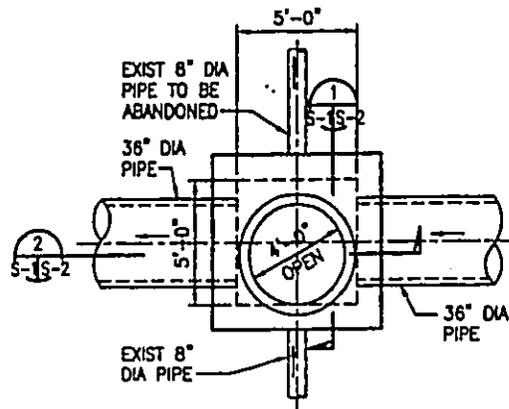
1 SMH1 (STA 0+00) PLAN
SCALE: 1/4" = 1'-0"



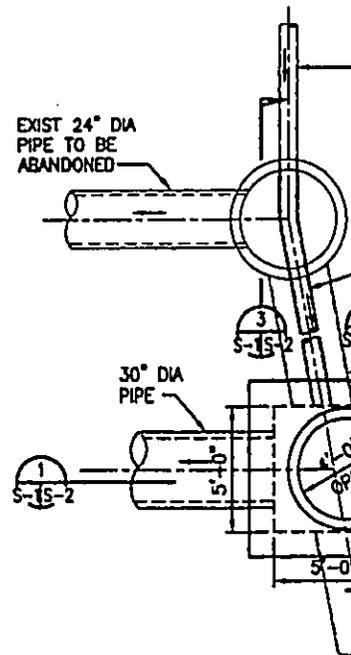
2 SMH3 (STA 3+89) PLAN
SCALE: 1/4" = 1'-0"



5 SMH12 (STA 26+78) PLAN
SCALE: 1/4" = 1'-0"

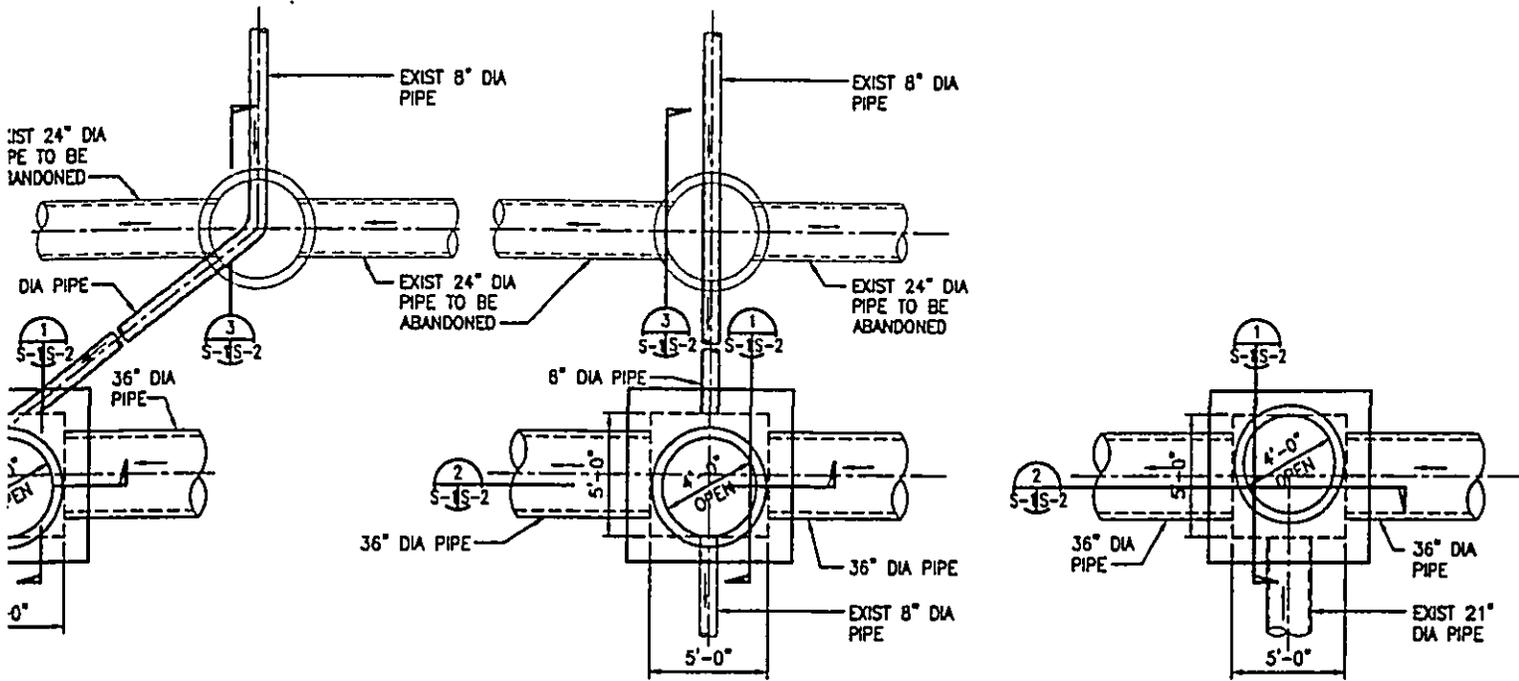


6 SMH14 (STA 31+90.36) PLAN
SCALE: 1/4" = 1'-0"



7 SMH15 (STA 33+) PLAN
SCALE: 1/4" = 1'-0"

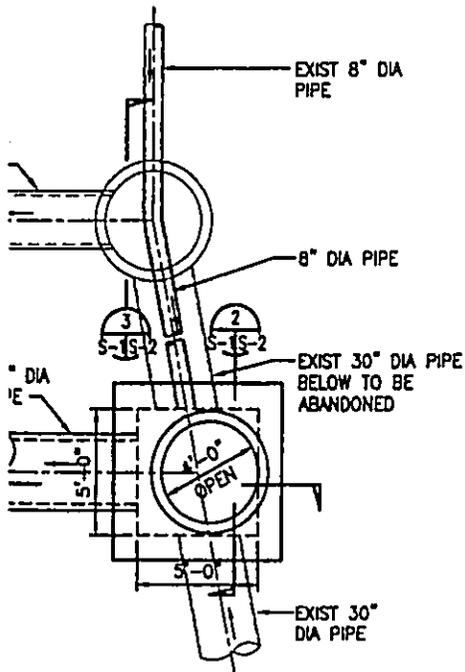
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13 (STA 3+89) PLAN
1/4" = 1'-0"

3 SMH6 (STA 11+78.46) PLAN
SCALE: 1/4" = 1'-0"

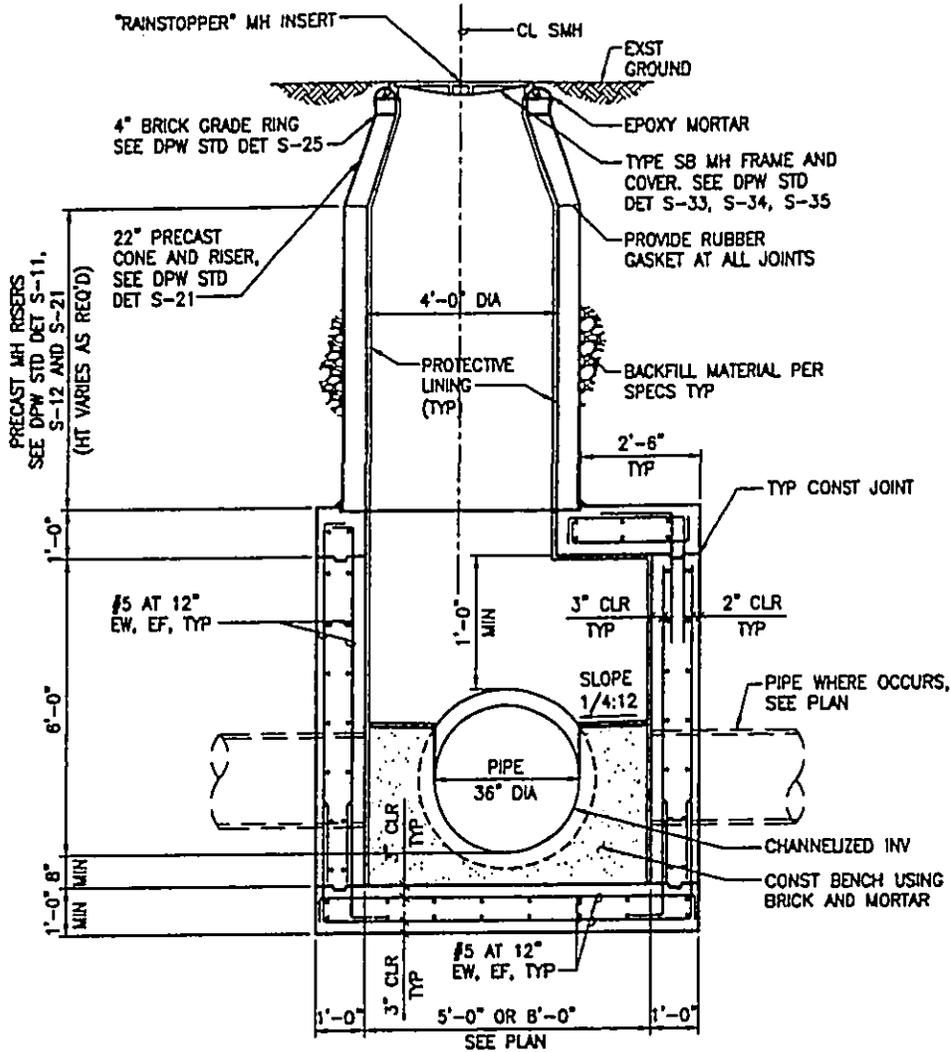
4 SMH9 (STA 19+17.72) PLAN
SCALE: 1/4" = 1'-0"



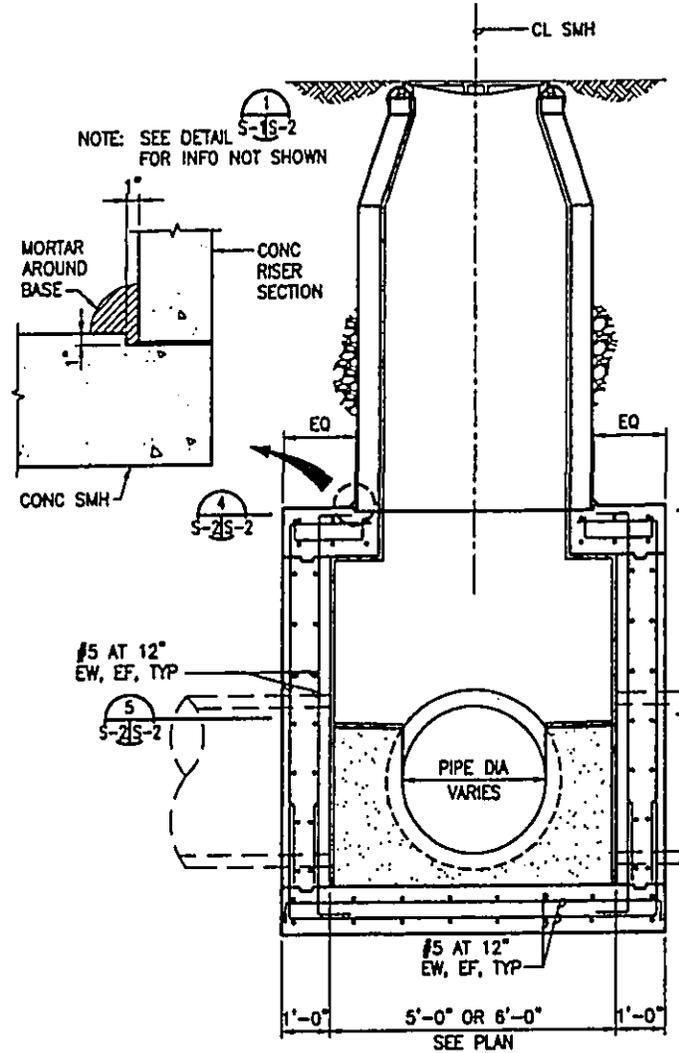
115 (STA 33+35.83) PLAN
1/4" = 1'-0"

REV	DATE	DESCRIPTION	NO. SHTS	APPR
				
THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING <small>143 PUNAHOA STREET, SUITE 1000 • HONOLULU, HAWAII 96814 PHONE: (808) 943-7700 • FAX: (808) 943-7701</small>				
OCEAN POINTE DEVELOPMENT OFFSITE SEWER EYVA BEACH, OAHU, HAWAII				
NOTES AND SMH PLANS				
DRAWN BY: DO, GY		DES BY: TN	CHECKED BY: DO	
SCALE: AS SHOWN		DATE: NOVEMBER 2003		

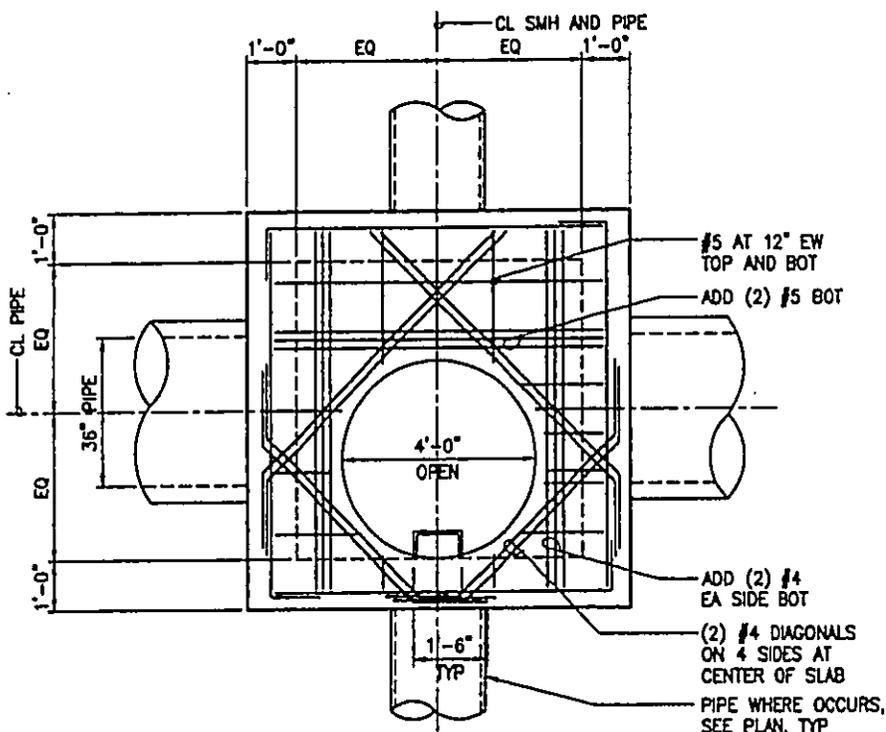
RECEIVED AS FOLLOWS



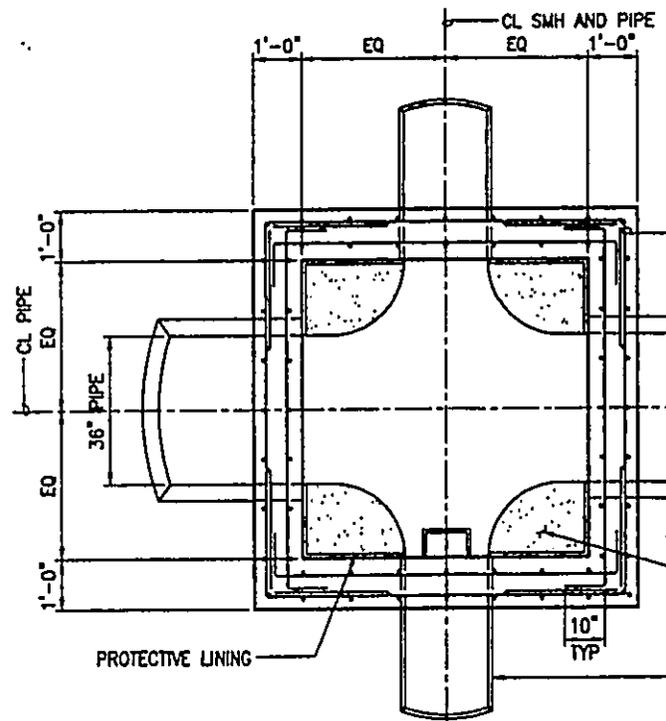
1 TYPICAL SECTION
S-3, S-1, S-2 SCALE: 1/2" = 1'-0"



2 TYPICAL SECTION
S-3, S-1, S-2 SCALE: 1/2" = 1'-0"

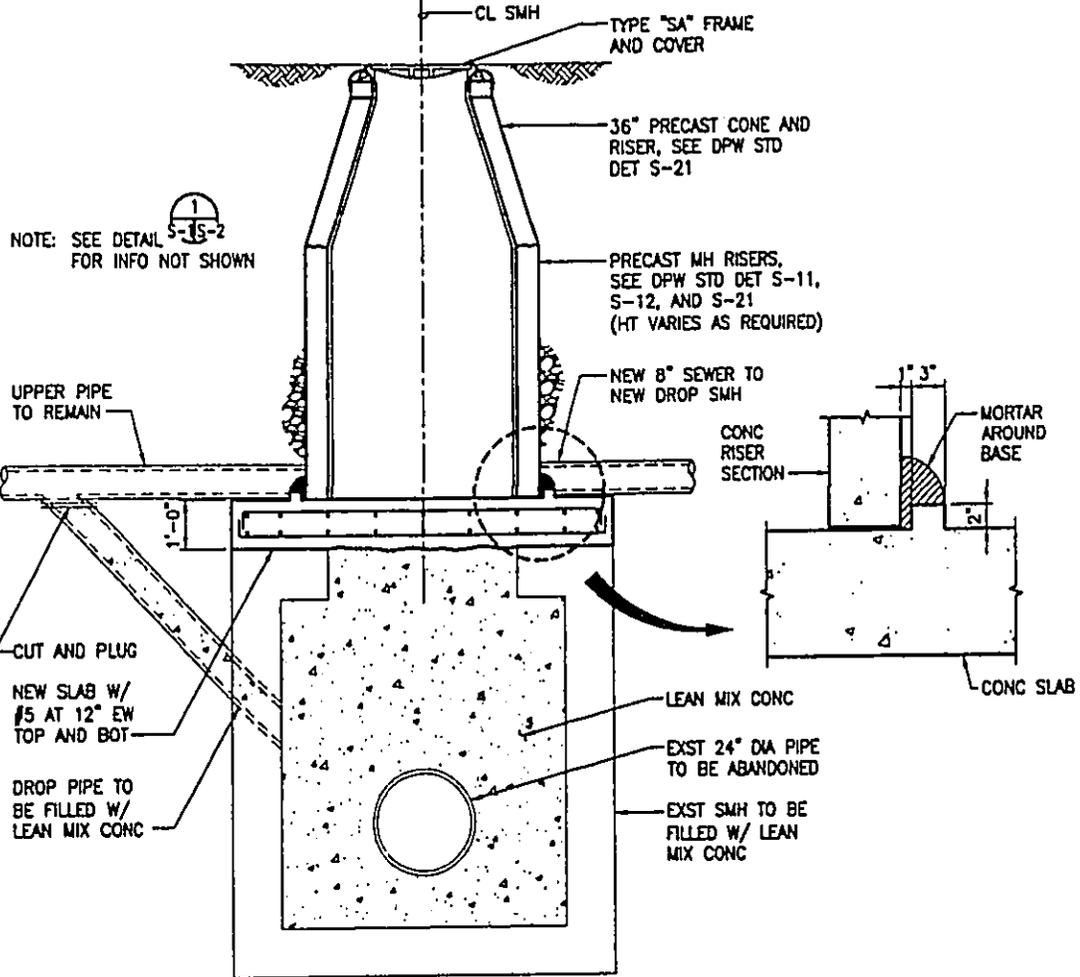
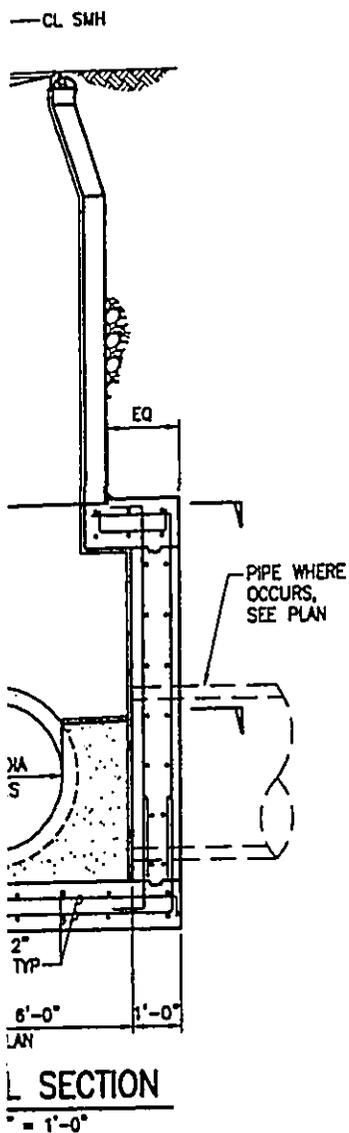


4 TYPICAL SMH - TOP SLAB PLAN
S-2, S-2 SCALE: 1/2" = 1'-0"

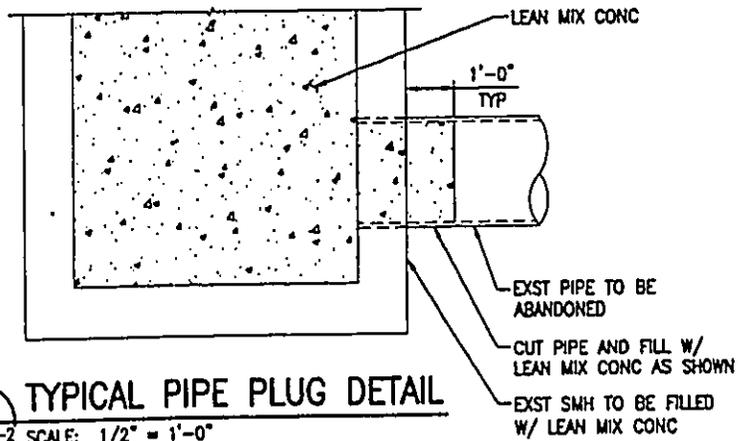
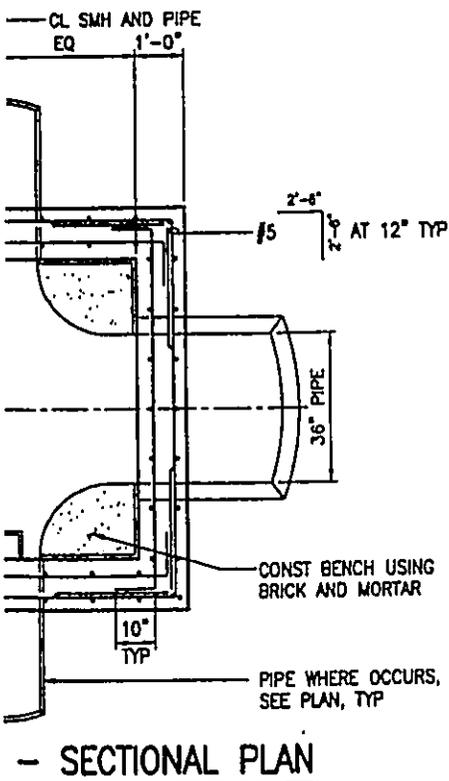


5 TYPICAL SMH - SECTIONAL PLAN
S-2, S-2 SCALE: 1/2" = 1'-0"

RECEIVED AS FOLLOWS

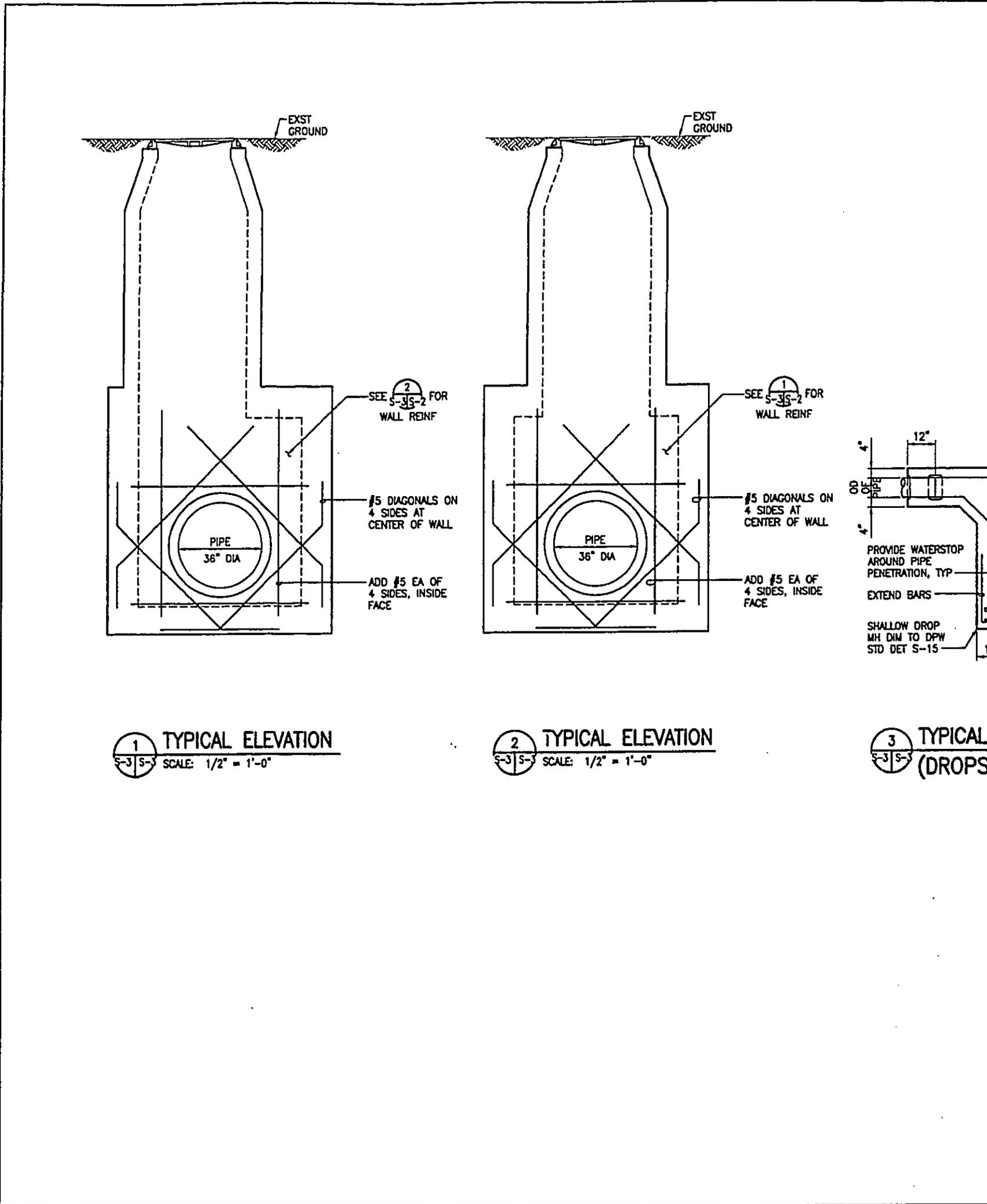


3 DEMOLITION AT EXISTING SMH
S-11-S-2 SCALE: 1/2" = 1'-0"

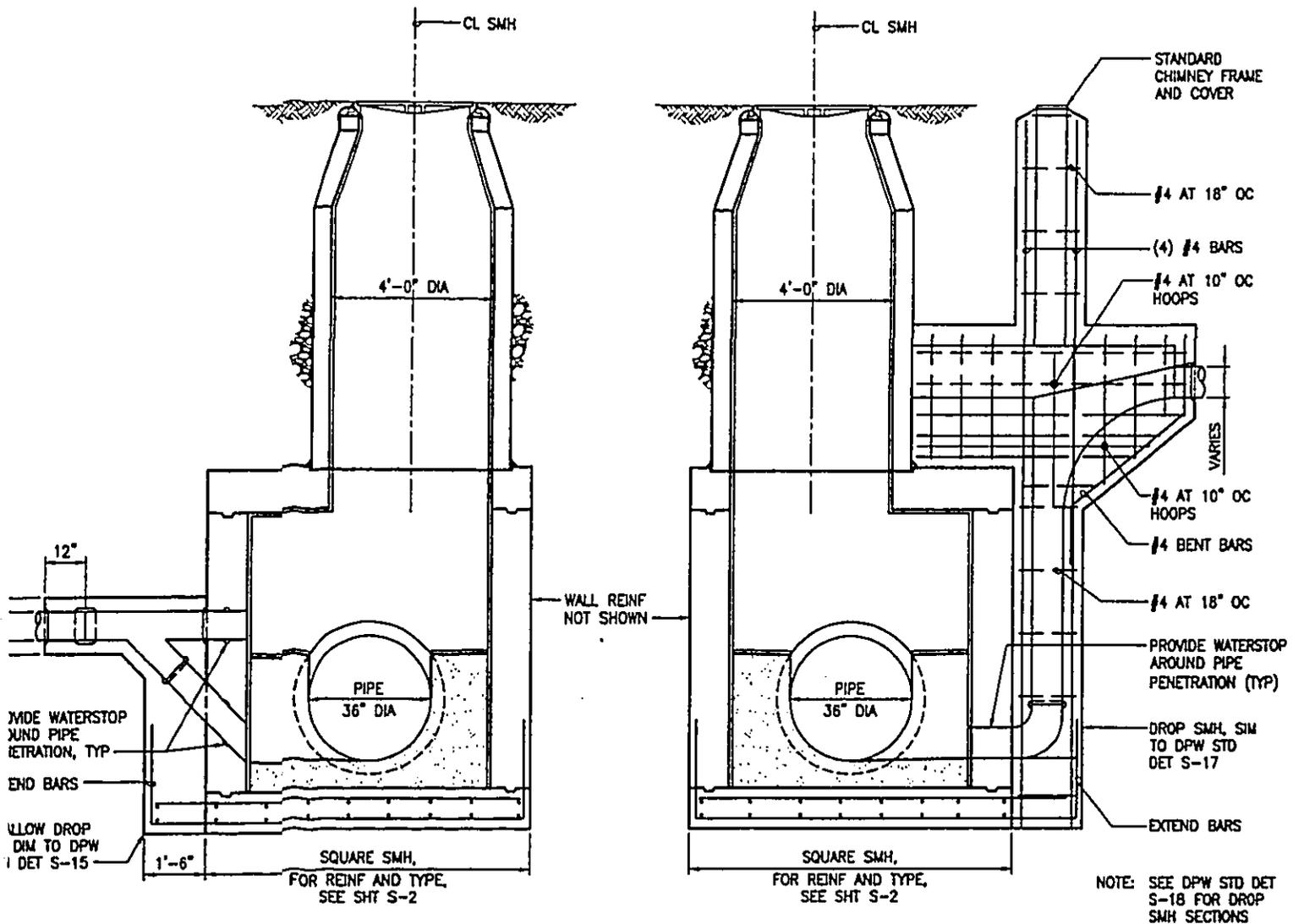


REV	DATE	DESCRIPTION	NO. SHTS	APPR
 <p>THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 614 PUNAH STREET, SUITE 100 • HONOLULU, HAWAII 96814 PHONE: (808) 944-7700 • FAX: (808) 944-7241</p>				
<p>OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA BEACH, OAHU, HAWAII</p>				
<p>TYPICAL SMH SECTIONS</p>				
DRAWN BY: DO, GT		DES BY: TH	CHECKED BY: DO	
SCALE: AS NOTED		DATE: NOVEMBER 2003		
<p>FILE POCKET FOLDER NO.</p>				

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS

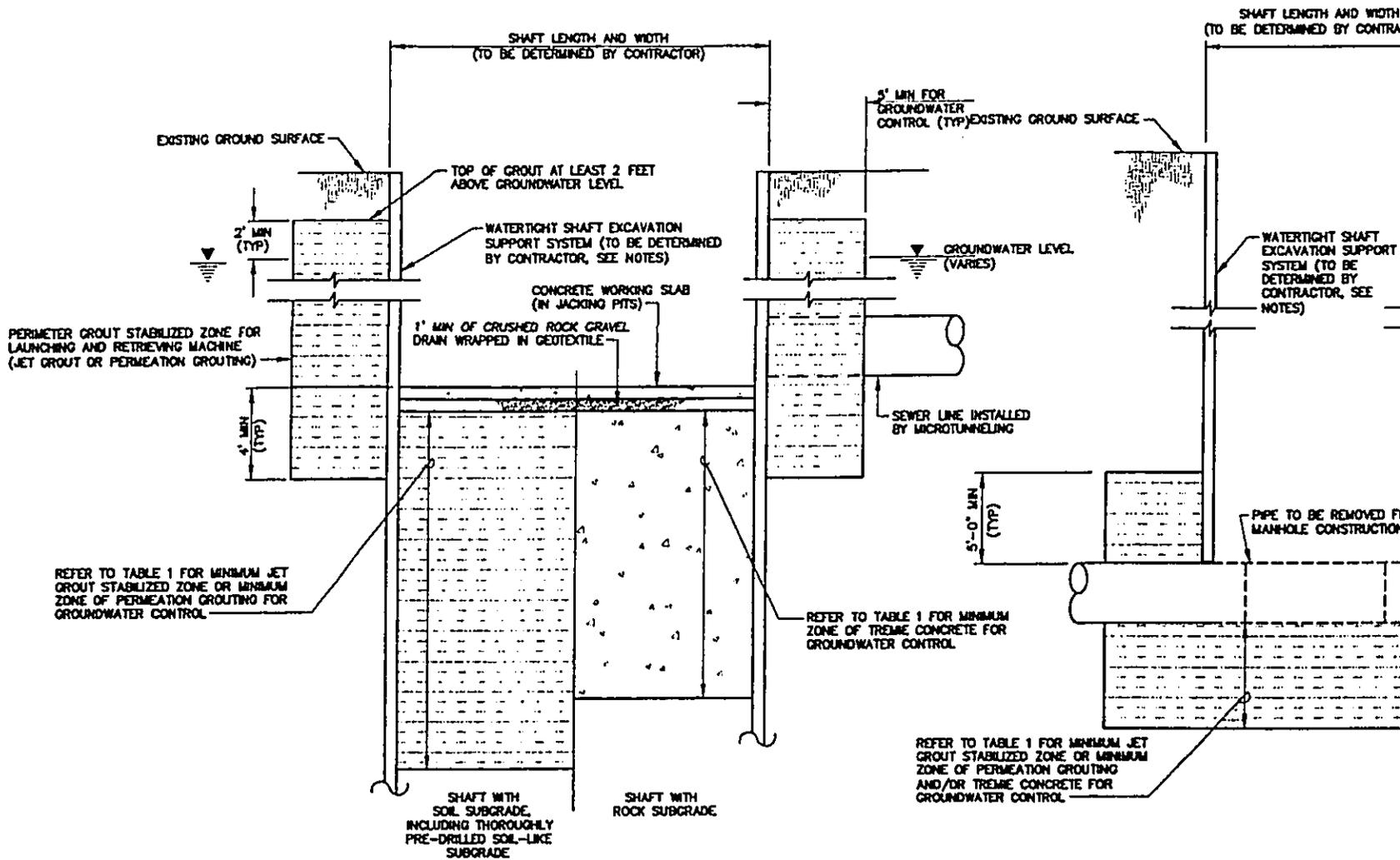


3 TYPICAL SHALLOW DROP SMH DETAIL
 (DROPS ≤ 5.0 FEET) SCALE: 1/2" = 1'-0"

4 TYPICAL DROP MANHOLE DETAIL
 (DROPS > 5.0 FEET) SCALE: 1/2" = 1'-0"

REV	DATE	DESCRIPTION	NO. SHITS	APPR
				
THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 418 PIKOOI STREET, SUITE 1001 • HONOLULU, HAWAII 96814 PHONE (808) 966-7700 • FAX (808) 966-7261				
OCEAN POINTE DEVELOPMENT OFFSITE SEWER EWA BEACH, OAHU, HAWAII				
ELEVATIONS AND DETAILS				
DRAWN BY: DO, GY		DES BY: TM	CHECKED BY: DO	
SCALE: AS SHOWN		DATE: NOVEMBER 2003		

RECEIVED AS FOLLOWS



TYPICAL SHAFT SECTION FOR JACKING AND RECEIVING PITS 1
SCALE: NONE G-1

TYPICAL SHAFT SECTION FOR INTERMEDIATE MANHOLE
SCALE: NONE

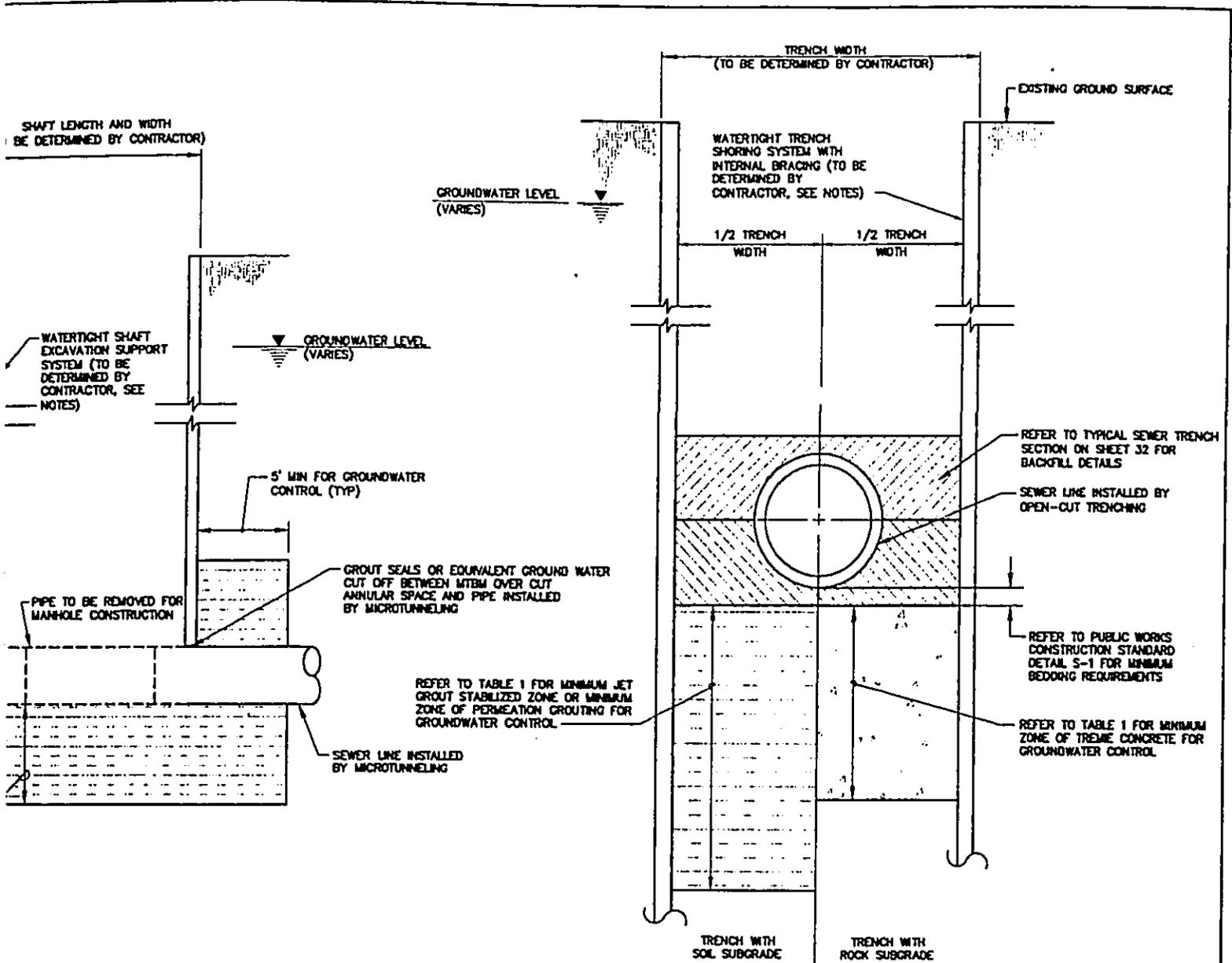
NOTES:

1. CONSTRUCTION SHAFTS AND OPEN-CUT TRENCHES LOCATED IN CITY STREETS OR HIGHWAYS SHALL BE COVERED DURING NON-WORKING HOURS TO SAFELY SUPPORT AND MAINTAIN STREET OR HIGHWAY VEHICULAR TRAFFIC, AS SPECIFIED.
2. REFER TO GEOTECHNICAL INVESTIGATION REPORT FOR ANTICIPATED SHAFT AND OPEN-CUT TRENCH EXCAVATION AND SUBGRADE CONDITIONS.
3. THOROUGHLY PREDRILL ALL SHEETPILES OR SHAFT PERIMETER SUPPORT LOCATIONS FOR ADEQUATE EMBEDMENT SHAFT AND TRENCH EXCAVATION SUPPORT SYSTEM.
4. SHAFT AND OPEN-CUT TRENCH EXCAVATION EXTENDING BELOW MEAN SEA LEVEL AND REMOVAL OF GROUND WATER WITHIN SHAFT OR TRENCH EXCAVATION SHALL NOT COMMENCE UNTIL GROUT OR TREMIE CONCRETE HAS ACHIEVED THE REQUIRED STRENGTH TO PROPERLY CONTROL GROUNDWATER AND STABILIZE THE GROUND AND SUPPORT THE EXCAVATION.
5. REFER TO SPECIFICATIONS AND GEOTECHNICAL INVESTIGATION REPORT FOR MINIMUM FACTOR OF SAFETY AGAINST BOTTOM HEAVE OR FAILURE.
6. REFER TO SPECIFICATIONS FOR SHAFT AND OPEN-CUT TRENCH EXCAVATION SUPPORT SYSTEM REQUIREMENTS. DRIVING OR PULLING OF SHEET PILES USING VIBRATORY HAMMERS IS PROHIBITED.
7. REFER TO TABLE 1 FOR MIN JET GROUT STABILIZED ZONE OR MINIMUM ZONE OF PERMEATION GROUTING AND/OR TREMIE CONCRETE FOR GROUNDWATER CUT-OFF.

DEPTH OF SHAFT OR TRENCH (FEET) *	MIN JET GROUT STABILIZED ZONE OR MINIMUM ZONE OF PERMEATION GROUTING AND/OR TREMIE CONCRETE FOR GROUNDWATER CUT-OFF (FEET)
< 10	5
> 10 - 15	10
> 15 - 20	14
> 20 - 26	18

* MEASURED FROM TOP OF EXISTING GROUND SURFACE TO TOP OF EXCAVATION SUPPORT SYSTEM.
NOTE: ASSUMED GROUND WATER LEVEL AT MEAN SEA LEVEL.

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TYPICAL SHAFT SECTION FOR IMMEDIATE MANHOLE
 SCALE: NONE
 2
 G-1

TYPICAL GROUNDWATER CONTROL DETAILS FOR SEWER LINE INSTALLED BY OPEN-CUT TRENCHING
 SCALE: NONE
 3
 G-1

TABLE 1

DEPTH (FEET)	MIN JET GROUT OR PERMEATION GROUTING STABILIZED ZONE (FEET)	MIN ZONE OF TREMIE CONCRETE (FEET)
5	5	4
10	10	8
14	14	12
19	19	16

TOP OF EXISTING GROUND SURFACE TO BOTTOM OF CUT TRENCH EXCAVATION
 GROUND WATER LEVEL AT +2 FEET ABOVE MSL.

60% DRAWING SUBMITTAL
 NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	NO. SHTS	APPR

JAMES K.P. KWONG
 LICENSED PROFESSIONAL ENGINEER
 No. 8948-C
 HAWAII, U.S.A.

THE LIMTIACO CONSULTING GROUP
 CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING
 433 PUEBEA STREET, SUITE 1400 - HONOLULU, HAWAII 96813
 PH: (808) 521-7700 • FAX: (808) 521-7300

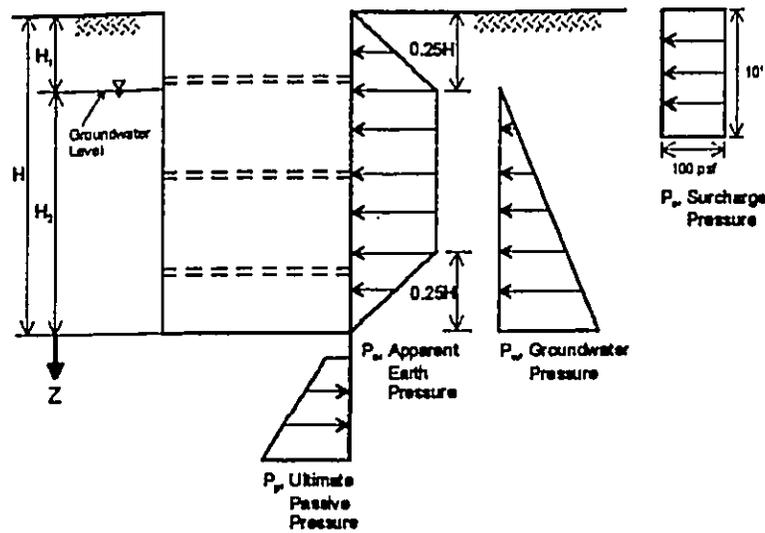
OCEAN POINT RECONSTRUCTED SEWER

EWA BEACH, OAHU, HAWAII

SHAFT AND TRENCH DETAILS

DRAWN BY: MAB	DES BY: JPK	CHECKED BY:
SCALE: AS SHOWN	DATE: 10-31-03	

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$P_p = 166Z \text{ (psf)}$
 $P_a = 43H \text{ (psf) above groundwater table}$
 $P_a = 18H \text{ (psf) below groundwater table}$
 $P_w = \gamma_w H_2$
 Total Pressure, $P = P_a + P_w + P_s$

- Notes:
1. Surcharge pressure should be increased if large equipment or stockpiled soil will be immediately adjacent to the shoring.
 2. A minimum factor of safety of 1.5 should be employed in passive earth pressure calculations.
 3. Passive resistance within the upper 2 feet should be ignored.

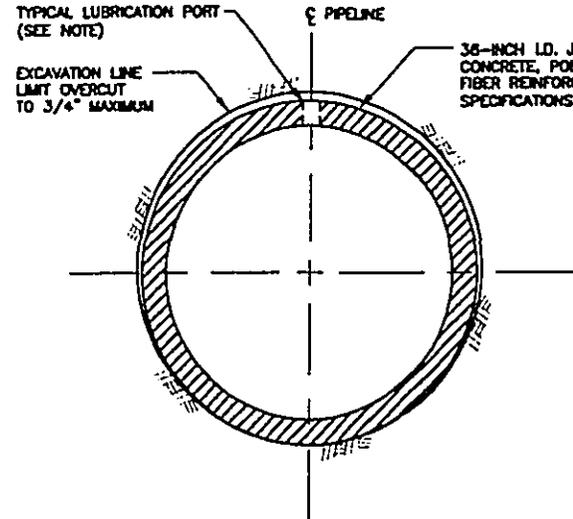
LATERAL EARTH PRESSURES GUIDELINES FOR SHAFT AND OPEN-CUT TRENCH EXCAVATION SUPPORT SYSTEM DESIGN

SCALE: NONE



NOTES FOR SHAFT AND OPEN-CUT TRENCH EXCAVATION SUPPORT SYSTEMS:

1. HEAVY EQUIPMENT, MATERIALS STORAGE, AND OTHER SURCHARGE LOADS SHOULD BE EVALUATED AND ADDED TO THE SURCHARGE PRESSURE INDICATED.
2. BELOW THE GROUNDWATER LEVEL, THE HYDROSTATIC PRESSURE SHALL BE ADDED TO THE LATERAL EARTH PRESSURE (AND APPROPRIATE SURCHARGE PRESSURES) TO OBTAIN THE TOTAL LATERAL PRESSURE FOR DESIGN OF EXCAVATION SUPPORT SYSTEM.
3. REFER TO GEOTECHNICAL INVESTIGATION REPORT FOR DISCUSSION OF ADDITIONAL SHAFT AND OPEN-CUT TRENCH EXCAVATION SUPPORT SYSTEM DESIGN CONSIDERATIONS.
4. REFER TO GEOTECHNICAL INVESTIGATION REPORT FOR ALLOWABLE BEARING PRESSURES FOR THRUST BLOCK DESIGN, AND ADDITIONAL DISCUSSION ON GROUND IMPROVEMENT CONSIDERATIONS.
5. REFER TO SPECIFICATIONS FOR SHAFT AND OPEN-CUT TRENCH DESIGN AND CONSTRUCTION REQUIREMENTS.



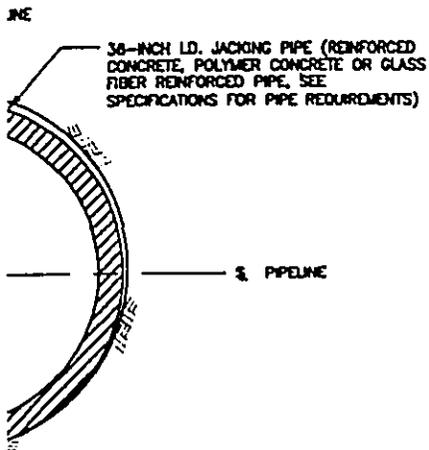
TYPICAL PIPE SECTION FOR 36-INCH I.D. CONCRETE PIPE WITH FIBER REINFORCEMENT INSTALLED BY MICROTUNNELING

SCALE: NONE

NOTE FOR LUBRICATION PORT:

LUBRICATION PORTS MAY BE LOCATED AROUND PIPE CIRCUMFERENCE AS REQUIRED. ALL LUBRICATION PORTS AND PLUGS SHALL BE DESIGNED TO WITHSTAND ALL INTERNAL AND EXTERNAL DESIGN PRESSURES INDICATED IN SPECIFICATIONS. CONTRACTOR TO SUBMIT LUBRICATION PORT AND PLUG DETAILS AND LOCATION FOR APPROVAL IN ACCORDANCE WITH SPECIFICATIONS.

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OR 36-INCH SEWER PIPE
JELING

2
G-2

ATED AROUND PIPE
ALL LUBRICATION PORTS SHALL
T FLUSH WITH INTERIOR OF PIPE.
SHALL BE DESIGNED TO
EXTERNAL DESIGN PRESSURES
ONTRACTOR TO SUBMIT
TAILS AND LOCATIONS IN
IS.

60% DRAWING SUBMITTAL
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	NO. SHTS	APPR
		THE LIMTIACO CONSULTING GROUP CIVIL, ENGINEERING AND ENVIRONMENTAL ENGINEERING 635 PITZER STREET, SUITE 400 • HONOLULU, HAWAII 96813 PHONE (808) 586-7700 • FAX (808) 586-7268		
		OCEAN POINT RECONSTRUCTED SEWER EWA BEACH, OAHU, HAWAII		
		LATERAL EARTH PRESSURE AND MICROTUNNELING DETAILS		
<small>THIS DRAWING IS PREPARED BY ME OR UNDER MY SUPERVISION AND I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF HAWAII.</small>		DRAWN BY: MAB	DES BY: JPK	CHECKED BY:
		SCALE: AS SHOWN	DATE: 10-31-03	

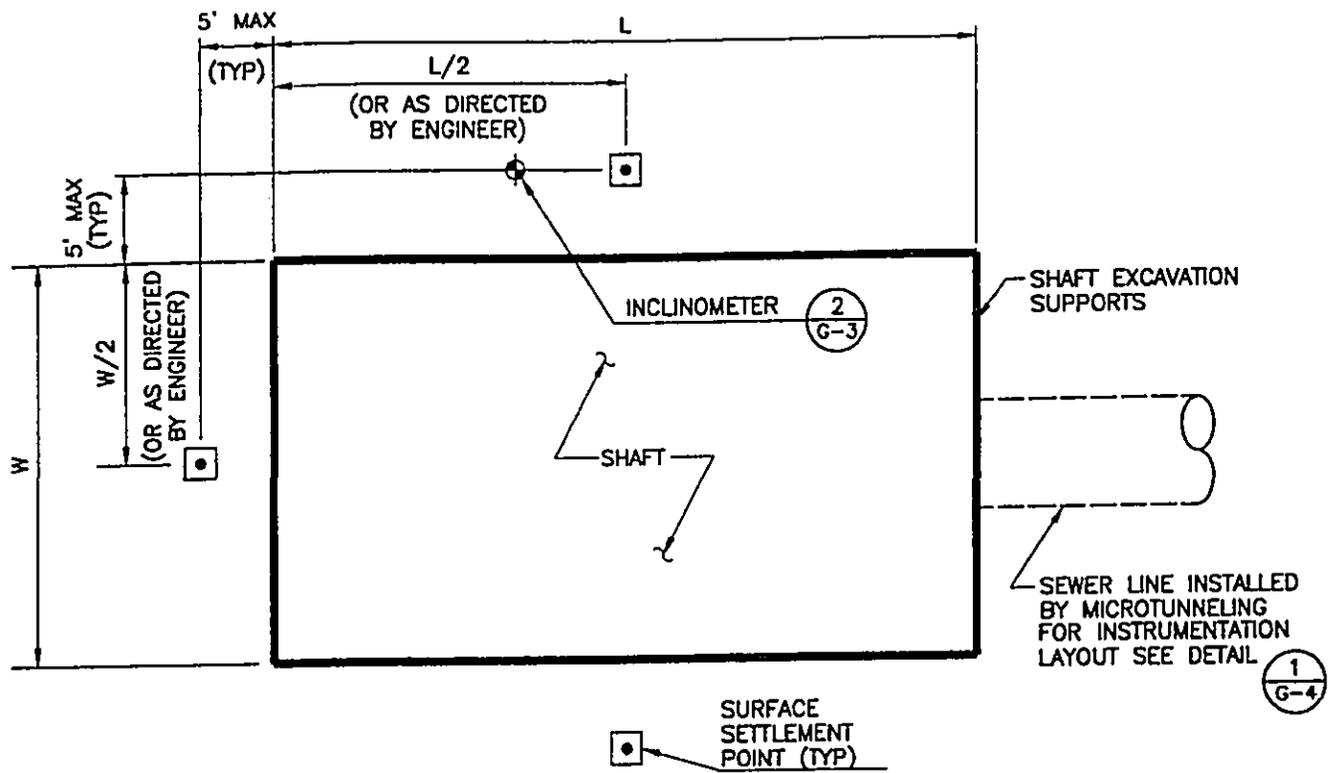
DRAWING G-2

SHEET

OF

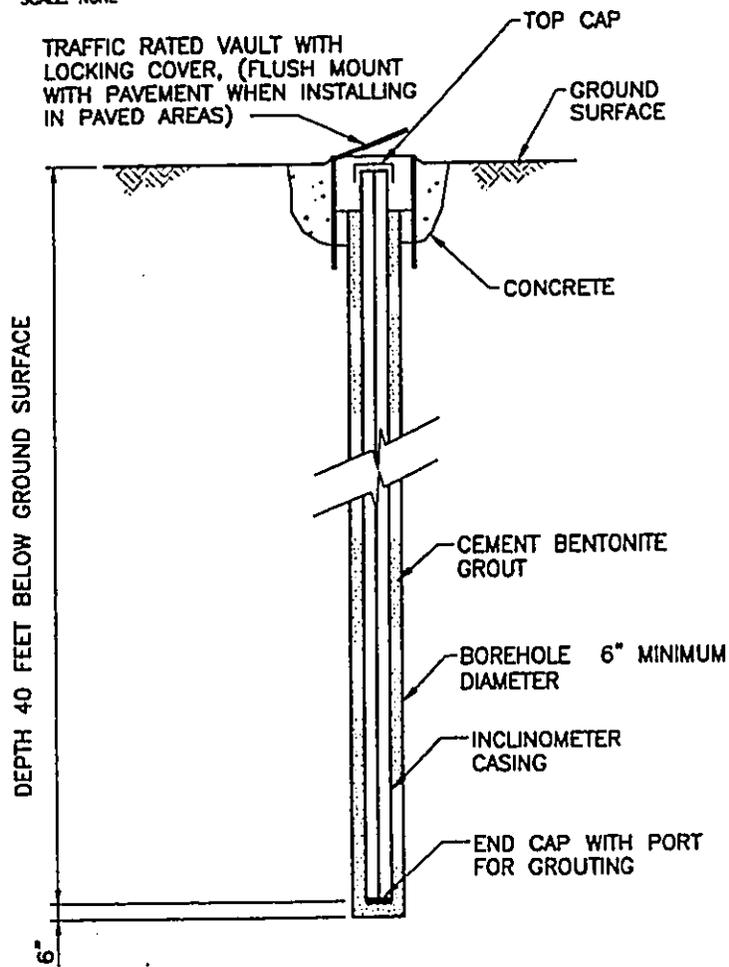
FILE POCKET FURNISH NO.

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TYPICAL INSTRUMENTATION LAYOUT AT RECTANGULAR SHAFTS (1/G-3)

SCALE: NONE



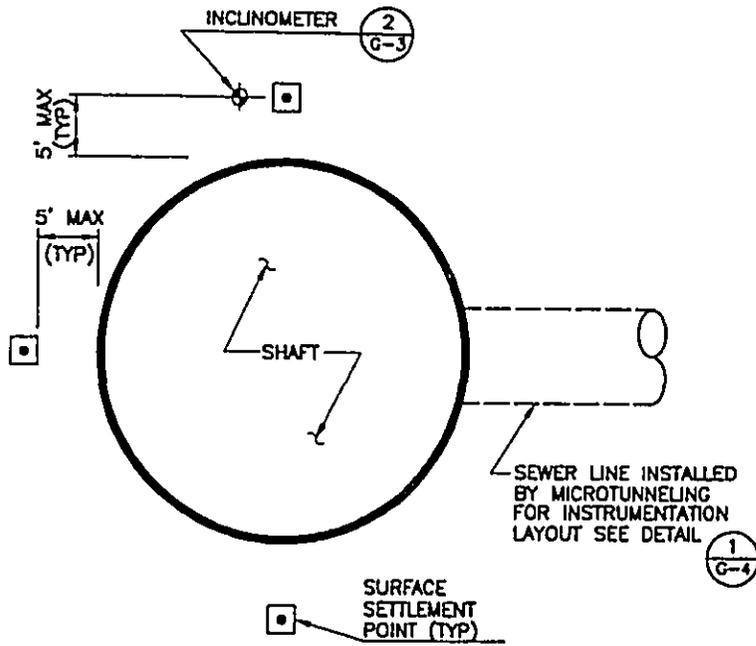
TYPICAL INCLINOMETER DETAIL (2/G-3)

SCALE: NONE

NOTES:

1. SEE SPECIFIC INSTRUMENT ALIGNMENT
2. INCLINOMETER FIELD DURING THE ENGINEERING

RECEIVED AS FOLLOWS



TYPICAL INSTRUMENTATION LAYOUT AT CIRCULAR SHAFTS (3 G-3)

SCALE: NONE

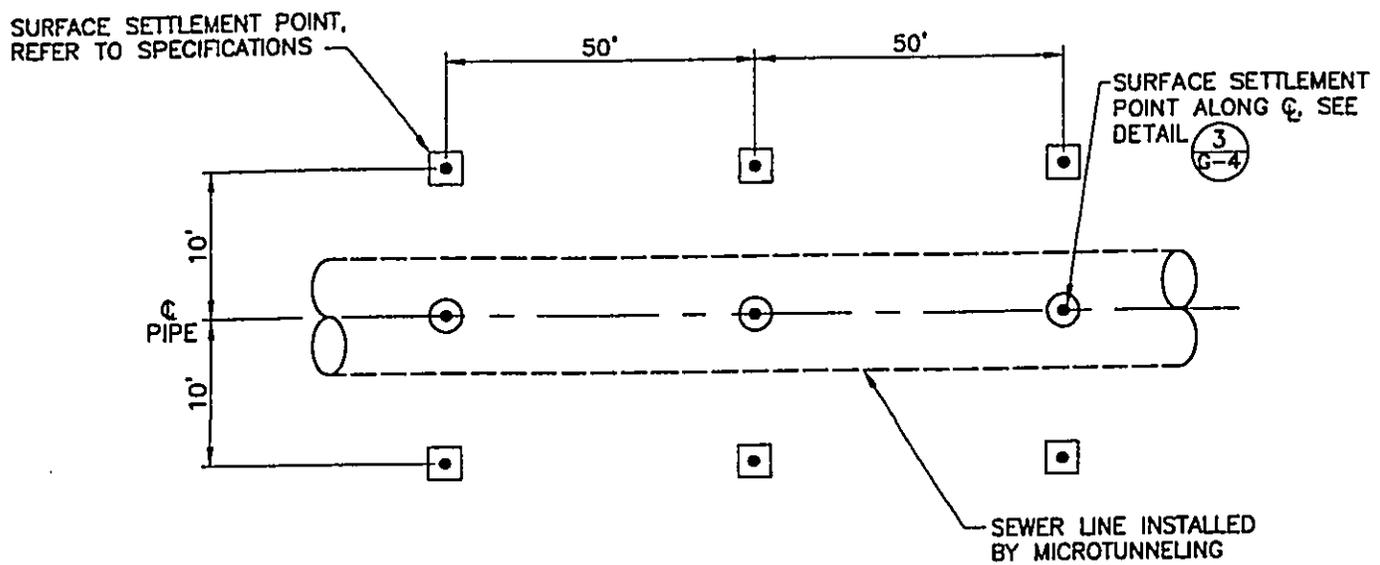
60% DRAWING SUBMITTAL
NOT FOR CONSTRUCTION

NOTES:

- SEE SPECIFICATION FOR ADDITIONAL INSTRUMENTATION REQUIREMENTS ALONG ALIGNMENT AND IN ALL ADJACENT PROPERTIES.
- INCLINOMETER LOCATIONS TO BE FINALIZED IN THE FIELD DURING CONSTRUCTION, AS DIRECTED BY THE ENGINEER.

REV	DATE	DESCRIPTION	NO. SHTS	APPR
		THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 415 PEECH STREET, SUITE 100 • HONOLULU, HAWAII 96813 PHONE (808) 396-7798 • FAX (808) 396-7761		
		OCEAN POINT RECONSTRUCTED SEWER		
		EWA BEACH, OAHU, HAWAII		
		INSTRUMENTATION DETAILS		
<small>THIS DRAWING IS THE PROPERTY OF THE ENGINEER AND IS NOT TO BE REPRODUCED OR CONSTRUCTION OF THIS PROJECT WILL BE UNDER HIS SUPERVISION</small>		DRAWN BY: HAS	DES BY: JPK	CHECKED BY:
		SCALE: AS SHOWN	DATE: 10-31-03	

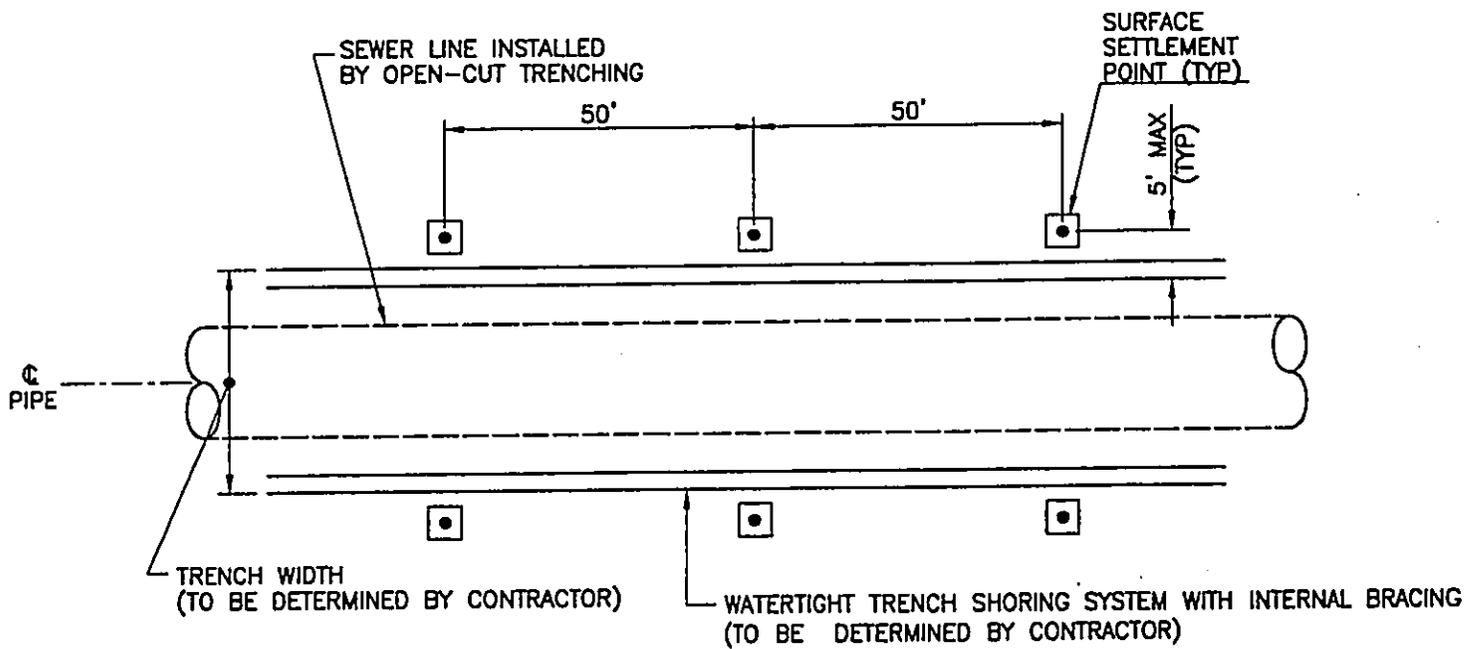
RECEIVED AS FOLLOWS



TYPICAL INSTRUMENTATION LAYOUT ALONG SEWER LINE
INSTALLED BY MICROTUNNELING

1
G-4

SCALE: NONE

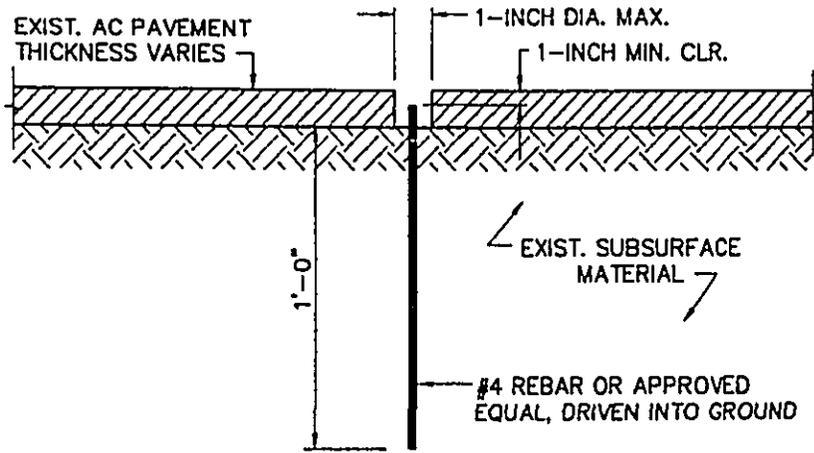


TYPICAL INSTRUMENTATION LAYOUT ALONG SEWER LINE
INSTALLED BY OPEN-CUT TRENCHING

2
G-4

SCALE: NONE

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SURFACE SETTLEMENT POINT ALONG ϕ OF SEWER LINE
 INSTALLED BY MICROTUNNELING

SCALE: NONE

3
G-4

NOTE:

1. REFER TO SPECIFICATIONS FOR OTHER INSTRUMENTATION AND MONITORING REQUIREMENTS.

NG

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 NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	NO. SHTS	APPR
		THE LIMTIACO CONSULTING GROUP CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING 405 PUNAHOU STREET, SUITE 2000 - HONOLULU, HAWAII 96814 PHONE: (808) 944-7700 • FAX: (808) 944-7342		
		OCEAN POINT RECONSTRUCTED SEWER EWA BEACH, OAHU, HAWAII		
		INSTRUMENTATION DETAILS		
<small>THIS DRAWING WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY SUPERVISION.</small>		DRAWN BY: NAB	DES BY: JPK	CHECKED BY:
		SCALE: AS SHOWN	DATE: 10-31-03	

FILE | POCKET | FOLDER | NO.

**Appendix B:
Compilation of Response Letters from Agencies and
Organizations**

Pre-assessment Comments:

Federal Agencies

Agency or Organization	Comments or Questions	Response
Department of the Army, Corps of Engineers	Response letter dated 11/4/03 confirm project site located in Zone A, and for buildings to be in conformance with C & C of Honolulu Land Use Ordinance (Aug. 1993). Response letter dated 11/25/03 indicates no new DA permit, or any modification to the existing DA permit is required for the project.	Information included in DEA
US Army Support Command Hawaii, Environmental Management Office	No response received as of 1/21/04.	
US Fish and Wildlife Service	No response received as of 1/21/04.	
Environmental Protection Agency	No response received as of 1/21/04.	

State Agencies

Agency or Organization	Comments or Questions	Response
Department of Accounting and General Services	No response received as of 1/21/04.	
Department of Agriculture	Response letter dated 9/26/02 for C & C Fort Weaver Road project. No comments.	Comment noted
Department of Business, Economic Development and Tourism, Office of Planning	No response received as of 1/21/04.	
Department of Business, Economic Development and Tourism, Department of Education	Response letter dated 11/13/03. No comments.	Comment noted

Agency or Organization	Comments or Questions	Response
Department of Health, Clean Air Branch	Response letter dated 10/21/03 for C & C Fort Weaver Road project. Dust control management plan be developed. Construction activities must comply with provisions of HAR, Chapter 11-60.1, 11-60.1-33	Addressed in DEA.
Department of Health, Clean Water Branch	Response letter dated 10/21/02 for C & C Fort Weaver Road project. Request Section 401 if USACOE requires a Federal permit. NPDES permit is required.	Addressed in DEA.
Department of Health, Environmental Management Division	No response received as of 1/21/04.	
Department of Health, Office of Environmental Quality Control	No response received as of 1/21/04.	
Department of Health, Noise, Radiation and Indoor Air Quality Branch	Response letter dated 10/21/02 for C & C Fort Weaver Road project. Request compliance with DOH Admin Rules Chapter 11-46, "Community Noise Control".	Addressed in DEA.
Department of Health, Wastewater Branch	Response letter dated 10/21/02 for C & C Fort Weaver Road project. Agency requests project conformance to DOH Admin Rules Chapter 11-62, "wastewater systems."	Comment noted.
Department of Land and Natural Resources, Commission on Water Resources Management	No response received as of 1/21/04.	
Department of Land and Natural Resources, Hawaii Historic Preservation Division	Response letter dated 11/19/03, indicating "no historic properties will be affected".	Addressed in DEA.
Department of Land and Natural Resources, Land Division	No response received as of 1/21/04.	
Department of Land and Natural Resources, Na Ala Hele Program	No response received as of 1/21/04.	
Department of Transportation, Highways Division	Response letter dated 11/24/03. Indicates project will not affect State ROW.	Addressed in DEA.

Agency or Organization	Comments or Questions	Response
University of Hawaii, Environmental Center	No response received as of 1/21/04.	
Office of Hawaiian Affairs	No response received as of 1/21/04.	

City and County of Honolulu

Agency or Organization	Comments or Questions	Response
Board of Water Supply	Response letter dated 11/14/03 regarding pre- assessment letter requesting coordination of construction schedules to minimize impacts. Submit plans to BWS for review. 12/3/03 consisting of verbal comments on preliminary and pre-final drawings of waterline relocation during design performance meeting.	Construction plans to be coordinated with BWS.
Department of Design and Construction	No response received as of 1/21/04.	
Department of Environmental Services	No response received as of 1/21/04.	
Department of Parks and Recreation	Response letter dated 11/6/03. No comments.	Comment noted
Department of Planning and Permitting	Response letter dated 11/19/03, indicating project is not defined as development, and is exempt from Sec. 25-1.3[2][M], Chap. 25, Revised Ordinances of Honolulu. Response letter dated 12/4/03 requesting discussion on BMP and proper permits to be secured if project encroaches on city ROW.	Included in DEA.
Department of Transportation Services	Letter dated 12/2/03 requesting that appropriate traffic control plans is incorporated to ensure safety for motorists and pedestrians and that DTS and OTS should be informed of the start of construction.	Addressed in DEA

Agency or Organization	Comments or Questions	Response
Fire Department	Response letter dated 10/10/02 for C & C Fort Weaver Road project. Maintain fire apparatus during construction and notify Fire Communication Ctr if existing fire hydrant system will be interrupted.	Construction plans will be circulated to Fire Department.
Police Department	Response letter dated 11/10/03. Request coordination with department on access routes.	Contractor to coordinate plans with Police Department.

Utilities

Agency or Organization	Comments or Questions	Response
Verizon Hawaii	Email response received 12/03 requesting coordination with their buried cable group to avoid accidental damage to underground telephone cables.	Response acknowledging coordination to avoid construction conflicts.
Hawaiian Electric Company, Inc.	Response letter dated 12/3/03 indicates they reserve the right to comment on construction plans for the protection of existing power lines before the plans are finalized.	Response letter dated 1/22/04 acknowledging construction plans will be reviewed by HECO.
Oceanic Time Warner Cable of Hawaii, Outside Plant Engineering	Response memo indicates proposed project will not affect network, as their cables are aerial.	Comment noted.
The Gas Company	No response received as of 1/21/04.	

Others

Agency or Organization	Comments or Questions	Response
Hawaii's Thousand Friends	No response received as of 1/21/04.	
Nature Conservancy	No response received as of 1/21/04.	

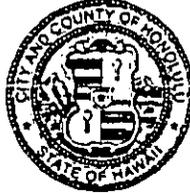
Agency or Organization	Comments or Questions	Response
Ewa Neighborhood Board No. 23	August 14, 2003: Presentation of project to Board. Consisted of project summary followed by a 30-minute question and answer period. December 11, 2003 scheduled meeting to update the Board.	
Outdoor Circle	No response received as of 1/21/04.	
Sierra Club	No response received as of 1/21/04.	

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.cc.honolulu.hi.us

Nov 20 2003
Sent email to
Colette

JEREMY HARRIS
MAYOR



ERIC G. CRISPIN, AIA
DIRECTOR

BARBARA KIM STANTON
DEPUTY DIRECTOR

2003/ELOG-3459 (ask)

November 19, 2003

Ms. Colette M. Sakoda
Senior Planner
Environet, Inc.
2850 Paa Street, Suite 212
Honolulu, Hawaii 96819

Dear Ms. Sakoda:

Special Management Area Review
Haseko (Ewa), Inc's Ocean Pointe Development
Offsite Sewer Project
Type of Project: Sewer Line Replacement
Tax Map Keys: 9-1-09: 11, 27, 28, 29, 30, and 36

The proposed project located adjacent to the above-referenced tax map key has been reviewed. We find that it:

- [] Is not within the Special Management Area. According to the information presented the project is makai of the shoreline and Special Management Area.
- [X] Is within the Special Management Area, but is not defined as "development" and is therefore, exempt (Section 25-1.3[2][M], Chapter 25, Revised Ordinances of Honolulu).

Should you have any questions, please contact Ardis Shaw-Kim at 527-5349.

Sincerely yours,

Eric G. Crispin
ERIC G. CRISPIN, AIA
for Director of Planning
and Permitting

EGC:pl

doc no. 260384

Draft Environmental Assessment Comment Period:

Federal Agencies

Agency or Organization	Comments or Questions	Response
Department of the Army, Corps of Engineers	No response received as of 1/21/04.	
US Army Support Command Hawaii, Environmental Management Office	No response received as of 1/21/04.	
US Fish and Wildlife Service	No response received as of 1/21/04.	
Environmental Protection Agency	No response received as of 1/21/04.	

State Agencies

Agency or Organization	Comments or Questions	Response
Department of Accounting and General Services	No response received as of 1/21/04.	
Department of Agriculture	No response received as of 1/21/04.	
Department of Business, Economic Development and Tourism, Office of Planning	No response received as of 1/21/04.	
Department of Business, Economic Development and Tourism	No response received as of 1/21/04.	
Department of Education	Comment letter dated 12/30/03 with no comments.	Response letter dated 1/20/04 acknowledging no comments.
Department of Health, Clean Air Branch	No response received as of 1/21/04.	
Department of Health, Clean Water Branch	No response received as of 1/21/04.	
Department of Health, Environmental Management Division	No response received as of 1/21/04.	
Department of Health, Office of Environmental Quality Control	Comment letter dated 1/5/04 regarding paving requirements, SMA permit, contacts, and cultural assessment issues.	Response letter dated 1/20/04 indicating compliance with HRS 103D-407 paving requirements, info waving SMA permit requirements, and detailed information on research and studies showing no existing cultural practice/resource within project boundaries

Agency or Organization	Comments or Questions	Response
Department of Health, Noise, Radiation and Indoor Air Quality Branch	No response received as of 1/21/04.	
Department of Health, Wastewater Branch	No response received as of 1/21/04.	
Department of Land and Natural Resources, Commission on Water Resources Management	See DLNR, Land Division	
Department of Land and Natural Resources, Hawaii Historic Preservation Division	Comment letter dated 12/9/03 indicates no historic properties will be affected by the project.	Response letter dated 1/20/04 acknowledging letter from DLNR, HPD to be incorporated into final EA.
Department of Land and Natural Resources, Land Division	Comment letter dated 12/30/03 with no comments.	Response letter dated 1/20/04 acknowledging letter of no comments from DLNR subdivisions, which will be incorporated into final EA.
Department of Land and Natural Resources, Na Ala Hele Program	See DLNR, Land Division	
Department of Transportation, Highways Division	Comment letter dated 12/19/03 indicates project will not affect State Highway Facilities.	Response letter dated 1/20/04 acknowledging letter of no impact.
University of Hawaii, Environmental Center	No response received as of 1/21/04.	
Office of Hawaiian Affairs	Comment letter dated 12/18/03 indicates no human remains or cultural deposits are expected in project area, and to contact SHPD in compliance with 6E-43.6 should human remains be discovered.	Response letter dated 1/20/04 acknowledges OHA letter and will include procedural info in final EA regarding 6E-43.6 inadvertent discoveries of burial sites.

City and County of Honolulu

Agency or Organization	Comments or Questions	Response
Board of Water Supply	Comment letter dated 12/22/03, requesting coordination of construction schedules to minimize impacts. Submit plans to BWS for review.	Response letter dated 1/20/04 indicating submittal of CD and coordination with agency. Info will be incorporated into final EA.
Department of Design and Construction	No response received as of 1/21/04.	
Department of Environmental Services	No response received as of 1/21/04.	

Agency or Organization	Comments or Questions	Response
Department of Parks and Recreation	Comment letter dated 12/15/03 with no comments.	Response letter dated 1/20/04 acknowledging no comments.
Department of Planning and Permitting	Comment letter dated 1/2/04 requiring correction of the spelling for Honouliuli WWPS and more specific information on the replacement of the chain linked fence with a new CMU wall.	Response letter dated 1/20/04 acknowledging final EA will be corrected and detailed CMU wall info will be incorporated as requested by DPP.
Department of Transportation Services	Comment letter dated 1/13/04 suggesting traffic study for construction period impacts, notification of DTS and OTS prior to construction, and called for revision of street usage permit to be issued by DTS, not DPP.	Response letter dated 1/22/04: mitigation measurements to minimize construction period impacts; acknowledged early notification of DTS and CTS, and revision to 6.1.
Fire Department	Comment letter dated 12/29/03 requiring maintenance of fire apparatus and notification of interruption to fire hydrant system.	Response letter dated 1/20/04 acknowledging contractors will follow requirements of the fire department.
Police Department	Comment letter dated 1/2/04 requiring coordination with District 8 to minimize negative impacts.	Response letter dated 1/20/04 acknowledging coordination with District 8 to be incorporated into final EA.

Utilities

Agency or Organization	Comments or Questions	Response
Verizon Hawaii	No response received as of 1/21/04.	
Hawaiian Electric Company, Inc.	Comment letter dated 12/17/03 with no comments. They reserve the right to comment on construction plans for the protection of existing power lines before the plans are finalized.	Response letter dated 1/21/04 acknowledges review of construction plans will be conducted with HECO, as requested.
Oceanic Time Warner Cable of Hawaii, Outside Plant Engineering	No response received as of 1/21/04.	
The Gas Company	No response received as of 1/21/04.	

Others

Agency or Organization	Comments or Questions	Response
Hawaii's Thousand Friends	No response received as of 1/21/04.	
Nature Conservancy	No response received as of 1/21/04.	
Ewa Neighborhood Board No. 23	No response received as of 1/21/04.	
Outdoor Circle	No response received as of 1/21/04.	
Sierra Club	No response received as of 1/21/04.	



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2350
HONOLULU, HAWAII 96804

HASEVO CONSULTING, INC.

PATRICIA HASEVO
MANAGING PARTNER

JAN 5 - 2004



January 20, 2004

OFFICE OF BUSINESS SERVICES

December 30, 2003

Mr. Timothy Tucker
Haseko (Ewa), Inc.
91-919 Kuhina Street, #102
Ewa Beach, Hawaii 96706

Ms. Rae M. Loui, Assistant Superintendent
Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96804

Dear Ms. Loui:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater
Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

Dear Mr. Tucker:

Subject: Draft Environmental Assessment for
Sewer Reconstruction and Ewa Beach
Wastewater Station Upgrade
TMK: 9-1-9:11, 27, 28, 29, 30, and 36

The Department of Education (DOE) has reviewed the Draft Environmental Assessment (DEA) for the reconstruction of the Pohakupuna Road Sewer Line and upgrade of the Ewa Beach Wastewater Pump Station.

The DOE has no comment or concern at this time.

Thank you for the opportunity to review the DEA. If you have any questions, please call me at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Sincerely yours,

Rae M. Loui
Rae M. Loui
Assistant Superintendent

Sincerely,

Roger Aoki

Roger Aoki, P.E.
Project Manager

We have received your letter dated December 30, 2003 regarding the subject project. This acknowledges that your department has no comment or concern at this time.

Thank you for participating in the planning phase of this important project.

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

RML:hy
c: CAS/leeward District
FSSB



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

200 SOUTH KEELE STREET
HONOLULU, HAWAII 96813
TEL: 808-548-1111
FAX: 808-548-1111
WWW.OEQC.HAWAII.GOV

GENEVIEVE SALMONSON
Director

Timothy Steinberger
January 5, 2004
Page 2

January 5, 2004

Timothy Steinberger, Director
Department of Design & Construction
630 South King Street
Honolulu, Hawaii 96813

Attention: Carl Asakaki

Dear Mr. Steinberger:

Subject: Draft Environmental Assessment (EA)
Pohakupuna Sewer Reconstruction & Fwa Beach Station Upgrade

We have the following comments to offer:

Paving: Hawaii Revised Statutes 103D-407 requires the use of recycled glass in paving materials whenever possible. For the text of this section of HRS go to our website at <http://www.state.hi.us/health/oeq/guidelines/fwaefx.html> or contact our office for a paper copy.

Permits and approvals: To the list in section 6 of required permits and approvals for this project add the Special Management Area permit.

Comments: You have documented your pre-consultation contacts in Appendix B. In the final EA include copies of this correspondence in addition to the draft EA comment letters received and responses to them. This is especially true of all correspondence with the State Historic Preservation Division of DLNR.

Cultural Impacts Assessment:

In section 4.9 you concluded that the project would not adversely affect cultural practices, based on the fact that it is in a developed suburban setting, and on a study done for the Ocean Pointe Master Plan. In section 3.9, however, you note that the Ocean Pointe location is a mile to the west of this project's location.

Practices can differ from location to location and are not restricted to a non-urban setting. If the subject area is in a developed urban setting, cultural impacts must still be assessed. Many incorrectly assume that the presence of urban infrastructure effectively precludes consideration of current cultural factors. For example, persons are known to gather kauna'ona, 'ilima, 'ulaloa, noni

or ki on the grassy slopes and ramps of H-1 freeway and some state highways on the neighboring islands. Certain landmarks and physical features are used by Hawaiian navigators for sailing, and the lines of sight from landmarks to the coast by fishermen to locate certain fishing spots. Blocking these features by the construction of buildings or tanks may constitute an adverse cultural impact.

In the final EA re-evaluate this project's impacts to current cultural practices, including the rationale behind your conclusions. If you need assistance refer to our *Guidelines for Assessing Cultural Impacts*. Go to our homepage at <http://www.state.hi.us/health/oeq/guidelines/index.html> or contact our office for a paper copy.

If you have any questions, call Nancy Heinrich at 586-4183.

Sincerely,

Genevieve Salmonson
GENEVIEVE SALMONSON
Director

c: Roger Aoki, Environment
Tim Tucker, HASEKU



January 20, 2004

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated January 5, 2004 regarding the subject project. The following has been prepared in response to your comments.

Paving: With respect to compliance with HRS 103D-407 regarding use of recycled glass in paving materials, because the chosen construction method is microtunneling as opposed to trenching, there will be minimal repaving necessary in the Pohakupuna Road sewer reconstruction project. Nonetheless, the contractor will be required to comply with all feasibly applicable state and county laws and regulations, which includes this specific requirement.

Permits and approvals: As stated in section 8.0, item no. 11, page 8-2 of the DEA, a Special Management Area permit will not be required for the project. Please see letter dated November 19, 2003 from the Department of Planning and Permitting, City and County of Honolulu in Appendix B in the final EA.

Contacts: Besides Pre-assessment period correspondence, comments and responses regarding the DEA will be included in the appendix of the final EA.

Cultural impacts assessment: The Ocean Pointe development is less than a mile north of the subject project (see Figure 1-1), and as we state in section 3.9 of the DEA, the City and County facility known as Oneula Beach Park, is "located nearly one mile west of the project site." We agree cultural practices do not only occur in non-urban settings. It should be noted that data gathering and subsequent conclusions regarding cultural resources or practices in this EA are based on literature research, project site visits and discussions with individuals who either grew up in Ewa Beach or have resided in the area for at least 30 years.

Ms. Genevieve Salmonson
January 20, 2004
Page 2

In the case of the subject project, there are no cultural resources on Papiipi Road or Pohakupuna Road or in the vicinity of the proposed construction. The final EA will appropriately summarize individual testimonies that form the basis of our analysis and conclusions.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Hascok
Carl Arakaki, Department of Design & Construction, City and County of Honolulu



January 20, 2004

Ms. P. Holly McElDowney, Acting Administrator
State Historic Preservation Division
Department of Land and Natural Resources
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Ms. McElDowney:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater
Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated December 9, 2003 regarding the subject project in which you commented as follows:

- The DEA in section 3.9 incorporates SHPD's earlier comments that there are no known historic sites within the existing corridor.
- Use of microtunneling techniques will help to minimize environmental impact.
- The project area is underlain by coral reef making it unlikely that historic sites would be found.
- Thus, SHPD has concluded that no historic properties will be affected by this project.

The final EA will include your comments made during the Pre-assessment period as well as your December 9, 2003 letter.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

1250 Paa Street, Suite 4114 Honolulu, Hawaii 96813 (609) 933-2225 Fax (609) 933-2221

PETER F. YOUNG
BOARD OF LAND AND NATURAL RESOURCES
COMMISSIONER OF WATER RESOURCE MANAGEMENT

DAVID DAVISON
DEPUTY COMMISSIONER
DEPUTY DIRECTOR, WATER

EMBERTY W. LAU
DEPUTY DIRECTOR, WATER



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

December 9, 2003

Timothy Tucker
Haseko (Ewa) Inc.
91-919 Kohina Street, #102
Ewa Beach, Hawaii 96706

LOG NO: 2003.2520
DOC NO: 031ZE104

Dear Mr. Tucker:

SUBJECT: Chapter 6E-42 Historic Preservation Review - Draft Environmental Assessment (DEA) Haseko (Ewa), Inc.'s Ocean Pointe Development Offsite Sewer Project to Replace 24" Sewer Line with 36" Sewer Line Honolulu, Ewa, O'ahu
TMK: (1) 9-1-009, 011, 027-030, 036

Thank you for the opportunity to comment on the DEA for this project. The DEA in Section 3.9 incorporates our earlier comments that there are no known historic sites within the existing road corridor. We also stated that the use of micro tunneling techniques will help to minimize environmental impact. We also note that the project area is underlain by coral reef making it unlikely that historic sites would be found. Thus we believe that "no historic properties will be affected" by this project. We suggest that our earlier comments as well as this letter be included in the DEA in Appendix B.

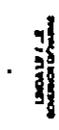
Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027.

Aloha,

P. Holly McElDowney, Acting Administrator
State Historic Preservation Division

Eljk

cc: Carl Arakaki, Department of Design and Construction, City and County of Honolulu, 650 South King Street, 11th Floor, Honolulu, HI 96813
Roger Aoki, Environet, Inc. 2850 Paa Street, Ste. 212, Honolulu, HI 96819



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809
December 30, 2003

PETER J. YOUNG
DIRECTOR
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809
January 20, 2004

POHAKUPUNAEDEA, RCH
Haseko (Ewa), Inc.
Timothy Tucker
91-919 Kuhina Street, #102
650 South King Street
Ewa Beach, Hawaii 96706

LD-NAV
HASEKO CONSTRUCTION, INC.
JAN 5 - 2004

Dear Mr. Tucker:

SUBJECT: Review: Draft Environmental Assessment
Project: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station
Applicant: C&C Department of Design and Construction
Consultant: Environet, Inc.

Thank you for the opportunity to review and comment on the subject matter
A copy of the document pertaining to the proposed project was transmitted or made available to the following Department of Land and Natural Resources' Divisions for their review and comment.

- Division of Aquatic Resources
- Division of Forestry & Wildlife
- Na Ala Hele Trails
- Division of State Parks
- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Oahu District Land Office

Based on the attached responses, the Department of Land and Natural Resources has no comment to offer on the subject matter.
Should you have any questions, please contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0384.

Very truly yours,
Nicholas A. Vaccaro
NICHOLAS A. VACCARO
Administrator



January 20, 2004
Ms. Diederre S. Mamiya, Administrator
Land Division, Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Mamiya:
Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated December 30, 2003 regarding the subject project. This acknowledges that the following DLNR divisions do not have any comments regarding the Draft EA:

- Division of Aquatic Resources
- Division of Forestry & Wildlife
- Na Ala Hele Trails
- Division of State Parks
- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Oahu District Land Office

Thank you for participating in the planning phase of this important project.

Sincerely,
Roger Aoki
Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Anakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmunson, Office of Environmental Quality Control, State of Hawaii

PETER T. YOUNG
 CHIEF OF BUREAU
 COMMISSIONER OF LAND AND NATURAL RESOURCES
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 LAND DIVISION
 1505 BERKELEY AVENUE
 HONOLULU, HAWAII 96813
 TELEPHONE: 521-2111
 FAX: 521-2112

STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 LAND DIVISION
 POST OFFICE BOX 621
 HONOLULU, HAWAII 96808
 December 8, 2003



LD/NAV
 Ref.: POHAKUPUNADEA.CMT
 L-3495
 Suspense Date: 12/29/03

MEMORANDUM:

TO: *XXX Division of Aquatic Resources
 *XXX Division of Forestry & Wildlife
 *XXX Na Ala Hele Trails
 *XXX Division of State Parks
 *XXX Engineering Division
 *XXX Commission on Boating and Ocean Recreation
 *XXX Commission on Water Resource Management
 *XXX Office of Conservation and Coastal Lands
 *XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
 Land Division

SUBJECT: Draft Environmental Assessment (DEA)
 Project: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station
 Applicant: C&COH Department of Design and Construction
 Consultant: Environet, Inc.

Please review the DEA pertaining to the subject matter and submit your comments (if any) on Division letterhead by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

We have no comments. () Comments attached.
 Division: _____
 Signed: *[Signature]*

Name: MICHAEL G. BUCK, ADMINISTRATOR
 Date: _____
 DIVISION OF FORESTRY AND WILDLIFE

DEC 11 2003

PETER T. YOUNG
 CHIEF OF BUREAU
 COMMISSIONER OF LAND AND NATURAL RESOURCES
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 LAND DIVISION
 1505 BERKELEY AVENUE
 HONOLULU, HAWAII 96813
 TELEPHONE: 521-2111
 FAX: 521-2112

STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 LAND DIVISION
 POST OFFICE BOX 621
 HONOLULU, HAWAII 96808
 December 8, 2003



LD/NAV
 Ref.: POHAKUPUNADEA.CMT
 L-3495
 Suspense Date: 12/29/03

MEMORANDUM:

TO: *XXX Division of Aquatic Resources
 *XXX Division of Forestry & Wildlife
 *XXX Na Ala Hele Trails
 *XXX Division of State Parks
 *XXX Engineering Division
 *XXX Commission on Boating and Ocean Recreation
 *XXX Commission on Water Resource Management
 *XXX Office of Conservation and Coastal Lands
 *XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
 Land Division

SUBJECT: Draft Environmental Assessment (DEA)
 Project: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station
 Applicant: C&COH Department of Design and Construction
 Consultant: Environet, Inc.

Please review the DEA pertaining to the subject matter and submit your comments (if any) on Division letterhead by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

We have no comments. () Comments attached.
 Division: _____
 Signed: *[Signature]*

Name: MICHAEL G. BUCK, ADMINISTRATOR
 Date: _____
 DIVISION OF FORESTRY AND WILDLIFE

DEC 11 2003

RECEIVED
 LAND DIVISION
 2003 DEC 17 10 45 AM

RECEIVED
 LAND DIVISION
 2003 DEC 17 10 45 AM

2/16

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96803
RECEIVED
DEC 11 8 53 AM '03

PETER I. YOUNG
COMMISSIONER OF LAND AND NATURAL RESOURCES
DAVID DARRISON
DEPUTY COMMISSIONER
EMMETT W. LAU
DIRECTOR, LAND DIVISION
ADJUTANT GENERAL
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSIONER OF LAND AND NATURAL RESOURCES
CONSTRUCTION DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96803
PLATE # 100

LD/NAV
Ref.: POHAKUPUNADEA.CMT
L-3495
Suspense Date: 12/29/03

MEMORANDUM:

TO: *XXX Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Na Ala Hele Trails
*XXX Division of State Parks
*XXX Engineering Division
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
*XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (DEA)
Project: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station
Applicant: C&GH Department of Design and Construction
Consultant: Environet, Inc.

Please review the DEA pertaining to the subject matter and submit your comments (if any) on Division letterhead by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

We have no comments. () Comments attached.
Division: State Parks Signed: [Signature]
Name: David S. Davis
Date: 12/16/03

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96803
RECEIVED
DEC 10 4:40

PETER I. YOUNG
COMMISSIONER OF LAND AND NATURAL RESOURCES
DAVID DARRISON
DEPUTY COMMISSIONER
EMMETT W. LAU
DIRECTOR, LAND DIVISION
ADJUTANT GENERAL
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSIONER OF LAND AND NATURAL RESOURCES
CONSTRUCTION DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96803
PLATE # 100

LD/NAV
Ref.: POHAKUPUNADEA.CMT
L-3495
Suspense Date: 12/29/03

MEMORANDUM:

FROM: *XXX Division of Aquatic Resources
*XXX Division of Forestry & Wildlife
*XXX Na Ala Hele Trails
*XXX Division of State Parks
*XXX Engineering Division
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
*XXX Oahu District Land Office

TO: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (DEA)
Project: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station
Applicant: C&GH Department of Design and Construction
Consultant: Environet, Inc.

Please review the DEA pertaining to the subject matter and submit your comments (if any) on Division letterhead by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

We have no comments. () Comments attached.
Division: CDM Signed: [Signature]
Name: David Mugh
Date: 12/11/03

RECEIVED
LAND DIVISION
2003 DEC 15 A 9 55

LAND AND NATURAL RESOURCES
CONTRACTOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 671
HONOLULU, HAWAII 96808
December 8, 2003

PETER T. YOUNG
CHIEF OF LAND AND NATURAL RESOURCES
COMMISSION ON THE USE OF PUBLIC LANDS

DAVID ANDERSON
DEPUTY DIRECTOR, LAND
CONSERVATION

ADAM B. BROWN
DEPUTY DIRECTOR, LAND
CONSERVATION

LD/NAV

Ref.: POHAKUPUNAEDEA.CMT

L-3495
Suspense Date: 12/29/03

MEMORANDUM:

- TO:
- *XXX Division of Aquatic Resources
 - *XXX Division of Forestry & Wildlife
 - *XXX Na Ala Hele Trails
 - *XXX Division of State Parks
 - *XXX Engineering Division
 - *XXX Commission on Water Resource Management
 - *XXX Office of Conservation and Coastal Lands
 - *XXX Oahu District Land Office

RECEIVED
LAND DIVISION
2003 DEC 15 A 9 59

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (DEA)
Project: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station
Applicant: C&Coh Department of Design and Construction
Consultant: Environet, Inc.

Please review the DEA pertaining to the subject matter and submit your comments (if any) on Division letterhead by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

We have no comments.

Comments attached.

Division: Land

Signed:

Name: Robert M. Iny

Date: Dec 11, 2003

UNCLASIFIED
CONTINUED



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

DEC 19 2003

RODNEY K. HARAGA
DIRECTOR

Office Director
HAWAIIAN LANGUAGE
LITERACY CENTER
HONOLULU, HAWAII

IN REPLY REFER TO
HWY-PS
2.2691

Mr. Timothy Tucker
Haseko (Ewa), Inc.
91-919 Kuhina Street, #102
Ewa Beach, Hawaii 96706

Dear Mr. Tucker:

Subject: Draft Environmental Assessment, Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station, Ewa Beach, TMK: 9-1-var.

The proposed project will not impact our State highway facilities.

If you have any questions, please contact Ronald F. Tazuki, Head Planning Engineer, Highways Division, at 587-1830. Please reference file review number: 03-358 in all contacts and correspondence regarding this comment.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

c: Office of Environmental Quality Control
Department of Design and Construction, Carl Arakaki
Environet, Inc., Roger Aoki



January 20, 2004

Mr. Rodney K. Haraga, Director of Transportation
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Haraga:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated December 19, 2003 regarding the subject project in which the Department of Transportation has concluded that the project will not impact state highway facilities.

The final EA will include your comment letter.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

C: Roger Aoki
Environet, Inc.
Dept. of Design and Construction
650 S. King St.
Honolulu, HI 96813

FAX (808) 584-1883
HASEYR CONSULTANTS, INC.

DEC 23 2003



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPIOLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

HRD03/1211

December 18, 2003

Timothy Tucker
Haseko Inc.
91-919 Kubina St. #102
Ewa Beach, HI 96706

RE: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station Draft EA. TMK: 91009.011.027.028.029.030.036.

Dear Mr. Tucker:

Thank you for the opportunity to comment on the above referenced EA. OHA notes that no human remains or cultural deposits are expected to be found during micro-tunneling, but that the SHPD will be contacted should such deposits be found and recognized. Under 6E-43.6, Inadvertent discovery of burial sites, you are also required to immediately stop work in the area until the SHPD staff has determined disposition of the remains. Please correct the final EA to reflect a work stoppage should human remains or cultural deposits be found.

Please contact Pua Aiu at 594-1931 or by e-mail at pua@ohia.org if you have further questions.

Sincerely,

Clyde W. Namu'o
Administrator

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



January 20, 2004

Mr. Clyde W. Namu'ou, Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Namu'ou:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater
Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated December 23, 2003 regarding the subject project. It has been noted that OHA concurs no human remains or cultural deposits are expected to be found during microtunneling, but that SHPD will be contacted should such deposits be found and recognized. The final EA will be revised to include the procedural requirement under 6E-43.6 regarding inadvertent discovery of burial sites.

Thank you for participating in the planning phase of this important project.

Sincerely,


Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



December 22, 2003

Mr. Timolly Tucker
Haseko (Ewa), Inc.
91-919 Kuhina Street, #102
Ewa Beach, Hawaii 96706

Dear Mr. Tucker:

Subject: Draft Environmental Assessment for the Reconstruct
Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater
Pump Station Project. TMK: 9-1-9, 11, 27, 28, 29, 30, 36

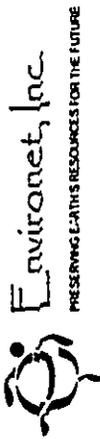
HASEKO CONSTRUCTION, INC.
ATTN: CLIFFORD S. JAMILE

DEC 23 2003

SERUO WAIKOLE, Mayor
EDDIE FLORES, Jr., Chairman
CHARLES A. SIED, Vice Chairman
JANILEY AUM
FRANCIS K. KAOPUA, SR.
DANIEL H. IEMAO

ROONEY K. HARADA, Esq.
LARRY J. LEDERER, Esq.

CLIFFORD S. JAMILE
Manager and Chief Engineer
DONNA YUKI KUROSAKI
Deputy Manager and Chief Engineer



January 20, 2004

Mr. Clifford S. Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Jamile:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater
Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated December 22, 2003 regarding the subject project.
Construction drawings have been reviewed by BWS and comments were provided the Limitaco
Consulting Group, Inc., project engineers. The construction schedule is being coordinated with
BWS to minimize impact to the water system.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki
Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

Very truly yours,

K. Suida
for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Office of Environmental Quality Control
Carl Arakaki, Department of Design and Construction
Roger Aoki, Environet, Inc.

The construction drawings should be submitted for our review and approval.

The construction schedule should be coordinated to minimize impact to the water system.

If you have any questions, please contact Joseph Kaakua at 748-5440.

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

1000 ULUOHA STREET, SUITE 300 • HONOLULU, HAWAII 96707
PHONE: (808) 692-3501 • FAX: 692-3131 • INTERNET: WWW.US.BOTANICAL.NZ



JEREMY HAYES
MANAGER

WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SAMPPA" DIAZ
MANAGER

December 15, 2003

HASEKO CONSTRUCTION, INC.

Mr. Timothy Tucker
Haseko (Iwa) Inc.
91-919 Kulinia Street, #102
Ewa Beach, Hawaii 96706

DEC 19 2003

Dear Mr. Tucker:

Subject: Draft Environmental Assessment
Reconstruct Pohakupuna Road Sewer line and Upgrade
Ewa Beach Wastewater Pump Station

Thank you for the opportunity to review and comment on the Draft Environmental Assessment relating to the Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station.

The Department of Parks and Recreation does not have any comment on this Draft Environmental Assessment; and as the proposed project does not affect any facilities or programs of this department, you can remove us as a consulted party to the Environmental Impact Statement process.

Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

Sincerely,

WILLIAM D. BALFOUR, JR.
Director

WDB:cu
11/16/03

cc: Mr. Roger Aoki, Environet, Inc.
Mr. Carl Arakaki, Department of Design and Construction
Office of Environmental Quality Control



January 20, 2004

Mr. William D. Balfour, Jr., Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawaii 96707

Dear Mr. Balfour:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated December 15, 2003 regarding the subject project. This acknowledges that DPR has no comment on the Draft EA. Per your request, the department will be removed as a consulted party regarding this project.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET - HONOLULU, HAWAII 96813
TELEPHONE: (808) 522-4410 • FAX: (808) 522-4411 • WWW.HONOLULU.HI



TIMOTHY TUCKER
DIRECTOR

BARBARA KIM STANTON
DEPUTY DIRECTOR

2003/ELOG-3738 (MW)

January 2, 2004

HASEKO CONSULTING, INC.
RECEIVED

JAN 5 - 2004

Mr. Timothy Tucker
Haseko (Ewa), Inc.
91-919 Kuhina Street, #102
Ewa Beach, Hawaii 96706

Dear Mr. Tucker:

Draft Environmental Assessment to
Reconstruct the Pohakupuna Road Sewer Line and
Upgrade the Ewa Beach Wastewater Pump Station

We have two comments. First, the Honolulu WWTP is incorrectly identified on page 2-1 as the "Honolulu" WWTP. Second, the discussion of flood hazard impacts on page 4-1 should mention the changes being made to the Ewa Beach WPS, notably replacing a chain-link fence with a CMU wall at the back property line and extending the front of the building 3 feet forward.

Should you have any questions, please contact Mike Watkins of our staff at 523-4406.

Sincerely yours,

ERIC G. CRISPIN, AIA
Director of Planning and Permitting

EGC:js

cc: DDC, Attn: Carl Arakaki
OEQC

p:\DirFunction\ea-est\2003\elog-3738



January 20, 2004

Mr. Eric G. Crispin, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Crispin:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated January 2, 2004 regarding the subject project. Page 2-1 will be revised to correctly refer to Honolulu WWTP, and the discussion of flood hazard impacts will be revised to include proposed changes to the Ewa Beach wastewater pump station.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU JAN 21 2004
 650 SOUTH KING STREET 3RD FLOOR • HONOLULU, HAWAII 96813
 TELEPHONE: (808) 533-4130 • FAX: (808) 533-4730 • INTERNET: www.cc.hawaii.gov



CHERYL D. SOON
 DIRECTOR
 GEORGE "TEDDY" MIYAMOTO
 PLANNING DIVISION

TP12/03-43661R

January 13, 2004

Mr. Timothy Tucker
 Hascko (Ewa), Inc.
 91-919 Kuhina Street, #102
 Ewa Beach, Hawaii 96706

Dear Mr. Tucker:

Subject: Reconstruct Pohakupuna Road Sewer Line and Upgrade Ewa Beach Wastewater Pump Station

In response to the letter from Environet, Inc., we have reviewed the draft environmental assessment for the subject project. The following comments are the result of this review:

1. A traffic study should be conducted for this project. The traffic study should address the project's impact on traffic during construction, its impact on the surrounding roadway system, as well as proposed mitigative measures.
2. The Department of Transportation Services and Oahu Transit Services, Inc. should be notified prior to the start of construction.
3. Section 6.1 should be corrected to state that the Street Usage Permit is issued by the Department of Transportation Services.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at 527-4976.

Sincerely,

Cheryl D. Soon
 CHERYL D. SOON
 Director

cc: Ms. Genevieve Salmonson, Office of Environmental Quality Control
 Mr. Carl Arakaki, Department of Design and Construction
 ✓ Mr. Roger Aoki, Environet, Inc.



January 21, 2004

Ms. Cheryl Soon, Director
 Department of Transportation Services
 City and County of Honolulu
 650 South King Street, 3rd Floor
 Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
 TMK: 9-1-09, 11, 27, 28, 29, 30, 36
 Draft Environmental Assessment (DEA)

We have received your letter dated January 13, 2004 regarding the subject project. The following has been prepared in response to your comments.

1. While we understand your concern for the impact of construction activities on traffic, we do not agree that a traffic study should be conducted. As we have discussed with the Ewa Beach Neighborhood Board, mitigation measures will include: 1) advance notice to schools within affected areas; 2) traffic control by police and/or trained construction flagmen; and 3) maintaining of two-way traffic at all times during construction, and a minimum of one travel lane will be kept open at all times.
2. Department of Transportation Services and Oahu Transit Services, Inc. will be notified prior to start of construction.
3. Section 6.1 will be revised to state that the Street Usage Permit is issued by the Department of Transportation Services.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki
 Roger Aoki, P.E.
 Project Manager

cc: Tim Tucker, Hascko
 Carl Arakaki, Department of Design & Construction
 Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

1430 Kalia Street, Suite 2110 Honolulu, Hawaii 96819 • Tel: (808) 533-2110 • Fax: (808) 533-2111

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
 3375 KONAUA STREET, SUITE 402 • HONOLULU, HAWAII 96819-1869
 TELEPHONE: (808) 935-7700 • FAX: (808) 931-7700 • TDD: (808) 935-7700



ATTILIO K. LEONARDI
 Fire Chief
 HONOLULU FIRE DEPARTMENT

JAN 8 - 2004

December 29, 2003

Mr. Timothy Tucker
 Hascok (Ewa), Inc.
 91-919 Kuhina Street, Unit 102
 Ewa Beach, Hawaii 96706

Dear Mr. Tucker:

Subject: Draft Environmental Assessment
 Pohakupuna Road Sewer Line Reconstruction and
 Ewa Beach Wastewater Pump Station Upgrade
 Ewa, Oahu
 Tax Map Keys: 9-1-009; 011, 027, 028, 029, 030, and 036

We received your letter on December 4, 2003, requesting our comments on the above-mentioned project.

The Honolulu Fire Department requires that the following be complied with for the duration of the project:

1. Maintain fire apparatus access throughout the construction site.
2. Notify the Fire Communication Center at 523-4411 of any interruption in the existing fire hydrant system.

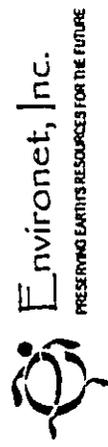
Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 831-7778.

Sincerely,

 ATTILIO K. LEONARDI
 Fire Chief

AKL/SK:lh

cc: Office of Environmental Quality Control
 Carl Arakaki, Department of Design and Construction
 Roger Aoki, Environet, Inc.



January 20, 2004

Hon. Attilio K. Leonard, Fire Chief
 Fire Department
 City and County of Honolulu
 3375 Koaapaka Street, Suite H425
 Honolulu, Hawaii 96819-1869

Dear Chief Leonard:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater
 Pump Station Upgrade, Ewa, Oahu, Hawaii
 TMK: 9-1-09, 11, 27, 28, 29, 30, 36
 Draft Environmental Assessment (DEA)

We have received your letter dated December 29, 2003 regarding the subject project. The following has been prepared in response to your comments. The contractor shall:

1. Maintain fire apparatus access throughout the construction site.
2. Notify the Fire Communication Center at 523-4411 of any interruption in the existing fire hydrant system.

The Final Environmental Assessment will reflect these comments and the Fire Department's requirements.

Thank you for participating in the planning phase of this important project.

Sincerely,

 Roger Aoki, P.E.
 Project Manager

cc: Tim Tucker, Hascok
 Carl Arakaki, Department of Design & Construction, City and County of Honolulu
 Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

1550 P... Street, Suite 1110 | Honolulu, Hawaii 96819 | Tel: (808) 933-2111 | Fax: (808) 933-2111

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
201 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 938-3111
<http://www.honolulu.gov>



LEE D. DONOHUE
CHIEF

OLEN S. RAJIVAMA
PAUL D. PUTZLUM
DEPUTY CHIEF

OUR REFERENCE CS-KP

January 2, 2004

HASTY

LEE D. DONOHUE, INC.

JAN 6 - 2004

Mr. Timothy Tucker
Haseko (Ewa), Inc.
91-919 Kuhina Street, 102
Ewa Beach, Hawaii 96706

Dear Mr. Tucker:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Reconstruction of the Pohakupuna Road Sewer Line and Upgrade of the Ewa Beach Wastewater Pump Station.

As previously stated, this project will have a temporary impact on the services provided by the Honolulu Police Department. We are pleased to note that the contractor will be working directly with Captain George Yamamoto of District 8 to route traffic in the area to minimize negative impacts.

If there are any questions, please call Captain Yamamoto at 692-4253 or Ms. Carol Soderant of the Support Services Bureau at 529-3658.

Sincerely,

LEE D. DONOHUE
Chief of Police

By 
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

cc: OEQC
Mr. Carl Arakaki (DDC)
Mr. Roger Aoki (Environet)

Serving and Protecting with Aloha



January 20, 2004

Hon. Lee D. Donohue, Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813
Attn: Karl Godsey, Assistant Chief of Police

Dear Assistant Chief Godsey:

Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)

We have received your letter dated January 2, 2004 regarding the subject project. This acknowledges the Police Department's assignment of Captain George Yamamoto of District 8 to work directly with the contractor to route traffic in the area to minimize negative impacts on police protection services.

The final Environmental Assessment will reflect these comments.

Thank you for participating in the planning phase of this important project.

Sincerely,


Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction, City and County of Honolulu
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

1120 Foa Street, Suite 1114 Honolulu, Hawaii 96813 Tel: (808) 933-1111 Fax: (808) 933-1111

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

GEN-9 (EIS/EA)



December 17, 2003

HASEKO CONSTRUCTION, INC.

DEC 19 2003

Mr. Timothy Tucker
Haseko (Ewa) Inc.
91-919 Kuhina Street - #102
Ewa Beach, HI 96706

Dear Mr. Tucker:

**Re: Reconstruction of Pohakupuna Road Sewer Line &
Upgrade of Ewa Beach Wastewater Pump Station
Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36**

Thank you for the opportunity to comment on the November 2003 draft EA of the subject project, as proposed by Haseko (Ewa), Inc. We have reviewed the document and have no comments at this time.

HECO reserves the opportunity to further comment on the protection of existing powerlines and electric power facilities that may be affected by the project until construction plans are finalized.

Again, thank you for the opportunity to comment on this project.

Sincerely,

Kirk S. Tomita
Senior Environmental Scientist

cc: Ms. Genevieve Salmonson (OECC)
Mr. Carl Arakaki (C&C/Depl. Design & Constr.)
Mr. Roger Aoki (Environet, Inc.)



WINNER OF THE EDISON AWARD
FOR OUTSTANDING INDUSTRIAL PERFORMANCE



PRE-SAVING EARTH'S RESOURCES FOR THE FUTURE

January 21, 2004

Mr. Kirk S. Tomita, Senior Environmental Scientist
Hawaiian Electric Company, Inc.
P. O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Tomita:

**Subject: Pohakupuna Road Sewer Line Reconstruction and Ewa Beach Wastewater
Pump Station Upgrade, Ewa, Oahu, Hawaii
TMK: 9-1-09, 11, 27, 28, 29, 30, 36
Draft Environmental Assessment (DEA)**

We have received your letter dated December 17, 2003 regarding the subject project. This acknowledges that HECO has no comments on the Draft EA at this time.

Review of the project's construction plans will be conducted with HECO to ensure that existing powerlines and electric power facilities would not be affected.

Thank you for participating in the planning phase of this important project.

Sincerely,

Roger Aoki, P.E.
Project Manager

cc: Tim Tucker, Haseko
Carl Arakaki, Department of Design & Construction
Genevieve Salmonson, Office of Environmental Quality Control, State of Hawaii

12345 67890 12345 67890 12345 67890 12345 67890 12345 67890

Appendix C:
Preliminary Acoustical Design Recommendations
(Y. Ebisu, Acoustical Consultants)

Y. Ebisu & Associates

Acoustical and Electronic Engineers

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Job #41.049
August 7, 2003

Thermal Engineering Corp.
512 Kalihi Street
Honolulu, Hawaii 96819

RECEIVED
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Attention: Mr. Ken Mashima, P.E.

THERMAL ENGINEERING CORP.

Subject: Preliminary Acoustical Recommendations for Emergency Generator Room
Treatment; Ewa Beach WWPS 600 KW Generator Upgrade

Dear Mr. Mashima:

The following letter report provides our acoustical design goals, and preliminary acoustical recommendations for the subject facility.

A. ACOUSTICAL DESIGN GOALS:

1. State Department of Health (DOH) Noise Regulations:

The properties adjacent to the project site were assumed to be in or zoned for single family residential (R-5) use. Applicable State DOH noise limits (daytime/nighttime) are 55/45 dBA along the wastewater pump station's property boundary lines.

2. Basis of Acoustical Design:

The State DOH nighttime noise limit of 45 dBA along the project site's property boundary lines is the most stringent requirement to be met. Based on the sound level predictions of the planned generator installation, approximately 45 to 50 dB of sound attenuation will be required to meet the State DOH nighttime limit of 45 dBA. This 45 dBA limit will be difficult to meet along the station's property lines due to the relatively short distances of the planned Generator Room ventilation openings to the property lines.

It should be possible to meet the DOH daytime limit of 55 dBA at all of the site property lines, while also meeting the 45 dBA nighttime limit at the nearest residences. This goal was adopted as the acoustical design requirement.

B. ACOUSTICAL ASSUMPTIONS:

1. 600 KW Generator with In-Frame Radiator: Free-field total noise level of approximately 94 dBA at 23 FT distance.
2. Radiator Fan Airflow Required: 42,590 CFM.
3. Maximum Static Pressure Drop of Intake or Exhaust Air Duct Silencers: less than 0.10 (inches of water).
4. Minimum Size of Intake and Discharge Air Openings: 60 SF (intake) and 60 SF (discharge).
5. Exhaust Pipe Noise Level with Critical Grade (30 dBA) Muffler: 68 dBA at 20 FT distance.

C. PRELIMINARY ACOUSTICAL RECOMMENDATIONS:

1. Exterior Walls and Roof: The exterior walls of the Generator Room should be formed from 8" thick dense concrete or CMU whose cells are fully grouted. Except for treated ventilation openings or penetrations, all cracks and voids in the walls should be sealed. Paint sealer should be used on one side of the CMU walls. The roof of the Generator Room should be formed from minimum 8" thick, dense concrete. If less roof slab thickness is used, a layer of 5/8" thick gypboard attached to 7/8" furring channels (spaced 24" O.C.) will need to be attached to the underside of the concrete ceiling.

The existing roof opening for the exhaust pipe needs to be reworked by infilling the large void between the exhaust pipe and roof opening with concrete and using a pipe sleeve to form a smaller circular opening in the roof for the exhaust pipe and thermal insulation.

2. Interior Finish Treatment of Generator Room: The ceiling and bare wall surfaces (from the ceiling down to the 1 FT height line) of the Generator Room should be treated with 4" total thickness of semirigid fiberglass treatment. The recommended composition of the fiberglass treatment is a 3-1/2" thick inner layer of unfaced, semirigid panels of Owens Corning Type 703 insulation (see ENCLOSURE 1) plus a 5/8" thick outer layer of white Armstrong #2910, film-faced, fiberglass ceiling panel (see ENCLOSURE 2). The insulation may be held in place with fasteners and/or a galvanized metal lath attached to Z-furring channels spaced 24" O.C. (see ENCLOSURE 3). Alternately, perforated metal, protective panels (see ENCLOSURE 4) may be used as the outer finish layer, with a 4" thick inner layer of unfaced Owens Corning Type 703 used between the bare wall and the perforated metal panels.

3. Radiator Discharge Air Opening: The discharge air opening should be treated with an inline, 7 FT long, IAC 7Ms duct silencer (see ENCLOSURE 5), with a minimum total face area of 60 SF. The duct silencers may be oriented horizontally with a lined transition duct and elbow located between the silencers and the radiator. The transition duct and lined elbow between the radiator and discharge duct silencer should all be lined with 6" thick semirigid duct liner. An inner layer of unfaced, 4" thick Owens Corning Type 703 insulation plus an outer face layer of 2" thick Owens Corning Duct Liner Board (see ENCLOSURE 6) may be used to construct the 6" thick duct liner. The black coated face of the Duct Liner Board should be exposed within the transition duct and lined elbow.

The silencer (60"W x 144"H x 84"L) may be fabricated from galvanized or stainless steel, and should use fiberglass as the baffle insulation material. Stainless steel construction is recommended for the discharge silencers. The silencers should be tilted to drain outward and with their internal baffles oriented vertically. A bird screen or grill should be added at the exterior end of the inlet air duct. Standard louvers may also be used at the exterior end of the silencers, but the opening may need to be oversized due to the lower effective free area of the louvers.

4. Exterior Double Door: The double door should be located on the east wall of the Generator Room. A raised threshold should be used to eliminate the need for automatic door bottom seals. The double door should be rated at a minimum STC 52 as an assembly, which includes a fully grouted steel frame, and adjustable, neoprene, compression-type seals along the head, jamb, astragal, and door bottom.

5. Intake Air Opening: A location at the east end of the south (makai) wall of the Generator Room is suggested for the intake air opening. It is suggested that the primary intake air be ducted into the room through a lined elbow and 7 FT long, IAC 7Ms duct silencers, with minimum total face area of 60 SF. The 6" thick elbow liner should be similar to that described for the discharge elbow. A vertical row of silencer modules 60" wide x 144" high can be used to form the intake silencer bank. The duct silencers should be tilted downward for drainage, and the perforated splitter elements in each silencer module should be oriented vertically. Stainless steel construction is recommended for the intake silencer. A rain gutter should be used along the roof overhang above the intake silencer bank. A bird screen or grill should be added at the exterior end of the inlet air duct. Standard louvers may also be used at the exterior end of the silencers, but the opening may need to be oversized due to the lower effective free area of the louvers.

6. Engine Exhaust Mufflers: One Residential Grade plus one Critical Grade mufflers, installed in series, with minimum 12" pipe size are recommended for this

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project. The suggested mufflers are Nelson Residential #44684 and Nelson Critical #41384 (see ENCLOSURES 7 and 8). I am assuming that the exhaust pipe will be thermally insulated with high temperature jacket, will be resiliently supported, and will be discharging upward and located at least 48 FT from any property line. Split collars (which do not make direct contact with the exhaust pipe) should be used on both sides of the exterior wall or roof penetration by the exhaust pipe, and 1/4" gap (with insulation spacers) should be provided between the exhaust pipe and the collar. The purpose of the collars is to minimize the size of the gap between the exhaust pipe and the structure.

7. Engine Generator Mounts: Spring-plus-neoprene-in-series vibration isolators with minimum 1-1/2" static deflection should be used to support the generator. Neoprene grommets and washers should be used as required at all isolator hold-down points (see ENCLOSURE 9). The vibration isolators should be located on outriggers (or height saving brackets), and should include seismic restraints.

If you have any questions regarding these recommendations, do not hesitate to call. You should pass these recommendations on to the other consultants and the potential generator suppliers for their review and evaluation.

Sincerely,



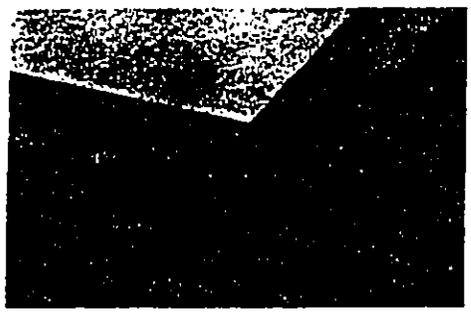
Yoichi Ebisu, P.E.

encl.

RECEIVED AS FOLLOWS



Industrial Insulation 700 Series Plain and Faced



Uses
Owens-Corning 700 Series Fiberglas® plain and faced industrial insulations are a highly versatile group designed to insulate ductwork, equipment, vessels, and tanks, both thermally and acoustically, where operating temperatures do not exceed 450F.

Type 701 is a lightweight, resilient insulation, in board form, used on vessels having irregular surfaces and where the exterior finish is supported by welded studs, pins, or other mechanical attachments.

Type 703 is a semi-rigid board recommended for use on equipment, vessels, and air-conditioning ductwork.

Type 705 is a rigid board with very high strength characteristics for use on chillers, hot and cold equipment, heating and air-conditioning ductwork, and where greater abuse resistance and good appearance is required.

Description
Owens-Corning Fiberglas 700 series industrial insulations are made of inorganic glass fibers preformed into semi-rigid to rigid rectangular boards of varying densities. Each type has specific thermal, acoustical, and physical characteristics which make it suitable for the uses described. Types 703 and 705 are available with factory-applied FRK-25 foil-reinforced kraft facing or ASJ-25 All-Service Jacket facing. Both facings are vapor barriers, and provide a neat and finished appearance.

These products are not designed for use inside ducts or equipment where the insulation is exposed directly to a moving air stream. Contact your local Owens-Corning Fiberglas Mechanical Division salesman for product recommendations.

®Registered trademark, Owens-Corning Fiberglas Corp.

Features and Related Benefits

Exceptional thermal efficiency	Fiberglas 700 series insulation boards save energy and reduce heat transfer, lowering operating costs, in -60F to +450F service.
Available in three densities	A selection of products is offered to meet specific performance and economic requirements.
Structural integrity	700 series insulations resist damage, maintain structural integrity and efficiency. Thickness stays uniform.
Excellent acoustical properties	This versatile group of Fiberglas boards efficiently reduces sound transmission.
Factory-applied facings	Attractive, finished appearance can be attained. Heavier density boards cut neatly, with neat, square corners.
UL listed	Fiberglas 700 series insulation (faced and unfaced) has a UL flame spread rating of less than 25*; this usually permits immediate building code approval, and lower insurance rates.

*This UL rating is used solely to measure and describe the properties of the products in response to heat and flame under controlled laboratory conditions. This numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions. Values are reported to the nearest 5 rating.

Performance & Physical Characteristics

Flat Surface
Time Rate of Heat Loss
per Unit Area
80 F Ambient Temperature
0.0 Wind Velocity, MPH
0.90 Surface Emittance

ASTM recommended practice for determination of heat loss or gain, and surface temperatures of insulated pipe and equipment systems by the use of a computer program ASTM designation C680.

TYPE 701 FIBERGLAS INSULATION

Insulation Thickness (Inches)	Operating Temperature, degrees F						
	150	200	250	300	350	400	450
	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.
1.5	11 88	20 93	31 100	42 106	56 113	70 121	81 129
2.0	8 86	15 91	23 95	32 101	43 106	54 112	66 119
2.5	7 85	12 89	19 93	26 97	34 102	44 107	54 112
3.0	5 84	10 87	16 91	22 95	29 99	37 103	45 108
4.0	4 83	8 86	12 88	17 91	22 94	28 98	34 102
5.0	3 82	6 84	10 87	13 89	17 92	22 95	27 98
6.0	3 82	5 84	8 86	11 88	15 90	18 92	23 95
7.0	2 82	4 83	7 85	9 87	12 89	16 91	20 93
7.5*	2 81	4 83	7 85	9 86	12 88	15 90	18 92

TYPE 703 FIBERGLAS INSULATION

Insulation Thickness (Inches)	Operating Temperature, degrees F						
	150	200	250	300	350	400	450
	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.
1.0	14 90	26 97	40 105	55 113	72 121	90 130	111 140
1.5	10 87	18 92	28 98	38 104	49 110	62 117	76 129
2.0	7 85	14 90	21 94	29 99	38 104	48 109	58 115
2.5	6 84	11 88	17 91	23 95	30 100	38 104	47 109
3.0	5 84	9 87	14 90	20 93	26 97	32 100	40 105
3.5	4 83	8 86	12 88	17 91	22 95	28 98	34 102
4.0*	4 83	7 85	11 87	15 90	19 93	24 96	30 99

TYPE 705 FIBERGLAS INSULATION

Insulation Thickness (Inches)	Operating Temperature, degrees F						
	150	200	250	300	350	400	450
	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.
1.0	14 90	27 97	40 105	55 113	71 121	89 130	109 139
1.5	10 87	18 92	28 98	38 104	49 110	62 116	75 123
2.0	7 85	14 90	21 94	29 99	38 103	47 109	58 114
2.5	6 84	11 88	17 91	23 95	30 99	38 104	47 108
3.0*	5 84	9 87	14 90	20 93	25 97	32 100	39 104

*Maximum allowable thickness (single or double layer) at maximum operating temperature (450F).

Mounting:

F405: Insulation placed against 24-gauge sheet metal over a 16-inch air space. This mounting configuration is typical of a sheet metal enclosure with insulation on one side.

Sound Absorption Coefficients:

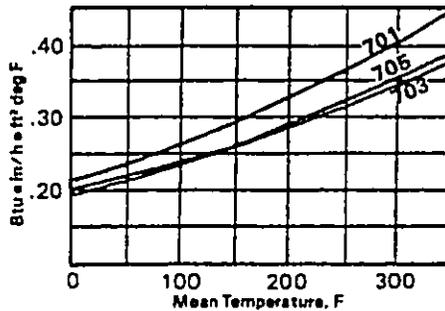
Frequency Hz	Unfaced Insulation Type						Faced Insulation Type					
	701		703		705		701		703 FRK or ASJ		705 FRK or ASJ	
	One-Inch Thickness	Two-Inch Thickness	One-Inch Thickness	Two-Inch Thickness	One-Inch Thickness	Two-Inch Thickness	One-Inch Thickness	Two-Inch Thickness	One-Inch Thickness	Two-Inch Thickness	One-Inch Thickness	Two-Inch Thickness
125	.38	.44	.33	.38	.32	.39	Not Available Faced		.31	.38	.25	.38
250	.34	.66	.28	.63	.30	.59			.45	.51	.48	.36
500	.68	1.07	.62	1.10	.66	1.06			.62	.83	.28	.39
1000	.82	1.06	.88	1.07	.90	1.08			.65	.73	.57	.37
2000	.87	.99	.96	1.05	.95	1.05			.51	.53	.39	.56
4000	.96	1.06	1.04	1.05	1.01	1.13			.28	.37	.30	.38
NRC	.68	.95	.69	.96	.70	.95		.56	.65	.43	.42	

For further Noise Control information, contact your local Owens-Corning Fiberglas representative.

Size and Density:

	701	703	705
Density (pcf)	1.50	3.00	6.00
Thickness (1/2" increments)	1 1/2"-4"	1"-2"	1"-2"
Compressive strength (psf at 10% deform.) (psf at 25% deform.)	20	90	350
Standard size (inches)	24"x48"		
Thermal conductivity at 75F mean temp.	0.25	0.23	0.23

Thermal Conductivity:



Vapor transmission rates:

ASJ-25 - .02 perms
FRK-25 - .02 perms

Beach puncture resistance:

ASJ-25 - 50 units
FRK-25 - 25 units

Surface burning characteristics:

(UL 723)*,
unfaced or faced
flame spread* 25
smoke developed 50

*This UL rating is used solely to measure and describe the properties of the products in response to heat and flame under controlled laboratory conditions. This numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions. Values are reported to the nearest 5 rating.

Facings:

Types 703 and 705 are available with the following factory-applied vapor barrier facings, with UL labels if specified:

- FRK—Foil reinforced kraft
- ASJ—Embossed white kraft foil laminate

Thickness to Prevent Condensation

Specification Compliance

Calculated per ASTM C680 (modified), flat, vertical surface.

57% Relative Humidity

Operating Temp., F	Thickness, Inches 90F Ambient				Thickness, Inches 80F Ambient			
	Type 703		Type 705		Type 703		Type 705	
-10	5½	12½	5	13	5	11½	5	12
0	5	11½	5	12	4½	10½	4½	10½
10	4½	10½	4	10½	4	9	4	9½
20	4	9	4	9½	3½	8	3½	8
40	3	6½	3	6½	2½	5½	2½	5½
60	2	4	2	4	1	2½	1½	2½
80	1	1	1	1½				
Emittance	0.9	0.2	0.9	0.2	0.9	0.2	0.9	0.2

80% Relative Humidity

Operating Temp., F	Thickness, Inches 90F Ambient				Thickness, Inches 80F Ambient			
	Type 703		Type 705		Type 703		Type 705	
-10	2	4½	2½	5	2	4½	2	4½
0	2	4½	2	4½	2	4	2	4
10	2	4	2	4	1½	3½	1½	3½
20	1½	3½	1½	3½	1½	3	1½	3
40	1	2½	1	2½	1	2	1	2
60	1	1½	1	1½	1	1	1	1
80	1	1	1	1				
Emittance	0.9	0.2	0.9	0.2	0.9	0.2	0.9	0.2

These products conform to the property requirements of government specifications:

701 703 705

HH-I-558B Amendment 3 Form A, Class 1		•	•
HH-I-558B Amendment 3 Form A, Class 2		•	•
HH-I-558B Amendment 3 Form B, Class 6	•		•
HH-I-558B Amendment 3 Form B, Class 7	•		•

Products 703 and 705 comply with the property requirements of:
 ASTM C612 "Standard Specification for Mineral Fiber Block and Board Thermal Insulation," Class I and II.
 MIL-I-24244 A
 NRC Guide 1.36
 NFPA 90A

Flat Surface
 Time Rate of Heat Loss
 per Unit Area
 80 F Ambient Temperature
 0.0 Wind Velocity, MPH
 0.20 Surface Emittance

ASTM recommended practice for determination of heat loss or gain, and surface temperatures of insulated pipe and equipment systems by the use of a computer program ASTM designation C680.

TYPE 701 FIBERGLAS INSULATION WITH BRIGHT METAL JACKET

Insulation Thickness (Inches)	Operating Temperature, degrees F													
	150		200		250		300		350		400		450	
	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	
1.5	10	94	18	104	28	114	39	124	52	135	65	147	81	160
2.0	8	91	14	99	22	107	30	116	40	125	51	135	63	145
2.5	6	90	12	96	18	103	25	110	33	118	41	126	51	135
3.0	5	88	10	94	15	100	21	106	28	113	35	120	43	128
4.0	4	87	7	91	11	96	16	101	21	106	27	112	33	118
5.0	3	85	6	89	9	93	13	98	17	102	22	107	27	112
6.0	2	85	5	88	8	91	11	95	14	99	18	103	22	108
7.0	2	84	4	87	7	90	9	93	12	97	15	101	19	105
7.5*	2	84	4	87	6	90	9	93	11	96	14	99	18	103

TYPE 703 FIBERGLAS INSULATION WITH BRIGHT METAL JACKET

Insulation Thickness (Inches)	Operating Temperature, degrees F													
	150		200		250		300		350		400		450	
	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	
1.0	13	97	24	109	36	121	50	134	65	147	82	161	111	140
1.5	9	93	17	102	25	111	35	120	46	130	58	141	76	129
2.0	7	90	13	98	20	105	27	113	36	121	45	129	58	115
2.5	5	89	10	95	16	101	22	108	29	115	37	122	47	109
3.0	5	88	9	93	13	98	19	104	24	110	31	116	40	105
3.5	4	87	8	91	12	96	16	101	21	107	27	112	34	102
4.0*	3	86	7	90	10	95	14	99	19	104	23	109	33	99

TYPE 705 FIBERGLAS INSULATION WITH BRIGHT METAL JACKET

Insulation Thickness (Inches)	Operating Temperature, degrees F													
	150		200		250		300		350		400		450	
	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	Heat Surf. Loss Temp.	
1.0	13	97	24	109	36	121	50	134	65	146	81	160	100	171
1.5	9	93	17	102	25	111	35	120	46	130	58	140	71	151
2.0	7	91	13	98	20	105	27	113	35	121	45	129	55	138
2.5	6	89	11	95	16	101	22	108	29	114	36	121	44	129
3.0*	5	88	9	93	13	98	19	104	24	110	31	116	38	123

*Maximum allowable thickness (single or double layer) at maximum operating temperature (450F).

Application Recommendations

Type 701—lightweight unfaced flexible insulation in board form for use on vessels having irregular surfaces, where the compressive strength is not a performance criterion.

Types 703 and 705—board insulations normally impaled on welded pins on flat surfaces. They are cut in segments and banded in place on irregular surfaces. Unfaced boards are normally finished with reinforced insulating cement or weatherproof mastic. For outdoor application: Types 703 and 705, faced.

ASJ-25 or FRK-25 Faced insulation boards shall be applied using mechanical fasteners such as weld pins or stick clips. Fasteners shall be located not less than 3"

from each edge or corner of the board. Pin spacing along the duct should be no greater than 12" on centers. Additional pins or clips may be required to hold the insulation tightly against the surface where cross breaking is used for stiffening. Weld pin lengths must be selected to insure tight fit but avoid "oil canning" effect.

Apply vapor seal ASJ or FRK pressure-sensitive patches. Rub hard with the nylon sealing tool to insure a tight bond and a vapor seal.

All insulation edges and butt joints are to be sealed with pressure-sensitive joint sealing tape to match the jacket. Rub hard with nylon sealing tool. Use 3" wide tapes on flat surfaces, or where edges are shiplapped and stapled. Five-inch wide tape can be used in lieu of shiplapping.

Precautions:

- Keep all contact adhesive surfaces clean.
- Use nylon sealing tool to prevent wrinkles and fishmouths.
- Ductwork or radius may require pre-scoring to allow the board to conform to the surface.
- When painting the facings for indoor applications, use only water base/latex products.

Limitations:

- Pressure-sensitive sealing tapes or patches should only be applied when the ambient temperature is between +35F and +110F.
- Maximum insulation surface temperatures in use are limited to -10F to +150F.
- Outdoor applications require additional weatherproofing. The product we have tested with our FRK facing and recommend with this type of application is: Cado-prene 725, manufactured by Epolux Mfg. Corp.

Caution

It is possible that heat may be generated from the resinous binder of insulations if ignited by external sources such as welding slag, cutting torches, etc. Care should be taken to avoid direct contact with the insulation by fire or ignition sources.

Insulation may cause temporary irritation. Wear long-sleeved, loose fitting clothing, gloves and eye protection, when handling and applying material. Wash with soap and warm water after handling. Wash work clothes separately in rinse washer. A disposable mask designed for nuisance type dusts is advisable where high dust levels are encountered.

When the insulation is brought up to operating temperature for the first time, some acrid smoke or fumes may be given off. This normally will stop in 24 hrs. Adequate natural ventilation should be used and for enclosed areas, mechanical ventilation is required. If the material must be installed on hot surfaces (above 200 F), a full-face respirator approved for protection against organic vapors shall be used.

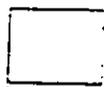


OWENS-CORNING FIBERGLAS CORP.
Mechanical Division
Fiberglas Tower, Toledo, Ohio 43659

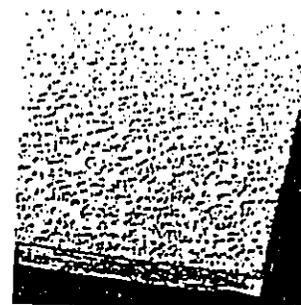
RANDOM FISSURED

Random Fissured is a popular vinyl-faced solution for excellent sound absorption and **HumiGuard Plus** performance.

Color Selection



White (WH)



Random Fissured Nonperforated

Key Selection Attributes

- Perforated options provide improved noise reduction
- Humidity-resistant **HumiGuard Plus** performance
- Easy-clean vinyl
 - Impact-resistant
 - Scrubbable
- 10-year limited warranty; 15-year with **HumiGuard Plus** products and Armstrong hot dipped galvanized grid

Typical Applications

- Discount stores and grocery stores
- Low-rise and single-story buildings
- Classrooms and locker rooms

Grid Face	Edge Detail	Item #	Dimensions	Acoustics		Fire/Flame	Sag Resistance	Light Reflect	Grid Interface	Cost
				NRC	CAC					
Random Fissured - Perforated										
15/16"		2908 2908M	24 x 24 x 5/8" 600 x 600 x 15mm		-	Class A		0.75		\$
15/16"		2910 2910M	24 x 48 x 5/8" 600 x 1200 x 15mm		-	Class A		0.75		\$
15/16"		2917 2917M	24 x 60 x 5/8" 600 x 1500 x 15mm		-	Class A		0.75		\$
Random Fissured - Nonperforated										
15/16"		2909 2909M	24 x 24 x 5/8" 600 x 600 x 15mm		-	Class A		0.75		\$
15/16"		2911 2911M	24 x 48 x 5/8" 600 x 1200 x 15mm		-	Class A		0.75		\$



High Acoustical Performance



Humidity (Sag) Resistance
4 drops = HumiGuard Plus
3 drops = HumiGuard Plus
1 drop = Standard



Relative Installed Cost
4 \$ = highest pricing
1 \$ = lowest pricing

Physical Data

Material
2908, 2909, 2910, 2911, 2917 -
Fiberglass

Surface Finish
Washable vinyl film facing
(UV protected)

Flame Spread/Fire Resistance
Class A: Flame Spread 25 or under
(UL Labeled)

ASTM E 1264 Classification
2908, 2910, 2917 - Type XII, Form 1,
Pattern E C
2909, 2911 - Type XII, Form 1,
Pattern E

Insulation Value
Average R Factor at 75°F (24°C) is 2.6

Backloading Recommendation
See pages 204-206 for details

Weight
0.20 lbs/SF

Warranty
See pages 204-206 for details

Application Considerations
Not recommended for cold storage rooms, labs with concentration of fumes, pools, and areas where temperatures exceed 140°F

Recommended Suspension System
Prelude 15/16" Exposed Tee grid systems



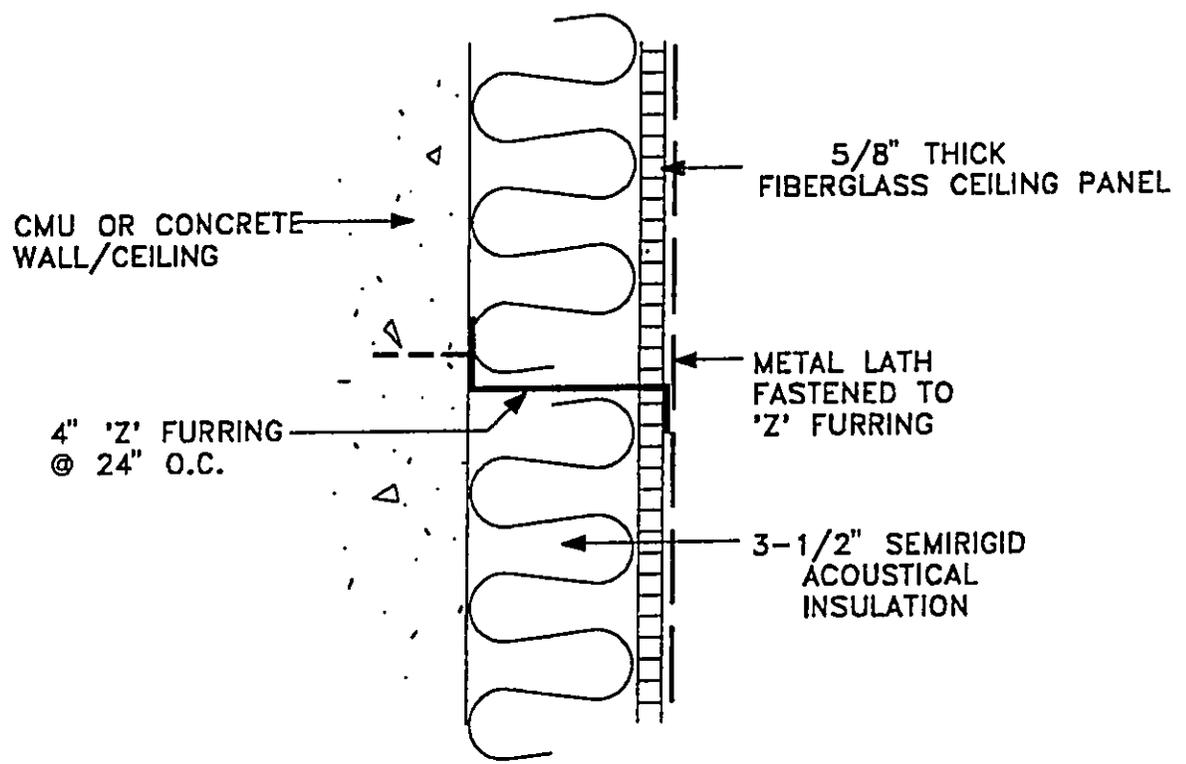
Random Fissured with Prelude 15/16" Exposed Tee grid



Random Fissured Perforated



TECHLINE
1-888-CEILINGS
OPTION 3



DETAIL A
ACOUSTICAL INSULATION

RECEIVED AS FOLLOWS

09900 ALP
Buyline 4955

ALPO ACOUSTICS

RINELL WOOD SYSTEMS, INC.
429 Waiakamilo Road Room 1
HONOLULU, HI 96817
Phone: 841-7688 FAX 841-7680

METAL
ACOUSTICAL
CEILING
AND
WALL
SYSTEMS

ENCLOSURE 4

SOLUTIONS IN NOISE CONTROL

CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

RECEIVED AS FOLLOWS

09/90/ALF
Buyline 4955

ALPRO ACOUSTICS

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METAL
ACOUSTICAL
CEILING
AND
WALL
SYSTEMS

ENCLOSURE 4

SOLUTIONS IN NOISE CONTROL

ALPRO CEILING & WALL SYSTEMS
ACOUSTICS

DT/Document

CATALOG CONTENTS:

General Information2
 Metal Acoustical Panels2-5
 Metal Acoustical Baffles6-7
 Product Specifications8

GENERAL INFORMATION

This catalog gives an overview of the standard metal acoustical systems manufactured by ALPRO ACOUSTICS, a division of Structural Systems Corporation.

The information that follows describes the standard products available. However, it does not include the many special product fabrication features available to the designer.

MR/Manufacturer

Alpro Acoustics has over forty-five years of experience in the acoustical panel industry and has produced quality products to meet the functional and aesthetic demands of a constantly changing market.

Alpro Acoustics manufactures standard panels yet is flexible enough to produce ceiling and wall systems to custom specifications.

Alpro has an ARCHITECTURAL SERVICE GROUP to assist the architect and designer in the engineering of unusual product sizes, shapes and configurations.

Alpro Acoustical Systems are sold nationally through a network of independent sales representatives. Installation is performed by local qualified contractors chosen by the customer.

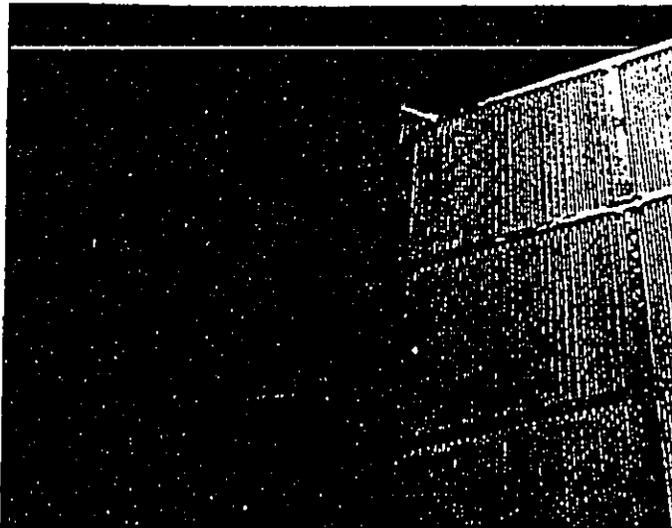
PP/Product Presentation

METAL ACOUSTICAL PANELS

NOISE REDUCTION

CEILING

Alpro Acoustics ceiling systems, consisting of modular panels and supporting grid sections with sound absorption media, have been tested by NVLAP certified testing laboratories in accordance with ASTM C-423 mounting. The results obtained showed NRC ratings of 1.00 and above.



Outdoor Amphitheatre

WALLS

Alpro modular wall panels and supporting trim components with sound absorption media produced NRC test ratings to 1.05 when tested in accordance with ASTM-C-423.

GENERAL

NRC ratings can be controlled by varying the thicknesses and/or densities of the sound control media.

ADVANTAGES

- Excellent NRC ratings of 1.00 and above
- Incombustible panels
- Class "A" flame spread rating
- Durable-abuse resistant
- Flexible-easy to install
- Economical
- Electrostatically applied powder paint
- Interior/Exterior applications
- Low maintenance
- Over 45 years proven performance

SOUND ABSORPTION COEFFICIENTS
OCTAVE BAND CENTER FREQUENCY, HZ

Application	Sound Pad	Mount	125 Hz	250 Hz	500 Hz	1 KHz	2 KHz	4 KHz	NRC
Wall			0.95	0.95	0.95	0.95	0.95	0.95	0.95
Wall			0.95	0.95	0.95	0.95	0.95	0.95	0.95

These tests are shown as examples of representative test results only. Contact Alpro for tests covering your particular noise control problem.

CEILING & WALL PANELS

09500/ALP
BuyLine 4955

UA/Uses, Applications

Alpro Acoustical System Panels are an economical solution to acoustical problems. They are ideal for industrial, institutional and commercial applications. The panel can be designed for new construction, renovation or retrofit jobs where a reduction of intrusive noise or reverberation time is needed.

MF/Materials, Finishes

STANDARD ALUMINUM PANELS are fabricated in stucco-embossed finish aluminum in thicknesses ranging from .020 to .032 inches.

STANDARD STEEL PANELS are fabricated of G90 hot-dipped galvanized smooth finish steel and are available in 22, 24 and 26 gauge.

STANDARD PERFORATION PATTERN uses 1/8 inch diameter holes located on 21/64 inch staggered centers in both aluminum and steel.

FOR CUSTOM MATERIALS OR PRODUCTS OTHER THAN DESCRIBED ABOVE, PLEASE CONTACT THE FACTORY.

RECOMMENDATIONS

ALUMINUM PANELS

Alpro Acoustics recommends that both perforated and unperforated ALUMINUM PANELS be used in either INTERIOR or EXTERIOR applications.

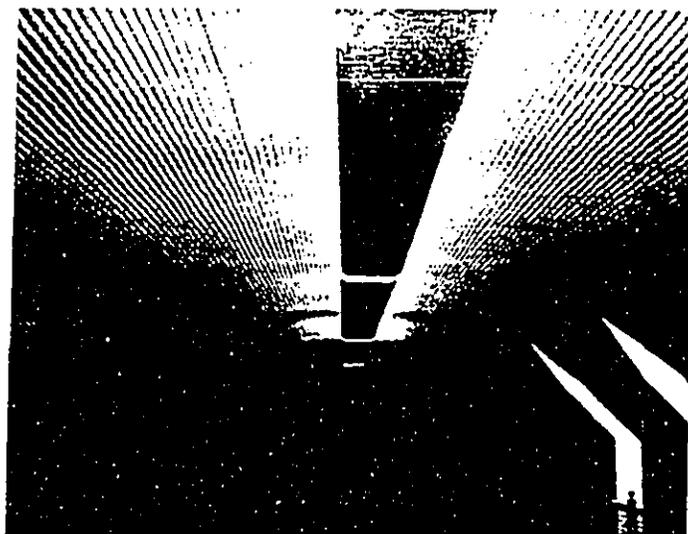
STEEL PANELS

Alpro Acoustics recommends the use of perforated or unperforated STEEL panels for INTERIOR applications only.

Note: The perforating process removes the galvanized protection from the interior perforated surface of the metal. Alpro Acoustics, therefore, does not recommend and will not warrant perforated steel panels used in an exterior environment.



Shopping Mall



College Library

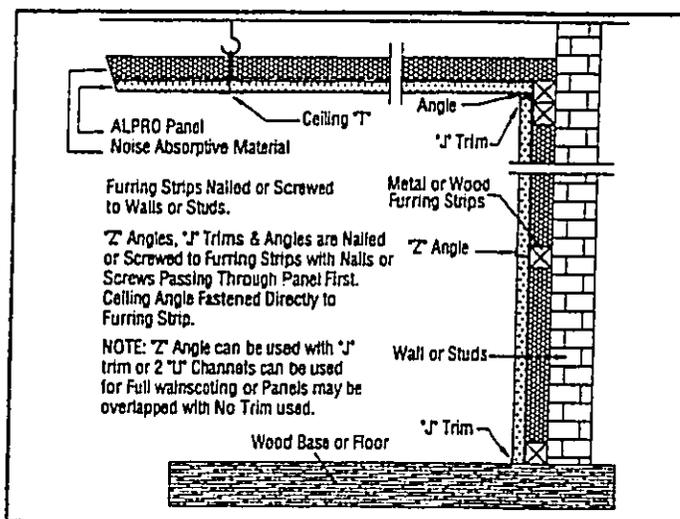
Electrochemical reactions can occur when dissimilar metals such as aluminum and steel are joined. Alpro Acoustics will not accept responsibility for using these products in such a manner.

FINISH

All Alpro panels receive a conversion coat. Alpro offers panels powder coated or degreased. Powder is electrostatically applied in a minimum thickness of 2.0 mils. The powder coated panels are cured in a convection oven.

Alpro standard colors are provided in matte finish (Regal White, Driftwood Gray, Baronet Beige, Graphite Black). Custom colors and other gloss levels are available. Please contact the factory.

TYPICAL ALPRO INSTALLATION



ALPRO CEILING & WALL PANELS

ACOUSTICS

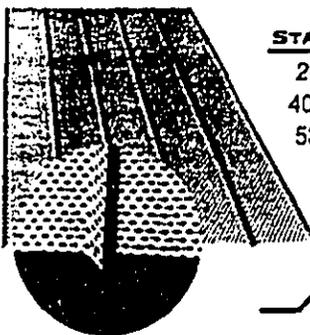
GRID PANEL PATTERNS AVAILABLE

Pattern	23" x 23"	23" x 47"	47" x 47"
A	Yes	Yes	Yes
C	Yes	Yes	Yes
F	Yes	Yes	Yes
J	Yes	Yes	Yes

WALL PANEL PATTERNS AVAILABLE

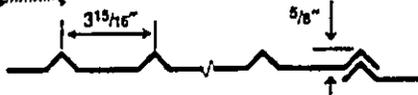
Pattern	Maximum Length	Aluminum Thickness		Steel Gauge	
A	120 inches	X	X	X	X
C-alum.	144 inches	X	X		
D	120 inches	X	X	X	X
F	144 inches	X	X	X	X

PATTERN "A"

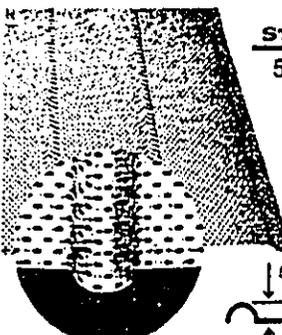


STANDARD WALL PANEL WIDTHS

24 3/4" covers 24" when lapped*
 40 3/4" covers 39 3/4" when lapped*
 53" covers 51 1/2" when lapped*

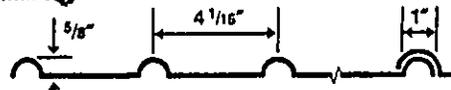


PATTERN "E"

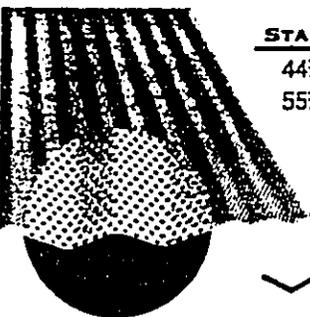


STANDARD WALL PANEL WIDTHS

54 1/2" covers 53 1/2" when lapped*

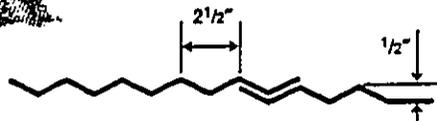


PATTERN "B"

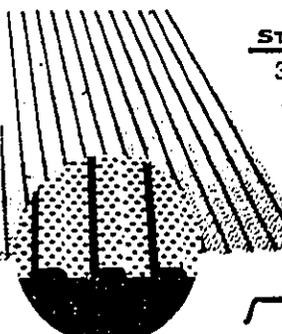


STANDARD WALL PANEL WIDTHS

44 3/4" covers 42 1/2" when lapped*
 55 1/2" covers 54 1/2" when lapped*



PATTERN "F"

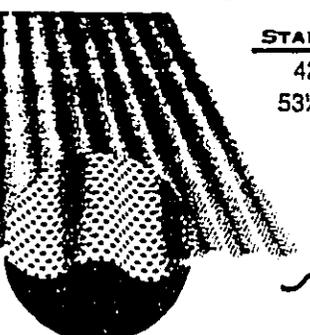


STANDARD WALL PANEL WIDTHS

38 3/4" covers 37 3/4" when lapped*
 48 3/4" covers 47 3/4" when lapped*

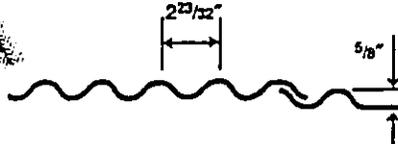


PATTERN "C"

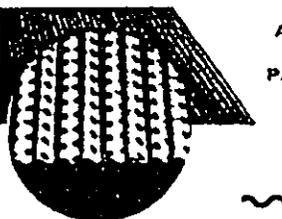


STANDARD WALL PANEL WIDTHS

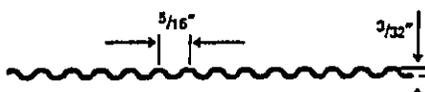
42" covers 40" when lapped*
 53 1/4" covers 51 1/4" when lapped*



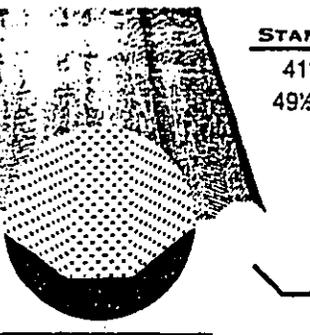
PATTERN "H"



AVAILABLE AS GRID PATTERN ONLY. SEE "GRID PANEL PATTERNS AVAILABLE" CHART.

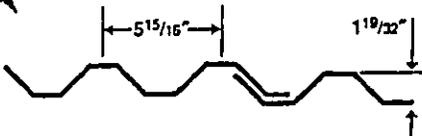


PATTERN "D"

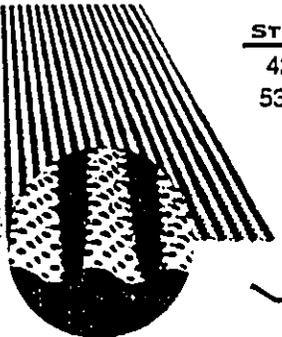


STANDARD WALL PANEL WIDTHS

41" covers 36 1/2" when lapped*
 49 3/4" covers 47 3/4" when lapped*

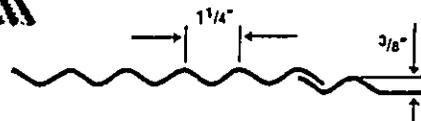


PATTERN "J"



STANDARD WALL PANEL WIDTHS

42 1/2" covers 40 3/4" when lapped*
 53 3/4" covers 51 3/4" when lapped*

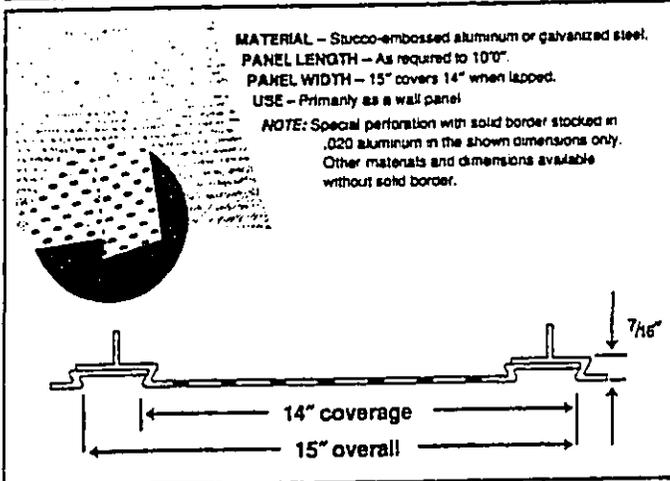


*NOTE: Dimensions may vary depending on material.

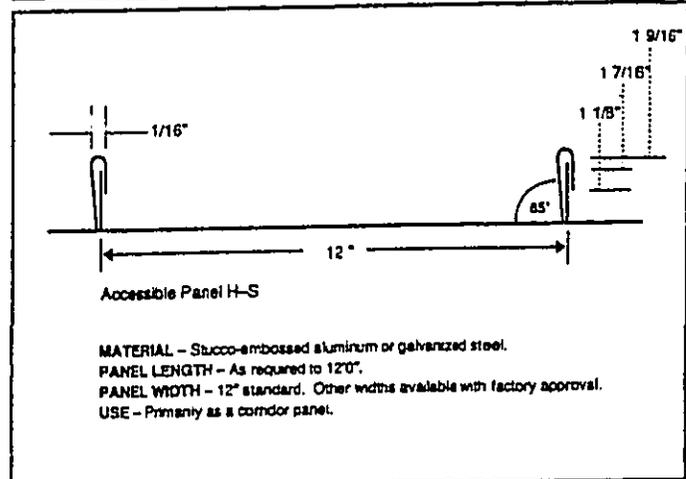
CEILING & WALL PANELS

09500/ALP
BuyLine 4955

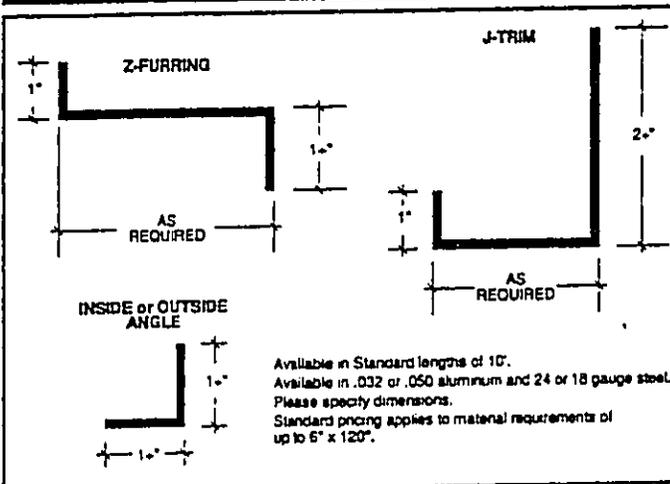
PATTERN MARK-7



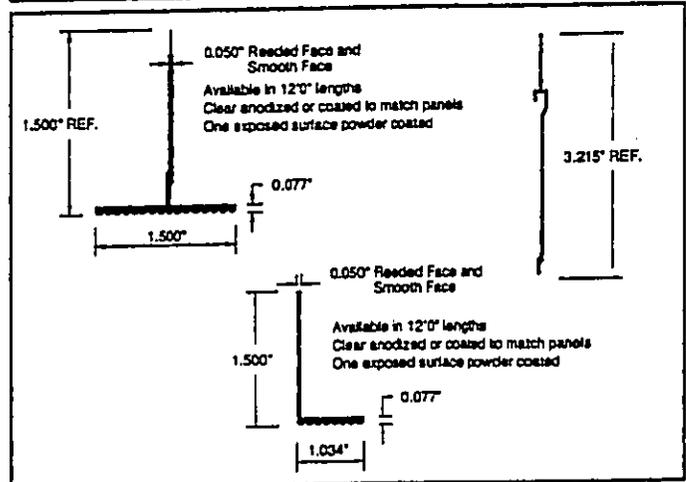
ACCESSIBLE PANEL H-S



MOUNTING ACCESSORIES



TEES AND ANGLES



GENERAL NOTES:

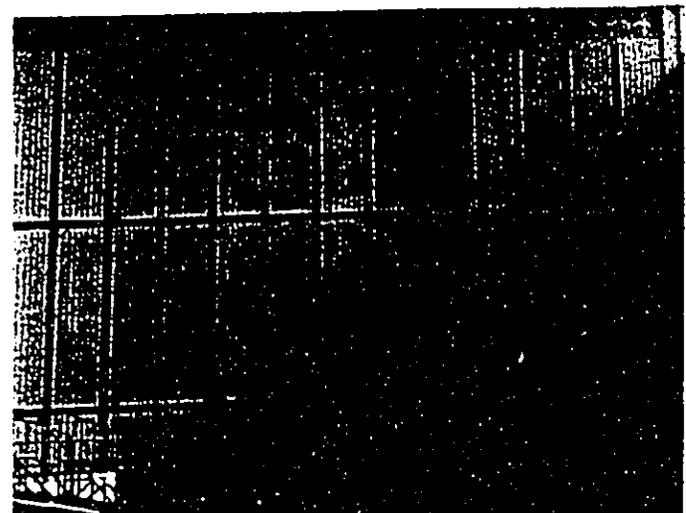
Degreased materials recommended for field painting only.

Panels available in both perforated and non-perforated metal.

Freight terms: Prepaid/Add or Collect, FOB New Orleans.

Approximate shipping weights per square foot:

Aluminum:	Steel:	Baffle:
.020 - .40#	26G - 1.10#	.020 - .50#
.032 - .65#	24G - 1.40#	.032 - .70#
	22G - 1.70#	26G - 1.42#
		24G - 1.68#
		22G - 1.95#

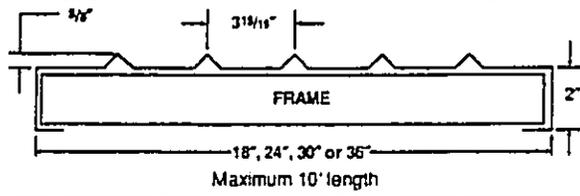
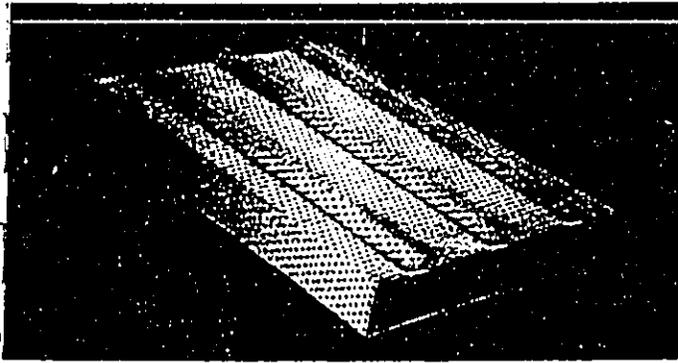


Baffle Panels

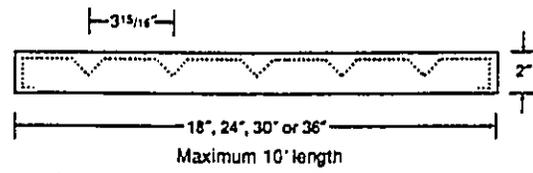
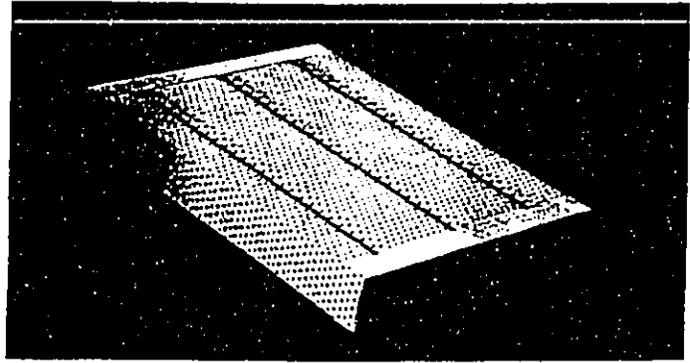
RECEIVED AS FOLLOWS

ALPRO ACOUSTICAL BAFFLE PANELS
ACOUSTICS

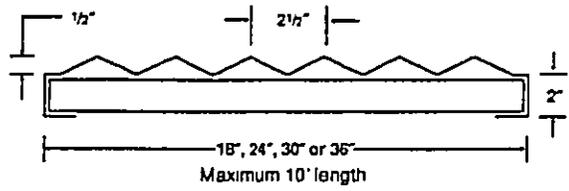
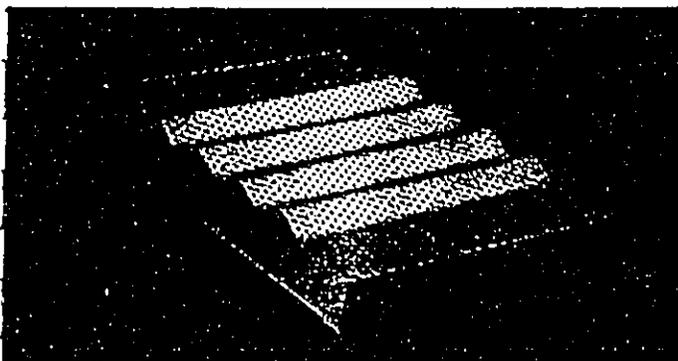
AO-BAF



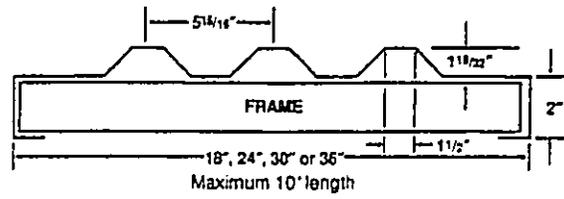
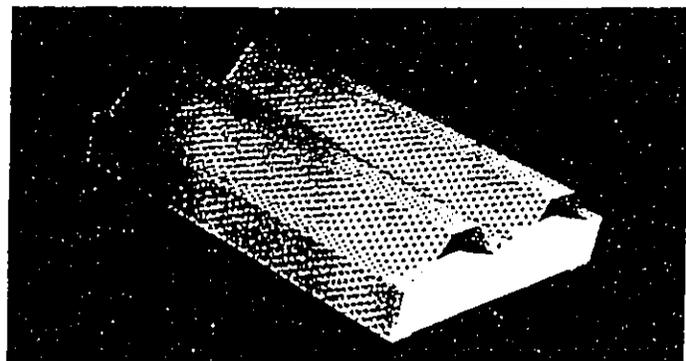
AI-BAF



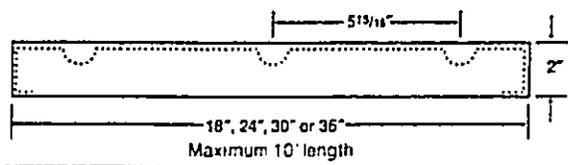
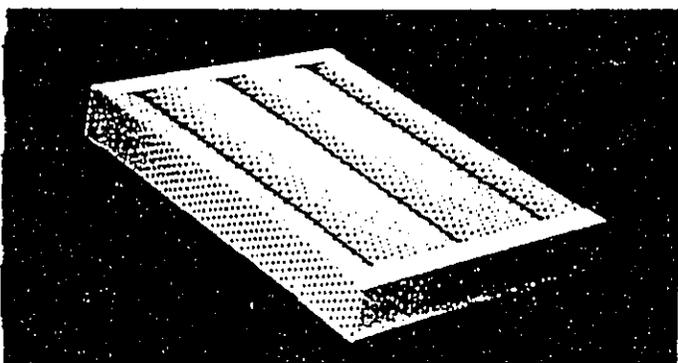
B-BAF



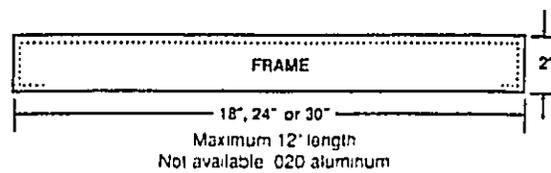
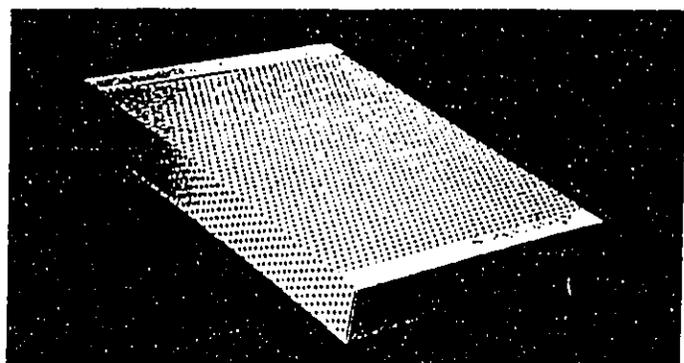
D-BAF



E-BAF



FLAT-BAF



ACOUSTICAL BAFFLE PANELS09500/ALP
BuyLine 4955*PP/Product Presentation***METAL ACOUSTICAL BAFFLE PANELS****GENERAL**

The Alpro Acoustics baffle panel is a modular unit consisting of a metal frame interfaced with a perforated metal skin which encapsulates and protects an acoustical energy-absorbing material.

The perforated skin is transparent to sound and allows the sound waves to enter the energy absorbing material where a portion is transformed to other forms of energy.

NOISE REDUCTION**NRC**

The noise reduction coefficient (NRC) value of the acoustical baffle panels ranges from .90 to 1.15 when tested in accordance with ASTM C-423.

STC

Sound transmission loss results ranged from an STC of 13 to an STC of 31 when tested in accordance with ASTM E-90.

UA Uses, Applications

Alpro Acoustics Metal Acoustical Baffle Panels are used primarily as sound absorbers and secondarily as sound transmission attenuators.

Metal Acoustical baffle panels can be mounted to the walls of the treated space in continuous runs or in clusters to achieve maximum sound control.

Baffle panels can also be suspended from the ceiling in a vertical pattern, on a horizontal plane as a monolithic system, or separately to create a "cloud" effect.

Alpro Acoustics baffle panels are designed for INTERIOR application and are NOT recommended for EXTERIOR application or where exposed to the weather.

In an interior environment of high humidity, Alpro recommends that ALUMINUM be used in lieu of steel and that a protective wrapping for the sound media be used.

Should panels require field painting, the acoustical media should be removed and a spray painting system should be used.

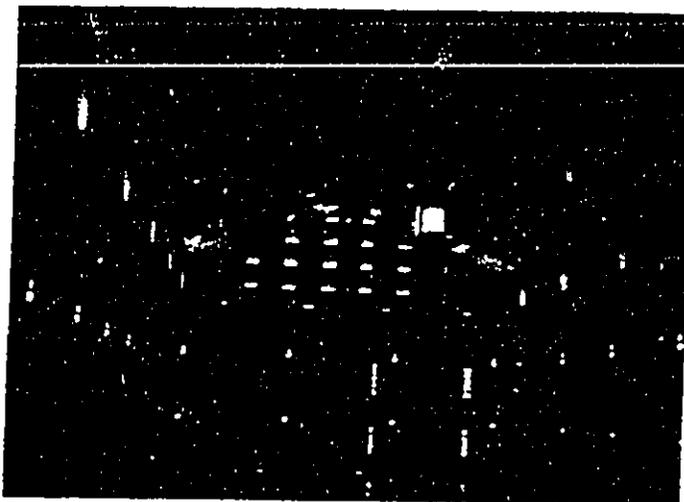
*MF/Materials, Finishes***METAL FACING**

The perforated metal facing (1/8 inch diameter holes on 21/64 inch staggered centers) is fabricated of stucco-embossed finish aluminum in thicknesses of .020 and .032 inches or G90 hot-dipped galvanized steel in thicknesses of 22, 24 or 26 gauge.

Heavier gauges available upon request.

FRAMES

The pre-formed metal facings are mechanically attached to a concealed or semi-concealed U-Channel of compatible metal in either .050 aluminum or 18 gauge galvanized steel.



State Prison Facility

Standard baffle frames accept a 2 inch thick sound pad. Panel thicknesses are available from 1 to 6 inches.

MOUNTING METHODS

Alpro offers three types of standard mounting methods for the baffle panels.

The first method is a two part "Z" clip. One piece is attached to the back of the baffle and the other is mounted on the mounting surface. "Z" clips are available in .050 aluminum or 18 gauge G90 galvanized steel. "Z" clips can be mounted flush to the surface or offset to the surface. Offset mounts can be 1" offset, 2" offset or 4" offset. Generally, an offset mount will improve the acoustic characteristics.

The second method consists of eyelets bolted into the rear four corners of the baffle so that it can be suspended from the ceiling using hanger wire.

The third method consists of a reinforced thru-bolt from face to rear of the baffle at each corner. This allows bolting directly to the mounting surface.

PANEL WIDTH

Standard completed panel widths are 18, 24, 30 and 36 inches.

PANEL LENGTH

Panel lengths range from 2 to 12 feet depending on the metal facing selected.

FINISH

All Alpro baffle panels receive a conversion coat. Alpro offers panels powder coated or degreased. Powder is electrostatically applied in a minimum thickness of 2.0 mils. The powder coated panels are cured in a convection oven.

Alpro standard colors are provided in matte finish (Regal White, Driftwood Gray, Baronet Beige, Graphite Black). Custom colors and other gloss levels are available. Please contact the factory.

RECEIVED AS FOLLOWS

ALPRO PRODUCT SPECIFICATIONS

ACOUSTICS

GENERAL ARCHITECTURAL SPECIFICATIONS

A. GENERAL

Provide metal acoustical panels as specified herein. Metal acoustical (CEILING PANELS) (WALL PANELS) (BAFFLE PANELS) shall be custom type as manufactured by ALPRO ACOUSTICS, a division of Structural Systems Corporation.

The metal acoustical (CEILING PANELS) (WALL PANELS) (BAFFLE PANELS) shall meet the requirements of Federal Specification SS-S118B; shall have a flame spread classification of 0 to 25 feet for a Class "A" rating, as tested in accordance with ASTM E-84; shall have an NRC rating of (SPECIFY), as tested in accordance with ASTM C-423 for noise reduction.

B. PRODUCT

1. MATERIALS:

The metal acoustical (CEILING PANELS) (WALL PANELS) (BAFFLE PANELS) shall be corrugated using (SPECIFY ALPRO PATTERN TYPE) and perforated using 1/8" diameter holes on 21/64" staggered centers, providing a 13% open area.

The panels shall be fabricated of stucco-embossed aluminum (.020) (.032) inches thick (OR) smooth finish G90 hot-dipped galvanized (22) (24) (26) gauge steel.

2. FINISH:

The panels shall receive a conversion coat prior to receiving an electrostatically applied (ACRYLIC) (OTHER) powder coated finish. All cut edges including

perforated holes must be coated. Finish shall be cured and bake-dried to insure proper adhesion and uniform surface hardness. Color to be selected from (ALPRO STANDARD COLOR) (APPROVED SPECIAL COLOR).

3. ACOUSTICAL INSULATION:

Provide (FIBERGLASS) (MINERAL FIBER) (OTHER) insulation (INCHES) thick and (POUNDS/CUBIC FOOT) pound density. The metal acoustical (CEILING PANEL) (WALL PANEL) (BAFFLE PANEL) with insulation shall have a noise reduction coefficient of (NRC VALUE) as tested in accordance with ASTM C-423 and shall be rated Class "A" as tested in accordance with ASTM E-84. Acoustical insulation shall be (UNWRAPPED); encapsulated in (POLYVINYLCHLORIDE (PVC)) (POLYETHYLENE) (OTHER).

4. MOUNTING DEVICES:

As recommended by manufacturer or as required by designer.

C. EXECUTION

1. INSTALLATION:

The acoustical contractor shall furnish and install the Alpro products, including moulding, clips and fasteners, in strict accordance with the manufacturer's recommendations in order to provide a satisfactory installation.

All materials and workmanship furnished under this section shall be guaranteed by the contractor for a period of one year from completion date and, on written demand by the architect, any defective materials or workmanship shall be replaced or corrected.

2. WARRANTY:

ALPRO ACOUSTICS warrants the metal acoustical panels and baffles for defects from the manufacturing process for one year from the date of shipment. Written notice of the defect is required.

3. MAINTENANCE

Maintenance consists of cleaning metal acoustical panels with a damp soft rag, warm water and mild soap.

STANDARD TOLERANCES

PANELS			
Length of Panel	18"-48"	48"-120"	120"-144"
Length Tolerance	± 3/16"	± 1/8"	± 1/4"
Squareness			
Diagonal Measurement	18"-48"	48"-120"	120"-144"
Diagonal Tolerance	± 1/8"	± 3/16"	± 1/4"
WALL ANGLES			
Straightness Tolerance	0.125" x length in ft.		
Angular Tolerance	± 1- 1/2° from 90°		
PERFORATED EDGE MARGINS			
Width from panel edge to nearest hole for minimum margins	1/2" maximum—No Minimum—measured from panel edge to nearest hole tangent line. Depends heavily on metal width tolerance as supplied by the mill.		



P.O. Box 10220
 NEW ORLEANS, LA 70181-0220
 TEL:(504) 733-3836 • FAX:(504) 733-3851
 888-733-3836

SOLUTIONS IN NOISE CONTROL

RECEIVED AS FOLLOWS

CERTIFIED PERFORMANCE DATA

Quiet-Duct® Silencers

with FORWARD and REVERSE FLOW AVAILABLE

Type Ms Quiet-Duct Silencers have been rated with procedures certified in accordance with applicable portions of ASTM E 477. All Dynamic Insertion Loss and Self-Noise Acoustic Performance Data were obtained in IAC's Aero-Acoustic Laboratory using the duct-to-room reverberant test facility with air flowing through the silencers.

- Forward Flow (+) occurs when noise and air travel in the same direction, as in a typical supply or fan discharge system.
- Reverse Flow (-) occurs when noise and air travel in opposite directions, as in a typical return or fan intake system.

For other IAC Rectangular Silencers and Tubular Conic-Flow® Silencers, see Application Manual. Use SNAP FORM for System Noise Analysis Procedures and PRESS FORM for cost optimization and Picking the Right Energy Saving Silencer.

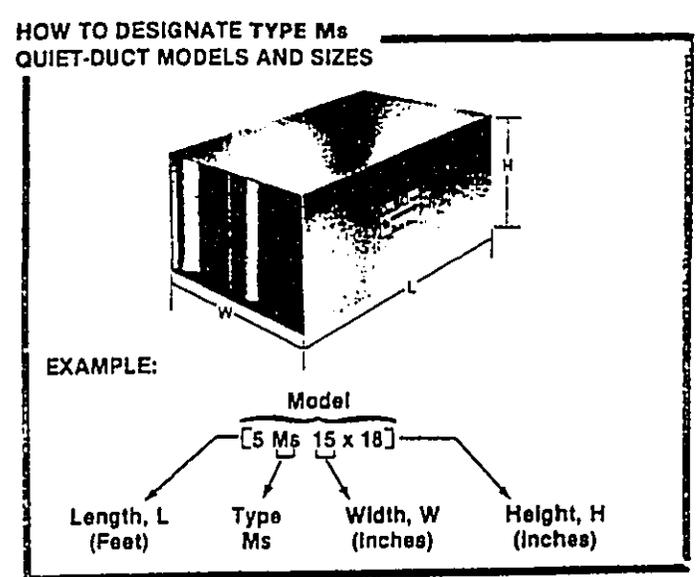


TABLE I DIMENSIONS AND WEIGHTS OF Ms SILENCER MODULES

Nominal Length	W, in.	7 1/2	7 1/2	7 1/2	15	15	15	15	15	15	15	30	30	30	30	30	30	45	45	45	45
3 feet	Wt, lb	22	40	51	37	47	57	67	80	89	100	80	95	110	130	145	160	156	177	197	218
5 feet	Wt, lb	44	67	91	63	80	96	114	134	150	167	135	161	187	222	248	274	275	310	345	381
7 feet	Wt, lb	63	95	129	88	112	135	159	193	216	240	188	224	261	310	347	384	-	-	-	-
10 feet	Wt, lb	89	135	180	125	159	192	226	273	-	-	-	319	371	440	-	-	-	-	-	-

NOTE: (-) Indicates size not available as standard.

TABLE II DYNAMIC INSERTION LOSS (DIL) RATINGS: FORWARD (+)/REVERSE (-) FLOW

IAC Model Number	Silencer Face Velocity, fpm	Octave Band, Hz								
		1	2	3	4	5	6	7	8	9
3MS	-4000	6	8	14	23	27	20	12	8	
	-2000	6	8	14	23	27	20	14	8	
	+2000	4	7	12	19	23	23	18	11	
	+4000	2	6	11	15	22	23	18	11	
5MS	-4000	9	12	21	34	43	33	22	9	
	-2000	8	11	18	32	42	33	22	11	
	+2000	6	10	18	30	42	34	23	14	
	+4000	4	9	17	29	38	34	23	15	
7MS	-4000	11	15	27	38	50	40	27	13	
	-2000	10	15	26	36	49	40	28	14	
	+2000	10	14	24	36	48	44	31	18	
	+4000	9	12	22	36	47	44	31	19	
10MS	-4000	14	24	36	44	53	50	34	19	
	-2000	13	21	35	43	52	50	37	20	
	+2000	12	20	34	42	51	52	43	22	
	+4000	11	16	32	42	50	53	43	23	

NOTE: All DIL and Self-Noise Acoustic Performance Data were obtained in IAC's Aero-Acoustic Laboratory using the duct-to-room reverberant test facility with air flowing through the silencers. See reverse side for Self-Noise and Aerodynamic Data.

ALSO SEE REVERSE SIDE FOR NOTE ON WHEN DILs EXCEED 50 dB

ENCLOSURE 5

INTERNATIONAL ACoustics COMPANY

TABLE III AERODYNAMIC PERFORMANCE DATA OF MS SILENCER MODULES

Module Size	Pressure Drop (in. H ₂ O)	705	1000	1225	1410	1585	1740	2000	2240	2450	2740	3170	3550
7 1/2 x 12	0.63	442	628	765	884	990	1085	1252	1400	1530	1712	1980	2218
	1.25	884	1252	1530	1770	1980	2170	2504	2800	3060	3424	3980	4436
	1.88	1326	1878	2295	2652	2970	3255	3758	4200	4590	5136	5940	6654
15 x 12	1.25	884	1252	1530	1770	1980	2170	2504	2800	3060	3424	3980	4436
	1.88	1326	1878	2295	2652	2970	3255	3758	4200	4590	5136	5940	6654
	2.50	1770	2504	3060	3540	3960	4340	5008	5800	6120	6848	7925	8872
	3.13	2210	3130	3825	4420	4950	5425	6280	7000	7650	8560	9906	11030
	3.75	2652	3756	4590	5304	5940	6510	7512	8400	9180	10272	11880	13308
	4.38	3104	4382	5355	6192	6932	7595	8764	9800	10710	11984	13865	15551
	5.00	3540	5008	6120	7080	7925	8680	10016	11200	12240	13696	15850	17744
30 x 18	3.75	2652	3756	4590	5304	5940	6510	7512	8400	9180	10272	11880	13308
	5.00	3540	5008	6120	7080	7925	8680	10016	11200	12240	13696	15850	17744
	6.25	4420	6260	7650	8840	9900	10850	12520	14000	15300	17120	19800	22180
	7.50	5304	7512	9180	10608	11880	13020	15024	16800	18380	20544	23780	26616
	8.75	6208	8764	10710	12384	13865	15190	17528	19600	21420	23968	27730	31102
	10.00	7080	10016	12240	14160	15850	17380	20032	22400	24480	27392	31700	35488
	9.38	6630	9390	11475	13280	14850	16275	18780	21000	22950	25680	29700	33270
45 x 30	11.25	7976	11268	13770	15920	17825	19530	22536	25200	27540	30816	35850	39924
	13.13	9322	13146	16065	18580	20800	22785	26292	29400	32130	35952	41600	46678
	15.00	10620	15024	18360	21240	23760	26040	30048	33600	36720	41088	47520	53232
	Silencer Entering Face Velocity, fpm	705	1000	1225	1410	1585	1740	2000	2240	2450	2740	3170	3550

NOTE 1: For module availability see Table I.
 NOTE 2: The tabulated air flow is in cfm based upon tests conducted in the IAC Research & Development Laboratory Facilities in accordance with applicable AMCA, ASME, and ADC Airflow Test Codes. These codes require specified lengths of straight duct both upstream and downstream for the test specimen. The downstream measurements are made far enough downstream to include "static regain". Therefore, if silencers are installed immediately before or after elbows, or transitions, or at the intake or discharge of the system, sufficient allowance to compensate for these factors must be included when calculating the operating static pressure loss through the silencer. These conditions can add from 1/2 to several velocity heads, depending on specific conditions. All acoustic and aerodynamic data obtained on 15 in. x 24 in. production units.

TABLE IV SELF-NOISE POWER LEVELS, dB re: 10⁻¹² WATTS

Ms All Sizes	-4000	-3000	-2000	-1500	-1000	+1000	+1500	+2000	+3000	+4000
	74	67	63	53	46	44	55	63	74	82
	67	61	56	52	45	32	47	54	64	72
	67	61	56	50	45	36	45	52	60	67
	71	66	58	51	41	34	43	50	58	65
	64	61	56	54	50	31	40	47	56	63
	67	64	59	56	51	32	42	48	58	64
	73	67	58	52	43	29	40	48	59	67
	75	67	58	52	43	21	34	44	57	67

WHEN DIL REQUIREMENTS EXCEED 50 dB

- Noise flanking around the silencer or along duct silencer walls may limit actual performance to approximately 50 dB Dynamic Insertion Loss for many systems.
- Self-Noise interference should be checked out especially for systems with high noise reduction requirements.
- Specially designed silencers and full-scale or scale-model testing are available for applications requiring silencing in excess of 50 dB or other unusual requirements.
- Call your local IAC Representative for details.

TABLE V FACE AREA ADJUSTMENT FACTORS

Add or subtract from PWL values above

	.625	1.25	2.5	5	10	15	30	60
	-6	-3	0	+3	+6	+9	+12	+15

*For intermediate face areas, interpolate to nearest whole number.

Multiply	By	To Obtain
cfm	4.719 x 10 ⁻⁴	cubic meters per second (m ³ /sec)
fpm	0.00508	meters per second (m/s)
in.	25.4	millimeters (mm)
l.w.g.	249.1	Newtons per square meter (N/m ²)
ft.	0.3048	meters (m)
ft ²	0.0929	square meters (m ²)
lb.	0.4535	kilogram (kg)

DIL, Self-Noise, and Airflow Data CERTIFIED in accordance with ASTM E-477
 We reserve the right to improve design and specifications without notice at any time.
 AVAILABLE UPON REQUEST: Specially designed silencers and full-scale or model testing for unusual applications.



NOTE: PAGES 5 THROUGH 52 OF THIS CATALOG ARE AVAILABLE AS INDIVIDUAL SHEETS FROM INDUSTRIAL ACOUSTICS COMPANY. REQUEST BY NUMBER SHOWN IN UPPER RIGHT HAND CORNER.

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SUBMITTAL SHEET

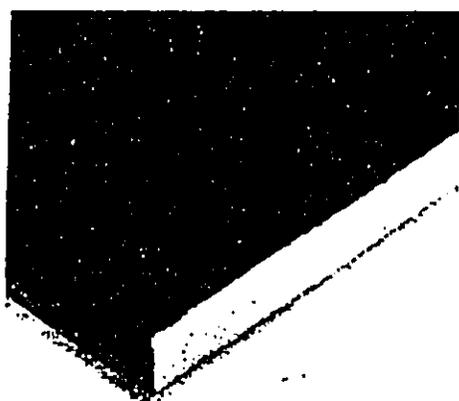


**Fiberglas®
Duct Liner Board**

Thickness:

- 1.0"
- 1.5"
- 2.0"

In stock



Uses

Fiberglas® duct liner board is used as an acoustical insulation to absorb air conditioning and heating equipment and blower noise in sheet metal ducts and plenums operating at velocities to 4000 fpm and temperatures to 250F. It also acts as thermal insulation, and may eliminate the necessity of insulating ducts externally to conserve heat or prevent condensation. The product is applied to the interior of the ductwork or plenum.

Description

Fiberglas duct liner board is a semi-rigid bonded board of glass fiber coated with a black-pigmented, fire-resistant coating on the side toward the airstream. This coating tightly bonds the surface fibers to resist damage during installation and in service, and provides a uniquely tough airstream surface. It is available in thicknesses of 1", 1½", and 2". It complies with the requirements of NFPA 90A.

Physical Properties	Test Method	Specification
Surface burning characteristics* (UL listed)	UL 723*	Flame spread 25* Smoke developed 50
Thermal conductivity (k) @ 75F mean temperature, Btu·in/hr·ft²·deg.F	ASTM C 518	"k" = 0.23
Nominal density	ASTM C 167	3.0 lb./cu. ft.
Corrosiveness	ASTM C 665	Will not cause corrosion greater than that caused by sterile cotton on aluminum, steel, or galvanized steel (1)
Fungi resistance	ASTM C 665	Will not support or promote mold or fungus growth.

(1) when wet, duct liner board in contact with galvanized steel will cause discoloration of the sheet metal.

*The surface burning characteristics of this product have been determined in accordance with UL 723. This standard should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest five (5) rating.

Specification compliance

Owens-Corning Fiberglas duct liner board insulation complies with the property requirements of ASTM specification C 1071, which replaces Federal Specification HH-1-545B (Amend.2) except as noted in the acoustical performance properties data.

Product packaging

Standard: Non-compression packaged in a corrugated sleeve with a tight heat-shrunk polyethylene film covering all sides.

48" x 96" duct liner board is available on a made-to-order basis palletized with a polyethylene shroud.

Product marking

Insulation thickness, name of manufacturer and production date are printed on the airstream surface of Owens-Corning duct liner board for easy identification. This assures that the installed product can be inspected for specification compliance after installation.

Availability

Fiberglas duct liner board is available in the following standard widths and lengths:

- 24" x 48"
- 48" x 96"

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Acoustical Performance Properties

ASTM C 1071 is considered to be the current industry standard. Specification values are shown in the table at right. Test values for Owens-Corning Duct Liner Board are shown below them.

The designer should use any of this data with the realization that they were collected using a limited sample size and are not absolute values. Therefore, reasonable tolerances must be applied when using these data. Several techniques for evaluating duct liner acoustical performance are in common use. However, some of the specification values in existence were derived using now obsolete test methods.

For more information, contact your Owens-Corning sales representative.

Sound absorption coefficients, Specification ASTM C 1071

Product	Thickness	Octave band center frequencies, Hz							NRC	Test Method
		125	250	500	1000	2000	4000			
Type II (rigid)	1.0"	.02	.20	.52	.73	.82	.84	.60	ASTM C 423 Type A Mtg.	
	1.5"	.05	.40	.77	.88	.88	.86	.75		
	2.0"	.12	.67	.99	.97	.91	.87	.90		

Sound absorption coefficients, as measured

Product	Thickness	Octave band center frequencies, Hz							NRC	Test Method
		125	250	500	1000	2000	4000			
	1.0"	.03	.22	.60	.84	.98	.97	.65	ASTM C 423 Type A Mtg.	
	1.5"	.16	.39*	.91	1.01	1.01	1.01	.85		
	2.0"	.24	.79	1.13	1.13	1.04	1.05	1.00		

*Below ASTM C 1071 specification value.

Application recommendations

All portions of duct designated to receive duct liner board shall be completely covered. Transverse joints shall be neatly butted and there shall be no interruptions or gaps.

The black coated surface of the duct liner board shall face the air stream.

Duct liner board shall be adhered to the sheet metal with 90% coverage of adhesive, and all exposed leading edges and all transverse joints coated with adhesive. Owens-Corning recommends only the use of adhesives complying with ASTM C 916.

Duct liner board shall be additionally secured with mechanical fasteners which shall compress the duct liner sufficiently to hold it firmly in place.

Duct liner board shall be cut to assure tight, overlapped corner joints. The top pieces shall be supported at the edges by the side pieces.

After installation, blow out duct system prior to occupancy to remove any cutting scraps and foreign material remaining in the duct.

No. Pins	Liner Interior Width
0	8" dn
2	9"-16"
3	17"-28"
4	29"-40"
5	41"-52"
6	53"-64"
7	65"-76"
8	77"-88"
9	89"-100"

The velocity rated side of liner must face the air flow

Liner adhered to the duct with 90% min. area coverage of adhesive

Side panels to support top panels

Duct section (typically 4 Ft. or 5 Ft.)

All transverse edges to be coated with adhesive

AIR FLOW

DETAIL-A

Maximum spacing for fasteners. Actual intervals are approximate.

Velocity	Dimensions			
	A	B	C	D
0-2500 FPM	3"	12"	4"	18"
2501-4000 FPM	3"	6"	4"	16"

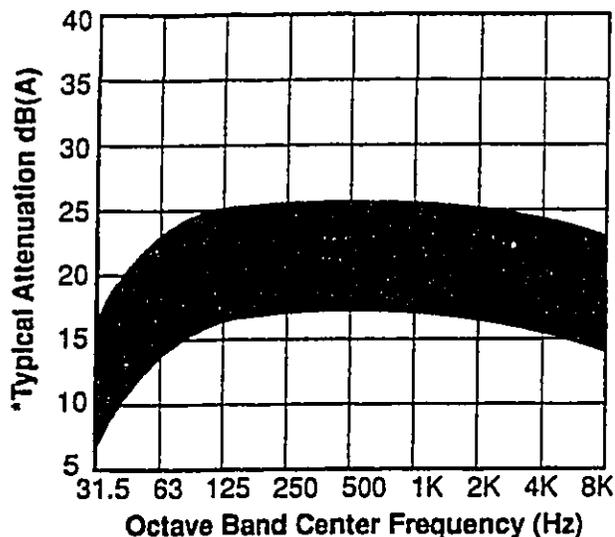


OWENS-CORNING FIBERGLAS CORP.
Mechanical Insulation Products
Fiberglas Tower, Toledo, Ohio 43659

Residential "200" Level Exhaust Silencers



Typical Attenuation Curve dB
(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)



Application:
Nelson Residential "200" Level Silencers are designed to reduce total engine exhaust noise 18-25 dB.* These silencers are recommended where minimum silencing is required and ambient noise levels are medium to high.

Construction:
Aluminized Steel: Nelson Silencers through 26" O.D. are fabricated of aluminized steel as standard materials. This material has a maximum operating temperature of 1250°F.

Mild Steel/Aluminized Steel: Nelson Silencers 30" O.D. and larger are fabricated of mild steel and aluminized steel. All silencers 30" O.D. through 36" O.D. have aluminized steel bodies with all other components fabricated from mild steel. Silencers 42" O.D. and larger are fabricated from mild steel.

Silicone Aluminum Paint: Nelson Silencers through 26" O.D. are given a coat of high heat resistant silicone aluminum paint.

Primer/Silicone Aluminum Paint: Nelson Silencers over 30" O.D. and larger are given a coat of high heat, rust inhibiting primer and then a topcoat of high heat resistant silicone aluminum paint. Physical properties are maintained up to 900°F* on aluminized steel and 1100°F* on mild steel.

Sample Specification:

The silencer is to be a Nelson Residential "200" Level Silencer constructed of aluminized steel (26" body diameter and smaller) or mild steel/aluminized steel (larger than 26" body diameter) with all welded construction and suitable for mounting in any position. The silencer shall be complete with the following Nelson accessories:



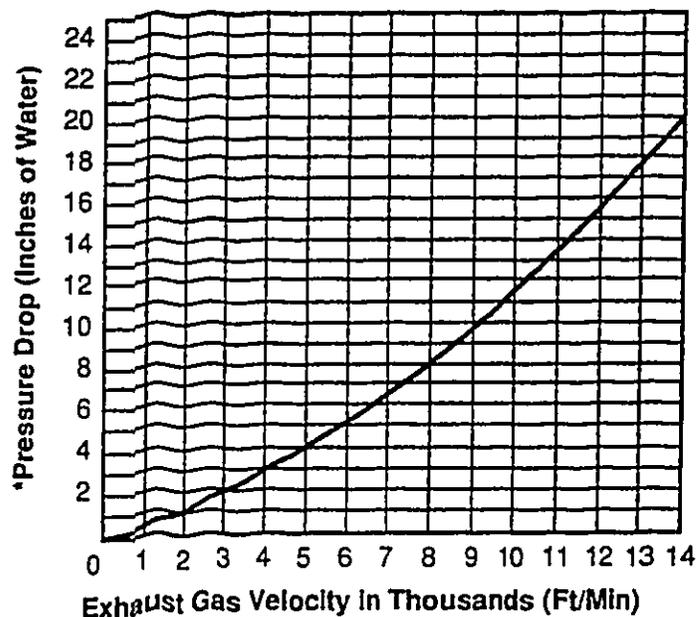
"F" Mounting Flange:
Standard in sizes 4" to 22". Drilling matches 125/150# ASA standard.



"P" Male Pipe Threads:
NPT ends offered in sizes 3/4" through 4".

Companion flanges available for 4" to 22".

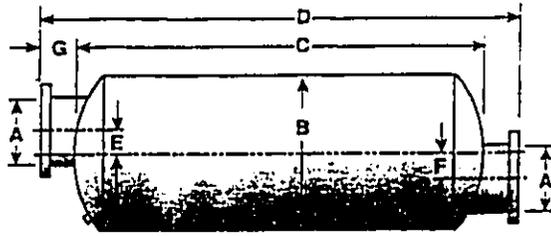
Pressure Drop



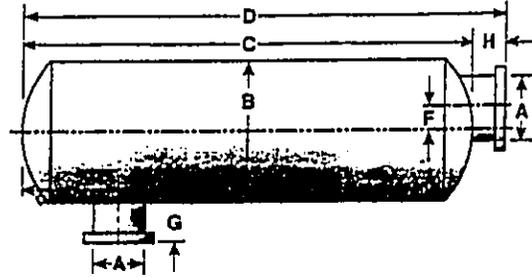
Note: When figuring pressure drop for side inlet or middle side inlet add 3" H₂O to back pressure shown on above curve.

*Estimated

Type 1



Type 3



Part Number	A Nominal Inlet Diameter	B Body Dia. O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length
*41220	2	8.1	31.7	35.5	1.25	1.25	1.9
*41225	2.5	9.0	38.8	42.8	1.50	1.50	2.0
*41230	3	10.1	38.2	44.0	2.75	2.75	2.9
*41235	3.5	10.1	44.2	50.0	2.06	2.06	2.9
*41240	4	10.1	49.2	55.0	2.30	2.30	2.9
*41250	5	14.1	43.5	51.3	3.60	3.60	3.9
*41260	6	14.1	57.5	65.3	3.60	3.60	3.9
41280	8	22.1	56.6	64.0	0	0	3.7
41282	10	22.1	84.6	92.0	0	0	3.7
41284	12	26.1	79.7	86.9	0	0	3.6
41286	14	36.1	94.6	101.0	0	0	3.2
41288	16	42.1	108.2	115.0	0	0	3.4
41299	18	42.1	108.2	115.0	0	0	3.3
41221	20	48.3	133.9	139.9	0	0	3.0
41222	22	54.3	135.5	143.1	0	0	3.8

Part Number	A Nominal Inlet Diameter	B Body Dia. O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length	H Outlet Length
43220	2	8.1	31.7	33.6	3.4	0	2.0	1.9
43225	2.5	9.0	38.8	40.8	4.4	1.5	2.5	2.0
43230	3	10.1	38.2	41.1	4.1	1.8	3.0	2.9
43235	3.5	10.1	44.2	47.1	4.6	2.1	3.0	2.9
43240	4	10.1	49.2	52.1	5.1	0	3.0	2.9
43250	5	14.1	43.5	47.4	5.8	2.6	4.0	3.8
43260	6	14.1	57.5	61.4	6.8	3.1	4.0	3.9
43280	8	22.1	56.6	60.3	11.3	0	4.0	3.7
43282	10	22.1	84.6	88.3	11.3	0	4.0	3.7
43284	12	26.1	79.7	83.3	12.9	0	4.0	3.6
43286	14	36.1	94.6	97.8	15.3	0	4.0	3.2
43288	16	42.1	108.2	111.8	16.1	0	4.0	3.4
43299	18	42.1	108.2	111.5	19.1	0	4.0	3.3
43221	20	48.3	133.9	136.9	20.0	0	4.0	3.0
43222	22	54.3	135.5	143.1	21.8	0	4.0	3.8

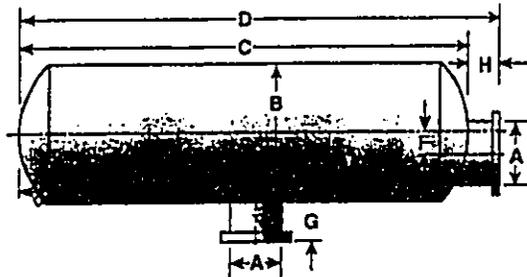
*Inlet and outlet offset from centerline of silencer as shown in dimension E and F.

Drains are standard on all silencers with a 9" body diameter or larger.

Note: Specifications are subject to change without notice.

Note: All dimensions are in inches.

Type 4



Part Number	A Nominal Inlet Diameter	B Body Diameter O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length	H Outlet Length
44640	4	10.1	49.2	52.1	24.6	0	30	2.9
44650	5	14.1	43.5	47.4	21.8	2.6	40	3.8
44660	6	14.1	57.5	61.4	28.8	3.0	40	3.9
44680	8	22.1	56.6	60.3	28.3	0	40	3.7
44682	10	22.1	84.6	88.2	42.3	0	40	3.6
44684	12	26.1	79.7	83.3	39.9	0	40	3.6
44686	14	36.1	83.3	86.5	44.3	0	40	3.2



NELSON DIVISION
Exhaust & Filtration Systems

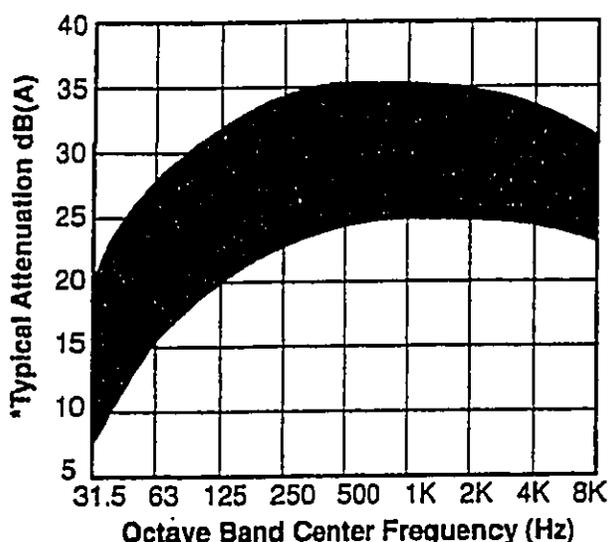
Hwy. 51 West, P.O. Box 428
Stoughton, Wisconsin 53589
Telephone (608) 873-4200
Telex 26-5433
Telefax (608) 873-1532

Industries, Inc.

Critical "300" Level Exhaust Silencers



Typical Attenuation Curve dB
(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)



Application:
Nelson Critical "300" Level Silencers are designed to reduce total engine exhaust noise 25–35 dB.* These silencers are recommended where ambient noise is low and a high degree of silencing is necessary.

Construction:
Aluminized Steel: Nelson Silencers through 26" O.D. are fabricated of aluminized steel as standard materials. This material has a maximum operating temperature of 1250°F.

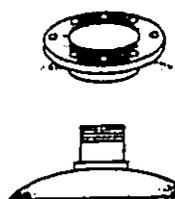
Mild Steel/Aluminized Steel: Nelson Silencers 30" O.D. and larger are fabricated of mild steel and aluminized steel. All silencers 30" O.D. and larger have aluminized steel bodies with all other components fabricated from mild steel.

Silicone Aluminum Paint: Nelson Silencers through 26" O.D. are given a coat of high heat resistant silicone aluminum paint.

Primer/Silicone Aluminum Paint: Nelson Silencers 30" O.D. and larger are given a coat of high heat, rust inhibiting primer and then a topcoat of high heat resistant silicone aluminum paint. Physical properties are maintained up to 900°F* on aluminized steel and 1100°F* on mild steel.

Sample Specification:

The silencer is to be a Nelson Critical "300" Level Silencer constructed of aluminized steel (26" body diameter and smaller) or mild steel/aluminized steel (larger than 26" body diameter) with all welded construction and suitable for mounting in any position. The silencer shall be complete with the following Nelson accessories:



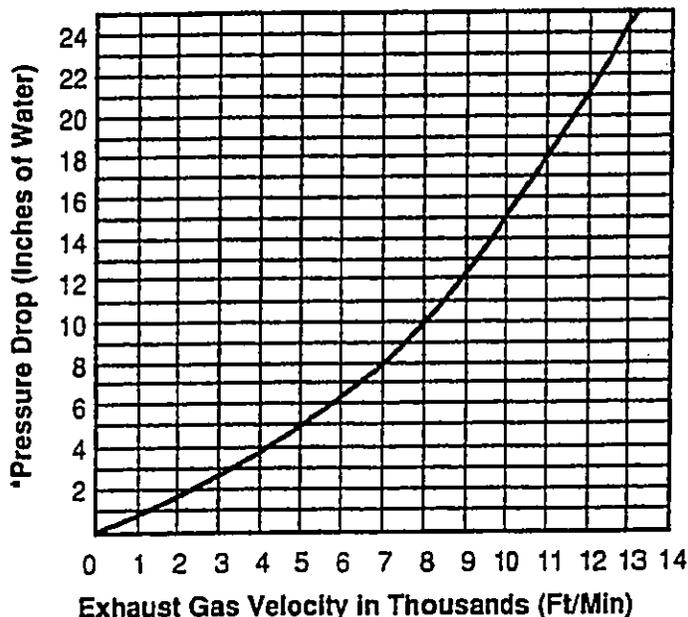
"F" Mounting Flange:
Standard in sizes 4" to 22". Drilling matches 125/150# ASA standard.

"P" Male Pipe Threads:
NPT ends offered in sizes 3/4" through 4".

Companion flanges available for 4" to 22".

Construction Features:
Double wrapped body is standard on all "300" Level Critical Silencers.

Pressure Drop

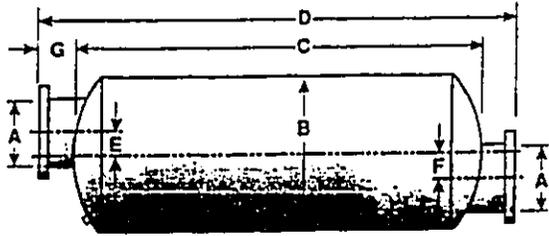


Note: When figuring pressure drop for side inlet or middle side inlet add 3" H₂O to back pressure shown on above curve.

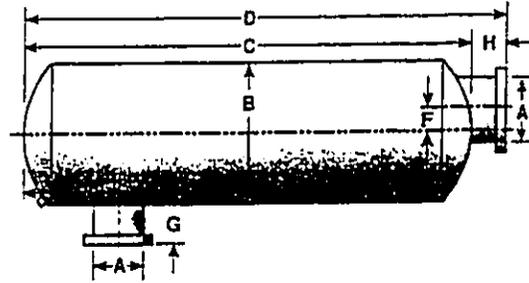
*Estimated

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Type 1



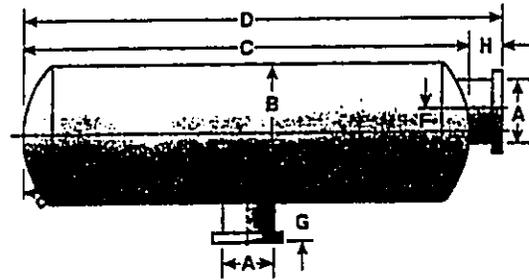
Type 3



Part Number	A Nominal Inlet Diameter	B Body Dia. O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length
41307	.75	4.2	21.3	23.9	0	0	1.3
41310	1	5.0	23.4	27.0	0.72	0.72	1.8
41313	1.25	6.1	27.5	31.1	0	0	1.8
41315	1.5	8.1	30.7	34.5	0	0	1.9
41320	2	9.0	40.8	44.0	0	0	1.6
41325	2.5	10.1	42.8	47.8	0	0	2.4
41330	3	11.1	50.0	55.6	0	0	2.8
41335	3.5	12.1	51.3	56.9	0	0	2.8
41340	4	12.1	58.3	63.9	1.80	1.80	2.8
41350	5	14.1	63.5	71.3	2.60	2.60	3.9
41360	6	16.1	72.0	80.8	2.00	2.00	4.4
41380	8	22.1	78.6	86.0	0	0	3.7
41382	10	26.1	79.7	86.9	0	0	3.6
41384	12	30.1	104.8	111.8	0	0	3.5
41386	14	42.1	108.2	114.8	0	0	3.3
41388	16	42.1	156.2	163.0	0	0	3.3
41399	18	48.3	133.9	139.9	0	0	3.0
41321	20	54.3	159.5	165.5	0	0	3.0
41322	22	60.3	161.2	166.8	0	0	2.8

Part Number	A Nominal Inlet Diameter	B Body Dia. O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length	H Outlet Length
43320	2	9.0	40.8	42.4	3.9	0	2.0	1.6
43325	2.5	10.1	47.2	49.6	4.1	0	2.5	2.4
43330	3	11.1	50.0	52.8	4.5	0	3.0	2.8
43335	3.5	12.1	51.3	54.1	5.2	0	3.0	2.8
43340	4	12.1	58.3	61.1	5.7	1.8	3.0	2.8
43350	5	14.1	63.5	67.4	5.8	2.6	3.0	3.9
43360	6	16.1	72.0	76.4	6.5	3.1	4.0	4.4
43380	8	22.1	78.6	82.2	11.3	0	4.0	3.6
43382	10	26.1	79.7	83.2	12.9	0	4.0	3.5
43384	12	30.1	104.8	108.3	14.4	0	4.0	3.5
43386	14	42.1	108.2	111.6	16.1	0	4.0	3.4
43388	16	42.1	156.2	159.6	16.1	0	4.0	3.4
43399	18	48.3	133.9	136.9	20.0	0	4.0	3.0
43321	20	54.3	159.5	162.5	26.0	0	4.0	3.0
43322	22	60.3	161.2	164.1	22.6	0	4.0	2.8

Type 4



*Inlet and outlet offset from centerline of silencer as shown in dimension E and F.

Drains are standard on all silencers with a 9" body diameter or larger.

Note: Specifications are subject to change without notice.

Note: All dimensions are in inches.

Part Number	A Nominal Inlet Diameter	B Body Dia. O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length	H Outlet Length
44740	4	12.1	58.3	61.1	29.2	1.8	3.0	2.8
44750	5	14.1	63.5	67.4	30.0	2.6	3.0	3.9
44760	6	16.1	72.0	76.4	36.0	3.1	4.0	4.4
44780	8	22.1	78.6	82.2	39.9	0	4.0	3.5
44782	10	26.1	79.7	83.2	39.9	0	4.0	3.5
44784	12	30.1	104.8	108.3	52.4	0	4.0	3.5
44786	14	42.1	108.2	111.5	54.1	0	4.0	3.3



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