Nimitz Hwy. Reconstructed Sewer

Staff/planner meeting reviewed 7 343

DEPARTMENT OF WASTEWATER MANAGEMENT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

KENNETH E. SPRAGUE
DIRECTOR

CHERYL K. OKUMA-SEPE
DEPUTY DIRECTOR

RECEIVED
97 AUG 12 P3:19
OFC. OF ENVIRONMENTAL QUALITY CONTROL

for compliance.

WEP 97-278

August 12, 1997

Mr. Gary Gill, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Notice of Determination - Negative Declaration
Nimitz Highway Reconstructed Sewer
(Auahi Street to Hotel Street)
TMK: 1-07-02, 03, and 2-1-02, 13
14, 15, 16, 25, 27, 29, 30, 31, 32

The Department of Wastewater Management (WWM), City and County of Honolulu, is the proposing and accepting agency for the above referenced project. WWM has reviewed and responded to comments on the draft environmental assessment for the project. The 30-day review period began on June 8, 1997. WWM has determined that implementation of this project will not have significant environmental effects. Therefore, the agency is issuing a negative declaration. Please publish this notice in the August 23, 1997 Environmental Notice. We have enclosed a completed OEQC Bulletin Publication Form and four copies of the final EA.

Identification of Proposing Agency
The Department of Wastewater Management, City and County of Honolulu

Identification of Accepting Agency
The Department of Wastewater Management, City and County of Honolulu

Brief Description of Proposed Action
The proposed project consists of: 1) replacement of the existing sewers from Hotel Street to Fort Street via River Street and Nimitz Highway with a single trunk sewer; 2) installation of a relief sewer from Fort Street to the Ala Moana Wastewater Pump Station (WWPS) via Queen Street, South Street and Ala Moana Boulevard; and 3) rehabilitation of the existing sewer along Nimitz Highway, Ala Moana Boulevard from Fort Street to Ala Moana WWPS.

Determination
Negative Declaration

87

Reasons Supporting Determination
This determination is based on the significance criteria listed in 11-200-12 of the Environmental Impact Statement Rules. Specifically, these significance criteria are addressed below:

1. The proposed project will not result in an adverse commitment, loss, or destruction of any natural or cultural resources. The project location is in the primary urban center of Honolulu including downtown and Kakaako district.

2. The range of beneficial uses of the environment will not be curtailed.

3. The 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 orders or executive orders. The project supports CCH's long range planning for the primary urban center.

4. The proposed project will not adversely affect the economic or social welfare or the community or state.

5. The project will not adversely affect public health. The project will improve public health by repairing the existing deteriorated sewer lines and increasing the sewer capacity to avoid backups and overflows in the collection system.

6. The project will not involve substantial adverse secondary impacts, such as population changes or effects on public facilities. The proposed project responds to current population trends.

7. The project will not involve a substantial degradation of environmental quality.

8. The project will not include considerable cumulative effect upon the environment nor involves a commitment for larger actions.

9. The project will not substantially affect a rare, threatened or endangered species, or its habitat. The proposed routes and surrounding areas are in a highly altered urban environment.

10. The project will not detrimentally affect air or water quality or ambient noise levels. The contractor will be instructed to comply with current State Department of Health regulations. Short-term impacts will occur during the construction phase.

11. The project will not affect an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geological hazardous land, estuary, fresh water, or coastal waters.

12. The project does not affect identified scenic vistas or view planes. The construction activities will take place on the roads. The actual pipe jacking is trenchless and underground.

13. The project does not require substantial energy consumption.

Contact Persons for Further Information

Proposing agency:
Mr. Glenn Okita
Department of Wastewater Management
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813
(808) 527-5829

Consultant:
Mr. Robin Matsunaga
M&E Pacific, Inc.
1001 Bishop Street
Suite 500, Pauahi Tower
Honolulu, Hawaii 96813
(808) 521-3051

Sincerely,

Cheryl K. Okuma-Seron

KENNETH E. SPRAGUE
Director

1997-08-23-OA-FEA- Nimitz
Highway Reconstructed Sewer

Final
Environmental Assessment

NIMITZ HIGHWAY RECONSTRUCTED SEWER

(AUAHI STREET TO HOTEL STREET)
TMK: 1-7-02, 03 and 2-1-02, 13,
14, 15, 16, 25, 27, 29, 30, 31, 32

NIMITZ HIGHWAY RECONSTRUCTED SEWER
(AUAHI STREET TO HOTEL STREET)

TMK: 1-7-02, 03 and 2-1-02, 13
14, 15, 16, 25, 27, 29, 30, 31,32

FINAL ENVIRONMENTAL ASSESSMENT

This environmental document was prepared pursuant to Chapter 343, Hawaii Revised Statutes

PROPOSING AGENCY:

Department of Wastewater Management
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

RESPONSIBLE OFFICIAL:

Cheryl K. Okuna-Lee
KENNETH E. SPRAGUE, Director

8/12/97
Date

PREPARED BY:

M&E Pacific, Inc.
1001 Bishop Street,
500 Pauahi Tower
Honolulu, Hawaii

August 1997

DEPARTMENT OF WASTEWATER MANAGEMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

KENNETH E. SPRAGUE
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DEPUTY DIRECTOR

WEP 97-278

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Determination
Negative Declaration

***Reasons Supporting* Determination**
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13. The project does not *require* substantial energy consumption.

Contact Persons for Further Information

Proposing agency: Mr. Glenn Okita
Department of Wastewater Management
City and County of Honolulu
650 South King Street
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(808) 527-5829

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Sincerely,

Cheryl K. Okuma-Sera

KENNETH E. SPRAGUE
Director

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1.0 DESCRIPTION OF THE PROPOSED ACTION AND STATEMENT OF OBJECTIVES

1.1 Project Description

The proposed project consists of: 1) replacement of the existing sewers from Hotel Street to Fort Street via River Street and Nimitz Highway with a single trunk sewer; 2) installation of a relief sewer from Fort Street to the Ala Moana Wastewater Pump Station (WWPS) via Queen Street, South Street and Ala Moana Boulevard; and 3) rehabilitation of the existing sewer along Nimitz Highway, Ala Moana Boulevard from Fort Street to Ala Moana WWPS.

Sewer replacement involves installation of a new line and abandonment of the existing line(s). It is necessary when an existing line is blocked, collapsed, degraded, or undersized and rehabilitation is not feasible. Replacement may require downtime and diversion of flow to allow shutdown.

Relief sewer installation involves construction of a new line and retaining existing line(s) to accommodate future flows. The relief sewer is usually constructed parallel to the overloaded existing sewer. A relief sewer may a) share all rates of flow with the existing sewer; b) take all flows in excess of a predetermined quantity; or c) divert flow from the upstream end of the collection system.

Sewer rehabilitation is a process by which an existing sewer is renovated in order to improve its structural integrity. Rehabilitation may be accomplished by several methods, including sliplining and coating.

1.2 Objectives and Need

The existing sewage collection system identified in this document was constructed in the early 1900s. This 100-year old collection system has outlived its design life and is in a deteriorated state largely due to corrosion and soil settlement over the years. A recent survey found several pipe segments that extend from Nimitz Highway/Maunakea Street to River Street/Hotel Street with reverse slope and manholes which have settled as much as two (2) feet since the date of construction. Data from various reports and studies (see references) indicate that the system no longer has adequate capacity to carry the current peak flows and severe surcharge conditions (sewer line is full to the top of the pipe) have developed in many places. Surcharged conditions may increase the probabilities for spills, overflows and backups within the collection system. This would result in higher operation and maintenance costs, create health and safety hazards to the general public and businesses in the tributary area which includes the entire downtown Honolulu. Television camera surveys have shown evidence of sulfide corrosion and a minor cracking. Therefore, the existing system must be either rehabilitated or replaced in areas of ongoing settlement to improve the current conditions and avoid potential incidents.

The reason that not all existing lines can be rehabilitated is that the manholes in the segment slated for replacement have settled differentially and pulled down the existing pipes unevenly. This has resulted in a disruption of the consistent pipe slope and created inverted siphons. Solids from sewage that is trapped in these low spots settle out. This accumulated sludge must be cleaned out or it will decrease the hydraulic capacity below the original design. Geotechnical engineering to strengthen the existing ground, such as jet grouting is required to prevent a repeat of past settlement failures. A relief sewer is needed to supplement the existing system with additional capacity. This relief sewer will be designed to have excess capacity to accommodate future flows in the tributary area which is expected to be fully developed in accordance with the City and County of Honolulu (CCH) long range planning.

2.0 AGENCIES CONSULTED IN THE ASSESSMENT PROCESS

The following parties were consulted during project planning and EA preparation:

State of Hawaii:
- Department of Land and Natural Resources (DLNR)
  - Historic Preservation Division
- Department of Business, Economic Development and Tourism
  - Office of State Planning (OSP)
- Office of Hawaiian Affairs
- Hawaii Community Development Authority (HCDA)
- Department of Health (DOH):
  - Clean Water Branch
  - Clean Air Branch
  - Noise, Radiation and Indoor Air Quality Branch
  - Office of Environmental Quality Control (OEQC)
- Department of Transportation
- University of Hawaii Environmental Center

City and County of Honolulu:
- Department of General Planning
- Fire Department
- Board of Water Supply
- Department of Public Works:
  - Storm Water Quality Section
- Department of Transportation Services
- Department of Wastewater Management (DWWM)

Private and Community Organizations:
- Hawaiian Electric Company (HECO)
- Gasco, Inc.
- GTE Hawaiian Telephone Company
- Downtown Neighborhood Board
- Harbor Square

3.0 DISCUSSION OF THE ASSESSMENT PROCESS

This environmental assessment (EA) was prepared in accordance with Section 343, Hawaii Revised Statutes (HRS) and Chapter 200 of Title 11, Hawaii Administrative Rules (HAR). It was intended to evaluate any significant environmental impacts due to the proposed actions, and to determine whether or not an environmental impact statement (EIS) is necessary. Agencies (listed above) having jurisdiction or expertise were consulted during this assessment process.

The assessment process also included a review of the latest EAs and engineering reports for other sewer projects in the general area. A negative declaration was approved for an earlier Nimitz Highway Reconstructed Sewer (Fort Street Mall to Alakea Street) project in 1986 (Calvin Kim and Associates). However, the project was never constructed. The need for that sewer work is even more pressing now and could be resolved through the implementation of this currently proposed project.

Review comments on the draft EA have been incorporated herein. The responses to the comments are included in Appendix A.

4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 Project Location

Figure 1 shows the location of the Nimitz Highway Reconstructed Sewer project. The proposed construction activities are within parcels identified by Tax Map Key (TMK) 1-7-02, 03 and 2-1-02, 13, 14, 15, 16, 25, 26, 27, 29, 30, 31 and 32. As shown, the sewer replacement starts from Hotel Street and stops at Fort Street via River Street and Nimitz Highway; the relief sewer runs from Fort Street to the Ala Moana WWPS via Queen Street, South Street and Ala Moana Boulevard; and the sewer rehabilitation begins from Fort Street and ends at Ala Moana WWPS along Ala Moana Boulevard. Alternatives to these routes were considered and are discussed in Section 7.0 of this document.

4.2 Topography and Climate

The project location is in the leeward coastal lowland area of Oahu. This area is virtually flat with an elevation of approximately 8 feet above mean sea level (MSL). The climate in the general area is similar to that of other coast areas in Honolulu. It is characterized by long southern exposures; temperature ranging from 55 degree Fahrenheit to 90 degree Fahrenheit; persistent northeasterly trade winds ranging from 8 to 18 miles per hour; and an average mean rainfall of less than 30 inches (Aloha Tower Associates, 1990; DWWM, 1985).

4.3 Infrastructure

Downtown Honolulu and Kakaako districts will be affected by this project. These districts are highly urbanized, occupied by industrial business, commercial, public facilities and residential development. Utilities such as water, sewer, drainage, fuel, gas, underground and aboveground power, and telephone are currently available in the area. A comprehensive record research was conducted to locate these lines. The proposed routes were chosen to avoid crossing and interference of utility lines to the extent practicable, based on best available information.

4.4 Land Use and Zoning

The project area encompasses the Chinatown Special District, the Central Business Mixed Use Zone (Downtown Honolulu, BMX-4), Hawaii Capital Special District, and the Kakaako Community Development District per Ordinance No. 86-107, Department of Land Utilization (DLU), CCH (Figure 2). The new relief sewer will run within the right-of-way and/or easement of CCH and State of Hawaii. The existing sewer alignments will remain largely unchanged; however, a small portion of the replacement sewer will have a slightly different alignment. About 300 feet of the relief sewer will be inside the Special Management Area (SMA) in Kakaako district (Figure 3). However, a SMA Use Permit is not needed for this project since the new sewer lines will be underground and within the state DOT right-of-way, in accordance with Chapter 205A, Section 22, Coastal Zone Management (CZM), Hawaii Revised Statutes (HRS). The Kakaako Base Zone Development Permit is not required for the same reasons. Nonetheless, the project shall comply with the Coastal Zone Management (CZM) objectives and policies (Sections 205A-4 and 5, HRS). The constructor is required to employ mitigation measures during construction to minimize polluted runoff (if any) and other environmental impacts addressed in this document.

4.5 Soils

Subsurface materials along the proposed alignments include: 1) variable surface fill materials composed of sandy gravely silts, silty sands and sandy gravels; 2) lagoonal deposits of very soft and highly compressible organic to sandy silts; 3) reef deposits of hard to loose cemented coral, sands and gravels; 4) alluvial deposits of medium stiff to hard clayey silts and silty clays; 5) loose to medium dense cinder sands; and 6) volcanic tuff and basaltic lava flows. Details of the subsurface conditions for the project area can be found in the Pre-Design Memorandum (M&E Pacific, Inc., Woodward-Clyde, 1996).

Subsurface petroleum contamination is a common problem in Honolulu, especially in the southern commercial/industrial areas. A recent subsurface investigation found free hydrocarbon product floating upon the groundwater table in the vicinity of Nimitz Highway and River Street intersection. Additionally, field observation indicated that petroleum contamination could be present in the vicinity of Queen Street and South Street intersection. The potentially responsible parties are unknown at this time. As a standard

practice, to comply with EPA and DOH requirements, the contractor must test and treat excavated materials (mostly from pit installation) for possible petroleum and other contamination. The proper handling and disposal measures are discussed in Section 6.3.

4.6 Water Quality

Groundwater underlying the project location is not considered to be a source of drinking water. As aforementioned, a recent soil investigation found free hydrocarbon product floating upon the groundwater table in the vicinity of Nimitz Highway and River Street intersection. The contractor will be required to monitor the groundwater discharges throughout the project, although minimal construction dewatering is anticipated due to the nature of the proposed pipeline installation method described in Section 5.1.

Most dewatering discharges are expected to only occur during the initial phase of pit construction. Since the pits are located near the proximity of the shoreline, the use of area-wide dewatering through well points is impracticable. If area-wide dewatering was feasible, it could also cause ground and building foundation subsidence. The only practicable means of dewatering is hydraulic isolation of the pits from the surrounding groundwater, then limiting dewatering to only within the pit itself. The hydraulic isolation of the pits can be accomplished by the Contractor at his choice in many ways. The bottoms of pits constructed with interlocking sheetpile side walks could be sealed with mudsills of hydraulic grout. In areas of engineered ground where sheetpiles are not necessary, any sand seams in excavated pit walls due to irregularities in the soil-grout could also be sealed with hydraulic grout. After the pits are hydraulically isolated from the surrounding groundwater, primarily the initial volume of water remaining within the pit needs to be pumped out. Only a small amount of seepage water that one may prudently expect to chronically leak into the pit would need to be pumped out on a continual basis. Such methods of dewatering should have negligible impacts on the water table and ground subsidence. The NPDES dewatering permit will have flow discharge limitations that will require implementation of the preceding means of dewatering. The preceding means of dewatering will also be recommended in the contract specifications. For additional precaution, contractor will be asked to provide inclinometers throughout the entire sewer line alignment to monitor subsidence.

Water removed from the pits must be either returned to the ground or discharged to the storm drain system after proper treatment in accordance with governing statutes and rules. The contract specifications will require compliance with the terms of a NPDES dewatering discharge permit approved by the State of Hawaii Department of Health (DOH) as consistent with Hawaii Administrative Rules (HAR) Chapter 11-54, Water Quality Standards, and Chapter 11-55, Water Pollution Control. As part of the compliance process, the baseline groundwater sampling has been conducted along the chosen alignment to identify potential contaminants which may be encountered for proper planning. Test data (see Appendix C) indicate that petroleum contamination is present in the vicinity of Nimitz Highway/River Street, Queen Street/South Street intersections, etc.

Therefore, prior to disposal, the contractor will be required to implement best management practices (BMP) for treatment and submit weekly monitoring test reports in accordance with Chapter 11-55. Typical BMPs previously approved by the DOH include the use of sedimentation tanks and filtration for physical constituents. Where petroleum contamination is confirmed, free product, if any, will be skimmed off the surface and oil/water separators will be used to remove the remaining miscible oils. Granular activated carbon (GAC) could be used to remove any dissolved organics or other contaminants. If the preceding methods cannot lower the levels of the contaminants to the levels allowed in the HAR for stormwater discharge, it will either be returned to the ground if permitted by the DOH or shipped to authorized vendors for treatment and disposal.

4.7 Natural Hazards

The project location is outside of the tsunami evacuated area as indicated in the Tsunami Evacuation Maps. It is outside of the 500-year flood plain based on Flood Insurance Rate Map. The entire island of Oahu is in seismic Zone 2A as determined in the 1992 edition of the Uniform Building Code. It is unlikely that a major earthquake will occur on Oahu.

4.8 Archaeological and Historic Sites

Approximately 2,000 feet of sewer replacement will take place along the periphery of the Chinatown Historic District generally bounded by Nuuanu Avenue, River Street, Nimitz Highway, and Beretania Street. The construction activities should not affect any structures due to the project location and subsurface nature of the construction method which will be discussed in Section 5.1.

The new relief sewer will connect to a 78-inch line near the Ala Moana WWPS on Keawe Street. The jacking pit originally shown in the draft EA near the old pump station (built in 1900) located northeast (mauka) of the present Ala Moana WWPS has been relocated (see Figure 3). This measure is expected to minimize the potential for any impact to the historic site.

There are several known archaeological sites within the project limits. Burial sites have been previously encountered (figures 4 and 5) near the Kawaiahao Cemetery on Queen Street and the old Honuakaha Smallpox Cemetery in the vicinity of South Street and Quinn Lane. The estimated burial depth varies from 3 to 4 feet below surface (figures 4A and 5A). A Programmatic Agreement, including a background study, burial treatment plan, and archaeological documentation plan, have been developed to handle the impacts of the project. Section 6.5 summarizes the findings of the archaeological reports included in their entirety in Appendix B.

Other archaeological sites may be encountered in the project area. Should evidence of archaeological sites be uncovered during excavation, all construction work will be ceased and the State Historic Preservation Office will be notified immediately for a field

investigation. The proposed mitigation measures are more completely discussed in Section 6.5.

4.9 Biological Resources

Generally, the proposed routes and surrounding areas are in a highly altered urban environment, providing little or no habitat for any terrestrial flora and fauna. No threatened or endangered species habitat should be found within the project area.

4.10 Noise

Vehicular traffic is the dominant source of ambient noise in the project area. The current State Department of Health (DOH) noise limits for commercial and apartment properties on Oahu are 60 dBA (decibels) and 50 dBA for daytime and nighttime periods, respectively. However, a Day-Night (24-hour average) Sound Level (Ldn) as much as 74.6 dBA was measured on Ala Moana Boulevard, and the lowest diurnal noise level measured between 12:30 p.m. to 2:30 a.m. was 67 dBA (HCDA, 1990). The proposed construction activities will create noise in excess of the noise limits. Mitigation measures to reduce the noise level and impacts to the surrounding environment are discussed in Section 6.2.

4.11 Air Resources

Air quality in the vicinity of the project is primarily affected by vehicular emissions, with carbon monoxide being the most abundant of the air pollutants emitted. State of Hawaii Ambient Air quality standards (AAQS) are provided in Hawaii Administrative Rules, Title 11, Chapter 59. The state DOH Clean Air Branch is the enforcing agency for these standards. Existing carbon monoxide monitoring results from downtown Honolulu and Kakaako area indicated compliance with state and federal standards for ambient air (HCDA, 1990). The proposed construction activities are expected to generate short-term impacts to air quality primarily from exhaust emissions. Fugitive dust is not expected to be significant because construction will take place in soils that are either saturated or of high moisture content. The applicable mitigation measures are discussed in Section 6.1.

4.12 Traffic

The proposed sewer lines run along heavily traveled roadways in downtown Honolulu and Kakaako district including River Street, Nimitz Highway, Queen Street, South Street and Ala Moana Boulevard. Having construction activities on these roads will cause adverse traffic impacts, especially near the jacking and receiving pits. Detailed traffic impacts and mitigation measures are discussed in Section 6.4.

5.0 General Description of the Project's Technical, Social, and Economic Characteristics

5.1 Technical Characteristics

The proposed method of pipeline installation for both the relief sewer and the replacement sewer is microtunneling. Microtunneling is a trenchless construction method which utilizes hydraulic jacks to push pipes through the ground behind a remotely operated tunnel boring machine. The maximum drive lengths are generally between 300 to 600 feet, depending upon the ground type and pipe size. Longer drives are possible. Man entry into the pipeline is not required.

Unlike conventional open trenching techniques that require excavation for the entire length of pipeline, the excavation requirements for microtunneling are chiefly limited to the endpoints of each drive at designated jacking and receiving pits (Figure 6). Some smaller excavation is required for sewer manholes and lateral connections to the pipe. The jacking pit contains the hydraulic jacks used to push the pipes. The receiving pit is used to recover the tunneling boring machine at the end of each drive. The excavated material is carried via augers and conveyors, or by recycled drilling mud slurry through closed system pipelines to the surface for processing and disposal (Figure 7). Work can proceed intermittently, although it is sometimes preferred to be able to proceed continuously at the end of long drives through sticky soils to prevent the pipe from getting stuck short of the receiving pit.

The tunneling operation does not create any ground subsidence or heave. The system has a built-in earth pressure balancing feature to prevent volumetric displacement of ground and water. This feature is desired since soft soils may be encountered. The lack of any volumetric displacement due to this unique feature also results in no dewatering from the tunneling itself.

Separation of the excavated material from the recyclable drilling mud is accomplished through the temporary separation equipment at the surface near the jacking pit. Vibrating screens with hydrocyclones or settling tanks can be used to separate the excavated material from the drilling fluid. The waste material is hauled away for drying and disposal offsite. The temporary remote control cabin, cranes, and other appurtenances are at the surface near the jacking pit. The equipment setup is site specific, depending upon the available space.

The special jacking pipes will be made of reinforced concrete, vitrified clay or reinforced fiberglass. The existing interceptor sewer is reinforced concrete pipe (RCP), the smaller trunk lines that connect to it are vitrified clay pipe (VCP), and the individual building laterals may be either VCP or cast iron. The two most common methods used for pipe rehabilitation are: the insertion of a flexible high density polyethylene (HDPE) liner pipe and the injection of concrete grout in the annular space between the liner and the original pipe; and a cured-in-place fiberglass pipe (CIPP) that is hydraulically pressurized to be

flush to the existing pipe (or it can bridge any voids), then thermally cured to rigid form. Each provides corrosion resistance and provides some additional structural reinforcement to the original carrier pipe. The existing manholes will be lined with a reinforced cementitious grout to repair any voids and provide some structural integrity, then coated with epoxy for corrosion resistance. All new manholes will be lined with PVC for corrosion resistance.

5.2 Social and Economic Characteristics

The project area encompasses Chinatown Special District, Downtown Financial District, the Capital Special District and Kakaako Community Development District (CDD). The general mix of land uses consists of commercial, residential, public facilities, and light industrial.

Chinatown is one of the earliest ethnic communities in Honolulu and remains a distinctive culture environment today. It is the oldest part of downtown and serves as a gathering place primarily for immigrants from China, Vietnam and other Asian countries. There are many restaurants, open markets and retail stores, etc. Chinatown is usually crowded during the day, except Sunday afternoon when most businesses are closed.

Downtown Financial District is the high-density, high-rise central business area and the headquarters for the state's major corporations and financial institutions. Several large residential complexes (Waterfront Towers, Honuakaha, Harbor Square, Harbor Court, Marine Tower and Harbor Village) are also within in the area. In addition, restaurants, retail stores and other commercial services are available throughout the area. Vehicular and pedestrian traffic is usually heavy on weekdays, and less busy during weekends.

The Hawaii Capital Special District is situated between the Downtown Financial District and the Kakaako CDD. The State Capitol Building, Honolulu Hale, Honolulu Municipal Building, and the Prince Kuhio Federal Building, etc. are located in this district. These offices are open on weekdays only. There are no major restaurants or retail stores in the area. Throughout the year, tourists come and visit the historic Iolani Palace next to the State Capitol Building.

The 1992 General Plan of the CCH envisioned Kakaako to be a "major residential area", as well as accommodating commercial and light industrial uses. The current general mix of land uses in the project area consists of commercial (i.e. Restaurant Row), residential (i.e. Waterfront Buildings), public facility (i.e. Ala Moana WWPS) and light industrial (i.e. warehousing operation at Fort Armstrong).

The construction of this project is expected to take place in 1998. The estimated construction cost is $20 million. Construction funds will be appropriated from the CCH's Capital Improvement Program. This project will neither increase user service charges, nor will it require direct assessment to the residents being served.

6.0 IDENTIFICATION AND SUMMARY OF MAJOR IMPACTS AND PROPOSED MITIGATION MEASURES

In the long term, this project will provide safe and uninterrupted sewer services for the residents and businesses in the tributary area. This would allow for projected growth without restrictions. The remaining impacts are short-term only.

6.1 Air Quality

The proposed construction activities could affect the air quality in the vicinity of the work area. However, fugitive dust generated from activities such as excavation and sheet piling is not expected to be significant since the soils in the general area have high moisture content. The depth to water table along the entire route is very shallow. Due to capillary action in the fines and clays, the soils are saturated at 2 to 3 feet below the ground surface. The contractor will be working with soils of high moisture content.

The contractor will be required to comply with provisions of Chapter 11-60.1, Hawaii Administrative Rules, Section 11-60.1-33 on fugitive dust and use best management practices (BMPs) such as frequent wetting down of loose soil areas with water, and covering of dirt-hauling trucks. For this particular project, the excavated soil will be stockpiled in a temporary location away from the job site since permanent on street lane closure is not allowed. The temporary stockpile will be wetted down with water and covered to suppress dust. During backfilling, contractor shall keep the native clay and the select borrow moist to minimize fugitive dust. The Contractor will be responsible for general housekeeping of the site and keeping adjacent areas free of mud and sediment.

Hydrocarbon emissions from the construction equipment and vehicles are expected. This should not significantly change the air environment in the project area presently bounded by heavily traveled roadways. The Contractor will be required to use emission control devices on all construction vehicles. All construction activities will need to comply with state air pollution control regulations (Chapter 60, Title 11, Administrative Rules of the State of Hawaii Department of Health).

6.2 Noise

The proposed construction activities may increase noise levels in the vicinity of the jacking pits, and somewhat less near the receiving pits. The impacts would be most significant in the downtown area since some pit locations are located close to businesses and residential condominiums. Construction related noise is regulated by the Noise, Radiation and Indoor Air Quality Branch, DOH. The contractor will need to comply with the DOH community noise control regulations for the duration of this project.

The maximum permissible sound levels (MPSL) for different zoning districts are specified in Chapter 46, Community Noise Control, Title 11, Administrative Rules of Department of Health. There are three types of zoning districts in the State of Hawaii for

noise control purposes: Class A, Class B and Class C. The project area is categorized as Class B zoning district which includes lands zoned for business, commercial, hotel, or similar type. The MPSLs for Class B zoning districts are 60 dBA for daytime (7 a.m. to 10 p.m.) and 50 dBA for nighttime (10 p.m. to 7 a.m.).

Certain construction activities will generate noises that exceed the DOH allowable daytime and/or nighttime levels. The loudest potential noise generating activity would be the driving of piles, if necessary, to support manholes situated in thick, consolidatable soil strata. Based on previous studies, the noise range for a pile driver is approximately 95 dBA to 105 dBA at 50 feet (HCDA, 1990). Vibratory driving equipment to install the sheet piling that will line each pit is estimated to be approximately 90 dBA. During the actual pipe jacking, noise emissions of the ancillary equipment at the surface without best management practices (BMP) for noise mitigation are approximately 60 dBA at the property boundary for systems that utilize slurry settling tanks. Systems that use vibrating screens and hydrocyclones can create noise levels in the vicinity of 90 dBA at the property boundary. A permit is required from DOH to operate any excessive noise source which emits or may emit noise levels in excess of the MPSLs, provided that the activities are in the public interest and meet permit conditions. However, the permit only allows for working hours between 7:00 a.m. and 6:00 p.m. of the same day, Monday through Friday, and between 9:00 a.m. and 6:00 p.m. on Saturday.

The allowable hours contain peak traffic hours usually between 7:00 a.m. and 8:30 a.m. in the morning, and between 3:30 p.m. and 5:30 p.m. in the afternoon on weekdays, when work activities are expected to be severely curtailed. The state DOT prohibits lane closures within Nimitz Highway during peak hours. The CCH requires that all traffic lanes be open during peak hours, although a waiver may be obtained depending upon the traffic conditions of the specific construction site. Consequently, the available construction time will be shortened by at least three and a half hours each day for some areas. If all lanes are required to be open during peak hours, the contractor will have to cease work and cover the pits while all ancillary construction equipment (i.e. control cabin, cables, piping, settling tanks, generator, etc.) will need to be located off road.

The DWWM is seeking a noise variance (see Table I on next page) from DOH which allows the contractor to have the flexibility of working extended hours. The proposal nighttime work is intended to lessen the overall total impact to the residents and businesses through the allowance of strictly limited noise levels utilizing best management practices in exchange for a much shorter duration of work. Sheet piling for pit construction or pile driving operations will be limited during daytime hours only to minimize adverse impacts to the residents in the neighborhood. The contractor will be directed to utilize quieter ancillary equipment such as settling tanks in lieu of noisier equipment such as vibrating screens or cyclones.

The proposed microtunneling method of construction will have less noise and traffic impacts compared with conventional open trench construction. The proposed noise variance is intended to take advantage of the lesser environmental impacts of this

construction technique. A three-tiered noise level variance is proposed. Construction of the requisite launching and receiving pits at the ends of each tunneling segment is no quieter than any other excavation activity and would be restricted to daytime hours. The tunneling equipment within the pits are relatively quiet. Ancillary equipment at the surface of the pits can vary in noise level emissions, depending on whether diesel or electric powered equipment are used. The proposed 85 dBA noise limit would effectively allow only muffled and shielded diesel powered generators and no mobile cranes, trucks, or excavators during the evening up until 10:00 p.m. The proposed 70 dBA noise limit for work after 10:00 p.m. would effectively limit above ground equipment to a quiet, stationary all-electric hoists. The construction contract specifications will specifically ban the use of back-up beepers, thus requiring a flagman instead. The proposed noise schedule also provides incentives for contractors to invest in quieter equipment that would be used around the clock on this as well as future construction projects.

Table I

Requested Noise Variance

Activity	Noise Limit	Time Period *		
	(dBA @ 50')	7:00 A.M. - 6:00 P.M.	6:00 P.M. - 10:00 P.M.	10:00 P.M.-7:00 A.M.
Pit Construction	95	Yes	No	No
Pile Driving	95	Yes	No	No
Tunneling & Pipe Laying	85	Yes	Yes	No
Tunneling & Pipe Laying	70	Yes	Yes	Yes
Emergency Tunneling	85	Yes	Yes	Yes

Remarks:

1. Construction activities on Saturday and Sunday are limited to 9:00 A.M. through 5:30 P.M.
2. Construction activities adjacent to the Honuakaha retirement home are limited from 7:00 A.M. to 10:00 P.M
3. Use of reverse signal alarms is prohibited at all times.

* DOT allowable work hours are 8:30 A.M. to 3:00 P.M. Monday through Friday, and 8:00 P.M. to 5:00 A.M. Sunday through Thursday.

As mentioned above, the contractor must obtain a noise permit in conformance with Chapter 11-46, Hawaii Administrative Rules, "Community Noise Control." In addition, the city has submitted a noise variance application to the DOH's Noise, Radiation and Indoor Air Quality Branch for approval. The noise permit and variance will also be included in the construction contract specifications. The contractor must also comply with the provisions of Chapter 11-42, Hawaii Administrative Rules, "Vehicular Noise

Control for Oahu". The construction activities will be monitored by construction management personnel and DOH inspector. Violations to permit and variance requirements would potentially result in shutdown. As a mitigation measure, all back-up beeper will be banned.

Again, compliance with the restrictions of the noise variance by the contractor will be monitored by independent construction management inspectors hired by the Department of Wastewater Management (DWWM). The Department of Health Noise, Radiation, & IAQ Branch (DOH) has the authority to enforce the restrictions. The contract specifications explicitly warn the contractor that non-compliance with the terms of the variance or complaints from citizens can result in reductions or revocation of the noise variance. Thus, the residents would continue to have recourse for redress even after the commencement of construction.

6.3 Excavated Material

Soil and groundwater samples were taken on Nimitz Highway as part of a past subsurface investigation conducted in 1992 (Harding Lawson Associates, 1992). Seven borings (Figure 8) were drilled to below the groundwater table between River Street and Richards Street. The samples were analyzed for petroleum hydrocarbons and BTEX. Trace levels of toluene were detected in soil samples from Borings 2, 4, and 6. No other contaminants were detected in the soil or groundwater samples.

A recent subsurface investigation along the proposed sewer alignment indicated that petroleum contamination may exist in the vicinity of Nimitz Highway/River Street and Queen Street/South Street intersections. The NPDES dewatering permit baseline sampling has been conducted for the current project. It included testing for total petroleum hydrocarbons, benzene, toluene, ethylbenzene, and xylenes (BTEX) and polynuclear aromatic hydrocarbons to identify areas where contamination may be expected. The results (see Appendix C) show that petroleum impacted soils do exist in several areas. However, the measured contaminant concentrations do not exceed those of the Tier I action levels defined in the 1996 DOH Technical Guidance Manual (TGM) for the Implementation of the Hawaii State Contingency Plan.

It is important to note that the TGM provides interim guidelines only. Adherence to the information contained in the TGM is voluntary. However, the guidelines and the rules and regulations on Environmental Response or any other applicable federal, state, and county requirements will be incorporated in this project as best management practices to minimize soil contamination and control hazardous substance releases. As such, the contractor will be responsible for treating and disposing contaminated soil at an approved site.

Primarily, prior to construction, soil samples will be collected and tested by a qualified testing laboratory. During construction, the contractor will be required to test the soil for petroleum contamination on a weekly basis and submit the test results to DOH for review

and assessment. Petroleum impacted soil that meets the criteria set in Section 9 of the TGM can be left in place at the release site. However, the contractor shall consult with DOH Solid and Hazardous Waste Branch prior to such action. Although not expected, the testing shall also determine if hazardous substances are present in the soil and if such substances comprise hazardous waste according to the Resource Conservation and Recovery Act (RCRA). If found, hazardous substances will be hauled to a remediation site on the mainland for further treatment.

Excess or petroleum contaminated soil in excess of TGM Tier I action levels can be treated on this island. If space is available, contaminated soil can be spread on windrows or the ground to let the volatile organics such as benzene, ethlybenzene evaporate into the atmosphere. The contaminated soil can also be bio-remediated with the use of microorganisms. For faster result or if land area is not readily available, the contaminated soil can be thermally treated at existing facilities locally. The treated soil will be first tested to determine whether it is below action levels, then shipped to city landfill for disposal.

6.4 Traffic

The proposed sewer alignments are along heavily traveled roadways including Nimitz Highway in the vicinity of Honolulu Harbor, Queen Street in Downtown, South Street in Kakaako. Any construction activities on these roads would cause adverse traffic impacts, especially during the peak hours from 7:00 a.m. to 8:30 a.m. in the morning and 3:30 p.m. to 5:30 p.m. in the afternoon. The degree of traffic impacts is related to lane closure requirement, pit locations (on or off road), allowable work hours by DOT and DTS, and DOH noise limitations.

Nimitz Highway is the primary traffic corridor between the Honolulu International Airport and Waikiki. It is heavily used throughout the day and is known to be congested during peak hours. The average traffic volume is approximately 5,000 vehicles per hour (vph) for daytime and 2,000 vph for nighttime (DOH, 1992). Queen Street provides access for vehicles entering and leaving downtown. Heavy traffic occurs during peak hours only. South Street conveys vehicles from Ala Moana Boulevard in Kakaako to King Street. Traffic on South Street is light between Ala Moana Boulevard and Queen Street in the project area.

Lane closure during peak hours would have adverse traffic impacts for all three thoroughfares. The State of Hawaii Department of Transportation typically prefers that all construction activities on Nimitz Highway be done between the hours of 7:00 p.m. and 5:00 a.m., except for Saturdays, Sundays and holidays, provided that a noise variance is granted by DOH. Closing of one lane on Queen Street would force the vehicles to take parallel roads such as King Street, Beretania Street and Nimitz Highway. South Street is an one way street and has street parking on both sides. Closing of one or two lanes while utilizing the two outside lanes on South Street for through traffic should be possible with minimal disruption.

Pit locations could significantly affect traffic movements, particularly the jacking pits that need to remain open during operations and require additional surface area for equipment. A typical jacking pit is approximately 20 feet in diameter and 15 feet in depth. It can also be constructed as a 20-foot long, 10-foot wide rectangle to fit one traffic lane for unidirectional alignments. Approximately 120 to 150 feet of lane length or equivalent off-road area is required to set up the control room, settling tanks, pipes and miscellaneous ancillary equipment. The pit excavation and sheet piling should take less than one week. During operations, the jacking pit stays open while the receiving pit remains closed until it is necessary to recover the boring machine. If both the jacking pit and ancillary equipment are located on the street, there will be traffic disruption during excavation and pipe jacking due to lane closure and other construction activities. If the ancillary equipment is located off street, daily operation of the offices and businesses in the vicinity could be affected. In addition, the permission of private property owners would be required.

Near the completion of each long drive through sticky clay soils that have high friction and are slightly thixotropic, tunneling machines have sometimes gotten stuck at the beginning of the next day's shift. Traffic disruption when a blocked tunnel has to be excavated at a unplanned site can be quite severe and is usually worse than planned excavations. Therefore, it is desirable for the contractor to have the option to work continuously without interruption near the end of each long drive to lessen the probability of these emergency excavations. The actual pipe jacking should take about two or three weeks in alternate directions, depending upon drive lengths and soil condition. A noise variance is needed to allow for 24-hour operation. Again, without a noise variance, the construction hours would be limited to between 8:30 a.m. and 3:30 p.m. of the same day, Monday through Friday. CCH permission to work on CCH streets between 9:00 a.m. and 6:00 p.m. on Saturday may be requested.

The proposed activity will have no effect during peak periods as all lanes on Nimitz Highway and most of Queen Street will be opened as normal. The exceptions are: Queen Street/Auahi Street, Queen Street/Punchbowl Street, and River Street between Nimitz Highway and Hotel Street. DOT has limited lane closures on the critical Nimitz Highway corridor during non-peak daylight hours to one lane only. These are contract specification that must be followed. Any excavations that extend beyond one lane during this time period must be constructed sequentially to comply with this restriction. Thorough and detailed traffic control plans prepared in accordance with the stipulated traffic control guidelines will be required by the DOT and DTS prior to issuance of a permit for work within the state right of way and city streets. The contractor will be required to implement these plans.

Additionally, the contractor must comply with safety precautions and measures as prescribed in the "Rules and Regulations Governing Use of Traffic Control Devices at Work Sites or Adjacent to Public Streets and Public Highways", as adopted by the State Highways Safety Coordinator, and Part VI, "Traffic Controls for Highway Construction

and Maintenance Operations," of the "Manual on Uniform Traffic Control Devices for Streets and Highways", April 1980.

Specifically, these plans and procedures require that vehicular and pedestrian access be maintained at all times. To avoid interference with the normal daytime activities, construction in the roadway area can be limited to the non-peak hours between 8:30 A.M. and 3:30 P.M., Monday through Friday. In addition, construction can be specified for night work, as an option, with the appropriate noise variance. All existing street improvements will be restored to original or better condition after installation of the sewer line is completed. Private rights-of-way and driveways will also be kept open at all times, unless the owners of the properties using these rights-of-way are otherwise provided for satisfactorily. Traffic to and from the private properties will be provided at all times and the contractor will be required to minimize inconveniences to the property owners. All driveway approaches, and other private property improvements will be restored to original or better condition after the installation of the sewer line is completed. The contractor shall publicize lane closures prior to construction. The service of off-duty officers must be obtained for locations identified in the traffic control plans. DWWM will monitor compliance and the DOT and DTS are responsible for enforcement of permit conditions.

In addition to tunneling operation, this project also involves existing lateral connections and intermediate manhole installations once the new sewer line is in place. The contractor should take no more than two days to connect the existing laterals. Intermediate manhole installation normally takes about three days. The traffic impacts associated with these activities are relatively small in comparison to the tunneling operation. However, the contractor must employ the same mitigation measures discussed above to minimize traffic disruption.

6.5 Archaeological Resources

No irrevocable commitment to loss or destruction of a cultural resource is expected due to the proposed project. Although the sewer line alignment is in the proximity of the burial sites, the proposed unique means of construction should result in no contact with any known or unknown resources. An archaeological monitoring plan and burial plan (Appendix B) has been developed and already submitted to the State Historic Preservation Division (SHPD) of the Department of Land & Natural Resources as part of the Programmatic Agreement. The monitoring plan report has concluded that the proposed design will not impact any burials. SHPD has accepted the monitoring plan report. SHPD review of the burial plan is still pending. The Office of Hawaiian Affairs has also reviewed the monitoring plan and burial plan reports.

The no-impact determination is based on the fact that the proposed sewer line maintains a vertical separation from the known limits of the recorded burials at both Honuakaha and Kawaiahao cemeteries (figures 4a and 5a). The ground level in the vicinity of Honuakaha and Kawaiahao cemeteries are approximately +6 and +7 feet above mean sea level

(MSL). At high tide, the water level would be expected to reach about +1 foot MSL. The monitoring plan report identifies that most of the burials are between 3 to 4 feet below the ground surface, or about 3 feet above MSL. This is logical, since burials would not be interred under water. The current design in progress places the top of the sewer pipe at 6 feet below MSL, or about 12 to 13 feet below the ground surface, much deeper than the conservative early estimate used in the archaeological report. Therefore, the top of the sewer pipe should be more than 8 feet deeper than any burial. There should be no chance of encountering any burials with horizontal tunneling 6 feet under water.

The only possibility for potentially encountering any cultural resources during construction could occur during vertical excavations. Unlike conventional open trench construction, excavations for tunneling pits are relatively small, few, and far in between. Further, tunneling pits will be placed as far from the Honuakaha Cemetery and Kawaiahao Cemetery sites as is possible to avoid any impact to the cultural resources. There are no known archaeological resources located near any other tunneling pits. The proposed method of horizontal tunneling will have less impact than conventional open trench construction techniques because it would avoid contact with both known and unknown burial zones. Therefore, the proposed method of construction in itself is a means of mitigation. There will be no lateral connections by open trenching in these areas.

Additionally, as noted in the archaeological monitoring plan, all excavations with the exception of the known area of fill on Nimitz Highway between Maunakea and Nuuanu will be monitored by an archaeologist. Extra care will be taken at any excavation in the surrounding vicinity of the Honuakaha and Kawaiahao cemeteries. The archaeologist will have the authority to stop construction if any archaeological resources are found. The terms of the monitoring plan and the burial plan will be incorporated into the construction contract specifications.

7.0 ALTERNATIVES TO THE PROPOSED ACTION

7.1 No Action

Implementation of this project will enable the CCH to rehabilitate the old and deteriorated sewer lines along Nimitz Highway and provide additional capacity to convey both current and future flows in the tributary area. Without this rehabilitation project, the existing surcharge conditions will remain, thus overflows and backups could occur in the collection system. Insufficient sewer capacity would restrict new hookups and future development within the tributary area, which is not consistent with the CCH's long range planning for primary urban center. Moreover, some of the large, built-in-place brick manholes are collapsing inward. Large quantities of bricks are continuously spalling off and are being removed from downstream manholes by DWWM maintenance crews. Since these large manhole volumes extend right up to the surface, this could lead to an eventual collapse of the manhole and create a life safety hazard.

7.2 Alternative Routes

The Ewa-Diamond Head through streets between Chinatown and the current Ala Moana Sewage Pump Station that could serve as potential sewer line routes are: Nimitz Highway/Ala Moana Boulevard, Halekauwila Street, Queen Street, King Street, and Hotel Street. Each of the alternatives to Queen Street have major subsurface obstacles that have made them virtually impassable. Since the turn of the century, very large storm drains have been constructed mauka/makai, perpendicular to the path of the sewer line. The storm drains increase in size in the direction from the mountains to the sea, thus are the most impassable along Ala Moana Boulevard. Ala Moana Boulevard and Halekauwila Street are also crowded with major electrical duct banks below the surface. The Fort Street Satellite City Hall is a major obstacle on King Street. The future subsurface corridor for a mass transit subway has been encumbered beneath Hotel Street. Although the construction impact of pits are much smaller than continuous open trench construction, there was concern of minimizing socio-economic impact to small businesses, with the greatest number and density along Hotel Street and King Street. Because of the preceding obstacles, Queen Street was the only feasible route. See Figure 9 for the alternative routes considered.

7.3 Alternative Technologies

The traditional method of construction requires incremental open trench excavation and backfill along the entire length of the new and replacement sewer lines. The driving of sheet piles and dewatering, are also typically associated with this method of construction. This method of construction is typically lower in cost compared to trenchless techniques. The excavations can be temporarily covered during periods of peak traffic, but have the relative potential for more adverse traffic, noise, economic, aesthetic, and water pollution impacts compared to trenchless techniques. Open trench construction is also expected to increase the potential for disturbing archaeological resources.

Pipe jacking is the forerunner of all trenchless techniques that utilizes an operator at the front end of the jacked pipes directly operating excavating tools. It is limited to very large pipe diameters (typically greater than 4 feet) because of man entry requirements and it does not have pressure balancing waste earth removal that can minimize the potential for ground subsidence and dewatering. Therefore, this method is not a feasible alternative.

Directional drilling is very similar to microtunneling. It has a remotely operated cutter head in front of jacked pipes, but it does not have a pressure balanced waste earth removal system than can lessen the potential for ground subsidence and dewatering.

Microtunnel technology was selected in consideration of the following:

- Less noise.

- Lower potential of disturbing archaeological resources.
- Less disruption of the highway and tributary traffic occurs.
- Less pavement demolition and repair is required.
- Less restoration of traffic signal detectors, medians, curbs and gutters is required.
- Less excavation and soil clean-up is required.
- Potential damage to other utilities is reduced.
- High accuracy in maintaining an even slope of construction.

8.0 LIST OF PERMITS

The following permits and clearances will be required as part of this project:

State of Hawaii:
Noise Variance (DOH Radiation, Noise and Indoor Air Quality Branch)
Noise Permit (DOH Radiation, Noise and Indoor Air Quality Branch)
Construction Dewatering Permit (DOH Clean Water Branch)
Highway, State - Permit to Perform Work (DOT Highways Division)

Note: Special Management Area (SMA) Use Permit (Office of State Planning) and the Kakaako Base Zone Development Permit (Hawaii Community Development Authority) are not required. See paragraph 4.4 for details.

City & County of Honolulu:
Construction Dewatering Permit to Discharge into City & County of Honolulu Storm Drainage System (if necessary)
Sewer Connection Permit (DWWM)
Public Right-of-Way - Permit to Excavate (DPW)
Street Usage Permit (DTS)
Grubbing, Grading, and Stockpiling Permit (DPW), if required

9.0 DETERMINATION

In accordance with Chapter 343, Hawaii Revised Statutes, this Environmental Assessment has characterized the technical and environmental issues of the Nimitz Highway Reconstructed Sewer project, identified potential impacts and their significance. It is anticipated that the proposed project will not significantly impact the environment. Therefore, a Negative Declaration is anticipated, and an Environmental Impact Statement is not required for this project. This determination is based on the significance criteria listed in §11-200-12 of the Environmental Impact Statement Rules. Specifically, these significance criteria are addressed below:

1. The proposed project will not result in an irrevocable commitment to loss or destruction of any natural or cultural resources. The potential for impacts to

cultural resources will be minimized by the unique construction method and archaeological monitoring plan.

2. The range of beneficial uses of the environment will not be curtailed.

3. The 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 orders or executive orders. The project supports CCH's long range planning for the primary urban center.

4. The proposed project will not adversely affect the economic or social welfare or the community or state.

5. The project will not adversely affect public health. The project will improve public health by repairing the existing deteriorated sewer lines and increasing the sewer capacity to avoid backups and overflows in the collection system.

6. The project will not involve substantial adverse secondary impacts, such as population changes or effects on public facilities. The proposed project responds to current population trends.

7. The project will not involve a substantial degradation of environmental quality.

8. The project will not include considerable cumulative effect upon the environment nor involves a commitment for larger actions.

9. The project will not substantially affect a rare, threatened or endangered species, or its habitat.

10. The project will not detrimentally affect air or water quality or ambient noise levels. Short-term impacts will occur during the construction phase. The contractor will be instructed to comply with current DOH regulations.

11. The project will not affect an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geological hazardous land, estuary, fresh water, or coastal waters.

12. The project does not affect identified scenic vistas or view planes. The construction activities will take place on the roads. The actual pipe jacking is trenchless and underground.

13. The project does not require substantial energy consumption.

10. REFERENCES

Documents reviewed during preparation of this Environmental Assessment include:

Calvin Kim & Associates, Inc. May 1986. Notice of Negative Declaration for Nimitz Highway Reconstructed Sewer (Fort Street Mall to Alakea Street)

Calvin Kim & Associates, Inc. and Gerald Park Urban Planner, February 1990. Environmental Assessment for Nimitz Highway Relief Sewer, Tax Map Key: 1-5-32, 33, 34, 42.

Cultural Surveys Hawaii, June 1993. An Archaeological Summary of the Kakaako Improvement District 1 Monitoring, Kakaako, Oahu, Hawaii.

Cultural Surveys Hawaii, June 1997. Archaeological Monitoring Plan, Burial Plan for Nimitz Highway Reconstructed Sewer (Auahi Street to Hotel Street).

Department of General Planning, City and County of Honolulu, 1992. General Plan, Objectives and Policies.

Department of Health, September 1996. Chapter 46, Community Noise Control, Title 11, Administrative Rules.

Division of Wastewater Management, October 1989. Environmental Assessment for Nimitz Highway Reconstructed Sewer (Richards Street to Maunakea Street), Tax Map Key: 1-7-01, 02 and 2-1-02, 13, 14, 16.

Group 70 International, Inc., January 1997. Final Environmental Assessment for An Amendment to the Mauka Area Plan, Kakaako Community Development District.

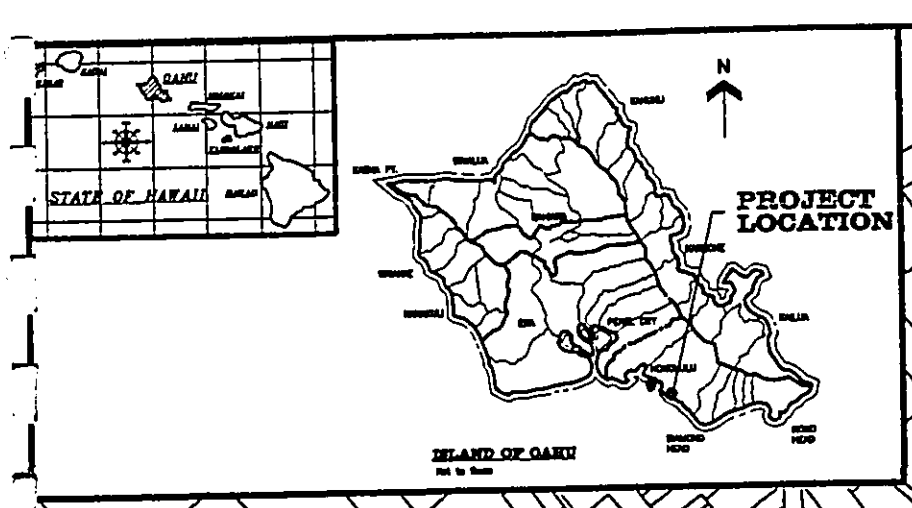
Hawaii Community Development Authority, State of Hawaii, January 1990. Final Supplemental Environmental Impact Statement for Kakaako Makai Area Plan.

Harding Lawson Associates, November 1992. Environmental Test Borings for Nimitz Highway Reconstructed Sewer.

Hazard Evaluation & Emergency Response, Department of Health, State of Hawaii February 1996. Technical Guidance Manual for the Implementation of The Hawaii State Contingency Plan (Draft Edition).

M&E Pacific, Inc., Woodward-Clyde, August 1996. Pre-design Memorandum for the Nimitz Highway Reconstructed Sewer.

M&E Pacific, Inc., Woodward-Clyde, October 1996. Addendum No. 1 to Pre-design Memorandum for the Nimitz Highway Reconstructed Sewer.



Project Start

ZONE 1 SECTION 7 | ZONE 2 SECTION 1

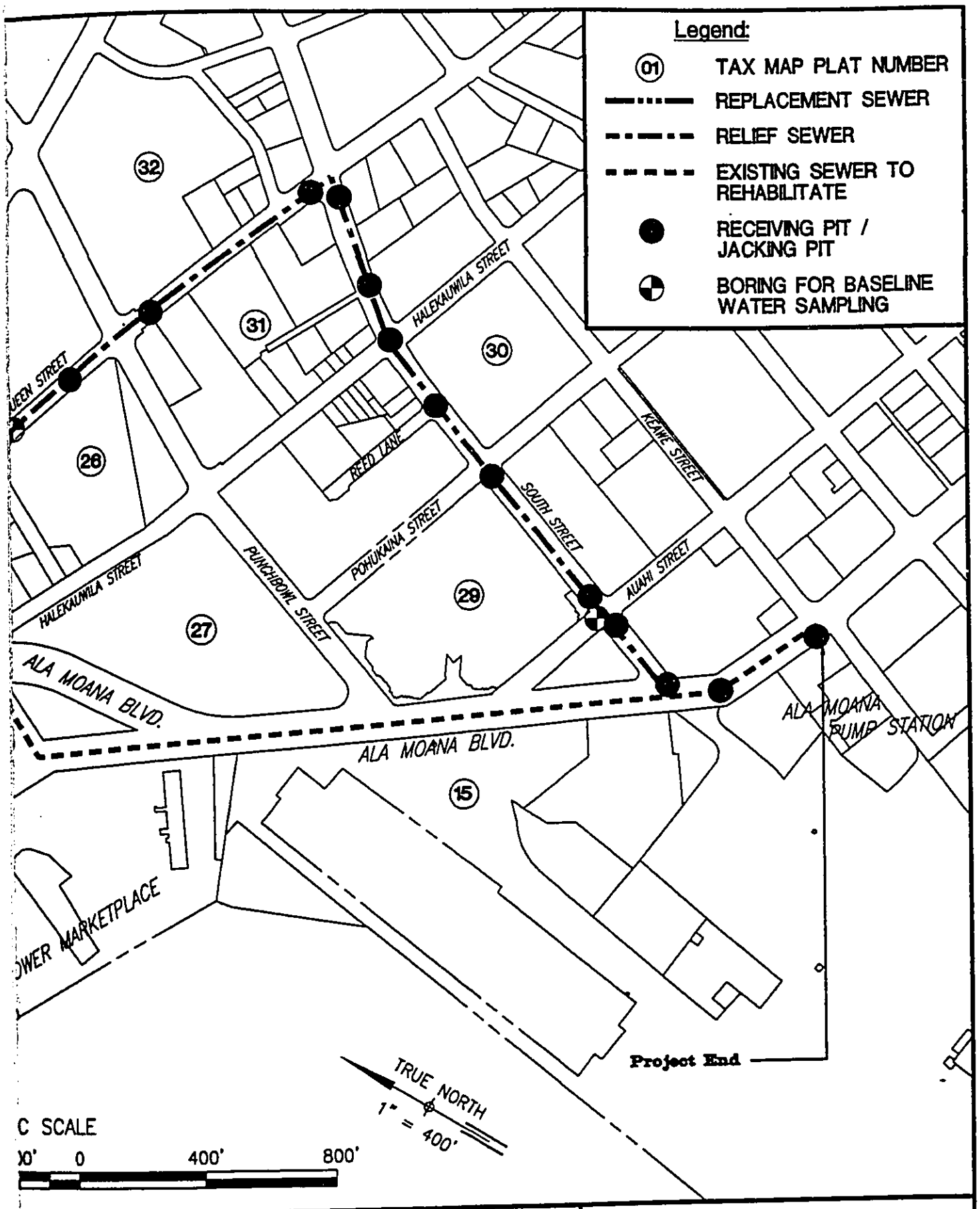
HONOLULU HARBOR

GRAPHIC SCALE
400' 200' 0 400'

PROJECT LOCATION MAP AND SITE PLAN
NIMITZ HIGHWAY RECONSTRUCTED SEWER
CITY & COUNTY OF HONOLULU

M&E Pacific, Inc.
ENGINEERS & ARCHITECTS
SUITE 500, PAUAHI TOWER · 1001 BISHOP ST., HONOLULU, HAWAII 96813

Aug 1998



PLAN
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FIGURE 1

Project No.
018079-5936 (M&E)
952020NA (WCC)

Woodward-Clyde

April 16, 1997 2:15PM

M&E Pacific, Inc.
ENGINEERS & ARCHITECTS
SUITE 500, PAUAHI TOWER · 1001 BISHOP ST., HONOLULU, HAWAII 96813

Woodward-Clyde

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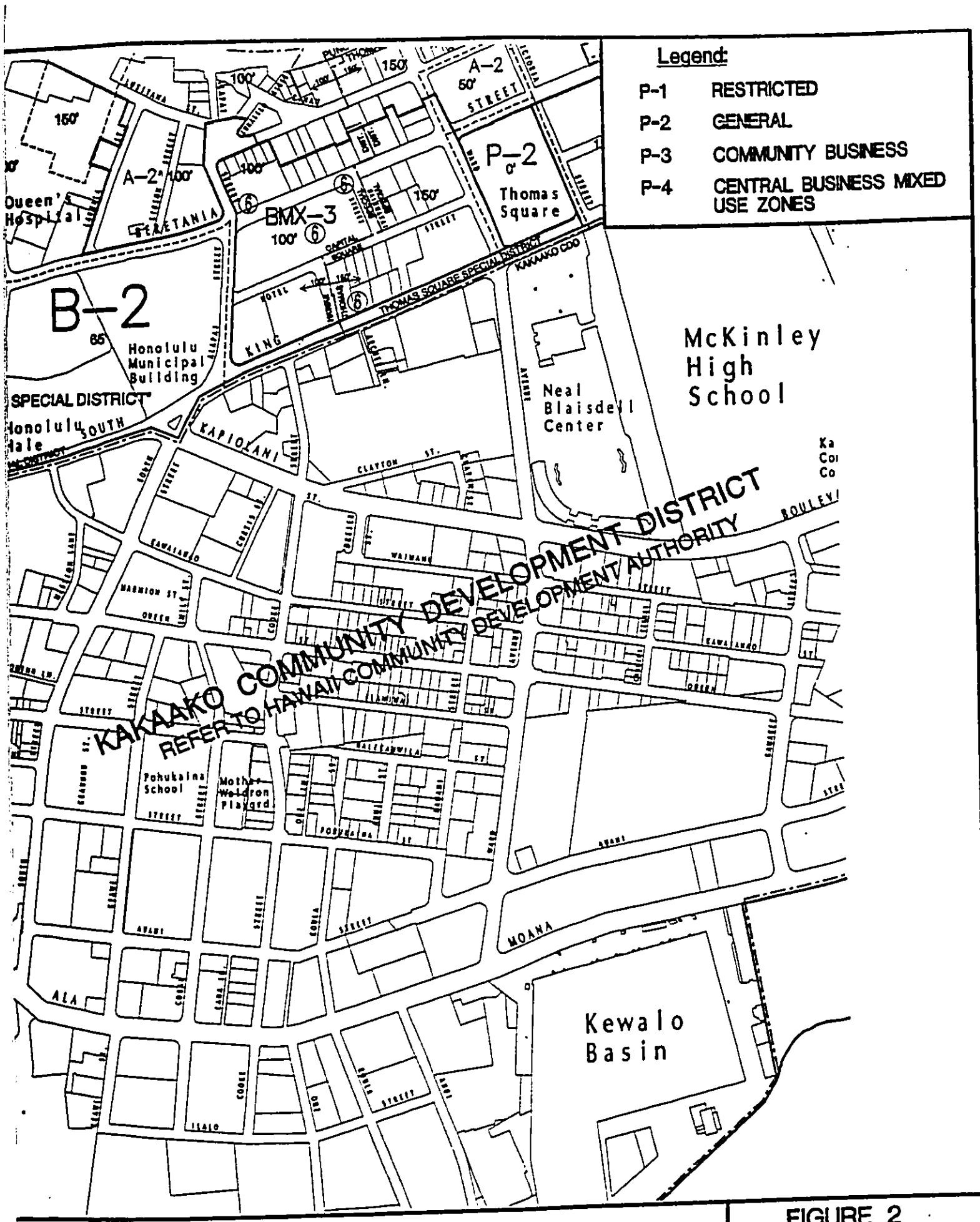
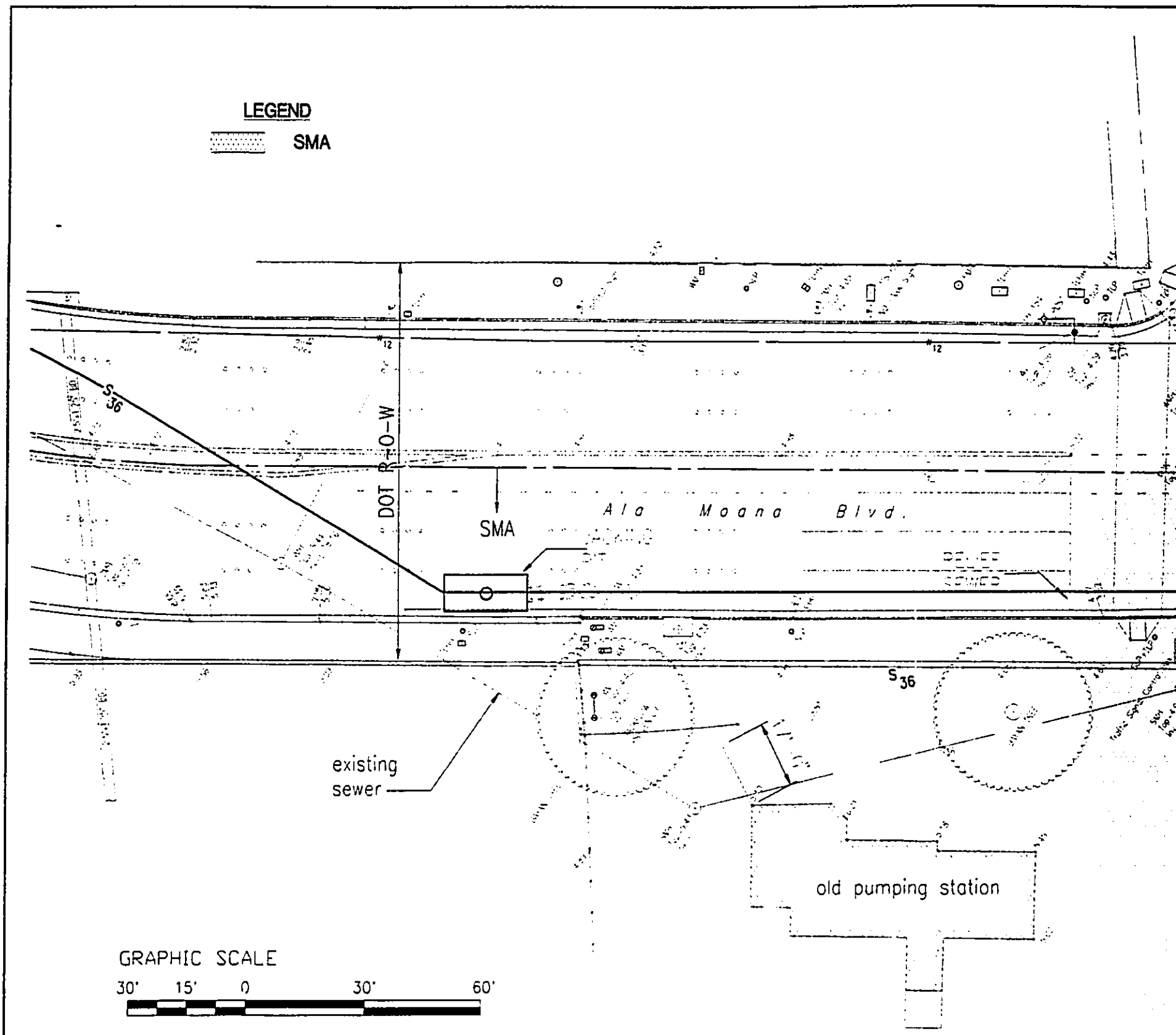


ZONING MAP
NIMITZ HIGHWAY RECONSTRUCTED SEWER
CITY & COUNTY OF HONOLULU

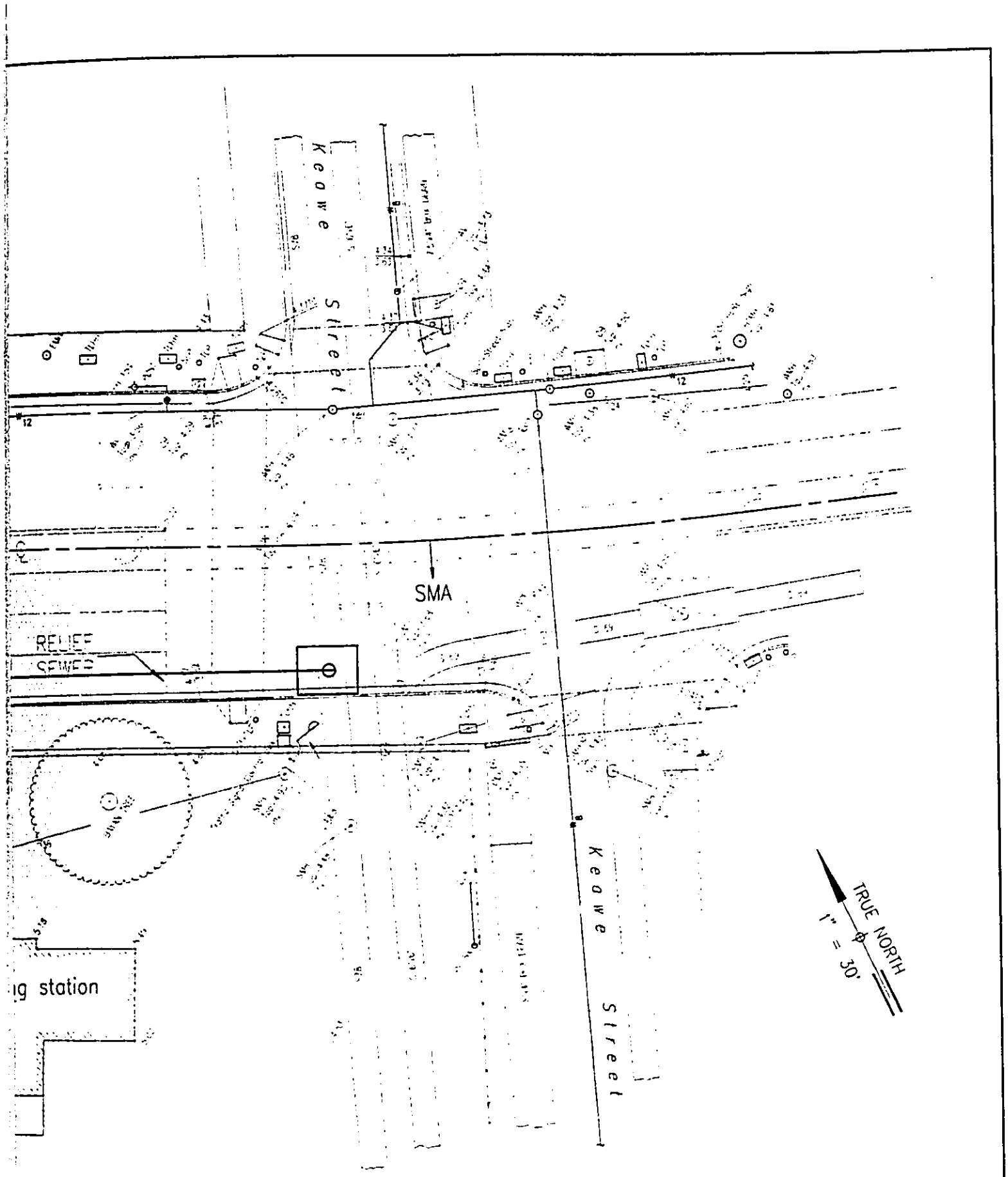
FIGURE 2

Project No.
018079-5936 (M&E)
952020NA (WCC)



M&E Pacific, Inc.
ENGINEERS & ARCHITECTS
SUITE 500, PAUAHI TOWER · 1001 BISHOP ST., HONOLULU, HAWAII 96813

AFFECTED SMA LOCATION MAP
NIMITZ HIGHWAY RECONSTRUCTED SEWER
CITY & COUNTY OF HONOLULU



MAP
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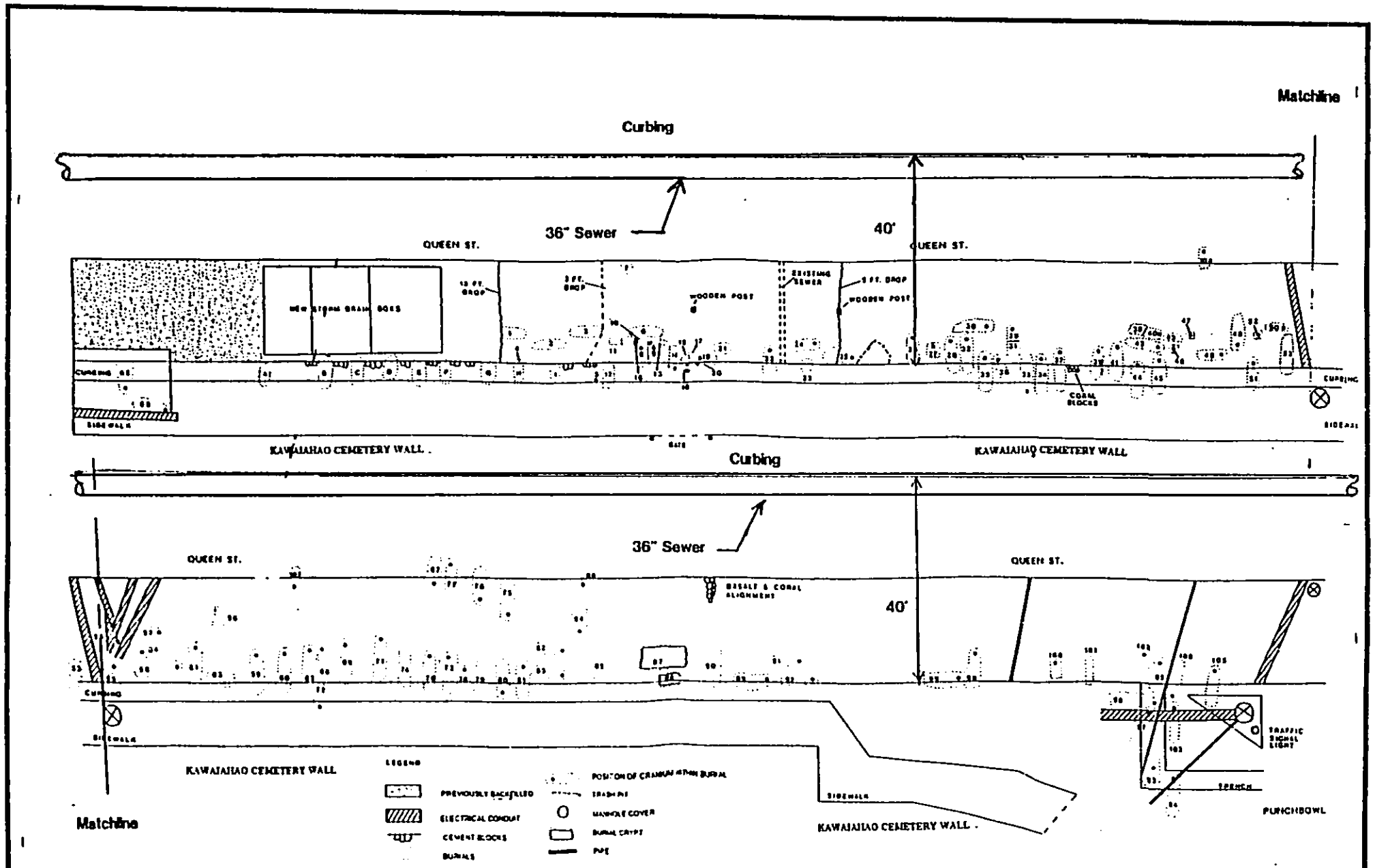
OLULU

FIGURE 3

Woodward-Clyde



Source: Cultural Surveys Hawaii, 1993.

M&E Pacific, Inc. ENGINEERS & ARCHITECTS	Woodward-Clyde	QUEEN STREET BURIAL LOCATIONS NIMITZ HIGHWAY RECONSTRUCTED SEWER CITY & COUNTY OF HONOLULU	FIGURE 4 Project No. 018079-5936 (M&E) 952020NA (WCC)

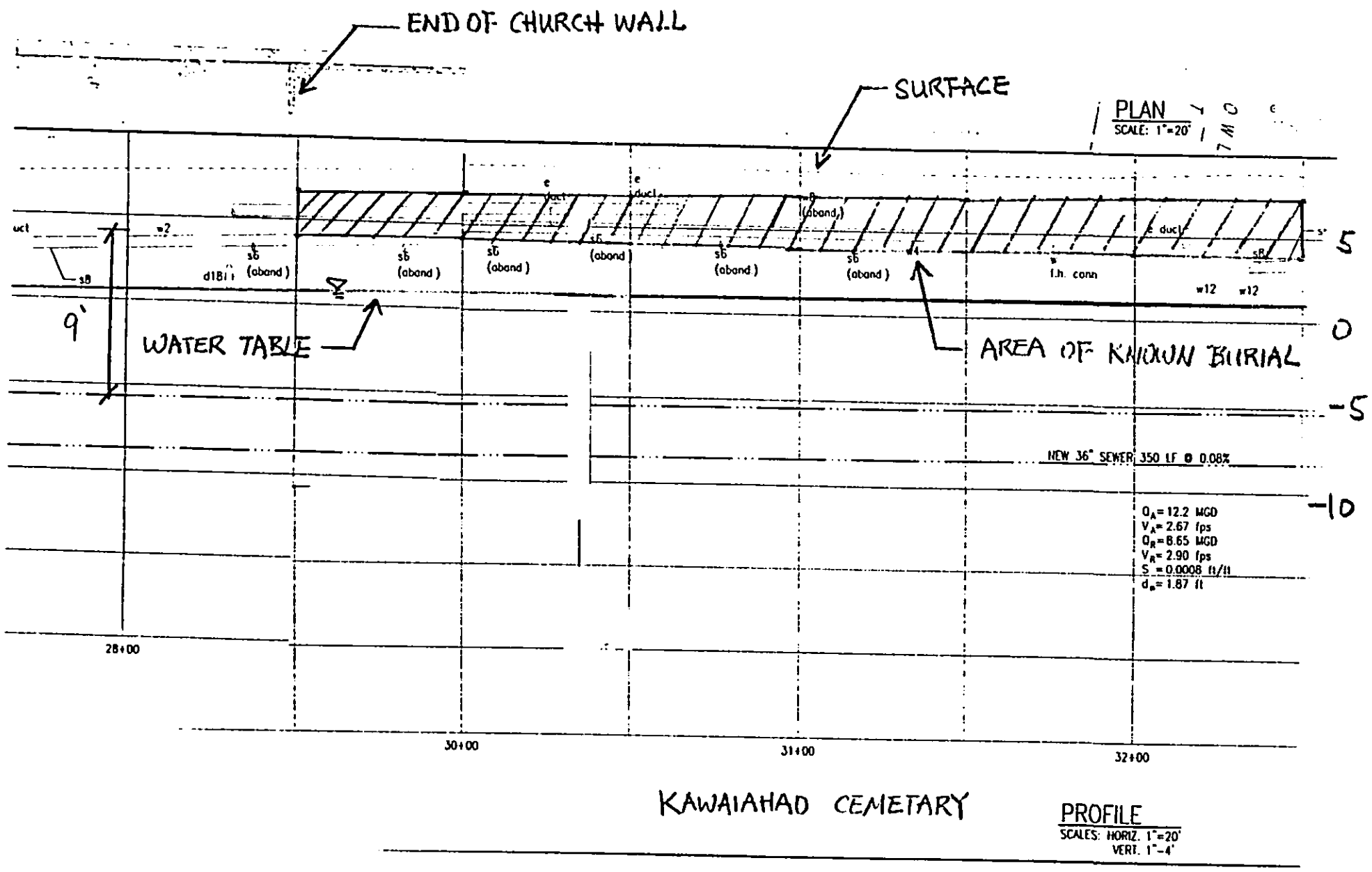
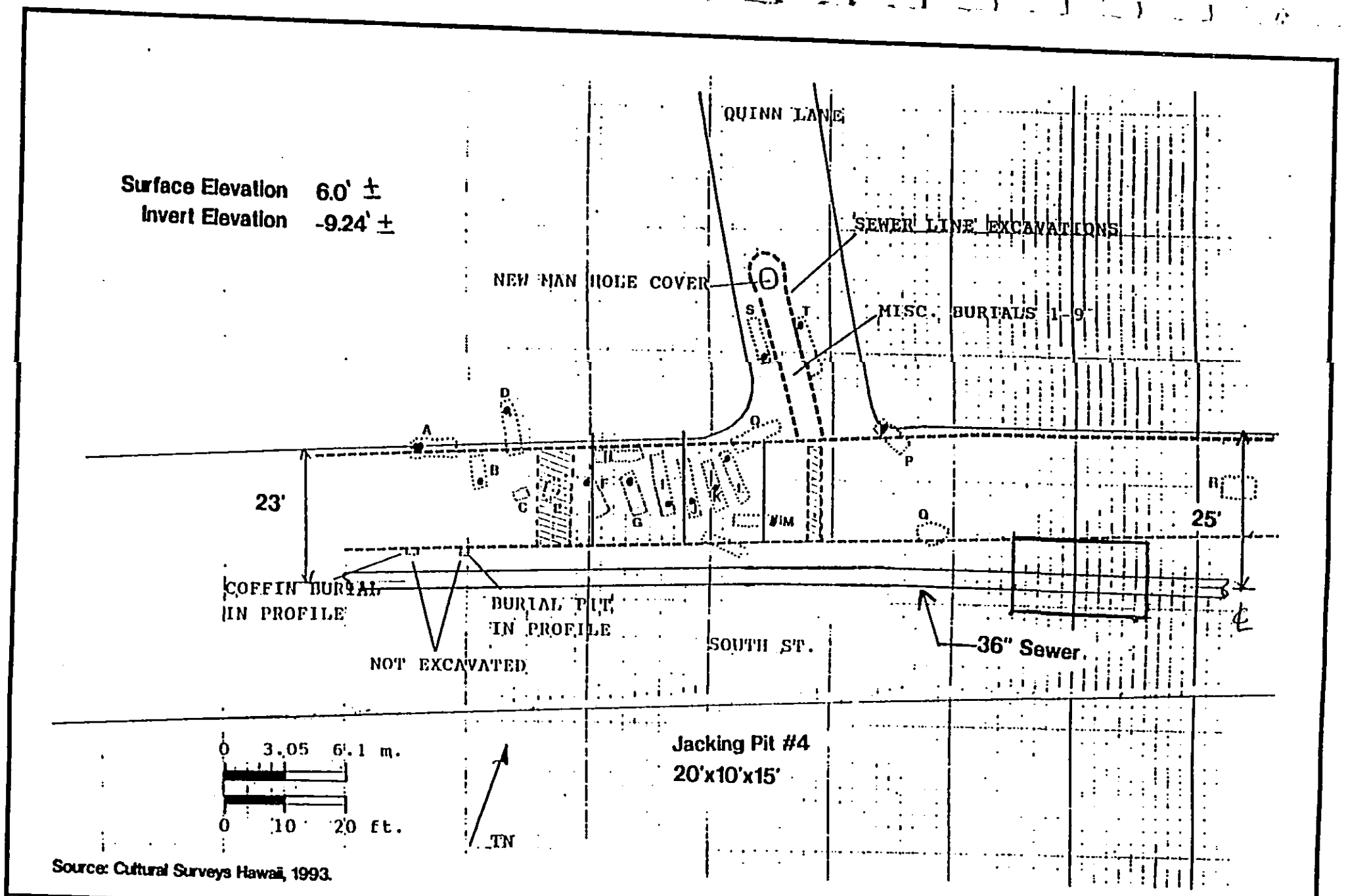

END OF CHURCH WALL
SURFACE
PLAN
SCALE: 1"=20'
WATER TABLE
AREA OF KNOWN BURIAL
9'
NEW 36" SEWER 350 LF @ 0.08%
Q_A= 12.2 MGD
V_A= 2.67 fps
Q_R= 8.65 MGD
V_R= 2.90 fps
S = 0.0008 ft/ft
d_n= 1.87 ft
5
0
-5
-10
28+00
30+00
31+00
32+00
KAWAIAHAD CEMETARY
PROFILE
SCALES: HORIZ. 1"=20'
VERT. 1"=4'

FIGURE 4A



Source: Cultural Surveys Hawaii, 1993.

M&E Pacific, Inc. ENGINEERS & ARCHITECTS	Woodward-Clyde	SOUTH STREET BURIAL LOCATIONS NIMITZ HIGHWAY RECONSTRUCTED SEWER CITY & COUNTY OF HONOLULU	FIGURE 5 Project No. 018079-5936 (M&E) 952020NA (WCC)

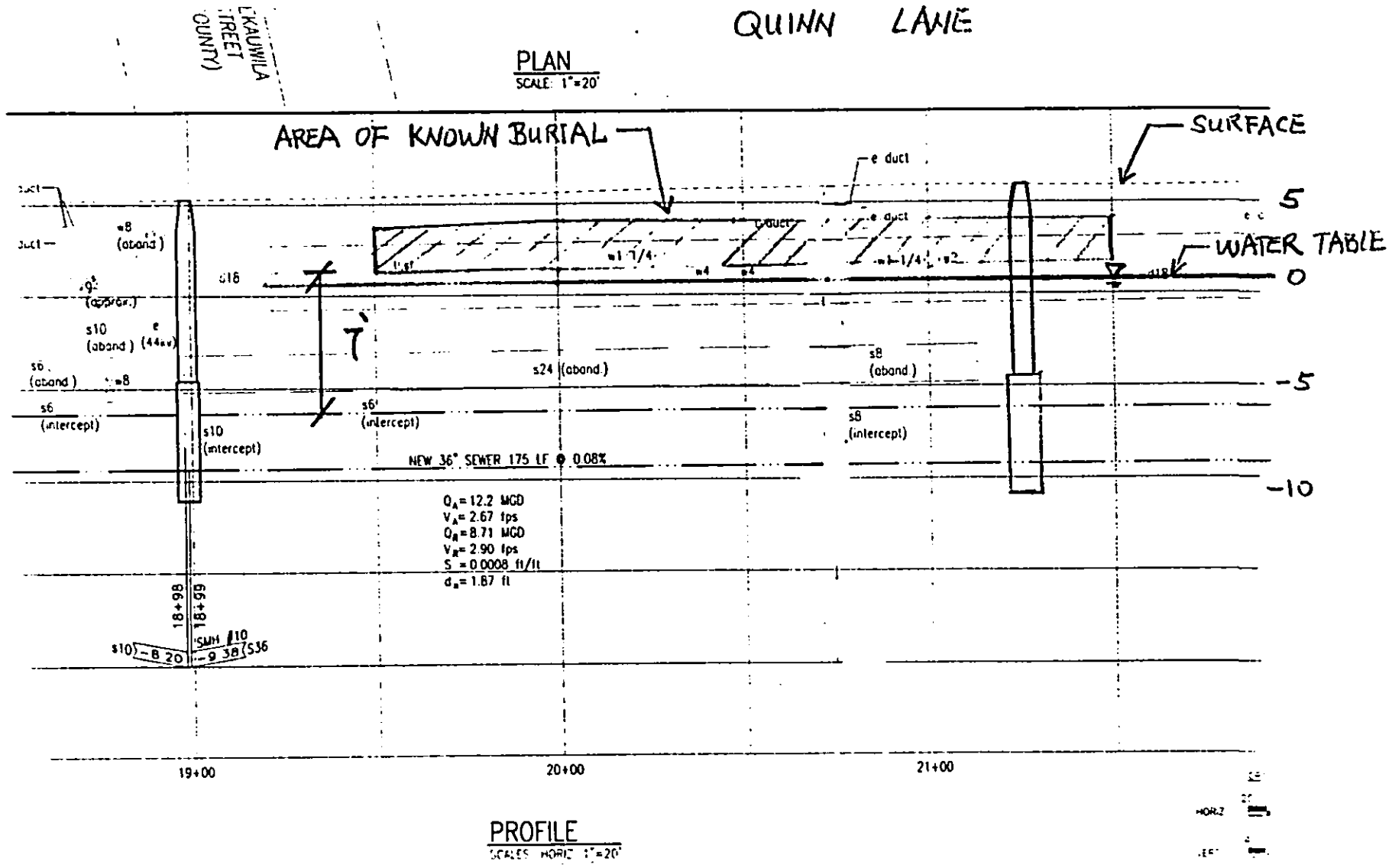
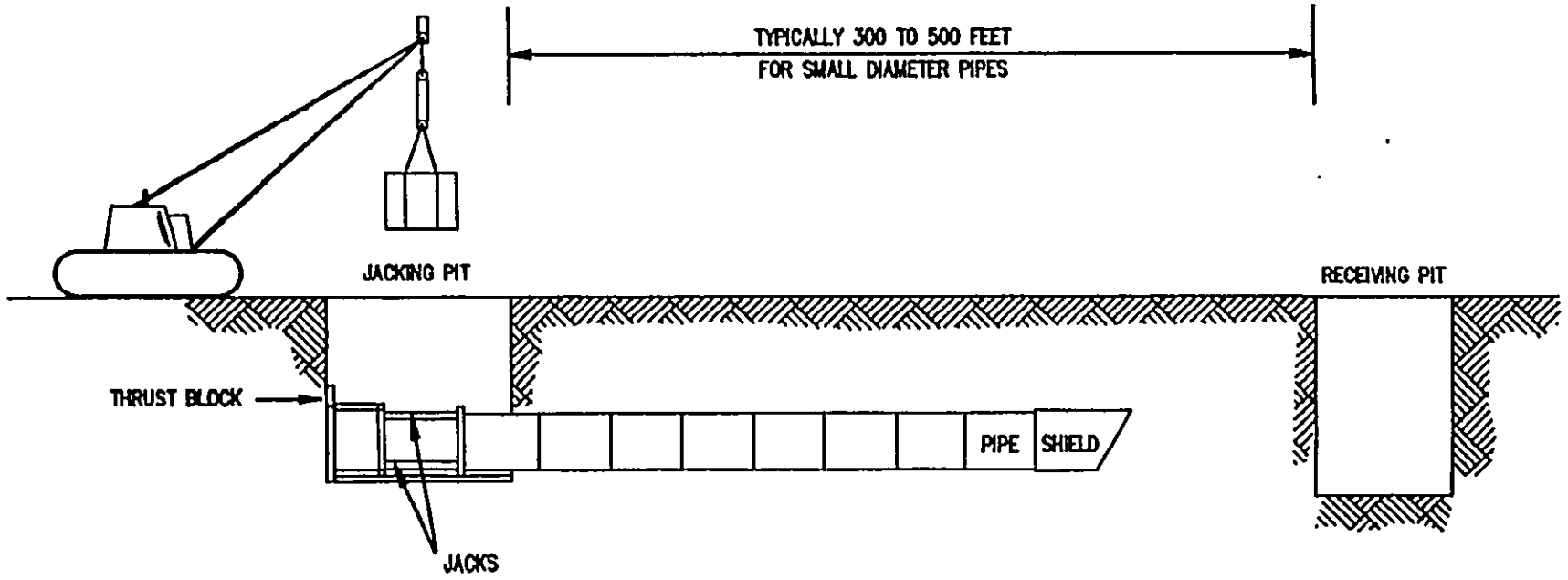
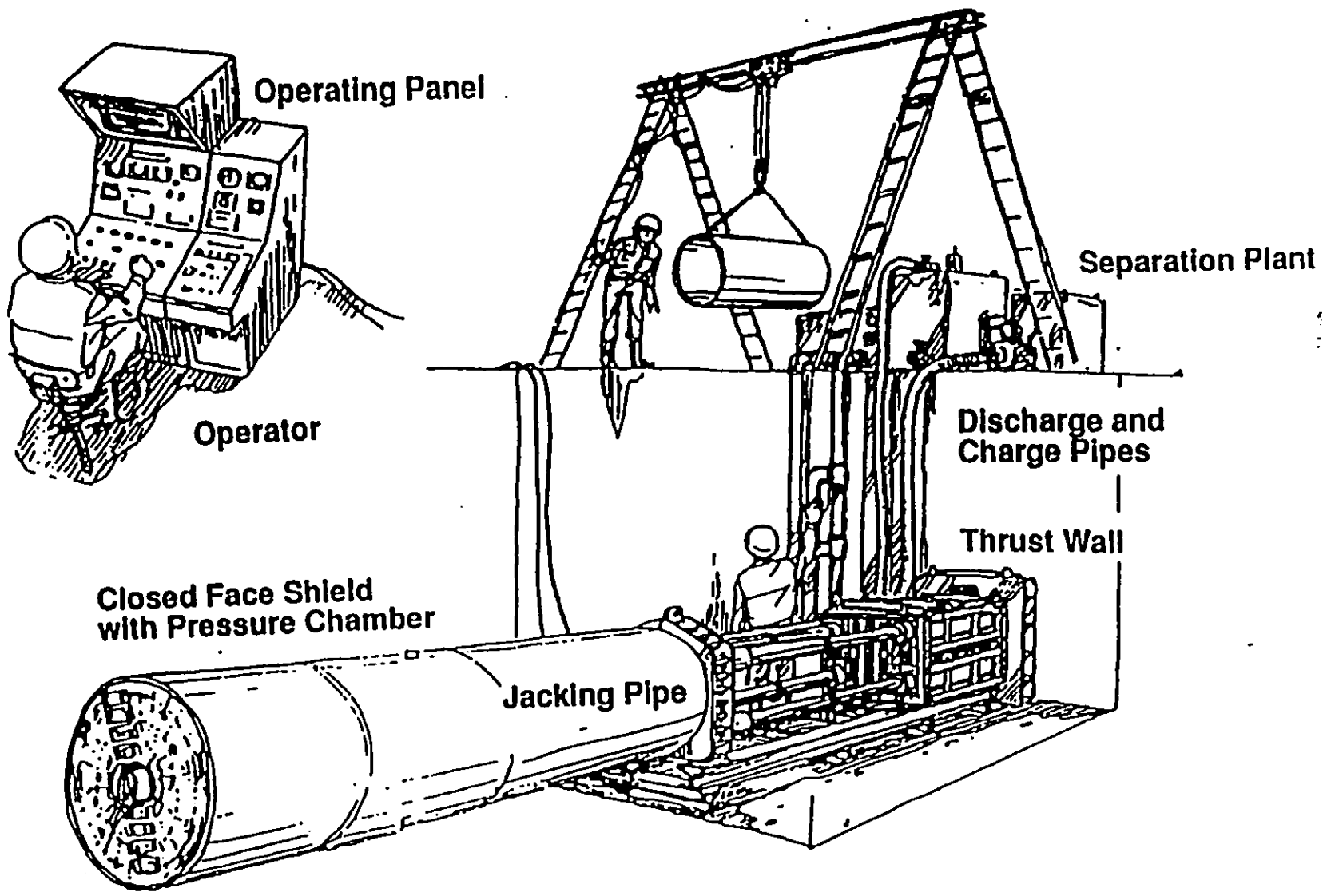

KAUWILA STREET (COUNTY)
QUINN LANE
PLAN
SCALE: 1"=20'
AREA OF KNOWN BURIAL
SURFACE
WATER TABLE
5
0
-5
-10
e duct
s18
s10 (abond.)
s6 (abond.)
s6 (intercept)
s10 (intercept)
s24 (abond.)
s6' (intercept)
s8 (abond.)
s8 (intercept)
NEW 36" SEWER 175 LF @ 0.08%
Q_A= 12.2 MGD
V_A= 2.67 fps
Q_R= 8.71 MGD
V_R= 2.90 fps
S = 0.0008 ft/ft
d_n= 1.87 ft
18+98
18+99
SMH #10
S10 - 8.20
- 9.38 (S36)
19+00
20+00
21+00
PROFILE
SCALES: HORIZ 1"=20'
HORIZ
VERT

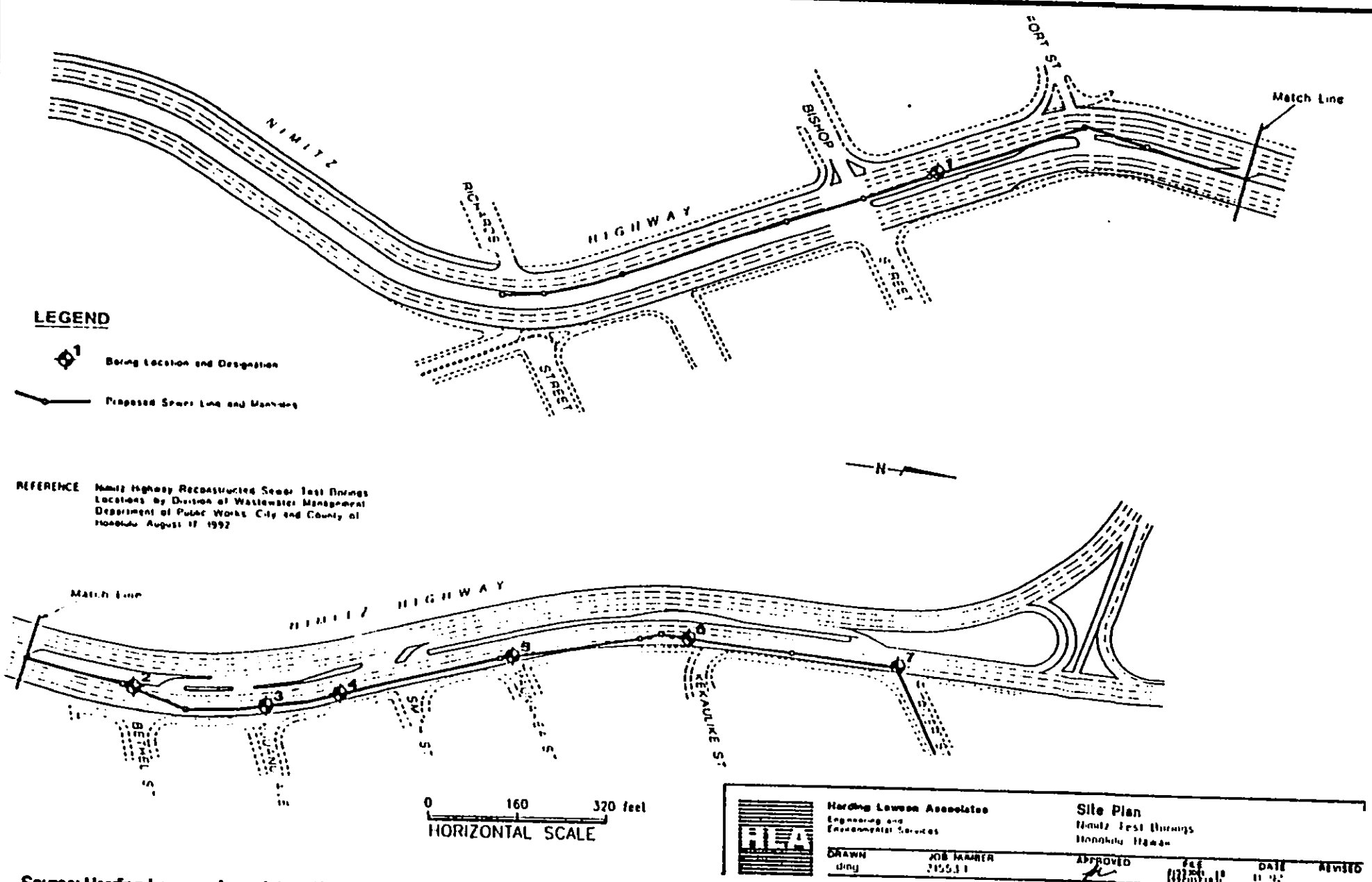
FIGURE 5A



M&E Pacific, Inc. ENGINEERS & ARCHITECTS	Woodward-Clyde	Typical Pipe Jacking Sewer	FIGURE 6
		Nimitz Highway Reconstructed Sewer City & County of Honolulu	Project No. 018079-5938 (M&E) 932020NA (WCC)



M&E Pacific, Inc. ENGINEERS & ARCHITECTS	Woodward-Clyde	Microtunneling Method	FIGURE 7
		Nimitz Highway Reconstructed Sewer City & County of Honolulu	Project No. 018078-5036 (M&E) 952020NA (WCC)



Source: Harding Lawson Associates, 1992.

M&E Pacific, Inc. ENGINEERS & ARCHITECTS

Woodward-Clyde

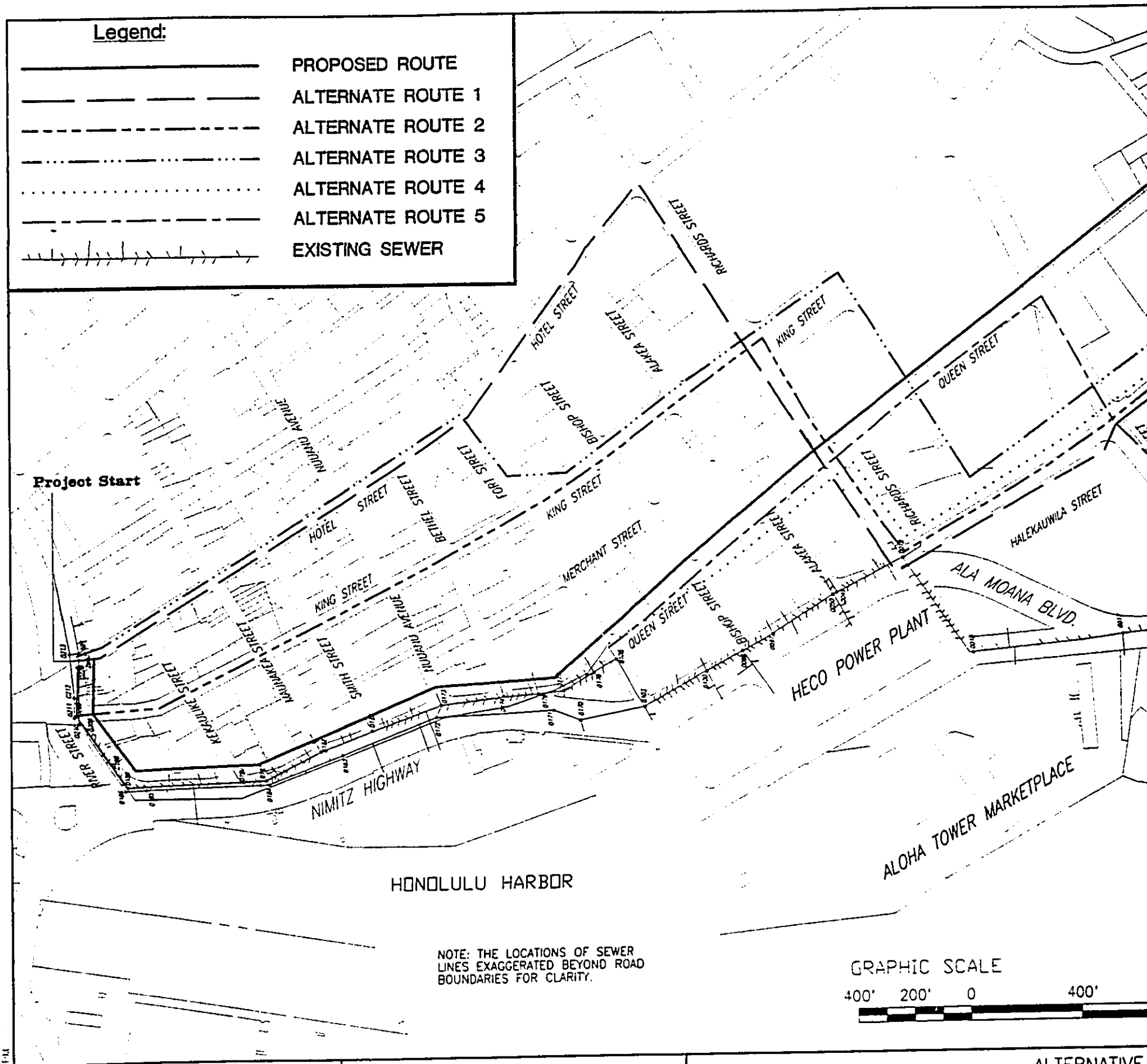
NIMITZ HIGHWAY BORING LOCATIONS
NIMITZ HIGHWAY RECONSTRUCTED SEWER
CITY & COUNTY OF HONOLULU

FIGURE 8

Project No.
018079-5936 (M&E)
952020NA (WCC)

Legend:

- PROPOSED ROUTE
- ALTERNATE ROUTE 1
- ALTERNATE ROUTE 2
- ALTERNATE ROUTE 3
- ALTERNATE ROUTE 4
- ALTERNATE ROUTE 5
- EXISTING SEWER



NOTE: THE LOCATIONS OF SEWER LINES EXAGGERATED BEYOND ROAD BOUNDARIES FOR CLARITY.

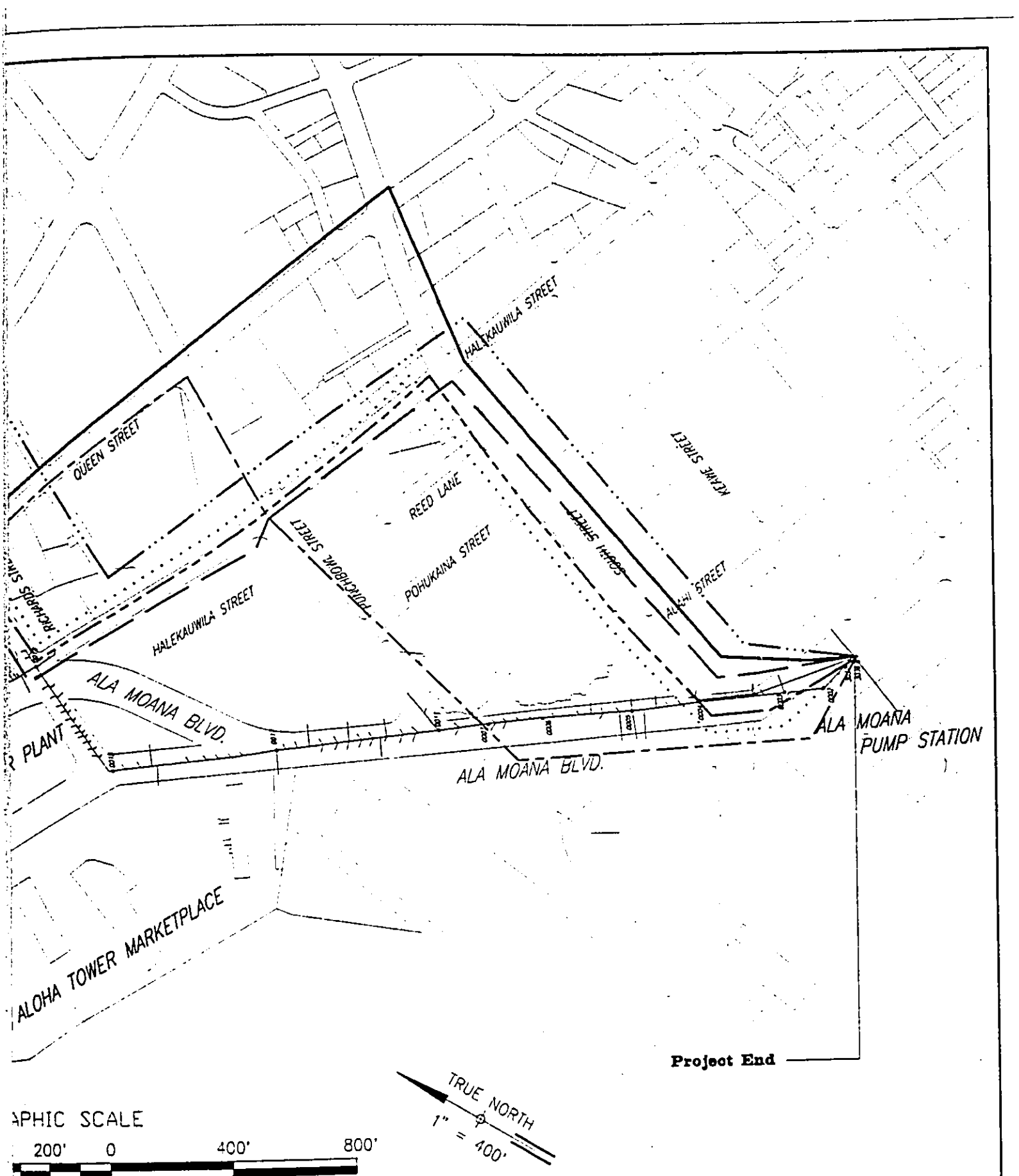
GRAPHIC SCALE

400' 200' 0 400'

M&E Pacific, Inc.
ENGINEERS & ARCHITECTS
SUITE 500, PAUAHI TOWER • 1001 BISHOP ST., HONOLULU, HAWAII 96813

Woodward-Clyde

ALTERNATIVE
NIMITZ HIGHWAY RECO
CITY & COUNTY



ALTERNATIVE ROUTES
NIMITZ HIGHWAY RECONSTRUCTED SEWER
CITY & COUNTY OF HONOLULU

FIGURE 9

Project No.
[illegible]

Appendix A

Draft EA Comments and Responses

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

BENJAMIN J. CAYETANO
GOVERNOR
SELLF. NAYA
DIRECTOR
BRADLEY A. MOSSMAN
DEPUTY DIRECTOR
RICK EGGED
DIRECTOR, OFFICE OF PLANNING

OFFICE OF PLANNING
235 South Beretania Street, 6th Fl., Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Tel: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-6771

June 26, 1997

Mr. Bruce D. Wade
M&E Pacific, Inc.
Pauahi Tower, Suite 500
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wade:

Subject: Draft Environmental Assessment, Nimitz Highway Reconstructed Sewer, Honolulu, Hawaii

We are very much aware of the need for the repairs and improvements to the Nimitz sewer system and believe that the project will produce beneficial results. Therefore, we support the project.

Please note that the project is exempt from the Special Management Area (SMA) permit system in accordance with the definition of development in Section 205A-22, Hawaii Revised Statutes. Nonetheless, the project is still obligated to comply with the Coastal Zone Management (CZM) objectives and policies (Sections 205A-4 and 5). In this regard, mitigation measures need to be employed during construction to minimize polluted runoff and other environmental impacts.

If there are any questions regarding this, please feel free to contact either Douglas Tom or Charles Carole of our CZM Program at 587-2875 and 587-2804, respectively.

Sincerely

Rick Egged
Director
Office of Planning

RECEIVED JUL 07 1997

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Mr. Rick Egged, Director
Office of Planning
Department of Business,
Economic Developement & Tourism
State of Hawaii
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Attention: Mr. Douglas Tom/Charles Carole

Dear Mr. Egged

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Environmental Assessment (EA)

Thank you for reviewing the subject draft EA. We understand that the Office of Planning supports the proposed project which is consistent with the CZM program objective and polices. During construction, the contractor will be required to use appropriate mitigation measures to minimize polluted runoff and other environemental impacts.

The City and County of Honolulu Department of Wastewater Management (proposing agency) has determined that the implementation of this project will not have significant environmental effects. Therefore, the agency will be issuing a Negative Declaration (ND). The final EA will be published in August 23, 1997 OEQC bulletin. If you have any questions or want to discuss these matters further, please call me at (808) 521-3051.

Sincerely,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, CCH

Suite 500 Pauahi Tower
1001 Bishop Street Honolulu, HI 96813
808-521-3051 FAX 808-521-0216

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPIOLANI BOULEVARD SUITE 500
HONOLULU HAWAII 96813

June 23, 1997

Bruce D. Wade
M & E Pacific Inc.
Suite 500 Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Re: Draft Environmental Assessment for Nimitz Highway Reconstructed Sewer

Dear Mr. Wade:

Thank you very much for the opportunity to review the above-referenced Draft Environmental Assessment (DEA). The Department of Wastewater Management (DWWM), City and County of Honolulu proposes to replace and rehabilitate existing sewerlines and install a relief sewer in the Downtown Honolulu and Kakaako districts.

The Office of Hawaiian Affairs(OHA)has some concerns with the proposed project based on the archaeological information contained in the DEA. According to the DEA the proposed relief sewerline will run through two areas containing previously encountered burial sites. The first is near the Kawaiahao Cemetery on Queen Street which contains over one hundred burials. The second is near the old Honuakaha Small Pox Cemetery (in the vicinity of South Street) which contains approximately twenty burials.

OHA agrees with the preparers of the DEA that archaeological supervision would be required for work in these areas. However, OHA is concerned about the ability of an on-site archaeologist to effectively monitor these areas due to the proposed "microtunneling" method of pipeline installation.

The DEA describes microtunneling as a "trenchless construction method which utilizes hydraulic jacks to push pipes through the ground behind a remotely operated tunnel boring machine."

The DEA further explains that excavation for microtunneling is "chiefly limited to the end points of each drive at designated jacking and receiving pits", and that "drive lengths are generally 300 to 600 feet (but)....longer drives are possible."

This method of tunneling would make the archaeological monitoring of these sites extremely difficult if not impossible. The attempts of an archaeologist to monitor the progress of a remotely operated jacking pipe, boring a tunnel 15 feet below the surface for distances of 600 feet, would be ineffective at best.

As a result of the potential difficulties associated with archaeological monitoring activities during microtunneling, OHA suggests two possible alternatives:

1) An alternate route should be chosen for the installation of the relief sewer system. OHA recommends the selection of an alternate route which entirely avoids both of the sites containing burials. We find it difficult to choose one of the four alternate routes proposed in the DEA (Figure 9), because the routes were not clearly represented.

   Figure 9 was difficult to interpret for several reasons. First, it is difficult to differentiate between the various alternate routes as they all overlap. Second, the legend is not consistent with the map (ie. alternate route #2 does not appear on the map). Third, some routes appear to follow several different paths (ie. alternate route #3 appears to run eastbound along Hotel Street, Queen Sreet, and Halekauwila Street).

2) In the two areas containing the burials "conventional open trenching techniques" should be used. This would require excavation for the entire length of the pipeline making effective archaeological monitoring possible. Microtunneling should only be used in areas which have been deemed previously disturbed.

OHA strongly urges these two alternatives be considered by DWWM. Furthermore, regardless of the route chosen, a burial treatment plan must be developed which identifies where remains, when found, will be reinterred.

If you have any questions or need additional information, please contact Lynn Lee, Acting Land and Natural Resources Division Officer or Richard Stcok, EIS Planner at (594-1888).

Sincerely yours,

Sesnita Moepono
Acting Administrator

RS:rs
cc: Trustee Clayton Hee, Board Chair
Trustee Rowena Akana, Land & Sovereignty Chair
Trustee Abraham Aiona, Board Vice-Chair
Trustee Haunani Apoliona
Trustee Billie Beamer
Trustee Frenchy DeSoto
Trustee Moses Keale
Trustee Collette Machado
Trustee Hannah Springer
Lynn Lee, LNR, Acting Officer
Administration

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Ms. Sesnita Moepono, Acting Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813-5249

Dear Ms. Moepono

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Environmental Assessment (EA)

Thank you for your review of the subject draft EA. We understand the concern of Office of Hawaiian Affairs (OHA) for potential for burial site impacts because tunneling cannot be monitored. You had proposed consideration of alternative routes and open trench construction.

Your concern was especially warranted at the time, since the archaeological monitoring and burial plans that were mentioned in the draft EA were then still only in progress. Since that time, however, an archaeological monitoring plan and burial plan has been developed and submitted to the State Historic Preservation Division (SHPD) of the Department of Land & Natural Resources. A copy was also forwarded to Richard Stook of your staff for review. We believe that you will concur with SHPD on their acceptance of the monitoring plan report and its conclusion that the proposed design will not impact any burials. SHPD review of the burial plan is still pending.

The ground level in the vicinity of Honuakaha and Kawaiahao cemetaries are approximately +6 and +7 feet above mean sea level (MSL). At high tide, the water level would be expected to reach about +1 foot MSL. Section 4 8 will be modified to include information from monitoring plan report that identifies that most of the burials are between 3 to 4 feet below the ground surface, or about 3 feet above MSL. This is logical, since burials would not be interred under water. The current design in progress places the top of the sewer pipe at 6 feet below MSL, or about 12 to 13 feet below the ground surface, much deeper than the conservative early estimate used in the archaeological report. Therefore, the top of the sewer pipe should be more than 8 feet deeper than any burial. There should be no chance of encountering any burials with horizontal tunneling 6 feet under water. Additionally, the proposed design also maintains horizontal separation between the sewerline and the known limits of the recorded burials at both Honokahua and Kawaiahao cemetaries. A new subsection 6.5, Archaeological Resources, will be added to Section 6.0, Impacts, to clarify the preceding.

Suite 500 Pauahi Tower
1001 Bishop Street Honolulu HI 96813
808 521-3051 FAX 808 521 3246

The only possibility for potentially encountering cultural resources during construction could occur during vertical excavation from ground, since it would pass through the noted burial depths. Excavations would need to be shored with corrugated metal sheetpiles that will be driven into the ground prior to digging to prevent the excavation from widening and blocking the entire road, or even undermining nearby sidewalks and offstreet structures. Excavations for tunneling are relatively small, few, and far in between. We are very conscious of cultural concerns and have moved the tunneling pits as far from the Honuakaha and Kawaihao cemetary sites as is possible. There are no known archaeological resources located near any tunneling pit. Conventional open trenching construction would also require sheetpiling. Because the sheetpiling would have to be continous for the entire 1-1/2 mile length of this project instead of small pits separated by large distances, open trench construction would increase the odds of encountering archaeological resources, especially at the Honuakaha Cemetary. While archaeological resources can be monitored during open trench construction, significant disturbance will occur to any burials or artifacts encountered. For example, if a portion of a corpse is encountered at the boundary of an excavation, one segment of sheetpile will need to be removed to recover the remainder of the corpse outside of the excavation. We maintain that the proposed method of horizontal tunneling will have less impact than the proposed alternative because it would avoid contact with both known and unknown burial zones.

The report figure will be improved for clarity. The Ewa-Diamond Head through streets between Chinatown and Ala Moana Pump Station that could serve as potential sewerline routes are: Nimitz Highway/Ala Moana Boulevard, Halekauwila Street, Queen Street, King Street, and Hotel Street. Each of the alternatives to Queen Street have major subsurface obstacles that have made them virtually impassable. Since the turn of the century, very large storm drains have been constructed mauka/makai, perpendicular to the path of the sewerline. The storm drains increase in size in the direction from the mountains to the sea, thus are the most impassable along Ala Moana Boulevard. Ala Moana Boulevard and Halekauwila Street are also crowded with major electrical duct banks below the surface. The Fort Street Satellite City Hall is a major obstacle on King Street. The future subsurface corridor for a mass transit subway has been encumbered beneath Hotel Street. Although the construction impact of pits are much smaller than continuous open trench construction, there was concern of minimizing socio-economic impact to small businesses, with the greatest number and density along Hotel Street and King Street. Because of the preceding obstacles, Queen Street was the only possible route.

Finally, as noted in the archaeological monitoring plan, all excavations with the exception of the known area of fill on Nimitz Highway between Maunakea and Nuuanu will be monitored by an archaeologist. Extra care will be taken at any excavation in the surrounding vicinity of the Honuakaha and Kawaiahao cemetaries. The archaeologist will have the authority to stop construction if any archaeological resources are found. The terms of the monitoring plan and the burial plan will be incorporated into the construction documents.

We thank you for your proposed suggestions. We would like to assure you that we are concerned over the protection of archaeological resources, have considered the issues that you

have raised, and have modified the EA to clarify these issues. We hope that we have adequately addressed your concerns in this letter, but would be happy to meet with you in person to discuss this further.

Based on the preceding, we hope that you will concur with the City and County of Honolulu Department of Wastewater Management that this project will not have significant environmental effects. Therefore, as proposing agency, it currently intends to issue a Negative Declaration (ND). Notice of availability of the final EA will be published in the August 28, 1997 OEQC Bulletin. If you have any questions or would like to discuss these matters further, please call me at 521-3051.

Sincerely yours,

Robin Matsunaga, P.E.
Project Manager

Attachment: SHPD Letter of July 23, 1997
Preliminary Construction Drawing Excerpts

xc: Glenn Okita DWWM, E&C
Elaine Jourdane DLNR, SHPD

CC To
Robin Matsunaga
M&E

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

July 23, 1997

Dr Hallett Hammatt
Cultural Surveys Hawaii
733 North Kalaheo Avenue
Kailua, Hawaii 96734

LOG NO: 19662
DOC NO: 9707RC41

Dear Dr. Hammatt:

SUBJECT: Review of Archeological Monitoring Plan - Nimitz Highway
Reconstructed Sewer
Honolulu, Honolulu, O'ahu
TMK: 1-7-02, 03; 2-1-02, 13-16, 25, 27, 29-32

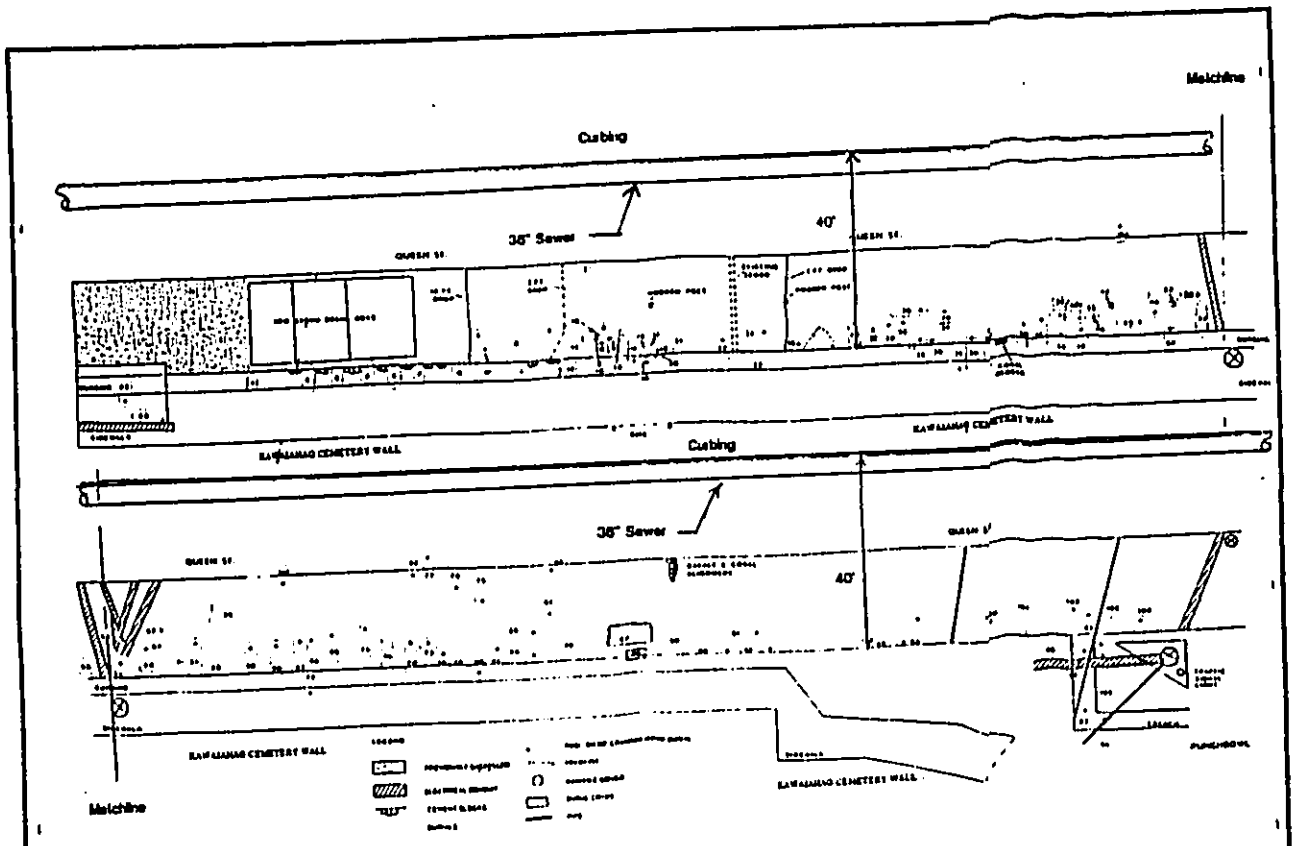
This reviews the plan which was submitted on July 2, 1997. This plan is quite clear as to the types of sites that may be found at the different jacking and receiving pits. We approve the plan, with the understanding that artifact analysis will include illustrations and that a clarification is made as to how many radiocarbon samples (as a maximum) will be submitted.

Our Burials Program will review the Burial Plan separately.

Aloha,

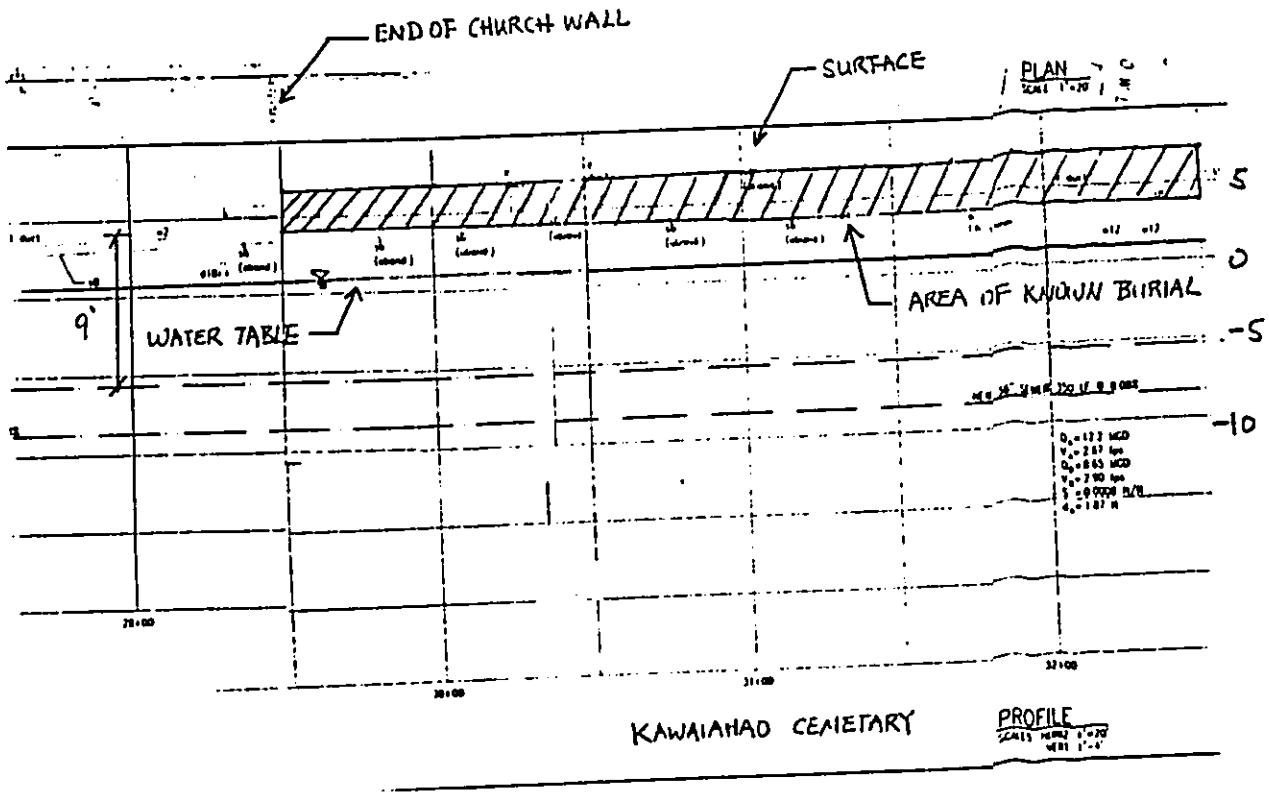
DON HIBBARD, Administrator
State Historic Preservation Division

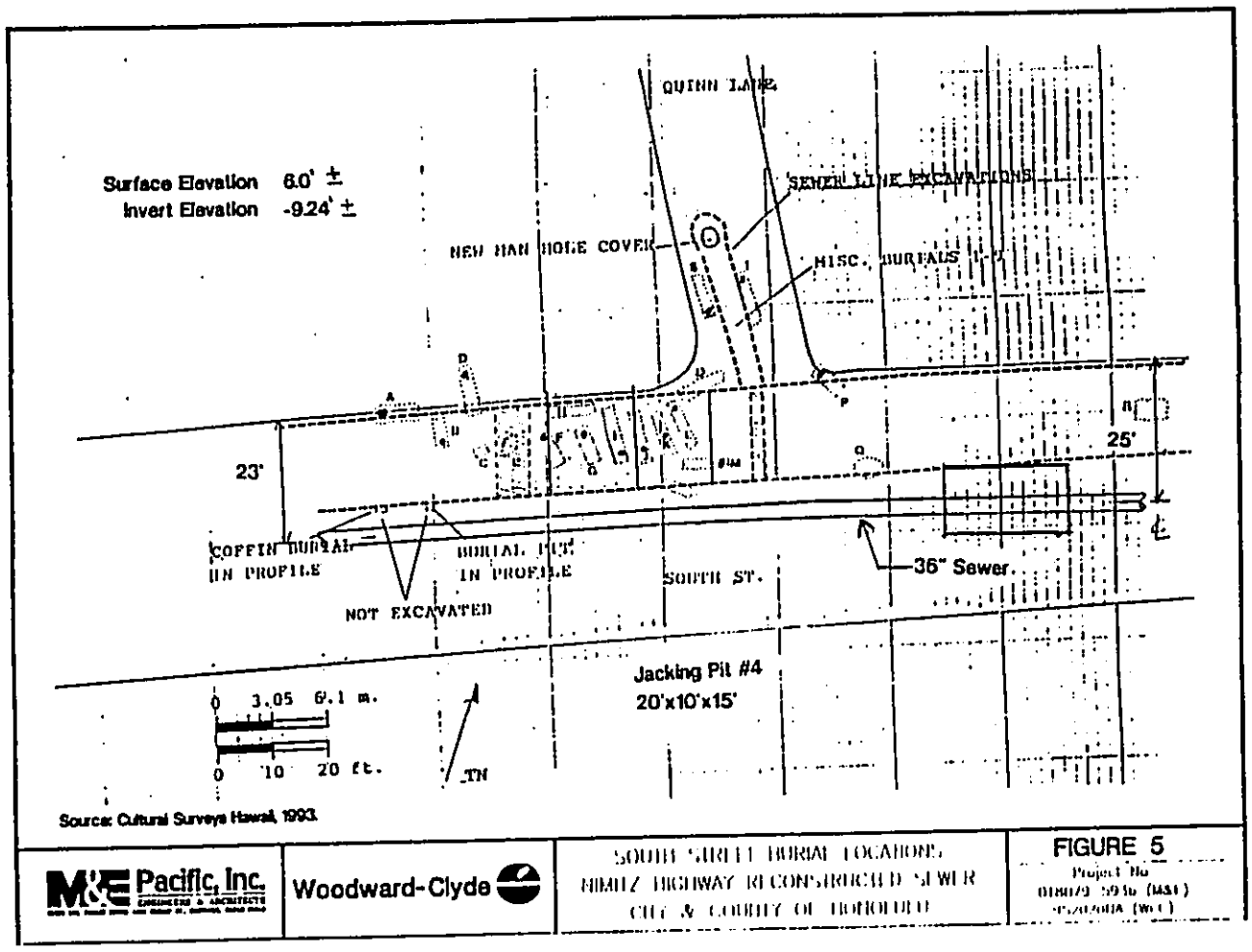
RC:jk



Source: Cultural Surveys Hawaii, 1993.

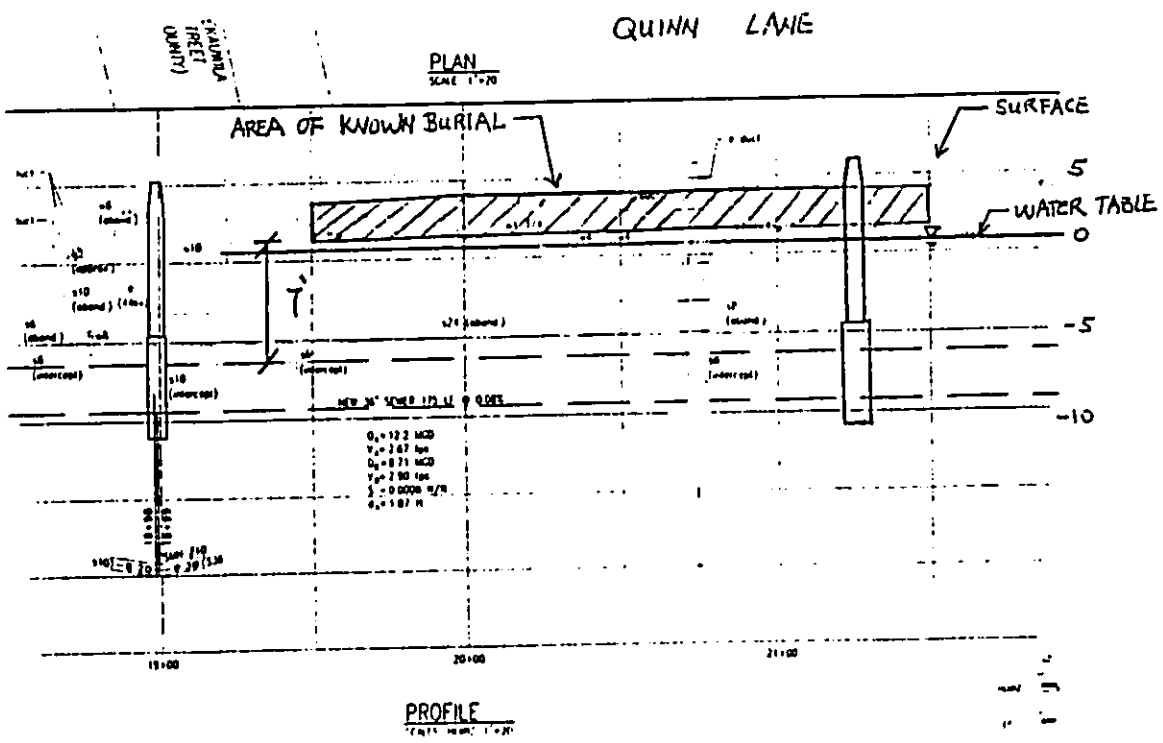
M&E Pacific, Inc. ENGINEERS & ARCHITECTS	Woodward-Clyde	QUEEN STREET BURIAL LOCATIONS NIMITZ HIGHWAY RECONSTRUCTED SEWER CITY & COUNTY OF HONOLULU	FIGURE 4 Project No. 01B079-5936 (M&E) 95Z0201A (WCC)





Source: Cultural Surveys Hawaii, 1993.

M&E Pacific, Inc.	Woodward-Clyde	SOUTH STREET BURIAL LOCATIONS NIMITZ HIGHWAY RECONSTRUCTED SEWER CITY & COUNTY OF HONOLULU	FIGURE 5 Project No [illegible]



BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

LAWRENCE MIKE
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P O BOX 3378
HONOLULU HAWAII 96801

In reply, please refer to

July 8, 1997 97-134/epo

Mr. Bruce D. Wade
M & E Pacific, Inc.
Suite 500, Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813-3497

Attention: Mr. Robin Matsunaga

Dear Mr. Wade:

Subject: Draft Environmental Assessment (DEA)
Nimitz Highway Reconstructed Sewer
Honolulu, Hawaii

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer:

Noise Concerns

1. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the maximum permissible sound levels specified in Chapter 11-46, Hawaii Administrative Rules, "Community Noise Control."

2. Section 8.0 (page 13) of the Draft Environmental Assessment incorrectly states that a noise variance can be obtained from the Department of Health's Clean Air Branch. Noise variances and community noise permits are issued by the Noise, Radiation and Indoor Air Quality Branch.

3. Traffic noise from heavy vehicles travelling to and from the construction site should be minimized near existing residential areas and must comply with the provisions of Chapter 11-42, Hawaii Administrative Rules, "Vehicular Noise Control for Oahu.

Should there be any questions on this matter, please contact Mr. Jerry Y. Haruno, Environmental Health Program Manager of the Noise, Radiation & Indoor Air Quality Branch.

RECEIVED JUL 14 1997

Air Quality Concerns

Proposed actions affecting air quality, in the form of fugitive dust, includes excavation, sheet piling, and other construction activities. There is a significant potential for fugitive dust to be generated during the removal of debris and during construction activities that would impact residential and business establishments and adjacent thoroughfares. It is suggested that a dust control management plan be developed which identifies and addresses activities that have a significant potential for fugitive dust to be generated. Implementation of adequate dust control measures during all phases of the project is warranted.

Construction activities must comply with provisions of Chapter 11-60.1, Hawaii Administrative Rules, section 11-60.1-33 on Fugitive Dust. The contractor should provide adequate means to control dust from road areas and during the various phases of construction activities. These means include, but not limited to:

a. planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing material transfer points and on-site vehicular traffic routes, and locating potentially dusty equipment in areas of the least impact;
b. providing an adequate water source at the site prior to start-up of construction activities; and

c. providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities.

If you have any questions regarding fugitive dust, please contact Mr. Calen Miyahara of the Clean Air Branch at 586-4200.

Sincerely,

Bruce S. Anderson, Ph.D.
Deputy Director for Environmental Health

c: NR&IAQB
CAB

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Dr. Bruce S. Anderson, Deputy Director
Environmental Health, Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Anderson

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Draft Environmental Assessment (EA)

Thank you for your comments on the subject draft EA. We have the following responses to your letter dated July 8, 1997 (97-134/epo).

Noise Concerns

1. The EA will be amended to reflect that a noise permit will be required comply with Chapter 11-46, Hawaii Administrative Rules, "Community Noise Control." In addition, the city has submitted a noise variance application to the DOH's Noise, Radiation and Indoor Air Quality Branch for approval. The noise permit and variance will also be included in the construction contract specifications.

2. We apologize for the mistake and will correct the sentence to read "A noise variance can be obtained from the Department of Health's Noise, Radiation and Indoor Air Quality Branch."

3. The construction document will specify that the contractor must comply with the provisions of Chapter 11-42, Hawaii Administrative Rules, "Vehicular Noise Control for Oahu". The construction activities will be monitored by construction management personnel and DOH inspector. Violations to permit and variance requirements would potentially result in shutdown. Each building manager will be able to contact the contractor representative and/or city official in case residents want to make a complain about noise.

Air Quality Concerns

We concur that the proposed activities could affect the air quality in the vicinity of the work area. Fugitive dust generated from excavation and sheet piling, however, is not expected to be significant since the soils in the general area have high moisture content. The depth to water table along the entire route is very shallow. Due to capillary action in the fines and clays, the soils are saturated at 2 to 3 feet below the ground surface. The contractor will be working with soils of high moisture content.

Suite 500 Pauahi Tower
1001 Bishop Street Honolulu HI 96813
808 521-3051 FAX 808 521-0236

The contractor will be required to comply with provisions of Chapter 11-60.1, Hawaii Administrative Rules, Section 11-60.1-33 on fugitive dust and use best management practices (BMPs) such as frequent wetting down of loose soil areas with water, and covering of dirt-hauling trucks. For this particular project, the excavated soil will be stockpiled in a temporary location away from the job site since permanent on street lane closure is not allowed. The temporary stockpile will be wetted down with water and covered to reduce dust generation. During backfilling, contractor shall keep the native clay and the select borrow moist to minimize fugitive dust.

With the preceding amendments, we trust that you will concur with the proposing agency, City and County of Honolulu Department of Wastewater Management, that this project will not have significant environmental effects and support its issuance of a Negative Declaration (ND). Notice of availability of the final EA will be published in the August 28, 1997 OEQC Bulletin. If you have any questions or wish to discuss these issues further, please call me at (808) 521-3051.

Sincerely yours,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, CCH

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

GARY GILL
DIRECTOR

July 8, 1997

The Honorable Kenneth E. Sprague
City and County of Honolulu
Department of Wastewater Management
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Sprague:

We submit for your response the following comments on a draft environmental assessment ("DEA") for the "Nimitz Highway Reconstructed Sewer." The DEA was submitted to our office by way of your May 28, 1997, letter. Initial notice of availability of this DEA was published in the June 8, 1997, edition of the *Environmental Notice*.

1. CULTURAL, ARCHAEOLOGICAL OR HISTORIC SITES

The DEA discusses previously encountered burial sites on Queen Street near Kawaiaha'o Cemetery and near South Street at Quinn Lane (Honuakaha Small Pox Cemetery). Maps were provided showing the locations of burials.

The project's proximity to documented existing historic burials will likely involve an irrevocable commitment to loss or destruction of a cultural resource (a significant effect under Section 11-200-12, Hawai'i Administrative Rules). We are unable to find discussion in Section 6.0 of the DEA of IMPACTS to these historic burial sites. We understand that certain MITIGATION MEASURES such as a Programmatic Agreement, including a background study, burial treatment plan, and archaeological documentation plan, will be developed to handle the impacts of the project.

Please consult with the O'ahu Island Burial Council and the Office of Hawaiian Affairs on potential impacts this project may have on these sites, and include in the final environmental assessment a discussion of impacts (direct, indirect and cumulative) to the historic burial sites along with a specific plan of mitigation based on the discussed

impacts. After reviewing the full impacts of the project, please evaluate whether the project may involve an irrevocable commitment to loss or destruction of a cultural resource and determine whether a full EIS should be prepared.

2. HISTORIC ALA MOANA PUMP STATION

A jacking pit of approximately 20 feet in diameter and 15 feet in depth will be positioned 15 feet away from the original Ala Moana Pump Station (listed on the Hawaii and National Register of Historic Places). In addition, a control room, settling tanks, pipes and heavy equipment will be stationed and operated in the vicinity of the jacking pit. Please describe the mitigation measures that will be taken to avoid damaging the historic building.

Please include a copy of this letter and your response (along with copies of all timely-received comment letters and your responses) in the final environmental assessment for this project. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist, at 586-4185. Thank you.

Sincerely,

GARY GILL
Director

c: Mr. Andy Huang, M&E Pacific, Inc.
Mr. Glenn Okita, DWWM

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Mr. Gary Gill, Director
Office of Environmental Quality Control
State of Hawaii
236 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Gill

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Draft Environmental Assessment (EA)

Thank you for reviewing the subject DEA. We acknowledge your concern about the potential adverse impacts on the burial sites near Kawaiaha'o Cemetery and Honoakaha Smallpox Cemetary. You also requested information on mitigation measures that will be taken to avoid damaging the historic Ala Moana Pump Station.

A new subsection 6 5, Archaeological Resources, will be added to Section 6.0, Impacts, to clarify that no irrevocable commitment to loss or destruction of a cultural resource is expected due to the proposed project. Although the sewerline alignment is in the proximity of the subject burial sites, the proposed unique means of construction should result in no contact with any known or unknown resources. An archaeological monitoring plan and burial plan has been developed and already submitted to the State Historic Preservation Division (SHPD) of the Department of Land & Natural Resources as part of the Programmatic Agreement referenced in your letter. The monitoring plan report has concluded that the proposed design will not impact any burials. SHPD has accepted the monitoring plan report (see enclosed letter). SHPD review of the burial plan is still pending The Office of Hawaiian Affairs is being notified concurrently

The specific new subsection will explain the technical rationale for no expected impacts to burials or cultural resources The ground level in the vicinity of Honuakaha and Kawaiahao cemetaries are approximately +6 and +7 feet above mean sea level (MSL). At high tide, the water level would be expected to reach about +1 foot MSL. Section 4.8 will be modified to include information from monitoring plan report that identifies that most of the burials are between 3 to 4 feet below the ground surface, or about 3 feet above MSL. This is logical, since burials would not be interred under water. The current design in progress places the top of the sewer pipe at 6 feet below MSL, or about 12 to 13 feet below the ground surface, much deeper than the conservative early estimate used in the archaeological report. Therefore, the top of the sewer pipe should be more than 8 feet deeper than any burial. There should be no chance of encountering any burials with horizontal tunneling 6 feet under water. Additionally, the proposed

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design also maintains horizontal separation between the sewerline and the known limits of the recorded burials at both Honokahua and Kawaiahao cemetaries.

The only possibility for potentially encountering any cultural resources during construction could occur during vertical excavations. Unlike conventional open trech construction, excavations for tunneling pits are relatively small, few, and far in between. We are very conscious of cultural concerns and have moved the tunneling pits as far from the Honuakaha and Kawaihao cemetary sites as is possible. There are no known archaeological resources located near any tunneling pit. The proposed method of horizontal tunneling will have less impact than conventional open trench construction techniques because it would avoid contact with both known and unknown burial zones. Therefore, the proposed method of construction in itself is a means of mitigation.

Additionally, as noted in the archaeological monitoring plan, all excavations with the exception of the known area of fill on Nimitz Highway between Maunakea and Nuuanu will be monitored by an archaeologist. Extra care will be taken at any excavation in the surrounding vicinity of the Honuakaha and Kawaiahao cemetaries. The archaeologist will have the authority to stop construction if any archaeological resources are found. The terms of the monitoring plan and the burial plan will be incorporated into the construction contract specifications.

Section 4.8 will be modified to reflect subsequent design modifications that relocate the jacking pit from its original location next to the Ala Moana Pump Station onto Nimitz Highway. This measure is expected to minimize the potential for any impact to this historic resource site.

With the preceding amendments, we trust that you will concur with the proposing agency, City and County of Honolulu Department of Wastewater Management, that this project will not have significant environmental effects and support its issuance of a Negative Declaration (ND). Notice of availability of the final EA will be published in the August 28, 1997 OEQC Bulletin. If you have any questions or wish to discuss these issues further, please call me at (808) 521-3051.

Sincerely yours,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, C&C

BENJAMIN J. CAYETANO
GOVERNOR

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
JERRY M. MATSUDA
GLENN M. OKIMOTO

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

IN REPLY REFER TO:

HWY-PS
2.5074

JUN 20 1997

Mr. Bruce D Wade
M & E Pacific, Inc.
Suite 500, Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wade,

Subject: Nimitz Highway Reconstructed Sewer
Draft Environmental Assessment

Thank you for your letter of June 4, 1997, transmitting the subject document for our review and comments.

We have the following comments:

1. Construction plans for all work to be done within the State highway right-of-way shall be submitted to the State Highways Division for review and approval. A permit for the construction activity will be required.

2. Existing accesses to our Harbor facilities (pier terminals, etc.) shall be kept open at all times during construction hours.

3. The contractor will be required to minimize adverse effects on the traffic flow on Nimitz Highway and Ala Moana Boulevard. The contractor should work during off-peak hours and consider working in the evenings or on the weekends.

4 This project should be coordinated with the Hawaii Community Development Authority's Kakaako Redevelopment project

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

RECEIVED JUN 23 '97

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida

SUBJECT: Nimitz Highway Reconstructed Sewer, Auahi Street to Hotel Street
Draft Environmental Assessment (EA)

Thank you for your comments on the subject draft EA. Our responses to your letter dated June 20, 1997 (HWY-PS 2.5074) are as follows.

1. We understand that all construction plans for work to be done within the State Highway right-of-way shall be submitted to the Highways Division for review and comment. Since the beginning of this project, we had submitted a 60% construction plans on May 28, 1997 and an advance traffic control only set of 80% plans on July 29, 1997 to the Highways Division for review. The DOT permitting requirement will be stated in the construction specifications which the contractor is obligated to meet.

2. Existing access to DOT Harbor Facilities will be kept open at all time during construction hours since all proposed work will be done on the EWA bound lanes.

3. The contractor will be required to keep all lanes open during peak hours and close no more than one lane during the day. Night time and weekend construction activities will be within the hours prescribed by the DOT, but may be further restricted by DOH noise variance.

4. We have been in consultation with the Hawaii Community Development Authority (HCDA) since the beginning of this project. HCDA has already reviewed the draft EA and the 60% construction plans

With the preceding amendments, we trust that you will concur with the proposing agency, City and County of Honolulu Department of Wastewater Management, that this project will not have significant environmental effects and support its issuance of a Negative Declaration (ND). Notice of availability of the final EA will be published in the August 23, 1997 OEQC Bulletin. If you have any questions or wish to discuss these issues further, please call me at (808) 521-3051.

Sincerely,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, CCH

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University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

July 8, 1997

EA: 00162

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To Andy Hwang	From Coll Environmental Ctr
Co MoE Pacific	Co
Dept	Phone # 956-3973
Fax # 545-7949	Fax # 956-3980

Mr. Gary Gill, Director
Office of Environmental Quality Control
235 S. Beretania, Room 702
Honolulu, Hawaii 96813

Dear Mr. Gill:

Draft Environmental Assessment
Nimitz Highway Reconstructed Sewer
(Auahi Street to Hotel Street)
Honolulu

Introduction

The proposed sewer reconstruction plan to which this Draft Environmental Assessment (Draft EA) relates consists of: (1) replacement of the existing sewers from Hotel Street to Fort Street via River Street and Nimitz Highway with a single trunk sewer; (2) rehabilitation of the existing sewer along Nimitz Highway, and Ala Moana Boulevard from Fort Street to Ala Moana WWPS; and (3) installation of a relief sewer from Fort Street to the Ala Moana Wastewater Pump Station (WWPS) via Queen Street, South Street and Ala Moana Boulevard.

Replacement involves installation of a new line and abandonment of the existing line, a process which may require downtime and diversion of sewage flow. Rehabilitation involves renovation of an existing sewer in order to improve its structural integrity, possibly by sliplining or coating the interior. Relief sewer installation involves construction of a new line *and* retaining existing lines to accommodate future flows.

We have been assisted in this review by Noel Ludwig, Environmental Center.

This Draft EA appears to address several of the basic concerns regarding this project. However, we suggest that certain areas need additional attention. In particular, the impacts of dewatering on offshore water turbidity, the impacts on traffic flow, and measures to reinforce existing sewer lines need additional consideration. These and other topics will be discussed in greater detail below.

In view of the nature of the proposed activities and their likely consequences, we suggest that the impacts of the proposed sewer reconstruction may, indeed, prove significant. Consequently, pursuant to Section 343-5(b), HRS, a draft EIS should be prepared for this project.

Dewatering

Although the document states that "[m]inimal dewatering is anticipated due to the nature of the proposed pipeline installation method" (p. 4), a statement which it claims is supported in Section 5.1, Section 5.1 does not even mention dewatering. The water table in this area is near the ground surface, approximately 5 feet below ground surface along Nimitz Highway (Kim & Associates, 1986, p. 4; Department of Transportation, 1996, p. 3-44). As a result, both ground subsidence and water disposal need to be considered.

While it seems reasonable that pumping needs will be reduced by the proposed microtunneling method, this should be elucidated in the relevant section. Does the tunnel need to be dewatered as well? What are the possible impacts on buildings and other infrastructure surrounding the jacking pits? Would pumping utilize a simple sump pump or would well-point systems within the jacking pits be necessary (Department of Transportation, 1996, p. 4-84)? A structural survey of nearby buildings may be necessary both before and after dewatering operations. In addition, during the dewatering process a monitoring program should be undertaken which includes such equipment as inclinometers to measure subsidence nearby (Department of Transportation, 1996, p. 4-84).

Water removed from the excavations must be either returned to the ground water system or added to the storm water drainage system. This water would contain suspended sediment which could adversely affect receiving surface water bodies by increasing their turbidity and sedimentation rates (Department of Transportation, 1996, p. 4-43). While the Draft EA makes note of the Construction Dewatering Permit(s) required (pp. 4 and 13), it does not mention how the project plans to meet the requirements of these permits. Since discharge must meet water quality standards, the water would need to be filtered or allowed to settle in order to remove sediment before discharge (Department of Transportation, 1996, p. 4-83). The Draft EA also does not mention how groundwater will be disposed of if it is found to be contaminated with BTEX or other pollutants.

In addition, there should be some discussion of the history of microtunneling in the Honolulu area. Has it worked well? What, if any, are its drawbacks? Are there ways to avoid subsurface structures which do not appear or have been mislocated on current maps?

Traffic

As the Draft EA points out, the state Department of Transportation prohibits lane closures on Nimitz Highway during peak hours, which will severely curtail work activities during these hours. However, it seems unlikely that all lanes can be totally reopened if equipment remains in the jacking pits and dewatering is ongoing. This should be discussed in much greater detail in the document. The overall effects on the traffic flow for both peak and off-peak periods should be made clear. Specific traffic control plans which must be followed should be named (see Kim & Associates, 1986, p. 11), and measures to comply with these plans should be discussed in greater detail.

Existing Sewer Lines

The Draft EA notes in passing that "the existing lines which may be structurally inadequate will eventually collapse, with serious risk to life and/or property" (p. 11). However, the document does not explain how this will be prevented by the proposed project. Indeed, at least part of the existing sewer line will remain in use after the new sewer line becomes active. The report should discuss whether it will be necessary to fill in any of the existing line for safety reasons.

In addition, there should be more detail regarding the material to be used for the pipes themselves (e.g., cement vs. iron) and for the lining material (e.g., PVC vs. polyethylene). If the rehabilitated pipes are also proposed to be lined, as they apparently are (p. 1), both the type of lining and the degree to which this lining will improve their structural integrity should be explained.

On page 1, the Draft EA claims that the existing sewage collection system "was constructed in the early 1900s." Although most of the lines were constructed around 1917 (making them 80 rather than 100 years old), at least a portion of the line appears to be significantly younger. The sewer reconstruction project discussed in Kim & Associates (1986) covers a significant segment of the line which the proposed project seeks to replace (see Figure 1 of the 1986 document). The degree to which this more recent segment is in need of replacement should be addressed.

We appreciate the opportunity to review this Draft EA. Again, there is a strong likelihood that the aforementioned effects will be significant. Hence, a Finding of No Significant Impact is unwarranted, and a draft Environmental Impact Statement should be prepared.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: Glen Okita, City & County of Honolulu Department of Wastewater Management
Andy Huang, M&E Pacific, Inc.
Roger Fujioka, Water Resources Research Center, University of Hawaii
Noel Ludwig

References

Calvin Kim & Associates, Inc., 1986. Notice of Negative Declaration for Nimitz Highway Reconstructed Sewer (Fort Street Mall to Alakea Street). Honolulu, HI.

US Department of Transportation, Federal Highway Administration, in conjunction with State of Hawaii Department of Transportation, 1996. Nimitz Highway Improvements from Keehi Interchange to Pier 16 (Awa Street): Draft Supplemental Environmental Impact Statement. Honolulu, HI.

M&E Pacific, Inc.
A Metcalf & Eddy Company

"REVISED"

August 5, 1997

Dr. John T. Harrison, Environmental Coordinator
University of Hawaii Environmental Center
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Dr. Harrison

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Environmental Assessment (EA)

Thank you for reviewing the subject draft EA. Your comments will help improve the quality of the document. Based on your letter, we perceive that many of the technical issues were not clearly explained in the draft EA. We agree that an EIS would be appropriate if the potential of significant potential adverse impacts or their mitigation measures require further investigation We feel that the potential concerns that you identified are either undue or can be mitigated, but need further clarification in certain areas of the EA document as you have suggested. By adding the following clarifications to the draft EA in response to your comments, we trust that you will concur that an EIS is not needed for this project.

- **Dewatering**

  Section 5.1 states--"The microtunneling system has a built-in earth pressure balancing feature to prevent any ground subsidence or disturbance during tunneling operations " The preceding reference is the rationale for the statement on page 4 as to why there should be minimal dewatering required. Subsidence and water disposal were considered and this method of construction was specifically selected so that subsidence would not occur and dewatering would not be created by the tunneling operation We will clarify in Section 5.1 how the lack of any volumetric displacement due to earth pressure balanced tunneling should result in no dewatering from the tunneling itself, nor cause any ground subsidence or heave.

  Most dewatering discharges are expected to be necessary only during the initial phase of pit construction. Since the pits are located near the proximity of the shoreline, the use of area-wide dewatering through well points is impracticable. If area-wide dewatering was feasible, it would also caused ground and building foundation subsidence as you had noted. The only practicable means of dewatering is hydraulic isolation of the pits from the surrounding

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groundwater, then limiting dewatering to only within the pit itself. The hydraulic isolation of the pits can be accomplished by the Contractor at his choice in many ways. The bottoms of pits constructed with interlocking sheetpile sidewalls could be sealed with mudsills of hydraulic grout. In areas of engineered ground where sheetpiles are not necessary, any sand seams in excavated pit walls due to irregularities in the soil-grout could also be sealed with hydraulic grout. After the pits are hydraulically isolated from the surrounding groundwater, primarily the initial volume of water remaining within the pit needs to be pumped out. Only a small amount of seepage water that one may prudently expect to chronically leak into the pit would need to be pumped out on a continual basis. Such methods of dewatering should have negligible impacts on the water table and ground subsidence. The NPDES dewatering permit will have flow discharge limitations that will require implementation of the preceding means of dewatering. The preceding means of dewatering will also be recommended in the contract specifications. We concur that as an additional precaution, inclinometers will be provided throughout the entire sewer line alignment by inclusion in the construction contract specifications to monitor subsidence. We will clarify Section 4.6 of the EA to describe that the physical setting and dewatering permit limitations will require implementation of the preceding dewatering methods that result in minimal flow quantities and mitigation through ground level monitoring.

We also concur that water removed from the pits must be either returned to the ground or discharged to the storm drain system after proper treatment in accordance with governing statutes and rules. The contract specifications will require compliance with the terms of a NPDES dewatering discharge permit that have been approved by the State of Hawaii Department of Health (DOH) as consistent with Hawaii Administrative Rules (HAR) Chapter 11-54, Water Quality Standards, and Chapter 11-55, Water Pollution Control. As part of the compliance process, the baseline groundwater sampling will be conducted along the chosen alignment to identify potential contaminants which may be encountered for proper planning. Prior to disposal, the contractor will be required to implement best management practices (BMP) for treatment and submit weekly monitoring test reports in accordance with Chapter 11-55. Typical BMPs previously approved by the DOH include the use of sedimentation tanks and filtration for physical constituents. If petroleum contamination is found, all free product is skimmed off the surface and oil/water separators are used to remove the remaining miscible oils. Granular activated carbon (GAC) could be used to remove any dissolved organics or other contaminants. If the preceding methods cannot lower the levels of the contaminants to the levels allowed in the HAR for stormwater discharge, it will either be returned to the ground if permitted by the DOH or shiped to authorized vendors for treatment and disposal. Section 4.6 of the EA will be modified to describe typical BMPs and alternatives to drainage discharge.

Exclusive of work at Honolulu International Airport, the proposed project would be the third microtunneling project in Honolulu. The only project within the center of metropolitan Honolulu that has been fully completed is the Nimitz Highway Relief Sewer, immediately adjacent to the west of the proposed project. That project microtunnelled 3,000 linear feet of 54 inch sewer pipe through similar varying soil conditions that also required engineered grouted soils in areas of soft ground. Because of the decreased traffic, noise, dewatering, and other adverse impacts typical of conventional open trench construction, that project achieved national recognition and was awarded top honors from the 1996 Consulting Engineers Council of Hawaii for engineering excellence. The City & County of Honolulu also saved nearly 4.0 million dollars by value engineering the use of microtunneling versus conventional open trench construction. The contractor, consulting engineers, or the Department of Wastewater Management (DWWM) have not identified any drawbacks of microtunneling versus conventional open trench construction. The DWWM exclusively selected microtunneling as the construction technique for this project because it is inherently less disruptive and consequently has less adverse impacts compared to conventional open trench construction techniques.

We concur that existing plan records are expected to have some inaccuracies or missing information. To minimize potential construction difficulties, thorough research was conducted at government agency and utility archives for subsurface obstructions. After the initial sewer alignment design, the drawings are reviewed by government agencies and utilities to reverify record drawing information. In areas where the existing utilities per record drawings are relatively close to the proposed sewer, it is prudent to conduct prior subsurface field excavations to verify the actual horizontal and vertical coordinate locations. This has already been done for this specific project. The locations of existing utilities and other subsurface obstructions are then adjusted on the design drawings in accordance with field data from subsurface investigations.

- **Traffic**

The interruption of work in this roadway project is not unique and is no different than any other of the many roadway excavation projects on Nimitz Highway that have been approved in the past by the State of Hawaii Department of Transportation (DOT). Immediately prior to the stipulated peak period, metal plates of suitable bearing strength are placed over the excavation, a smooth riding connection is provided at the edge of the plates, all equipment and materials are removed from the roadway and all temporary traffic control devices are removed. Since the DOT bans the placement of any objects on trafficked surfaces, one possible method could have all hoses, pipes, and cables leading to the equipment and

dewatering pumps in the excavations could typically be already buried in shallow trenches also covered by metal plates in the roadway that extend from the pit to the edge of the road. Excluding continuously functioning devices such as the dewatering pumps quick-disconnect cables & hoses could be employed. Equipment is commonly left in excavations during brief peak traffic period interruptions.

The proposed activity will have no effect during peak periods as all lanes will be opened as normal. In recognition of the high traffic volume on this critical thoroughfare, DOT has limited lane closures during other non-peak daylight hours to one lane only as a mitigation measure. This is a contract specification that must be followed. Any excavations that extend beyond one lane during this time period must be constructed sequentially to comply with this restriction. Thorough and detail traffic control plans prepared in accordance with the stipulated traffic control guidelines will be required by the DOT prior to issuance of a permit for work within the state right of way. Adequate signage to warn all drivers and pedestrians in advance is strictly required by the DOT as part of traffic control requirements. Vehicular and pedestrian access, private rights-of-way and driveways, and access to private properties will be maintained or provided with satisfactory alternatives at all times. The DOT is responsible for monitoring of compliance. Section 6.4 of the EA will be modified to clarify the maintenance of access, list the names of traffic control guidelines, compliance measures via inclusion in the construction contract specifications, and the additional mitigation measure of limiting lane closures during non-peak daytime work to only one lane.

- **Existing Sewer Lines**

The last sentence of Section 7.1 in the EA is erroneous, inaccurate, misleading, and requires correction. The statement was intended to state that some of the large, built-in-place brick manholes were collapsing inward. Large quantities of bricks are continuously spalling off and are being removed from downstream manholes by DWWM maintenance crews. Since these large manhole volumes extend right up to the surface, this could lead to an eventual collapse of the manhole and create a life safety hazard. Existing manholes that will either be rehabilitated to have adequate structural integrity, completely replaced, or abandoned. The common practice of backfilling all abandoned manholes will be a contract specification.

Conversely, the existing pipelines that are intended to remain in service or that could be abandoned in the future do not pose any potential hazard for collapse. The wall thicknesses of the existing pipelines were designed to have adequate strength for the given conduit size, depth of burial, and surface loads. Gaseous hydrogen sulfide and water vapor has etched portions of the surface. As the line is submerged below the water table, infiltration is occuring

at some of the pipe joints and a few isolated cracks. These conditions were observed via remote television cameras. If the sewer is rehabilitated, the liner will stop all corrosion and infiltration while providing additional strength to the conduit. If the sewer is abandoned, the line will eventually become filled with groundwater, which would eliminate the continuation of sulfide corrosion when the pipe is fully immersed. Particularly since the active pressure of the external saturated soil is counterbalanced by water inside the abandoned pipe and that the pipe still currently retains most of its original strength, the abandoned pipe should not pose any structural integrity concerns. This is a commonplace practice for pipes that are not near (i.e., less than 3 feet or one pipe diameter) the surface.

The only reason that all of the existing lines were not rehabilitated is that existing manholes in the segment slated for replacement have settled differentially and pulled down the existing pipes unevenly. This has resulted in a disruption of the consistent pipe slope and created inverted siphons. Solids from sewage that is trapped in these low spots settle out. This accumulated sludge must be cleaned out or it will decrease the hydraulic capacity below the original design.

The existing interceptor sewer is reinforced concrete pipe (RCP), the smaller trunk lines that connect to it are vitrified clay pipe (VCP), and the individual building laterals may be either VCP or cast iron. The two most common methods used for pipe rehabilitation are: the insertion of a flexible high density polyethylene (HDPE) liner pipe and the injection of concrete grout in the annular space between the liner and the original pipe; and a cured-in-place fiberglass pipe (CIPP) that is hydraulically pressurized to be flush to the existing pipe (or it can bridge any voids), then thermally cured to rigid form. Each provides corrosion resistance and provides some additional structural reinforcement to the original carrier pipe. The manholes will be lined with a reinforced cementitious grout to repair any voids and provide some structural integrity, then coated with epoxy for corrosion resistance.

DWWM records indicate that each of the manholes along the route to be rehabilitated were constructed precisely in the year 1900. "Early 1900s" was used in the text to account for any potential portions of the system built later that could subsequently be added to the specific scope of the project. Based on the data that we have, this statement is correct. Whether the age of the system is 1900 or 1917, however, the point of this section is that the sewer system is old and has outlasted its design life, particularly for warm climates with brackish water infiltration where sulfide corrosion is a major problem. The Nimitz Highway Reconstructed Sewer (Fort Street Mall to Alakea Street) project discussed in the 1986 Kim and Associates negative declaration was never constructed. The need for its replacement is even more pressing now and would be resolved through the implementation of this currently proposed project.

In summary, the EA will be clarified or modified per your input as follows:

- Section 1.2 will add justification for replacement of a portion of the existing sewer lines due to differential settlement.
- Section 3.0 will refer to still pending sewer replacement needs that were previously identified in an approved 1986 Negative Declaration;
- Section 4.6 will describe typical dewatering treatment BMPs and alternative means of disposal for dewatering discharges;
- Section 5.1 will clarify that the tunneling method does not displace ground nor water, nor will it cause ground subsidence or additional dewatering discharges. Section 5.1 will also add descriptions on pipe rehabilitation liner materials;
- Section 6.4 will clarify the maintenance of traffic and pedestrian access, traffic control plan references, and traffic mitigation measures; &
- Section 7.1 will correct the erroneous statement that does not correctly identify the anticipated hazards of manhole collapse in the no action alternative.

With the preceding amendments, we trust that you will concur with the proposing agency, City and County of Honolulu Department of Wastewater Management, that this project will not have significant environmental effects and support its issuance of a Negative Declaration (ND). Notice of availability of the final EA will be published in the August 28, 1997 OEQC Bulletin. If you have any questions or wish to discuss these issues further, please call me at (808) 521-3051.

Sincerely,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, C&C

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET SUITE H425
HONOLULU, HAWAII 96819-1880

JEREMY HARRIS
MAYOR

ANTHONY J. LOPEZ, JR.
FIRE CHIEF

ATTILIO K. LEONARDI
FIRE DEPUTY CHIEF

July 10, 1997

Mr. Robin Matsunaga, P.E.
Project Manager
M & E Pacific, Inc.
Suite 500 Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Matsunaga:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
NIMITZ HIGHWAY RECONSTRUCTED SEWER
(AUAHI STREET TO HOTEL STREET)
TMK: 1-7-02, 03 and 2-1-02, 13, 14, 15, 16, 25, 27, 29, 30, 31, 32

We have reviewed the subject material provided and foresee no adverse impact in Fire Department facilities or services. Fire protection services provided from the Kakaako and Central engine companies with ladder service from Kakaako are adequate.

Access for fire apparatus, water supply and building construction shall be in conformance to existing codes and standards.

Should you have any questions, please call Acting Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

Sincerely,

ANTHONY J. LOPEZ, JR.
Fire Chief

AJL/MPN:ay

RECEIVED JUL 15 '97

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Mr. Anthony J. Lopez, Fire Chief
Fire Department
City and County of Honolulu
3375 Koapaka Street, Suite H425
Honolulu, Hawaii 96819

Attention: Mr. Arthur Ugalde

Dear Mr. Lopez

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Environmental Assessment (EA)

Thank you for reviewing the subject draft EA. We understand that the Fire Department foresees no adverse impact from this project. We concur and will require the contractor to conform with existing codes and standards on access for fire apparatus, water supply and building construction.

The City and County of Honolulu Department of Wastewater Management (proposing agency) has determined that the implementation of this project will not have significant environmental effects. Therefore, the agency will be issuing a Negative Declaration (ND). If you have any questions or want to discuss these matters further, please call me at (808) 521-3051.

Sincerely,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, CCH

Suite 500 Pauahi Tower
1001 Bishop Street, Honolulu, HI 96813
808-521-3051 FAX 808-524-7256

PLANNING DEPARTMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET 8TH FLOOR • HONOLULU HAWAII 96813-3017
PHONE (808) 523-4711 • FAX (808) 523-4730

JEREMY HARRIS
MAYOR

PATRICK T. ONISHI
CHIEF PLANNING OFFICER

DONA L. HANAIKE
DEPUTY CHIEF PLANNING OFFICER

GW 6/97-1226

June 26, 1997

Mr. Robin Matsunaga
M&E Pacific, Inc.
Suite 500 Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Matsunaga:

Nimitz Highway Reconstructed Sewer
Draft Environmental Assessment (DEA)

We have reviewed the subject DEA and offer the following comments.

A. The proposed project consists of: (1) replacement of the existing sewers from Hotel Street to Fort Street via River Street and Nimitz Highway with a single trunk sewer; (2) installation of a relief sewer from Fort Street to the Ala Moana Wastewater Pump Station (WWPS) via Queen Street, South Street and Ala Moana Boulevard; and (3) rehabilitation of the existing sewer along Nimitz Highway and Ala Moana Boulevard from Fort Street to the Ala Moana WWPS.

B. The proposed project is in conformance with General Plan objectives and policies for full development of the Primary Urban Center (PUC).

C. A symbol for a publicly funded sewer system, within six years, is shown on the current Development Plan Public Facilities Map (DPPFM) for the PUC. The alignment of this symbol coincides with that of the replacement sewer portion of the proposed project, except for a one-block long divergence between the intersection of Queen Street and Nimitz Highway and the makai portion of Fort Street; because this divergence is minor and does not substantially change the project, the replacement sewer portion of the project is in conformance with provisions of the Development Plan for the PUC.

RECEIVED JUL 01 1997

D. Relief sewers are generally considered as major projects and, as such, require depiction on the DPPFM. The DPPFM for the PUC does not show a sewer system symbol for the relief sewer portion of the proposed project. Per the provisions of Section 24-1.2, ROH, amendment of the DPPFM for the PUC to show a publicly funded sewer system symbol for the relief sewer portion of this proposed project is required when construction and land acquisition funds are budgeted for this portion of the project. For your convenience, we have enclosed a PD Form 102 which the Department of Wastewater Management may use to apply for amendment of the DPPFM.

E. The rehabilitation portion of the proposed project is not considered a major project and is not required to be shown on the DPPFM.

F. A map of the tributary area of the project should be included in the Final EA and your application for the DPPFM amendment.

Should you have any questions, please call Gordon Wood of the Planning Department staff at 527-6073.

Yours very truly,

PATRICK T. ONISHI
Chief Planning Officer

PTO:lh

Enclosure

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Mr. Patrick T. Onishi, Chief Planning Officer
Planning Department
City and County of Honolulu
650 South King Street, 8th Floor
Honolulu, Hawaii 96813

Attention: Mr. Gordon Wood

Dear Mr. Onishi

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Environmental Assessment (EA)

Thank you for reviewing the subject draft EA. We acknowledge that the proposed project is in conformance with General Plan objectives and polices for full development of the Primary Urban Center (PUC). Since the Department of Wastewater Management (DWWM) has obtained the funding for this project, the amendment application to the development plan public facilities maps (DPPFM) is no longer required. However, the final relief sewer alignment will be submitted to your department for an update of the DPPFM. Please contact Glenn Okita of DWWM at 527-5829 for details. As requested, we will include a map of the tributary area of this project in the Final EA.

The City and County of Honolulu Department of Wastewater Management (proposing agency) has determined that the implementation of this project will not have significant environmental effects. Therefore, the agency will be issuing a Negative Declaration (ND). The final EA will be published in August 23, 1997 OEQC bulletin. If you have any questions or want to discuss these matters further, please call me at (808) 521-3051.

Sincerely,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, CCH

Suite 500 Pauahi Tower
1001 Bishop Street Honolulu HI 96813
808 521-3051 FAX 808 524-0246

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • 11TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4341 • FAX: (808) 527-5857

JEREMY HARRIS
MAYOR

JONATHAN K. SHIMADA, PhD
DIRECTOR AND CHIEF ENGINEER
ROLAND D. LIBBY, JR.
DEPUTY DIRECTOR

ENV 97-102

June 18, 1997

Mr. Bruce D. Wade
M&E Pacific, Inc.
Pauahi Tower, Suite 500
1001 Bishop Street
Honolulu, Hawaii 96813

Attention: Mr. Robin Matsunaga

Subject: Draft Environmental Assessment (DEA)
Nimitz Highway Reconstructed Sewer
TMK: Various

We have reviewed the subject DEA and have the following comments:

1. Please expand Section 4.6, Water Quality, as to what type of best management practices (BMPs) will be used at receiving pit/jacking pits for mitigation of pollutant discharge.

2. Describe methods to prevent collected/contained excavation material from discharging into the City drainage system.

If you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

for JONATHAN K. SHIMADA, PhD
Director and Chief Engineer

cc: DWWM (Glenn Okita)

RECEIVED JUN 23 1997

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Mr. Jonathan K. Shimada, Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Attention: Mr. Alex Ho

SUBJECT: Nimitz Highway Reconstructed Sewer, Auahi Street to Hotel Street
Environmental Assessment (EA)

Dear Mr. Shimada

Thank you for your comments on the subject draft EA. We have the following responses to your letter dated June 18, 1997 (ENV 97-102).

1. As suggested in your letter, we will expand Section 4.6, Water Quality, to describe the best management practices (BMPs) contractor would use for mitigation of pollutant discharge. Essentially, typical BMPs previously approved by the DOH include the use of sedimentation tanks and filtration for physical constituents. If petroleum contamination is found, all free product will be skimmed off the surface and oil/water separators will be used to remove the remaining miscible oils. Granular activated carbon (GAC) could be used to remove any dissolved organics or other contaminants. If the preceding methods cannot lower the levels of the contaminants to the levels allowed by state Department of Health (DOH), discharge will be returned to the ground if permitted by the DOH or shipped to authorized vendors for treatment and disposal.

2. The excavated material will be stockpiled off-site and later used as backfilling material. The material collected in the settling tanks will be placed on temporary drying beds for dewatering. The dried material will be stockpiled, sampled, tested, and potentially remediated prior to disposal.

The City and County of Honolulu Department of Wastewater Management (proposing agency) has determined that the implementation of this project will not have significant environmental effects. Therefore, the agency will be issuing a Negative Declaration (ND). If you have any questions or want to discuss these matters further, please call me at (808) 521-3051.

Sincerely yours,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, CCH

Suite 500 Pauahi Tower
1001 Bishop Street Honolulu HI 96813
808-521-3051 FAX 808 521-2246

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

July 7, 1997

TSP6/97-02819R

Mr. Robin Matsunaga
M&E Pacific, Inc.
Suite 500 Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Matsunaga:

Subject: Nimitz Highway Reconstructed Sewer

In response to the June 4, 1997 letter from Mr. Bruce Wade, the draft environmental assessment for the subject project was reviewed. This document includes a discussion of the traffic impacts of the proposed project. It should be noted that construction plans, along with traffic control plans, for all work within the City's right-of-way should be submitted to this department for review and approval as they become available.

Should you have any questions, please contact Faith Miyamoto of the Transportation System Planning Division at 527-6976.

Sincerely,

CHERYL D. SOON
Director

RECEIVED JUL 09 '97

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Attention: Ms. Faith Miyamoto

Dear Ms. Soon

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Environmental Assessment (EA)

Thank you for reviewing the subject draft EA. In addition to the draft EA, we had submitted, since the beginning of this project, 60% construction plans along with traffic control plans and 80% advance traffic control plans to your department for review. We will send the 100% plans to you as soon as they become available. We understand that your final approval of the plans will be required for the proposed work.

The City and County of Honolulu Department of Wastewater Management (proposing agency) has determined that the implementation of this project will not have significant environmental effects. Therefore, the agency will be issuing a Negative Declaration (ND). If you have any questions or want to discuss these matters further, please call me at (808) 521-3051.

Sincerely,

Robin Matsunaga, P.E.
Project Manager

cc: Glenn Okita - DWWM, CCH

Suite 500 Pauahi Tower
1001 Bishop Street Honolulu, HI 96813
808-521-3051 FAX 808 521-3049

RECEIVED JUL 1 1997

June 30, 1997

M&E Pacific, Inc.
Suite 500 Pauahi Tower
1001 Bishop Street
Honolulu, Hawai'i 96813

Department of Wastewater Management
City and County of Honolulu
650 South King Street
Honolulu, Hawai'i 96813
Attn: Kenneth R. Sprague, Director

Re: Nimitz Highway Reconstructed Sewer

Gentlemen:

I am writing on behalf of the Association of Apartment Owners of Harbor Square in response to the Draft Environmental Assessment dated May 28, 1997. We have several concerns:

NOISE

Any proposal that involves nighttime construction activity and resulting noise in the vicinity of Harbor Square at 700 Richards Street and 225 Queen Street in Downtown Honolulu is of grave concern to us. Harbor Square is a mixed used condominium including 360 residential apartments. Our property is zoned for residential use and our residents are entitled to the quiet of the night.

The draft report glosses over Harbor Square with comments suggesting that the area is filled with financial and government buildings "rather empty on weekends" and "open on weekdays only." With 360 residential apartments, Harbor Square is a very large exception to this generalization. And there are other residential complexes on Queen Street between Bethel and South Streets.

We are familiar with the problem of downtown traffic and do not wish to complicate it unnecessarily. But we strenuously object to any plans for nighttime work,

with its attendant back-up bells, generators, heavy equipment noise and other disruptions. The echo off surrounding highrise towers tends to amplify noise and expand the circumference of our concern. Generally speaking, any construction activity on Queen Street between Bethel and Punchbowl Streets should respect nighttime restrictions.

EXISTING LINES

We also are concerned about the nature of the proposed construction. Historically, Queen Street was the shore road. Historians say portions of it sometimes were awash at high tide. We understand that much of the Queen Street area is fill. The proposed micro-tunneling may assume a consistency of soils conditions that does not exist.

Construction affecting other Downtown streets has revealed a welter of old lines, pipes and conduits still in use but not mapped or accurately platted. We are concerned that broken utility lines may result from blind boring through uncertain soils.

ACCESS AND TRAFFIC

Finally, we question the chosen alignment. Queen Street is a narrow thoroughfare, a major bus route, heavily travelled by commercial vehicles, tour buses and passenger cars. Because of the pattern of one way streets, there is no effective parallel street in the downtown area. As it is, any activity in existing underground conduits causes major disruptions or diversions along the length of Queen Street. Unlike Ala Moana, which has the width to absorb construction and remain open, Queen barely accommodates its existing lanes. Buses and large trucks cannot navigate turns at its corners if lanes are constricted. Queen is also a major route for the Kakaako and Beretania Fire Stations and the sole access to our public garage entry on Richards Street.

Against this, it seems inappropriate that Queen Street be considered for the construction of a new sewer line. Initial installation and future repairs will be far more disruptive than it the line were placed along the wider Ala Moana corridor.

If construction along the length of Ala Moana is unacceptable, Halekauwila Street is far less congested than Queen Street. In our vicinity, it serves as an off-ramp from

Ala Moana and an exit from Richards Street. Beyond Punchbowl Street, it is a secondary road, paralleled by Queen and Pohukaina Streets.

Please reconsider the findings and recommendations of the draft report, taking into account both the residential character of Harbor Square and the practical importance of keeping Queen Street open to traffic.

Sincerely,

Robert Bruce Graham, Jr.
President, AOAO Harbor Square

M&E Pacific, Inc.
A Metcalf & Eddy Company

August 4, 1997

Mr. Robert Bruce Graham, Jr, President
AOAO Harbor Square
700 Richards Street
Honolulu, HI 96813

Dear Mr. Graham

SUBJECT: Nimitz Highway Reconstructed Sewer
Auahi Street to Hotel Street
Environmental Assessment (EA)

Thank you for your review of the subject draft EA. We acknowledge your concerns about the potential impacts on ambient noise level, the potential for utility interruption, and potential traffic impacts in the general project area near Harbor Square. Our responses are as follows.

- **Noise**

We acknowledge that there is a significant downtown residential population and your concern that night time work could adversely impact the well-being of its residents. We recognize the significant residential population and had made the point of mailing individual copies of this draft EA to each residential complex for the specific purpose of garnering your input. The generalization describing the bulk of the buildings in our civic center will be amended to reflect our oversight of excluding the significant residential presence in this neighborhood.

We assure you that the conditional proposal for night time work is intended to lessen the overall total impact to the residents through the allowance of strictly limited noise levels utilizing best management practices in exchange for a much shorter duration of work. The well-being of the residents is the paramount criterion in this proposal, not secondary issues such as traffic. The cross reference to traffic restrictions in Section 6.2 was intended to show how much of an impact that the compounded non-complementary noise and traffic restrictions would make on the time duration of construction along each specific segment.

The proposed microtunneling method of construction will have less noise and traffic impacts compared with conventional open trench construction. The proposed noise variance is intended to take advantage of the lesser environmental impacts of this construction technique. A three-tiered noise level variance is proposed (see attached matrix). Construction of the requisite launching and receiving pits at the ends of each tunneling segment is no quieter than

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1001 Bishop Street Honolulu HI 96813
808 521-3051 FAX 808 524-0246

any other excavation activity and would be restricted to daytime hours. The tunneling equipment within the pits are relatively quiet. Ancillary equipment at the surface of the pits can vary in noise level emissions, depending on whether diesel or electric powered equipment are used. The proposed 85 dBA noise limit would effectively allow only muffled and shielded diesel powered generators and no mobile cranes, trucks, or excavators during the evening up until 10.00 p.m. The proposed 70 dBA noise limit for work after 10.00 p.m. would effectively limit above ground equipment to a quiet, stationary all-electric hoists. The construction contract specifications specifically ban the use of back-up beepers. The preceding multi-tiered noise schedule also provides incentives for contractors to invest in quieter equipment that would be used around the clock on this as well as future construction projects. Compliance with the restrictions of the noise variance by the contractor will be monitored by independant construciton managment inspectors hired by the Department of Wastewater Management (DWWM). The Department of Health Noise, Radiation, & IAQ Branch (DOH) has the authority to enforce the restrictions. The contract specifications explicitly warn the contractor that non-compliance with the terms of the variance or complaints from citizens can result in reductions or revocation of the noise variance. Thus, the residents would continue to have recourse for redress even after the commencement of construction.

The EA will be clarified to reflect the proposed multiple noise and time restrictions. Presentation of the preceding was made at the Downtown Neighborhood Board meeting of July 3, 1997. A public information meeting will be scheduled shortly to reiterate the preceding and to provide additional available information. A legal notice in the daily newspapers will announce when the variance is under DOH consideration, giving the public the opportunity for formal input.

The EA has explored alternative modes of operation in addition to conventional daytime only work. The noise variance is independent of the EA. We hope that the clarifications added to the EA will help you in your final assessment of the noise variance application.

- **Subsurface Conditions and Existing Utilities**

Extensive geotechnical investigation has been conducted along the route to characterize the subsurface. Since only discrete soil borings will be drilled along the alignment, non-heterogeneous conditions not encountered in the borehole investigations can be expected to be encountered. The microtunneling equipment, however, can be designed to handle a wide range of varying soil conditions. Soil conditions that are not suitable for the support of the eventual pipeline will be grouted to afford sufficient strength.

M&E Pacific, Inc.

Letter of August 4, 1997 to
Mr. Robert Bruce Graham

We concur that existing plan records are expected to have some inaccuracies or missing information. To minimize potential construction difficulties, thorough research was conducted at government agency and utility archives for subsurface obstructions. After the initial sewer alignment design, the drawings are reviewed by government agencies and utilities to reverify record drawing information. In areas where the existing utilities per record drawings are relatively close to the proposed sewer, it is prudent to conduct prior subsurface field excavations to verify the actual horizontal and vertical coordinate locations. This has already been done for this specific project. The locations of existing utilities and other subsurface obstructions are then adjusted on the design drawings in accordance with field data from subsurface investigations. The design includes the prior relocation of utilities that would conflict with the proposed sewerline.

- **Access and Traffic**

Traffic impact was one of the major elements considered in route selection for the sewerline. The Ewa-Diamond Head through streets between the Chinatown area and Ala Moana Pump Station that could serve as potential sewerline routes are: Nimitz Highway/Ala Moana Boulevard, Halekauwila Street, Queen Street, King Street, and Hotel Street. Each of the alternatives to Queen Street have major subsurface obstacles that have made them virtually impassable. Since the turn of the century, very large storm drains have been constructed mauka/makai, perpendicular to the path of the sewerline. The storm drains increase in size in the direction from the mountains to the sea, thus are the most impassable along Ala Moana Boulevard. Ala Moana Boulevard and Halekauwila Street are also crowded with major electrical duct banks below the surface. The Fort Street Satellite City Hall is a major obstacle on King Street. The future subsurface corridor for a mass transit subway has been encumbered beneath Hotel Street. Although the construction impact of pits are much smaller than continuous open trench construction, there was concern of minimizing socio-economic impact to small businesses, with the greatest number and density along Hotel Street and King Street. Because of the preceding obstacles, Queen Street was the only feasible route.

We understand your concern regarding potential impacts to this critical local access road and thoroughfare. In recognition of this importance, absolutely no lane closures will be allowed during both morning and afternoon peak hour periods as the primary mitigation measure. For other non-peak hours, the preparation of thorough and detailed traffic control plans will be required by the City & County of Honolulu Department of Transportation Services (DTS) prior to issuance of a permit for street usage. The traffic control plans will provide adequate or alternative passage for buses and trucks. Vehicular and pedestrian access, private rights-of-way and driveways, and access to private properties will be maintained or provided with satisfactory alternatives at all times. Adequate signage to warn all drivers and pedestrians in advance is strictly required by the DTS. Section 6.4 of the EA will be modified to include the preceding clarifications of potential impacts and mitigation measures.

M&E Pacific, Inc.

Letter of August 4, 1997 to
Mr. Robert Bruce Graham

With the preceding amendments, we trust that you will concur with the proposing agency, City and County of Honolulu Department of Wastewater Management, that this project will not have significant environmental effects and support its issuance of a Negative Declaration (ND). The final EA will be published in the August 28, 1997 OEQC Bulletin. If you have any questions or wish to discuss these issues further, please call me at (808) 521-3051.

Sincerely,

Robin Matsunaga, P.E.
Project Manager

attachment: Proposed Noise Variance Limits

cc: Glenn Okita - DWWM, C&C

Attachment

Requested Noise Variance

Activity	Noise Limit	Time Period *		
	(dBA @ 50')	7:00 A.M. - 6:00 P.M.	6:00 P.M. - 10:00 P.M.	10:00 P.M.-7:00 A.M.
Pit Construction	95	Yes	No	No
Pile Driving	95	Yes	No	No
Tunneling & Pipe Laying	85	Yes	Yes	No
Tunneling & Pipe Laying	70	Yes	Yes	Yes
Emergency Tunneling	85	Yes	Yes	Yes

Remarks:

1. Construction activities on Saturday and Sunday are limited to 9:00 A.M. through 5:30 P.M.
2. Construction activities adjacent to the Honuakaha retirement home are limited from 7:00 A.M. to 10:00 P.M.
3. Use of reverse signal alarms is prohibited at all times.

* DOT allowable work hours are 8:30 A.M. to 3:00 P.M. Monday through Friday, and 8:00 P.M. to 5:00 A.M. Sunday through Thursday.

Appendix B

Archaeological Monitoring Plan
and
Burial Plan

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

CC TO
Robin Matsunaga
Mark E

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

Gilbert Coloma-Agaran

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 23, 1997

Dr. Hallett Hammatt
Cultural Surveys Hawaii
733 North Kalaheo Avenue
Kailua, Hawaii 96734

LOG NO: 19862
DOC NO: 9707RC41

Dear Dr. Hammatt:

SUBJECT: Review of Archeological Monitoring Plan -- Nimitz Highway
Reconstructed Sewer
Honolulu, Honolulu, O'ahu
TMK: 1-7-02, 03; 2-1-02, 13-16, 25, 27, 29-32

This reviews the plan which was submitted on July 2, 1997. This plan is quite clear as to the types of sites that may be found at the different jacking and receiving pits. We approve the plan, with the understanding that artifact analysis will include illustrations and that a clarification is made as to how many radiocarbon samples (as a maximum) will be submitted.

Our Burials Program will review the Burial Plan separately.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

RC:jk

Burial Treatment Plan for State Site 50-80-14-4534 and State Site 50-80-14-3712 and Inadvertent Burials for the Nimitz Highway Reconstructed Sewer Honolulu *Ahupua'a*, Kona District, O'ahu (TMK 1-7-02,03 and 2-1-02, 13-16, 25, 27, 29-32)

by

Brian L. Colin, B.A.

and

Hallett H. Hammatt, Ph.D.

for

M & E Pacific Inc.

Cultural Surveys Hawaii Inc.
June 1997

INTRODUCTION

At the request of M & E Pacific, Inc. for the proposed Nimitz Highway Reconstructed Sewer Project, Honolulu, Oahu, Hawaii (TMK 2-1-03, 10-12, 17, 25, 26, and 29-31) (for the Department of Wastewater Management, City and County of Honolulu) (figs. 1 & 2), Cultural Surveys Hawaii Inc. has prepared this Burial Treatment Plan for possible inadvertent burials and for the two previously identified burial sites, State site 50-80-14-4534 the Queen Street Burials associated with the Kawaiaha'o Cemetery and State site 50-80-14-3712 the Honuakaha Small Pox Cemetery. (TMK 2-1-32:17)

The route of the sewer reconstruction project begins on River Street, at the intersection of River and Hotel, runs to Nimitz Highway, along Nimitz Highway to Fort Street where it merges onto the western end of Queen Street, along Queen Street to South Street, along South Street to Ala Moana Boulevard, and finally along Ala Moana Boulevard to the Ala Moana Wastewater Pump Station at Ala Moana Boulevard and Keawe Street, a distance of approximately 7,800 linear feet (fig. 3). The sewer will be replaced by a method of microtunneling rather than the conventional open trench method of construction, requiring the excavation of 24 jacking and receiving pits. The pits will each measure approximately 20 feet in diameter to accommodate tunneling machinery (the exception will be at the pit near the corner of Queen and Punchbowl and on South adjacent to Quinn Lane, both of these pits will be 20 ft. by 10 ft. due to the South Street and Queen Street burials). In addition to the 24 jacking and receiving pits, which will be spaced out along the entire route (see Fig. 3), there will also be 20 additional potholes along the line. The pothole will range in diameter from 3 to 4 ft. They are utilized by construction personnel to confirm the location of subsurface electrical boxes and lines etc. The method of excavation employed for the jacking and receiving pits entails the initial removal of asphalt, cement, and road material followed by the placement of metal sheeting forms by force which will then be followed by the excavation of the interior material of the pit. The lateral lines, potholes and manholes will be excavated in the traditional open trench manner.

This Burial Treatment Plan is to be presented in conjunction with the Monitoring Plan (also by Colin and Hammatt, 1997) which contains the anticipated findings and detailed research regarding the previous archaeology conducted along the proposed line.

Inadvertent Human Burials

Based on the previous archaeological work conducted along the proposed sewerline there is the possibility of encountering inadvertent human burials along the entire line with the exception of the block on Nimitz Highway between Maunakea Street and Nuuanu Avenue in which the entire deposits are known to be fill.

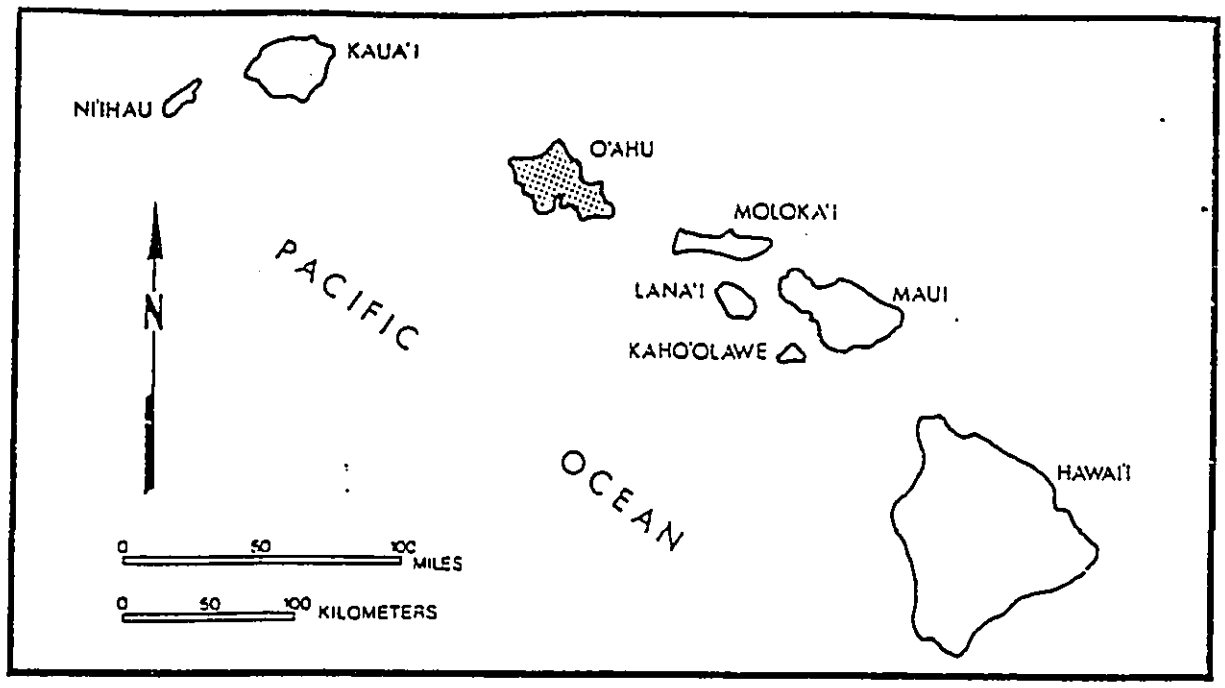


Fig. 1 State of Hawai'i

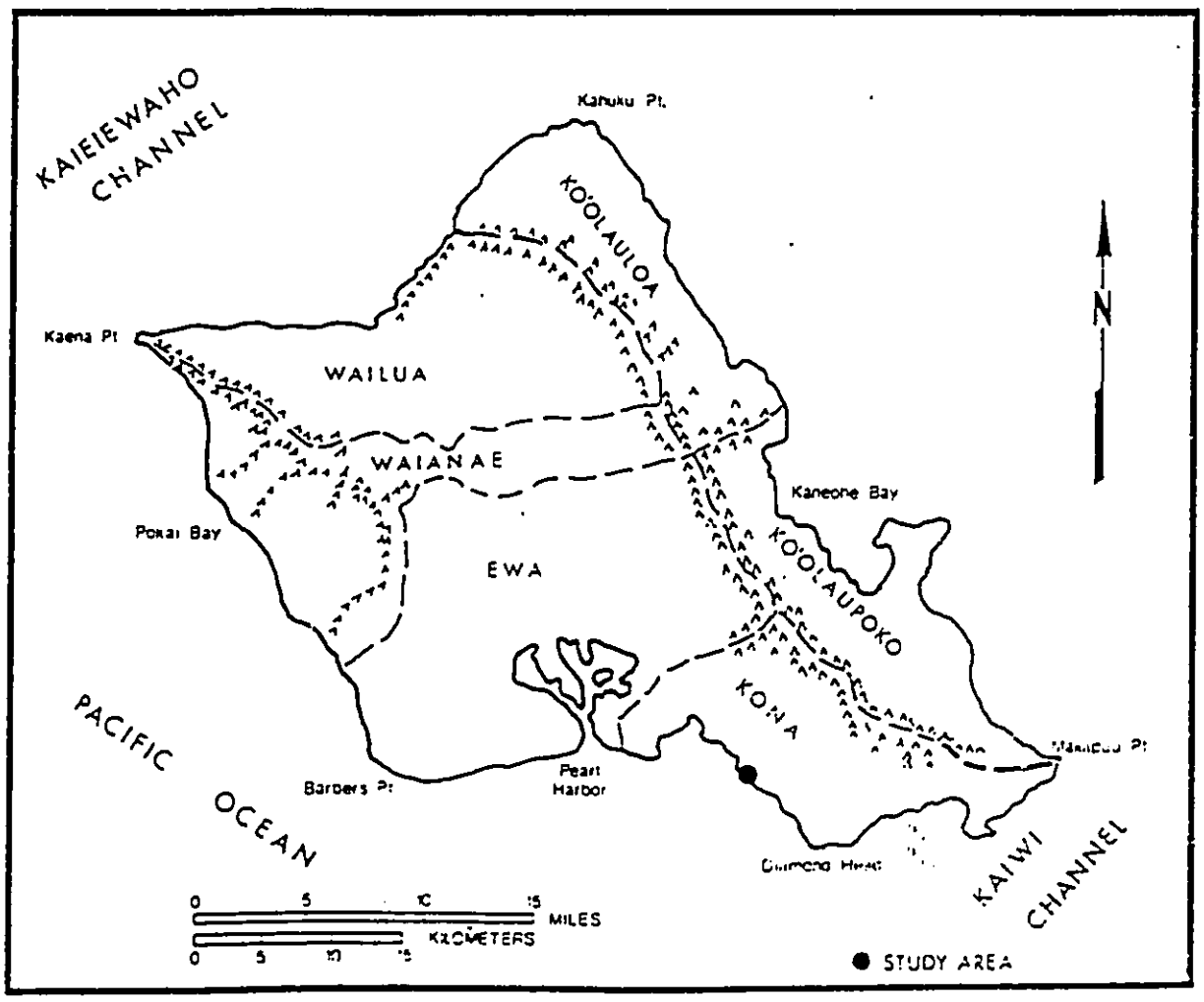


Fig. 2 O'ahu Island Location Map

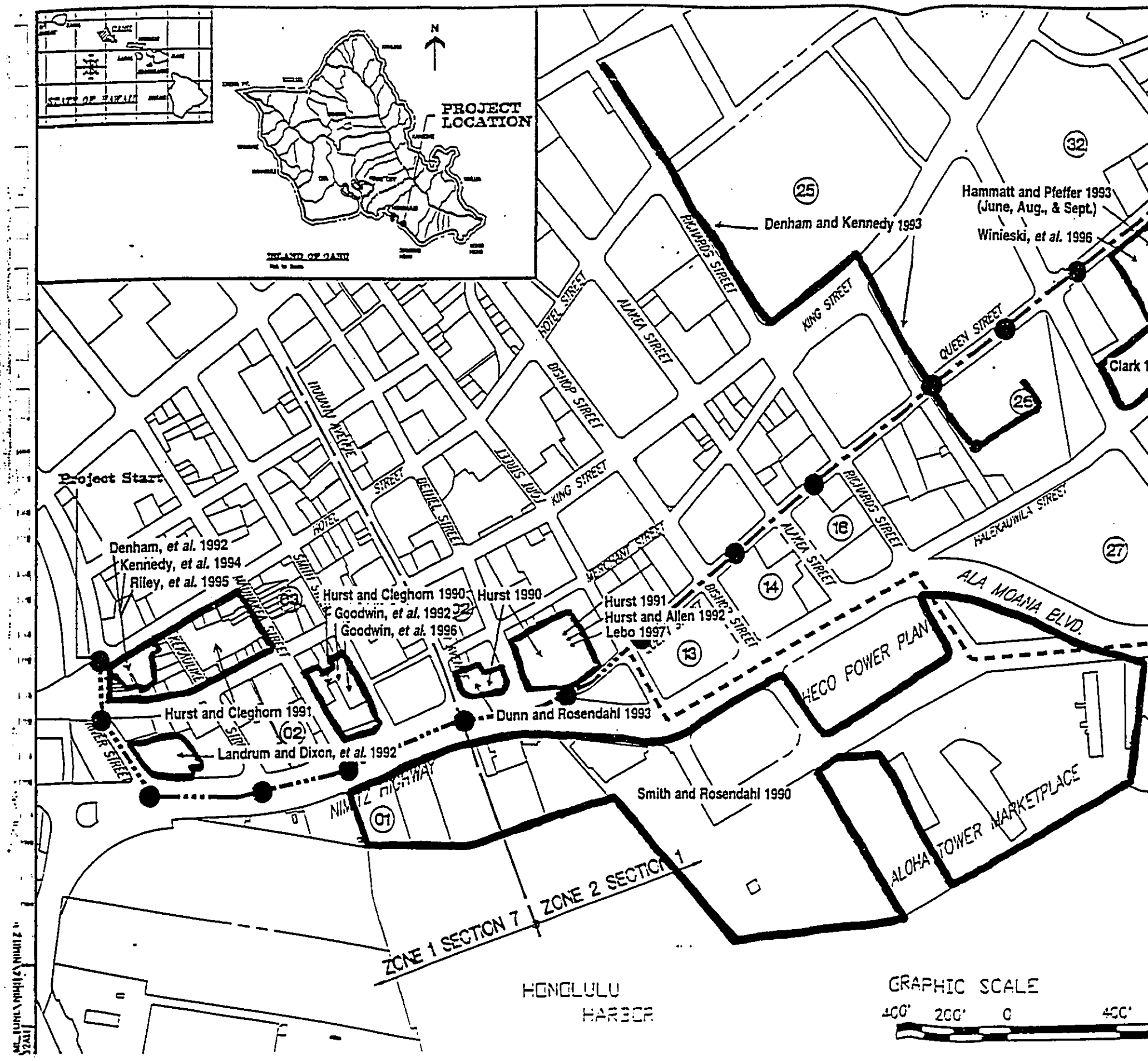
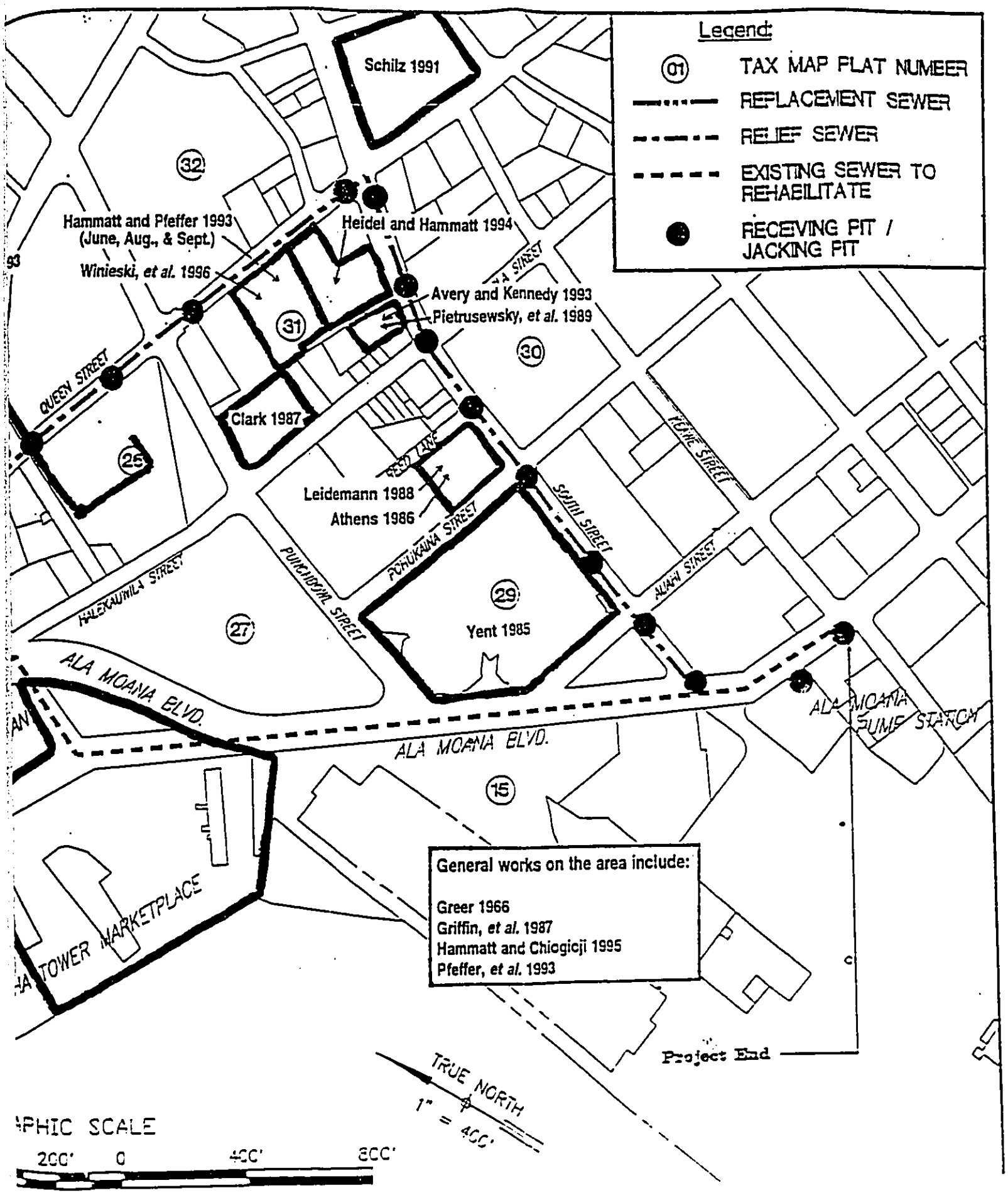


Fig. 3 Map Showing Project Area and Locations of Previous Archaeological Projects


Legend:
01 TAX MAP PLAT NUMEER
REPLACEMENT SEWER
RELIEF SEWER
EXISTING SEWER TO REHABILITATE
RECEIVING PIT / JACKING PIT
Schilz 1991
Hammatt and Pfeffer 1993 (June, Aug., & Sept.)
Winieski, et al. 1996
Heidel and Hammatt 1994
Avery and Kennedy 1993
Pietrusewsky, et al. 1989
Clark 1987
Leidemann 1988
Athens 1986
Yent 1985
QUEEN STREET
KEEO LANE
PUNCHBOWL STREET
PUNAHOU STREET
SCHOOL STREET
PENSACOLA STREET
ALAKEA STREET
HALEKAUWILA STREET
ALA MOANA BLVD.
ALA MOANA PUMP STATION
TOWER MARKETPLACE
General works on the area include:
Greer 1966
Griffin, et al. 1987
Hammatt and Chiogioji 1995
Pfeffer, et al. 1993
Project End
TRUE NORTH
1" = 400'
GRAPHIC SCALE
200' 0 400' 800'

Queen Street Burials, 50-80-14-4534 (fig.4)

Numerous burials were recovered from Queen Street directly *makai* of Kawaiaha'o Cemetery between Punchbowl and South Streets during the installation of a storm drain in 1986-87. A total of 116 burials were recovered from this area and were labelled as 1 through 107 and A through I. The burials were all located within 35 feet of the present *makai* wall of Kawaiaha'o Cemetery, and all but a few were located inside of what appeared to be old fence posts defining the original cemetery boundary. A search of maps and documents revealed that in the early part of the twentieth century the Territorial Government of Hawaii and/or the City and County of Honolulu purchased from, or traded land to, the owners of Kawaiaha'o Church for a 9.2 m.- (30 ft.-) wide strip of Kawaiaha'o Cemetery fronting on Queen Street. Prior to this, Kawaiaha'o Cemetery extended approximately 9.2 m. (30 ft.) into what is now Queen Street. Project file records available at the Department of Public Works (Division of Land Survey and Acquisition) indicate that, by 1921, the City and County of Honolulu had acquired the rights to the strip of land in front of the Queen Street side of Kawaiaha'o Cemetery. A map dated February, 1921 clearly shows this strip of land. The records did not state the exact parameters of the trade or purchase, but they do indicate clearly that title of the land was obtained by 1921 from Kawaiaha'o Church for the purpose of widening Queen Street.

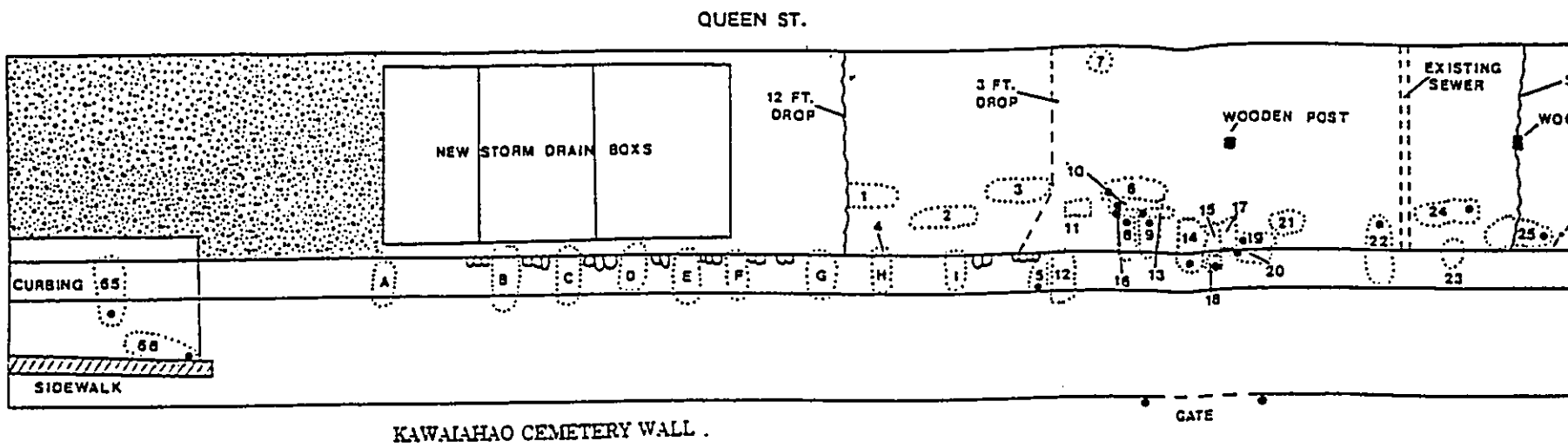
The burials located in this strip, formerly in Kawaiaha'o Cemetery, were never removed. There are no records to indicate burial disinterment was planned by any particular party; however, their presence must have been known due to rectangular cement grave outline markers were found associated with a number of burials directly underneath the modern road bed, and at least one crypt was partially destroyed during construction of the road. It appears that any headstones that may have been present were removed as no trace of them was found in the present disinterment. Records detailing the exact circumstances of this event have yet to be uncovered.

Former Cemetery Boundary

It appears that the boundary line of the cemetery was located in the area near Burials 20 and 25. If this is indeed the case, then Burials 7, 56, 67, 75, 77, 78, 84, 86, 104, and 107 were all located outside of the old cemetery fence. However, the cemetery could have had an irregular boundary that would have included the majority of these burials. It does appear, however, that based on its location and lack of associated introduced artifacts and/or associated grave goods, Burial 7 may be a prehistoric burial that was not interred within the cemetery.

Reinterment of Queen Street Remains

In 1987, the officials at Kawaiaha'o Church offered to provide a place for the reinterment of the remains. A vault was constructed and donated by E.E. Black on the present day Cemetery grounds. All of the remains from Queen Street were reinterred with their respective grave goods. At the request of the involved parties, no osteological work was performed on these remains.



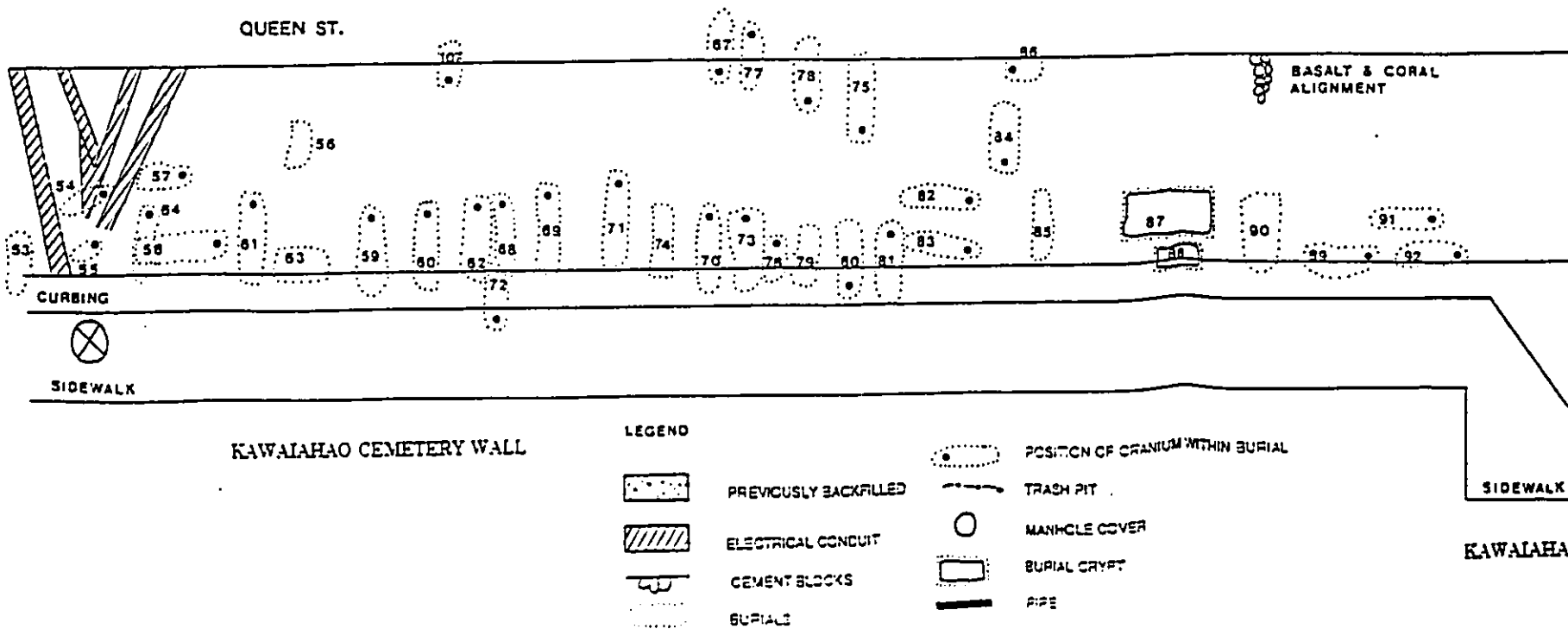
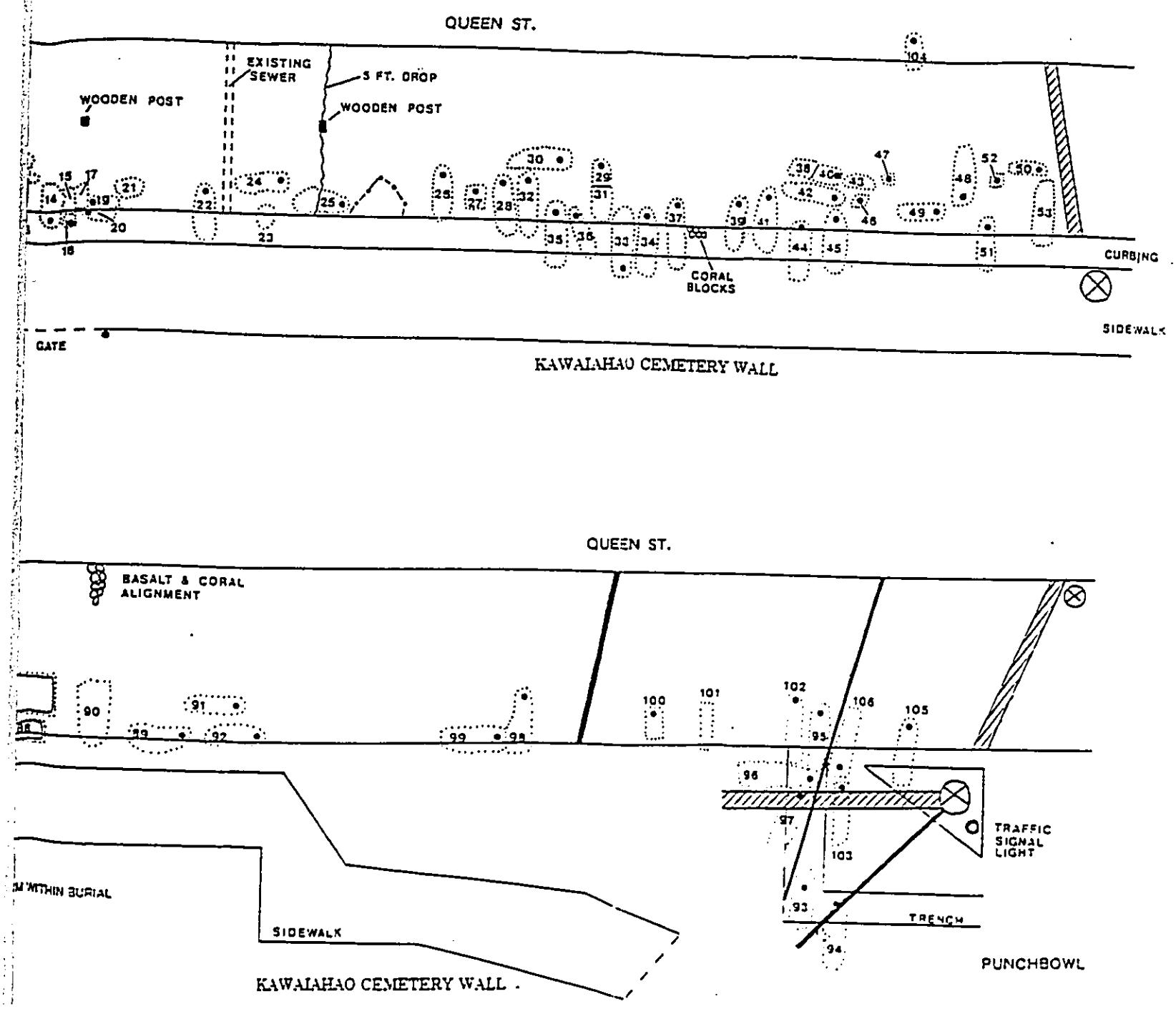


Figure 4 Map of the Queen Street Burials (50-80-14-4534) Showing Location and Orientation Where Possible (Pfeffer and Hammatt 1993)



ıere Possible (Pfeffer

Stratigraphic Context and Description of the Queen Street Burials

The burials interred in Kawaiaha'o Cemetery along the *mauka* side of the present layout of Queen Street were interred in pits that were dug and refilled with a naturally occurring cinder layer. This cinder layer was deposited by an eruption of the Sugarloaf/Tantalus volcanoes. The practice of interring human remains in cinder does not seem to have been practiced by the ancient Hawaiians. Rather, this is a reflection of the location of Kawaiaha'o Church and its surrounding cemetery grounds necessitating the burial of remains near the Church.

Coffin Presence/Absence and General Orientation of the Queen Street Burials

The vast majority of the burials located at Queen Street were interred in coffins and almost all of the remains were in an extended position. Of the 116 burials that were recovered from Queen Street, 90.50% or 105 burials, were definitely interred in coffins. Only two burials (1.7%) were definitely not interred in coffins (Burials 86 and 107). The presence or absence of a coffin could not be established for 4.3%, or five burials (Burials 17, 21, 56, 87, and 88). Four partial burials were located in small wooden boxes. This represented 3.5% of the total number of burials (Burials 11, 43, 47, and 52). These boxes contained one or more skulls and no other human remains. One of the coffins recovered contained no remains at all (Burial 74).

As shown, Figure 4 details the exact location and orientation of each burial recovered along Queen Street. The orientation of each burial is determined from the position of the cranium (represented by a black dot in the figure) wherever possible. The burials located on the Diamond Head side of the trench (Burials A through I) were encountered on the first day of construction excavation, before archaeologists were called in to monitor the excavations. Therefore, an accurate orientation could not be established for those burials.

Orientation of both the Queen Street and South Street remains was established using the method described in Bowen (1981) and was based on an imaginary line drawn through the long axis of the remains from head to foot. The terminology used in conjunction with the magnetic orientation descriptions is calibrated to downtown Honolulu. Of the 116 burials disinterred from beneath Queen Street an accurate orientation was established for 94. Of these, 39 burials were interred southwest to northeast (*makai*). Another 17 sets of remains were interred northwest to southeast ('Ewa). Another 12 burials were interred northeast to southwest (*mauka*), and 6 burials were interred southeast to northwest (Diamond Head). An accurate orientation could not be established for 22 sets of remains.

Therefore, it can be seen that, for the burial remains for which an orientation could be established, roughly 41% were oriented southwest to northeast (*makai*), while the remaining three orientation positions combined accounted for roughly 36% of the burials.

Associated Artifacts From the Queen Street Burials

A relatively large number of artifacts were recovered from the burials at Queen Street. Suffice it to say here that many were of western contact association such as buttons and beads.

Condition of remains from the Queen Street Burials

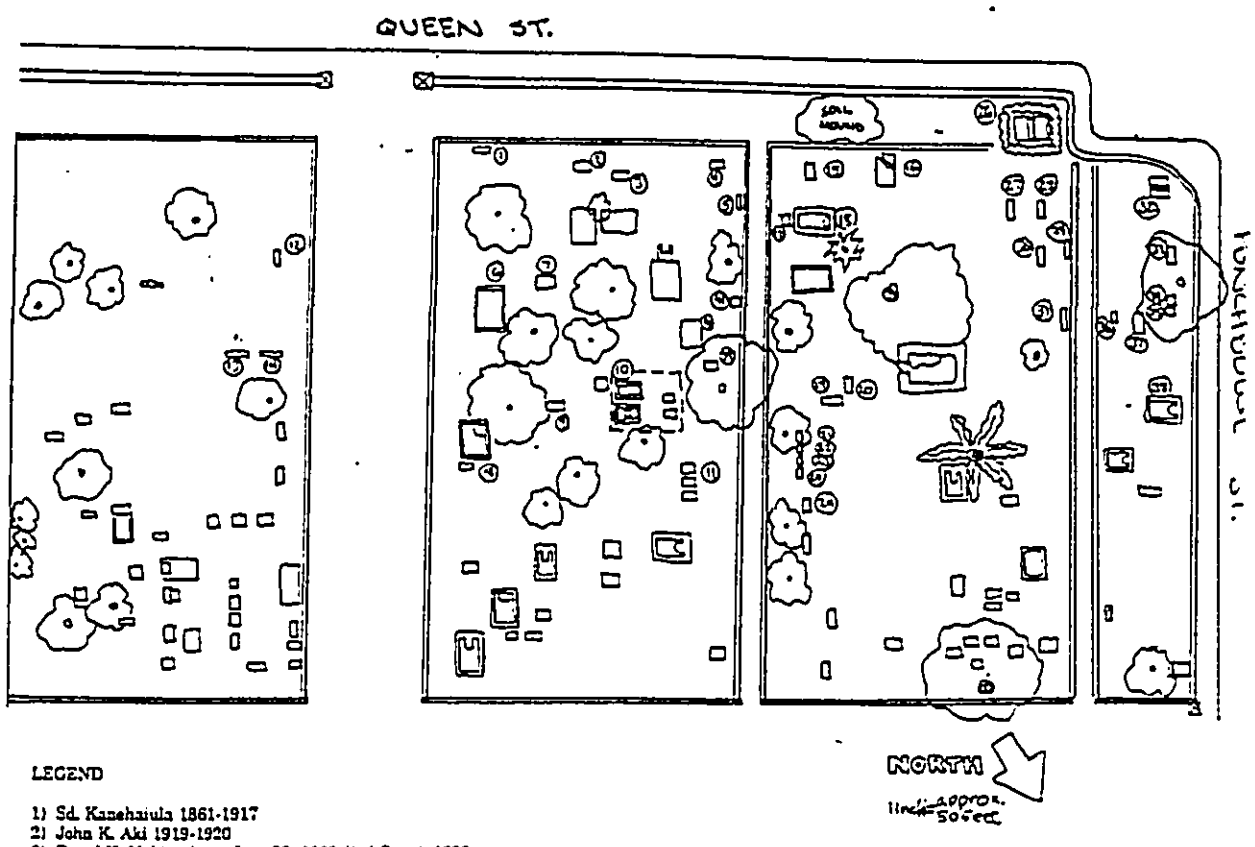
The remains recovered from the burials at Queen Street were, for the most part, in poor to very poor condition. This seems to have been due, at least in part, to the acidity of the cinder in which they were interred and to the poorly drained soil environment. Both of these factors contributed to relatively speedy decay of carbonate remains (bone). The use of salt to help preserve the bodies also increased the rate of decay.

Average Depth of the Burials From Queen Street

The vast majority of the burials from Queen Street were interred in fairly shallow pits that were on average 120 cms (3.9 ft.) below the present land surface. However, a number of burials were interred in pits that were up to 170 cms (5.6 ft.) in depth. It should be noted that these measurements were taken from the present land surface, not the original land surface at the time of deposition. Therefore, the actual burial depth may be somewhat shallower than the measurements given. Several burials were located at depths of less than one meter (3.3 ft.).

Age and Historic Description of Kawaiaha'o Cemetery

Kawaiaha'o Cemetery is connected to and is a part of Kawaiaha'o Church, the central church in early historic Hawaii. The church was founded in 1835 by Protestant Missionaries who arrived in Hawaii in 1822 to convert the native peoples to Christianity. As the most important church in Hawaii, Kawaiaha'o attracted a large congregation of Hawaiian and foreign peoples who lived in and around Honolulu. It is highly probable that the cemetery was established soon after, or simultaneously with the church. Based on church records, it appears that the area covered by Queen Street was used to inter both foreign and native Hawaiian peoples. A map compiled by Cultural Surveys Hawaii details the plots and burials in the area just *mauka* of the present-day Queen Street (fig.5). The majority of burials in this section of the cemetery appear to be Hawaiian (based on surnames). While there appears to be several foreign burials in the area, the majority of foreign missionaries, business men, and their families were buried separately in an area closer to the church itself. Interestingly, the dates on a number of the burials closest to present day Queen Street are very close to the 1921 date of the widening of Queen Street. The burials closest to Queen Street range in date from 1911 to 1923. This indicates that the burials found underneath Queen Street may have been interred only a few years prior to the widening of the street. Based on the number of Hawaiian surnames in the area adjacent to the present day line of Queen Street it is expected that the majority of the burials are of Hawaiian descent, with some of Caucasian or other origin.



LEGEND

1) Sd. Kanehaiula 1861-1917
2) John K. Aki 1919-1920
3) David K. Nahina born Jan. 25, 1902/died Oct. 4, 1923
4) Brother Abraham Maui Born Dec. 10, 1896/died Feb. 7, 1919
5) Mother Lakaua Kaimana Dec. 1, 1916
6) Lucy Kapuhaialiiaika Mamalu Kauli born July 5, 1853 Waipio Hawai'i/died June 30, 1928
7) Brother Clauden Schutte died 1919
8) Robert Pahukula Gunn 1910-1911
9) Steven Kaiini Oneha Jr. Jan 7, 1913/Jan 28, 1921
10) Liliʻalani Plot (various dates: 1909, 1917,1932)
11) Beloved Mother Kapika Kakalia 1859-1918 (plus two connected plots, 1973, 1986)
12) Julia Rasmussen Dec. 16, 1918 and Douglas Gilbert April 30, 1945
13) Peter Henry Kanu 6 Aug? 1875
14) Kalaikuaiwa Nov 11, 1862
15) Mrs. Kanaiilanu born Oct. 30, 1870/died Sept. 16, 1912
16) Mrs. Marʻehu born Aug 20,1882/died May 10, 1911
17) Mrs. Kelekia Kalaluhi born March 5, 1865/died Dec. 21, 1909
18) Mar 17, 1842
19) Mother Helen K. Kahookano Sept. 20, 1871/June 29, 1914
20) Our beloved baby born Feb. 16, 1911/died Feb. 17, 1911
21) Hiram Koiomoku Jan 16, 1860/Aug. 20, 191
22) Hana Iosepa Apr. 15, 1851/Jan 3, 1901
23) J.K. Iosepa June 15, 1849/Feb. 19, 1905
24) Kawa Iosepa May 10, 1822/Sept. 3, 1904
25) Kalaua Keikeki May 10, 1906/May 25, 1920
26) Marker for 102 sets of remains excavated under Queen Street Nov. 20, 1988
27) Willie Laukaula Son of W.K.& L. Luther/Nov. 9, 1910/Feb. 3, 1914
28) Wahineaea Luther Beloved child of W.K.& L. Luther/Born Nov. 15, 1912/died March 4, 1913/at rest
29) Beloved Father William Simlilk Apr. 1, 1885/July 2, 1927
30) Rebecca Daughter of D.D. & Rose Bernal Feb. 13, 1921/Dec. 11, 1922
31) Martha Kesiohulani Kuapa Beloved Wife of J.K. Namoolau/ born Mar. 21, 1855/died May 23, 1913/at rest
32) Miss Rose Akeau Oct. 10, 1886/July 29, 1904
33) Julia K. Manu Sept. 17, 1879/Mar. 12, 1926
34) Child William Kokokeala born Aug 11, 1919/died July 29, 1920
35) Mother Lizzie Kipola Keana born Sept. 28, 1897/died Nov. 24, 1919
36) Halaulani Lobo 1859-1912
37) Matuoe Ainaloha/Apr. 6, 1870/Jan. 28, 1970
38)Keanahoe May 16, 1874/Jan. 21, 1922/ Aloha Ke Akua

Figure 5 Map of Kawaiahaʻo Cemetery with Named and Dated Plots (Pfeffer and Hammatt 1993)

As a final note, when the vault was being dug in the present cemetery road to re-inter the remains, five more unmarked burials were located under the road. This seems to indicate that either poor records were kept of the location of the remains, or that knowledge of the exact location of certain remains was not of critical concern.

Summary of Findings of the Queen Street Burials

While no osteological work was performed on the Queen Street burials, they were deemed to be mostly Hawaiians by virtue of an examination of all surrounding headstones, especially *mauka*, which carried only Hawaiian names on them. Some, of course, may have been foreigners. Most of the artifacts were western articles, such as buttons and beads but there were some traditional Hawaiian artifacts also included. Traditional grave goods, however, would not have been unusual for this time period even though they would have been buried in a Christian fashion. The cinder matrix for the burials, the coffin burials, the western goods included with the burials, and the context of the burials in the vicinity of Kawaiaha'o Church all indicate these burials were buried with the customs and practices of post-contact Christianity.

Honuakaha Cemetery

The Honuakaha Cemetery has been impacted by four separate projects the following (also in the Monitoring Plan) is a brief synopsis of the projects findings:

In 1986, Cultural Surveys Hawaii, recovered twenty-eight burials during the excavation of a storm drain along the *'Ewa* side of South Street, along with other subsurface road improvements into Quinn Lane. A total of thirty-one burial features were encountered, two were left in situ, one proved to be an empty coffin, and the remaining 28 were disinterred. The burials, part of the Honuakaha Cemetery (State site 50-80-14-3712) and therefore were reinterred in the Honuakaha Memorial Park in 1993. These burials, while part of the Honuakaha Cemetery, have been commonly referred to as the South Street Burials. In the following section information listed under the heading of South Street Burials refers only to these burials although due to their being a part of the Honuakaha Cemetery that information may be extrapolated to the entire Honuakaha Cemetery.

In 1993, Archaeological Consultants of Hawaii, Inc., conducted archaeological monitoring of construction activities at the South Street Building Complex (TMK 2-1-31:20). A total of six individual, in situ, burials were encountered during work and subsequently four of the individuals were disinterred. All of the burials encountered are believed to be part of the Honuakaha Cemetery (State site 50-80-14-3712). The burials were reinterred in the Honuakaha Memorial Park in 1993.

In May and June of 1993, Cultural Surveys Hawaii performed test excavations at the American Brewery lot (State site 50-80-14-9917) with the aim of identifying all archaeological features located on the property (TMK 2-1-31:21), with special emphasis on delineating the boundary of a portion of the Honuakaha Cemetery (State site 50-80-14-3712) known to be located on the *makai* portion of the property. A total of 29 burial pits were located with generally no disturbance or exposure of actual burials. The limits of the cemetery were defined with the excavation of 24 backhoe trenches.

Between October 1993 and September 1995, Cultural Surveys Hawaii, conducted archaeological monitoring of construction activities, as well as disinterment of previously identified and inadvertently discovered human remains at the American Brewery lot (TMK 2-1-31:21). A total of eleven burials were removed from the area of the building footprint prior to construction. Seven of these burials were previously identified and four were inadvertent finds. In addition 14 burials were removed as inadvertent finds during utility installations in Quinn Lane. All disinterred burials from the project and previously disinterred burials from South Street and Quinn Lane, during other projects, also believed to be associated with the Honuakaha Cemetery (State site 50-80-14-3712), were reinterred in a specially constructed crypt under the garden of the new Honuakaha Housing Project (American Brewery Site).

Historic Research and Archaeological Work on the Honuakaha Cemetery

Historic research, archaeological analysis, and osteological examination have shown that these burials are associated with the smallpox epidemic of 1853-54. Historic maps show that the major quarantine hospital for smallpox sufferers during the epidemic was in Kaka'ako just *makai* of Queen Street. Historic research has shown that Honuakaha Cemetery, created solely for the victims of the epidemic, was located *makai* of Queen Street on the 'Ewa side of South Street. This cemetery now covered by urban development including the Old Kaka'ako Fire Station, several buildings, and a portion of the American Brewery lot (50-80-14-9917), as well as South Street and Quinn Lane may contain more than 1000 burials. Osteological analysis could not confirm the presence or absence of smallpox on the remains, but historic information clearly indicates that the burials encountered under South Street and Quinn Lane are a portion of Honuakaha Cemetery (fig. 6).

During the smallpox epidemic of 1853-54, large numbers of individuals perished daily and were interred by the local sheriff's department. At the height of the smallpox epidemic, the burial details were made up largely of sailors, policemen, and convicts who worked to commute their sentences. Documents from that time period indicate that the burials were packed into the ground as close as possible to each other, at a minimum of depth, and in multiple numbers. A letter dated October 16th, 1858 from William John Hildyard talks about the extreme stench of decaying flesh that wafted over Downtown Honolulu whenever the wind blew onshore. He also mentions the method of interment and how the graves were:

> "dug just wide enough to admit the corpse edge-wise, or on its side...the depth of the graves have average three feet."

When the smallpox epidemic broke out among the Hawaiian population (people with little or no immunity to smallpox), it spread quickly through entire villages, killing large numbers of people and entire families before the people had time to react. There were very few able-bodied people who could give each deceased individual a traditional Hawaiian or Christian burial. So great a number of people were affected, that the only people capable of burying the vast number of individuals were the members of the police department, able-bodied seamen, and convicts who could be conscripted to help them.

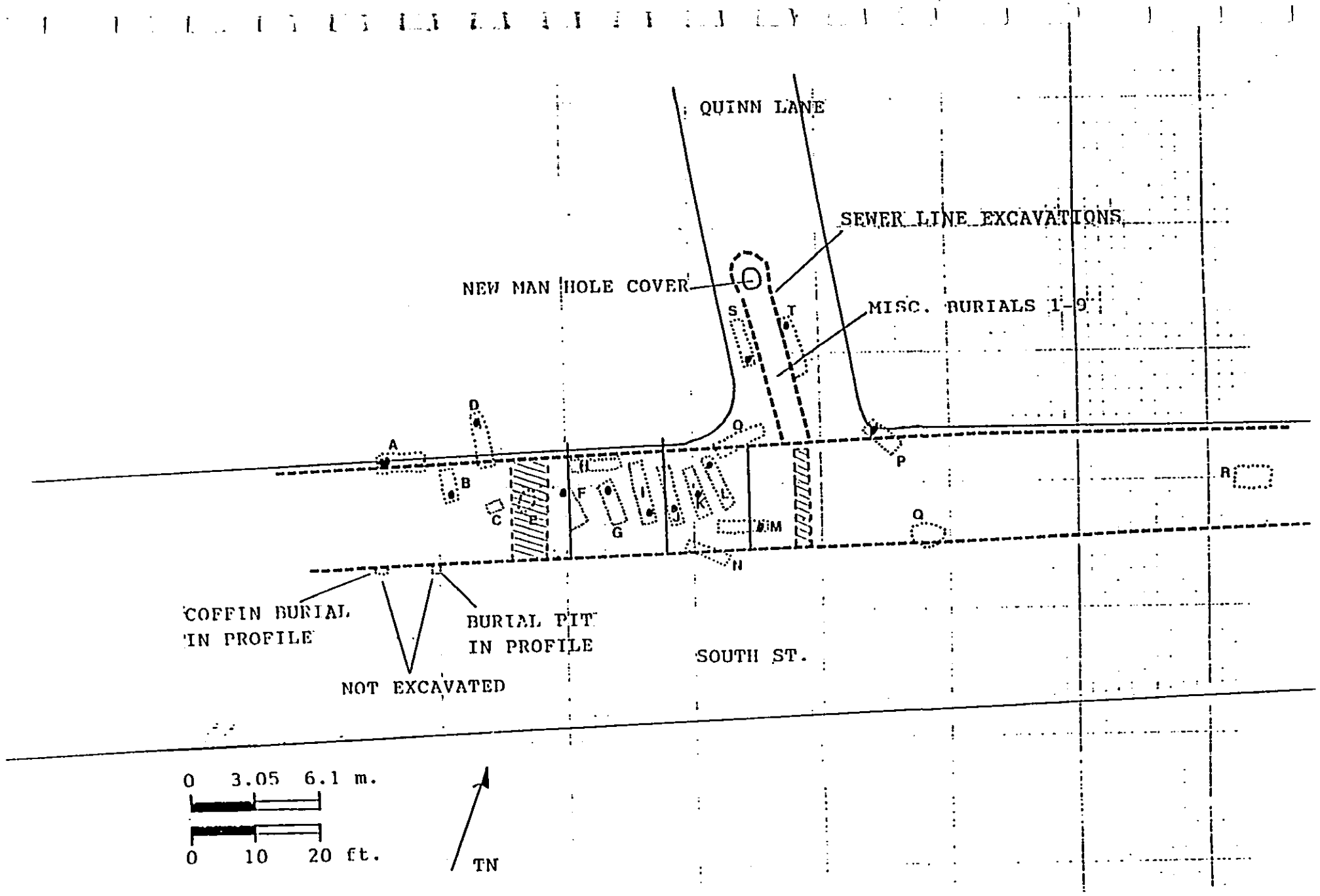


Figure 6 Map of South Street Burials (50-80-06-4531-A-U, 1-9) (Pfeffer and Hammatt 1993)

Therefore, many of the traditional Hawaiian customs and the newer Christian burial practices were ignored through lack of knowledge, lack of time, and due to the sheer numbers of deceased individuals awaiting burial during the height of the epidemic. Accounts of the epidemic describe the problems faced by the police department as they struggled to keep up with the burial detail. Greer (1969) details the gruesome task facing the government and the police force during the height of the epidemic:

> "On Saturday, July 23, the Rev. S. C. Damon was on the street. He passed a saloon. In front stood a red handcart loaded with two corpses; inside stood the operator with his cup of cheer. Death was already commonplace, and so were the carts that clattered daily through streets with their grisly burdens. Burying was an arduous and disgusting but necessary chore. The whole police force was put under the control of the R.C.H.P. during the epidemic, and by the end of June was principally occupied in attending the sick and digging graves."
> When the smallpox broke out there were four white [?] prisoners in the fort sentenced for terms of two years... By authority Parke offered them pardons if they would work at burying...
>
> On July 18, the R.C.H.P. issued a notice: Since it was hard to get help with the burying, all able-bodied men recovered from the smallpox or already completely exposed, would be at the call of the commissioners, sub-commissioners, police, or their agents, to assist in this work without pay.... The notice roused opposition, but the *Polynesian* explained that the police could not get needed help in some cases at a distance from town. Men who had been nursed and cured refused to bury their neighbors; the Honolulu police were busy in the city and could not go two or three miles out to work. From June 26 to July 22, government people buried 532 corpses in Honolulu, an average of 19 a day; by July 26 the total had risen to 663. Between July 28 and September 2, the number of burials under the direction of the R.C.H.P. by police and others in Honolulu and environs totaled 349, with the whole number being 1,012. Among those laid to rest at public expense were 51 constables-50 Hawaiians and one foreigner-who died in the line of duty."

Greer further details the appalling conditions present at the smallpox hospital and cemetery at Honuakaha in the following excerpt:

> "From the hospital on Queen Street [at the time Queen Street was probably the closest street and used as a landmark reference] doomed patients could view their last earthly home. The government smallpox cemetery filled the pesthouse enclosure, and as the weeks passed it became a stinking horror. By the middle of October, at lest 1,000 cadavers jammed the yard. Bodies were packed close; in the later stages of the epidemic graves were dug just wide enough to admit the corpse lying on its side. In many places the sandy earth had settled, with promise of even more sinking to come with the rainy season- and graves averaged only three feet deep..."

Stratigraphic Context and Description of the South Street Burials

The burials along the 'Ewa portion of South Street and Quinn Lane were found in the naturally-occurring sand strata common to the *makai* portion of the Kaka'ako area.

Remnants of this sand layer have been located throughout Kaka'ako. All of the burials were found in this sand layer, unlike those found in the cinder layers at Queen Street. Burial in natural sand layers was one of the traditional burial practices in prehistoric Hawaii (Griffin et al. 1987).

Coffin Presence/Absence and Orientation of the South Street Burials

Of the 31 burials located and removed from the South Street burial area 18 were interred in wooden coffins, and five were not interred in coffins. Interment in a coffin could not be conclusively determined for the remaining eight burials.

Burial orientation description follows the format used in Bowen (1981), using an imaginary line through the long axis of the burial from head to foot. Seven burials at the South Street burial area were interred northwest to southeast ('Ewa). Five burials were interred southeast to northwest (Diamond Head). One burial was interred northeast to southwest (*mauka*) and one was interred southwest to northeast (*makai*). An accurate orientation for the remaining 17 burials could not be established, although more of the burials appear to be oriented northwest/southeast ('Ewa).

Thus, it can be seen that for the 14 burials where orientation could be established, fully half of those were oriented northwest to southeast ('Ewa). This is a marked contrast to Queen Street where the majority of the burials were oriented southwest to northeast.

Associated Artifacts From the South Street Burials

The majority of the artifacts found with the burials from the South Street burial area were items that appeared to come from the burial attire of the deceased individuals. The most common items found at South Street were buttons from clothing, beads and other jewelry adornments, and glass and metal coffin fragments (glass viewing plates, bronze hinges, nails, etc.). Of these items, buttons were the most common.

Condition of Remains from the South Street Burials

The burials found in the South Street Quinn Lane area were all buried in relatively shallow graves in a naturally occurring sand layer. Some, but not all of the burials were interred in coffins (mentioned above). The burials from South Street were in a fairly good state of preservation and osteological analysis could be readily performed on these remains. The reason for this good state of preservation is due in part to the fact that the burials were interred in sand which is a favorable environment for the preservation of carbonate remains (such as bone) because of its low acidity and excellent drainage. This is in direct contrast to the remains from the Queen Street area (Kawaiaha'o Cemetery), less than 200 m. (656 ft.) *mauka*.

Average Depth of the Burials From South Street/Quinn Lane

The burials from South Street were not interred in deep graves. The average depth of the burials recovered from South Street was between 90 and 120 cms (2.9-3.9 ft.) below the present land surface. This depth includes a pre-road fill layer lying immediately above the burials that is approximately 30 cms (.9 ft.) thick. If the sand was not extensively graded,

the burials were less than one m. (3.3 ft.) beneath the contemporary land surface. This shallow depth confirms historic accounts that describe interments of three feet or less (Hildyard, W., 1853).

Age of the South Street (Honuakaha Cemetery) Burials

According to historic accounts the South Street/Quinn Lane remains were part of the much larger Honuakaha Cemetery which was created and used specifically as a place of interment for the victims of the smallpox epidemic of 1853-54. These records indicate that the property purchased by the Minister of the Interior, John Young, in 1851, for the government. It was then used as a quarantine hospital and cemetery. Prior to that time, the property had been a Land Commission Award to Kekuanaoa (LCA 677) and because of its sandy nature may have been used as a prehistoric burial place. The close proximity of 4533-1, just *makai* of the Honuakaha lot, lends support to this premise.

Osteology of the South Street Burials

Dr. Pietrusewsky et al. (1989) confirms that the remains are of Polynesian ancestry. A total of 28 identifiable individuals were examined by Pietrusewsky. Of these, 12 were male, 14 female, and two were subadults of unknown sex. The majority of individuals interred at the cemetery were adults between 19-35 years of age, with a mean age at death of 29 years.

There is an under-representation of subadults in the skeletal population that may be indicative of the type of victim that succumbed to smallpox in the 1853-54 epidemic. The average-age-at-death estimate of 29 years reflects the enormous impact that the smallpox epidemic had on the Hawaiian population. The loss of a large number of individuals at their reproductive and economic peak certainly exacerbated the decline of the Hawaiian population since that time.

Special Features of the South Street Burials

The burials at South Street appear, based on their layout and interment, to have been interred in a short period of time. Unlike the Queen Street burials, where a number of interments were superimposed over one another, the South Street burials were largely interred at the same depth and in similar orientation. The majority of these burials were all found in close proximity to one another (sometimes within 20 cm or .6 ft. of each coffin) indicating that they were a part of a series of public interments done in a very short period of time. Their close proximity to one another, similar depths, lack of superposition, and other factors are reminiscent of mass burials and agree with descriptions of the method of interment during the smallpox epidemic.

Summary of Findings at the South Street Burials

Of the 28 sets of burials examined from South Street/Quinn Lane the sex of the individual could be determined for 26 individuals. Of these, 12 were male and 14 were female (Pietrusewsky, 1989). Two sets of remains were subadult and could not be accurately sexed. As mentioned above, all research (historical, archaeological and osteological) indicates that many of these burials are probably related to the smallpox epidemic of

1853-1854. The burials occur in a shallow sandy matrix and there were fewer artifacts associated with the burials than in those of the Queen Street burials. The smaller amount of associated grave goods may indicate differing social status as well as the circumstances of death. The sandy matrix and the proximity to a Land Commission Award property allow us to consider that prior to its use as a cemetery for the smallpox epidemic this area may have also served as a small family plot for prehistoric burials.

PRESENT PROJECT

The present project will pass both the Queen Street and Honuakaha Cemeteries. The microtunnelling is expected to have no impact on either burial site due to the fact that the tunnelling will take place 8.5 ft. below surface (at the water table) along Queen Street and at 9.24 ft. below surface along South Street (which is 3.24 ft. below the water table) which is well below the location of previously encountered burials. Due to this reason the microtunneling is not expected to impact any burials along the entire line.

Jack and Receiving Pits

There is one jack or receiving pit proposed to be adjacent to the Queen Street Burial Site. It is presently proposed to be on the *makai* side of Queen Street near the corner of Queen and Punchbowl. The pit is planned to measure 20.0 ft. by 10.0 ft. and 15.0 ft. deep. and its exact location will not be precisely determined until the beginning of construction. This pit, near the corner of Queen and Punchbowl, is expected to be located along the *makai* side of Queen Street where previous excavation has not encountered human remains (a previously installed sewer line runs along the *makai* side of Queen Street and during the construction of the Honuakaha Elderly housing project (the American/Honolulu Brewery site a number of sewer connection laterals extending *mauka/makai* to the middle of Queen Street did not encounter and human remains or evidence of any (i.e. no burial pits were observed)).

Two jacking and receiving pits are planned for the corner of Queen and South Street and another pit is planned for the corner of South Street and Halekauwila Street. These pits are the next closest to the two burial sites but based on previous archaeological work these areas are believed to be outside of both cemetery boundaries.

No lateral connections or potholes presently planned for Queen Street between Punchbowl and South Street or for South Street between Queen and Halekauwila Street.

Monitoring

An on site archaeological monitor has been requested for the excavation of all jacking and receiving pits, all lateral connections and all potholes along the entire line with the exception of the block along Nimitz Highway between Maunakea and Nuuanu (which historical research and previous archaeological work has displayed is 100% fill). In the case of the pit (near the corner of Punchbowl and Queen streets) mentioned above, special care will be taken during excavation in which the operator will be informed by the on site archaeologist to modify his/her excavation technique (i.e. to slowly remove material

approximately 1.0 ft. at a time) which will facilitate the archaeologist in observation of sediments therefore allowing the possible early detection of burial pit outlines prior to disturbing any remains in the event burial pits are encountered.

Potential problems

There is a potential problem with the method of excavation for the jacking and receiving pits. After the initial removal of roadway material, a metal sheeting preform will be forced into the ground, in the shape of the pit, prior to the excavation of material. This has the potential to disturb or bisect subsurface materials prior to excavation. This method also prevents the viewing of sediments in profile which is often an aid in discovery of archaeological materials or deposits.

Proposed Action

In the event that human remains are encountered either inadvertent or within the two previously identified burial sites work will immediately be halted in the area of discovery. This action will be followed by immediate notification of the Burials Branch of the Department of Land and Natural Resources/State Historic Preservation Division. No further action will take place without DLNR/SHPD input.

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ARCHAEOLOGICAL MONITORING PLAN FOR THE NIMITZ HIGHWAY RECONSTRUCTED SEWER HONOLULU, OAHU, HAWAII
(TMK 1-7-02,03 and 2-1-02, 13-16, 25, 27, 29-32))

by

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and

Hallett H. Hammatt, Ph.D.

Prepared for

M & E Pacific, Inc.

by

Cultural Surveys Hawaii
June 1997

I. Introduction

At the request of M & E Pacific, Inc., the present document provides an archaeological monitoring plan for the proposed Nimitz Highway Reconstructed Sewer Project, Honolulu, Honolulu, Oahu, Hawaii (TMK 2-1-03, 10-12, 17, 25, 26, and 29-31) (figs. 1 & 2). The route of the sewer reconstruction begins on River Street, at the intersection of River and Hotel, runs to Nimitz Highway, along Nimitz Highway to Fort Street where it merges onto the western end of Queen Street, along Queen Street to South Street, along South Street to Ala Moana Boulevard, and finally along Ala Moana Boulevard to the Ala Moana Wastewater Pump Station at Ala Moana Boulevard and Keawe Street, a distance of approximately 7,800 linear feet (fig. 3). The sewer will be replaced by a method of microtunneling rather than the conventional open trench method of construction, requiring the excavation of 24 jacking and receiving pits. The pits will each measure approximately 20 feet in diameter to accommodate tunneling machinery (the exception will be at the pit near the corner of Queen and Punchbowl and on South adjacent to Quinn Lane, both of these pits will be 20 ft. by 10 ft. due to the South Street and Queen Street burials). In addition to the 24 jacking and receiving pits, which will be spaced out along the entire route (see Figure 3), there will also be 20 additional potholes along the line. The pothole will range in diameter from 3 to 4 ft. They are utilized by construction personnel to confirm the location of subsurface electrical boxes and lines ect. The method of excavation employed for the jacking and receiving pits entails the initial removal of asphalt, cement, and road material followed by the placement of metal sheeting forms by force which will then be followed by the excavation of the interior material of the pit. The lateral lines, potholes and manholes will be excavated in the traditional open trench manner.

II. Previous Archaeology

Due to the considerable area through which the present project traverses and the substantial amount of previous archaeology conducted in the *ahupua'a*, the previous archaeology section for this report will focus only on work that was conducted along the project route. In numerous instances there is more than one report for each project area (i.e. a historic document search, an inventory survey report, and finally a data recovery report) therefore the specific data recovery report will be the focus of the present review, in most cases. The previous archaeological works will be listed by street and in a corresponding "distance from the beginning" fashion (i.e. the project begins at the corner of River and Hotel therefore the previous work at that corner is first and the Ala Moana Pumping station is at the other end of the line therefore it is discussed last).

In 1973, the Chinatown Historic District (State site 50-80-14-9986) and the Merchant Street Historic District (50-80-14-9905) were nominated to the National Register of Historic Places (DLNR 1974:110, 140). The Chinatown Historic District is bound by River, Beratania, Nuuanu, and Nimitz. The Merchant Street Historic District is bound by Nimitz/Queen, Nuuanu, King and Fort Street.

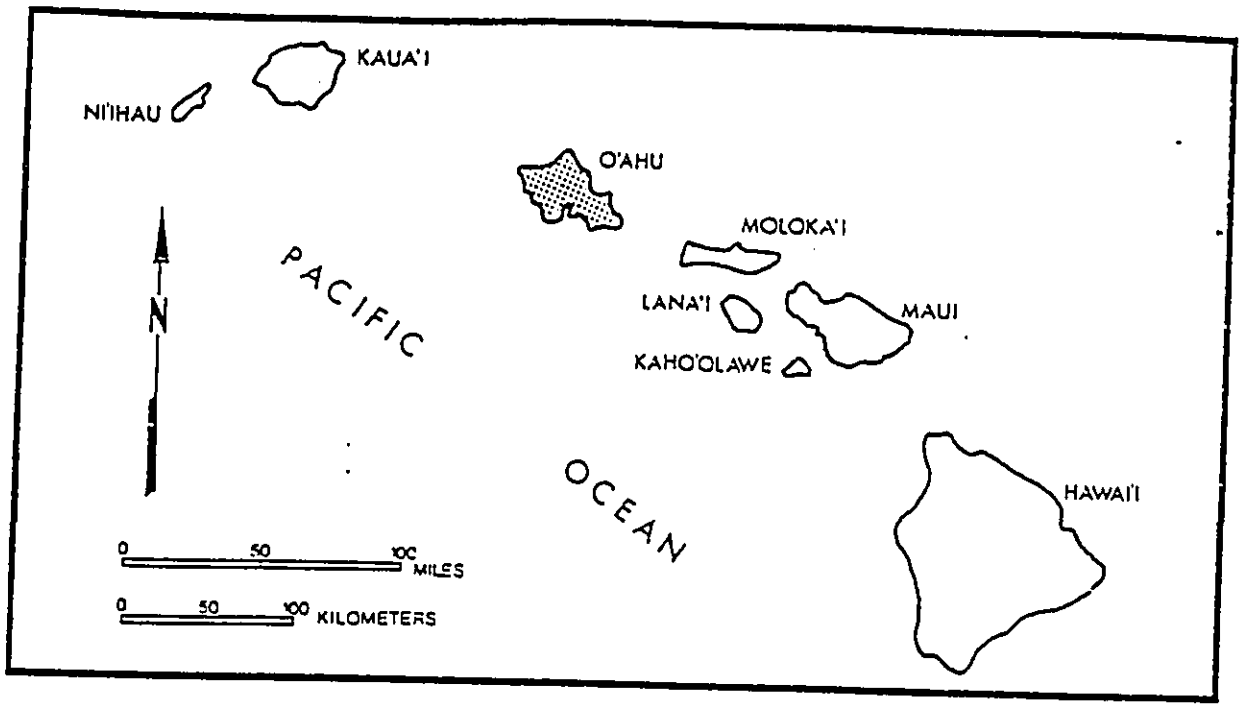


Fig. 1 State of Hawai'i

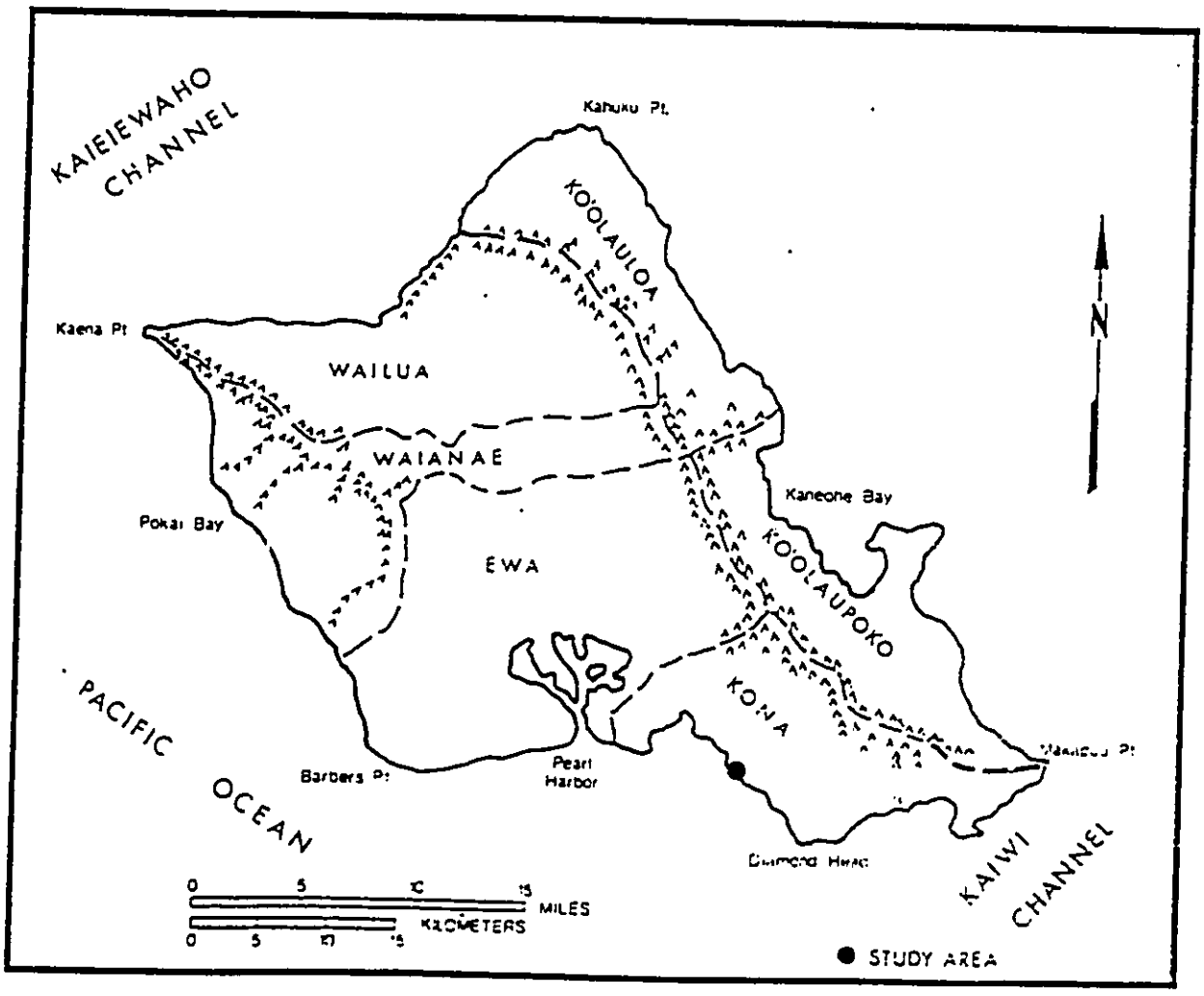


Fig. 2 O'ahu Island Location Map

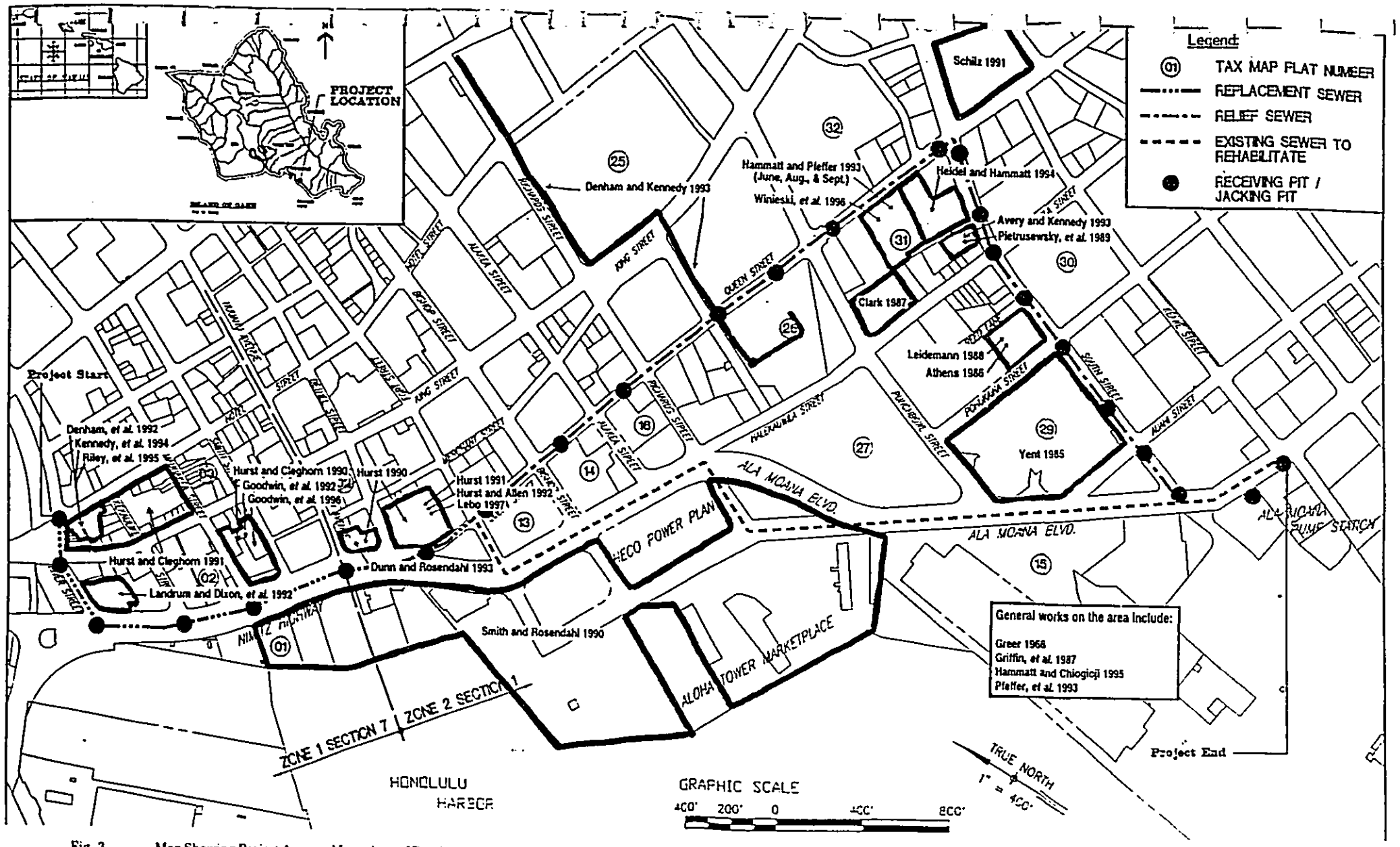


Fig. 3 Map Showing Project Area and Locations of Previous Archaeological Projects

River Street

In June 1995 a three volume data recovery report by Archaeological Consultants of Hawaii, Inc. (Riley et al. 1995) detailed the final findings for the Kekaulike Revitalization Project, Ewa Block (TMK 1-7-03:32) at the former site of the H.Y. Wong Building. The three volumes document the 64 individual test units excavated at two previously identified sites State site -4587 a fishpond and -4588 a multi-component site. "From these test units abundant artifactual material, faunal remains and midden material were recovered" (Riley et al. 1995:ii) which document the use of the project area from the early developmental period through the historic mercantile period to virtually the present. A total of 5,153 artifacts were recovered during the excavations. A total of 55 sub-surface features were encountered including post-molds, pits, a possible burn layer (possibly associated with the 1900 Chinatown fire) historic trash dumps etc. Significant features encountered include the fishpond wall, the fishpond natural deposition layer, and the trash fill layer that appears to represent the intention filling of the fishpond which was filled by 1879. Also a coral block platform with a human burial underneath (a radio-carbon date of associated material produced a date range of A.D. 796 - 1000). Another very interesting finding was the dating of coconut and wood fiber found within the fishpond wall construction which produced a date range of A.D. 874-1061 which would be the earliest date obtained associated with a fishpond in Hawaii. In addition to the above a total of five human burials were also encountered during the excavations.

In the earlier inventory survey of the project area (Kennedy et al 1994) a total of 53 features were encountered although, unfortunately, no attempts were made to correlate features between the inventory and data recovery phases.

In 1989, the Applied Research Group from the Bishop Museum reported on findings from their Emergency Mitigation of construction activities for a project on the corner of River Street and Nimitz Highway. A total of five historic era pit and trash dump features were encountered in addition to a single human burial Site 50-Oa-A5-16.

Nimitz Highway

In 1992, International Archaeological Research Institute, Inc. conducted archaeological monitoring, survey and data recovery on the city block bounded by Maunakea Street to the north, Smith Street to the south, Nimitz Highway on the west and a series of businesses along King Street to the east at the Marin Tower Project, Site 50-80-14-4494. A total of 1129.0 $m.^2$ were excavated during the project. The project findings revealed a 200-plus year occupation of the area with the dominate features being the Don Francisco Marin compound and the post 1860 Honolulu Iron Works operations at the site. Seventeen burials were encountered in association with the Marin compound (probably of the Marin family). The old Iron Works site was found to have heavily impacted the *makai* (west) portion of the project. Block VI and VII

In 1990, Paul H. Rosendahl, Ph.D., Inc. conducted a Historical Assessment for the Aloha Tower Complex which fronts Honolulu Harbor from Pier 5 to Pier 14. "The current study

has determined that the entire project area sits on historic period fill which has been placed over an area once submerged. There are no intact prehistoric remains in the area, or if there are such remains, they are subsurface and have been brought in with the fill" (Smith and Rosendahl 1990:ii).

In 1993, Paul H. Rosendahl, Ph.D., Inc. conducted an archaeological inventory survey of the Nuuanu Court project area. The project area is bounded by Bethel Street to the south, Nimitz Highway to the west and Nuuanu Avenue to the north and buildings to the east. The work encountered a large cultural deposit (State site 50-80-14-2456) which represents both the prehistoric period and the transitional period the prehistoric and historic. The deposit (-2456) was previously identified in the Harbor Court (the Kaahumanu Parking Structure) project which is situated across the street on the corner of Bethel, Nimitz and Queen. "A total of 19 features were identified in the trench sidewalls. The features include 11 probable postholes, of both prehistoric and historic age; a basin-shaped pit originating in the prehistoric layer; a historic ash lens, a historic foundation wall, a section of disturbed wall or curbing (historic), a historic wall with associated filled in basement, a historic pipe trench, and two historic floors associated with prior buildings on the parcel" (Dunn and Rosendahl 1993:16). Age determinations for the project range from AD 1250 to the present.

In 1991, "the Anthropology Department of Bishop Museum conducted archaeological data recovery of intact cultural deposits and structural remains at the proposed Harbor Court redevelopment project area.." (Lebo et al 1997:1). The work documented State site 50-80-14-2456 the intact cultural deposit. The project area is bounded by Bethel Street to the north, Queen Street and Nimitz Highway to the west, and buildings along the east and southern sides. Work at the site "provide information on Native Hawaiian occupations associated with the village of Kou/Honolulu from the late eighteenth to mid-nineteenth century" (*Ibid.*:195). "These investigations indicate a dynamic post-contact Native Hawaiian occupation at the site characterized by a vibrant interchange of traditional and introduced ideas, materials, technology, and cultural lifeways. Rich local marine and terrestrial resources were utilized for food, tools, ornaments, building materials, and clothing" (*Ibid.*). The Historical Background research documents the presence of a *heiau* complex, Pākākā *heiau*, at or very close to the project area. The historical research also documented that "it appears highly likely that the residences of Kamehameha I's queens Ka'ahumanu, Kaheiheimālie, and Kekāuluoli existed on the project area from 1809 to the early 1820s, and probably within a palisade of logs noted by 'Ī'ī and others. These traditional residences were most likely surrounded by their retainers in the village known as Pūlaholaho, which extended north beyond the project area" (*Ibid.*).

Queen Street

In 1993, Archaeological Consultants of Hawaii, Inc., conducted archaeological monitoring of the subsurface excavations for the State Capitol Complex Telecommunications Conduits, Phase III. A total of two significant archaeological sites were encountered during their monitoring activities. State site 50-80-14-4605 consisted of multi-component site with the following features; a historic trash pit (1), a ditch (1), a pit (1), a firepit (1),

six postholes, and a single human burial. State site 50-80-14-4606 consisted of nine historic trash pits which were scattered throughout the excavated conduits. The conduit excavations crossed the current project area at the intersection of Queen Street and Mililani Street. Two radiocarbon dates sent from State site 50-80-14-4605 Feature E and Feature H returned dates of AD 1390-1700 and AD 860-1330 respectively.

In 1987, the Department of Anthropology, Bernice Pauahi Bishop Museum, conducted archaeological monitoring at the Makai Parking Garage situated at the corner of Halekauwila and Punchbowl Streets (TMK 2-1-31:23). "A total of 35 archaeological features were found during the monitoring of construction excavations. These include 16 pits, 7 human burials, 5 animal burials, 1 segment of a buried surface, 2 building foundations, 1 posthole, 1 burned soil area, and 2 areas containing animal bone in disturbed layer I soils" (Clark 1987: 52). The 35 features have collectively been assigned State site 50-80-14-2963. Most of the burials appeared to have been priorly disturbed. Two radiocarbon samples were analyzed and dated from AD 1270 to 1410. The stratigraphy of the project included recent fill layers, fishpond fill layers, natural beachfront layer overlaying cinder, and finally fishpond sediments. The human burials encountered by Clark were found in natural sand layer.

In 1982, Jason Ota and Wendell Kam reported on six partial sets of human remains encountered during the construction activities of the State Office Building #2 of the *makai*/Diamond Head corner of Punchbowl and Halekauwila Streets (TMK 2-1-31). The burials were located in sand and prehistoric fill deposits and two of the burials displayed evidence of premortem tooth evulsion of the central and lateral incisors. Therefore, while not definitive evidence, it is probably that the burials represent prehistoric to early historic Hawaiian individuals.

Cultural Surveys Hawaii, in 1986-1987, recovered 116 burials from underneath Queen Street (fig.4) , directly *makai* of the Kawaiahao Cemetery (fig. 5) between Punchbowl and South Streets during installation of a storm drain (Pfeffer et al. 1993). Historical research revealed that in the early part of the twentieth century the Territorial Government of Hawaii and/or the City and County of Honolulu purchased from, or traded land to, the owners of Kawaiahao Church for a 9.2 m. (30.0 ft.) wide strip of Kawaiahao Cemetery fronting Queen Street for the widening of Queen Street. When Queen Street was widened the burials in the 9.2 m. strip purchased from Kawaiahao Church were never removed. All but ten of the burials were located inside of what appeared to be the old fence posts which defined the original cemetery boundary. One of the ten burials located outside of the old cemetery boundaries appears to have been a traditional prehistoric burial (Burial #7). The burial area, known as the Queen Street Burials, has been assigned State site #50-80-14-4534-(a-I,1-107).

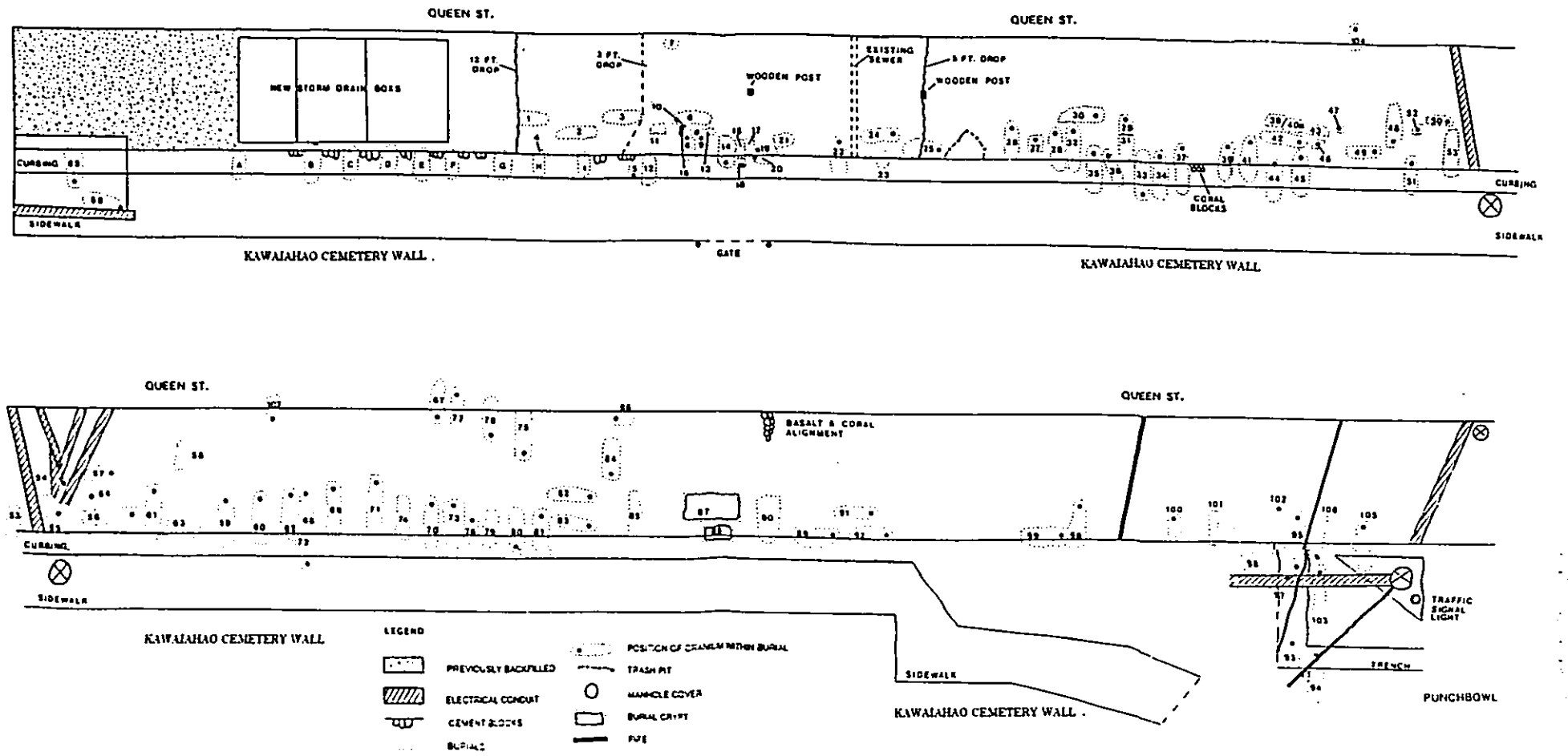
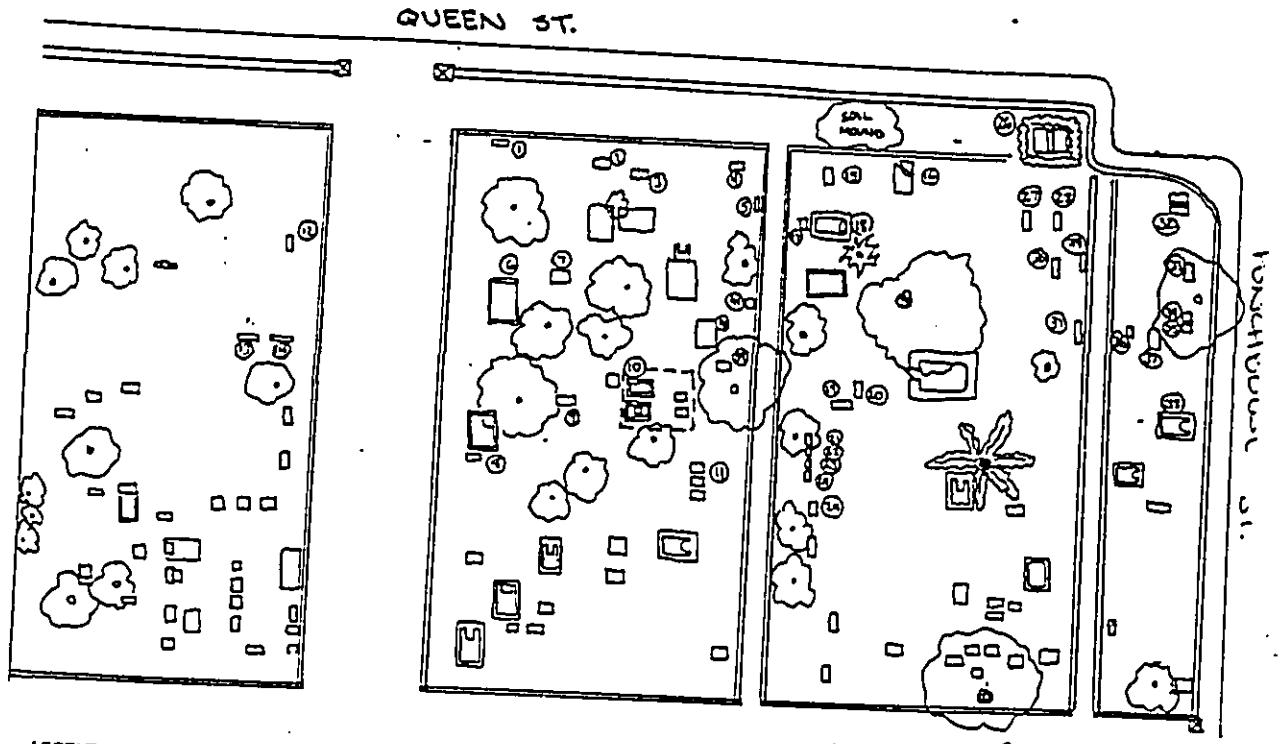


Figure 4 Map of the Queen Street Burials (50-80-14-4534) Showing Location and Orientation Where Possible (Pfeffer and Hammatt 1993)



LEGEND

1) Sd. Kanehaiula 1861-1917
2) John K. Aki 1919-1920
3) David K. Nahina born Jan. 25, 1902/died Oct. 4, 1923
4) Brother Abraham Maui Born Dec. 10, 1896/died Feb. 7, 1919
5) Mother Lakaua Kaimana Dec. 1, 1916
6) Lucy Kapuhaialilieka Mamalu Kaili born July 5, 1853 Waipio Hawai'i/died June 30, 1923
7) Brother Clauden Schutte died 1919
8) Robert Pahukula Gunn 1910-1911
9) Steven Kaiini Oneha Jr. Jan 7, 1913/Jan 28, 1921
10) Lilikalani Plot (various dates: 1909, 1917,1932)
11) Beloved Mother Kapika Kakalia 1859-1918 (plus two connected plots, 1973, 1986)
12) Julia Rasmussen Dec. 16, 1918 and Douglas Gilbert April 30, 1945
13) Peter Henry Kanu 6 Aug? 1875
14) Kalaikuaiwa Nov 11, 1882
15) Mrs. Kainaillanu born Oct. 30, 1870/died Sept. 16, 1912
16) Mrs. Mar?ehu born Aug 20,1882/died May 10, 1911
17) Mrs. Kelekia Kalaluhi born March 5, 1865/died Dec. 21, 1909
18) Mar 17, 1842
19) Mother Helen K. Kahookano Sept. 20, 1871/June 29, 1914
20) Our beloved baby born Feb. 16, 1911/died Feb. 17, 1911
21) Hiram Kolomoku Jan 16, 1860/Aug. 20, 191
22) Hana Iosepa Apr. 15, 1851/Jan 3, 1901
23) J.K. Iosepa June 15, 1849/Feb. 19, 1905
24) Kawa Iosepa May 10, 1822/Sept. 8, 1904
25) Kalaua Kekeiki May 10, 1906/May 25, 1920
26) Marker for 102 sets of remains excavated under Queen Street Nov. 20, 1988
27) Willie Laukaula Son of W.K.& L. Luther/Nov. 9, 1910/Feb. 3, 1914
28) Wahinesea Luther Beloved child of W.K.& L. Luther/Born Nov. 15, 1912/died March 4, 1913/at rest
29) Beloved Father William Simlilk Apr. 1, 1885/July 2, 1927
30) Rebecca Daughter of D.D. & Rose Bernal Feb. 13, 1921/Dec. 11, 1922
31) Martha Kealohilani Kuapa Beloved Wife of J.K. Namoolau/ born Mar. 21, 1855/died May 23, 1911/at rest
32) Miss Rose Akeau Oct. 10, 1886/July 29, 1904
33) Julia K. Manu Sept. 17, 1879/Mar. 12, 1926
34) Child William Kokokeala born Aug 11, 1919/died July 29, 1920
35) Mother Lizzie Kipola Keana born Sept. 26, 1897/died Nov. 24, 1919
36) Halaulani Lobo 1859-1912
37) Manoe Ainaloiha/Apr. 6, 1870/Jan. 25, 1970
38)Keanahoe May 16, 1874/Jan. 21, 1922/ Aloha Ke Akua

Figure 5 Map of Kawaiaha'o Cemetery with Named and Dated Plots (Pfeffer and Hammatt 1993)

In May and June of 1993, Cultural Surveys Hawaii performed test excavations at the American Brewery lot (State site 50-80-14-9917) with the aim of identifying all archaeological features located on the property (TMK 2-1-31:21), with special emphasis on delineating the boundary of a portion of the Honuakaha Cemetery (State site 50-80-14-3712) known to be located on the *makai* portion of the property. A total of 29 burial pits were located with generally no disturbance or exposure of actual burials. The limits of the cemetery were defined with the excavation of 24 backhoe trenches.

Between October 1993 and September 1995, Cultural Surveys Hawaii, conducted archaeological monitoring of construction activities, as well as disinterment of previously identified and inadvertently discovered human remains at the American Brewery lot (TMK 2-1-31:21). A total of eleven burials were removed from the area of the building footprint prior to construction. Seven of these burials were previously identified and four were inadvertent finds. In addition 14 burials were removed as inadvertent finds during utility installations in Quinn Lane (fig. 6). All disintered burials from the project and previously disintered burials from South Street and Quinn Lane, during other projects, also believed to be associated with the Honuakaha Cemetery, were reinterred in a specially constructed crypt under the garden of the new Honuakaha Housing Project (American Brewery Site).

In 1994, Cultural Surveys Hawaii, conducted an archaeological assessment of the Kaka'ako Fire Station. The original portion of the fire station was built in 1929 with additions in 1930 and 1931. The old fire station was nominated to the Hawaii and National Register of Historic Places in 1979 and was granted this status in 1980.

In 1991, Alan Schilz evaluated the archaeological material recovered and/or observed at the proposed Queen Emmalani Tower site (TMK 2-1-48:8-19). Sampling and testing for hazardous waste in the area precluded an in-depth excavation and only archival and historic research was conducted for the project. His research indicated that no further work would be necessary at the site and that no sensitive archaeological remains were expected on the site.

South Street

In 1987, P. Bion Griffin, Dennis Keene and Joseph Kennedy wrote a report detailing archival research and archaeological assessment of the Kaka'ako Community Development District. The development district comprises the area bounded by Ala Moana Boulevard, and by Punchbowl, King and Pi'ikoi Streets. The report summarized the historical import of the area:

> Without a doubt the single most striking archaeological deposit, and the one to which we assign the highest priority, is the 1853 Honuakaha Cemetery fronted by South Street and bisected by Quinn Lane. More than 1000 human burials are reportedly therein.

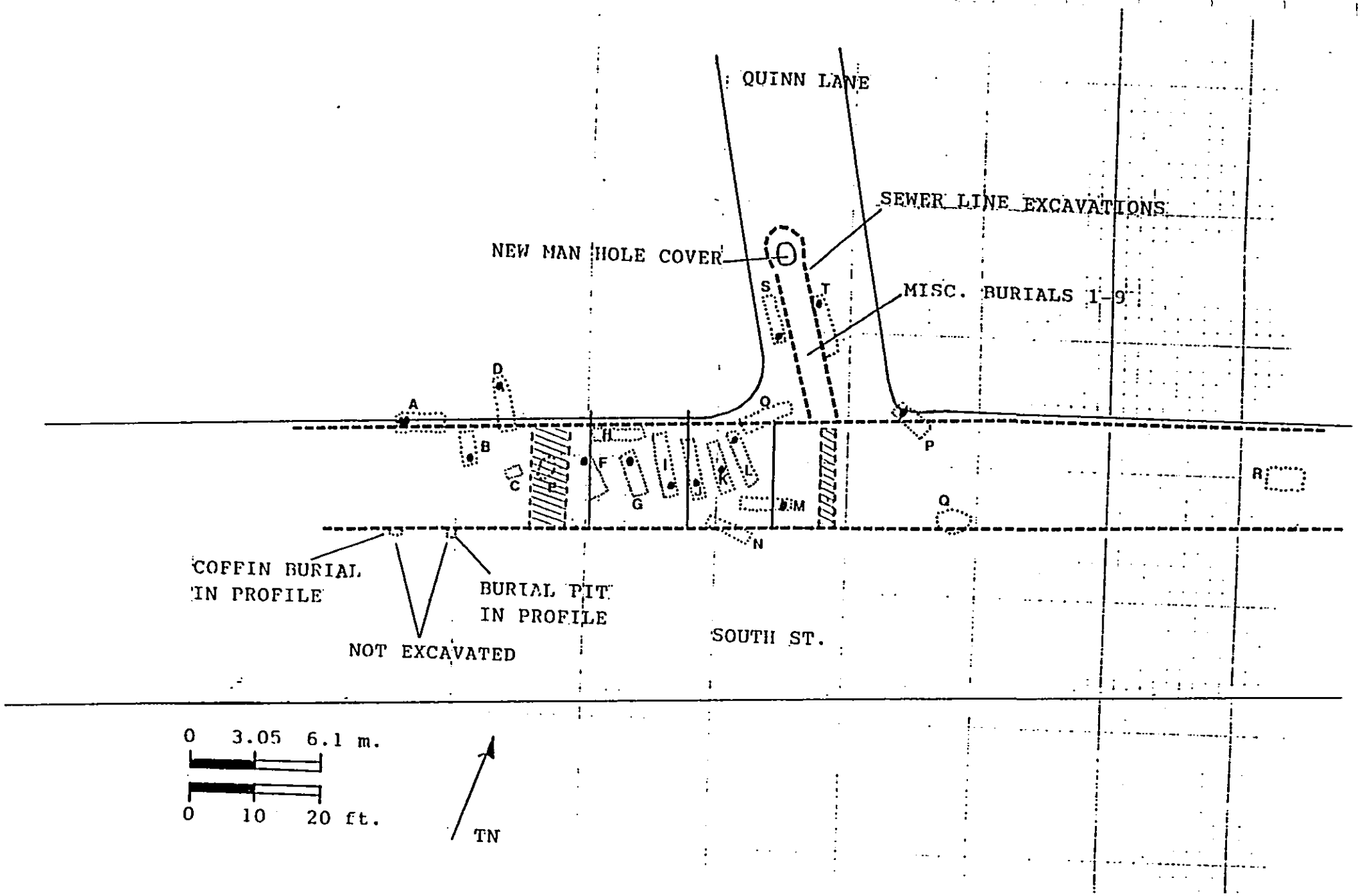


Figure 6 Map of South Street Burials (50-80-06-4531-A-U, 1-9) (Pfeffer and Hammatt 1993)

> Burials will be found throughout Kaka'ako. Some will be in sand remnants, others intruding into the pumice deposited from ancient Punchbowl eruptions. Most will be prehistoric or early historic. We expect that, as in the case of the Ka'akaukukui Cemetery, deaths from pre-1853 epidemics resulted in many burials throughout Kaka'ako. The chance of high status (ali'i) burials, from residences in adjacent elite locations, is high (Griffin et al. 1987:73).

The Ka'akaukukui Cemetery referred to in this report is based upon the discovery of burials - "all likely interred in the late 1700's or early 1800's" - during excavation in 1985 "on the site of the old Ironworks complex" (*Ibid.*:4). The burials - assigned State site #50-80-14-2918 - were documented by Martha Yent (1985) of the Department of Land and Natural Resources Division of State Parks. The Griffin et al. report notes:

> Many more burials are very likely to exist along the extent of the old sand beach [i.e., above the original shoreline at the present Ala Moana Blvd.]. As development proceeds in a Diamond Head direction, human burials and house sites are certain to be found. Specific locations are unknown. (*Ibid.*:4)

An additional concern of the report is the archaeology of 1900 to 1940, especially remnants of the former multi-ethnic residential enclaves, the general locations of which are recorded in the report:

> Sub-surface archaeological materials are likely preserved, but houses built in the 1930's and 1940's may have been largely on top of slightly earlier fill, and be evidenced only be trash pits and yard features. Examination of a few remaining old wooden frame houses suggests that where the ground has not been bulldozed prior to placement of warehouses, etc., some evidence of the ethnic communities may be present... Purposefully buried cherished objects, done early in WW II, may still be in the ground.
>
> ....Japanese 'camps' may be found in archaeological remains; these objects are residues should shed considerable light on pre-war life styles, including relative acculturation, ties to Japan, and quality of life. The early Filipino camps should be sought; their story is largely unknown (*Ibid.*:11).

In 1986, Cultural Surveys Hawaii, recovered twenty-eight burials during the excavation of a storm drain along the *'Ewa* side of South Street, along with other subsurface road improvements into Quinn Lane. A total of thirty-one burial features were encountered, two were left in situ, one proved to be an empty coffin, and the remaining 28 were disintered. The burials, part of the Honuakaha Cemetery (State site 50-80-14-3712) and therefore were reinterred in the Honuakaha Memorial Park in 1993.

In 1993, Archaeological Consultants of Hawaii, Inc., conducted archaeological monitoring of construction activities at the South Street Building Complex (TMK 2-1-31:20). A total of six individual, in situ, burials were encountered during work and subsequently four of the individuals were disintered. All of the burials encountered are believed to be part of the

Honuakaha Cemetery (State site 50-80-14-3712). The burials were reinterred in the Honuakaha Memorial Park in 1993.

In 1986, J. Stephen Athens, performed archaeological monitoring and excavation for the Judiciary Parking Garage located on the *'Ewa/mauka* corner of Pohukaina and South Streets (TMK 2-1-30:3,4,38,39,41, and 43). Based on material recovered from the excavations, Athens posits that the area now encompassed by the Judiciary Parking Garage was used as an early dumping site during the historic period. Aside from historic bottle glass concentrations, no evidence of Hawaiian or other cultural features were located. No undisturbed sand layers were noted in the excavations and much of the area appeared to have be priorly disturbed. It is likely that this project was carried out in an area that was under water, or was intertidal in prehistoric times. Therefore, little in the way of prehistoric Hawaiian deposits would likely be discovered.

Finally, the Ala Moana Waste Water Pumping Station on Keawe Street is on the Hawaii and National Register of Historic Places (State site # 50-80-14-9710). The building was constructed in 1900 and is considered to have "high" preservation potential and historic significance.

III. Monitoring

According to Hawaii Administrative Rules Title 13 Department of Land and Natural Resources, Subtitle 13 State Historic Preservation Division Rules, Chapter 279 Rules Governing Minimal Standards for Archaeological Monitoring Studies and Reports, 13-279-4 Archaeological Monitoring Report, archaeological monitoring shall be based on a written plan, which specifies that the following eight pieces of information be included in a monitoring plan.

1. Anticipated finds and locations: Similar to the previous research section this section will be organized by streets, starting at the corner of Hotel and River Street, and in some instance by individual street blocks.

   River Street and Nimitz between River and Kekaulike Street

   Based on the previous archaeological work conducted along River Street there is the potential to encounter both prehistoric and historic archaeological remains or properties. Potential finds include; fishpond sediments and/or fishpond walls, prehistoric and/or historic living surfaces (i.e. cultural layers) in alluvial deposits, possible lead pipes associated with the initial water system of Honolulu, inadvertent human burials (both prehistoric and historic), prehistoric and historic trash pits or dumps, prehistoric or historic structural foundations (i.e. platforms, basements, pavings etc.), evidence of the burn layer associated with the Chinatown fires, and finally historic and prehistoric material mixed within the fill layers. Age determinations for this area range from AD 796 to present.

Nimitz Highway between Kekaulike Street and Nuuanu Avenue

Based on the previous archaeological work conducted in the area this section of Nimitz Highway is 100% fill between the road surface and the water table. Portions of the fill could contain prehistoric and historic artifacts although they would be out of context.

Nimitz Highway/Queen Street between Nuuanu Avenue and Fort Street Mall

Based on previous archaeological work conducted in the area there is the potential to encounter State site #50-80-14-2456 (a prehistoric to historic large cultural deposit). Potential finds include; *prehistoric/historic* living surfaces in alluvial deposits, possible lead pipes associated with the initial water system of Honolulu, inadvertent human burials (both prehistoric and historic), prehistoric and historic trash pits or dumps, prehistoric or historic structural foundations (i.e. platforms, basements, etc.) some connected with significant people in Hawaii's past (i.e. Ka'ahumanu, Hewahewa, Kamehameha), and finally historic and prehistoric material mixed within the fill layers.

Queen Street between Fort Street Mall and Punchbowl Street

Based on historical research and information Queen Street is one of the older streets within Honolulu. Therefore there is the potential for subsurface intact prehistoric and historic deposits, inadvertent human burials, and possible house foundations and associated material covered over during subsequent widening of Queen Street.

Queen Street between Punchbowl and South Street

Based on previous archaeological work conducted in the area there is the possibility that inadvertent human burials will be encountered in this area as the sewer line passes by the Queen Street burials (State site #50-14-80-4534) which were located along the *mauka* side of Queen Street in an area previously encompassed by Kawaiahao Cemetery prior to the widening of Queen Street (See the Burial Treatment Plan, Colin and Hammatt 1997). Other archaeological materials that may be encountered include prehistoric and historic trash pits, cultural layers, and artifacts out of context within the overlaying fill layers.

South Street between Queen and Halekauwila

Based on the previous archaeological work conducted in the area there is the possibility that inadvertent human burials will be encountered in this area as the sewer passes by Quinn Lane, an area known to contain a portion of the Honuakaha Cemetery (State site 50-14-80-3712) (see the Burials Treatment Plan, Colin and Hammatt, 1997 for complete details). Other subsurface materials that may be encountered in this section include fishpond sediments and/or fishpond walls, prehistoric and/or historic living surfaces (i.e. cultural layers), prehistoric or

historic trash pits, and artifacts out of context in the overlaying fill layers.

South Street between Halekauwila and Pohukaina

Based on the previous archaeological work conducted in the area there is the possibility of encountering fishpond sediments or fishpond walls, prehistoric or historic living surfaces and/or cultural layers (possibly in sand), prehistoric or historic trash pits, possibly inadvertent human burials, and artifacts out of context in the fill layers. Historic refuse is known to have been utilized as fill in this area.

South Street between Pohukaina and Auahi

Based on the previous archaeological work in the area this block is most likely to be composed of fill and previously disturbed materials. Archaeological materials most likely to be encountered would be associated with the remnants of the former multi-ethnic residential enclaves which would include trash pits and yard features. Historic refuse is known to have been utilized as fill in this area.

South Street between Auahi and Ala Moana Boulevard and Ala Moana Boulevard between South Street and the Keawe Street

Based on the previous archaeology in the area there is the possibility of encountering remnants of the old sand beach shoreline. In this area there is the possibility of encountering prehistoric and historic living surfaces and cultural layers, traditional burials, prehistoric and historic trash pits, and artifacts out of context in the fill layers. However based on past monitoring efforts in this portion of Kaka'ako it is anticipated that fill layers will overly lagoonal deposits. The sewer line terminates at the Ala Moana Waste Water Pumping Station which is on the Hawaii and National Register of Historic Places.

2. Extent of monitoring. The archaeologist(s) will monitor all subsurface excavation for jacking and receiving pits, potholes, manholes, and all lateral connections. The exception is for the block of Nimitz Highway between Maunakea Street and Nuuanu Avenue in which the entire deposits are known to be fill. When deposits are determined to be culturally sterile and/or ground disturbance is limited to the reworking of previously disturbed deposits (by this project), then on site monitoring in that area will be terminated after consultation with the SHPD Oahu archaeologist.

3. Treatment of remains encountered: If any archaeological remains are encountered during ground disturbing activities (except for artifacts out of context from the fill layers which includes portions of South Street from Halekauwila to Ala Moana Boulevard where historic refuse was utilized as fill material over former ponds), work will be stopped immediately in that area and the archaeologist will notify the

SHPD/DLNR of the nature of the discovery. If an intact cultural layer, living surface, archaeological sub-surface features (e.g. postholes, pits, hearths etc.), fishpond sediments (if found attempts will be made to collect collum samples for possible pollen analysis), fishpond walls, foundations, charcoal deposit, artifacts or midden deposits, or trash pits are encounter then select sorted samples of charcoal will be collected (for the possibility of radiocarbon analysis, especially if the charcoal appears in a prehistoric context); bulk samples of midden material will be collected; all prehistoric artifacts will be collected; all historic artifacts will be collected unless large trash or refuse pits are encountered in which case only diagnostic samples will be taken; and standard documentation will be conducted (i.e. scale maps, profiles, photographs, detailed soil and provenice descriptions, and interpretation).

The method of excavation that will be utilized in the jacking and receiving pits (see introduction) is not ideal for allowing the recordation of stratigraphy, observation of features, or clearly defining context of material excavated.

4. The monitoring archaeologist has the authority to halt construction in the immediate area of the find in order to carry out the plan. The consulting archaeological firm will make it clear to construction personnel that the archaeologist has the authority to halt work when it is deemed appropriate.

5. Pre-construction conference between the archaeologist and the construction crew. Before work begins on the project the on-site archaeologist will explain to the entire construction crew what materials may be encountered and the procedures to follow if archeological materials are encountered, as well as the role of the archaeologist. At this time it will be made clear that the archaeologist must be on site for all initial grading activities and that the archaeologist has the authority to immediately stop work if necessary.

6. Laboratory work to be performed on collected materials. If human remains are encountered, the consulting parties (SHPD/DLNR, Honolulu County, and the Oahu Burial Council) will decide if it is appropriate to remove the human skeletal remains and if osteological analysis of human remains may occur. If removal is appropriate the remains will be stored temporarily at the SHPD Honolulu office until reburial plans are finalized. Artifactual material will be catalogued and analyzed along with samples of midden material, if collected. Charcoal and other datable materials will be submitted for dating, if in situ well-documented samples are obtained from a clearly pre-historic context which has not mixed with historic materials.

7. Schedule for Reports. A draft Archaeological Monitoring Report will be submitted within 90 days of completion of monitoring fieldwork to the State Historic Preservation Division (SHPD) for review and approval. The consulting archaeological firm will submit the final Archaeological Monitoring report within 30 days after any review comments have been received.

8. Archiving of Collections. All burial materials will be given to DLNR/SHPD for storage. Materials not associated with burials will be temporarily stored at the consulting archaeological firm until an appropriate curation facility is available on O'ahu.

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Appendix C

Baseline Water Sampling Data

M&E Pacific, Inc.
A Metcalf & Eddy Company

Suite 500, Pauahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 FAX (808) 524-0246

Laboratory Test Data for Water Samples, Extracted July 14, 1997, for Nimitz Highway Reconstructed Sewer.

Analyte	Reporting Limit (mg/L)	South St/Auahi St ID# 97070218 MWSA-W714 (mg/L)	Nimitz Hwy/River St ID# 97070219 MWNR-W714 (mg/L)	Queen St/Punchbowl St ID# 97070505 MWQP-W725 (mg/L)	River St/Hotel St ID# 97070506 MWRH-W725 (mg/L)	Tier 1 Action Level (mg/L)
Purgeable Hydrocarbons as Gasoline	0.05	N.D.	2.6	0.084	N.D.	N.S.
Benzene	0.001	N.D.	0.065	N.D.	N.D.	1.7
Toluene	0.001	N.D.	0.016	N.D.	N.D.	2.1
Ethyl Benzene	0.001	N.D.	0.023	N.D.	N.D.	0.14
Total Xylenes	0.002	N.D.	0.056	N.D.	N.D.	10
Extractable Hydrocarbons as Diesel	0.05	0.093	22.0	0.57	0.27	N.S.
Oil & Grease	0.001	0.0014	0.023	N.D.	N.D.	N.S.
Acenaphthene	0.01	N.D.	N.D.	N.D.	N.D.	8.32
Benzo(a)pyrene	0.01	N.D.	N.D.	N.D.	N.D.	0.0002
Fluroanthene	0.01	N.D.	N.D.	N.D.	N.D.	0.013
Napthalene	0.01	N.D.	N.D.	N.D.	N.D.	0.77