CHARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

COLLEEN M. SUYAMA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

January 24, 2007

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RECEIVED
OFC. OF ENVIRONMENTAL QUALITY CONTROL

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

Dear Ms. Salmonson:

RE: Final Environmental Assessment for the Proposed Kahului Town Center Redevelopment Located at TMK 3-7-007:005, 008, 009, 010, 027, and 050, Kahului, Island of Maui, Hawaii (EA 2006/0008) (SM1 2006/0010)

The Maui Planning Commission at its regular meeting on January 23, 2007, accepted the Final Environmental Assessment (FEA) for the subject project, and issued a Finding of No Significant Impact (FONSI). Please publish the FEA in the **February 8, 2007**, Office of Environmental Quality Control (OEQC) Environmental Notice.

We have enclosed a completed OEQC Publication Form and four (4) copies of the FEA. If you have any questions, please call Ms. Ann T. Cua, Staff Planner, of this office by email to ann.cua@co.maui.hi.us or by telephone at 270-7521.

Sincerely,

Jeffrey S. Hunt

JEFFREY S. HUNT
Planning Director

JSH:ATC:sls
Enclosure
c: Ann T. Cua, Staff Planner
Chris Hart, Chris Hart & Partners
Kahului Public Library (w/report)
EA Project File (w/copies of enclosures)
General File
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2007-02-08-MA-FEA-KAHULUI TOWN CENTER

Final Environmental Assessment

prepared in support of

Kahului Town Center

TMK: (2) 3-7-007:005, 008, 009, 010, 027, and 050
Kahului, Maui, Hawaii

December 2006

Prepared for:
A & B Properties, Inc.
822 Bishop Street
Honolulu, Hawaii 96814
808/525-8485

Prepared by:
Chris Hart & Partners, Inc.
1955 Main Street, Suite 200
Wailuku, Hawaii 96793
808/242-1955

CHRIS HART & PARTNERS, INC.
LANDSCAPE ARCHITECTURE & LAND USE PLANNING

graphic images by MC Architects, Inc.

Index

Final Environmental Assessment

ATTACHMENTS

I. PROJECT INFORMATION

A. PURPOSE OF THE REQUEST

This Environmental Assessment (EA) has been prepared in order to assess the potential environmental impacts associated with the development of the Kahului Town Center project situated on a 19.9 acre site at Kahului, Island of Maui, Hawaii, TMK Nos. (2) 3-7-07: 005, 008, 009, 010, 027 and 050. The project will incorporate a traditional town concept with a mixture of retail, office, multi-family residential and park uses in a pedestrian-friendly setting. The redevelopment project will be implemented in phases spanning over a 6- to 10-year period.

The applicant is ~~voluntarily~~ submitting the proposed action for review in accordance with the provisions of HRS Chapter 343 and HAR Title 11, Chapter 200, Environmental Impact Statement Rules, in conjunction with the filing of a Special Management Area (SMA) Use Permit application.

B. PROJECT PROFILE

Proposed Project:	Approximately 144,000 square feet of retail commercial space; 96,000 square feet of new office space and 57,000 square feet of existing office space; 442 multi-family residential units; 1,913 structured and surface parking stalls to accommodate the project; on- and off-site infrastructure improvements; and landscape planting, including a town square park.
Existing Land Use:	Kahului Shopping Center
Project Area:	19.9 acres
Access:	Various entryways from Ka`ahumanu Avenue; Pu`unene Avenue; Kamehameha Avenue; and Lono Avenue

C. REQUIRED LAND USE AND DEVELOPMENT PERMITS

The following land use development permits and approvals are required for the project, and all, except building permits and consolidation/resubdivision, are in the process of being obtained:

- Special Management Area (SMA) Use Permit
- Building Permits
- Grading Permit
- National Pollution Discharge Elimination System (NPDES) Permit
- Demolition Permits for Structures over 50 years old
- Flood Development Permits
- *Consolidation or Consolidation/Resubdivison of internal lots*

D. IDENTIFICATION OF THE APPLICANT AND OWNER

Applicant/Owner:	A&B Properties, Inc.
Address:	822 Bishop Street Honolulu, Hawaii 96813
Phone/Fax:	808/525-8461; 808/525-8477
Contact:	Mr. Darren S. Lake, Project Manager

E. CONSULTANTS

Land Use Planners:	Chris Hart & Partners, Inc. 1955 Main Street, Suite 200 Wailuku, Maui, Hawaii 96793-1706
Phone/Fax	808/242-1955; 808/242-1956
Contact:	Mr. Michael Summers, Senior Planner
Architect:	MC Architects 1044 Nuuanu Avenue Honolulu, Oahu, Hawaii 96817
Phone/Fax:	808/529-0807; 808/529-0907
Contact	Mr. Steve Marlette

Civil Engineer:	Sato & Associates, Inc. 2046 South King Street Honolulu, Hawaii 96826
Phone:	808/955-4441; 808/942-2027
Contact:	Mr. Kelvin Sato
Traffic Engineer:	Phillip Rowell and Associates 47-273 "D" Hui Iwa Street Kaneohe, Oahu, Hawaii 96744
Phone/Fax:	808/239-8206; 808/239-4175
Contact:	Mr. Phillip Rowell
Archaeologist:	Scientific Consultant Services, Inc. 711 Kapiolani Blvd. Suite 975 Honolulu, Hawaii 96813
Phone/Fax:	808/597-1182; 808/597-1193
Contact:	Mr. Michael Dega

F. APPROVING AGENCY

Agency:	Maui Planning Commission c/o Department of Planning County of Maui 250 South High Street Wailuku, Maui, Hawaii 96793
Phone/Fax:	Phone: 808/270-7735; 808/270-7634

G. PRE-CONSULTATION

A. COUNTY OF MAUI

1. Department of Planning
2. Department of Public Works and Environmental Management
3. Maui County Urban Design Review Board
4. Maui Planning Commission
5. Members of the Maui County Council
6. Mayor, County of Maui

B. STATE OF HAWAII

1. Department of Transportation

C. PUBLIC OUTREACH

1. Community Open House (January 21, 2006)
2. Residential Broker Focus Groups (July 2005)
3. Presentation to Rotary Club of Wailuku

II. DESCRIPTION OF THE PROPERTY AND PROPOSED ACTION

A. PROPERTY LOCATION

The subject property is the site of the existing Kahului Shopping Center block, including the shopping center and other commercial buildings. It comprises six (6) contiguous parcels bounded by Ka`ahumanu Avenue, Pu`unene Avenue, Kamehameha Avenue, and Lono Avenue. This property is located within the core of Kahului Town, between the Maui Mall Shopping Center, to the east, and the Queen Ka`ahumanu Shopping Center and several other businesses, to the west, in central Kahului, Maui, Hawaii TMK Parcel Nos. (2) 3-7-07: 005, 008, 009, 010, 027 and 050 (See: Figure Nos. 1, 2, and 3, "Regional Location", "Tax Map Key", and "Aerial Photograph").

B. EXISTING LAND USE

The subject property is developed as the Kahului Shopping Center block, including the shopping center and other commercial buildings. The Kahului Shopping Center block accommodates a mix of tenants including retailers, professional service establishments, professional offices, restaurants, and a variety of other businesses. Prior to a 2005 fire, the Kahului Shopping Center block included approximately 99,000 square feet of retail space within the shopping center. 50,000 square feet were lost to the fire. In addition to the Kahului Shopping Center, the commercial buildings include approximately 80,000 square feet of commercial office and retail space. (See: Figure No. 4 and 5 a-b, "Aerial Photograph - Existing Site Condition" and "Topographic and ALTA Survey").

C. LAND USE DESIGNATIONS

State Land Use Classification:	Urban
Wailuku-Kahului Community Plan:	(B) Business/Commercial (See: Figure No. 6 "Community Plan Map")
County Zoning:	B-2 Community Business District (See: Figure No. 7, "Zoning Map")

Flood Zone Designation:	Portions of the property are within Zone "V" (potential tsunami inundation), Zone "A-4" (potential flood inundation), and Zone "C" (minimal flood hazard potential) (See: Figure No. 8 a-b, "Flood Insurance Rate Map")
Special Designations:	Special Management Area (SMA) (See: Figure No. 9, "Special Management Area Map")

D. DESCRIPTION OF PROPOSED ACTION

In February 2005, a major fire occurred at the Kahului Shopping Center (KSC). About 50% of the buildings were destroyed, including Ah Fooks Super Market, the Salvation Army Thrift Shop, and TJ's Oriental Food Mart. As a result of this unfortunate event, A&B Properties, Inc. (A & B) contracted with a joint-venture team of MC Architects of Hawaii and Nestor + Gaffney Architecture of California to prepare a master plan for a mixed-use development of the KSC block. The 19.9-acre site is entirely owned by A&B Properties and is bounded by Ka`ahumanu Avenue, Pu`unene Avenue, Kamehameha Avenue, and Lono Avenue.

The KSC block is strategically located between the Maui Mall, located to the east, and the MCC Student Housing Project (currently under construction), proposed Kane Street Commercial Mixed-Use Project and Queen Ka`ahumanu Shopping Center, located to the west. Its central location, within close proximity to the Kahului Harbor, makes the site especially attractive and accessible for the establishment of an identifiable and vibrant "town center" to serve Kahului. The town center would be comprised of commercial office uses, retail, restaurant, and residential uses organized around a pedestrian-oriented "Main Street" that would link the block with the Maui Mall and Queen Ka`ahumanu Shopping Center (See: Figure Nos. 10 and 11, "Existing A&B Land Ownership" and "Long-term Kahului Town Center Strategic Vision"). Figure No. 11 depicts the connectivity and synergy that exists between the proposed Town Center District and the existing adjacent Retail/Entertainment District at the Maui Mall, the Residential Mixed-Use District along Vevau Street, and the Fashion & Retail/Entertainment District at the Queen Ka`ahumanu Shopping Center. The figure also illustrates a longer-term vision, beyond the scope of this project, which would strengthen the linkages between the four distinct districts.

Historical Context

During the early 1900s, the subject property was part of the plantation camp of Kahului Village. The Kahului Railroad was located nearby to transport cut sugar cane, equipment, supplies and workers to and from the fields. The camp village included stores, eateries, movie theaters, and residential housing (See: Figure No. 12, "Historic Aerial Photos Prior to 1952"). In 1946, a tsunami inundated much of the plantation camp along the shoreline frontage of Kahului Harbor including the subject property.

In 1951, the Kahului Shopping Center was opened and touted to be "the first shopping center west of the Rocky Mountains." It was the centerpiece of a new residential development in Kahului referred to as "Dream City". For many residents, this master planned development represented a new beginning in their lives by affording plantation workers an opportunity to own their home. Over the next 30 years as the Kahului residential increments were developed, residents moved from outlying plantation villages, which were then converted into sugar cane fields. Also during this time, the Maui Mall and Queen Ka`ahumanu Shopping Center were developed to cater to the island's growing population.

Today, Kahului remains a thriving community, as the hub of commercial and industrial activity on the island of Maui. It contains the island's only commercial harbor and its major commercial airport. According to the 2000 U.S. Census, the population of Kahului was 20,134 residents, representing the largest census division on Maui. Hundreds of businesses are located in Kahului. Within the past 10 years, commercial growth has expanded along the Dairy Road corridor with the addition of the Maui Market Place and the superstores of Home Depot, Lowe's, Wal-Mart, K-Mart, and Costco. Also, spanning from Kahului to Wailuku is the developing Maui Lani residential community.

Kahului Town Center Strategic Master Plan

The Kahului Town Center (KTC) Strategic Master Plan proposes the creation of a town center with a mix of retail, office and residential uses in a pedestrian-friendly setting.

The plan incorporates the following design objectives:

- Create a Town Center for Kahului in which residents can live, work and play;
- Embody the spirit and the "friendly casual" atmosphere of the local lifestyle;
- Revive the Kahului core by creating exciting urban retail and residential housing opportunities for local residents;
- Create a pedestrian-friendly environment;
- Unify existing and planned neighboring developments, namely the Maui Mall (retail/entertainment center), the mixed use commercial/residential area (Kane Street project and student housing on Vevau Street), and the Queen Ka`ahumanu Shopping Center (fashion retail/entertainment district) by creating linkages between them and giving strength to the larger "district" (See: Figure No. 11, "Long-term Kahului Town Center Strategic Vision");
- Enhance the tradition of the Kahului Shopping Center as a gathering place, where people can go to relax, be entertained, and socialize;
- Create shade and outdoor spaces that encourage people to stay longer with more frequent visits; and
- Enhance the unique sense of place grounded in the history of Kahului Town.

Although maintaining a connection to its plantation camp roots, the proposed Town Center represents a major redevelopment project and the evolution of Kahului as an urban center. The concept of a town center with mixed-use development in a pedestrian-friendly setting reflects a basic tenet of the "Smart Growth" approach to land planning converting under-utilized, in-fill land to more productive and efficient land use not unlike the original Kahului Town. The project will provide opportunities for commercial and residential development in close proximity to existing residential areas, government services, and centers of employment. The site is also near the Kahului Harbor, which hosts a large number of cruise ship passengers who spend a free day touring the island. For many of these passengers, the area surrounding Kahului Harbor, including the Maui Mall and Kahului Shopping Center block, is the first view of Maui. The proposed project architecture and retail uses seek to enhance the Maui experience for these passengers.

Development Concept

The plan includes a pedestrian oriented "Main Street", Town Center Drive, that connects Maui Mall to Ka`ahumanu Center. Town Center Drive becomes the chief organizing element that links the four blocks or "Districts" together. Town Center Drive will be a very pedestrian-oriented streetscape with wide sidewalks available for street-front cafes and pedestrian seating areas. Crosswalks will be raised, making pedestrians more visible to drivers and to calm traffic. Interior intersections between Kinau Avenue, Town Center Drive and secondary interior road connections will consist of pavement built to the height of the raised crosswalks. The plan creates a very comfortable walking environment that shifts the emphasis of the area from vehicular-oriented to pedestrian-oriented and encourages walking through the district.

The project's Main Street, Town Center Drive, connecting Lono Avenue and Pu`unene Avenue and the cross street, Kinau Avenue connecting Ka`ahumanu Avenue and Kamehameha Avenue will intersect at a roundabout near a town square that will function to organize the project site into four (4) quadrants. Each quadrant has the potential to be an individual project with different mixes of retail, office, and residential components. The retail/commercial spaces will front the town square and the interior streets to provide interest, energy and activity along the sidewalks. The sidewalks will be 20-feet wide to accommodate sidewalk dining and retail displays along with benches, canopies, and street trees for shade, color and interest. Building heights along Town Center Drive will vary from 30 to 62 feet and from one to four stories.

Town center Drive and Kinau Avenue will include a two-lane vehicular private roadway with angled parking and a speed limit up to 10 MPH. These interior streets will include a landscaped boulevard concept to create an active and comfortable streetscape with convenient parking available to retailers. On-street parking will also serve to calm traffic and provide a buffer between pedestrians along the sidewalks and vehicular traffic (See: Figure Nos. 13, 14a-c, and 15 "Site Plan", "Conceptual Landscape and Site Plan", and "Enlarged Site Section of Town Center Drive"). A mass transit/bus drop-off point will be placed at the Kinau entrance to the project from Kaahumanu Avenue (See: Figure No. 13, "Site Plan").

Icon and Town Square

The roundabout will incorporate a prominent focal point to provide a visual landmark for the Town Center District. Adjacent to this area will be the Town Square Park, a multi-functional, half-acre open space area with shade trees and lawn area available for public activities and as an amenity for the residential units. This space could be utilized for art fairs, small music venues, play area for children or a weekend farmers market. Retail spaces fronting on the Town Square Park could include outdoor cafes and restaurants to take advantage of the park atmosphere.

Commercial Development

The Kahului Town Center will be an important hub for commerce, employment, housing, entertainment, and civic purposes in Central Maui. The 20-acre site will feature approximately 144,000 square feet of retail space and 96,000 square feet of new and 57,000 square feet of existing commercial office space. It is anticipated that many of the existing businesses within the Kahului Shopping Center will become tenants of the newer buildings. The district will feature a diverse tenant mix potentially including Ah Fooks, (the former Kahului Shopping Center anchor tenant) grocer, boutique retailers, restaurants, clubs, and cafes, one or more banks, medical clinics, general merchandisers, professional offices and business services. Boutique retailers, restaurants and cafes will be featured at ground level along Town Center Drive and Kinau Avenue, while professional offices will be located within the secondary first floor space and upper floors of some buildings.

Residential Development

The residential component will feature a mixture of townhouse units, four-story stacked flats and "podium" residential product. Approximately 442 residential units are planned on the site. The breakdown of units is anticipated to be as follows:

- Seventy-eight (78) 1-bedroom units;
- Two hundred and ninety four (294) 2-bedroom units; and
- Seventy (70) 3-bedroom units.

The project will be especially attractive to future residents that want to live within walking distance of employment, shopping, dining, and entertainment.

Residential development at the Kahului Town Center will be within easy walking distance of retail and other commercial services, as follows:

- One block from a market, drug store, theater and shops at the Maui Mall;
- One block from six (6) financial institutions located on or adjacent to the subject property;

- One block from Hoaloha Park, a 3-acre shoreline park at Kahului Harbor;
- One block from several churches, health clinics, public library, and swimming pool at the Salvation Army Center;
- Two blocks from the Queen Ka`ahumanu Shopping Center, the fashion retail/entertainment district of Kahului; and
- One block from the Kahului Harbor, a future site for inter-island ferry service.
- Walking distance to the Maui Community College

Parking

Each residential unit will be provided on-site parking. Angled parking along the interior streets will provide approximately one-fifth of the required parking and will serve the ground floor retailers. Parking within the interior of the lots will accommodate the remainder of the required parking. This parking will be surface (Quadrants 1 and 2) and within parking structures (Quadrants 3 and 4).

Architectural Character

The architectural character of the development will be grounded in style that evokes the historical evolution of Kahului with specific historical references to buildings in Hawaii. Style will reflect a humble "sense of place" keeping true to the hearts and history of Kahului. Historic urban centers like downtown Hilo, Historic Lahaina Town and Paia that hold a strong place in the hearts of the Kama'aina will be used as reference architecture (See: Figure No 17 a-u, "Architectural Drawings").

The majority of the facades reflect a "plantation style" motif due to the fact that Kahului's past is steeped in plantation history. Additionally, this motif was appropriate for creating a livable, comfortable, and humble sense of place for the local community with a connection to the site history. The plantation motif will attempt to hearken back to the plantation camps that existed on the site in the 20's and 30's, such as Fish Camp, Filipino Camp, and Store Camp. Both the commercial and portions of the larger residential buildings incorporate plaster, akin to the Baldwin Bank and the Old Kahului Store as an example of context.

The project is large enough to support multiple aesthetics. The project applies many specific details that are reminiscent of some of the more prominent Neo Classical and Mission Revival buildings in Maui without creating a "revival" kind of place. This approach considers the Secretary of the Interior's guidelines for Historic Buildings, we should not wholesale recreate historic buildings; we should create new buildings that are informed by our past but not slaves to it.

The intent of the architectural design is to provide a variety of Maui-based architectural images along the street frontages, so the overall development has the appearance of having been built by a variety of landowners over a long period of time each possessing its own Hawaii-based architectural character. We believe that this approach will eliminate the monotony of a uniform architecture character and add a historical architectural richness to the Town Center development.

The street level architectural character is based on giving a "friendly casual" pedestrian scale to the streetscape using images of plantation era storefronts found in Lahaina, Paia and upcountry Maui towns. Large, wall-hung shaded overhangs; large storefront areas with clerestory glass made of a variety of wood, metal and glass give a variety of historical images to the pedestrian scale of the development. The street level building materials will be a combination of historical retail storefront materials, such as board and batten, horizontal wood siding with accented corner elements and plaster or stucco based materials. The materials selected are intended to give a variety of character to the storefront areas resulting in the "friendly casual" aloha spirit of the kama'aina lifestyle.

The ground level retail spaces are differentiated from upper levels of office or residential spaces by use of a historical cornice at the second level floor line in a variety of sizes and styles reminiscent of plantation architecture found throughout Maui. This differentiation helps breaks down the mass of the overall building and again, gives scale to the pedestrian environment. Upper-level commercial spaces in Quadrants 1 and 4 along interior street frontages emphasize an architectural character found on the streets of Lahaina and Hilo. The use of a variety of building heights, cornice lines and roof appendages add to the character of the Town Center with buildings built at different times and styles.

The architectural character of the upper level residential development is characterized by a variety of undulations within the façade and varying overall heights of portions of the building help break up the mass of the buildings. Façade treatments include a variety of open lanais with decorative railing designs overlooking the streetscape and park area. The top of the various buildings are capped with a variety of Maui-based historical cornice elements and sloped roof "hats" at accent feature areas.

The Ka`ahumanu Ave frontage on Quadrants 3 and 4 have been designed as an entry "gateway" to the development from Ka`ahumanu Ave. This "gateway" element at the intersection of Kinau Street and Ka`ahumanu Ave is designed with vertical towers

flanking the intersection intended to be a focal point of the view plane of the Town Center project and visible from the water (cruise ships, super ferry etc).
The successful development of the Kahului Town Center will require that the outdoor spaces be comfortable and inviting to users throughout the day and that there is a sense of scale and place in the new urban setting. The old Kahului Shopping Center was punctuated with numerous large monkey pod trees that created a shade canopy that invited outdoor seating and gathering by both patrons and visitors to the shopping center. In like fashion, the new Kahului Town Center will have many of the existing monkey pod trees relocated along the interior streetscapes and in the town square to maintain the qualities that existed in the old Kahului Shopping Center. New medium canopy trees will be added along the streetscapes to create additional shade and interest. Existing monkey pod and coconut trees will also be maintained or relocated where possible on the existing streets surrounding the Town Center block.

In addition to the canopy trees, there will be elements, including street furniture including, benches, trash receptacles, bollards and potted plants that help to define the spaces and identify crosswalks. Street level signage, lighting, paving, and landscape will be integrated to provide unity and variety throughout the Town Center. These elements will shape a pedestrian friendly environment that will define the quality of the new development.

The use of native plant materials, including Hawaiian kou, pandanus, and hibiscus, will be incorporated throughout the proposed development.

Project Phasing

A key objective of the development program is to have enough retail and residential housing to be able to convey the "vision" and potential of the district. Town Center Drive and other access roadways have been located to utilize existing curb cuts onto adjacent streets. This configuration will allow construction of the roadways and utility infrastructure to progress with the first phase and independent of specific projects within the quadrants.

The first two phases of development will include commercial and residential within Quadrants 1 and 2, which will strengthen the "Town Center" concept and establish the core elements of the Town Center. Phases I and II will also include ground floor retail development along the Town Center Drive frontage of Quadrants 3 and 4. Full build-out of Quadrants 3 and 4 will be completed in later phases. The retail and office uses will be developed hand-in-hand with residential development. Both uses will rely on each other to create the synergy necessary for a successful "town center".

The development of the subject Town Center project will be guided by the project master plan and the design guidelines to establish a strong "Town Center" concept and integrated design character for the project. At each phase of development, the project will comply with applicable building and parking codes.

The following are highlights of the development concept for each quadrant of the Kahului Town Center Project:

- **Quadrant #1:** This area is located on the Kamehameha Avenue and Pu`unene Avenue frontage and proposed for commercial development. The proposed development would be composed of ground floor retail uses fronting on Town Center Drive with two to three levels of offices above. Given the demand for commercial space and minimum amount of existing buildings, this quadrant will compromise the first phases of development. Development of Quadrant 1 will trigger the requirement for 366 parking stalls. Quadrant 1 will accommodate 184 surface parking stalls. Surface parking within Quadrant 3 will accommodate the remaining required stalls until permanent structured parking is provided within Quadrants 3 and 4.

Quadrant 1 Density

Use	**Sq. Ft. / Units**
Retail	36,234 SF
Office	61,574 SF
Restaurant	4,484 SF
Bank	9,000 SF
Parking	366 stalls (182 stalls located within Quadrant 3)
Timing	2008

(See: Figure Nos. 13 and 17b-k "Site Plan" and "Architectural Drawings" and the Table 67 on page 68 of the report.)

- **Quadrant #2:** This area is located on the Kamehameha Avenue and Lono Avenue frontage and proposed for residential housing and retail development. Ground floor activity generating retail will be located along the Town Center Drive frontage to energize the abutting sidewalks. The Kamehameha Avenue frontage will primarily have two to three-story townhouse residential units. Parking for residential uses, located in the interior of the Quadrants, has been separated from retail/commercial uses. Development of Quadrant 2 will trigger the requirement for 230 parking stalls. Quadrant 2 will accommodate 208 surface parking stalls. Surface parking within Quadrant 3 will accommodate the remaining required stalls until permanent structured parking is provided within Quadrants 3 and 4.

Quadrant 2 Density	
Use	**Sq. Ft. / Units**
Retail	12,163 SF
Residential	80 Units
Restaurant	1,258 SF
Parking	230 stalls (22 stalls located within Quadrant 3)
Timing	*2009*

(See: Figure Nos. 13 and 17b-k "Site Plan" and "Architectural Drawings" and the Table 67 on page 68 of the report.)

- **Quadrant #3:** This area is located along the Ka`ahumanu Avenue and Pu`unene Avenue frontage and is considered to be most desirable for a residential product due to the ocean view orientation. This Ka`ahumanu Avenue frontage is very suitable for a "podium" residential product with retail at the ground level facing the streets, private on-grade parking servicing the residential, and the residential units above at roughly the 22-foot elevation. The interior portion near the Town Square is desirable for mixed-use development with retail/commercial on the ground level and residential units on the upper levels and on-grade parking. Development of Quadrant 3 will trigger the requirement for 854 parking stalls. Quadrant 2 will accommodate 846 structured parking stalls. Surface parking within Quadrant 4 will accommodate the remaining required stalls until permanent structured parking is provided within Quadrant 4.

Quadrant 3 Density	
Use	**Sq. Ft. / Units**
Retail	40,732 SF
Residential	295 Units
Restaurant	6,593 SF
Parking	854 stalls (8 stalls located within Quadrant 3)
Timing	2011

(See: Figure Nos. 13 and 17b-k"Site Plan" and "Architectural Drawings" and the Table 67 on page 68 of the report.)

Quadrant #4: This area is located along the Ka`ahumanu Avenue and Lono Avenue frontage and would expand on the existing commercial office complex that includes the Kahului Building and the Central Pacific Bank. The plan includes "podium" residential units to take advantage of the harbor and Town Square park views. This quadrant will be anchored by specialty shops, which might include a market, on the prominent Main Street corner. Development of Quadrant 4 will trigger the requirement for 464 parking stalls. Quadrant 4 will accommodate 675 structured parking stalls. Surplus parking within Quadrant 4 will accommodate the required stalls for Quadrants 1, 2, and 3.

Quadrant 4 Density

Use	Sq. Ft. / Units
Retail	29,414 SF
Residential	67 Units
Office (New)	34,600 SF
Office (Existing)	56,700 SF
Bank	4,180 SF
Parking	675 stalls (464 stalls are required for Quadrant 4. Surplus 211 stalls will accommodate parking required for Quadrants 1, 2, and 3.)
Timing	2012

(See: Figure Nos. 13 and 17b-k "Site Plan" and "Architectural Drawings" and the Table 67 on page 68 of the report.)

<u>The above outlines the proposed project concept. While maintaining the concept outlined herein, specific building and Quadrant densities may potentially be changed and overall project density may potentially be decreased.</u>

Project Information

Table 1 shows the project's design specifications.

Project Design Specifications

	Allowed/Required	Proposed
Project Area		19.9 acres (866,844 SF)
Total Building Floor Area	1,733,688 SF	706,640 SF
Floor Area Ratio	200%	82%
Total Building Floor Areas: Retail: Office: Restaurant: Bank: Residential Units:		 118,543 SF 152,823 SF (56,653 SF existing) 12,335 SF 13,180 SF 442
Parking Stalls Provided: Standard Compact Tandem Compact Handicap Total	25% of the total req. stalls Allowed for Apartments 1,913 stalls	1,872 stalls — — 41 stalls 1,913 stalls
Building Height	6-stories	6-stories

Figure Nos. 13 and 14a shows the proposed conceptual site plan and landscape plan for the subject development.

Access. Ingress and egress will be from internal privately owned and maintained streets that are accessible from Ka`ahumanu, Pu`unene, Kamehameha, and Lono Avenues. Each street will be improved to accommodate two lanes of traffic, curbs, sidewalks, and gutters.

On and Off-Site Infrastructure Improvements. On-site improvements consist of, but are not limited to, paved internal streets and parking lots, underground utilities, and landscape planting. An underground drainage system will also be provided.

Additional onsite storm runoff created by the project will be intercepted by swales and drain inlets located within the paved parking and landscape areas and retained onsite.

Off-site infrastructure improvements relating to roadway, traffic, water, sewer, utility, and drainage facilities affecting State and/or County roadways or other lands may be required to support the development. While the specific nature of each improvement is not known at this time, the EA is intended to address all current and future instances involving use of State and/or County lands relating to offsite infrastructure improvements in support of the project.

Ka`ahumanu Avenue and Pu`unene Avenue are under the jurisdiction of the State Department of Transportation (SDOT). Kamehameha Avenue and Lono Avenue are under the jurisdiction of the County Department of Public Works and Environmental Management (DPWEM). Improvements will not be necessary for Ka`ahumanu Avenue. Improvements to Pu`unene Avenue will be constructed, in accordance with SDOT standards. Kamehameha Avenue will be improved to County standards, including curbs, gutters, and sidewalks. Lono Avenue currently has curbs, gutters and sidewalks.

There are existing 12-inch water distribution lines on all the abutting four (4) streets and upgrades will not be necessary with the exception of additional fire hydrants.

The site contains sewer lines of various sizes including an existing 18-inch county gravity line that runs the length of Town Center Drive and is within the service area of the County's Kahului Wastewater Treatment Facility. The Quadrant concept was designed in order to accommodate this existing county sewer line. During the time of building permit application, the applicant will comply with any assessment fees and requirements established by the DPWEM.

Consolidation/Resubdivision. The subject property currently comprises six (6) parcels. These parcels will either be consolidated into one parcel, or the property will be consolidated and resubdivided into six (6) or less parcels.

Construction. Construction will be phased over a 6- to 10-year period and will comply with the required State and County requirements during the construction permit review. There will be short-term construction related impacts to the surrounding environment. Standard mitigation measures to control these impacts are described in Section III of this report.

Figure No. 20 identifies the proposed phasing and staging of construction areas for the build-out period of the project.

Interim Farmers Market. A farmers market is being planned within Quadrant 3 as an interim use until this section of the property is fully developed, scheduled to occur in 2011. The proposed interim structure will be approximately 23,000 square feet and will accommodate approximately 17,250 square feet of selling space. The parking demand of approximately 87 stalls will be met with the Phase I central roadway street parking and existing surface parking within Quadrant 3. The Phase I central roadway will provide access for the market. The Farmer's Market is anticipated to operate in the mornings from (8 a.m.) till mid-afternoon. The tenants will include vendors of local farm products, arts and crafts. Open floor space will be provided to the tenants, and after closing each day, the floor area will be cleared. The location of the market is shown on Figure No. 20, "Construction Phasing and Staging Plan". The architectural character of the farmers market pavilion is shown on Figure No. 17r "Architectural Drawings".

On-site Lighting. The project's site lighting will consist of pole mounted fixtures with a downward directed light source in parking areas and a combination of pole mounted and bollard lights in pedestrian areas. Pole mounted light fixtures will be kept at a pedestrian related height of 12'-15'. All site light fixture design will be coordinated with building architectural fixtures and finishes to compliment one another and add visual unity to the project during the day and at night. The light elements will be specified to maximize energy efficiency and provide the necessary lighting for safety and circulation.

Energy and Water Conservation Measures. The following Energy and Conservation Measures will be incorporated into the project:

For natural cooling, use:

- Reflective or light colored roofing
- Light colored paving ~~(concrete)~~ and building surfaces
- Tree planting to shade buildings and paved areas
- Building orientation and design that captures trade winds

Maximize efficiencies for lighting, Heating, Ventilation, Air Conditioning (HVAC) systems and other equipment. Use insulation and/or radiant barriers, natural ventilation, ceiling fans and shading to avoid the use of air conditioning whenever appropriate.

- Provide tenant sub-metering to encourage utility use accountability.
- Select lamps and ballasts with the highest efficiency, compatible with the desired level of illumination and color rendering specifications.
- Incorporate daylighting controls and/or motion activated light controls in low or intermittent use areas.
- Locate fresh air intakes away from polluted or overheated areas. Locate on roof where possible.
- Use separate HVAC systems to serve areas that operate on widely differing schedules and/or design conditions.
- Install water conserving, low flow fixtures as required by the *Uniform Plumbing Code.*

Incorporate water efficient landscaping (xeriscaping) using the following Principles:

- Appropriate plant selection: Use drought tolerant and/or slow growing hardy grasses, native and indigenous plants, shrubs, ground covers, trees, appropriate for local conditions, to minimize the need for irrigation.
- Practical turf areas: Turf only in areas where it provides functional benefits.
- Mulches: Use mulches to minimize evaporation, reduce weed growth and retard erosion. Contact the local Board of Water Supply for additional information on xeriscaping such as efficient irrigation, soil improvements, mulching, lists of low water-demand plants, tours of xeriscaped facilities, and xeriscape classes.
- Consult with Maui Electric Company Inc. to participate in programs promoting energy saving and energy efficiency technologies.

Sustainable Building Design Principles. The developer is investigating the feasibility of incorporating individual green building technologies into the project and individual building design. Additionally, the developer is investigating the feasibility of obtaining LEED certification. The U.S. Green Building Council (USGBC) is currently reviewing two new certifications that could potentially be applicable to this project: LEED-Neighborhood Development certification and LEED- Multifamily certification. Although these certification programs have not been implemented by the USGBC, they are expected to be available as the project is built-out. The USGBC has released draft standards for the LEED- Neighborhood Development certification. A table has been attached as Appendix K, outlining these standards based on the September, 2005 draft obtained from the USGBC website, and includes comments indicating whether each standard is potentially applicable to this project. The table should only be used as an indicator of whether a standard is applicable to the project and therefore potentially feasible. The feasibility of meeting these standards will continue to be evaluated. For individual buildings, the developer will continue to review the feasibility of seeking LEED- NC and/or LEED for multi-family certification.

E. ALTERNATIVES

1. No Action

Analysis. The "no action" alternative would leave the project area essentially in its existing condition. This is not a viable alternative since the subject property is currently significantly underutilized even prior to the February 2005 fire that destroyed the Ah Fooks Super Market, the Salvation Army Thrift Store, and TJ's Oriental Food Mart and damaged several other buildings on the property. Leaving the property in its existing underutilized condition would deprive the property owner of the opportunity to make investments into the property that would produce a greater long-term return on investment. The "no action" alternative would also deprive the community of the additional goods and services that could be provided on this urban designated and very conveniently located parcel.

2. Alternative Styles, Size, and Configuration

Analysis. Various alternative configurations were considered during the design phase of the project. A summary of these alternatives is presented below:

Pedestrian Mall. A shopping mall is a shopping center with a pedestrian focus where customers park in private parking lots located around the mall, or in outlying areas and walk to stores. A pedestrian mall is large or small shopping area, typically in a town center, where a narrow pedestrian only street or plaza provides access to the stores. Customers typically park in private parking lots located around the mall, or in outlying areas and walk to the stores.

In August 1992 A&B Properties contracted with Group 70 International to prepare a conceptual design plan for the Kahului Downtown Area, which essentially comprised the blocks between the Maui Mall and Queen Ka`ahumanu Shopping Center, including the subject property. The plan called for the creation

of a pedestrian mall, which would extend from Maui Mall through the Kahului Shopping Center. Two- and three-story mixed-use retail and office buildings would be located along a pedestrian spine with surface parking at the rear of the buildings along Ka`ahumanu Avenue and Kamehameha Avenue. Vehicular intrusion into the mall would be prohibited except from driveways into the proposed surface parking lots. It was envisioned that the Pedestrian Mall would be energized by the existing shopping centers and that the redevelopment would create a sense of cohesion and identify to a revitalized downtown area (See: Appendix A, "1992 Conceptual Design Plan - Downtown Area").
After carefully studying the successes and failures of Pedestrian Malls throughout the United States, consulting with local and national urban design professionals, and visiting several mixed-use redevelopment projects on Oahu and on the Mainland, A&B concluded that the currently proposed "Main Street" concept, with vehicle traffic permitted, would provide the greatest opportunity to realize a truly self-sustaining, economically vibrant, and aesthetically pleasing "town center".

Appendix B, of the report, contains several articles that document the poor performance of Pedestrian Malls throughout the United States. According to Neil Fraser's June 5, 2005, article "*A Pedestrianised City is not the Answer*" the city of Buffalo documented the success and/or failure of 72 other pedestrian malls throughout the country. Interestingly, the overall greatest similarity between the experiences was that vehicular traffic was reintroduced in an effort to boost performance. The Buffalo study documented that:

- 83 percent (60) cities have completely or partially reopened the pedestrian malls to vehicular traffic;
- 6 percent (4) are considering reopening their pedestrian malls to vehicular traffic; and
- 11 percent (8) consider their pedestrian malls to be successful.

In Matt Branagh's article "*More pedestrian malls fail than succeed, observers say*" the following quote testifies to the challenges pedestrian malls have faced:

> "*Many cities have tried pedestrian malls. Most have failed.*
>
> *The city of Greely opted earlier this year to spend $2.6 million to scrap its downtown pedestrian mall - a project that cost more than $4 million to build*

20 years ago. And Eugene, Ore., is spending 2.4 million to reconnect streets through its troubled outdoor mall.

"Most of the pedestrian malls in the country have not succeeded," said Kennedy Smith with the National Trust for Historic Preservation's National Main Street Center, a Washington, D.C.- based group focused on downtown areas. "It's really a credit to Boulder that it has succeeded."

Of the 200 or so pedestrian malls built during the past 40 years, Smith estimates that only 30 remain today."

In Fraser's article he references the following comments made by Roberta Brandes Gratz and Norman Mintz in their landmark book "*Cities Back from the Edge*". Grantz and Mintz stress that cars serve a necessary role downtown and should not be banned.

"They provide action and movement. They belong downtown. Cars are essential for some pickups and deliveries and, certainly for servicing downtown merchants. But regulation of hours for car use, slowing traffic to a pedestrian pace, locating parking lots behind stores and not in front, instituting angled and parallel street parking instead of prohibiting on-street parking, and placing great value on sidewalk amenities – all can go along way to keeping the car from undermining a downtown street."

"Streets should almost never be totally closed to traffic. This might work on some short, narrow streets that would not attract much traffic anyway. Closing streets to all traffic for the sake of creating a pedestrian mall has proved unsuccessful in most places for this very reason. Many pedestrian malls have been reopened to vehicular traffic. Oak Park near Chicago; State Street in Chicago; Riverside, California; Milwaukee; Dubuque and Burlington Iowa among others have put the street back but added amenities and traffic calming ... slowing cars is a centerpiece of the multiple efforts."

"Numerous people walking on the sidewalk and slow cars passing by can be signs of downtown health. Similarly, cars parking along the street provide a frame for the streetscape and a barrier between moving vehicles and people walking on the sidewalks. Wide streets offer the opportunity for angled parking, giving the street a narrower appearance, providing more spaces that parallel parking and slowing passing traffic."

The proposed Main Street concept focuses on creating pedestrian-oriented streets that insure safe pedestrian mobility and an aesthetically pleasing pedestrian experience, while also providing retailers with conveniently located on-street parking close to their businesses.

From a traffic circulation perspective, the Main Street approach improves circulation by spreading traffic across the grid; thereby, reducing volumes and congestion at the primary intersections.

From an environmental perspective, it appears that the economic viability of many downtown pedestrian malls have significantly declined, resulting in a marked deterioration of the physical environment.

Also, Frazier concludes that based on research, pedestrian malls generally have been successful in three settings: (1) Tourist destinations (Aspen, Colorado); (2) University towns with large numbers of people without vehicles (Charlottesville, Virginia); and (3) Large cities with large numbers of employees and residents within walking distance of the pedestrian mall (Minneapolis, Minnesota, 160,000 employees and 30,000 residents within a five-minute walk of the pedestrian mall.)

Given the experience of other downtown areas, it has been concluded that a pedestrian mall concept for the Kahului Town Center is not a viable option.

Traditional Shopping Center. A traditional shopping center is a collection of retail and service uses, typically including one or more magnet stores such as a supermarket, that are located on a single parcel of land oriented towards surface parking lots. Customers walk from their parking lots to access the stores.

The applicant considered the following two scenarios. First, rebuilding the existing buildings destroyed by the fire and leaving the remaining structures in their current condition. Second, redeveloping the entire site as a new shopping center.

Neither approach accomplished the client's goal of establishing a mixed-use town center within the heart of Kahului. Traditional shopping centers focus parking in large surface parking lots abutting the primary arterials with general merchandise, retail, restaurant, service, and entertainment uses focused on the interior of the site. Residential and commercial office uses are typically not integrated into a shopping center development. Shopping centers are successful when convenient automobile access and abundant parking is available and when there is a sufficient massing of retail activity to create interest. Shopping centers are typically not considered business or commercial districts because they do not provide significant commercial office space.

Development of a traditional shopping center would foreclose the opportunity to create an authentic mixed-use town center. A&B's vision for the site is to create a development where residents can live, work, and play without the need to use an automobile on a daily basis. The Main Street concept best accomplishes this objective.

From a traffic circulation perspective, the Main Street alternative will improve traffic circulation by reestablishing the historic street network; whereas, a shopping center development would rely solely on the primary arterials for access and would eliminate the inner connectivity between streets.

From an environmental perspective, there would be little difference in the impacts caused by either alternative. However, by developing housing in close proximity to jobs and services, it can be anticipated that fewer vehicular trips would be generated by the development as compared to a less concentrated development pattern spread over a larger area.

The primary impact caused from redevelopment of the site is the dislocation that the project may have on existing businesses. Prior to the fire, there were approximately 76 tenants on the property. There are approximately 70 tenants currently on the property. The following summarizes some of the measures A&B will take to mitigate the impact to existing businesses:

- Existing tenants will be allowed to continue to operate their businesses on the property until construction is initiated. Construction is not anticipated to commence until all of the required governmental approvals are obtained, which is anticipated by Mid-2007. Tenants will be given proper notice prior to being required to vacate the property.

- The project will be constructed in phases. The majority of the existing commercial tenants are located within Quadrants 3 and 4. These Quadrants are not likely to be impacted for five (5) years or more.

- Space will be offered to existing tenants. The phased development will allow tenants from Quadrant #4 to move to Quadrant #1, which will be developed first. Within Quadrant #1, the Applicant has initiated discussions with some of the tenants that would be dislocated.

- If there is a need for temporary relocation during construction, tenants will be offered space for lease within other properties within the A&B portfolio. If tenants are not interested in a location within the Kahului Town Center or tenants have a use that would not conform to the Kahului Town Center, A&B staff will assist the dislocated tenants to find space within an alternative suitable location within the A&B Central Maui portfolio.

Regional Mall. A regional mall is a shopping mall which is designed to service a larger area than a conventional mall. Regional malls typically provide general merchandise and services in full depth and variety. Parking ussually occurs in private parking lots or parking structures, or in outlying areas and customers walk to stores.

The subject property is accessible from four major roadways (Ka`ahumanu Avenue, Kamehameha Avenue, Pu`unene Avenue, and Lono Avenue), and is of sufficient size to support the parking required of a regional mall.

Similar to a traditional shopping center, a regional mall at the subject location would preclude the opportunity to create a vibrant town center for Kahului.

From an environmental perspective, a regional mall would require more impervious surfaces, which would produce more runoff that would need to be retained on-site. This alternative may also generate more vehicular trips since it is entirely dependent on the broader regional market for its sales, and is a higher trip generator than residential and office uses.

Moreover, the regional mall alternative precludes the opportunity to provide much needed resident housing in a location that is centrally located and within easy walking distance of employment and services.

Single-Use Commercial or Residential. The project could be developed as a single-use multi-family residential development or as a single-use commercial project, such as an office park. However, neither approach would accomplish the Applicant's goal of creating a town center within Kahului, where residents can work, shop, and be entertained within a compact urban setting.

From an environmental perspective, the range of impacts associated with either scenario is a function of the project's density. More density produces more vehicular trips within the immediate area and places a greater demand on public infrastructure and services. However, a mixed-use project at the proposed location would produce a more efficient and less costly development pattern, closer to urban infrastructure and services, than a more spread-out development pattern with segregated uses.

III. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Land Use

Existing Conditions. The subject property is located in central Kahului, within an area that is planned for commercial development. The project site is bound by Lono Avenue to the west, Kamehameha Avenue to the south, Pu'unene Avenue to the east, and Ka'ahumanu Avenue, a divided four-lane major roadway, is situated to the north of the subject property, and serves as the major regional arterial between Wailuku and Kahului. Major commercial retail facilities proximate to the project area include the Queen Ka'ahumanu Shopping Center and Maui Mall. Based on the Wailuku-Kahului Community Plan and the Kahului Town Center Strategic Master Plan, the area between these facilities is very suitable for higher density mixed-use commercial and multi-family residential projects that together create a more cohesive downtown commercial core within Kahului.

Established zoning and community plan designations are consistent with existing commercial and residential uses in the vicinity of the project. The Community Plan map presents an illustration of the range of potential future land uses planned within the immediate area (See: Figure No. 6, "Community Plan Map"). The following is a description of zoning, community plan designations, and existing land uses adjacent to the subject property:

North:	Community Plan: Business/Commercial, Park State Land Use: Urban Zoning: B-2 Community Business District Existing uses. Ka'ahumanu Avenue, Maui Seaside Hotel, Hoaloa Park, used car dealership, Hideaway Restaurant and the First Hawaiian Bank

South:	Community Plan: (B) Business/Commercial; Public-Quasi-Public State Land Use: Urban Zoning: B-2 Community Business District; R-3 Residential District **Existing uses.** Kahului Shell Service Station, dental clinic, credit union, Salvation Army Center, Kahului Union Church
East:	Zoning: (B-2) Community Business Community Plan: (B) Business/Commercial State Land Use: Urban **Existing uses.** Bank of Hawaii, Maui Community Clinic; American Savings Bank
West:	Community Plan: Business/Commercial State Land Use: Urban Zoning: B-2 Community Business District **Existing uses.** Kitagawas used car facility, Community Clinic of Maui, Treats & Sweets, Office building, Chevron Gas Station and convenience store

Potential Impacts and Mitigation Measures. The proposed project is compatible with established land use patterns in the vicinity of the project and with proposed future land use patterns as represented by existing zoning and community plan designations on and adjacent to the project site. Development of the project site into a mixed-use residential, commercial office, and commercial retail facility will contribute to the evolution of an identifiable downtown core within central Kahului between the Queen Ka`ahumanu Shopping Center and the Maui Mall.

2. Topography and Soils

Existing Conditions. The site is improved as the Kahului Shopping Center, Burger King Restaurant, Lord's Team Ministries building Title Guaranty &

Escrow Services, Lono Center Building, Hawaii National Bank Building, Kahului Building and the Central Pacific Bank Building. The property slopes slightly from west to east with elevations ranging from 9.5 feet to 5.5 feet above mean sea level. The average slope is 2% or less. The soil is classified as Fill Land (Fd) by the United States Department of Agriculture Soil Conservation Service Soil Survey. This land type consists mostly of areas filled with bagasse and slurry from sugar cane fields. A few areas are filled with material from dredging and soil excavations.

Potential Impacts and Mitigation Measures. The topographic and soil analysis suggests that the proposed land uses are suitable for the site, including buildings, driveways, parking, and landscape planting.

3. **Terrestrial Biota (Flora and Fauna)**

Existing Conditions. The subject property is currently developed with several buildings and paved parking areas. No known rare, endangered, or threatened species of flora or fauna are present on the subject property. The property contains many mature monkey pod trees.

Potential impacts and Mitigation Measures. The project will retain as many of the mature monkey pod trees as possible. A tree survey will be conducted to determine which monkey pods are viable for transplant. To the extent practicable, the other monkey pod trees will be relocated to other areas onsite. Due to the large and intrusive root system of monkey pod trees, these trees will not be utilized within the on-grade paved parking areas of the project.

4. **Flood and Tsunami Hazard**

Existing Conditions. According to Panel Number 150003 0190 D of the Flood Insurance Rate Map, March 16, 1995, prepared by the United States Federal Emergency Management Agency, portions of the project site are situated in Flood Zone "V" (potential tsunami inundation), Zone "A-4" (potential 100-year flood hazard), and Zone "C" (minimal flood hazard potential) (See: Figure No. 8a-b, "Flood Insurance Rate Map").

The "V-line" of the tsunami inundation zone passes through a small portion of Quadrant 3 fronting on Kaahumanu Ave. This portion of the structure has been designed to be approximately 3.8 feet above the existing grade and supported on structural piers above the existing grade such that Tsunami waters can pass under this portion of the structure with minimal obstruction to the flow of water.

Flood Zone A4 is outside of the tsunami inundation zone and is an area of 100-year flood with base elevations determined. Floor elevations for buildings within Flood Zone A4 will have elevations equal to or higher than the known base flood elevation. A site plan has been incorporated into the report that delineates flood zones. (See: Appendix G, "Preliminary Drainage Report").

Potential Impacts and Mitigation Measures. Proposed improvements to the subject property will be constructed, in accordance with flood hazard mitigation standards (i.e. elevation of habitable units above the estimated flood hazard potential).

5. **Air Quality**

Existing Conditions. Air quality refers to the presence or absence of pollutants in the atmosphere. It is the combined result of the natural background and emissions from many pollution sources. The impact of land development activities on air quality in a proposed development's locale differs by project phase (site preparation, construction, occupancy) and project type. In general, air quality in Kahului is considered relatively good. Non-point source emissions (automobile) are not significant to generate a high concentration of pollutants. The relatively high quality of air can also be attributed to the region's exposure to wind, which quickly disperses concentrations of emissions. The Kahului area is currently in compliance with standards established by the Clean Air Act, as well as the State of Hawaii Air Quality Standards.

Potential Impacts and Mitigation Measures. Air quality impacts attributed to the proposed project could include dust generated by the short-term construction related activities. Site work such as grading and building construction, for example, will generate airborne particulate. Adequate dust control measures that comply with the provisions of Hawaii Administrative Rules, Chapter 11-60.1, "Air Pollution Control, " Section 11-60.1-33, Fugitive Dust, will be implemented during all phases of construction. Some of these measures will include:

- 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 routes, and locating potentially dusty equipment in areas of least impact.

- Providing an adequate water source on site prior to start-up of construction activities so that the project site can be regularly sprinkled to keep dust down.

- Onsite dirt piles or other stockpiled particulate matter will be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind blown dust emissions.

- Traffic speeds will be limited to 15 miles per hour or less on all unpaved surfaces and access will be restricted to reduce unnecessary vehicle traffic.

- Landscaping and rapid covering of bare areas, including slopes, beginning with the initial grading phase.

- Installation of temporary silt screens and a 12-feet high geo-textile dust fence around the perimeter of the project site.

- Controlling of dust from shoulders, project entrances, and access roads.

- Providing adequate dust control during weekends, after hours, and prior to daily start-up of construction activities. Controlling of dust from debris hauled away from project site.

In addition, prior to demolition of the existing structures, a comprehensive survey by a certified asbestos inspector will be undertaken to identify any asbestos-containing materials that may be present, as required by state and federal regulations. A pre-demolition survey for other potential hazardous materials, including but not limited to lead-based paint, fluorescent light bulbs, and PCB-light ballasts, will also be conducted.

All asbestos-containing building materials will be removed and properly disposed of by a licensed asbestos abatement contractor prior to demolition. Any lead-based paint identified during the inspection will be addressed as necessary to ensure compliance with state and federal environmental and health and safety regulations and to control lead exposure during the demolition; lead-based paint that is in good condition will generally not require abatement. Other hazardous materials (fluorescent light bulbs, PCB light ballasts, etc.) will be removed and properly managed prior to the demolition so as to ensure compliance with applicable state and federal environmental regulations. Arsenic-containing canec board, where present, will be carefully removed and handled prior to or during the demolition in order to minimize damage, control any potential for arsenic exposure during the demolition, and ensure compliance with applicable state and federal regulations.

6. **Noise Characteristics**

Existing Conditions. The noise level is an important indicator of environmental quality. In an urban environment, noise is due primarily to vehicular traffic, air traffic, heavy machinery, and heating, ventilation, and air-conditioning equipment. Ramifications of various sound levels and types may impact health conditions and an area's aesthetic appeal. Noise levels in the vicinity of the project area are generally low. Traffic noise from Ka`ahumanu, Pu`unene, Kamehameha, and Lono Avenues is the predominant source of background noise in the vicinity of the subject property.

Potential Impacts and Mitigation Measures. In the short-term, the proposed project could generate some adverse impacts during construction. Noise from heavy construction equipment, such as bulldozers and material-carrying trucks and trailers, would be the dominant source of noise during the construction period. To minimize construction related impacts to the surrounding neighbors, the developer will limit construction activities to normal daylight hours, and activities associated with the construction phase of the project, will comply with the Department of Health's Administrative Rules, Chapter 11-46, "Community Noise Control". In the longer-term, the proposed project should not significantly impact existing noise conditions in the area due to the relatively small increase in traffic generated by the project.

7. **Archaeological/Historical Resources**

Existing Conditions. Scientific Consultant Services, Inc. (SCS) conducted an Archaeological Inventory Survey of the Kahului Shopping Center property comprising approximately 19.9 acres. The primary goal of this study was to investigate the presence/absence of surface and subterranean archaeological structures, artifacts, or cultural deposits across the project parcel (<u>See</u>: Appendix D, "Archaeological Inventory Survey").

Because of the project's location in central Kahului, there is little surviving surface character predating the most recent period. Therefore, the study focused on testing the subsurface deposits for significant historic and/or traditional resources. A total of 16 Stratigraphic Trenches were excavated using a backhoe. The findings can be summarized as follows:

- Trenches were excavated across representative portions of the entire Kahului Shopping Center (KSC) block and revealed no evidence of traditional Hawaiian occupation. Although various artifact types associated with the 1920s through present day were recovered, the artifacts were identified in secondary context, most likely having been brought into the area with fill.

- All excavation units did exhibit an average of approximately 0.80 m of recent and/or historic deposits which could have truncated earlier deposits.

- No surface sites or features of potential historic significance were present in the project area;

- Excavation failed to yield any significant buried (subsurface) features or significant artifacts;

- No traditional artifacts or buried cultural layers were recovered in any of the excavations; and

- No human remains were recovered in any of the excavations.

Potential Impacts and Mitigation Measures. The findings of the archaeological inventory survey were negative. No significant historic sites or features were located. No significant historic and/or archaeological sites or features were recorded in the project area. However, due to the presence of sandy deposits throughout the project area, and, due to the well-documented presence of traditional native Hawaiian burials and other archaeological resources in the general Kahului area, future planned construction activities should be subjected to appropriate archaeological monitoring.

In addition, the landowner/applicant contracted Scientific Consultant Services (SCS) to conduct an inventory, recordation, and photographic documentation of all existing buildings over 50 years old for archiving with the State Historic Preservation Division (See: Appendix F, "Limited Archival Survey Documentation Report").

8. **Visual Resources**

Existing Conditions. The subject property is situated within central Kahului. The Maui Scenic Coastal Resources Study, August 1990 (See Figure No. 16), identifies West Maui Mountain Views occurring from Pu`unene Avenue. This view is currently affected by several existing structure along Pu`unene Avenue and will be further impacted by the project. It should be noted that with the project, the substantial views of the West Maui Mountains along most of the stretch of Pu`unene Avenue between Kuihelani Highway and Ka`ahumanu Avenue will for the most part remain.

Potential Impacts and Mitigation Measures. No unique scenic resources are anticipated to be impacted by the development. As such, the proposed project is not anticipated to significantly impact public view corridors and will not have significant adverse impact upon the visual character of the site and its immediate environs.

The proposed development will have a visual impact along all four (4) abutting streets, namely Ka`ahumanu Avenue, Kane Street, Kamehameha Avenue, and Pu`unene Avenue. The proposed urban redevelopment project will result in the massing of new buildings on the site. The height of the majority of buildings will be comparable to the existing 4-story Kahului Building near the corner of Lono Avenue and Ka`ahumanu Avenue. The project will utilize design guidelines to articulate desired architectural design elements, a consistent landscape planting theme, and other design features to enhance the character of the built environment.

B. SOCIO-ECONOMIC ENVIRONMENT

1. **Population**

Existing Conditions. Maui County experienced relatively strong population growth during the past two decades with the 2000 resident population expanding to 128,241, an 80.6% increase over the 1980 population of 70,991 (United States Department of the Census, 2000). Population growth is projected to continue with the year 2020's resident population projected to reach 175,136 (SMS Research and Marketing Services, Inc., June 2002). Similarly, visitor growth has increased significantly in the County over the last decade with the average daily visitor count increasing from 15,363 in 1980 to 43,854 in 2000, a 285% increase in visitors per day. Thus, the County's defacto population, defined as all persons physically present in an area, grew to 168,544 in 2000, an 88% increase over 1990 levels (SMS Research and Marketing Services, Inc., June 2002).

Likewise, the Wailuku-Kahului region experienced high growth rates as the population grew to 41,503 in 2000, up from 32,816 in 1990 (SMS Research and Marketing Services, Inc., 2002). The anticipated 2020 population of the Wailuku-Kahului region is projected to reach 55,424 in 2020.

Potential Impacts and Mitigation Measures. Using national demographic multipliers for standard housing types (American Housing Survey, 1987), the proposed project may increase the population of the immediate Wailuku-Kahului area by 1,046 persons. This increase in population represents approximately 7.5% of projected population growth within Wailuku-Kahului to 2020.

2. Economy

Existing Conditions. The Wailuku-Kahului economy is based primarily around commerce, the visitor industry, plantation agriculture, and the provision of regional services. The region encompasses the island's civic and business centers and the major seaport and airport. Kahului functions as the island's primary shipping and industrial center. Major economic generating land uses in the vicinity of the project site include the Maui Mall, the Queen Ka`ahumanu Shopping Center, Kahului harbor, visitor accommodations and various industrial land uses.

Potential Impacts and Mitigation Measures. The project will generate construction-phase economic impacts that are generally short-term effects. They include employment, income, and expenditure impacts that are created by on-site and off-site construction employment, on-site and off-site trade/transportation/service employment, and manufacturing employment in support of construction. The proposed project will produce a limited number of full and part-time jobs during the construction phase of the development. The project will also generate long-term employment during the operation phase.

Short-term construction related impacts. Using the State of Hawaii, Department of Business Economic Development and Tourism's Input-Output Model (2003), the direct, indirect, and induced employment impact generated spread over the construction phase of the development (6 to 10 years) is approximately 2,929 jobs. The direct cumulative employment impact during this period is estimated to be approximately 1,227 jobs during the construction phase.

Long-term operation phase impacts. During the operation phase, the project will provide a mixture of office, restaurant, and retail uses. During the operation phase, at full build-out it is estimated that 609 fulltime retail, restaurant, and professional jobs will be created within the Kahului Town Center. This is based on a national average of 550 square feet per food service employee, 818 square feet per retail employee (strip malls), and 375 square feet per office employee (Source: Energy Information Administration, 1995 Commercial Buildings Energy Consumption Survey). The majority of these jobs are anticipated to be filled by existing Maui residents.

3. Housing

Existing Conditions. Pursuant to the Hawaii Housing Policy Study, 2003, in 2002 there was a resident housing unit deficit of 5,053 units in Maui County. In order to eliminate pent-up demand over 20 years, 17,586 units will need to be produced. Of these units, a significant number of units are needed between 2003 and 2007 for persons typically considered to be part of the gap-group, earning between 140% and 160% of the median household income as determined by the Department of Housing and Urban Development. The following table provides a breakdown of demand for units by affordability.

Purchase Price (in Thousands)							
Year	Median Income (HUD)	Demand	80%-120% of Med Income Count Price	100%-120% of Med Income County Price	120%-140% of Med Income County Price	140%-180% of Med Income Count Price	>180% of Med Income County Price
2003	$61,368	440	110 $20 -$251	130 $251-$302	60 $302-$352	60 $352-$537	80 >$537
2004	$62,043	360	90 $193-$241	110 $241-$289	50 $289-$338	50 $338-$515	60 >$515
2005	$62,725	400	100 $185-232	120 $232-$278	50 $278-$324	60 $324-495	70 >$495
2006	$63,478	460	110 $178-$223	140 $223-$268	60 $268-$312	70 $312-$477	80 >477
2007	$64,240	390	90 $172-$215	120 $215-$258	50 $258-$301	60 $301-$460	70 >$460

Source: Hawaii Housing Policy Survey, 2003

Potential Impacts and Mitigation Measures. The housing within the project will specifically target Maui residents by first providing housing that is priced at levels that would generally be considered affordable to the gap-group. Additionally, priority will be given to owner-occupants and to Maui residents for sale of all of the residential units. The number of units that can be offered with first priority to Maui residents is currently restricted by the Owner-occupant provision of the condominium law which prohibits priority from being given to anyone when offering the required 50% Owner-occupant units to the public. By constructing 442 multi-family residences, of which several will be priced within the gap-group range, the project serves to reduce the existing pent-up demand for resident housing. Additionally, the Applicant will be working with the County Department of Housing and Human Concerns to prepare an affordable housing agreement for the project. ~~This agreement will mirror the affordable housing ordinance proposed for Maui County.~~ The project will comply with affordable or workforce housing ordinances in place at the time of development of each phase.

4. **Cultural Resources**

Existing Conditions. The subject property is located within a highly urbanized commercial area in central Kahului. The site is located between the Maui Mall and the Queen Ka`ahumanu Shopping Center along Ka`ahumanu Avenue, a divided four lane major roadway. A Cultural Impact Assessment was prepared for the subject 19.9-acre property, in accordance with the provisions of Act 50, SLH 2000 (See: Appendix E, "Cultural Impact Assessment").

Potential Impacts and Mitigation Measures. There are no visible cultural resources, i.e. medicinal plants, shoreline resources, religious sites, or archeological resources that will be impacted by the project. Nor are there such sites in the immediate vicinity of the subject property that require access through the property. From a cultural practices and beliefs perspective, the subject property bears no apparent signs of cultural practices or gatherings taking place on the subject property or in the immediate vicinity of the subject property.

C. INFRASTRUCTURE

A Preliminary Engineering Report and Drainage Report was prepared by Sato & Associates, Inc., which addresses the project's off-site infrastructure and drainage impacts (See: Appendices F and G, Preliminary Engineering Report and Preliminary Drainage Report). The following is a description of infrastructure systems that will service the development.

1. **Water**

Existing Conditions. Domestic water and fire flow for the Kahului area are serviced from the 3.0 million gallon (MG) Waiale Tank and 2.0 MG Kahului tank. Water for both tanks originates from the Iao Aquifer. There are existing 12-inch water distribution lines on Ka`ahumanu Avenue, Pu`unene Avenue, Kamehameha Avenue and Lono Avenue. In July 2003, the State Commission on

Water Resource Management designated the Iao Aquifer as a critical groundwater management area.

Potential Impacts and Mitigation Measures. The estimated average daily domestic water demand for the project is estimated at full build-out to be 263,000 gallons. The estimated average daily irrigation water demand is estimated at 7,500 gallons. A well will be constructed for irrigation purposes and upgrades to ~~these~~ distribution lines are not anticipated, except for the addition of fire hydrants to comply with current standards. There are a number of existing water meters throughout the site which serve the existing commercial retail and office uses. With the redevelopment of the site, some of these meters will be turned back to the County in exchange for credits towards new meters to adequately serve the various phases of the project. At the present time there are no reclaimed water lines around the site. However, when it becomes available the project will use reclaimed water for irrigation purposes. As part of the building permit process, domestic water and fire flow calculations will be provided to determine the adequacy of the existing water system, in accordance with the rules of the Department of Water Supply.

2. **Sewer**

Existing Conditions. Sewage treatment will be accommodated at the County's Kahului Wastewater Treatment Facility. There are existing sewer lines of various sizes within and around the project site. An 18-inch gravity line bisects the site. Wastewater collected from the Kahului area is transported to the Kahului Wastewater Treatment Plant on Amala Place. According to the Wastewater Reclamation Division, the Kahului Wastewater Reclamation Facility has a capacity of 7.9 mgd. The current average daily flow is approximately 5.0 mgd. Over 2 mgd has been allocated to planned projects.

Potential Impacts and Mitigation Measures. At build out, the project will generate approximately 143,000 gallons of wastewater per day. Based on current County assessment rates, the estimated wastewater assessment fee would be $651,000. This fee is collected at the time of building permit application and will likely be higher over the timeframe of the proposed redevelopment. Based on recommendations of staff of the Wastewater Reclamation Division, DPWEM, the applicant intends to videotape the existing sewer lines running through the site to verify if the lines are still active. As part of the building permit review, the applicant will provide an analysis of the existing sewer system to determine if there is adequate capacity to accommodate the project's flow. The applicant will undertake any necessary upgrades to the project's sewer system.

3. Drainage

Existing Conditions. The project site is currently a shopping center. The lot consists mainly of AC pavement and concrete with landscape planting on the exterior of the lot and within the paved parking areas. Slopes within the site are relatively flat in the 2% range.

Storm runoff sheet flows to various locations around the 19.9 acre site. Portions of the runoff flow into catch basins along the perimeter of the site, while the remaining runoff flows towards drain inlets within the site. It is estimated that the present onsite runoff for a 50-year, 1-hour storm from the entire project site is 82.82 cfs.

Potential Impacts and Mitigation Measures. ~~After the development~~ At full development of the proposed project, it is estimated that the 50-year storm runoff will be 104.37 cfs, a net increase of 21.55 cfs. Onsite runoff will be intercepted by grated catch basins located within the paved parking and landscape areas. The runoff will be conveyed to an onsite subsurface drainage system, which will be located beneath the paved parking. The subsurface drainage system consists of a perforated drain line embedded in crushed rock which will be wrapped with a layer of filter fabric. Surface runoff entering the perforated pipe will be allowed to infiltrate into the ground. The drainage system ~~has been~~ will be designed and sized to accommodate the increase in surface runoff from a 50 year storm created by the proposed project. At full build-out, the project will retain approximately 54 cfs - double the County standard. Compared to existing conditions, the project will decrease the runoff by approximately 32.45 cfs through retention. The drainage design criteria shall be to minimize any alterations to the natural pattern of the existing onsite surface runoff. In addition, the project will incorporate pervious surfaces and retention swales wherever feasible to further filter the runoff prior to entering the underground retention piping. Mechanical filtering devices will also be analyzed during the design process to be incorporated into the drainage system (See: Appendices F and G, "Preliminary Engineering Report and Preliminary Drainage Report").

4. Roadways and Traffic

Existing Conditions. A Traffic Impact Analysis Report was prepared by Phillip Rowell and Associates which describes the traffic characteristics of the proposed project and likely impacts to the adjacent roadway network (See: Appendix H, "Traffic Impact Analysis Report"). The purpose of the study is as follows:

- Determine and describe the traffic characteristics of the proposed project.
- Quantify and document the traffic related impacts of the proposed project.
- If required, identify and evaluate traffic related improvements required to provide adequate access to and egress from the proposed project and to mitigate the project's traffic impacts.

Summary of Proposed Development Plan

The Kahului Town Center is a mixed-use urban infill project that is intended to create a community within the core of Kahului where people can live within walking distance of employment, shopping, dining, and other conveniences. The densities of each individual Quadrant are subject to change, as the project is developed. However, the overall project density will not increase. The following table identifies the project's proposed build-out within each of its four (4) quadrants.

Proposed Use	Units	Quad 1	Quad 2	Quad 3	Quad 4	Total
Residential	Units	0	80	295	67	442
Existing Office Building	Gross Square Feet	0	0	0	56,653	56,653
New Office Building	Gross Square Feet	61,574	0	0	34,596	96,170
Bank	Gross Square Feet	9,000	0	0	4,180	13,180
Restaurant	Gross Square Feet	4,484	1,258	6,593	0	12,335
Retail	Gross Square Feet	36,234	12,163	40,732	29,414	118,543

Description of Existing Streets and Intersection Controls

Access to the project will be from Ka`ahumanu Avenue, Pu`unene Avenue, Kamehameha Avenue, and Lono Avenue.

The following is a summary of the major roadways in the study area:

Puunene Avenue
Puunene Avenue is a major State highway connecting Kahului with Mokulele Highway, with a north-south orientation. Within the study area, Puunene Avenue is a four-lane, two-way facility with separate left turn lanes. The intersections with Kaahumanu Avenue, Kamehameha Avenue and Wakea Avenue are signalized.

Kaahumanu Avenue
Kaahumanu Avenue is a six-lane, two-way east-west State roadway connecting Wailuku and Hobron Triangle. All intersections within the study area have separate left turn storage lanes. Major intersections are signalized.

Kamehameha Avenue
East of School Street, Kamehameha Avenue is a four-lane, divided roadway connecting Hobron Triangle and Kahului. There are separate left turn lanes at the intersection with Puunene Avenue. West of School Street, Kamehameha Avenue is a two-lane roadway.

Lono Avenue
Lono Avenue is located along the eastern boundary of the project. Within the study area, Lono Avenue is a two-lane, two-way roadway with a north-south orientation. Lono Avenue is a County roadway.

Kane Street
Kane Street ends at Kaahumanu Avenue and becomes Kahului Beach Road north of Kaahumanu Avenue. Between Kaahumanu Avenue and Vevau Street, Kane Street is four lanes wide. South of Vevau Street, Kane Street is two lanes wide. Kane Street is a County Roadway.

Wakea Avenue
Within the study area, Wakea Avenue is a two-lane, two-way roadway. Within the western half of the study area, Wakea Avenue has an east-west orientation. In the vicinity of Lono Avenue, the street turns north and intersects Kaahumanu Avenue with a north-south orientation. Wakea Avenue is a County roadway.

Level-of-Service Analysis of Existing Conditions

The existing levels-of-service of the study intersections are summarized in Table 6, of the Traffic Impact Analysis Report. State of Hawaii Department of Transportation requested that the level-of-service analysis be performed using the Synchro software. The level-of-service analysis of the signalized intersections was therefore performed using Synchro 6. The results shown in the table are the volume-to-capacity ratios, delays and levels-of-service of the overall intersections.

For unsignalized intersections, the delays and levels-of-service of the lowest controlled lane groups are shown in the table. All the remaining controlled movements of the intersection operate at a higher level-of-service than that shown in the table. The

Highway Capacity Software nor Synchro calculates the volume-to-capacity ratio of an unsignalized intersection.

Table 6 Existing (2004/2005) Levels-of-Service

Peak Hour and Movement	Right-of-Way Control	AM Peak Hour			PM Peak Hour		
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS
Kaahumanu Av. at Wakea Av.	Signalized	0.52	22.9	C	0.88	25.4	C
Kaahumanu Av. at Kahului Beach Rd.	Signalized	0.71	219.7	F	0.85	54.7	D
Kaahumanu Av. at Lono Av.	Signalized	0.60	22.2	C	0.74	19.6	B
Kaahumanu Av. at Kahului SC	Unsignalized		>999.9	F		>999.9	F
Kaahumanu Av. at Puunene Av.	Signalized	0.63	28.0	C	1.00	51.5	D
Kaahumanu Av. at Maui Mall	Signalized	0.37	15.2	B	0.61	18.2	B
Hana Highway at Kamehameha Av.	Signalized	0.58	31.8	C	0.86	52.7	D
Puunene Av at Kahului Shopping Center North	Unsignalized		19.8	C		49.6	E
Puunene Av at Kahului Shopping Center South	Unsignalized		32.3	D		257.3	F
Kamehameha Av. at Puunene Av.	Signalized	0.52	18.7	C	0.86	30.0	C
Puunene Av. at Wakea Av.	Signalized	0.69	45.9	D	0.73	38.7	D
Lono Av. at Vevau St.	Unsignalized		14.0	B		33.3	D
Kamehameha Av. at Lono Av.	Signalized	0.33	9.0	A	0.43	10.6	B
Lono Av. at Wakea Av.	Signalized	0.46	16.3	B	0.47	15.0	B
Kamehameha Av. at School St.	Unsignalized		13.0	B		18.0	C
Kamehameha Av. at Kane St.	Unsignalized		30.5	D		151.2	F
Kane St. at Vevau St.	Unsignalized		20.8	C		47.4	E

NOTES:
1. V/C denotes ratio of volume to capacity. V/C ratios are not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Potential Impacts and Mitigation Measures. An analysis was undertaken to estimate the amount of project-generated traffic at various intersections. The methodology involves the estimation of weekday peak-hour trips that would be generated by the proposed project, distribution and assignment of these trips on the approach and departure routes, and finally determination of future background plus project traffic projections.

Separate trip generation analyses were performed for each quadrant of the Kahului Town Center project, as summarized in Table 8 of the Traffic Impact Analysis Report:

Proposed Development Plan By Quadrant

Table 8 Proposed Development Plan By Quadrant

Proposed Use	Land Use Code	Units	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	Totals
Residential	230	Units	0	80	295	67	442
Existing Office	710	Square Feet	0	0	0	56,653	56,653
New Office	710	Square Feet	61,574	0	0	34,596	96,170
Bank	912	Square Feet	9,000	0	0	4,180	13,180
Restaurant	832	Square Feet	4,484	1,258	6,593	0	12,335
Retail	820	Square Feet	36,234	12,163	40,732	29,414	118,543

Notes:
(1) Source:

The total number of trips was discounted to account for reduced trips generated by the mixed-use development. This discount was estimated separately for each type of use within the project. The discount for the retail trips was estimated by comparing the sum of the trips generated by each quadrant to the trips generated by the total retail within the project. Since the number of trips generated by retail projects is nonlinear, the difference between the two calculations is the discount applicable for the overall development. The estimated discount was applied to both new retail trips and pass-by retail trips.

The discount for the remaining elements of the project was estimated by comparing the estimated number of trips generated by each component of the project and allocating 5% of the trips as internal trips. This is a small percentage as compared to the discount allowed by other jurisdictions for multi-use developments, which typically range between 10% and 15%. Therefore the discounts that were used for this project are conservative. The discounts are summarized in Table 10 of the Traffic Impact Analysis Report:

Table 10 Discounts for Mixed Use Development

Proposed Use	Land Use Code	Mixed Use Discount AM	Mixed Use Discount PM
Residential	230	5%	5%
Existing Office	710	5%	5%
New Office	710	5%	5%
Bank	912	5%	5%
Restaurant	832	5%	5%
Retail	820	40%	35%

Trip Generation Analysis Results

The total trips generated by the project are summarized in Table 11, of the Traffic Impact Analysis Report.

Table 11 Total Trips Generated by Proposed Project

Period & Direction		Residential	Existing Office	New Office	Bank	Restaurant	Retail			Project Totals		
							Total	Pass By	Net	Total	Pass By	Net
Total Trips Generated By Project - Unadjusted for Mixed Use Development												
AM Peak Hour	Total	194	98	149	163	115	268		268	977	0	977
	In	33	77	132	91	60	163		163	558	0	558
	Out	161	11	17	72	55	105	0	105	421	0	421
PM Peak Hour	Total	230	84	144	603	135	990	574	416	2196	574	1612
	In	153	14	25	302	80	474	288	186	1048	288	760
	Out	77	70	119	301	55	516	286	230	1138	286	852
Discounts for Mixed Use Development												
AM Peak Hour	Total	10	4	8	9	6	107		107	144	0	144
	In	1	4	6	4	3	65		65	83	0	83
	Out	9	0	2	5	3	42	0	42	61	0	61
PM Peak Hour	Total	12	4	8	31	7	347	201	146	409	201	208
	In	7	1	1	15	3	165	102	63	192	102	90
	Out	5	3	7	16	4	182	99	83	217	99	118
Total Trips Generated By Project - Adjusted for Mixed Use Development												
AM Peak Hour	Total	184	84	141	154	109	161	0	161	833	0	833
	In	32	73	126	87	57	98	0	98	473	0	473
	Out	152	11	15	67	52	63	0	63	360	0	360
PM Peak Hour	Total	218	80	136	572	128	643	373	270	1777	373	1404
	In	146	13	24	287	77	309	188	121	856	188	668
	Out	72	67	112	285	51	334	185	149	921	185	736

Traffic Impact Analysis

The purpose of this section is to summarize the results of the level-of-service analysis, which identifies the project-related impacts. In addition, any mitigation measures necessary and feasible are identified and other access, egress and circulation issues are discussed. The impact of the project was assessed by analyzing the changes in traffic volumes and levels-of-service at the study intersections.

Changes in Total Intersection Volumes

An analysis of the project's share of 2012 background plus project intersection approach volumes at the study intersections is summarized in Table 12, of the Traffic Impact Analysis Report. The table summarizes the project's share of total 2012 peak hour approach volumes at each intersection. Also shown are the percentage of 2012 background plus project traffic that is the result of background growth and traffic generated by related projects.

Table 12 Analysis of Project's Share of Total Intersection Approach Volumes (1)

Intersection	Period	Existing	2012 Background	2012 Background Plus Project	Background Growth Trips	Background Growth Percent of Total Traffic (2)	Project Traffic Trips	Project Traffic Percent of Total Traffic (2)
Wakea Av at Kaahumanu Av	AM	2850	3360	3525	510	14.5%	165	4.7%
	PM	3130	3690	3987	560	14.0%	297	7.4%
Kahului Beach Rd at Kaahumanu Av	AM	3865	4780	5054	915	18.1%	274	5.4%
	PM	4780	6125	6637	1345	20.3%	512	7.7%
Lono St at Kaahumanu Av	AM	3670	4430	4668	760	16.3%	238	5.1%
	PM	4300	5195	5637	895	15.9%	442	7.8%
Center St at Kaahumanu Av	AM	3445	4110	4046	665	16.4%	-64	-1.6%
	PM	4245	5070	5073	825	16.3%	3	0.1%
Puunene Av at Kaahumanu Av	AM	3520	4195	4170	675	16.2%	-25	-0.6%
	PM	4475	5335	5315	860	16.2%	-20	-0.4%
Maui Mall at Kaahumanu Av	AM	2445	2980	3005	535	17.8%	25	0.8%
	PM	2935	3575	3612	640	17.7%	37	1.0%
Hana Hwy at Kaahumanu Av	AM	3055	3835	3902	780	20.0%	67	1.7%
	PM	3990	5105	5209	1115	21.4%	104	2.0%
Puunene Av at Maui Mall North	AM	1240	1415	1395	175	12.5%	-20	-1.4%
	PM	1740	2015	1940	275	14.2%	-75	-3.9%
Puunene Av at Maui Mall South	AM	1345	1535	1512	190	12.6%	-23	-1.5%
	PM	1745	2035	1957	290	14.8%	-78	-4.0%
Puunene Av at Kamehameha Av	AM	2390	2880	3023	490	16.2%	143	4.7%
	PM	3285	4115	4367	830	19.0%	252	5.8%
Puunene Av at Wakea Av	AM	2420	2805	3023	385	12.7%	218	7.2%
	PM	2785	3355	3731	570	15.3%	376	10.1%
Lono Av at Vevau St	AM	710	815	1055	105	-1.0% (3)	240	22.7%
	PM	990	1185	1702	195	-3.5% (3)	517	30.4%
Lono St at Kamehameha Av	AM	1145	1315	1427	170	11.9%	112	7.8%
	PM	1615	2055	2199	440	20.0%	144	6.5%
Lono Av at Wakea Av	AM	1905	2190	2273	285	12.5%	83	3.7%
	PM	1965	2285	2368	320	13.5%	83	3.5%
School St at Kamehameha Av	AM	610	800	800	190	23.8%	0	0.0%
	PM	885	1180	1180	295	25.0%	0	0.0%
Kane St at Kamehameha Av	AM	785	990	990	205	20.7%	0	0.0%
	PM	1430	1995	1995	565	28.3%	0	0.0%
Kane St at Vevau St	AM	675	775	868	100	11.5%	93	10.7%
	PM	1030	1165	1534	135	8.8%	369	24.1%

Notes:
(1) Volumes shown are total intersection approach volumes or projections.
(2) Percentage of total 2012 background plus project traffic.
(3) Background traffic projections are less than existing traffic volumes because traffic is redistributed as a result of converting Vevau Street from two-way to one-way between Kane Street and Vevau Street. This redistribution of traffic results in negative percentages for background growth . This anomaly distorts the calculations to overestimate percentages of project generated traffic.

An analysis of the project's pro rata share of the increase of traffic volumes between 2005 and 2012 is summarized in Table 13, of the Traffic Impact Analysis Report. This table summarizes the growth between 2005 and 2012 and indicates the percentage of growth resulting from background growth and related projects and the percentage growth resulting from project generated traffic.

Table 13 Analysis of Project's Share of Total Intersection Approach Volumes Growth (1)

Intersection	Period	Existing	2012 Background	Background Plus Project	Background Growth (2) Volume	Background Growth (2) % of 2005 to 2012 Growth	Project Trips (3) Volume (4)	Project Trips (3) % of 2005 to 2012 Growth
Wakea Av at Kaahumanu Av	AM	2850	3360	3525	510	75.6%	165	24.4%
	PM	3130	3690	3987	560	65.3%	297	34.7%
Kahului Beach Rd at Kaahumanu Av	AM	3865	4780	5054	915	77.0%	274	23.0%
	PM	4780	6125	6637	1345	72.4%	512	27.6%
Lono St at Kaahumanu Av	AM	3670	4430	4668	760	76.2%	238	23.8%
	PM	4300	5195	5637	895	66.9%	442	33.1%
Center St at Kaahumanu Av	AM	3445	4110	4046	665	110.6%	-64	-10.6%
	PM	4245	5070	5073	825	99.6%	3	0.4%
Puunene Av at Kaahumanu Av	AM	3520	4195	4170	675	103.8%	-25	-3.8%
	PM	4475	5335	5315	860	102.4%	-20	-2.4%
Maui Mall at Kaahumanu Av	AM	2445	2980	3005	535	95.5%	25	4.5%
	PM	2935	3575	3612	640	94.5%	37	5.5%
Hana Hwy at Kaahumanu Av	AM	3055	3835	3902	780	92.1%	67	7.9%
	PM	3990	5105	5209	1115	91.5%	104	8.5%
Puunene Av at Maui Mall North	AM	1240	1415	1395	175	112.9%	-20	-12.9%
	PM	1740	2015	1940	275	137.5%	-75	-37.5%
Puunene Av at Maui Mall South	AM	1345	1535	1512	190	113.8%	-23	-13.8%
	PM	1745	2035	1957	290	136.8%	-78	-36.8%
Puunene Av at Kamehameha Av	AM	2390	2880	3023	490	77.4%	143	22.6%
	PM	3285	4115	4367	830	76.7%	252	23.3%
Puunene Av at Wakea Av	AM	2420	2805	3023	385	63.8%	218	36.2%
	PM	2785	3355	3731	570	60.3%	376	39.7%
Lono Av at Vevau St	AM	710	815	1055	105	30.4%	240	103.1% (5)
	PM	990	1185	1702	195	27.4%	517	109.1% (5)
Lono St at Kamehameha Av	AM	1145	1315	1427	170	60.3%	112	39.7%
	PM	1615	2055	2199	440	75.3%	144	24.7%
Lono Av at Wakea Av	AM	1905	2190	2273	285	77.4%	83	22.6%
	PM	1965	2285	2368	320	79.4%	83	20.6%
School St at Kamehameha Av	AM	610	800	800	190	100.0%	0	0.0%
	PM	885	1180	1180	295	100.0%	0	0.0%
Kane St at Kamehameha Av	AM	785	990	990	205	100.0%	0	0.0%
	PM	1430	1995	1995	565	100.0%	0	0.0%
Kane St at Vevau St	AM	675	775	868	100	51.8%	93	48.2%
	PM	1030	1165	1534	135	26.8%	369	73.2%

Notes:
(1) Volumes shown are total intersection approach volumes or projections.
(2) Background versus existing.
(3) Background plus project versus background.
(4) Project generated traffic
(5) Background traffic projections are less than existing traffic volumes because traffic is redistributed as a result of converting Vevau Street from two-way to one-way between Kane Street and Vevau Street. This redistribution of traffic results in negative percentages for growth between existing and 2012 background. This anomaly distorts the calculations to indicate that the growth as a result of project generated traffic is greater than 100%.

Results of the Level-of-Service Analysis

The results of the level-of-service analysis are summarized in Table 14 of the Traffic Impact Analysis Report. For the signalized intersections, the volume-to-capacity ratio, control delay and level-of-service for the overall intersection is shown for each intersection. For the unsignalized intersections, the control delay and the level-of-service of the movement with the lowest level-of-service is shown. The results of the level-of-service analysis are discussed separately for each movement.

Table 14 2012 Levels-of-Service

		AM Peak Hour								PM Peak Hour							
		2012 Without Project			2012 With Project			Changes		2012 Without Project			2012 With Project			Changes	
	Intersection	V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
1	Kaahumanu Av. at Wakea Av.	0.62	24.8	C	0.65	25.5	C	0.03	0.7	0.81	25.4	C	0.84	30.8	C	0.03	5.4
2	Kaahumanu Av. at Kahului Beach Rd.	0.89	326.8	F	0.92	338.6	F	0.03	11.8	1.08	89.2	F	1.13	108.7	F	0.05	19.5
4	Kaahumanu Av. at Lono Av.	0.74	26.7	C	0.89	33.5	C	0.15	6.8	0.91	28.2	C	1.28	91.9	F	0.37	63.7
5	Kaahumanu Av at Kinau Avenue		(5)	F		22.4	C		NC		42.2	E		49.0	E		6.8
6	Kaahumanu Av. at Puunene Av.	0.75	30.1	C	0.75	30.1	C	0.00	0.0	1.19	95.0	F	1.19	98.7	F	0.00	3.7
7	Kaahumanu Av. at Maui Mall	0.44	16.4	B	0.45	16.5	B	0.01	0.1	0.74	20.9	C	0.76	21.1	C	0.02	0.2
8	*Hana Highway at Kamehameha Av.*	0.69	36.6	D	0.69	37.5	D	0.00	0.9	1.17	105.7	F	1.20	119.4	F	0.03	13.7
9	Puunene Av at Drives E & F		25.3	D		19.9	C		-5.4		159.5	F		43.0	E		-116.5
10	Puunene Av at Town Center Drive		55.2	F		32.9	D		-22.3		818.1	F		549.2	F		-268.9
11	Kamehameha Av. at Puunene Av.	0.62	20.8	C	0.64	21.8	C	0.02	1.0	0.92	30.0	D	0.88	73.4	E	-0.04	43.4
12	Puunene Av. at Wakea Av.	0.77	53.0	D	0.82	54.2	D	0.05	1.2	0.87	46.8	D	0.94	53.5	D	0.07	6.7
13	Lono Av. at Town Center Drive		15.8	C		26.5	D		10.7		76.4	F			F		
14	Kamehameha Av. at Lono Av.	0.38	9.3	A	0.40	9.4	A	0.02	0.1	0.54	12.1	B	0.57	12.2	B	0.03	0.1
15	Lono Av. at Wakea Av.	0.53	17.6	B	0.55	18.1	B	0.02	0.5	0.56	16.6	B	0.58	17.3	B	0.02	0.7
17	Kamehameha Av. at School St.		17.4	C		17.4	C		0.0		36.6	E		36.6	E		0.0
31	Kamehameha Av. at Kane St.		55.6	F		55.6	F		0.0			F			F		NC
31	Kane St. at Vevau St.		26.7	D		38.5	E		9.8		111.5	F		760.4	F		648.9
51	Town Center Drive at Kinau Avenue				0.10		A						0.22		A		
52	Town Center Drive at Drive C					9.2	A							10.80	B		
53	Town Center Drive at Drives G & H					9.3	A							10.8	B		
54	Kinau Avenue at Drives B & D					8.8	A							11.0	B		
55	Kinau Avenue at Drive L					8.8	A							9.8	A		
56	Kinau Avenue at Drive K					8.4	A							8.7	A		
57	Kinau Avenue at Kamehameha Av					126.7	F							>999.9	F		
58	Kamehameha Avenue at Drive J					150.5	F							>999.9	F		
59	Puunene Avenue at Drive I					40.0	B								F		

NOTES
1. V/C denotes ratio of volume to capacity
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. NC denotes "Not Calculated." The calculated delay is greater than 999.9 seconds per vehicle
5. Calculated delay is greater than 999.9 seconds per vehicle.
6. NC = Not Calculated

1. Kaahumanu Avenue at Wakea Avenue

During the morning peak hour, the intersection will operate at Level-of-Service C without and with project traffic. During the afternoon peak hour, the intersection will operate at Level-of-Service C without the project and with the project. As the intersection will operate at Level-of-Service C or better during both peak periods, no mitigation is recommended.

2. **Kaahumanu Avenue at Kahului Beach Road and Kane Street**

This intersection will operate at Level-of-Service F during both peak periods, without and with project related traffic. It should be noted that the intersection currently operates at Level-of-Service F during the morning peak hour and Level-of-Service D during the afternoon peak hour as indicated in Chapter 2. Improvement of this intersection has been recommended as part of the MCC Student Housing and Kane Street Mixed Use Projects. The recommended improvements were reassessed in response to comments from SDOT. The recommended improvements are described in chapter 6 of the TIAR.

4. **Kaahumanu Avenue at Lono Avenue**

This intersection will operate at Level-of-Service C during the morning peak hour, but will operate at Level-of-Service F during the afternoon peak hour, without and with project generated traffic. During the afternoon peak hour, the control delay will increase from 28.2 seconds per vehicle to 91.9 seconds per vehicle. It is recommended that the northbound approach be modified to provide one northbound to westbound left turn lane and a optional left, through and right turn lane.

5. **Kaahumanu Avenue at Kinau Avenue**

This intersection is a stop sign controlled intersection. Therefore, the delays and levels-of-service shown are for the movement with the lowest level-of-service. As part of the pre-consultation with SDOT at the start of this project, it was decided that signalization of this intersection was not a viable option. It was decided that left turns from the Kahului Town Center would be prohibited in the interest of safety and maintaining an acceptable level-of-service. Therefore, it is the southbound approach that will operate at Level-of-Service F and not traffic exiting the project. Traffic exiting the project will operate a Level-of-Service C during both peak periods and traffic turning left into the project will operate at Level-of-Service C during both peak periods. It was determined that restricting traffic movements of the southbound approach to right turns only was not viable at this time but should be considered in the future if an opportunity arises.

6. **Kaahumanu Avenue at Puunene Avenue**

During the morning peak hour, this intersection will operate at Level-of-Service C, without and with the project. During the afternoon peak hour, the intersection will operate at Level-of-Service F, without and with the project. It is recommended that the northbound approach be modified to provide an additional northbound to westbound left turn lane. The northbound approach will have two left turn only lanes plus an optional through and right turn lane.

7. **Kaahumanu Avenue at Maui Mall**

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service C during the afternoon peak hour. No mitigation is recommended.

8. **Hana Highway at Kamehameha Avenue and Hobron Avenue**

This intersection will operate at Level-of-Service D during the morning peak hour, without and with the project, and Level-of-Service F during the afternoon peak hour. It is recommended that the northbound approach of Kamehameha Avenue be modified to provide an additional northbound to eastbound right turn lane.

9. **Puunene Avenue at Maui Mall North and Drive E**

This intersection is unsignalized. The delays and levels-of-service shown are the delays and levels-of-service of the movement with the highest delay and lowest level-of-service, which is the westbound approach. During pre-consultation meetings, it was determined that left turns out of the project should be prohibited in the interest of pedestrian safety. Traffic exiting the project is restricted to right turns only and will operate at Level of Service B during both peak periods. Traffic turning left into the project from Puunene Avenue will operate at level-of-service A during both peak periods. When possible, traffic using the east lag of this intersection should be restricted to right turns in and out. The levels-of-service would then be comparable to those of traffic entering and exiting the project site.

10. **Puunene Avenue at Town Center Drive**

This intersection is also unsignalized. The delays and levels-of-service shown are the delays and levels-of-service of the movement with the highest delay and lowest level-of-service, which is the westbound approach, which will operate at Level-of-Service F, without and with. Traffic entering and exiting the project will operate at Level-of-Service C, or better during both peak periods. When possible, traffic using the east lag of this intersection should be restricted to right turns in and out. The levels-of-service would then be comparable to those of traffic entering and exiting the project site.

The viability of installing a traffic signal at the intersection of Puunene Avenue at Town Center Drive was discussed with DOT. Based on this discussion, it was concluded that a traffic signal at this location would not operate well with the adjacent signalized intersection because the intersections are too close to provide adequate queue space and the queues would back up through the adjacent intersection.

11. **Puunene Avenue at Kamehameha Avenue**

This intersection will operate at Level-of-Service C during the morning peak hour, without and with project raffic. During the afternoon peak hour, the level-of-service will decrease from Level-of-Service D without project traffic to Level-of-Service E with project traffic. It recommended that the westbound approach be modified to provide an additional westbound to southbound left turn, that the left turn storage lane be lengthened and that the existing right turn only lane be modified to allow an optional through movement or right turn.

12. **Puunene Avenue at Wakea Avenue**

During the morning and afternoon peak periods, this intersection will operate at Level-of-Service D without and with the project traffic during both peak periods. No mitigation is recommended.

13. **Lono Avenue at Town Center Drive and Vevau Street**

This intersection will operate at Level-of-Service D during the morning peak hour. During the afternoon peak hour, the intersection will operate at Level-of-Service F without and with project traffic. It is recommended that the intersection be converted to a four-way stop sign controlled intersection. As a four-way stop sign controlled intersection, the level-of-service will still be Level-of-Service F, but the control delay will decrease from 819.3 seconds per vehicle to 85.5 seconds per vehicle. Not only will this improvement significantly reduce to control delay, but it will facilitate pedestrian crossings between the Kahului Town Center and MCC Student Housing projects and enhance pedestrian safety.

14. Lono Avenue at Kamehameha Avenue

This intersection will operate at Level-of-Service A during the morning peak hour, without and with project traffic, and Level-of-Service B during the afternoon peak hour, without and with project traffic. No mitigation is recommended.

15. Lono Avenue at Wakea Avenue

This intersection will operate at Level-of-Service B during both peak hours, without and with project traffic. No mitigation is recommended.

17. Kamehameha Avenue at School Street

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service E during the afternoon peak hour. There is no change in the delay or level-of-service because the project does not contribute any traffic to this intersection. As the project adds no traffic to this intersection, there is no impact as a result of project generated traffic and no mitigation is recommended.

18. Lono Avenue at Project Drive A

All movements at this intersection will operate at Level-of-Service B or better during the morning peak hour and Level-of-Service C or better during the afternoon peak hour.

31. Kamehameha Avenue at Kane Street

This intersection will operate at Level-of-Service F during the morning peak hour and Level-of-Service F during the afternoon peak hour. There is no change in the delay or level-of-service because the project does not contribute any traffic to this intersection. As the project adds no traffic to this intersection, there is no impact as a result of project generated traffic and no mitigation is recommended. It was concluded in the traffic study for the MCC Student Housing and Kane Street Mixed Use project that traffic signals are warranted at this intersection for background without project conditions.

32. **Kane Street at Vevau Street**

This intersection will operate at Level-of-Service E during the morning and Level-of-Service F during the afternoon peak hour. The peak hour warrant for a traffic signal is satisfied for 2012 background without project conditions. The approach that triggers the warrant is the eastbound approach exiting Kaahumanu Shopping Center.

51. **Town Center Drive at Kinau Avenue**

This intersection is planned to be a roundabout. The Highway Capacity Manual methodology calculates only the volume-to-capacity ratio of each approach. Shown in the level-of-service table (Table 14) is the volume-to-capacity ratio and level-of-service of the approach with the lowest level-of-service. All four approaches will operate at Level-of-Service A, or better.

52. **Town Center Drive at Drive C**

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service B during the afternoon peak hour.

53. **Town Center Drive at Drives G & H**

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service B during the afternoon peak hour.

54. **Town Center Drive at Drives B & D**

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service B during the afternoon peak hour.

55. **Town Center Drive at Drive L**

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service A during the afternoon peak hour.

56. **Town Center Drive at Drive K**

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service A during the afternoon peak hour.

57. **Kinau Avenue at Kamehameha Avenue**

As currently proposed, this intersection will operate at Level-of-Service C during the morning peak hour and Level-of-Service F during the afternoon peak hour. The southbound to eastbound left turn is the controlling movement in both cases. In addition, the redistribution of left turn traffic from Drive J will aggravate the poor level-of-service during the afternoon peak hour. With the additional traffic from Drive J, improvement of the intersection will be required. There are two possible mitigation measures: provide a left turn refuge lane or install traffic signals.

Installation of a left turn refuge lane would be difficult to install because of the south leg of the intersection. With a separate left turn refuge lane, the intersection would operate at Level-of-Service C during the morning and Level-of-Service D during the afternoon.

The afternoon peak hour volumes satisfy the peak hour warrant for a traffic signal. As a signalized intersection, all movements will operate at Level-of-Service C, or better, and the overall intersection will operate at Level-of-Service C.

58. **Kamehameha Avenue at Drive J**

This intersection is the driveway along the north side of Kamehameha Avenue and west of Puunene Avenue. All movements are expected to operate at an acceptable level-of-service except the southbound to eastbound left turn, which will operate at Level-of-Service F. The estimated left turns from Drive J is 42 vehicles per hour during the morning peak hour and 166 vehicles per hour during the afternoon peak hour. This large number of vehicles will have to turn out and cross the eastbound left turn storage lane approaching Puunene Avenue. As this will be a difficult move for this number of vehicles, it is recommended that left turns from this driveway be prohibited and redirected to use Kinau Avenue to exit the project onto Kamehameha Avenue. With this mitigation, the driveway will operate at Level-of-Service A during the morning and afternoon peak hours.

59. **Puunene Avenue at Drive I**

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service D during the afternoon peak hour. An impact of this driveway that is not assessed in the level-of-service analysis is the limited distance between the driveway and Kamehameha Avenue. Drivers exiting this driveway that want to turn left at Kamehameha Avenue will block the southbound through lanes alone Puunene Avenue. A detail of the proposed configuration of this intersection that will address this issue is presented in Chapter 6 of the TIAR. Left turns from the driveway should also be prohibited.

Summary of Mitigation Measures

Based on the results of the level-of-service analysis, mitigation is required at the following intersections:

A. Kaahumanu Avenue at Kahului Beach Road & Kane Street
B. Kaahumanu Avenue at Lono Street
C. Kaahumanu Avenue at Puunene Avenue
D. Hana Highway at Kamehameha Avenue & Hobron Avenue
E. Kamehameha Avenue at Puunene Avenue
F. Lono Avenue at Town Center Drive and Vevau Street
G. Kinau Avenue at Kamehameha Avenue
H. Puunene Avenue at Drive I
I. Kamehameha Avenue at Lono Avenue

Table 15 of the Traffic Impact Analysis Report is a summary of the results of the level-of-service analysis and the recommended mitigation measures for each intersection.

Table 15: Summary of Mitigation Measures

	Intersection	Recommended Mitigation
1	Kaahumanu Av. at Wakea Av.	No mitigation required.
2	Kaahumanu Av. at Kahului Beach Rd.	Mitigation recommended as part of MCC and Kane Street Projects.
4	Kaahumanu Av. at Lono Av.	Modify northbound approach to provide optional left, through and right plus left turn only lane.
5	Kaahumanu Av at Kinau Avenue	Prohibit northbound to westbound left turns and northbound through movements.
6	Kaahumanu Av. at Puunene Av	Widen northbound approach to provide second left turn lane.
7	Kaahumanu Av. at Maui Mall	No mitigation required.
8	Hana Highway at Kamehameha Av.	Modify Kamehameha Avenue approach to provide second right turn only lane.
9	Puunene Av at Drives E & F	Prohibit left turns from eastbound and west bound approaches.
10	Puunene Av at Town Center Drive	Prohibit left turns from eastbound and westbound approaches.
11	Kamehameha Av. at Puunene Av.	Add second westbound to southbound left turn lane, lengthen left turn storage lanes and modify right turn lane to allow through movement or right turn.
12	Puunene Av. at Wakea Av.	No mitigation required.
13	Lono Av. at Town Center Drive	Convert to a four-way stop sign controlled intersection.
14	Kamehameha Av. at Lono Av.	No mitigation required for project traffic. Left turn storage lane should be extended to mitigate existing backups.
15	Lono Av. at Wakea Av.	No mitigation required.
17	Kamehameha Av. at School St.	No mitigation required.
31	Kamehameha Av. at Kane St.	*Traffic signals recommended for MCC and Kane Street projects.*
32	Kane St. at Vevau St.	No mitigation for project traffic. Traffic signals are warranted for Kaahumanu Shopping Center approach.
51	Town Center Drive at Kinau Avenue	Designed as a roundabout. No additional mitigation required.
52	Town Center Drive at Drive C	No mitigation required.
53	Town Center Drive at Drives G & H	No mitigation required.
54	Kinau Avenue at Drives B & D	No mitigation required.
55	Kinau Avenue at Drive L	No mitigation required.
56	Kinau Avenue at Drive K	No mitigation required.
57	Kinau Avenue at Kamehameha Av	Install traffic signals.
58	Kamehameha Avenue at Drive J	Restrict to right turns only.
59	Puunene Avenue at Drive I	See Figure 16.

A. Kaahumanu Avenue at Kahului Beach Road & Kane Street

This intersection will operate at Level-of-Service F during both peak periods, without and with project related traffic. It should be noted that the intersection currently operates at Level-of-Service F during the morning peak hour and Level-of-Service D during the afternoon peak hour as indicated in Chapter 2 of the TIAR. Improvement of this intersection has been recommended as part of the MCC Student Housing and Kane Street Mixed Use Projects. The recommended improvements are shown on Figure 13 of the TIAR.

B. Kaahumanu Avenue at Lono Street

This intersection will operate at Level-of-Service C during the morning peak hour, but will operate at Level-of-Service F during the afternoon peak hour, without and with project generated traffic. It is recommended that the northbound approach be modified to provide one northbound to westbound left turn lane and a optional left, through and right turn lane. See Figure 14 of the TIAR

C. **Kaahumanu Avenue at Puunene Avenue**

During the morning peak hour, this intersection will operate at Level-of-Service C, without and with the project. During the afternoon peak hour, the intersection will operate at Level-of-Service F, without and with the project. It is recommended that the northbound approach be modified to provide an additional northbound to westbound left turn lane. The northbound approach will have two left turn only lanes plus an optional through and right turn lane. A schematic drawing is shown in the discussion on pedestrians.

D. **Hana Highway at Kamehameha Avenue & Hobron Avenue**

This intersection will operate at Level-of-Service D during the morning peak hour, without and with the project, and Level-of-Service F during the afternoon peak hour. It is recommended that the northbound approach of Kamehameha Avenue be modified to provide an additional northbound to eastbound right turn lane. See Figure 15 of the TIAR.

E. **Kamehameha Avenue at Puunene Avenue**

This intersection will operate at Level-of-Service C during the morning peak hour, without and with project traffic. During the afternoon peak hour, the level-of-service will decrease from Level-of-Service D without project traffic to Level-of-Service E with project traffic. It recommended that the westbound approach be modified to provide an additional westbound to southbound left turn, that the left turn storage lane be lengthened and that the existing right turn only lane be modified to allow an optional through movement or right turn.

F. **Lono Avenue at Town Center Drive and Vevau Street**

This intersection will operate at Level-of-Service D during the morning peak hour. During the afternoon peak hour, the intersection will operate at Level-of-Service F without and with project traffic. It is recommended that the intersection be converted to a four-way stop sign controlled intersection. As a four-way stop sign controlled intersection, the level-of-service will still be Level-of-Service F, but the control delay will decrease. Not only will this improvement significantly reduce to control delay, but it will facilitate pedestrian crossings between the Kahului Town Center and MCC Student Housing projects and enhance pedestrian safety.

G. Kinau Avenue at Kamehameha Avenue

As currently proposed, this intersection will operate at Level-of-Service C during the morning peak hour and Level-of-Service F during the afternoon peak hour. The southbound to eastbound left turn is the controlling movement in both cases. In addition, the redistribution of left turn traffic from Drive J will aggravate the poor level-of-service during the afternoon peak hour. With the additional traffic from Drive J, improvement of the intersection will be required. There are two possible mitigation measures: provide a left turn refuge lane or install traffic signals. Installation of a left turn refuge lane would be difficult to install because of the south leg of the intersection. With a separate left turn refuge lane, the intersection would operate at Level-of-Service C during the morning and Level-of-Service D during the afternoon. The afternoon peak hour volumes satisfy the peak hour warrant for a traffic signal. As a signalized intersection, all movements will operate at Level-of-Service C, or better, and the overall intersection will operate at Level-of-Service C.

H. Puunene Avenue at Drive I

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service D during the afternoon peak hour. An impact of this driveway that is not assessed in the level-of-service analysis is the limited distance between the driveway and Kamehameha Avenue. Drivers exiting this driveway that want to turn left at Kamehameha Avenue will block the southbound through lanes alone Puunene Avenue. A detail of the proposed configuration of this intersection that will address this issue is presented as Figure 16 of the TIAR.

I. Kamehameha Avenue at Lono Avenue

To mitigate existing backups along the southbound left turn, the left turn storage lane should be extended to comply with AASHTO guidelines. The required length is approximately 325 feet.

Other Transportation Issues

Pedestrians Crossing Lono Street

It is anticipated that there will be a significant number of pedestrians crossing Lono Street at Town Center Drive since this crossing is aligned with Vevau Street, which will also be a pedestrian oriented street. Accordingly, any potential measures available to enhance pedestrian safety, as well as to encourage pedestrian flows, should be implemented.

There are no estimates available of the number of pedestrian crossing expected. There are no pedestrian generation data available.

As previously discussed, a four-way stop sign controlled intersection has been recommended at this intersection to mitigate the poor level-of-service of the intersection. This four-way stop will slow traffic down along Lono Street and require all vehicles approaching the intersection to stop. Therefore any pedestrians crossing the intersection will have the right-of-way.

Pedestrians Crossing Puunene Avenue

During pre-consultation meetings, the safety of pedestrians wanting to cross Puunene Avenue was an issue discussed.

There is a pedestrian warrant for traffic signals but this warrant was not examined as there are no pedestrian related data for any of the pedestrian crosswalks. As there are no pedestrian trip generation data available, it is not possible to estimate the number of pedestrians that will use these crosswalks in order to assess this warrant. The minimum number of pedestrian crossings required to trigger this warrant is "100 or more for each of any four (4) hours or 190 or more during any one (1) hour." The warrant also states that a signalized pedestrian crosswalk should not be provided within 300 feet of a signalized intersection unless it can be verified that the signal will not adversely impact the operation of the existing signalized intersection. 5 As both crosswalks along Puunene Avenue are approximately 300 feet from the nearest signalized intersection, installing a pedestrian signal to the crosswalks do not comply with this criterion.

Lastly, is was also concluded that coordination of four traffic signals within 1000 feet of roadway would be difficult. The result would be constrained flow along Puunene Avenue as queues would back up through the upstream signals.

In order to provide safer crosswalks across Puunene Avenue, it was determined that the safest and most viable alternative would be to provide a pedestrian refuge median along Puunene Avenue in the vicinity of Town Center Drive. This can be accomplished as left turns from the project have been prohibited and left turns from the Maui Mall side of Puunene Avenue should be prohibited when possible. Not only will the prohibition of left turns enhance the safety of pedestrians crossing Puunene Avenue, but traffic movements that adversely affect safety and level-of-service will be eliminated.

Internal Circulation

During the pre-consultation meetings, it was requested that the viability of closing the internal street system to through traffic and restricting the central area, in the vicinity of the roundabout at the intersection of Town Center Drive at Kinau Avenue, to pedestrians only. It was decided that a subjective assessment should be provided rather than a detailed analysis as presented for the preferred concept.

After reviewing the concept, it is obvious that closure of the central area of the project site will result in traffic having to take circuitous routes around the project. This means more traffic at the intersections around the perimeter of the project. One of the major objectives of the access and egress concept as shown in the plan is to minimize adverse circulation by providing the most direct routes possible to the parking facility locations within the project in order to minimize the traffic impacts of the project on the adjacent roadway network. Blocking the central area to traffic would put this traffic back into the adjacent roadway network.

Lastly, while this concept may encourage more pedestrian circulation within the project, it would also offset some of the advantage of the multi-use concept since traffic could not move between all the quadrants without getting back onto the public roadway system and therefore would affect the traffic discounts used for a multiuse development. This will have a particularly adverse impact on traffic circulation of service vehicles, which would have to make numerous entrances and exits to serve the project.

An alternative to closing the central area to vehicular traffic is to convert Town Center Drive and Kinau Avenue from two-way to one-way operation. The same arguments as against the closure of the central area are applicable to the one-way concept but possibly not to the same degree.

Town Square Park

The Town Square Park will primarily serve as a gathering place for residents of the project and for customers of the project's various restaurants and retailers. Occasionally, the park may be utilized for special events, such as a farmers or crafters market, musical performances, etc. Such events will be typically scheduled during non-peak traffic hours, such as during weekend mornings and evenings. If it is anticipated that an event will overlap into the peak periods, a traffic and parking management plan will be developed. Since each event may be unique, it is not possible to anticipate these events in preparing the TIAR or the parking analysis. Based on the traffic engineer's experience with the Hawaii Convention Center, after several events, a library of traffic and parking management plans will be amassed.

<u>Fire and Emergency Vehicle Access</u>

<u>The proposed roadway widths will provide for 20 feet of clearance after factoring in street parking, as generally required for emergency vehicle access. The round-about will be designed to accommodate the required fire truck turning radius.</u>

5. Electrical and Telephone

Existing Conditions. Electric, telephone and cable television services are provided by Maui Electric Company <u>(MECO),</u> Hawaiian Telcom, and Oceanic Time Warner. Services are available to the project property from Kamehameha Avenue and Lono Avenue via existing underground lines.

The County of Maui normally requires that overhead lines be relocated underground in concert with road widening improvements, i.e. construction of curbs, gutters, and sidewalks. Since Puunene Avenue is being widended, the overhead lines along the Puunene frontage will be relocated underground. New service connections will be designed and constructed underground because the existing systems are near capacity.

New service connections will also be designed and constructed because the existing systems are near capacity.

Potential Impacts and Mitigation Measures. The proposed project will not have any adverse impact upon the existing electrical or telephone systems that will serve the subject property. Discussions conducted with MECO officials have indicated that the proposed buildings are an acceptable distance from power lines, and as such there would be no adverse impacts from power line emissions to occupants of the proposed project.

D. PUBLIC SERVICES

The County's Public Facilities Assessment Update, July 15, 2002, analyzes existing and future conditions relating to the provision of public infrastructure and service systems for Maui and within each community plan region. The following summarizes existing conditions within Wailuku-Kahului and identifies potential impacts and mitigation measures resulting from the project.

1. Recreational Facilities

Existing Conditions. According to the County's Public Facilities Assessment Update, July 15, 2002, the Wailuku-Kahului region is endowed with 16 neighborhood parks providing a wide variety of facilities to meet the recreational needs of the community. Larger sub-regional park facilities include the Maui High playfields, Hoaloa Park and Kahului Community Park. Wailuku-Kahului is also the center of regional park facilities for the Island of Maui. Central recreation areas, such as the Maui War Memorial Complex and the Waiehu Golf Course, provide an extensive array of facilities and activities for area residents to enjoy.

Wailuku-Kahului contains more parks (in terms of number, size, and facility) per capita than any other Maui Community Plan Region. Due largely to the number of regional facilities, Wailuku-Kahului has 14 tennis courts, 12 tot lots, 87 sports fields, 16 sports courts, 4 gyms, and 8 community centers. However, it is currently estimated that the Wailuku Kahului community currently needs 1 additional sport court and 216.8 acres of sub-regional parkland to satisfy the recreational needs of the existing community.

Regional and sub-regional parks within proximity of the project site include: The Maui Botanical Gardens, Kahului Harbor Park, Keopualani Regional Park, Hoaloa Park, Kanaha Beach Park, Maui Community College Fields, and Kahului Pool.

Potential Impacts and Mitigation Measures. The proposed development will increase the population of the immediate area and will therefore produce a marginal increase in the use of neighborhood and regional park facilities. In order to mitigate this impact, the owners of the project will comply with the requirements for Parks and Playgrounds, pursuant to Maui County Code Section 18.16.320. The park assessment requirements are designed to mitigate the incremental impact that new development places upon the region's park facilities. In addition, a park will be developed within the Kahului Town Center project that will be privately maintained and available for use by residents and the public. As such, the proposed project is not anticipated to significantly impact public recreational facilities.

2. Police and Fire Protection

Existing Conditions. The Wailuku-Kahului CPR falls within the MPD's District I. This police district is served by the Wailuku (Central) Station, which houses the MPD Headquarters for the entire County. The Wailuku Station is currently staffed with 111 budgeted uniformed patrol officers and an estimated share of 38 investigative officers (FY 2001). If allocated by Community Plan Region (CPR) population, 62 uniformed officers and 22 investigative officers are estimated to be on call to service the policing needs of the Wailuku-Kahului CPR.

District I staffing is sufficient to meet the current estimated policing needs of the Wailuku-Kahului CPR. The Wailuku Station's 149 budgeted officers comprise about 45 percent of the County total. In year 2001, the Wailuku District received 47,976 calls for service, or 327 per officer, representing 49 percent of total calls for service in the County.

By 2020, police needs in the Wailuku-Kahului CPR will increase by approximately 37 percent from the current allocation of 83 officers to 114. The 31 new officers will require a further addition of 9 new support positions.

Three fire stations serve Wailuku-Kahului. The Kahului Fire Station on Dairy Road provides service to the project site. This facility is sufficiently proximate to provide adequate fire service to the site.

Potential Impacts and Mitigation Measures. The proposed project will produce an increase in the population of the immediate area. The increase in population will produce a marginal increase in demand for police and fire protection services, including personnel, vehicles, and facilities. To discourage criminal activity and alleviate the potential impact on police services, the applicant will incorporate strategies into the project to facilitate natural surveillance. Such strategies would include parking lot and sidewalk lighting; limiting the number of access ways into the site to Town Center Drive, Kinau Avenue, and the other proposed driveways; providing visibility to various public and private spaces within the project site from adjacent roadways and uses; providing visibility to common areas from residential areas of the project; and incorporating benches and outside seating areas into the project design to facilitate observation of common areas. The applicant is also considering providing round-the-clock security, which would most likely take the form of a roving patrol shared with the adjacent Maui Mall. The project also complies with the County's parking requirements.

3. **Schools**

Existing Conditions. The Wailuku-Kahului region has two high schools, Baldwin High and Maui High, with combined fall 2001 enrollment of 3,366 students. Four elementary schools serve the region: Waihee Elementary, Wailuku Elementary, Lihikai Elementary, and Kahului Elementary. The area has two intermediate schools: Maui Waena Intermediate and Iao Intermediate.

Private elementary, intermediate, and high schools that are located in Wailuku-Kahului include:

- Chris the King Church (Pre-school to grade 6)
- Emmanuel Lutheran Church and Schools (Pre-school to grade 6)
- St. Anthony Grade School (Grades K-6)
- St. Anthony High School (Grades 7-12)

The following public schools service the project site: Maui High School, Kahului Elementary, and Maui Waena Intermediate. The actual 2001 enrollment for these schools was as follows:

	2001 Enrollment

Kahului Elementary	834
Maui Waena Intermediate	1,008
Maui High	1,673

The following table provides total rated capacity, 2001 total enrollment, and projected 2005 enrollment information for Wailuku-Kahului school aged children.

	Total Rated Capacity	2001 Total Enrollment	2005 Projected Enrollment
Elementary School Age (5-9)	3,884	3,807	2,984
Intermediate School Age (10-14)	1,206	1,850	2,977
High School Age (15-18)	3,003	3,366	2,542

According to the Public Facilities Assessment Update, July 15, 2002, the following facilities will be required to service the planning region to 2020.

- **Elementary Schools.** The region will require at least one additional elementary school by 2020. Maui Lani Elementary School is scheduled to open in 2007 and will absorb some the projected 2020 demand.

- **Intermediate School.** Significant overcrowding is present at Wailuku-Kahului's intermediate schools, with enrollment at 133-177% of rated capacity. Adjusting for private school enrollment, demand for 3 additional intermediate schools to serve this region begins in 2005, building to 4 by 2020.

- **High schools.** After consideration of private school enrollments, the two current high schools appear to be sufficient to meet the demand of this region to 2015, when a third high school appears justified. However, actual conditions at Maui and Baldwin High Schools indicated an overcapacity situation in 2001 (121% and 104% of capacity, respectively).

Potential Impacts and Mitigation Measures. Using State of Hawaii, Department of Education, multipliers for standard housing types of school aged children the proposed project could increase the student population of the affected schools by approximately:

Grade	Students
K-5	48
6-8	18
9-12	30

The Applicant will work with the Department of Education to determine appropriate mitigation measures to address the project's impact on school facilities.

4. Medical Facilities

Existing Conditions. The Wailuku-based Maui Memorial Medical Center (MMMC) provides centralized medical services for the Island. Medical and dental offices are located in Wailuku and Kahului to serve the area's residents. According to the County's Public Facilities Assessment Update, July 15, 2002, the status of hospital facilities on Maui in 2000 is as follows:

- **Obstetric and Pediatric Beds** are significantly underutilized throughout the County of Maui, with a maximum actual occupancy rate of 31% compared to the desirable rate of 85%.
- **Critical Care Beds,** available only at Maui Memorial Medical Center, stayed occupied at a fairly favorable 64% rate in 2000, compared to the desirable rate of 75%.
- **Acute Care Beds** appeared to be undersupplied at MMMC. This could be because non-acute patients were occupying acute care beds while they waited for long-term care beds at Hale Makua and Kula Hospital.
- **Long-term Care Beds** at Hale Makua and Kula Hospital appeared to be inadequate to handle demand in 2000, with occupancy rates consistently exceeding the desired rate of 95%.
- **Specialty Care Beds** were generally underutilized in hospitals of the County of Maui in 2000.

As for the existing capacity of Emergency Medical Services, the County's Public Facilities Assessment Update, July 15, 2002, notes that the Wailuku-Kahului area is currently served by two ambulance stations, which is adequate to service the current population.

Potential Impacts and Mitigation Measures. The proposed project will produce an increase in the population of the immediate area. The increase in population will produce a marginal increase in demand for physicians, dentists, nurses, mental health personnel, and hospital beds. In the context of the overall population growth for the island, the proposed project will not produce an overall significant impact to the island's medical facilities.

5. **Solid Waste**

Existing Conditions. Only two landfills are currently operating on Maui, the Central Maui Landfill in Pu`unene, and the Hana landfill. Residential solid waste collection is provided by the County and taken to the Central Maui Landfill, which also accepts waste from private refuse collection companies.

All solid wastes generated during demolition and construction will be managed in accordance with state and federal regulations. Asbestos-containing materials will be disposed of at the Central Maui Sanitary Landfill. Fluroescent light bulbs and any PCB-containing light ballasts will be shipped to mainland disposal or recycling facilities. A detailed plan for recycling of construction/demolition materials will be developed prior to the start of the demolition and construction phases. All other construction/demolition waste that is not suitable for recycling and does not require special management will be disposed of at the Maui Demolition and Construction Landfill.

According to the County's Public Facilities Assessment Update, July 15, 2002, existing capacity and planned expansion of the Central Maui Landfill will accommodate the Wailuku-Kahului Community Plan Region's waste disposal needs beyond the year 2020.

Potential Impacts and Mitigation Measures. Based upon figures provided by the County of Maui, Curbside Refuse Collection System Plan, September 2000, the subject project will generate approximately 1.72 tons per household per year, which is equivalent to 3,440 pounds/year of solid waste. Thus, the residential component of the project is anticipated to generate approximately 1,520,480 pounds/year or 4,165 pounds per day of solid waste. Based upon a standard of .001 tons/day of solid waste generation per office and retail employee, the project may generate approximately .609 tons or 1,218 pounds per day of solid waste (Source: M. Greenburg, *A primary on Industrial Environmental Impact*).

Solid waste collection for the proposed project will be contracted to a private collection company. Green waste from the site will be either mulched on site or deposited at the Central Maui landfill's green waste recycling facility. During construction the applicant will incorporate a job-site recycling plan in order to reduce the amount of construction related waste generated by the project.

IV. RELATIONSHIP TO GOVERNMENT PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE LAW

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes four major land use districts into which all lands in the State are placed. These districts are designated Urban, Rural, Agricultural, and Conservation. The subject property is within the Urban District. The proposed improvements are permitted within the Urban District.

B. GENERAL PLAN OF THE COUNTY

The General Plan of the County of Maui (1990 update) provides long-term goals, objectives, and policies directed toward improving living conditions in the County. The following General Plan Themes, Objectives and Policies are applicable to the proposed project:

Theme No. 4: **Maintain a Viable Economy That Offers Diverse Employment Opportunities For Residents**

Theme No. 5: **Provide for Needed Resident Housing**

Amendments to the General Plan recognize the need to maintain a healthy economy and broaden our economic base so that we are not so dependent on tourism.

I.B. <u>Land Use</u>

Objective No. 2 **To use the land within the County for the social and economic benefit of all the County's residents.**

Policies:

(c.) *Encourage land use methods that will provide a continuous balanced inventory of housing types in all price ranges.*

II.A. Economic Activity

Objective No. 1: **To provide an economic climate which will encourage controlled expansion and diversification of the County's economic base.**

Policies:

(a). Maintain a diversified economic environment compatible with acceptable and consistent employment.

Objective No 2. **To provide a balance between visitor industry employment and non-visitor employment for a broader range of employment choices for the County's residents.**

Policies:

(a). Encourage industries that will utilize the human resources available from within Maui County rather than having to import workers.

III. Housing and Urban Design

A. HOUSING

Objective No. 1. **To provide a choice of attractive, sanitary and affordable homes for all our residents.**

Policies:

(b.) Encourage the construction of housing in a variety of price ranges and geographic locations.

Objective No. 2 **Provide affordable housing to be fulfilled by a broad cross-section of housing types.**

B. URBAN DESIGN

Objective No. 1: To see that all developments are well designed and are in harmony with their surroundings.

Policies:

(a) *Require that all appropriate principles of urban design be observed in the planning of all new developments.*

(b) *Encourage expansion in the process to require all non single -family development to be reviewed by the Urban Design and Review Board.*

Objective No. 2: To encourage developments which reflect the character and the culture of Maui County's people.

Policies:

(b) *Encourage community design which establishes a cohesive identify.*

C. WAILUKU-KAHULUI COMMUNITY PLAN

Nine community plan regions have been established in Maui County. Each region's growth and development is guided by a community plan, which contains objectives and policies in accordance with the Maui County General Plan. The purpose of the community plan is to outline a relatively detailed agenda for carrying out these objectives.

The subject property is located within the Wailuku-Kahului Community Plan region. The Community Plan update was adopted through Ordinance No. 1674 and became effective in 1987. The Wailuku-Kahului Community Plan was updated in 2002.

The following Wailuku-Kahului Community Plan goals, objectives, and policies are applicable to the proposed action:

<u>Land Use</u>

Goal

An attractive, well-planned community with a mixture of compatible land uses in appropriate areas to accommodate the future needs of residents and visitors in a manner that provides for the social and economic well-being of residents and the preservation and enhancement of the region's environmental resources and traditional towns and villages.

Analysis. The project will provide a mixture of compatible land uses within an area that is currently highly suited for mixed-use commercial and multi-family residential development. The project is targeted to the current needs of island residents for reasonably priced housing within walking distance of diverse shopping, employment, recreational, and educational opportunities and experiences.

Transportation

Objectives and Policies

1. Provide bikeway and walkway systems in the Wailuku-Kahului area which offer safe and pleasant means of access, particularly along routes accessing residential districts, major community facilities and activity centers, school sites, and the shoreline between Kahului Harbor and Pa'ia.

2. Accommodate bicycle and pedestrian ways within planned roadway improvements.

Analysis. A primary design objective is to create a pedestrian-oriented neighborhood. The street will incorporate landscape planting, shade trees, and wide sidewalks. Within the project, residents will be within close walking distance to stores, shops, restaurants, and professional services. The design of the town center is intended to minimize vehicle trips by residents of the project. The project will provide on-street parking and off-street parking at convenient locations to accommodate other public traffic. <u>The project will also provide a mass transit/bus drop-off point at the Kinau entrance to the project from Kaahumanu Avenue.</u>

Urban Design

Goal:

An attractive and functionally integrated urban environment that enhances neighborhood character, promotes quality design, defines a unified landscape planting and beautification theme along major public roads and highways, watercourses and at major public facilities, and recognizes the historic importance and traditions of the region.

1. Improve pedestrian and bicycle access within the region.

2. Existing and future public rights-of-way along roads and parks shall be planted with appropriate trees, turf grass and ground covers.

Objectives and Policies for Kahului

1. Circulation: Provide and maintain sidewalks and bikeways for convenient and pleasant connections between activity centers, such as shopping centers, schools, Maui Community College and public parks. These pathways should have adequate separation from vehicular traffic for safety purposes.

2. *Building* Form and Character: Maintain compatible scale relationships between the existing low-scale character of the area, adjacent public uses and higher buildings.

   a. The low-rise character of the central business area should be maintained. Higher building forms up to six stories should be sited in the central portion of commercial blocks.

   b. Building heights along the perimeter of commercial blocks should provide a transition in scale to adjacent public and quasi-public uses.

   c. Commercial uses along the perimeter of central business area blocks should be low-rise and provide sufficient setbacks to allow landscaped buffers along street frontages.

Analysis. A primary design objective is to facilitate pedestrian connectivity between the Queen Ka`ahumanu Shopping Center and Maui Mall. It is anticipated that the residents of this project will utilize interior streets for access to nearby amenities and services.

The project will incorporate 5-story buildings in Quadrants #3 and #4 along Ka`ahumanu Avenue to provide ocean view opportunities for the multi-family residential units. The 5-story buildings will also be situated along a portion of Kinau Avenue. The buildings situated along Town Center Drive and around the Town Square Park in the center of the project will be a mixture of two (2) to 4-story buildings. Street tree planting along the frontage of the public streets will soften the visual impact of the buildings.

The project incorporates several important "smart growth" principles into the design of the project, including:

- Creating pedestrian oriented streets through the incorporation of landscape planting and shade trees, wide sidewalks, textured pavement at the intersections, and sidewalk dining and retail sales;

- Placing the off-street parking within the interior of the lot;

- Providing a variety of housing choices at varying prices within walking distance of shopping, employment, recreational, and educational opportunities;

- Providing the opportunity for multi-family residential uses above the ground floor retail; and

- Incorporating a variety of architectural styles and building forms into the design of the project.

As proposed, the project will bring economic vitality and definition, or a "sense of place", to a currently underdeveloped block within the core of Kahului's commercial district. It is anticipated that similar type uses and building forms will emerge around the block to create a more cohesive and unified mixed-use commercial environment over the next several years.

D. MAUI COUNTY ZONING

The project site is zoned B-2 Community Business District, in accordance with MCC Chapter 19.18. The proposed commercial and apartment residential uses are permitted in this district. Also, the proposed floor area is approximately 82% of the total lot area; a maximum of 200 % of the total lot area is permitted. The maximum proposed building heights will be 5-stories; a 6-story building height is allowed.

The following parking requirements apply to the proposed project:

	Retail	Office	Restaurant	Bank	Apartment Units	Required Parking	Total	Difference
Quadrant #1	36,234 sf	61,574 sf	4,484 sf	9,000 sf	0	366 stalls	184 stalls	-182 stalls
Quadrant #2	12,163 sf	0	1,258 sf		80 units	230 stalls	208 stalls	-22 stalls
Quadrant #3	40,732 sf	0	6,593 sf		295 units	854 stalls	846 stalls	-8 stalls
Quadrant #4	29,414 sf	91,249 sf	0	4,180 sf	67 units	464 stalls	675 stalls	+211 stalls
Total	118,543sf	152,823 sf	12,335 sf	13,180 sf	442 units	1,913 stalls	1,913 stalls	0 stalls
Parking standard	1 stall/200 sf	1 stall/500 sf	1 stall/100 sf of seating/dining area (70% of total floor area)	1 stall/300 sf	2 stalls/unit			
Required parking	593 stalls	306 stalls	86 stalls	44 stalls	884 stalls		1,913 stalls	

Since the project will be developed over a number of years by quadrant and parking is available at the Kahului Shopping Center site, it is expected that adequate parking will be available on the property to meet the parking requirement for a given phase of development. In the long term, consideration should be given to amending the Off-street Parking and Loading requirements to reduce standards for mixed commercial/residential projects. This consideration would reflect the studies that confirm that mixed-use developments generate a lower demand for parking spaces.

E. SPECIAL MANAGEMENT AREA OBJECTIVES AND POLICIES

The subject project is located within the Special Management Area (SMA). As such, the proposed improvements will require an SMA Use Permit. Pursuant to Chapter 205A, Hawaii Revised Statutes, and the Rules and Regulations of the Planning Commission of the County of Maui, projects located within the SMA are evaluated with respect to SMA objectives, policies and guidelines. This section addresses the project's relationship to applicable coastal zone management considerations, as set forth in Chapter 205A and the Rules and Regulations of the Maui Planning Commission.

1. **Recreational Resources**

Objective: Provide coastal recreational resources accessible to the public.

Policies:

(A) Improve coordination and funding of coastal recreation planning and management; and

(B) Provide adequate, accessible and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring placement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or require reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing;

(viii) Encourage reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.

Analysis. The subject property is situated within the commercial center of Kahului Town, *mauka* of Ka`ahumanu Avenue, and will therefore have no direct impact on the public's use or access to the shoreline area.

As noted, the owners of the project will comply with the requirements for Parks and Playgrounds, pursuant to Maui County Code Section 18.16.320. The park assessment requirements are designed to mitigate the incremental impact that new development places upon the region's park facilities.

2. **Archaeological/Historical Resources**

Objective: Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(a) Identify and analyze significant archeological resources;

(b) Maximize information retention through preservation of remains and artifacts or salvage operations; and

(c) Support state goals for protection, restoration, interpretation, and display of historic structures.

Analysis. As discussed, Scientific Consultant Services, Inc. (SCS), conducted an Archaeological Inventory Survey of the entire project area. The primary goal of this study was to investigate the presence/absence of surface and subterranean archaeological structures, artifacts or cultural deposits across the project parcel.

As noted in the Archaeological Inventory Survey, no significant historic and/or archaeological sites or features were recorded in the project area. However, due to the presence of sandy deposits throughout the project area, and, due to the well-documented presence of traditional Native Hawaiian burials and other archaeological resources in the general Kahului area, future planned construction activities should be subjected to appropriate Archaeological Monitoring. (See: Appendix D).

From a cultural practices and beliefs perspective, the subject property bears no apparent signs of cultural practices or gatherings taking place on the subject property or in the immediate vicinity of the subject property that will be impacted by the project.

In addition, the applicant is contracting with an architectural historian to review and document those existing buildings over 50 years old.

3. Scenic and Open Space Resources

Objective: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(a) Identify valued scenic resources in the coastal zone management area;

(b) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(c) Preserve, maintain, and where desirable, improve and restore shoreline open space and scenic resources; and

(d) Encourage those developments that are not coastal dependent to locate in inland areas.

Analysis. The Maui Scenic Coastal Resources Study, August 1990 (See Figure No. 16), identifies West Maui Mountain Views occurring from Pu`unene Avenue. With the proposed development, mountain views along Pu`unene Avenue between Mokulele Highway and Ka`ahumanu Avenue will be largely maintained; however, these views will be affected in the vicinity of the project site due to building massing.

4. Coastal Ecosystems

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(a) Improve the technical basis for natural resource management;

(b) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(c) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

(d) Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

Analysis. As described in Section III.C.3 of this report, with the incorporation of the mitigation measures identified in Appendix G, the project will not have a significant direct impact on the region's coastal ecosystem and therefore there should be no significant adverse impacts to near shore waters from point and non-point sources of pollution during the operational or construction phase of the project.

5. Economic Uses

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

(a) Concentrate coastal dependent development in appropriate areas;

(b) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area;

(c) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such development and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

  (i) Use of presently designated locations is not feasible;

  (ii) Adverse environmental impacts are minimized; and

  (iii) The development is important to the State's economy.

Analysis. The proposed development is situated *mauka* of Ka`ahumanu Avenue within the commercial core of Kahului Town. The proposed mixed-use development incorporates ground floor retail and services with a mixture of office space and multi-family residential units. As designed, the project will provide a range of multi-family residential housing opportunities within close proximity of commercial goods and services and will serve to strengthen and define Kahului Town's commercial core.

6. **Coastal Hazards**

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.

Policies:

(a) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and non-point source pollution hazards;

(b) Control development in areas subject to storm wave, tsunami, flood, erosion, subsidence, and point and non-point pollution hazards;

(c) Ensure that developments comply with requirements of the Federal Flood Insurance Program;

  i. Prevent coastal flooding from inland projects; and

  ii. Develop a coastal point and nonpoint source pollution control program.

Analysis. As discussed in Section III.A.4 of this report, the project site is situated within Flood Zones "V", "A-4" and "C". The project will comply with the flood hazard requirements.

7. **Managing Development**

Objective: Improve the development review process, communication, and public participation in the management of coastal resources hazards.

Policies:

(a) Use, implement, and enforce existing laws effectively to the maximum extent possible in managing present and future coastal zone development;

(b) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and

(c) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Analysis. The development of the subject property is being conducted in accordance with applicable State and County requirements. Opportunity for review of the proposed action is provided through the County's Special Management Area (SMA) permitting process.

8. **Public Participation**

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

(a) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program.

(b) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and

(c) Organize workshops, policy dialogues, and site-specific medications to respond to coastal issues and conflicts.

Analysis. Prior to the filing of the subject HRS Chapter 343 Environmental Assessment and Special Management Area (SMA) Use Permit, there was pre-consultation with various public agencies and officials, business groups, and the community-at-large. These activities included personnel meetings, mail outs, and informational meetings, in order to describe the proposed project and solicit issues that need to be addressed. Consulted agencies included the Department of Planning, Department of Public Works and Environmental Management, State Department of Transportation, Maui District Highways Office, members of the Maui County Council, and the Mayor of Maui County. Also, the applicant conducted a community open house to provide the public with the opportunity to review project plans, ask questions, and provide comments.

Furthermore during the scheduled public hearing and meetings, the public will have an opportunity to review and comment on the proposed project. Landowners located within 500 feet of the project will be notified of the scheduled public hearing dates. Public hearing dates and location maps will also be published in a locally circulated newspaper on two separate occasions. The public will be allowed to participate in the public hearing portion of the Maui Planning Commission's review process.

9. **Beach Protection**

Objective: Protect beaches for public use and recreation.

Policies:

(a) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

(b) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(c) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Analysis. Ka`ahumanu Avenue, along with existing commercial development, separates the subject property from the shoreline. Accordingly, the project will not involve construction of any structures within the shoreline area and the subject property will not have a direct physical impact upon any public beaches, due to its separation from the coastline.

10. **Marine Resources**

Objective: Implement the State's ocean resources management plan.

Policies:

(a) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(b) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(c) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

(d) Assert and articulate the interest of the state as a partner with federal agencies in the sound management of the ocean resources within the United States exclusive economic zone;

(e) Promote research, study, and understanding of ocean processes, marine life, and other ocean development activities relate to and impact upon the ocean and coastal resources; and

(f) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Analysis. The proposed project does not involve the direct use or development of marine resources. The project will produce no direct impact on the region's coastal or marine resources, and with the incorporation of erosion and drainage control measures during construction and after construction as identified in this report, there should not be significant adverse impacts to near shore waters from point and non-point sources of pollution. Therefore, the subject project will not produce any significant impacts on any coastal or marine resources.

F. ENVIRONMENTAL ASSESSMENT SIGNIFICANCE CRITERIA

In accordance with Title 11, Department of Health, Chapter 200 and Subchapter 6, Section 11-200-12, Environmental Impact Statement Rules, and based on the detailed analysis contained within this document, the following conclusions are supported.

1. **The proposed action will *not* result in an irrevocable commitment to loss or destruction of natural or cultural resources.**
   Analysis. As documented in this report, the proposed project will not involve the loss or destruction of any natural or cultural resource (See Section III.A.B.C).

2. **The proposed action will *not* curtail the range of beneficial uses of the environment.**
   Analysis. The subject property is within the State's Urban District and is zoned and community planned for commercial and residential development and is presently developed with these uses. Thus, the proposed action will not curtail the range of beneficial uses of the environment.

3. **The proposed action will *not* conflict with State or County long-term environmental policies and goals as expressed in Chapter 344, HRS, and those which are more specifically outlined in the Conservation District Rules.**

   Analysis. The project is being developed in compliance with the State's long-term environmental goals. As documented in this report, adequate mitigation measures will be implemented to minimize the potential for negative impact to the environment, including near and off-shore coastal waters, potable water resources, flora and fauna, archeological and cultural resources, and scenic resources.

4. **The proposed action will *not* substantially affect the economic or social welfare and activities of the community, county or state.**

Analysis. The project will increase the available supply of commercial space within the commercial core, which will help to satisfy unmet demand. In addition, short-term economic impacts will result from the increase in activity associated with the construction of the project. Full and part-time jobs will be created during the operation phase of the development.

5. **The proposed action will *not* substantially affect public health.**

Analysis. There are no special or unique aspects of the project that will have a direct impact on public health. It is anticipated that occupants of the project will utilize existing medical facilities located in Kahului and Wailuku and that these facilities will not be significantly impacted by the project.

6. **The proposed action will *not* result in substantial secondary impacts.**

Analysis. The proposed project will produce an increase of approximately 45,000 square feet of commercial retail space and approximately 70,000 square feet of office space, beyond what existed prior to the February 2005 fire. The increase in commercial space will produce an increase in the number of employees and customers on the property. The increase in visitors to the site will increase traffic at the affected intersections, noise levels, air pollution, and other growth related impacts. However, as analyzed in Section III of this report, the increase in the level of these impacts is relatively small and can be mitigated and will therefore not substantially impact the environment.

7. **The proposed action will *not* involve substantial degradation of environmental quality.**

Analysis. Mitigation measures will be implemented during the construction phase in order to minimize negative impacts on the environment, especially with regards to construction runoff. Also, the design of the project has incorporated mitigation measures to minimize impacts to near shore waters that could arise from an increase in runoff generated on the site as a result of the project (See Section III.C.3 for a discussion of drainage). Other environmental resources such as endangered species of flora and fauna, air and water quality, and archeological resources will not be significantly impacted by the subject project.

8. **The proposed project will not produce cumulative impacts and does *not* have considerable effect upon the environment or involve a commitment for larger actions.**

Analysis. The proposed project does not involve a commitment for larger action on behalf of the applicant or any public agency. The subject property is State and County zoned and community planned for urban development, and as such, is part of the planned future growth for the region. As described in this report, the project will not significantly impact public infrastructure and services including roadways, drainage facilities, water systems, sewers, educational facilities, and parks. In addition, the project is not anticipated to induce significant population growth and will therefore not produce considerable effect on the environment nor require a commitment for larger actions by governmental agencies.

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

Analysis. As described in Section III.A.3 of this report, there are no rare, threatened, or endangered species of flora and fauna at the project site.

10. **The proposed action will *not* substantially or adversely affect air and water quality or ambient noise levels.**

Analysis. As described in Section III.A.5 and 6 and III.C.3 of this report, there is a potential for negative impacts to air or water quality and ambient noise levels related to short-term construction activities. Air, noise and dust impacts will be mitigated through implementation of standard mitigation measures as identified previously in this report. It is not anticipated that there will be significant long-term impacts to air or water quality and ambient noise levels due to the operation phase of the development.

11. **The proposed action will *not* substantially affect or be subject to damage by being located in an environmentally sensitive area, such as flood plain, shoreline, tsunami zone, erosion-prone areas, estuary, fresh waters, geologically land or coastal waters.**

Analysis. According to Panel Number 150003 0183D of the Flood Insurance Rate Map, May 15, 2002, prepared by the United States Federal Emergency

Management Agency, the project site is situated in Flood Zone C. Flood Zone C represents areas of minimal flooding.

12. **The proposed action will *not* substantially affect scenic vistas or view planes identified in county or state plans or studies.**

Analysis. As discussed in Section III.A.8 of this report, the proposed project is not anticipated to significantly impact public view corridors along Pu`unene Avenue that extend from its intersection with Kamehameha Avenue and Ka`ahumanu Avenue. Mountain views in the immediate vicinity of the site will be affected by building massing. The project will not produce a significant adverse impact upon the visual character of the area.

13. **The proposed action will not require substantial energy consumption**

Analysis. Upon build-out of the project, energy consumption will be increased above existing and historic levels of usage in the area, since the project is a more intensive use of the site. However, the proposed commercial and residential mixed use project is designed to minimize automobile usage by residents, since they will be within close walking distance of retail and service establishments. Because Kahului Town serves as the regional commercial center of Maui Island, it is expected that the proposed mixed use project will continue to attract patrons who reside in Central Maui and outlying areas (e.g. Upcountry, Paia-Haiku, South Maui). Thus, it is not anticipated that the resultant increase in energy consumption will be significant in the context of existing levels of vehicular energy usage in the region, and on Maui.

V. FINDINGS AND CONCLUSIONS

This environmental assessment has examined the environmental and socio-economic impacts associated with the construction of the proposed mixed use project, as well as associated on-site infrastructure on property located in central Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-07: 005, 008, 009, 010, 027 and 050.

The analysis concludes that the project should not result in significant environmental impacts to surrounding properties, near shore waters, natural resources, or archaeological and historic resources on the site or in the immediate area. With the incorporation of the mitigation measures identified in this document, public infrastructure and services including roadways, sewer and water systems, fire protection, and parks will not be significantly impacted by the project. The proposed project will not significantly impact public view corridors and will not produce a significant adverse impact upon the visual character of the site and its immediate environs.

The subject property is situated within the State's Urban District and is County zoned B-2 Community Business District. The community plan designation for the property is Business/Commercial. The proposed mixed-use commercial and multi-family residential project is permitted within this district. Based upon the findings of this report, the proposed project is in conformance with State and County land use plans and policies including Chapter 205A, HRS, as well as the Wailuku-Kahului Community Plan Land Use Map.

In light of the foregoing, the proposed project will not result in significant impacts to the environment and a Finding of No Significant Impact (FONSI) is warranted.

VI. REFERENCES

Burchell, Robert W., David Listokin, et al. Development Impact Assessment Handbook. Washington, D.C.: ULI-the Urban Land Institute, 1994.

County of Maui, Department of Planning. 1991. *The General Plan of the County of Maui, 1990 Update.* Wailuku, Hawaii.

County of Maui, Department of Planning. 2002. *Wailuku-Kahului Community Plan.* Wailuku, Hawaii.

County of Maui, Office of Economic Development. 2003. *Maui County Data Book.* Wailuku, Hawaii.

Federal Emergency Management Agency. *Flood Insurance Rate Map.* Community Panel Map Number 150003 0190 D. Revised May 15, 2002.

M. Greenburg, *A Primer on Industrial Environmental Impact.* New Brunswick, NJ: Rutgers University Center for Urban Policy Research, 1979.

SMS Research and Marketing Services, *Maui County Community Plan Update Program: Socio Economic Forecast.* Prepared for the Planning Department County of Maui, June 14, 2002.

University of Hawaii, Land Study Bureau. May 1967. *Detailed Land Classification – Island of Maui.* L.S.B. Bulletin No. 7. Honolulu, Hawaii.

U.S. Department of Agriculture, Soil Conservation Service in Cooperation with the University of Hawaii, Agricultural Experiment Station. 1972. *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* Washington, D.C.

Figures

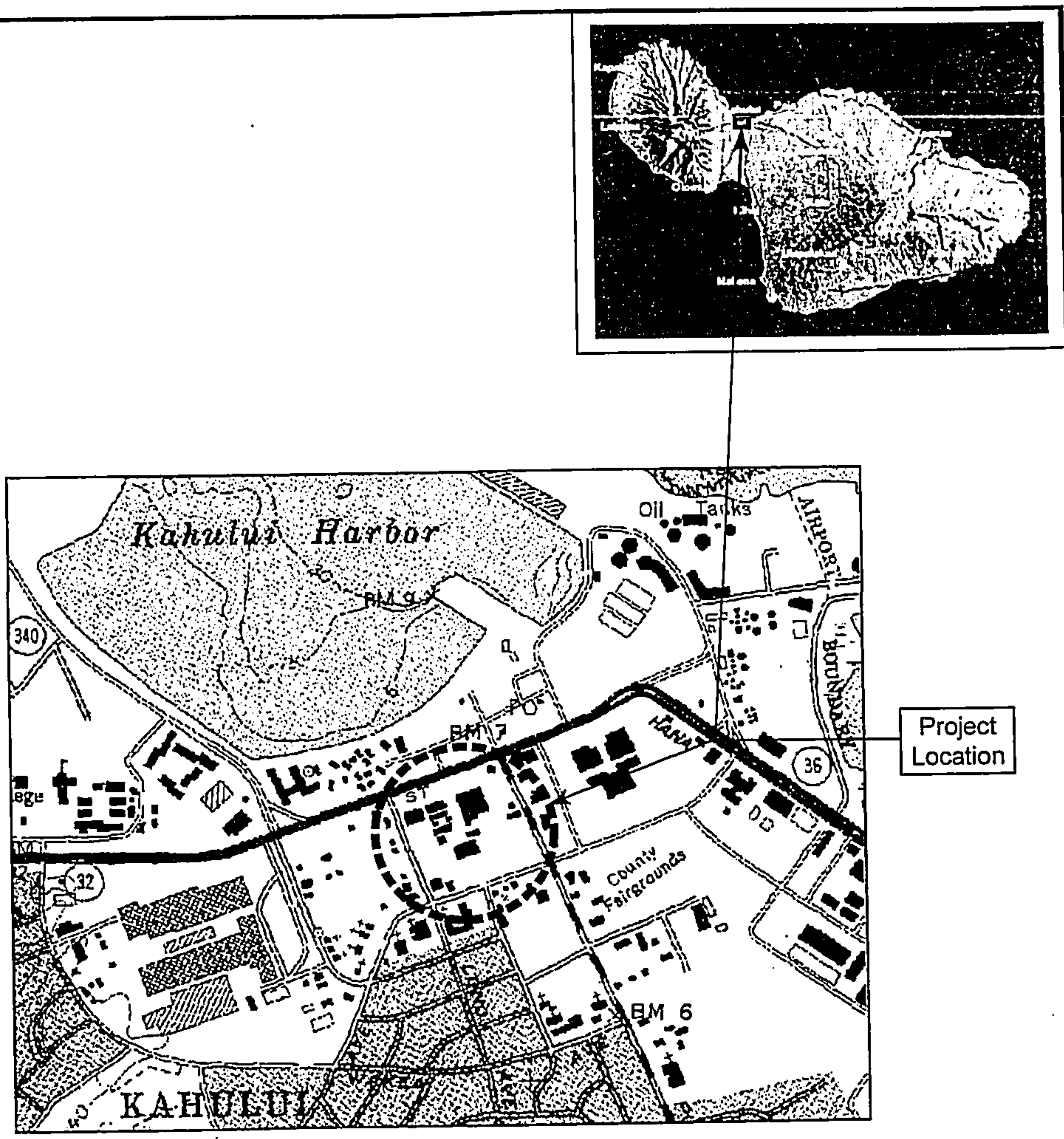


FIGURE 1

Not to Scale

MARCH 2006

REGIONAL LOCATION

Kahului Town Center

CHRIS HART & PARTNERS, INC.

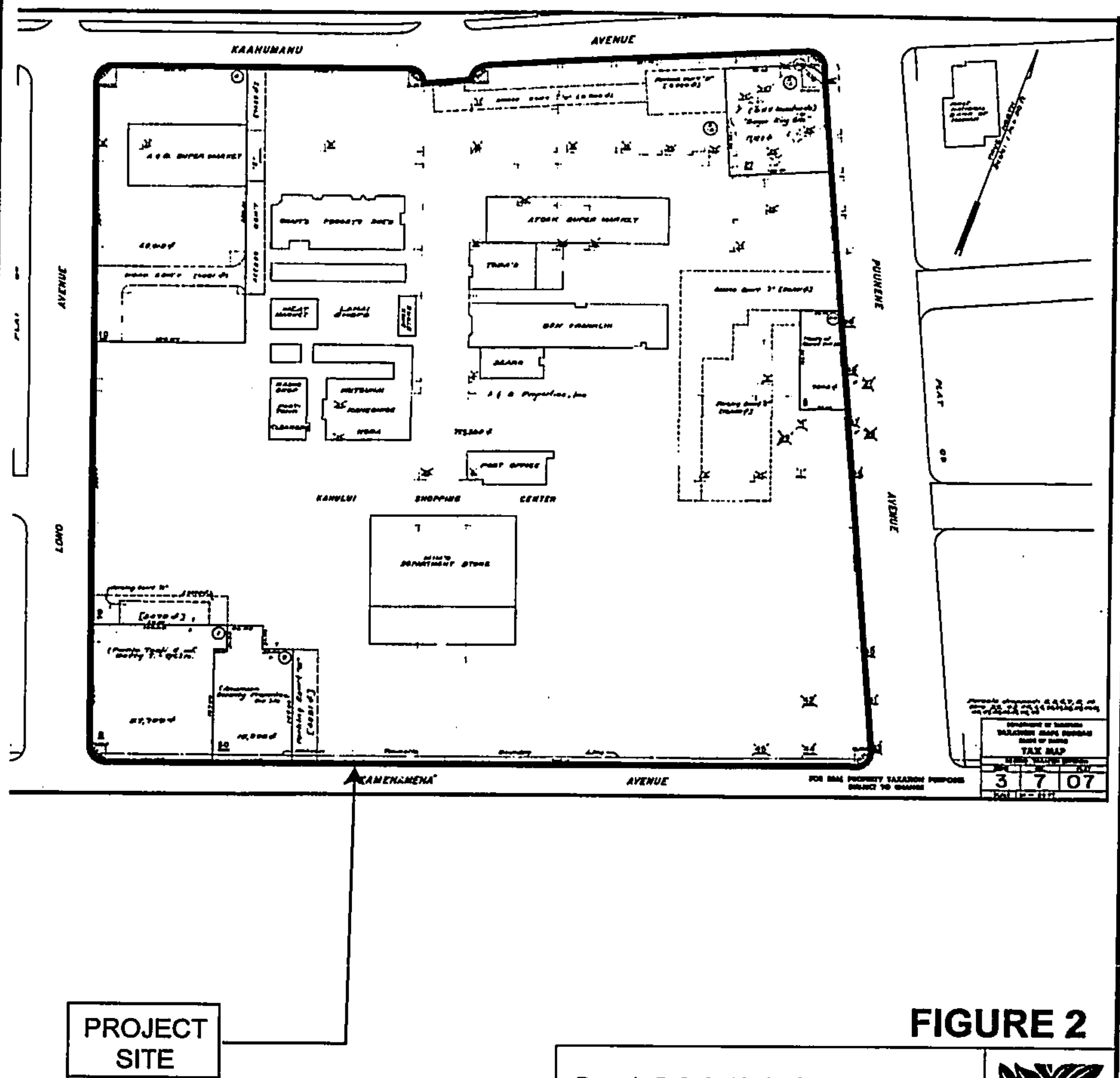
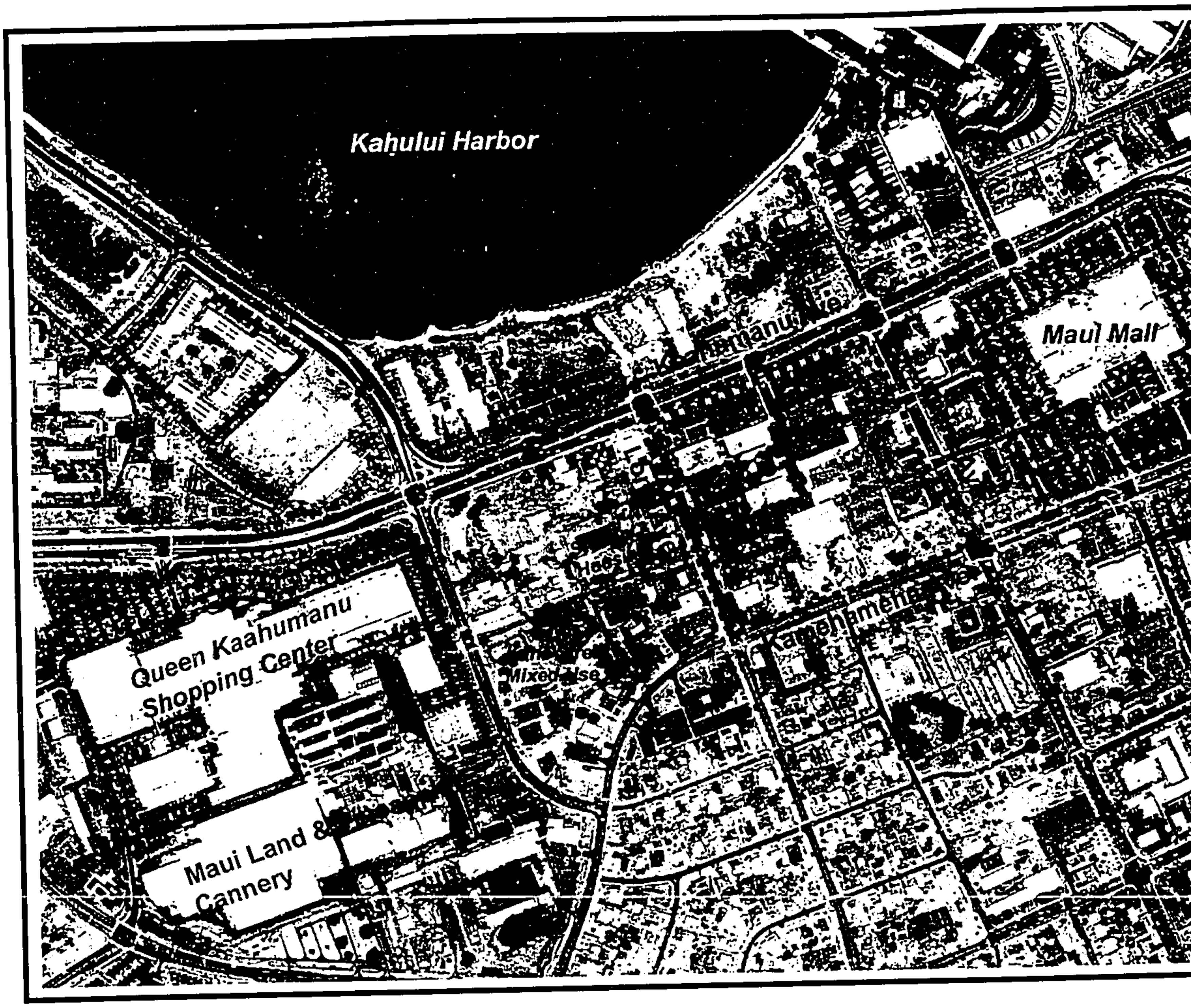


FIGURE 2

Parcels 5, 8, 9, 10, 27 & 50 Not to Scale	MARCH 2006
TAX MAP **Kahului Town Center**	

CHRIS HART & PARTNERS, INC.


Kahului Harbor
Maui Mall
Queen Kaahumanu
Shopping Center
Maui Land &
Cannery

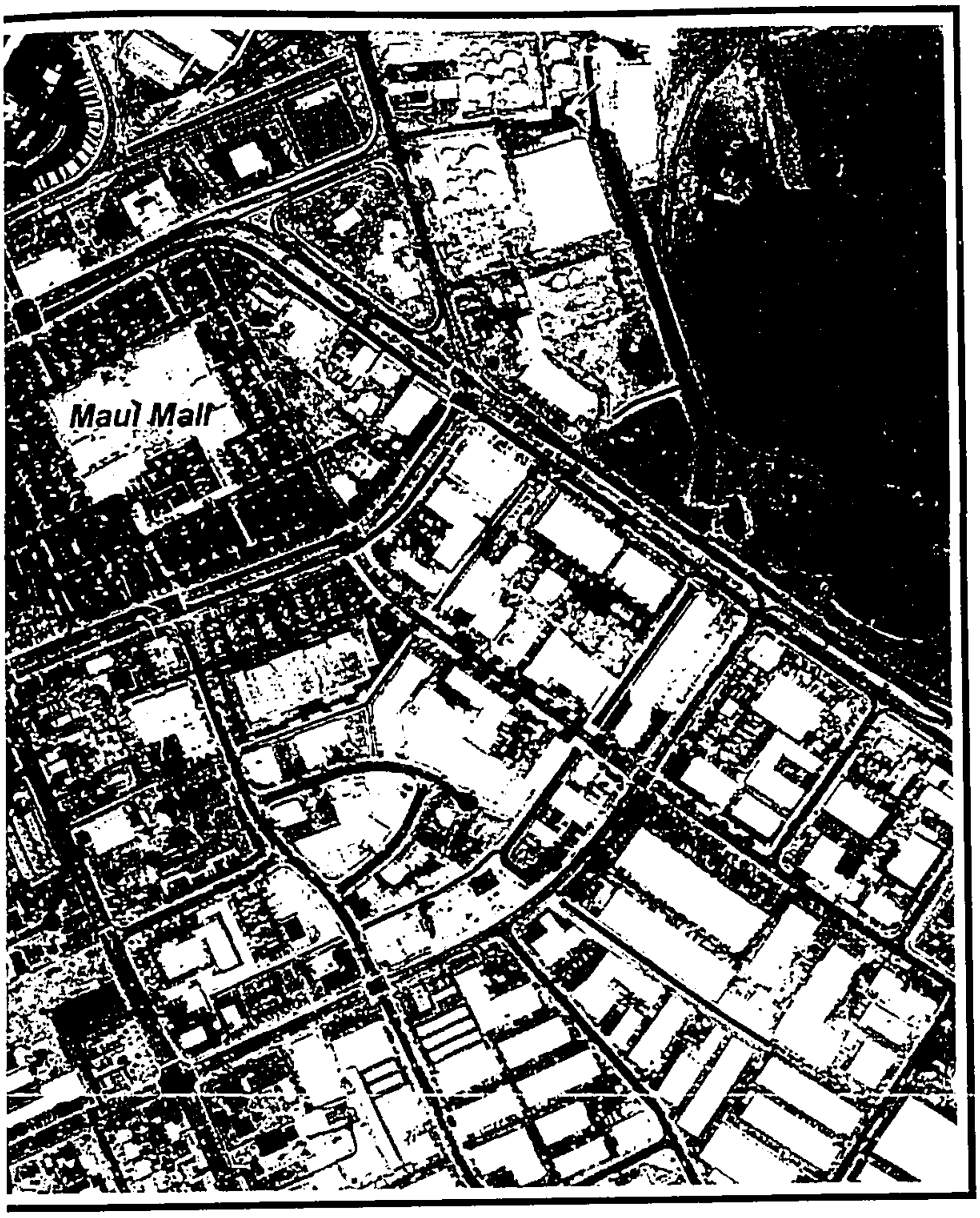


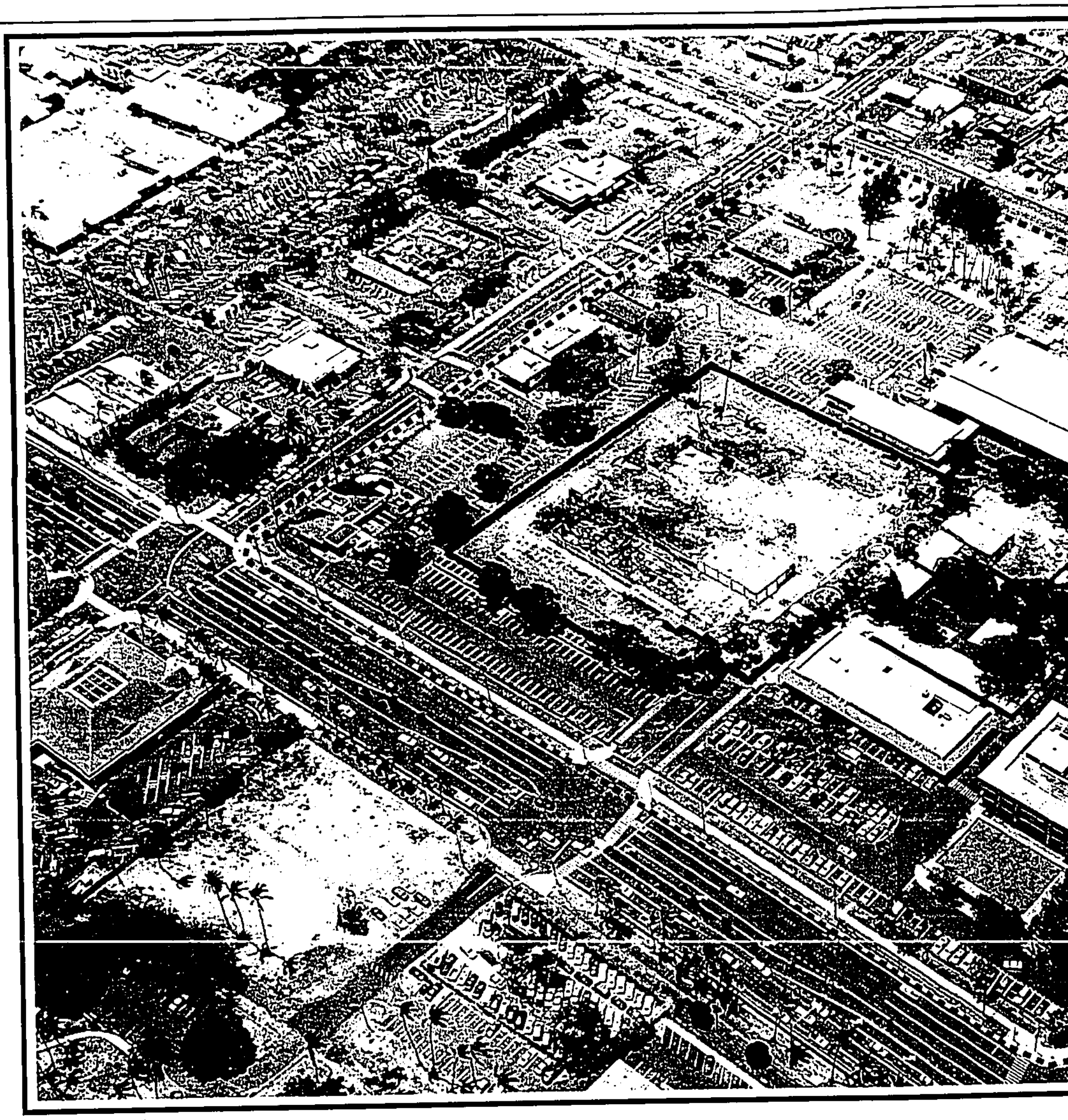
FIGURE 3

Not to scale

MARCH
2006

AERIAL PHOTOGRAPH
KAHULUI TOWN CENTER

CHRIS HART & PARTNERS



March 2005

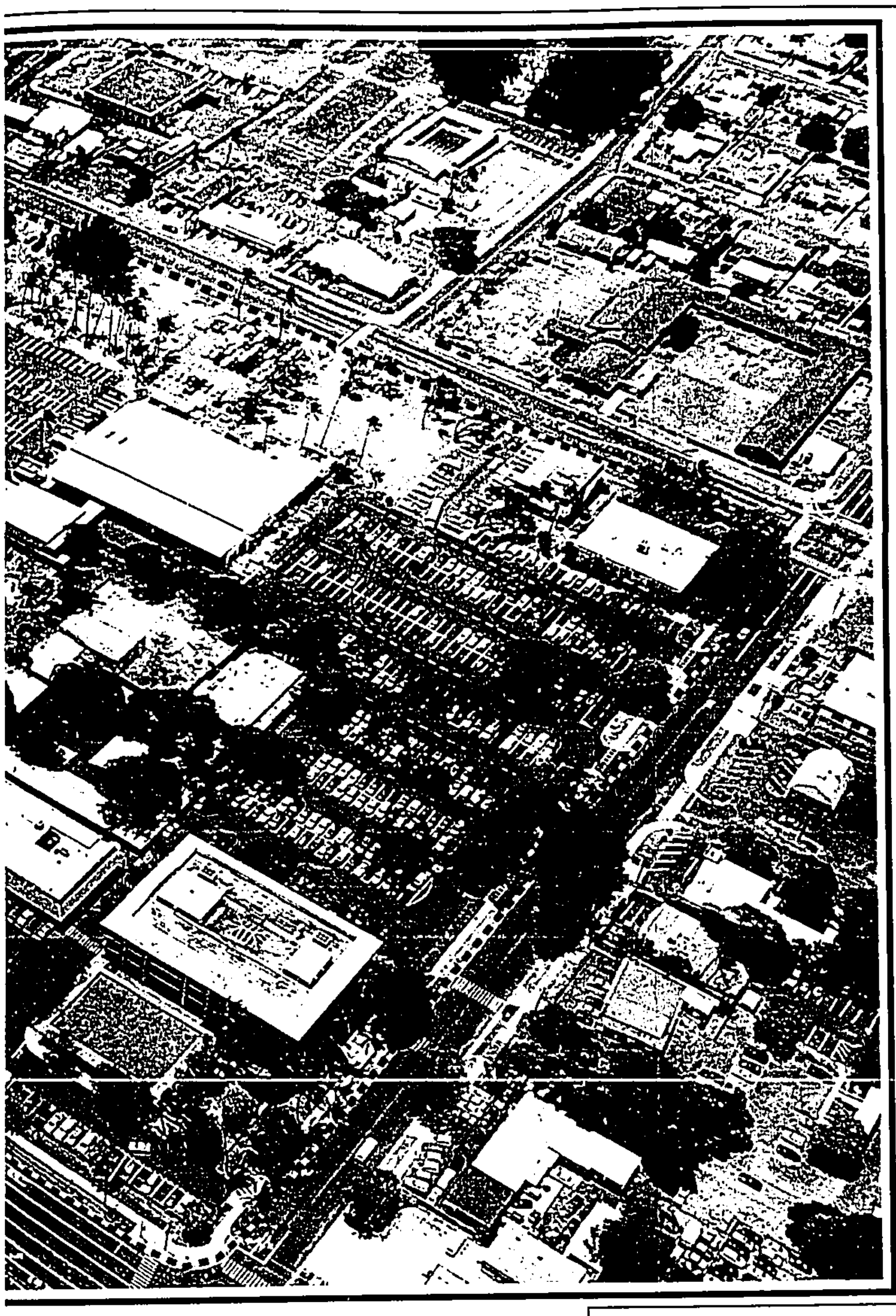


FIGURE 4

Not to scale	MARCH 2006

Aerial Photograph - Existing Site Condition
KAHULUI TOWN CENTER

CHRIS HART & PARTNERS


KAMEHAMEHA AVENUE
PUUNENE AVENUE
KAAHUMANU AVENUE

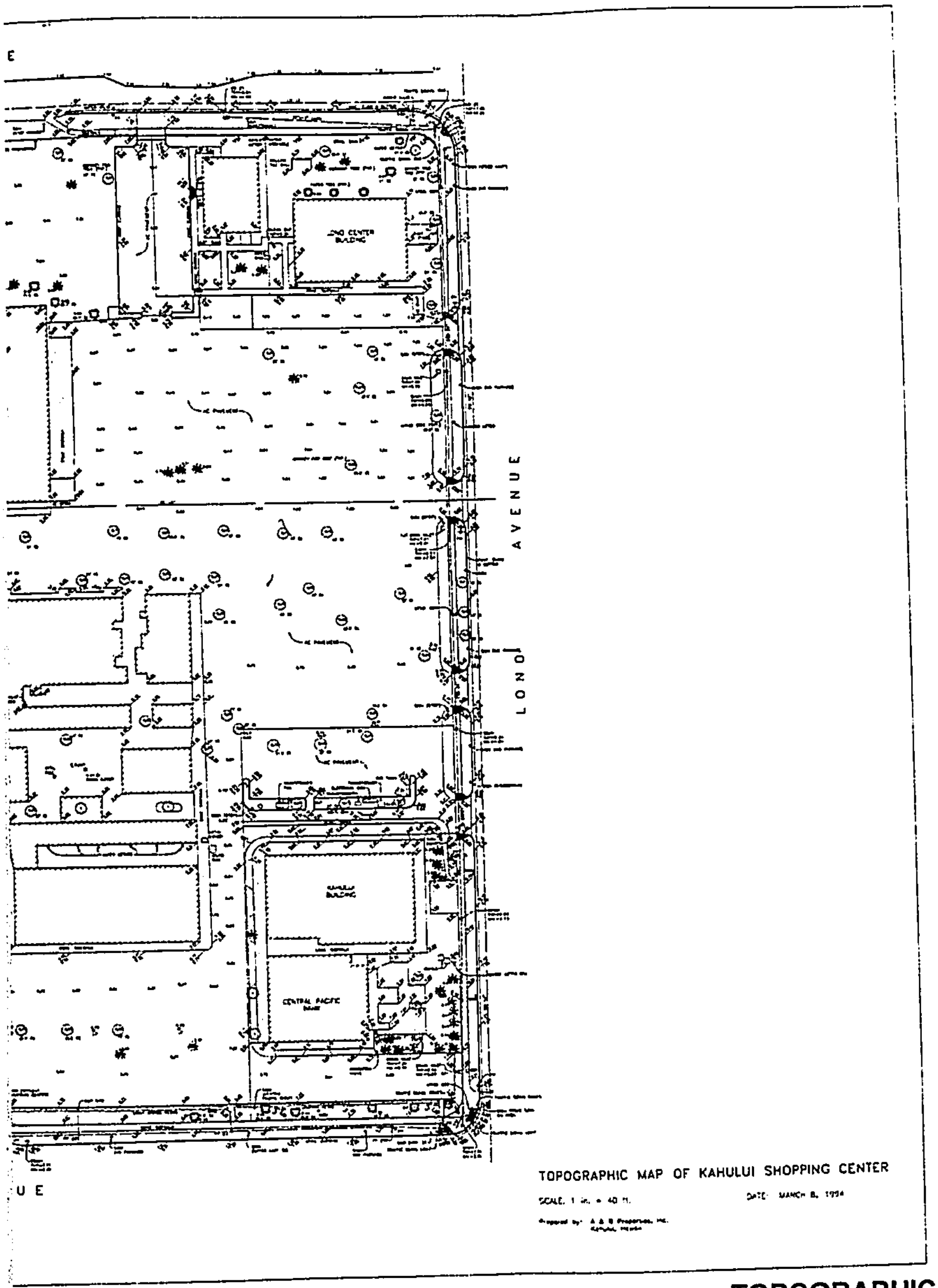


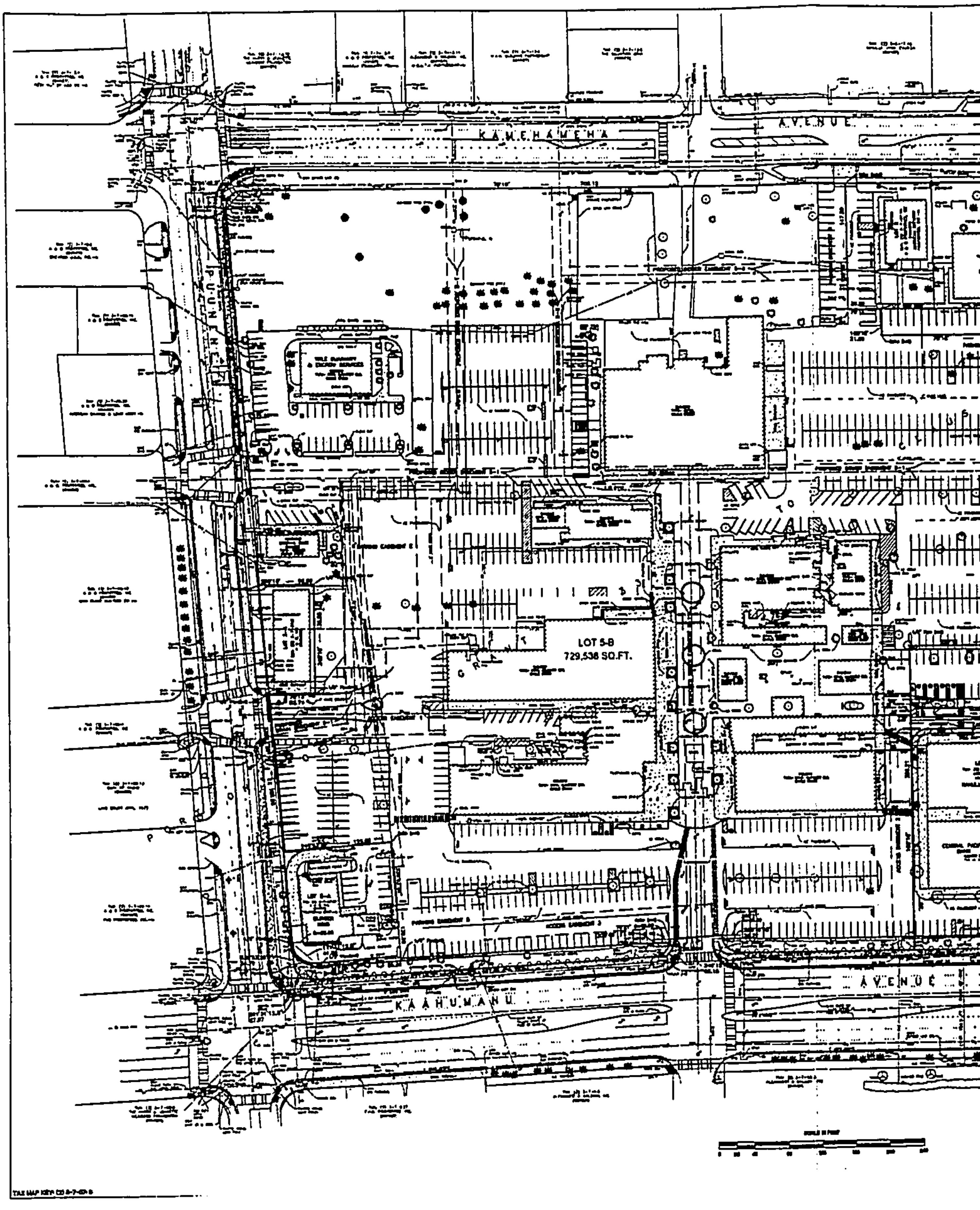
FIGURE 5.a

TOPOGRAPHIC SURVEY

Not to scale MARCH 2006

KAHULUI TOWN CENTER

DOCUMENT CAPTURED AS RECEIVED



DOCUMENT CAPTURED AS RECEIVED

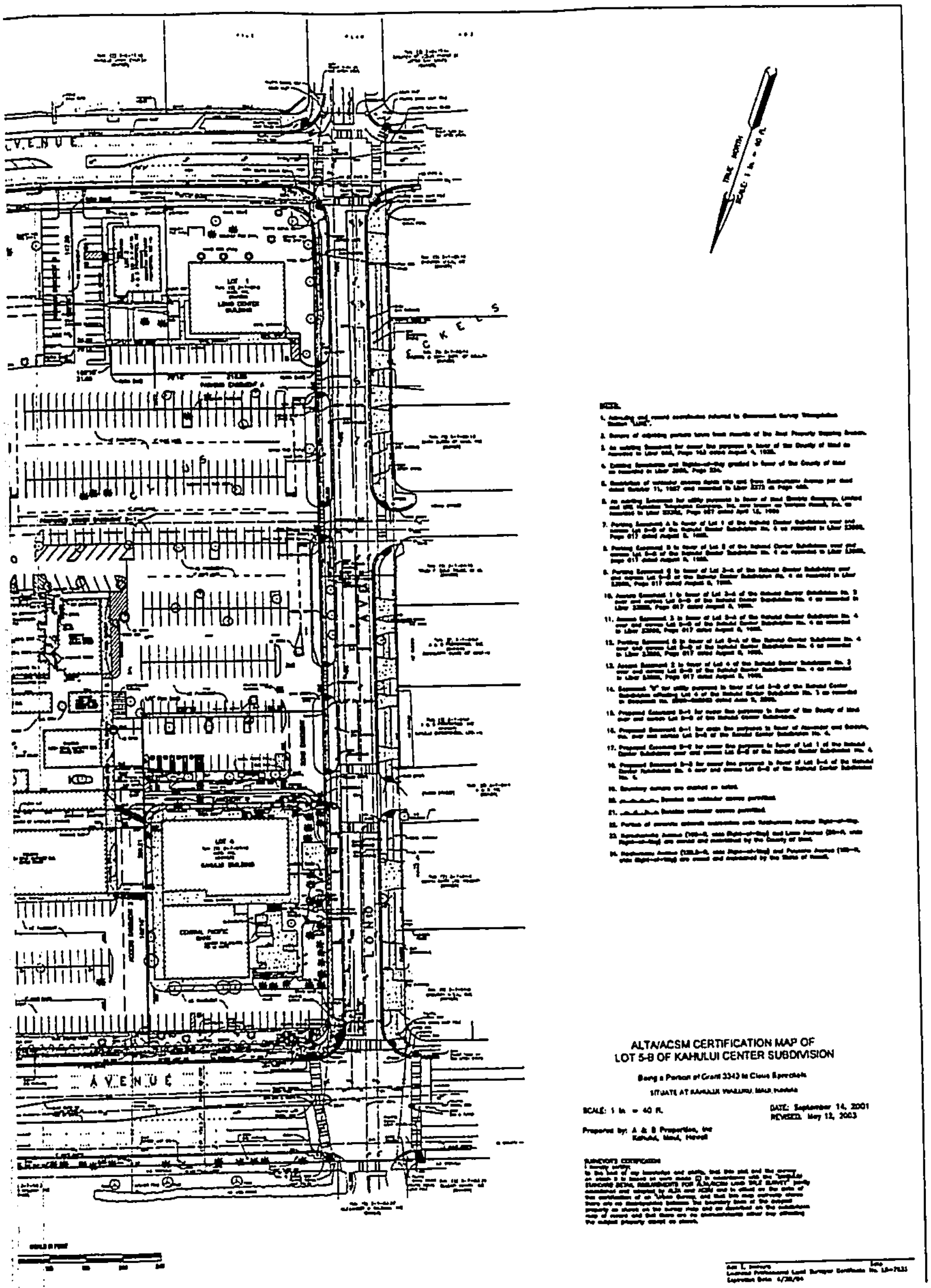


FIGURE 5.b

ALTA SURVEY

Not to scale MARCH 2006

KAHULUI TOWN CENTER

CHRIS HART & PARTNERS, INC.

Oversized Drawing

See Original File

001

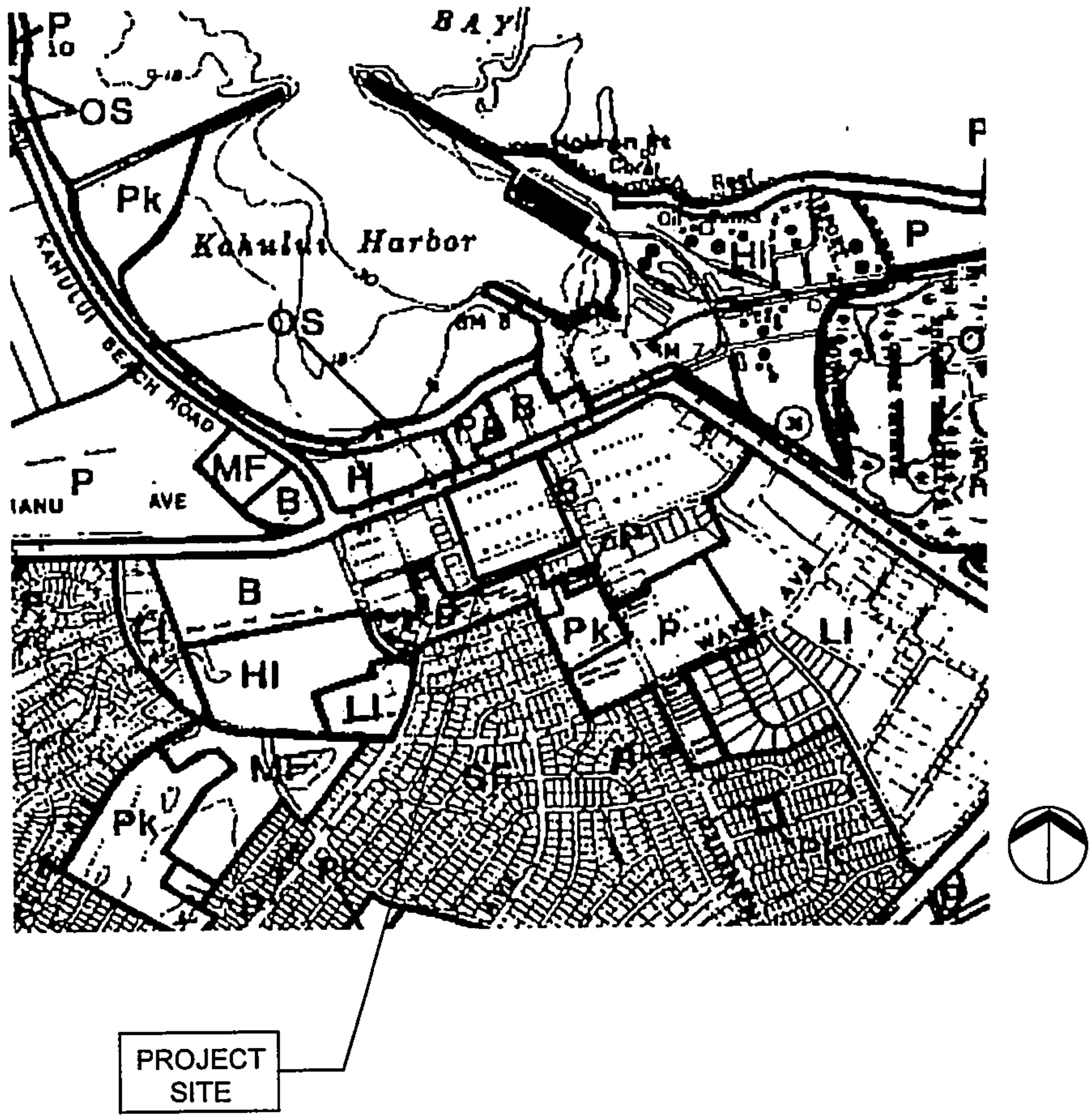


FIGURE 6

MARCH
2006

WAILUKU-KAHULUI COMMUNITY PLAN

Kahului Town Center

CHRIS HART & PARTNERS, INC.

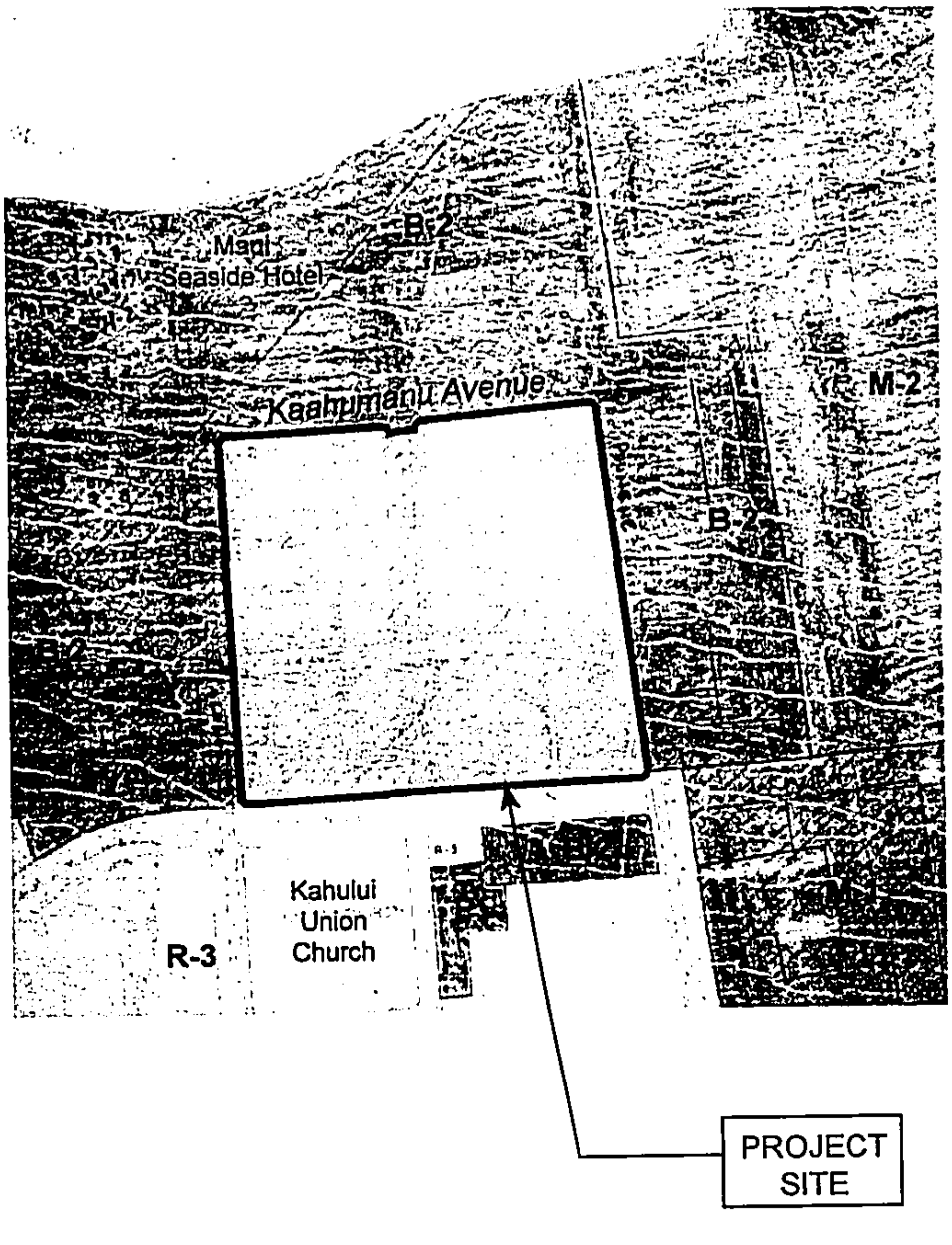


FIGURE 7

Land Zoning Map No. 1 *Not to Scale*	MARCH 2006	CHRIS HART & PARTNERS, INC.
COUNTY ZONING MAP **Kahului Town Center**		

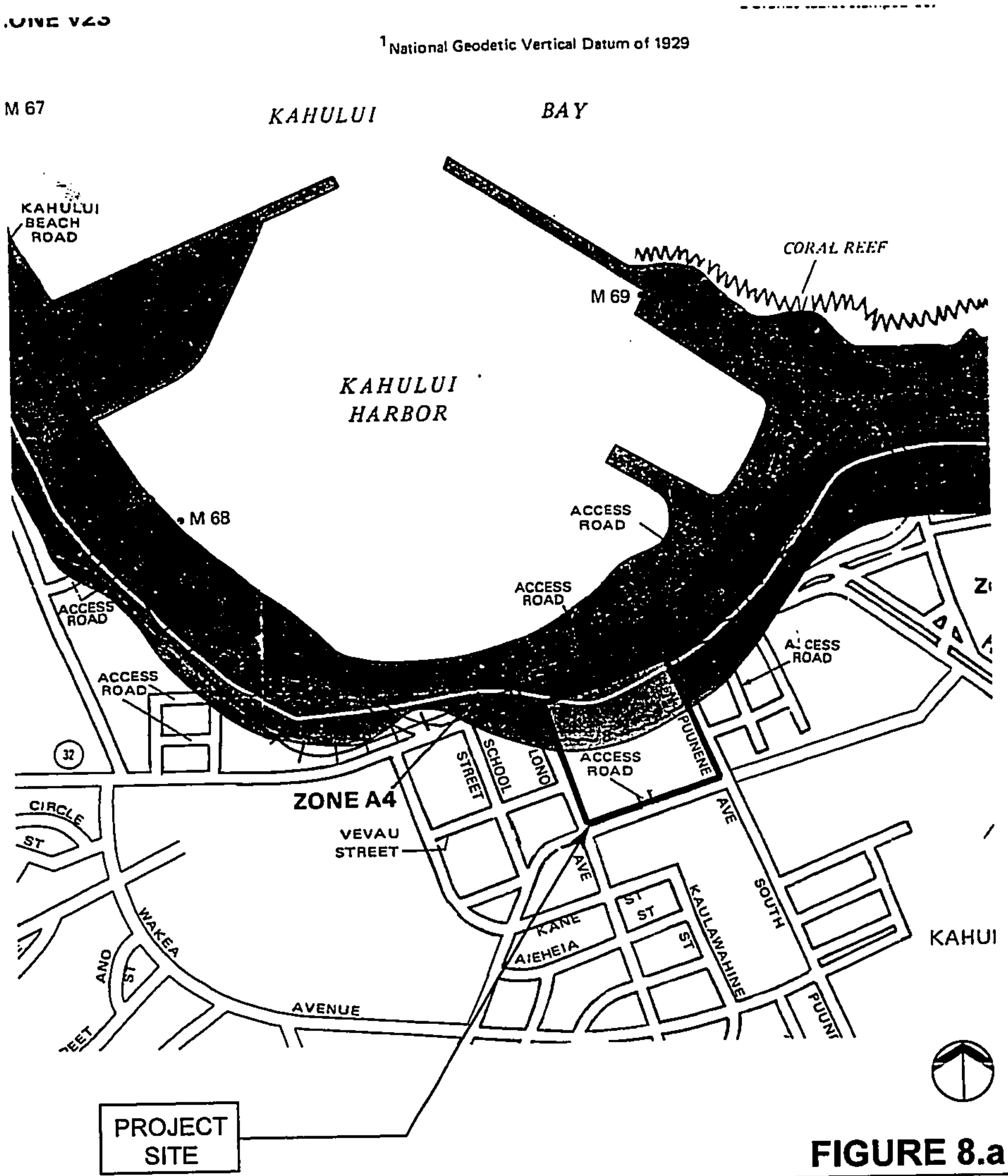
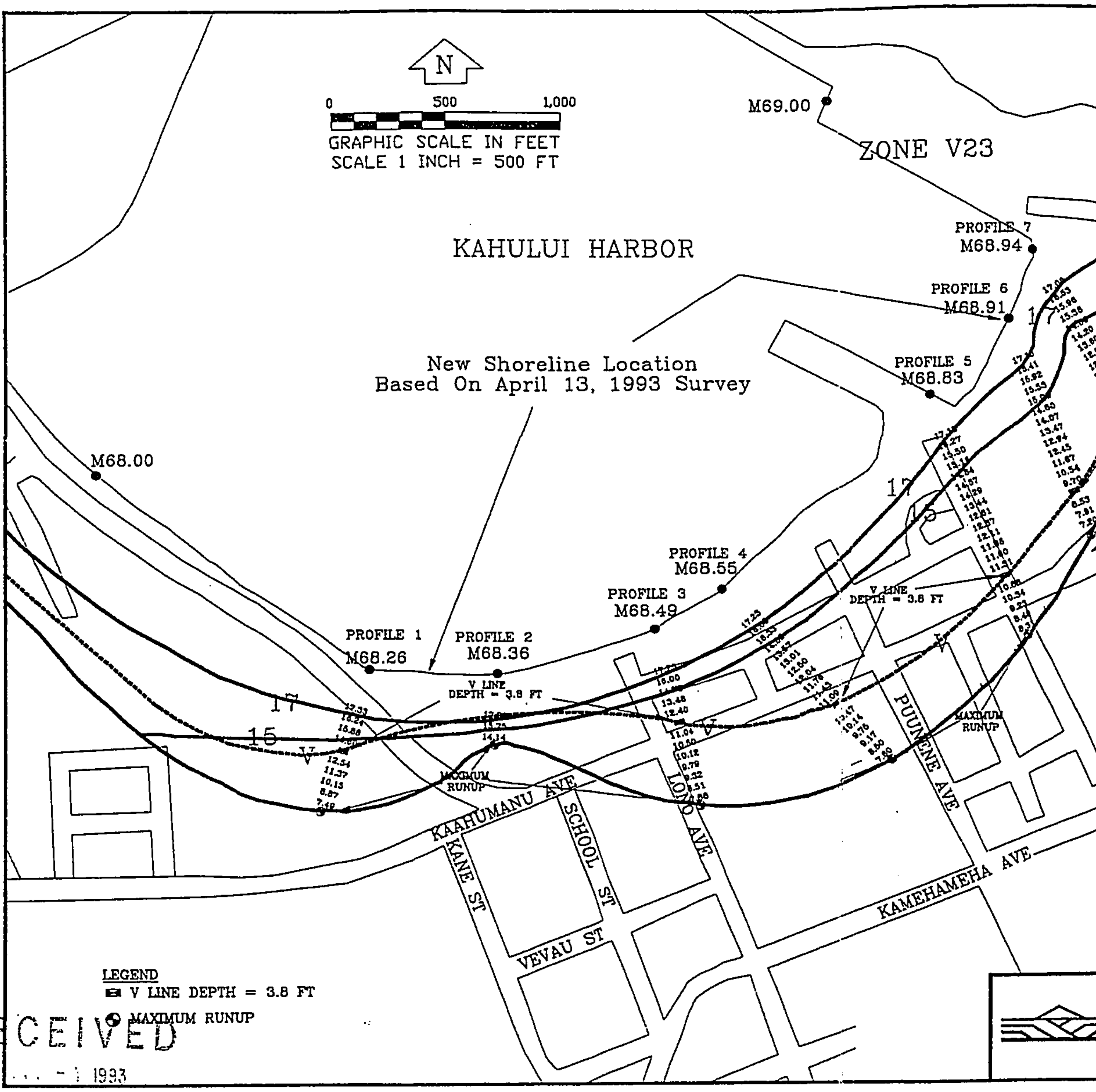


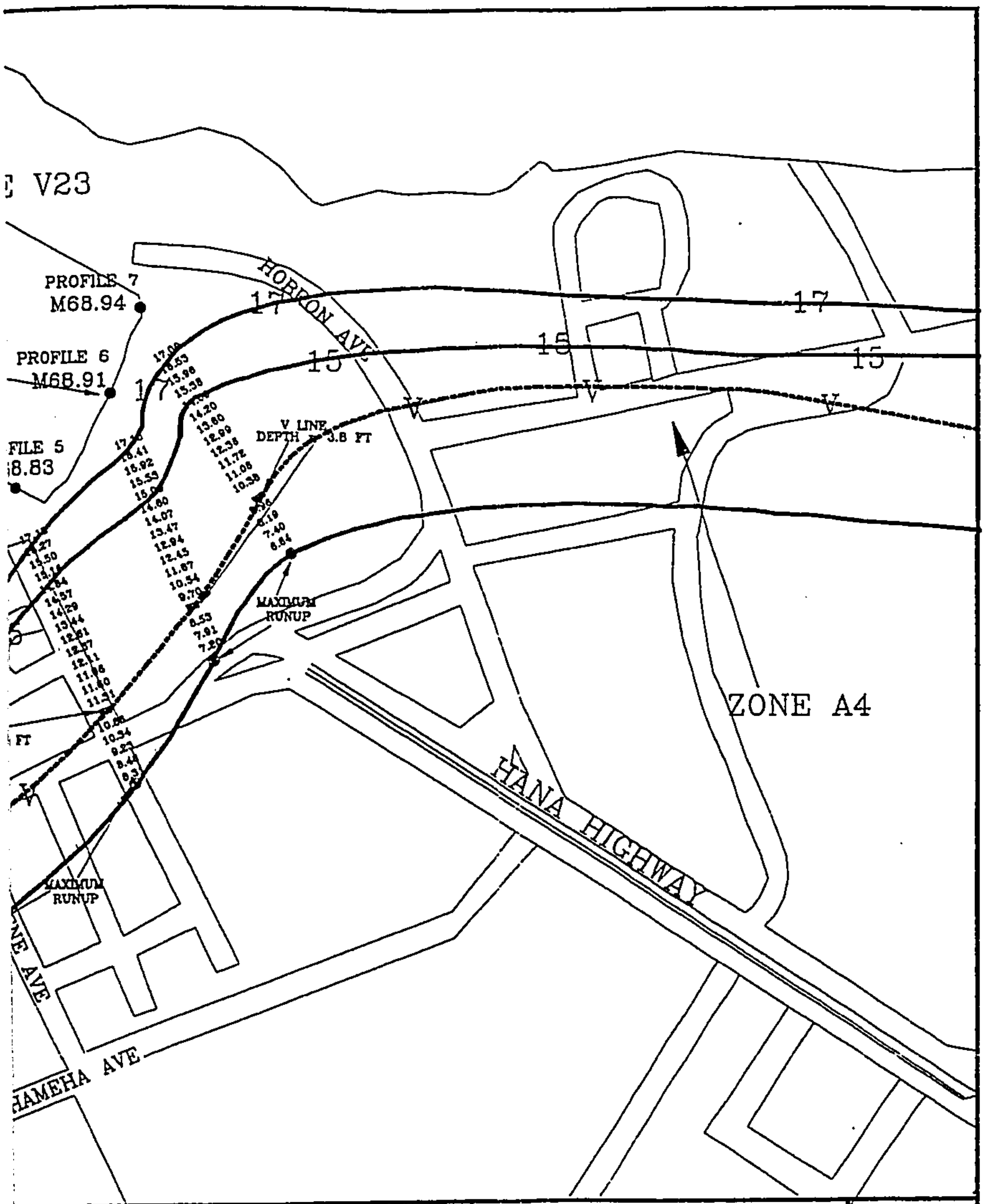
FIGURE 8.a

Not to Scale FEMA Flood Insurance Map	MARCH 2006	CHRIS HART & PARTNERS, INC.
FLOOD MAP **Kahului Town Center**		

Panel 190 (3/16/1995)



H. KAWAHARA, P.E.



Edward K. Noda and Associates, Inc.

New Revised FIRM BFEs Which Smoothly Transition Into Existing FIRM BFEs

FIGURE 15R

FIGURE 8.b

REVISED FLOOD INSURANCE RATE MAP

Not to scale MARCH 2006

KAHULUI TOWN CENTER

CHRIS HART & PARTNERS, INC.

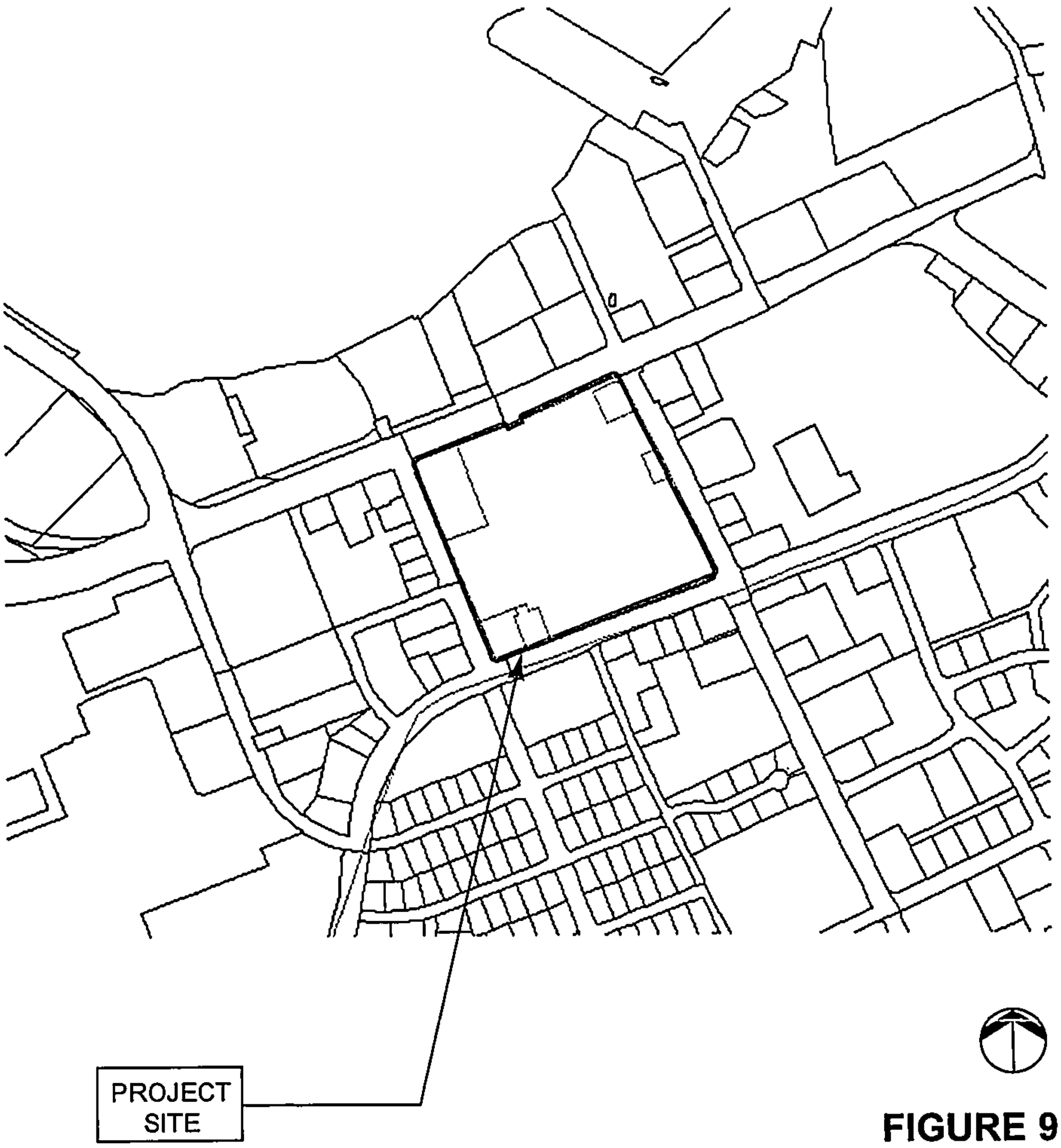


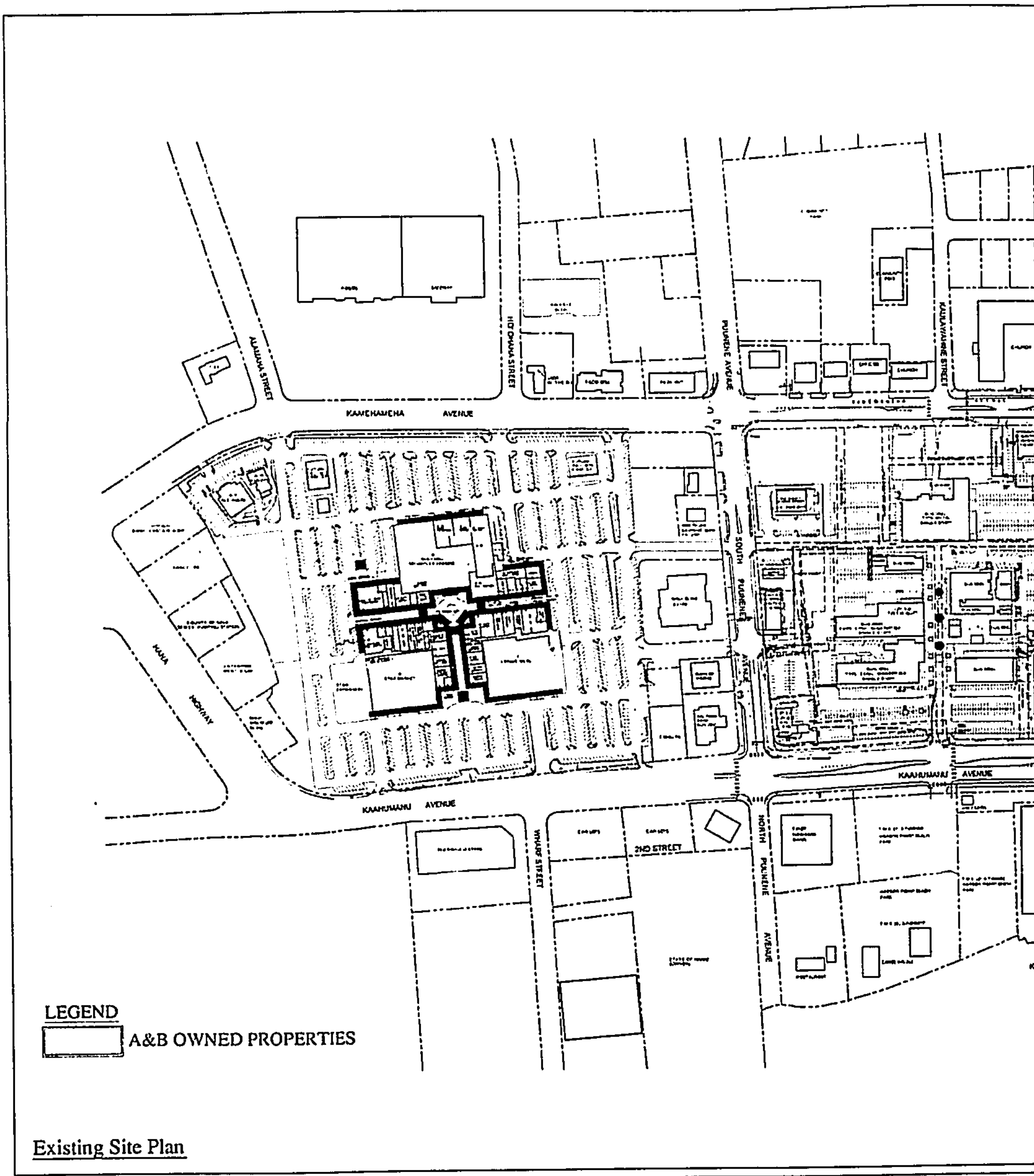
FIGURE 9

MARCH
2006

SPECIAL MANAGEMENT
AREA MAP
Kahului Town Center

CHRIS HART & PARTNERS, INC.

DOCUMENT CAPTURED AS RECEIVED



Kahului Town Center Existing Ownership Pl

DOCUMENT CAPTURED AS RECEIVED

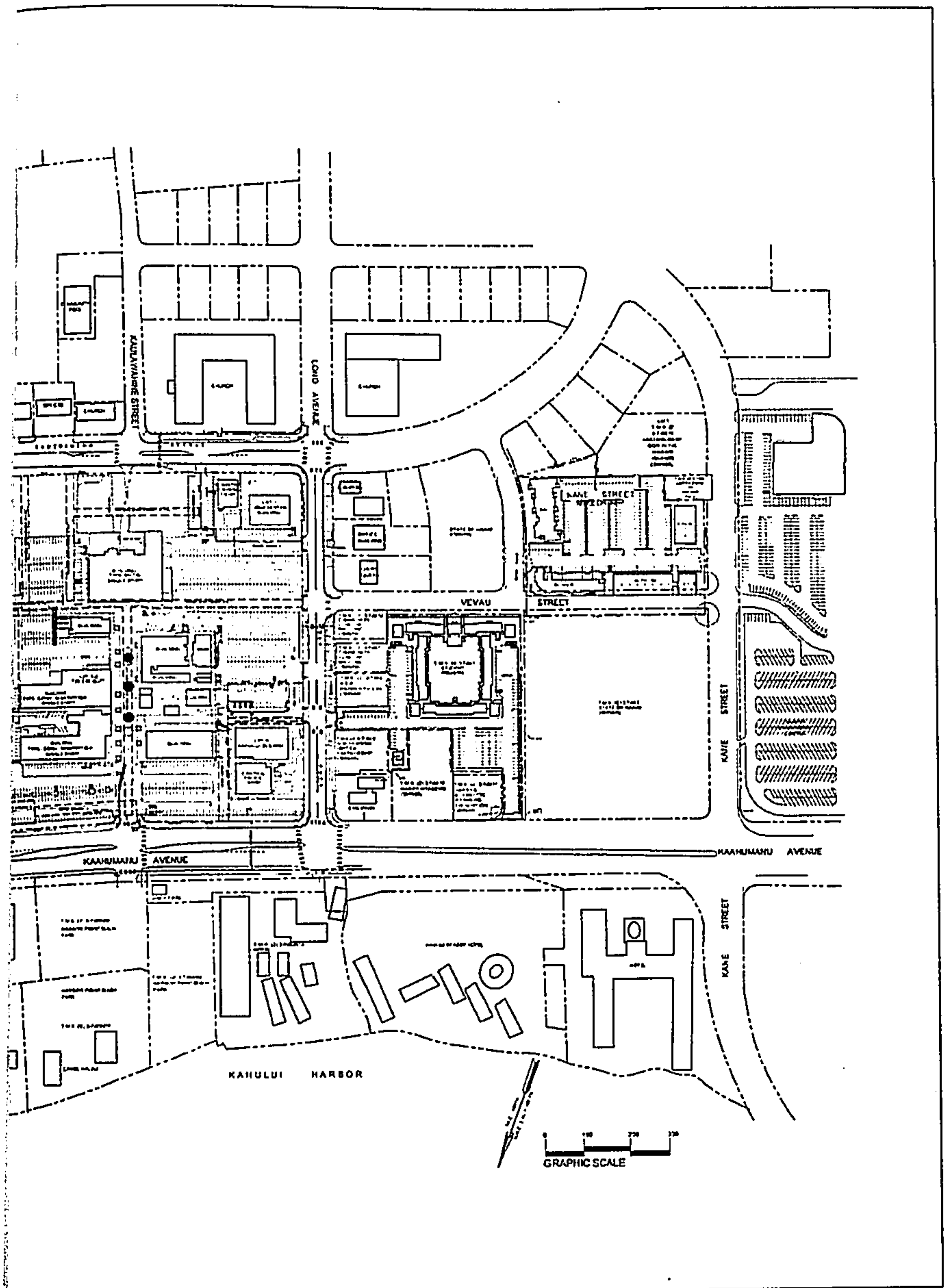


FIGURE 10

Existing Ownership Plan

EXISTING A&B LAND OWNERSHIP

Not to scale MARCH 2006

KAHULUI TOWN CENTER

CHRIS HART & PARTNERS, INC.


RETAIL/ ENTERTAINMENT DISTRICT
TOWN CENTER DISTR
KAMEHAMEHA AVENUE
HANA HIGHWAY
KAAHUMANU AVENUE
3
4
LEGEND
RESIDENTIAL
MIXED USE
EXISTING COMMERCIAL
NEW COMMERCIAL

DOCUMENT CAPTURED AS RECEIVED

:ENTER DISTRICT	RESIDENTIAL/ MIXED USE DISTRICT	FASHION RETAIL
		ENTERTAINMENT DISTRICT

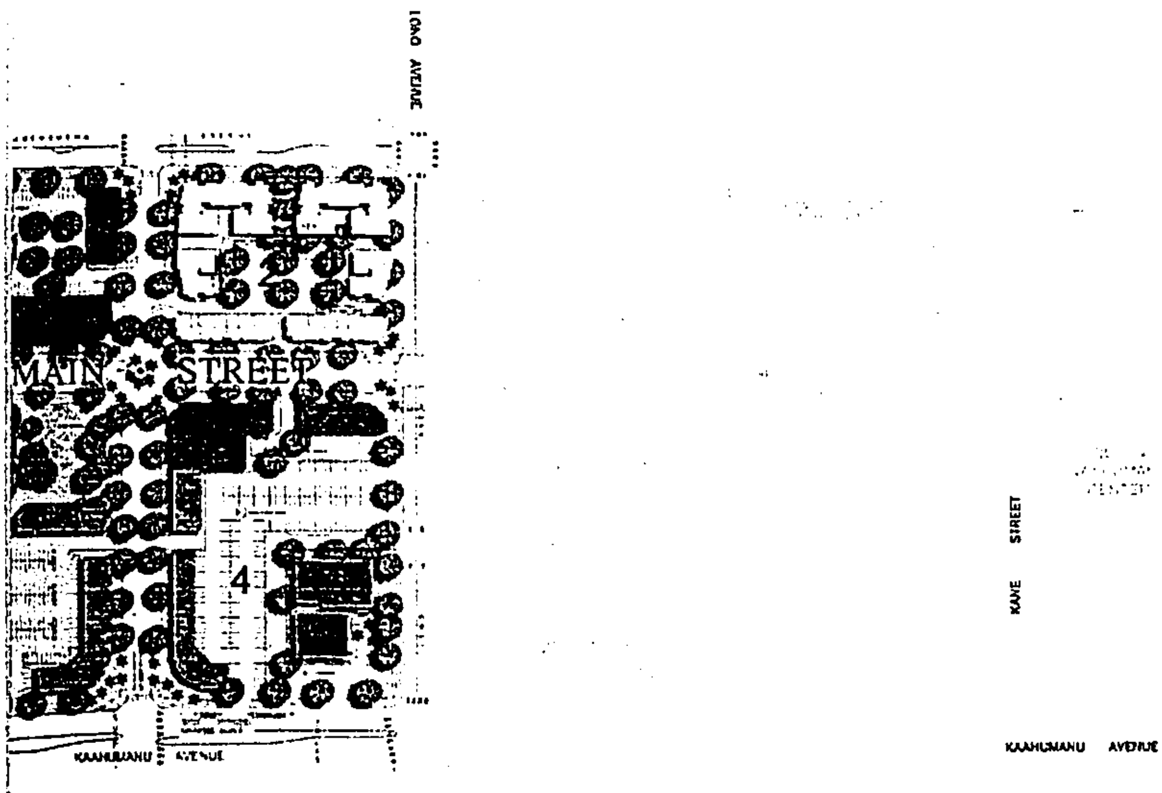


FIGURE 11

r Strategic Vision

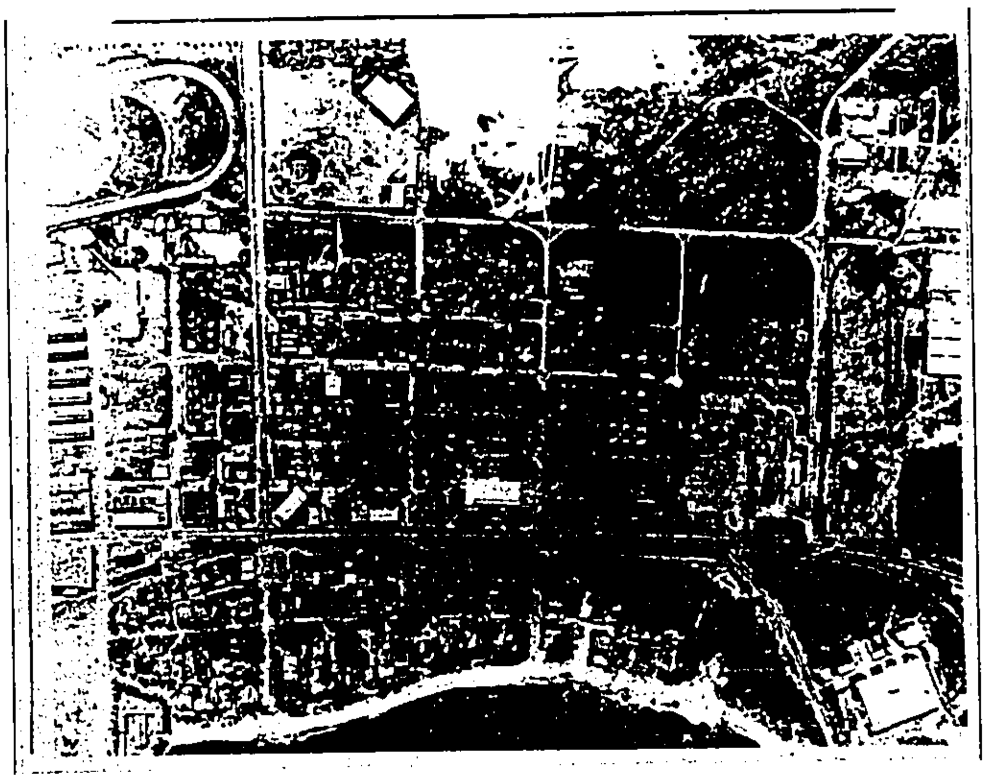
Mc Architects

LONG-TERM KAHULUI TOWN CENTER STRATEGIC VISION

Not to scale MARCH 2006

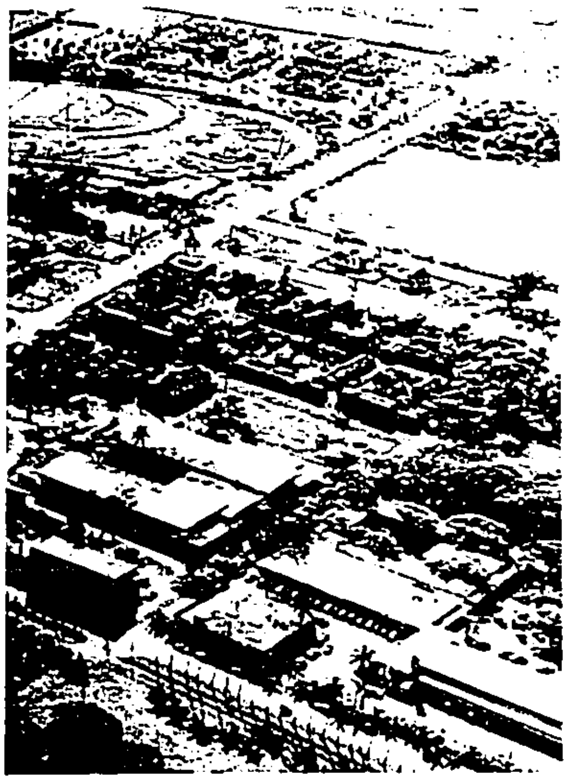
KAHULUI TOWN CENTER

CHRIS HART & PARTNERS, INC.

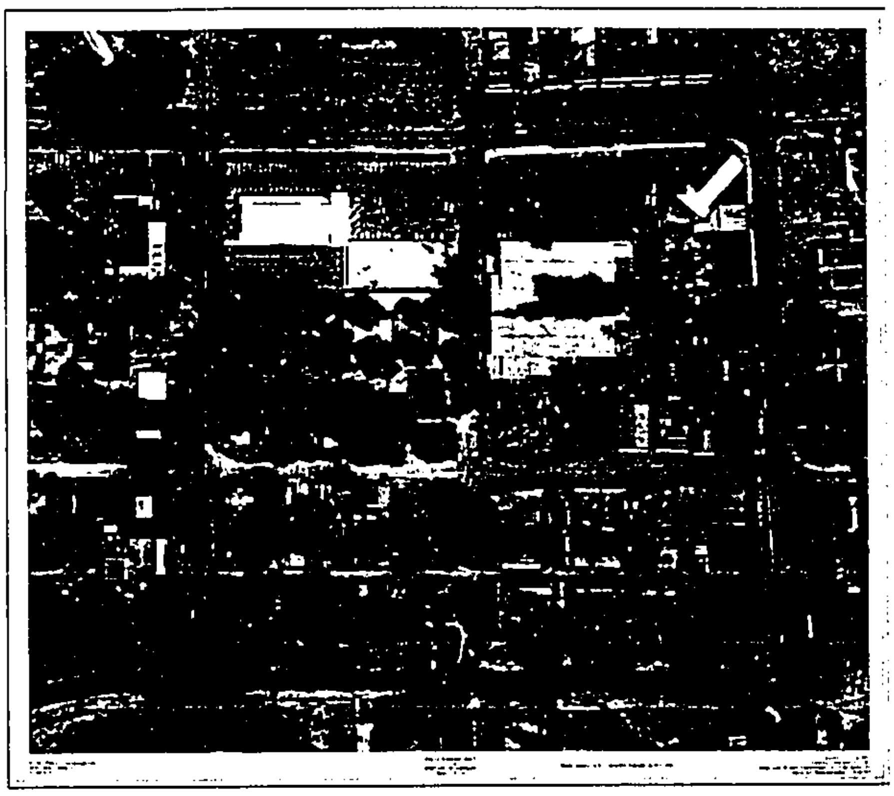


1. Older Kahului is laid out in a grid with commercial development along the streets and plantation housing internal to the lots. Estimated date of photo is 1950.

2. The corner of present day Kaahumanu Avenue
Avenue. Estimated date of photo is early 1950's.



Kaahumanu Avenue and Puunene
hoto is early 1950's.



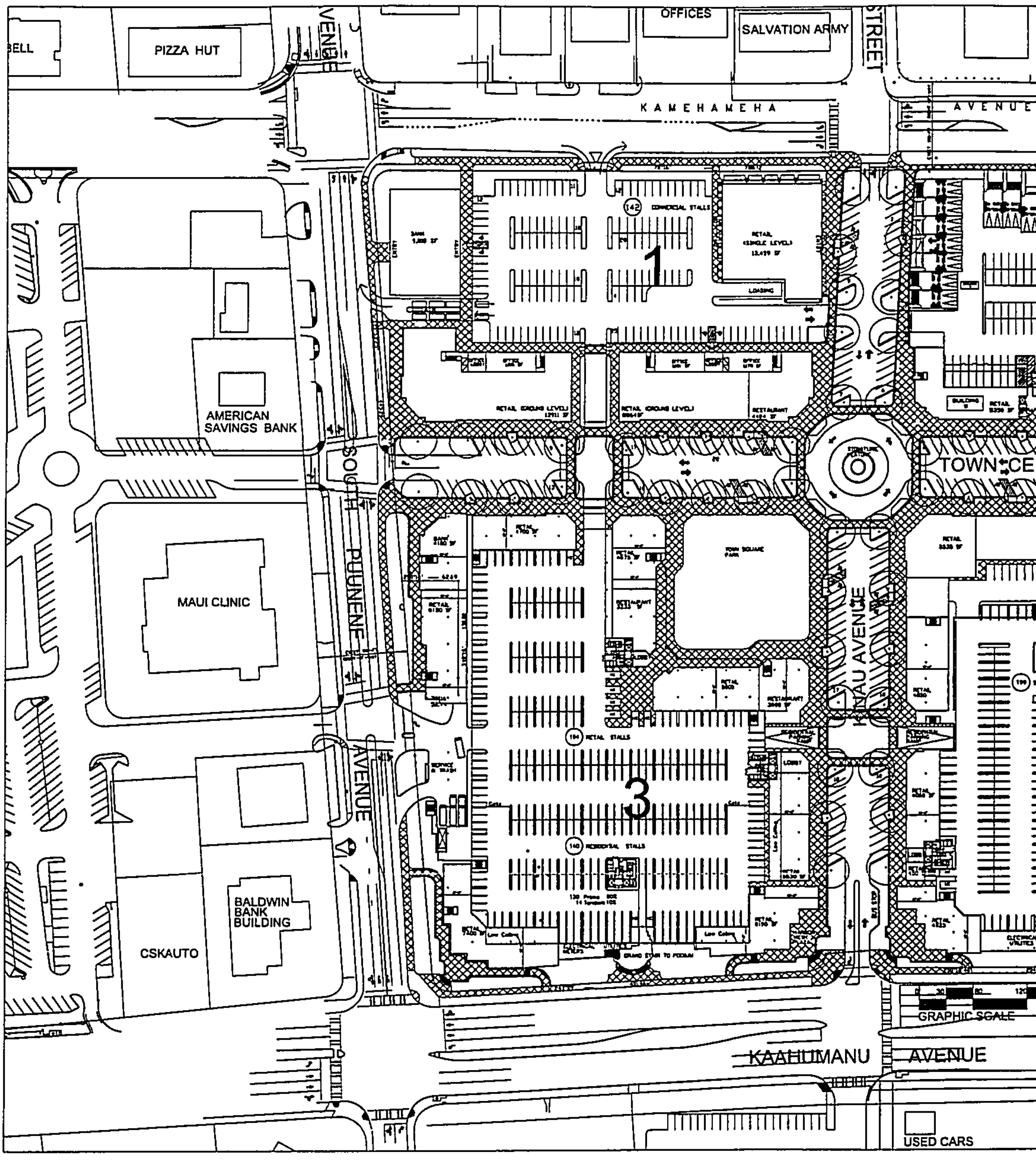
3. The first phase of the shopping center being developed in 1957.

FIGURE 12

Not to scale	MARCH 2006

HISTORICAL AERIAL PHOTOS
Prior to 1952
KAHULUI TOWN CENTER

CHRIS HART & PARTNERS, INC.

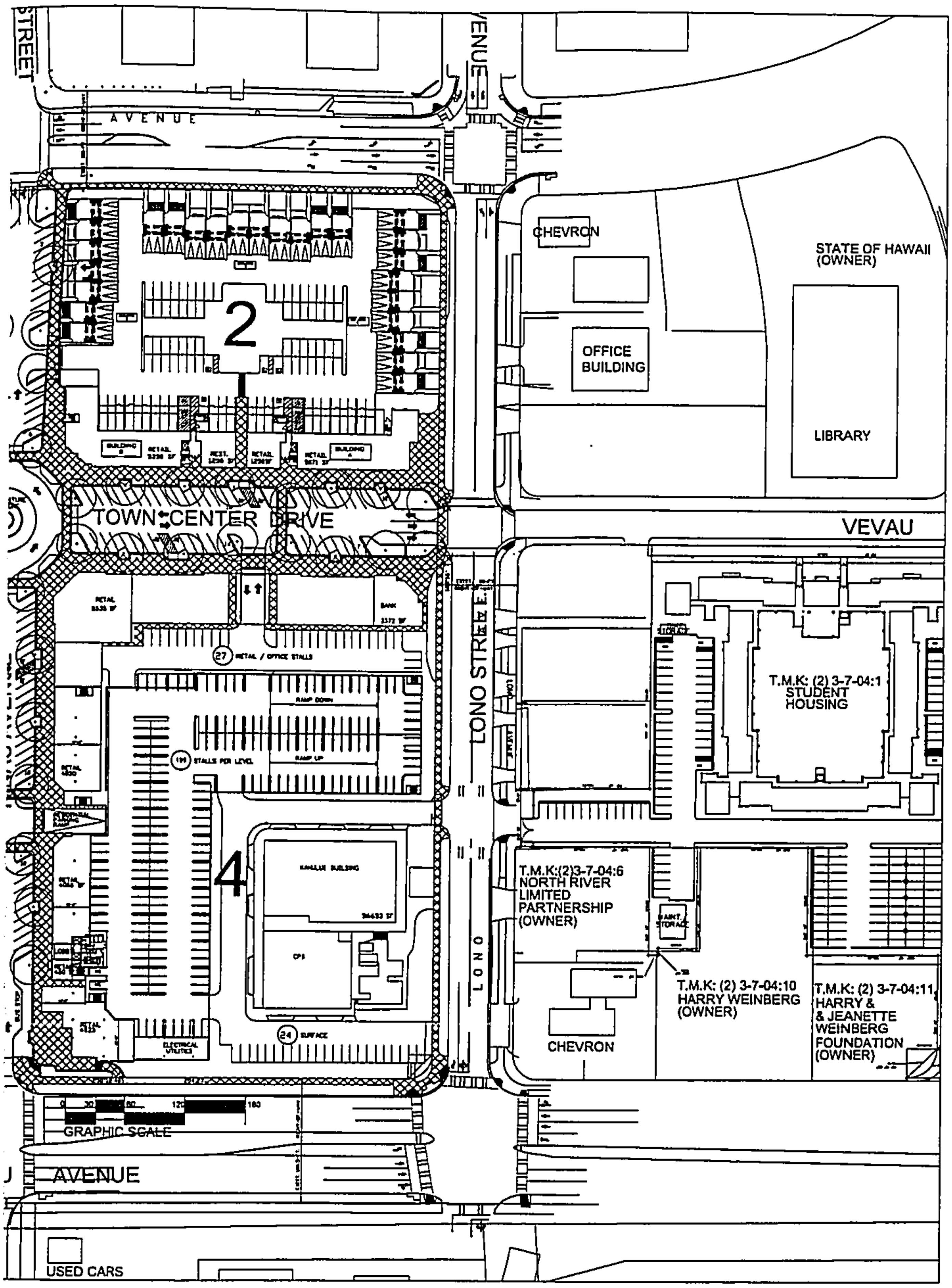


A&B PROPERTIES, INC.

KAHULUI TOWN CENTE

FIRST FLOOR PLANS

0' 20' 40' 80' 160' 320'



CENTER, MAUI
OR PLANS
640'

Mc Architects

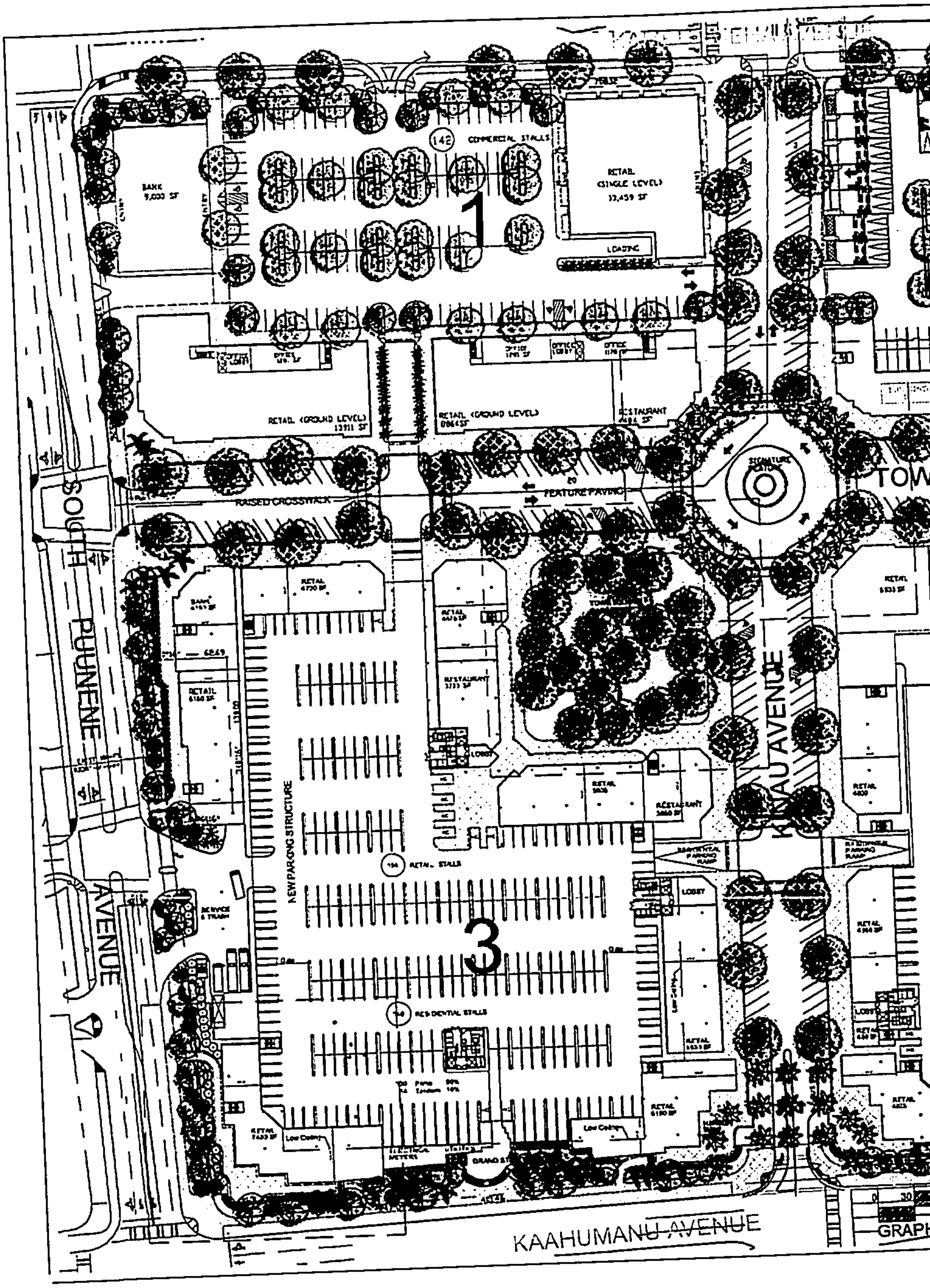
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

FIGURE 13

SITE PLAN



1
3
SOUTH PUUNENE AVENUE
KAAHUMANU AVENUE
NEW PARKING STRUCTURE
RAISED CROSSWALK
FEATURE PAVING
COMMERCIAL STALLS
RETAIL (GROUND LEVEL)
RESTAURANT
LOADING
RETAIL STALLS
RESIDENTIAL STALLS

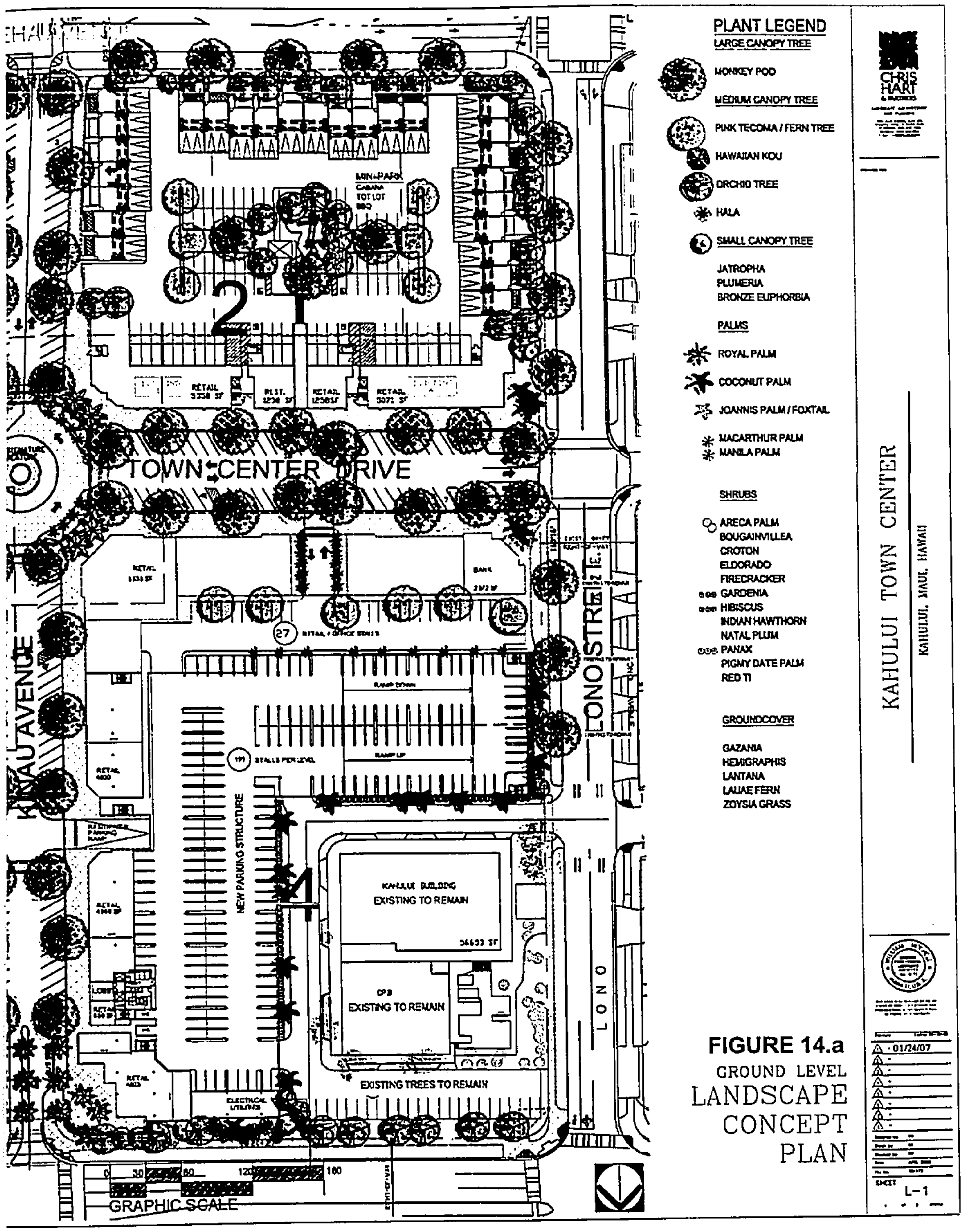
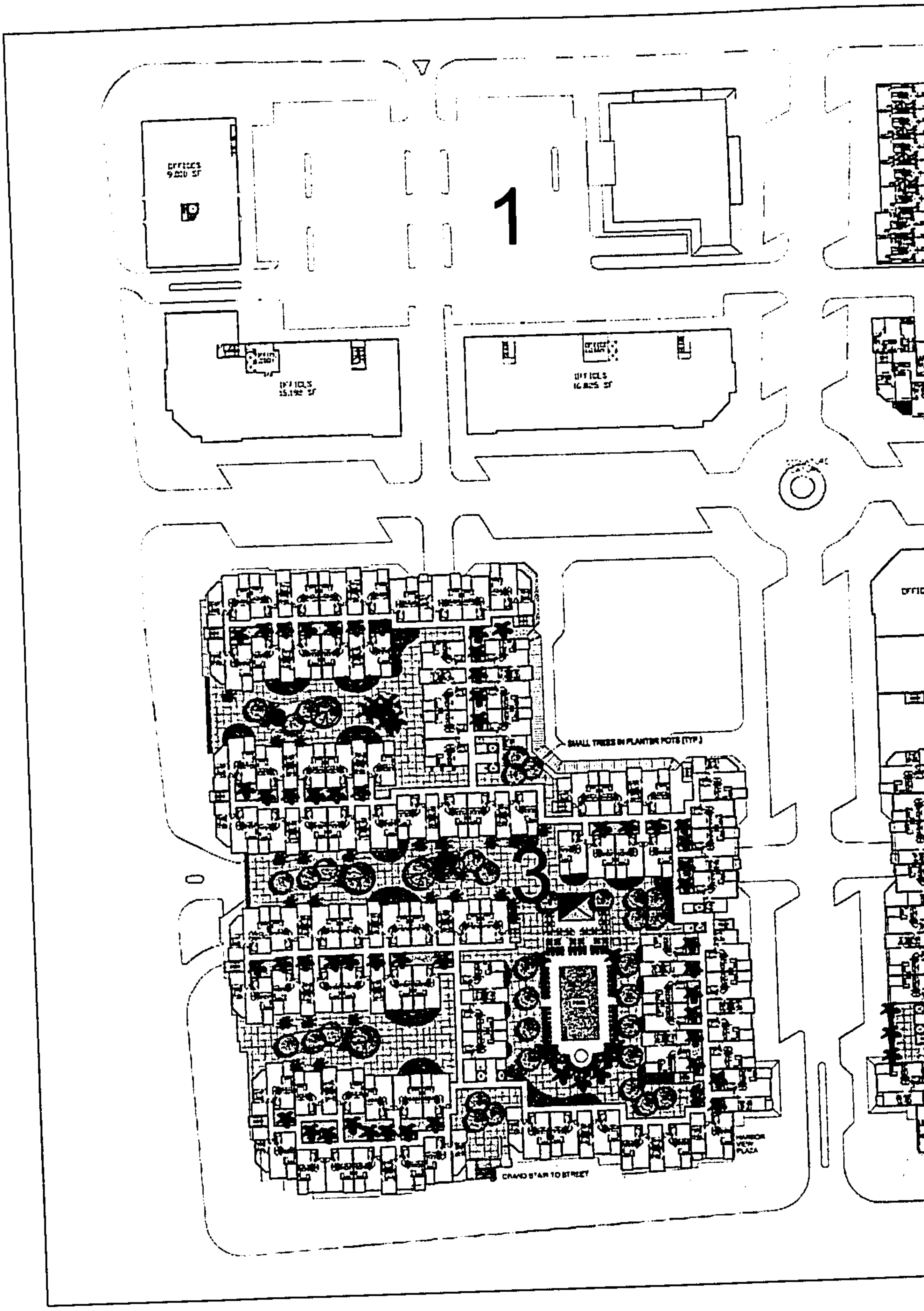


FIGURE 14.a

GROUND LEVEL LANDSCAPE CONCEPT PLAN


OFFICES
9,000 SF
1
3
SMALL TREES IN PLANTER POTS (TYP.)
HARBOR
VIEW
PLAZA
GRAND STAIR TO STREET

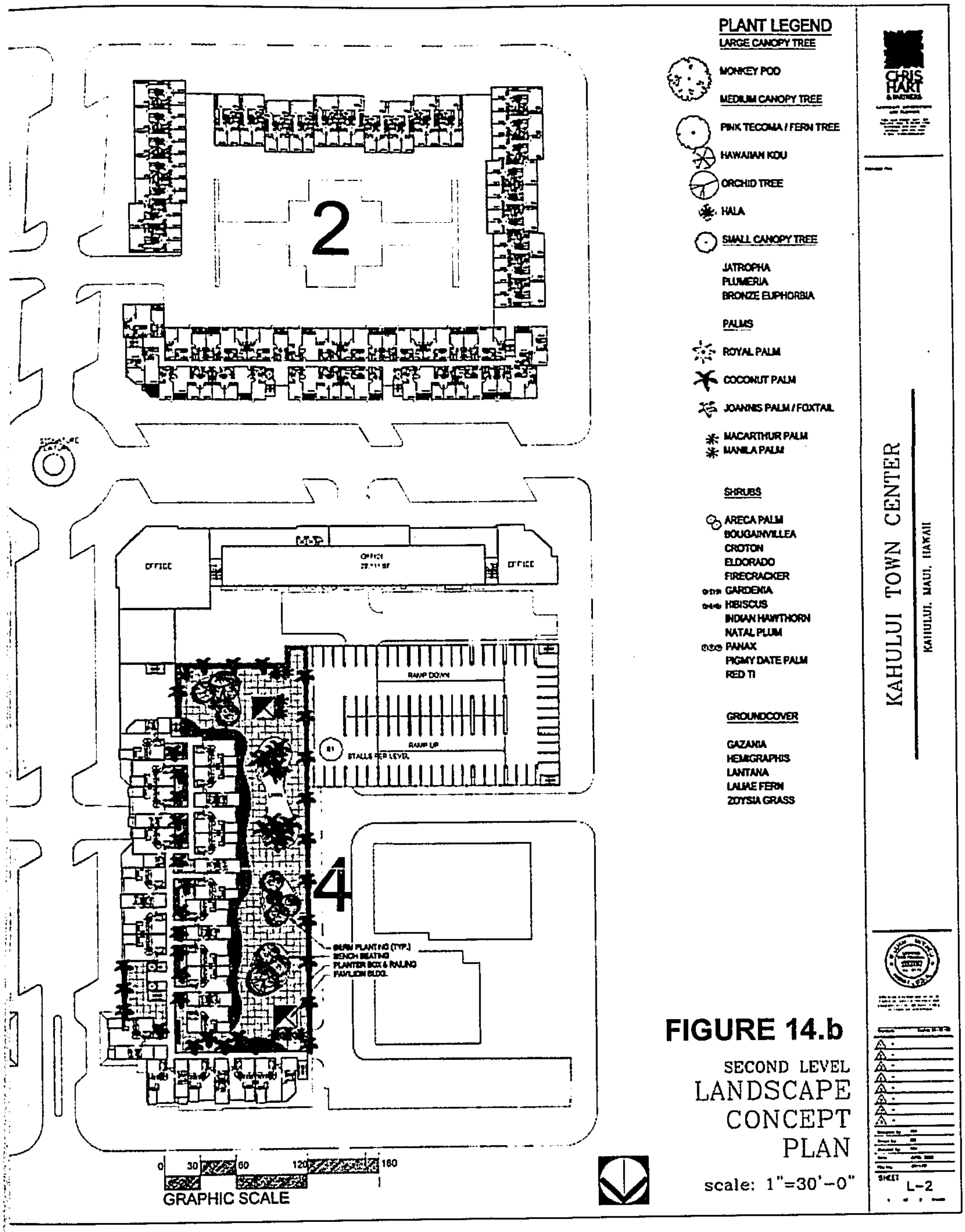


FIGURE 14.b

SECOND LEVEL LANDSCAPE CONCEPT PLAN

scale: 1"=30'-0"

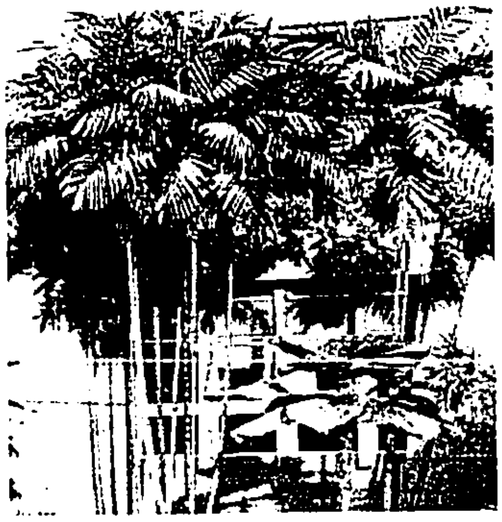
MONKEY POD

FERN TREE

BRONZE EUPHORBIA

SINGAPORE PLUMERIA

HAWAIIAN KOU



MACARTHUR PALM

CHRIS HART & PARTNERS

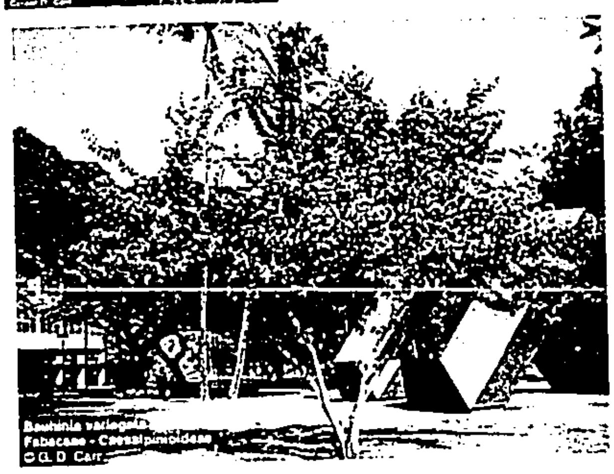
KAHULUI TOWN

MANILA PALM

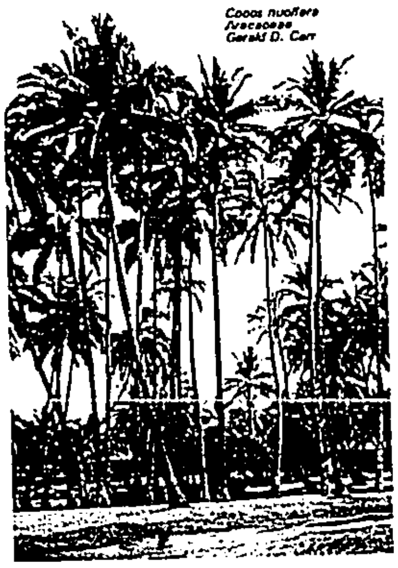
ROYAL PALM

PINK TECOMA

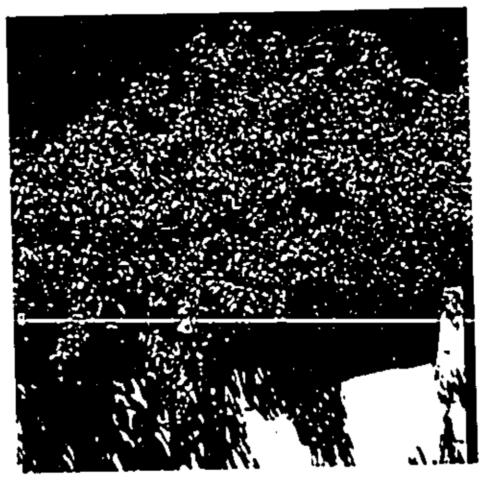
HALA TREE



ORCHID TREE



COCONUT PALM



JATROPHA TREE

)WN CENTER

LANDSCAPE PLANT MATERIAL

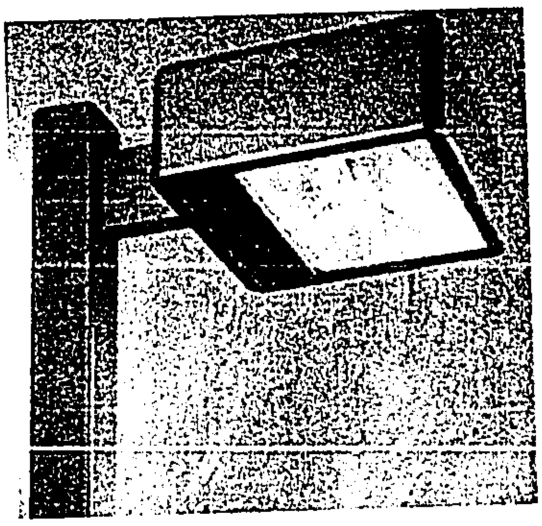
FIGURE 14.c

STAMPED CONCRETE

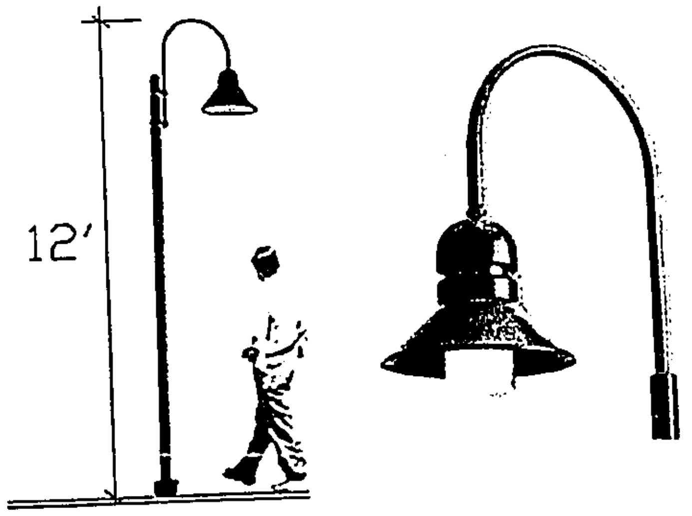
BOLLARD

TREE GRATE

S-1 Slate Gray



PARKING LIGHT

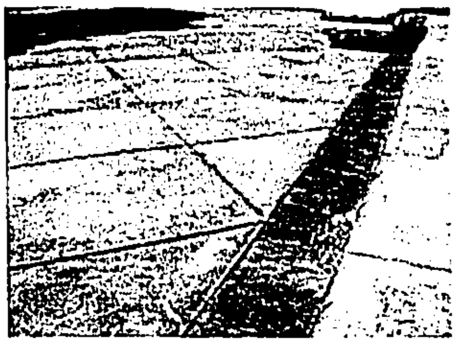


STREET LIGHT

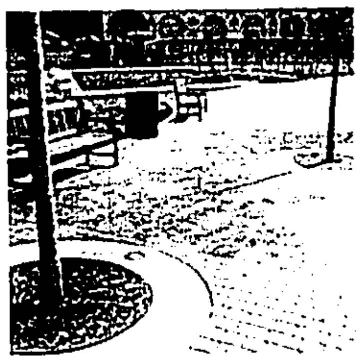
CHRIS HART & PARTNERS

KAHULUI TOWN CE

CONCRETE



COLORED & SCORED CONCRETE

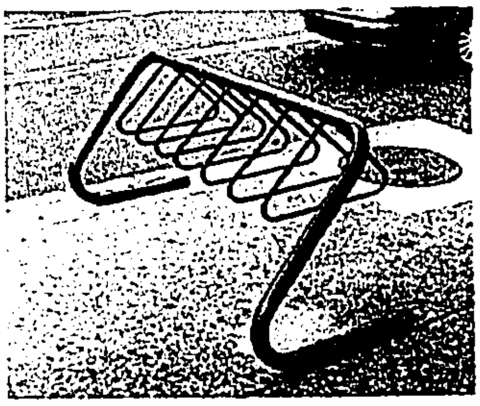


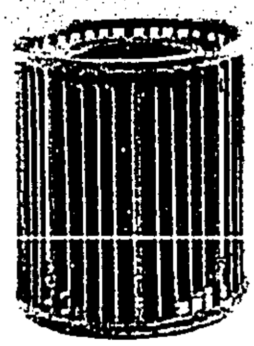
PAVERS

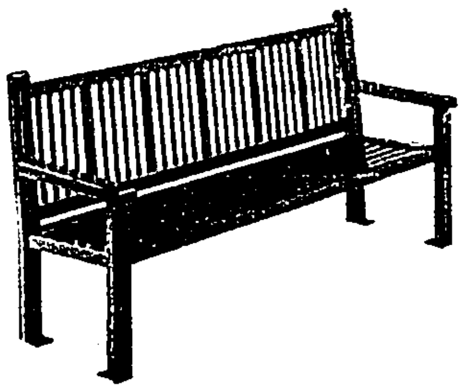
PAVERS

FEATURE PAVING OPTIONS

Slate Gray





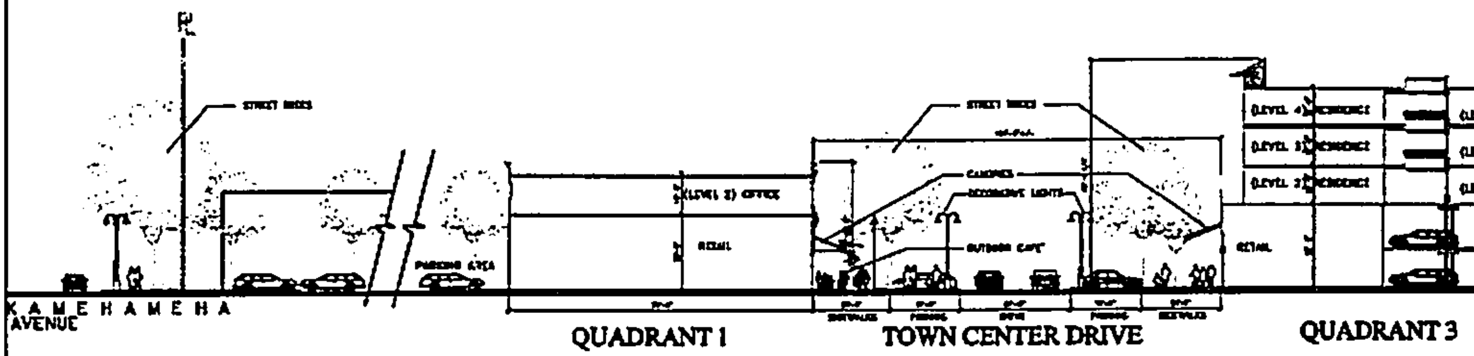


STREET FURNITURE

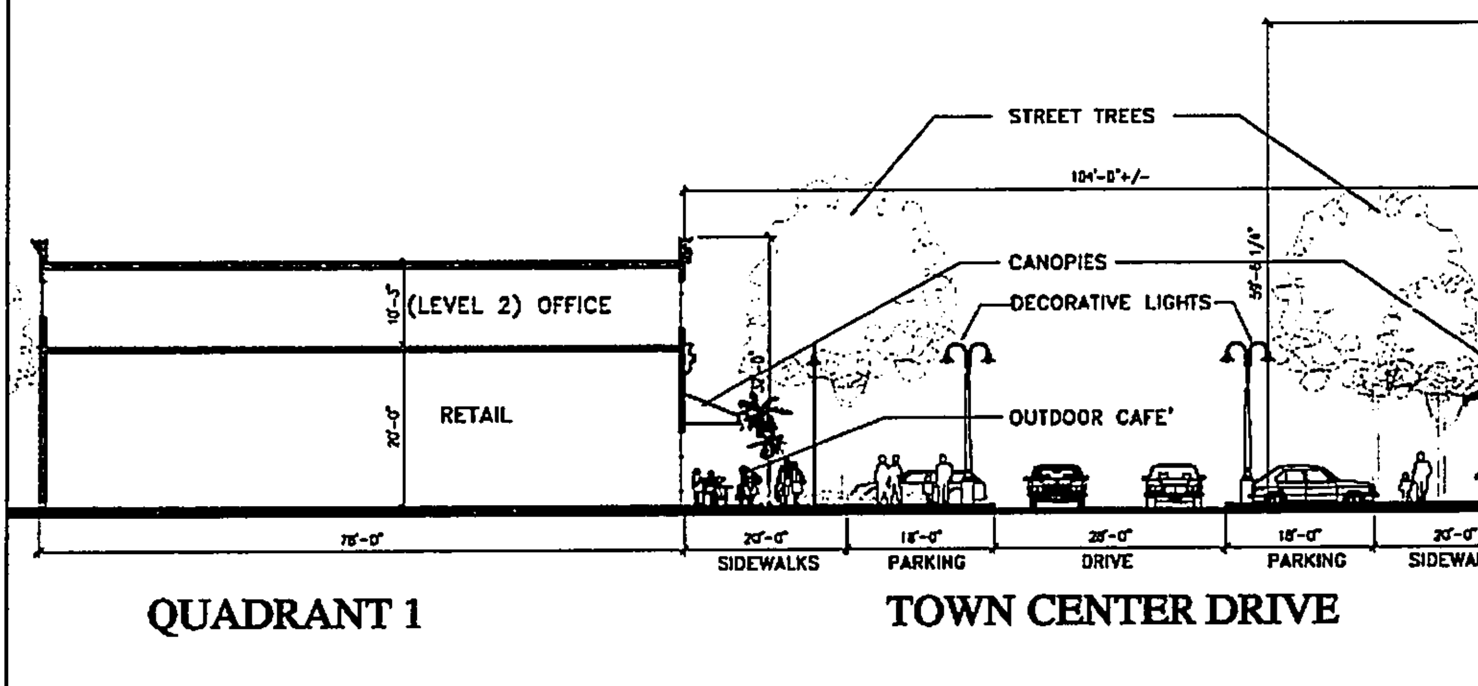
VN CENTER

LANDSCAPE SITE AMENITIES

FIGURE 14.d



SITE SECTION



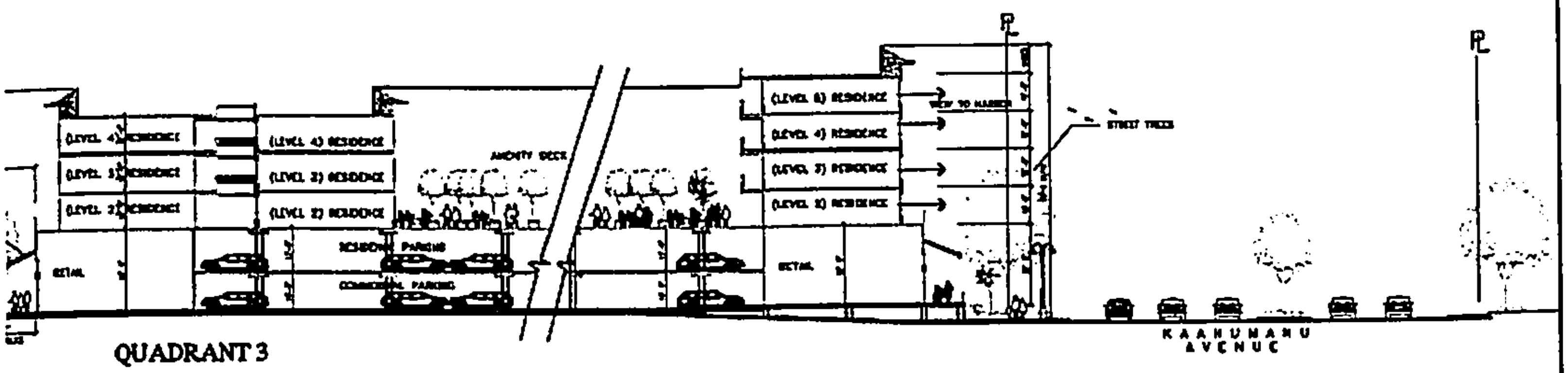
ENLARGED SIT

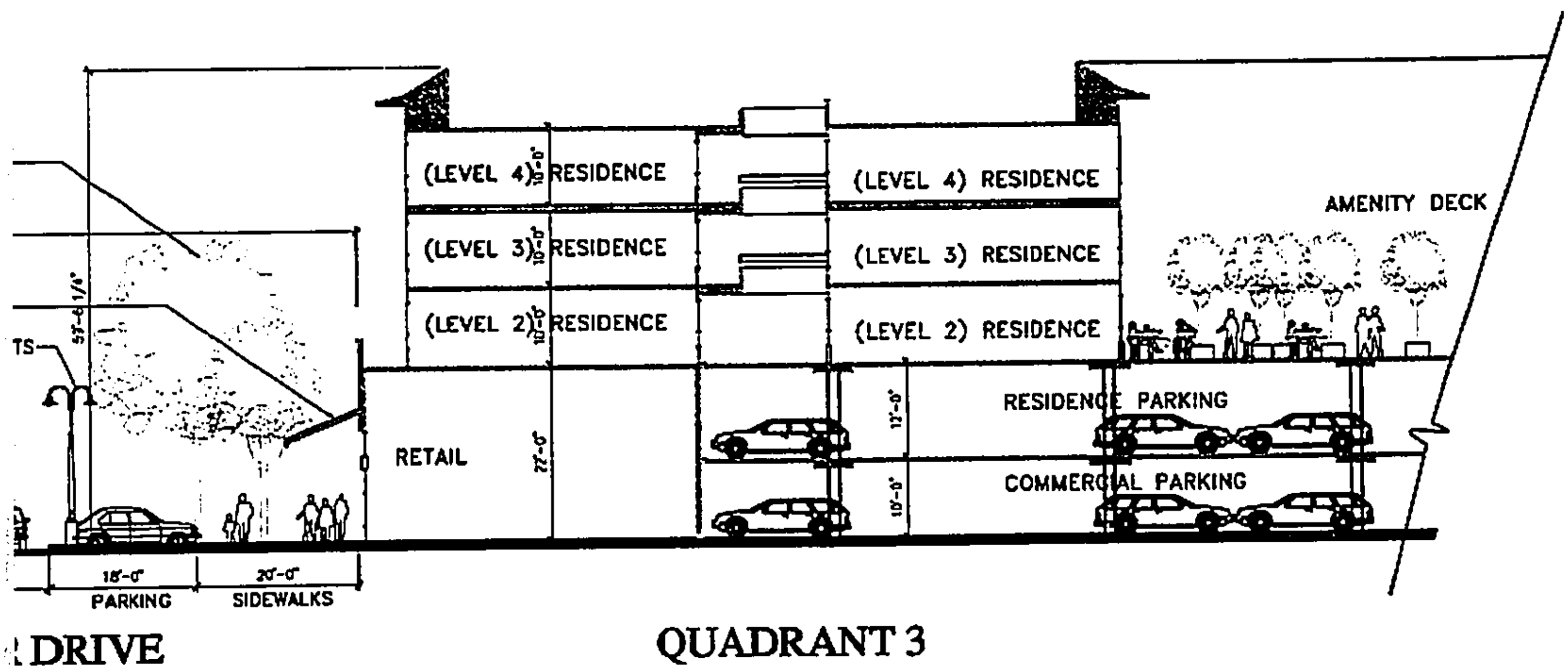
A&B PROPERTIES, INC.

K A H U L U I T O W N C

S I T E S E C T I

ENLARG





NLARGED SITE SECTION

FIGURE 15

OWN CENTER, MAUI

SITE SECTIONS

ENLARGED SITE SECTION AT TOWN CENTER DRIVE

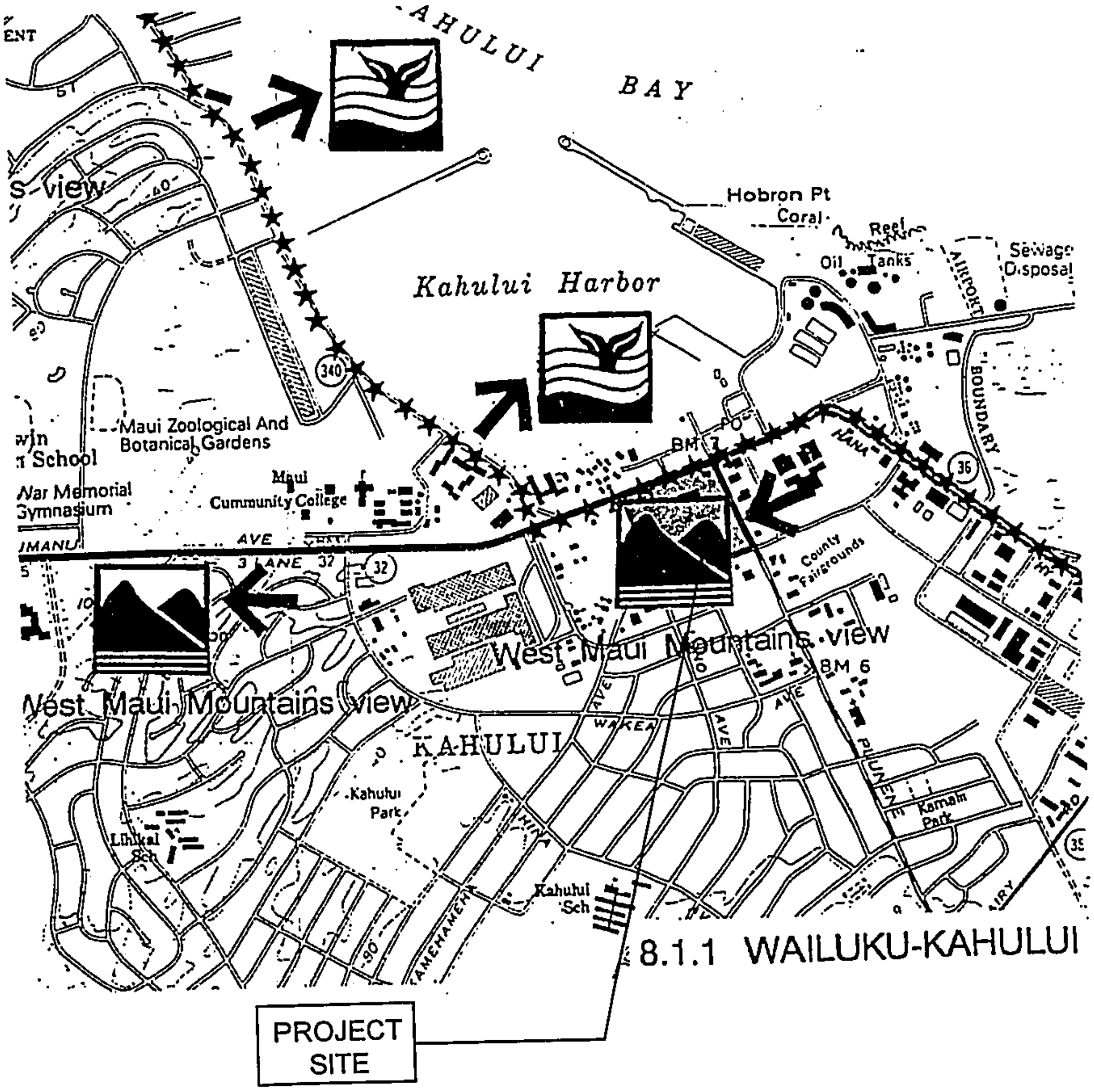
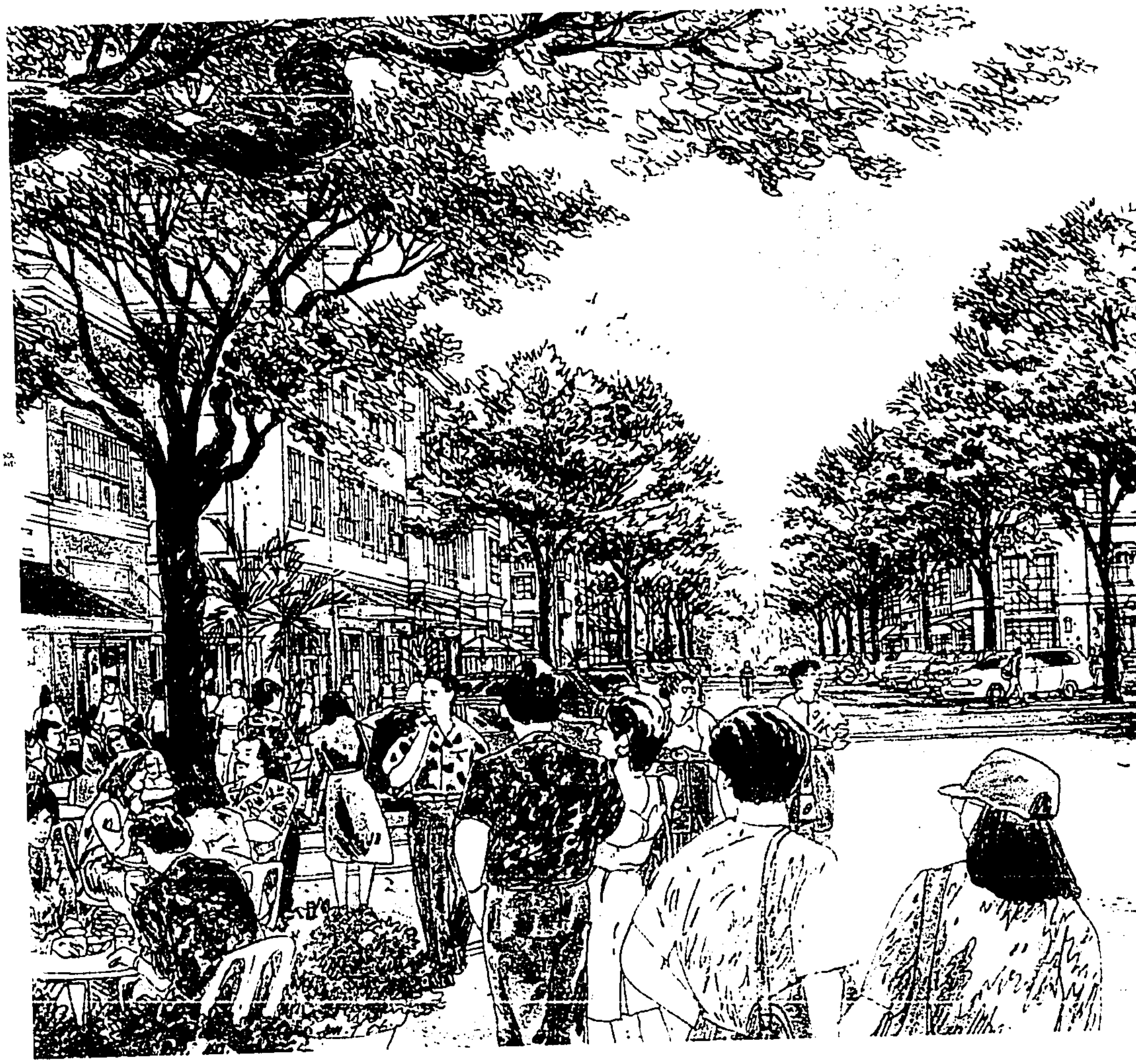


FIGURE 16

MARCH 2006	
SCENIC RESOURCES MAP **Kahului Town Center**	CHRIS HART & PARTNERS, INC.



PERSPECTIVE OF TOWN CEN

KAHULUI TOWN CENTE

A&B PROPERTIES, INC.

OWN CENTER DRIVE

N CENTER, MAUI

FIGURE 17.a

Mc Architects

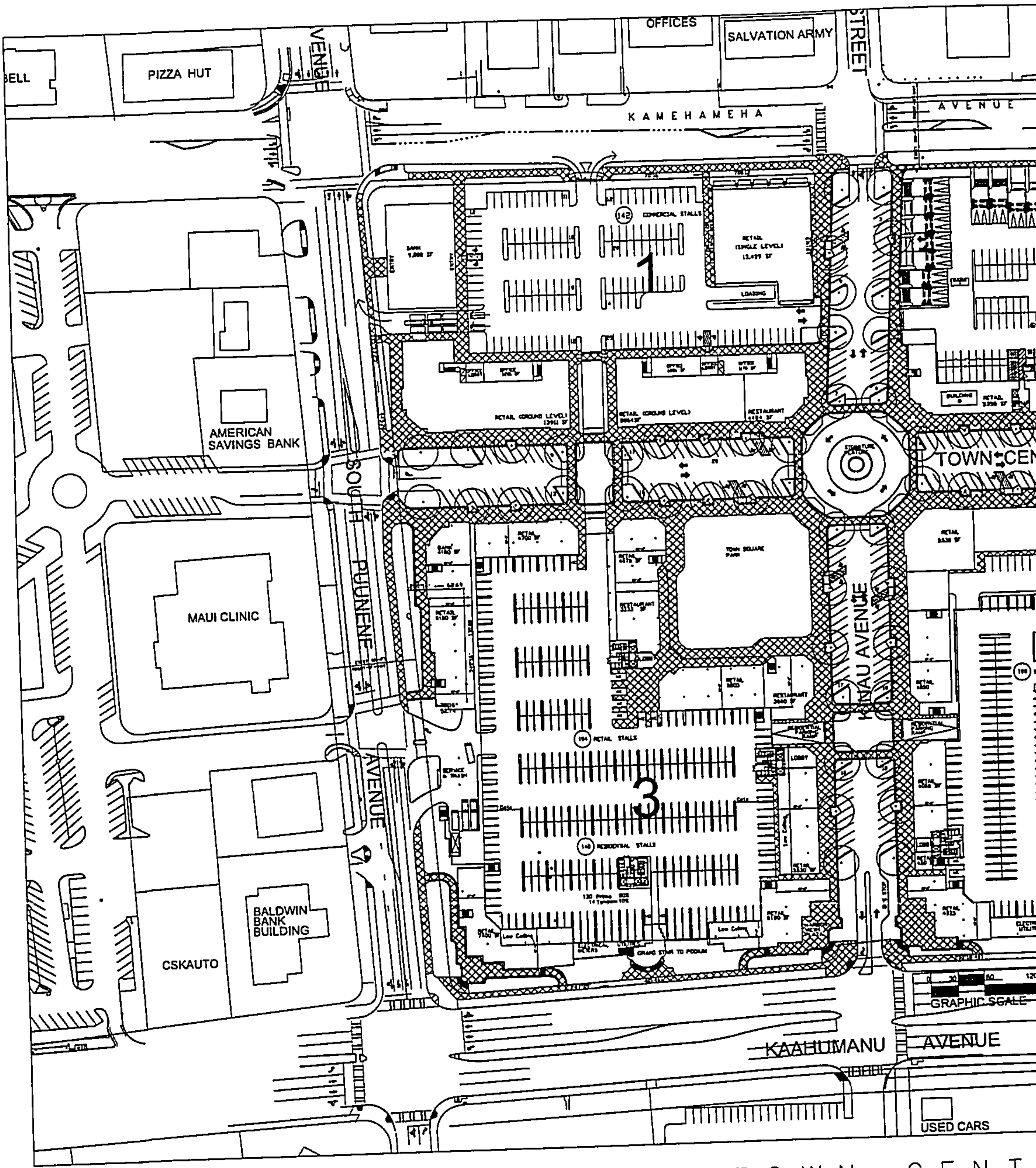
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART & PARTNERS, INC.

ARCHITECTURAL DRAWINGS

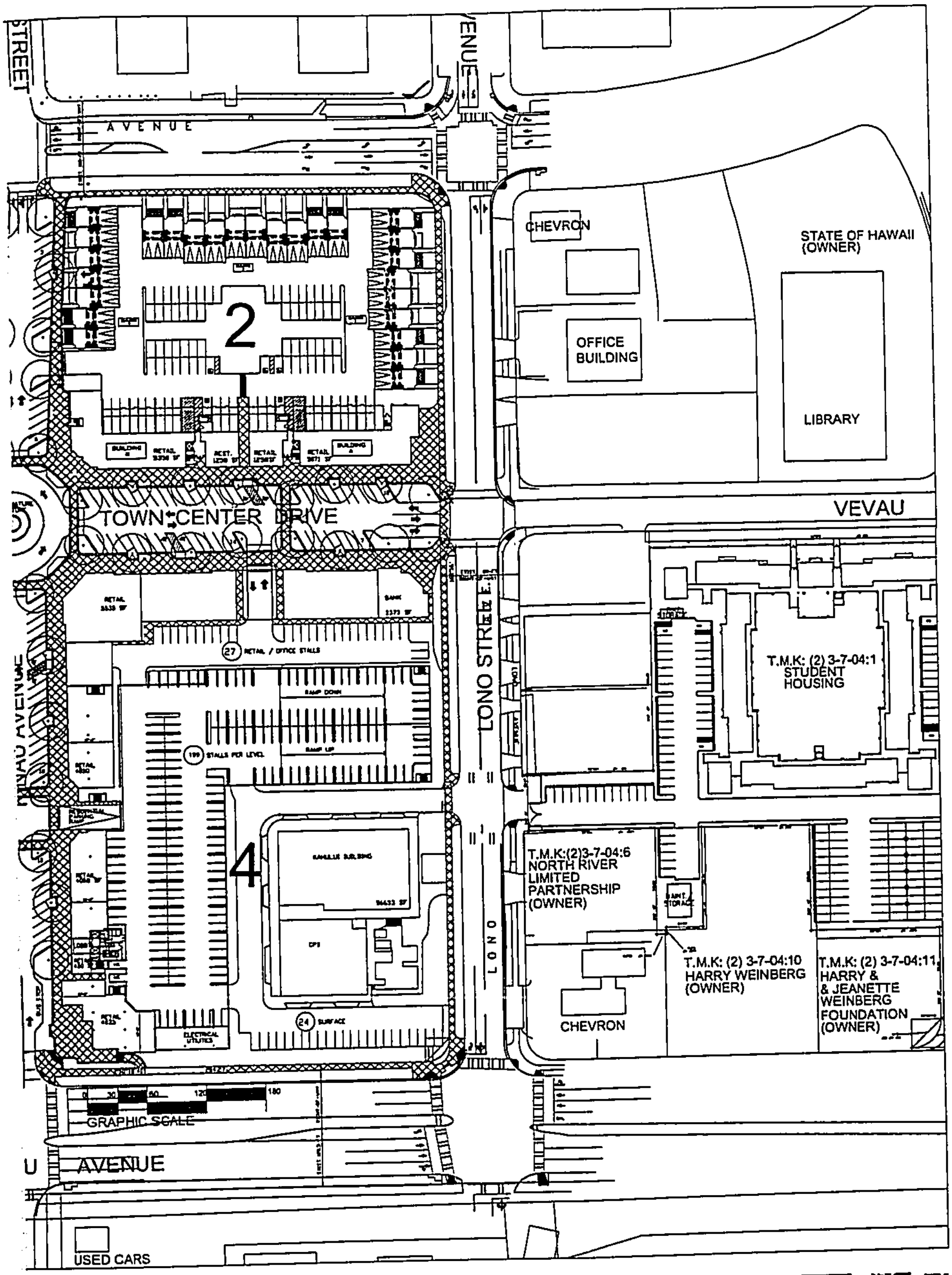
APRIL 2006



K A H U L U I   T O W N   C E N T

F I R S T   F L O O R   P L A N S

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.



CENTER, MAUI

OR PLANS

640'

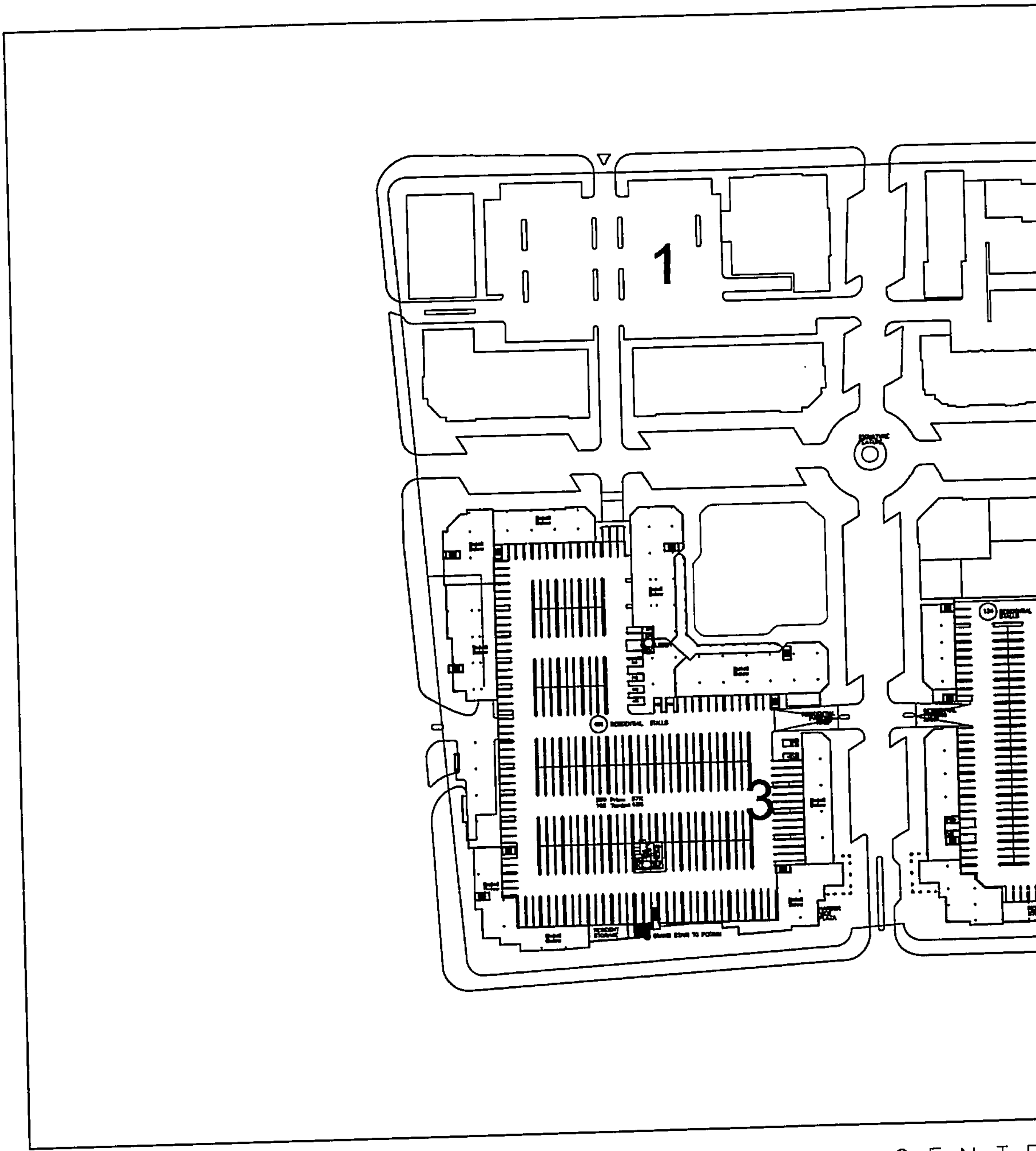
Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

FIGURE 17.b ARCHITECTURAL DRAWINGS

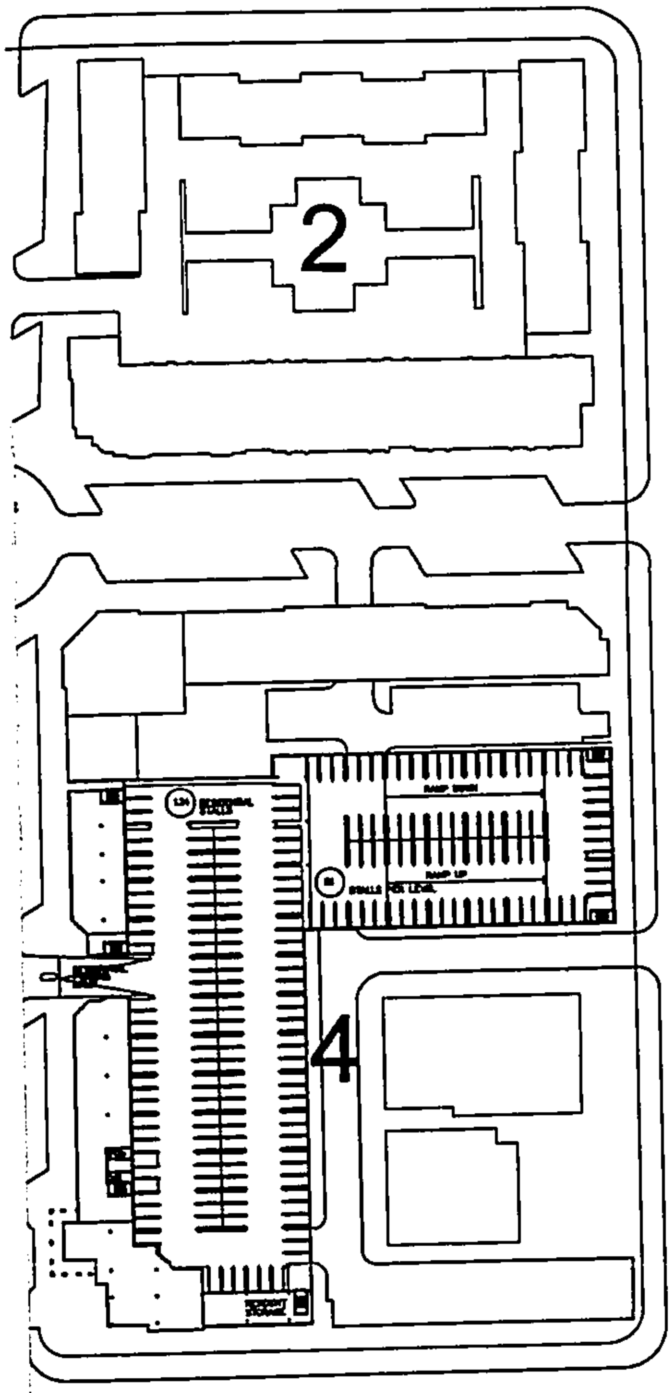


K A H U L U I   T O W N   C E N T E

I N T E R M E D I A T E   P A R K I N G   F L O O R

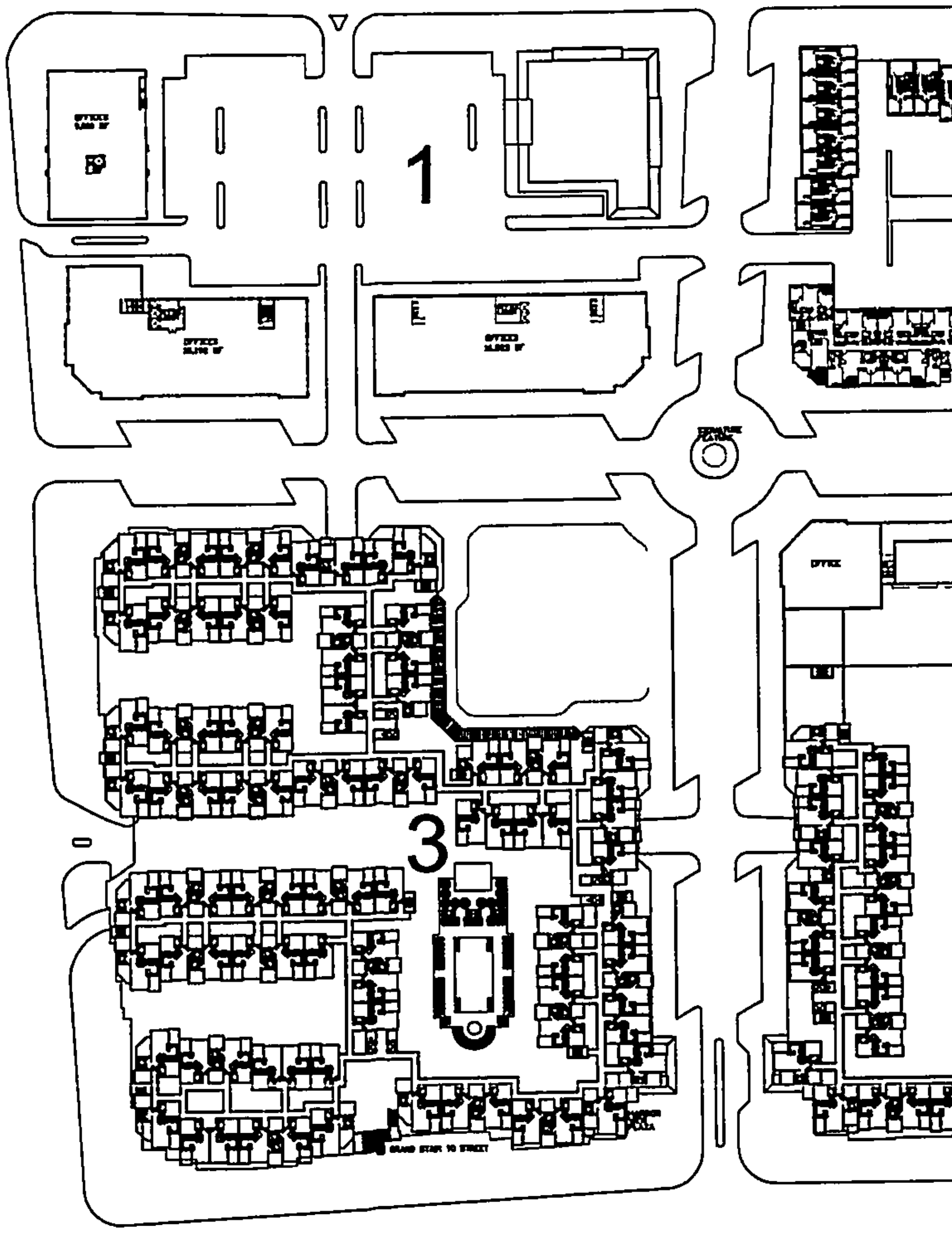
0' 20' 40' 80' 160' 320'

A&B Properties, Inc.



CENTER, MAUI
G FLOOR PLANS
640'

FIGURE 17.c
ARCHITECTURAL DRAWINGS

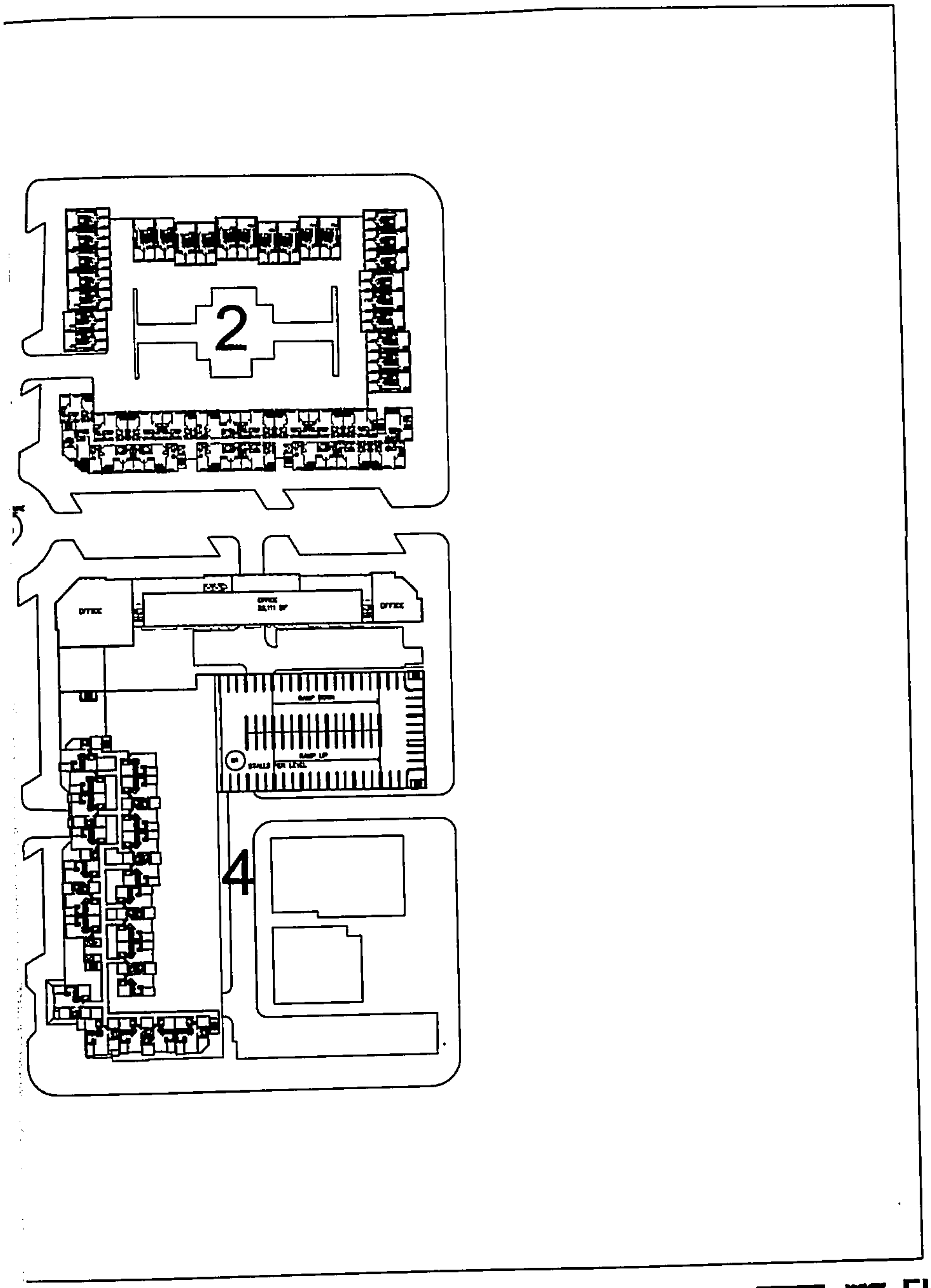


A&B PROPERTIES, INC.

KAHULUI TOWN CENTE

SECOND FLOOR PLANS

0' 20' 40' 80' 160' 320'



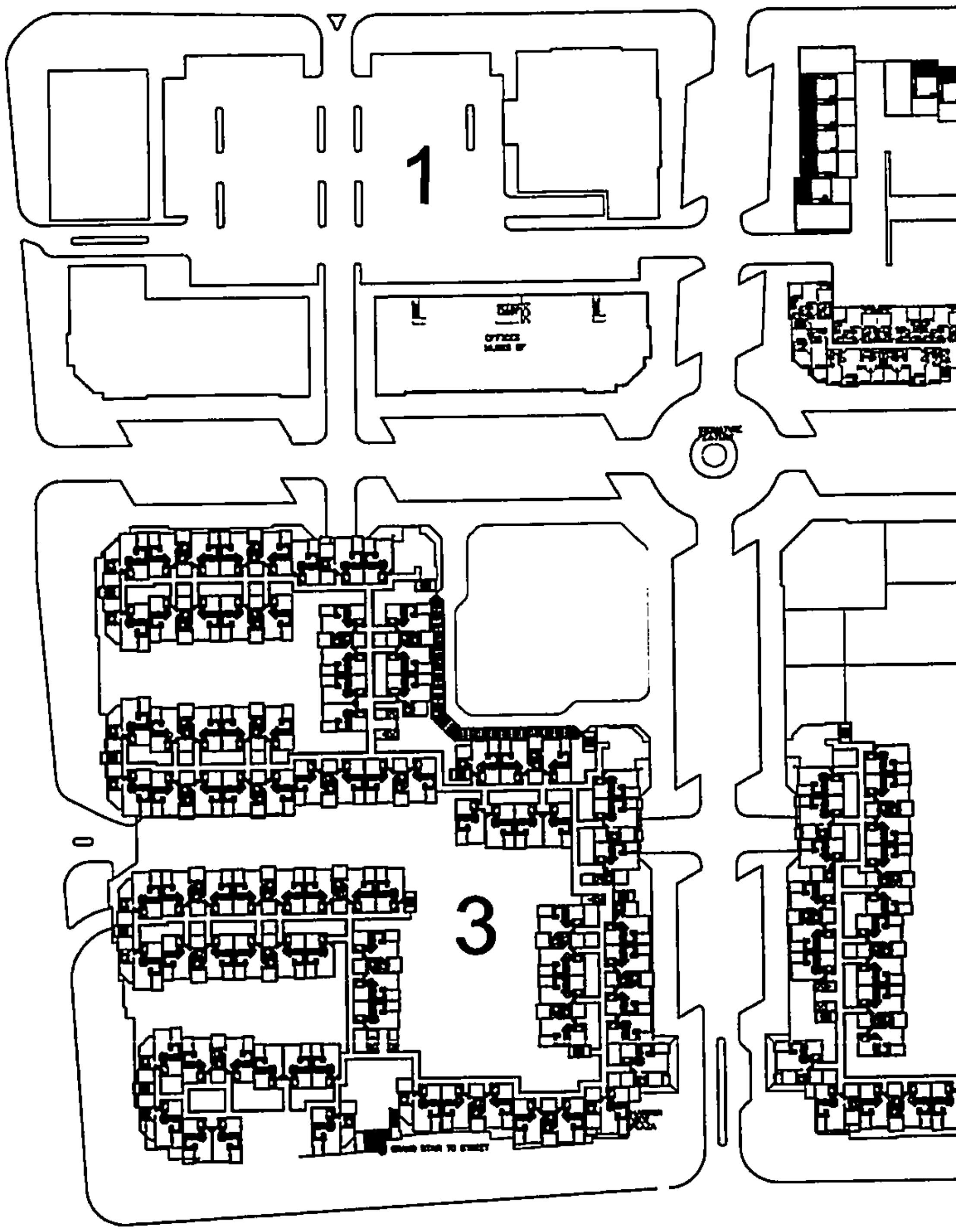
CENTER, MAUI

R PLANS

640'

LESLIE LIPPICH
ARCHITECT & ASSOCIATES INC.

FIGURE 17.d
ARCHITECTURAL DRAWINGS

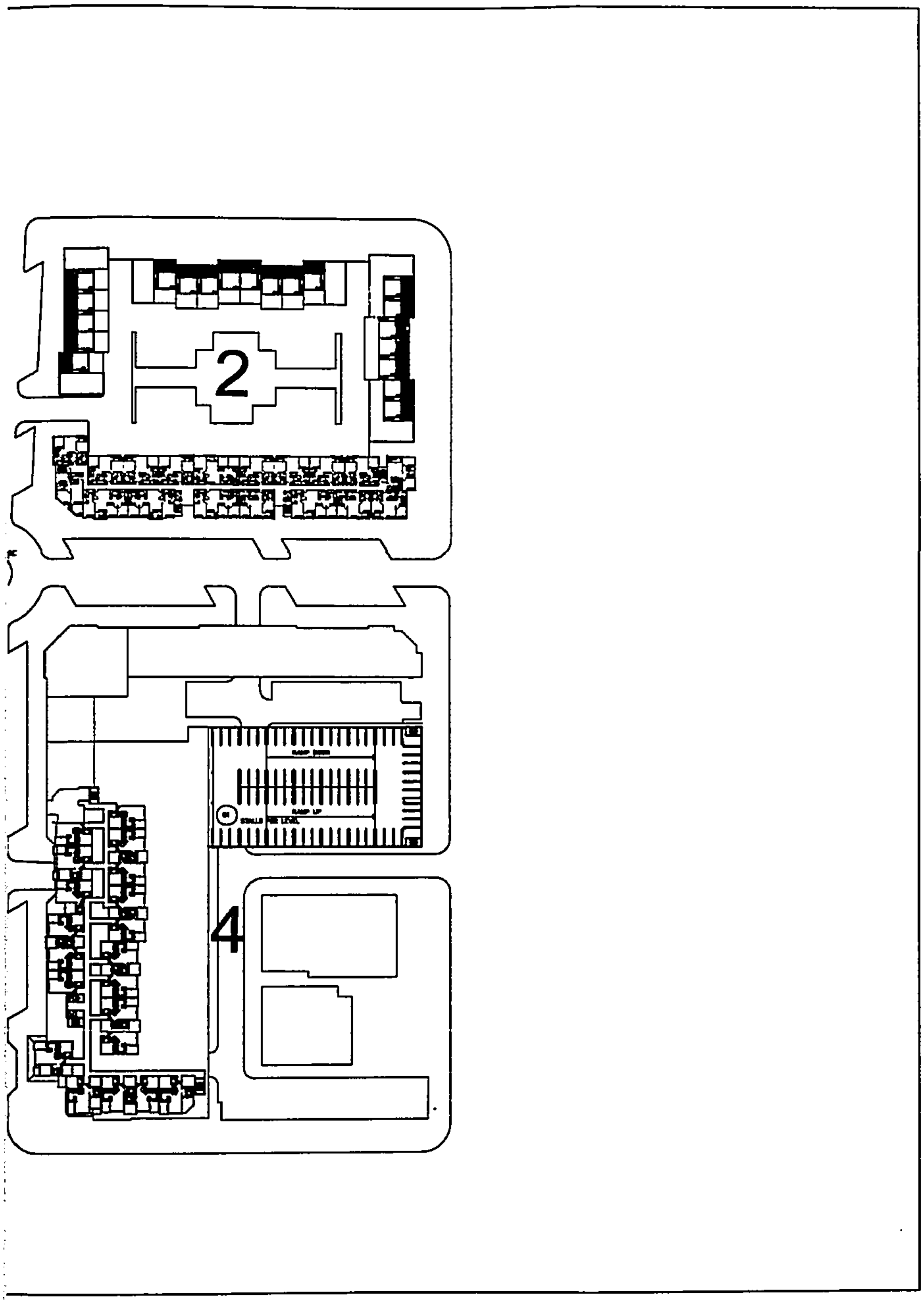


A&B PROPERTIES, INC.

K A H U L U I   T O W N   C E N T E

THIRD FLOOR PLANS

0' 20' 40' 80' 160' 320'



CENTER, MAUI

PLANS

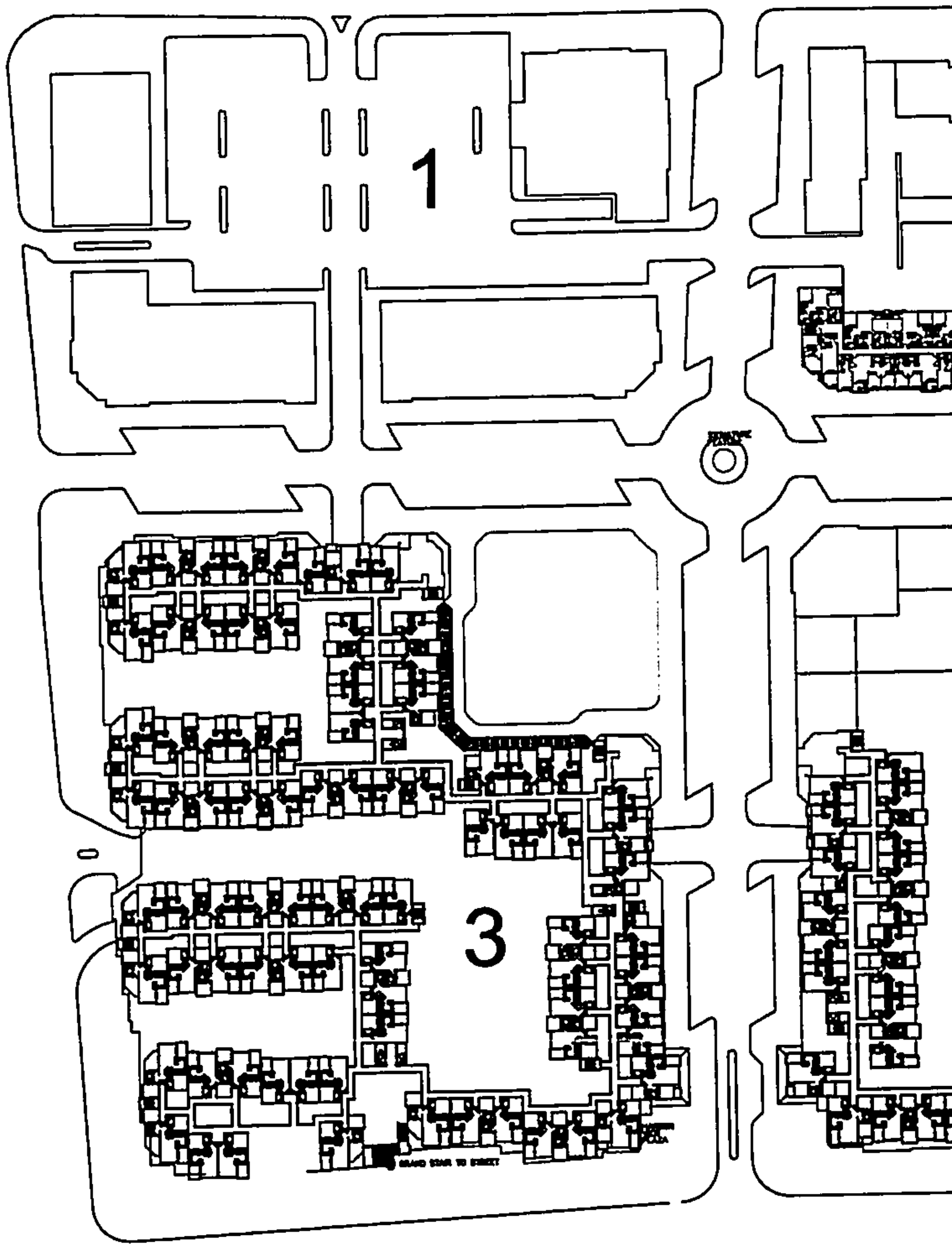
640'

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LTD

CHRIS HART

FIGURE 17.e
ARCHITECTURAL DRAWINGS

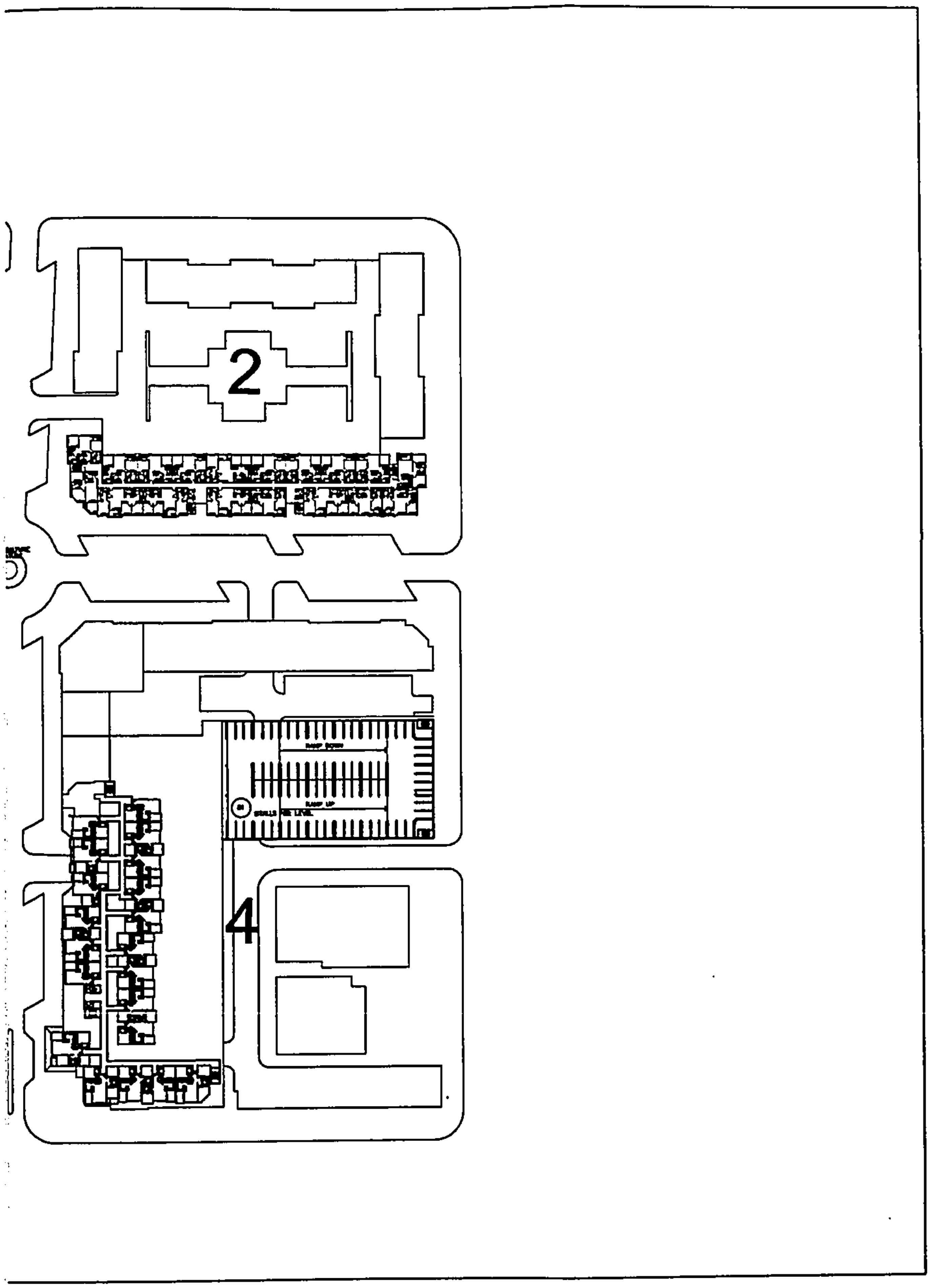


A&B PROPERTIES, INC.

KAHULUI TOWN CENTE

FOURTH FLOOR PLANS

0' 20' 40' 80' 160' 320'



C E N T E R ,   M A U I
O R P L A N S

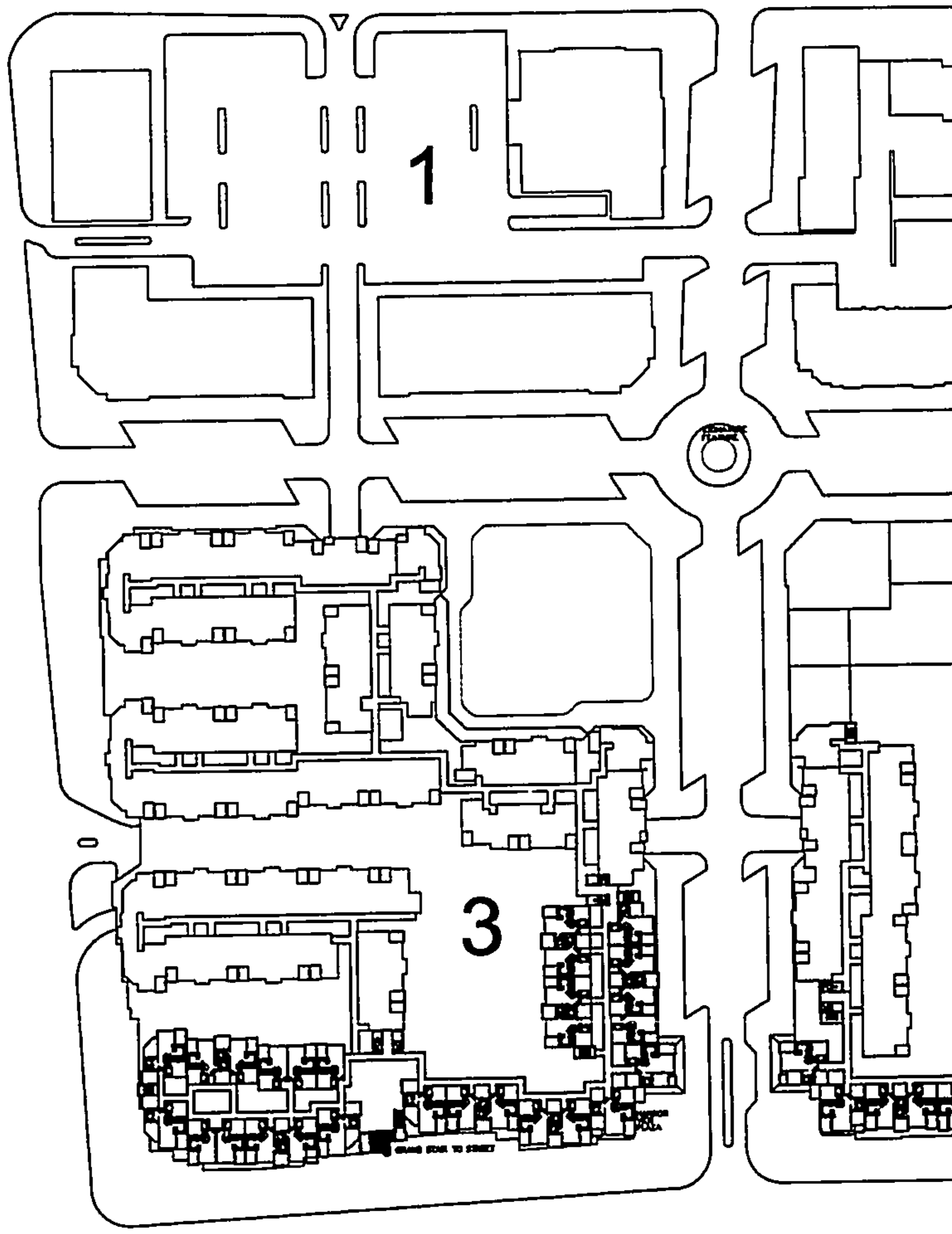
640'

LESLIE LIPPICH
ARCHITECT & ASSOCIATES INC.

H C A HAWAII LLC

CHRIS HART

FIGURE 17.f
ARCHITECTURAL DRAWINGS

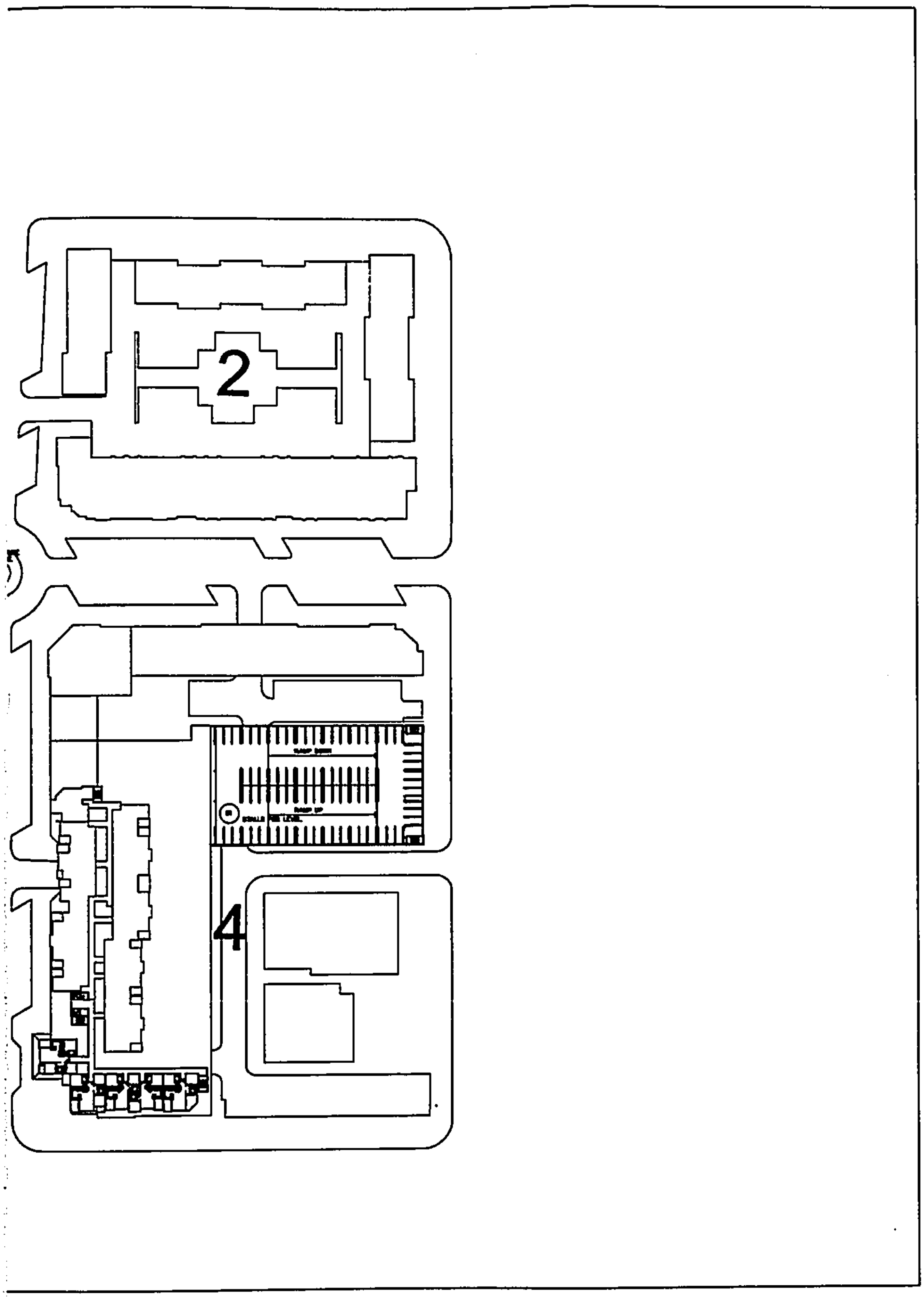


A&B PROPERTIES, INC.

KAHULUI TOWN CENTE

FIFTH FLOOR PLANS

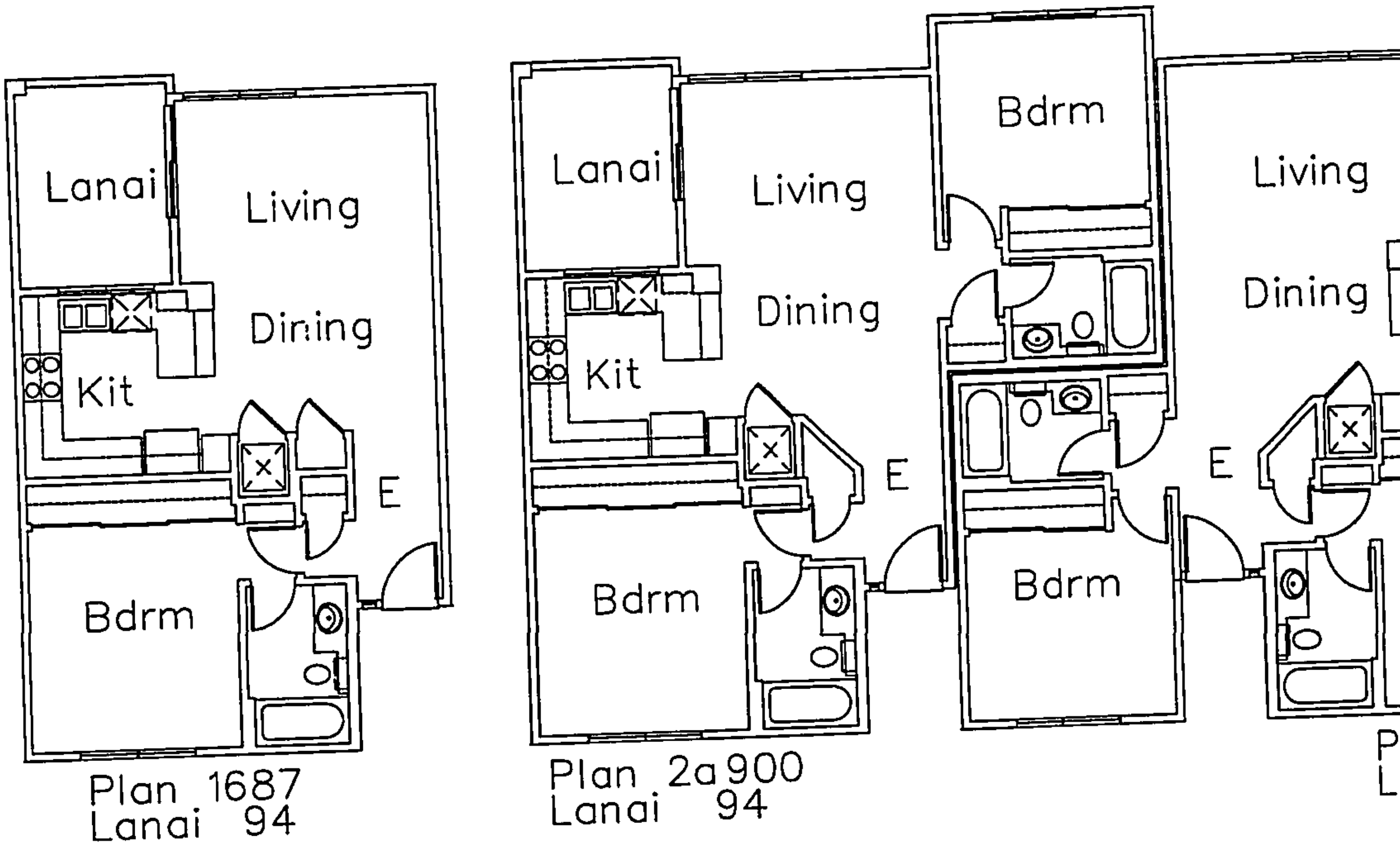
0' 20' 40' 80' 160' 320'



CENTER, MAUI
PLANS
640'

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

FIGURE 17.g
ARCHITECTURAL DRAWINGS



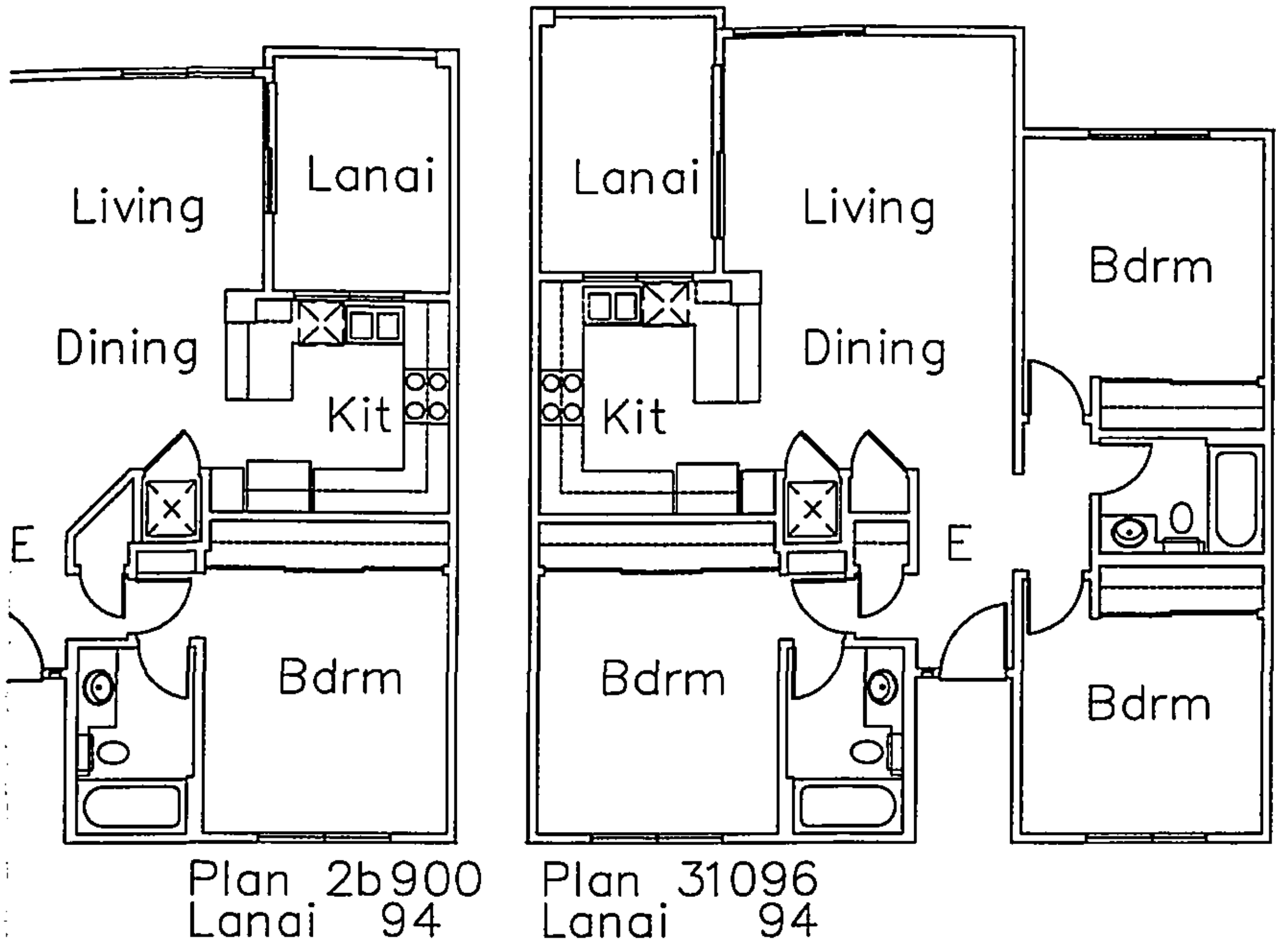
ONE BEDROOM UNIT

TWO BEDROOM UNIT

TWO BEDROO

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

K A H U L U I T O W N C E N T
Q U A D R A N T S 3 & 4 U N I T P L A
SCALE: 3/8"=1'-0"



BEDROOM UNIT

THREE BEDROOM UNIT

CENTER, MAUI

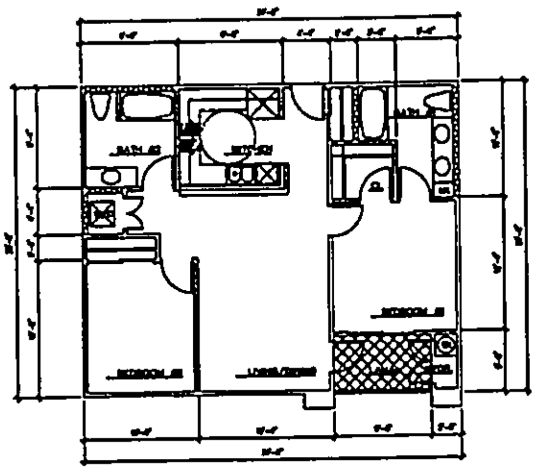
NIT PLANS

12' 16' 20'

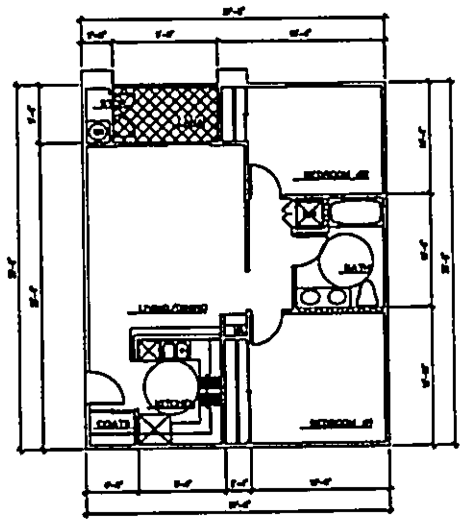
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

N G A HAWAII LLC

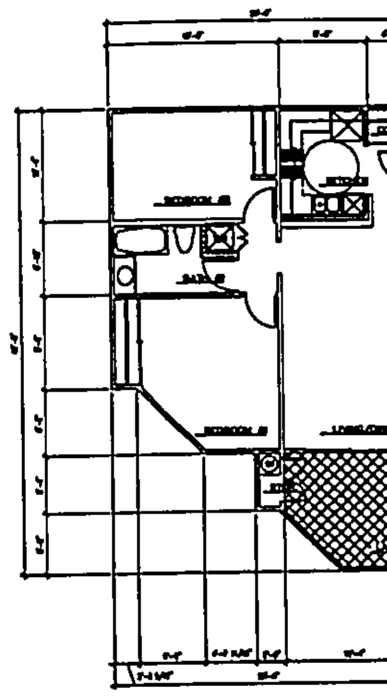
FIGURE 17.h
ARCHITECTURAL DRAWINGS



UNIT TYPE 1
FLOOR PLAN [illegible] SQ.FT.

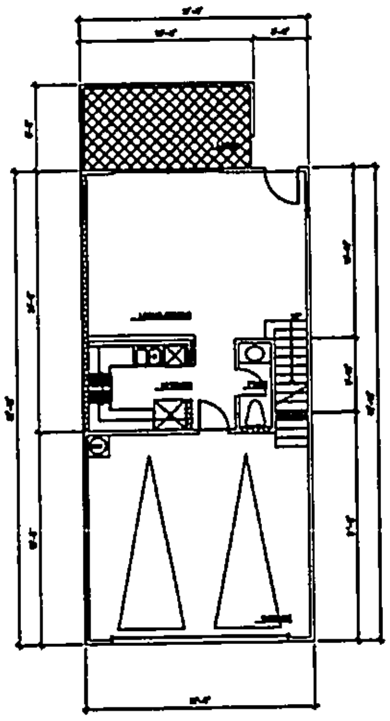


UNIT TYPE 2
FLOOR PLAN (H.C.) [illegible] SQ.FT.

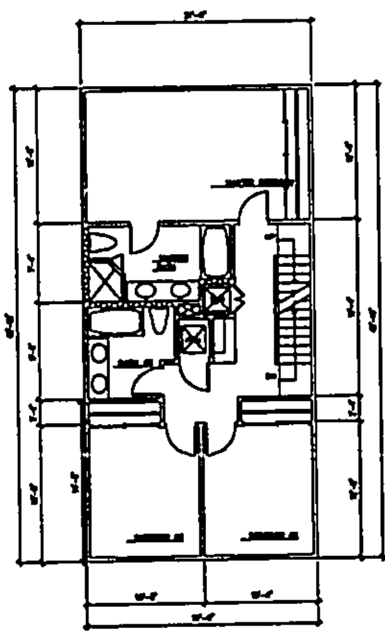


UNIT TYPE 3
FLOOR PLAN

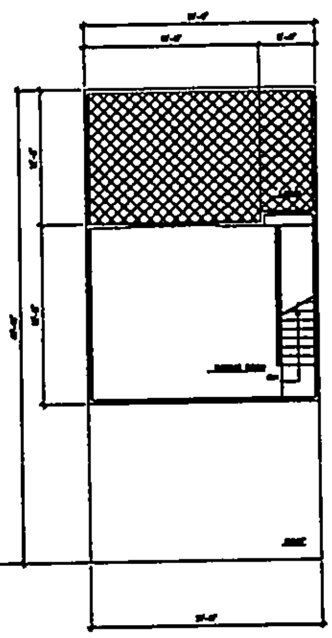
TOWNHOUSE UNIT PLANS



TOWNHOUSE TYPE 1
FIRST FLOOR 472 SQ.FT.



TOWNHOUSE TYPE 1
SECOND FLOOR [illegible] SQ.FT.



TOWNHOUSE TYPE 1
THIRD FLOOR [illegible] SQ.FT.

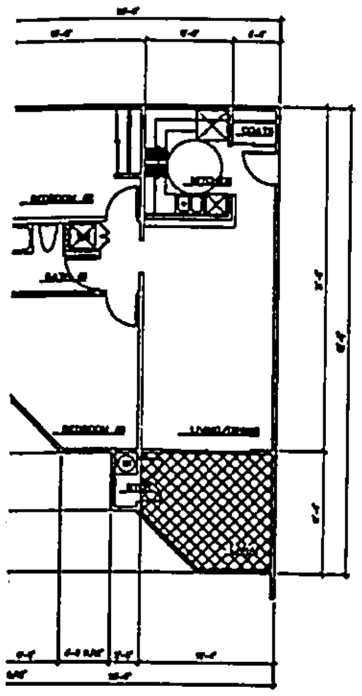
CONDO UNIT PLANS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

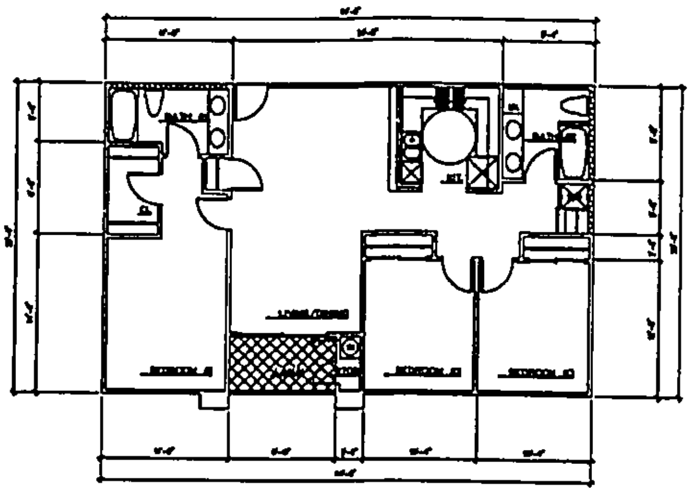
KAHULUI TOWN CENTE

QUAD 2 UNIT PLANS

SCALE 3/16"=1'-0"

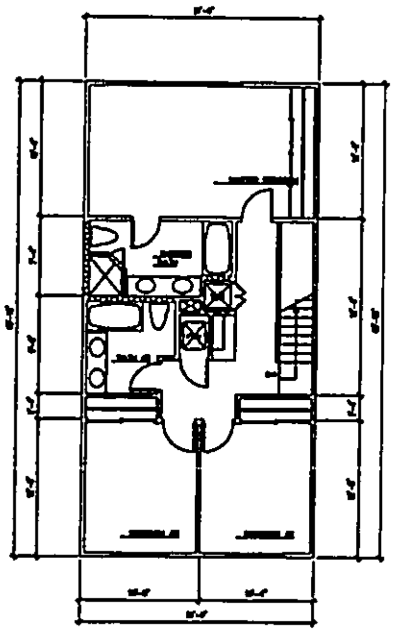


PE 3
PLAN [illegible] SQ.FT.

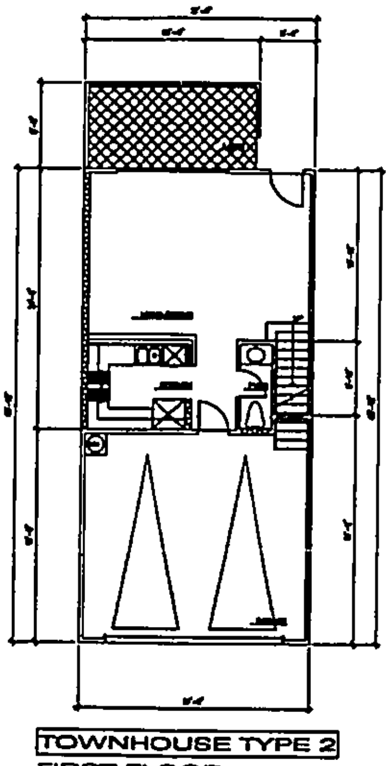


UNIT TYPE 4
FLOOR PLAN 1,196 SQ.FT.

1
75 SQ.FT.



TOWNHOUSE TYPE 2
SECOND FLOOR 874 SQ.FT.



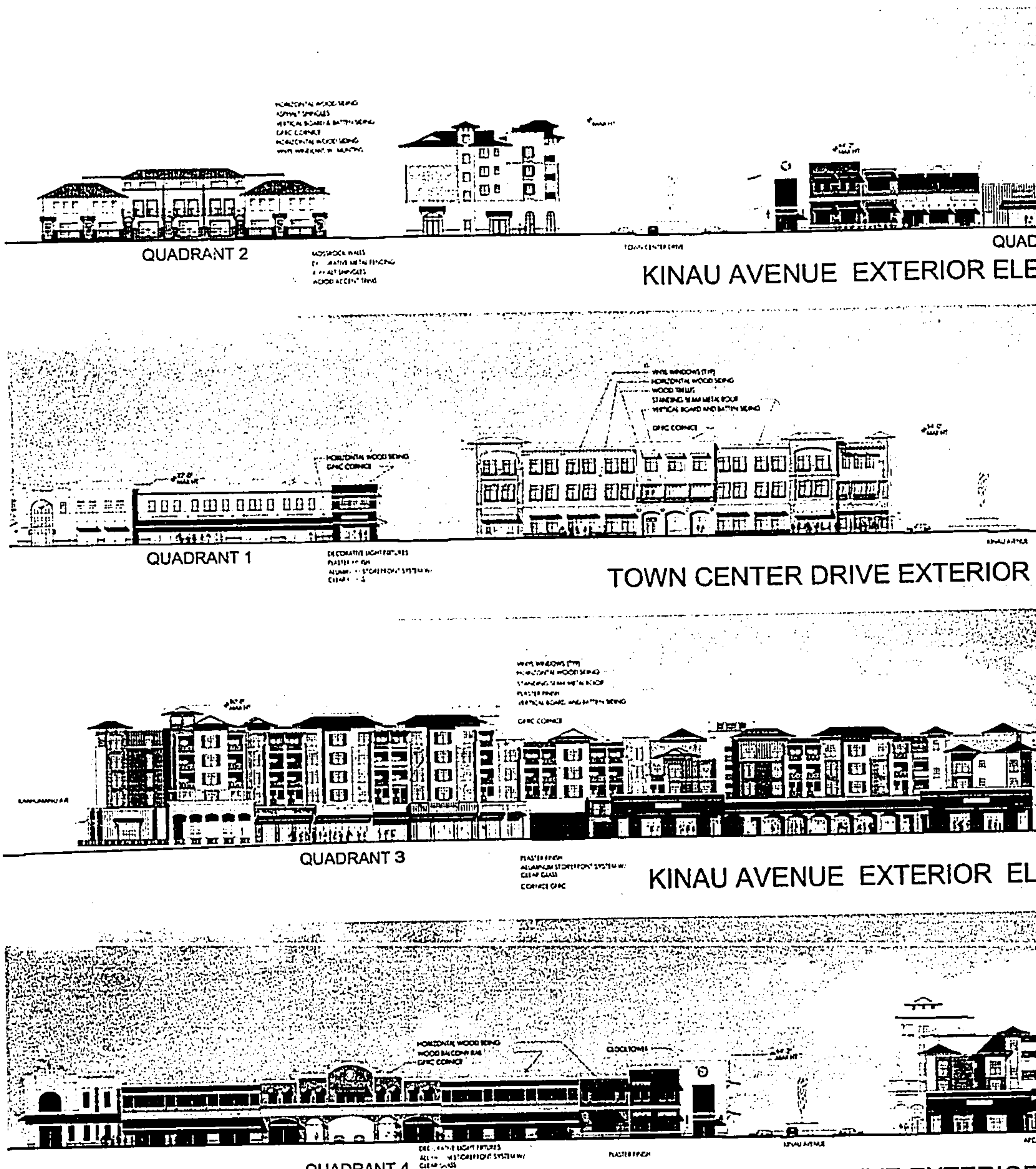
TOWNHOUSE TYPE 2
FIRST FLOOR 472 SQ.FT.

CENTER, MAUI
PLANS
12' 18' 24'

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

N G A HAWAII LLP ARCHITECTURE PLANNING

FIGURE 17.i
ARCHITECTURAL DRAWINGS

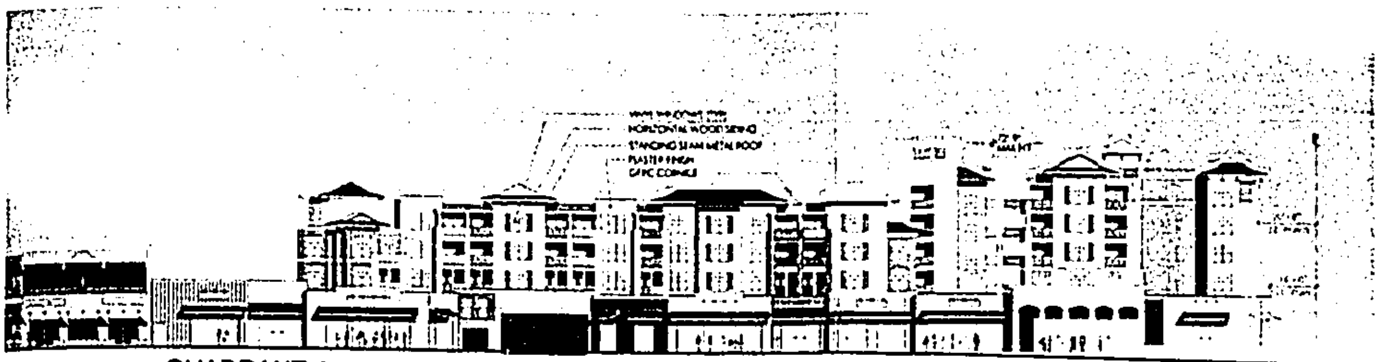


KAHULUI TOWN CENTE

EXTERIOR ELEVATIONS

0' 10' 25' 50' 100' 200'

A&B PROPERTIES, INC.

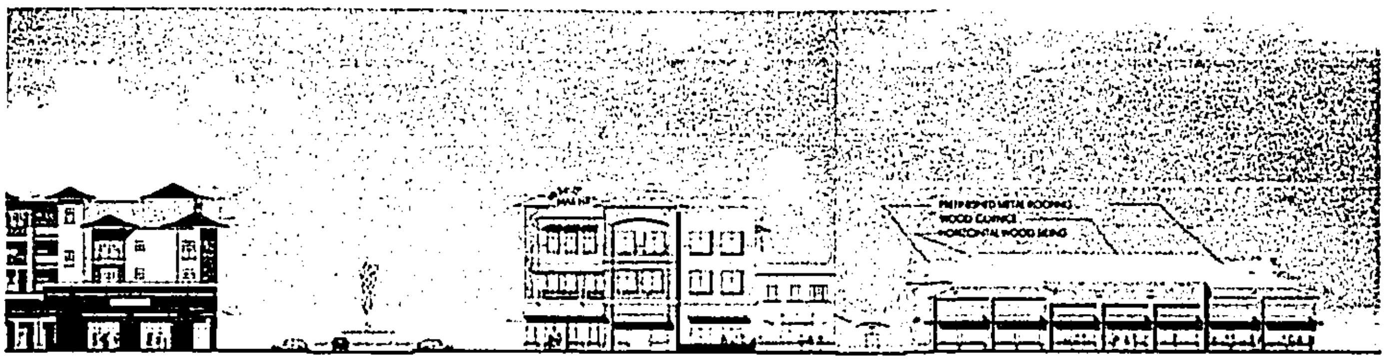


QUADRANT 4

TERIOR ELEVATION

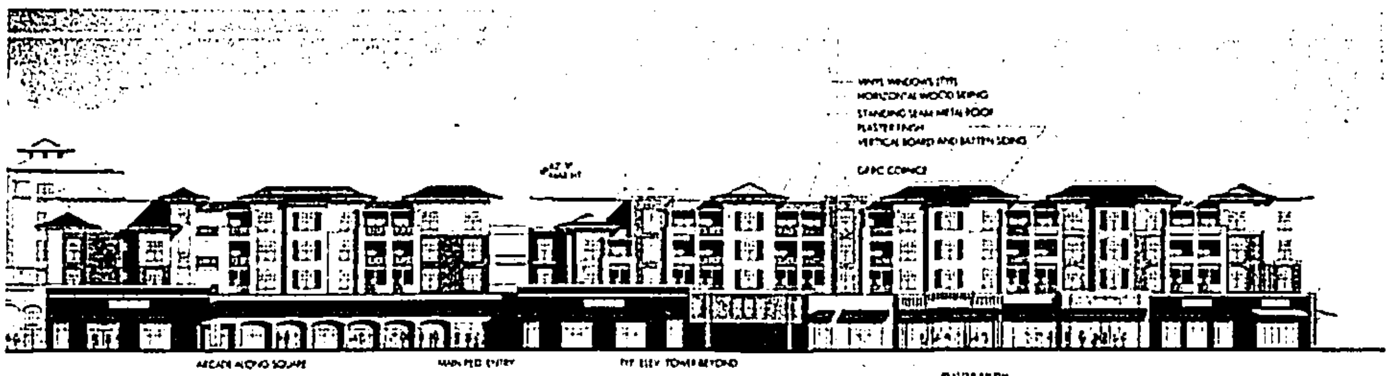
QUADRANT 2

EXTERIOR ELEVATION



QUADRANT 1

TERIOR ELEVATION



QUADRANT 3

EXTERIOR ELEVATION

CENTER, MAUI
LEVATIONS

200' 300'

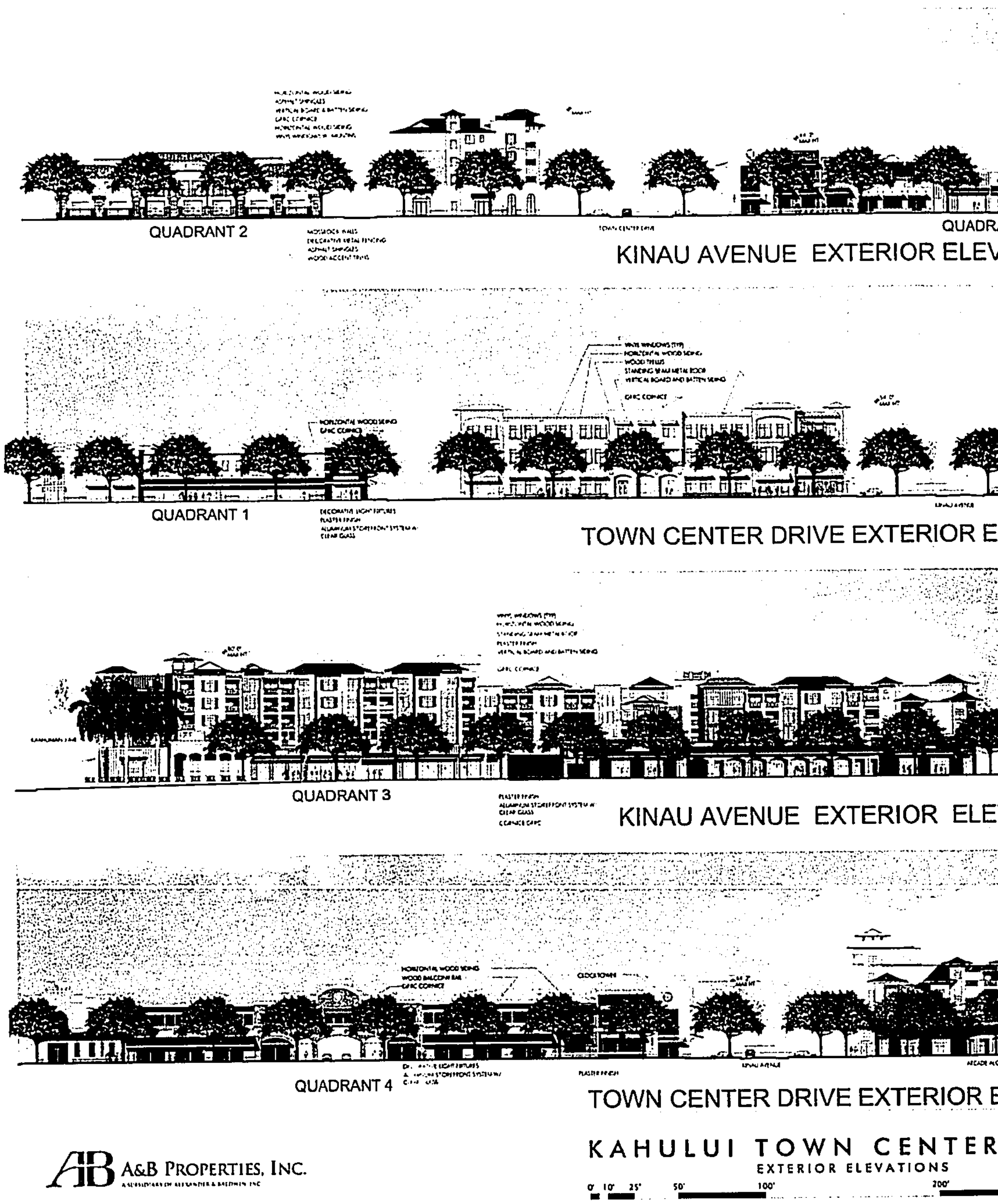
Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

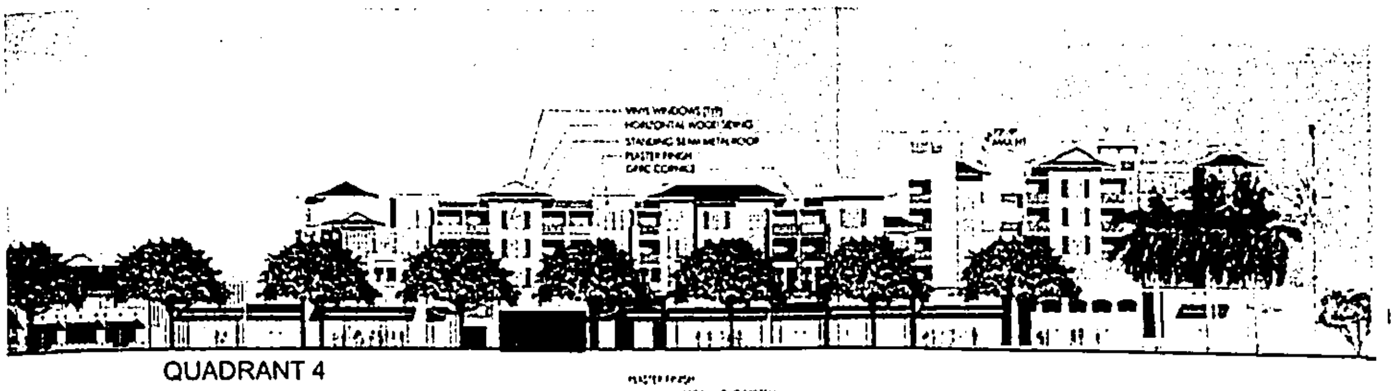
NCA HAWAII LLP

CHRIS HART

FIGURE 17j
ARCHITECTURAL DRAWINGS



QUADRANT 2
KINAU AVENUE EXTERIOR
QUADRANT 1
TOWN CENTER DRIVE EXTERIOR
QUADRANT 3
KINAU AVENUE EXTERIOR
QUADRANT 4
TOWN CENTER DRIVE EXTERIOR
KAHULUI TOWN
EXTERIOR ELEVATIONS
0' 10' 25' 50' 100' 200'
A&B PROPERTIES, INC.

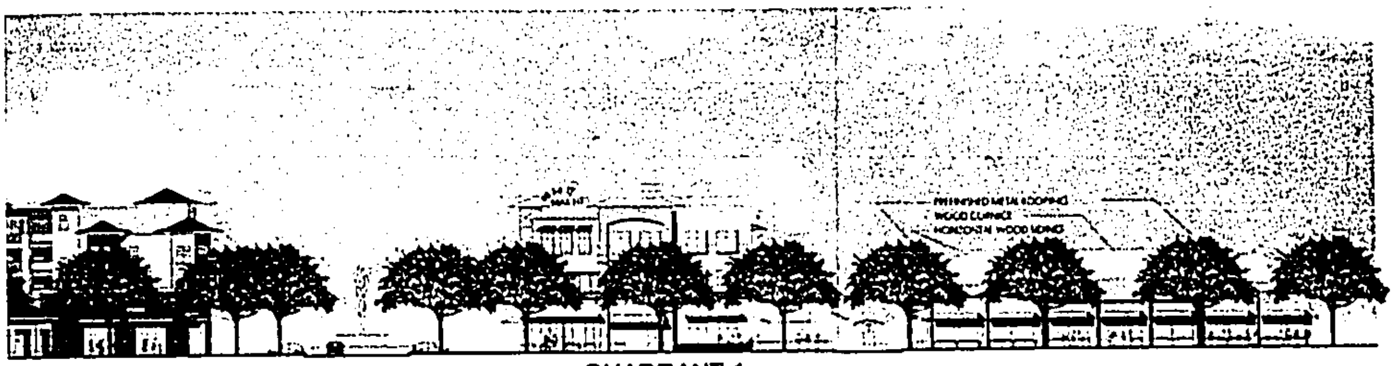


QUADRANT 4

TERIOR ELEVATION

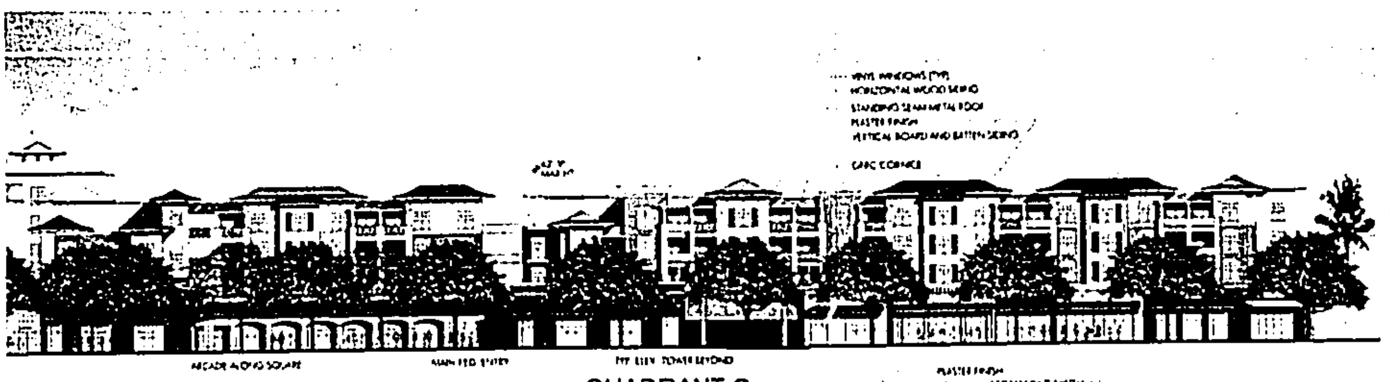
QUADRANT 2

EXTERIOR ELEVATION



QUADRANT 1

TERIOR ELEVATION



QUADRANT 3

EXTERIOR ELEVATION

CENTER, MAUI

LEVATIONS

200' 300'

Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

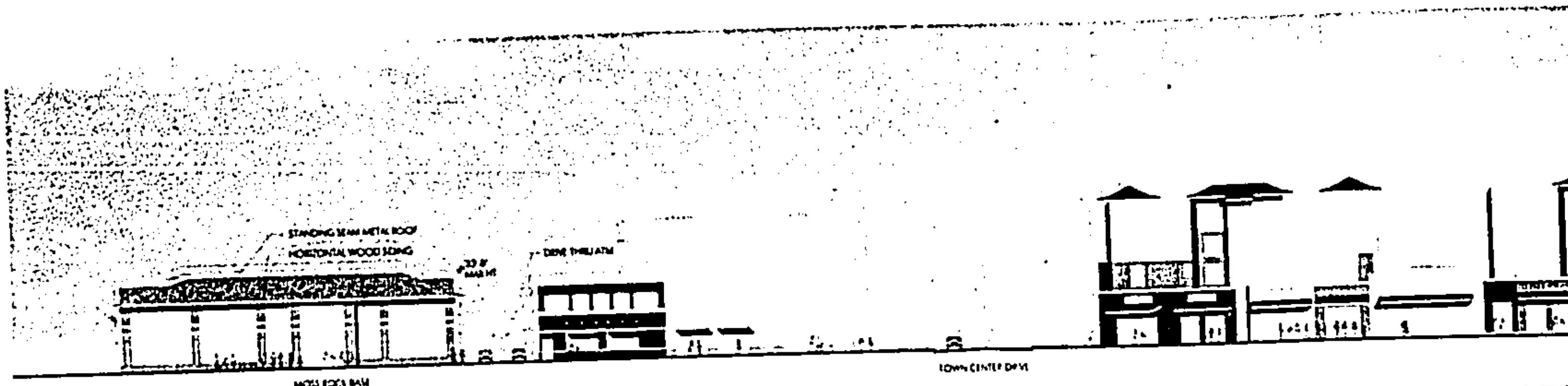
NGA

NGA HAWAII LLP

CHRIS HART

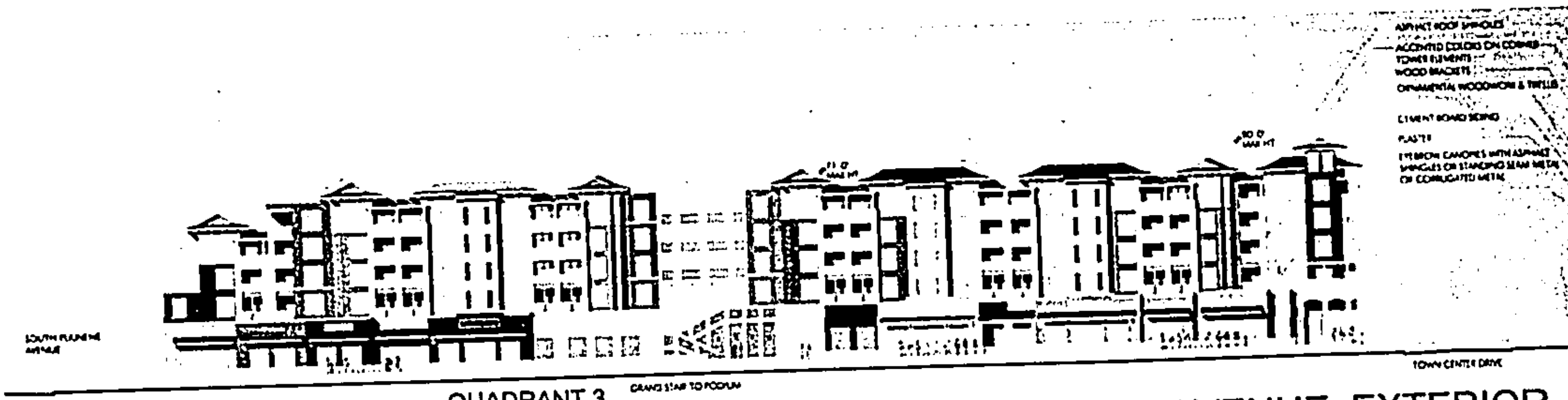
FIGURE 17k

ARCHITECTURAL DRAWINGS



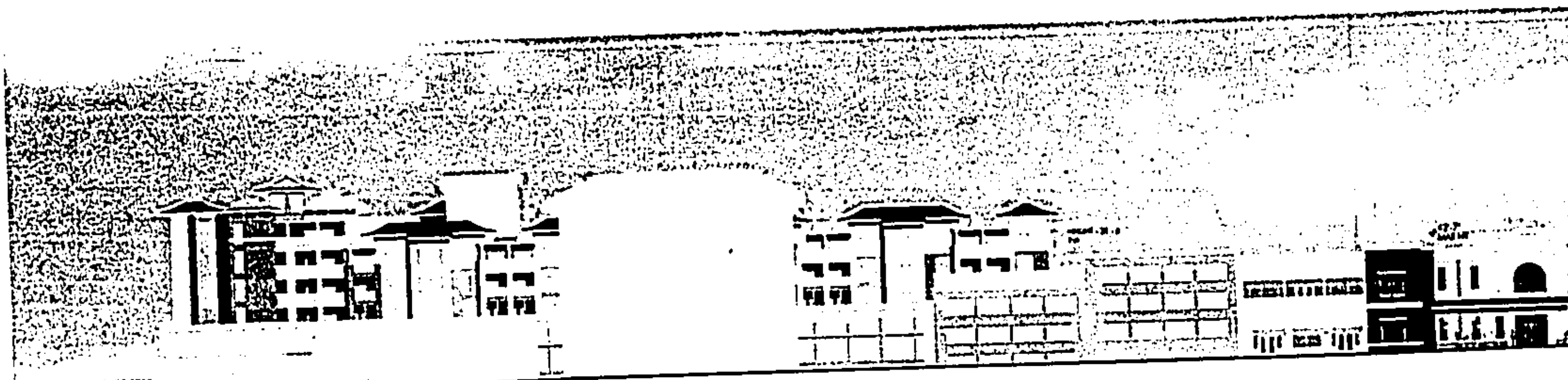
QUADRANT 1

SOUTH PUUNENE AVENUE EXTERIOR



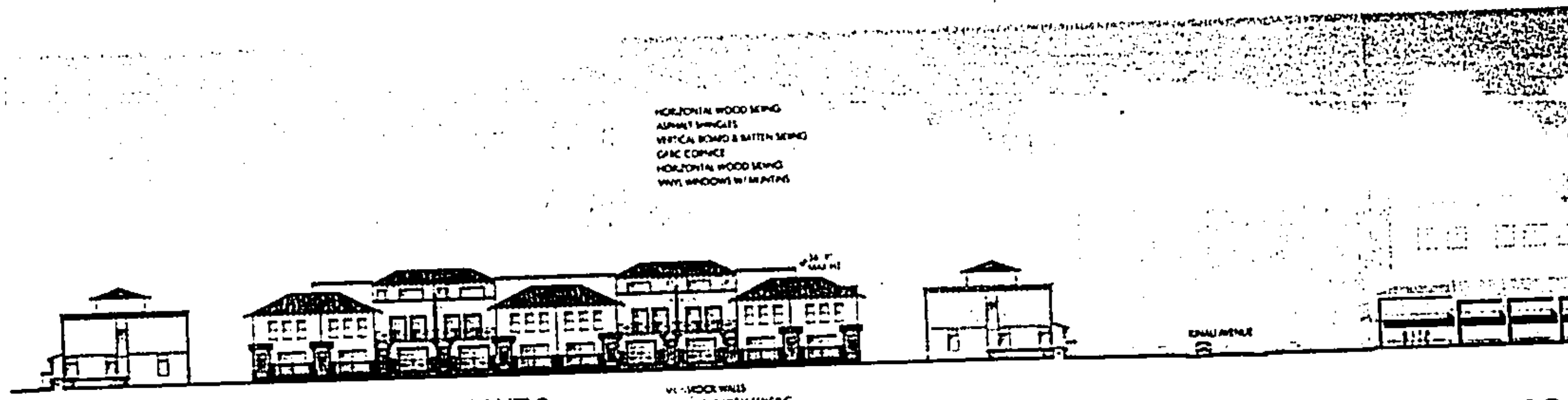
QUADRANT 3

KAAHUMANU AVENUE EXTERIOR



QUADRANT 4

LONO AVENUE EXTERIOR ELE



QUADRANT 2

KAMEHAMEHA AVENUE EXTERIO

KAHULUI TOWN CENTE

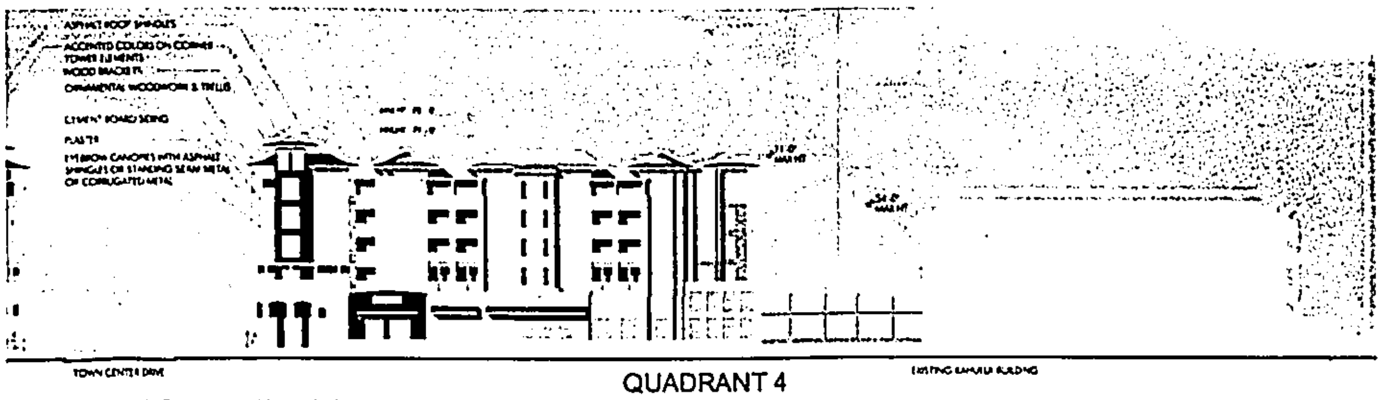
EXTERIOR ELEVATIONS

0' 10' 25' 50' 100' 200'

A&B PROPERTIES, INC.

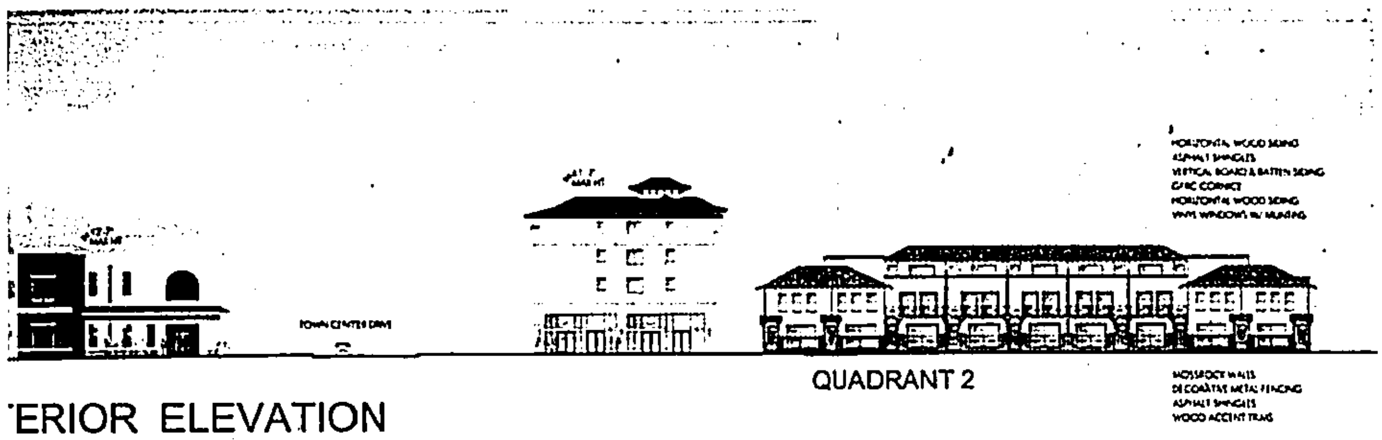
QUADRANT 3

JE EXTERIOR ELEVATION



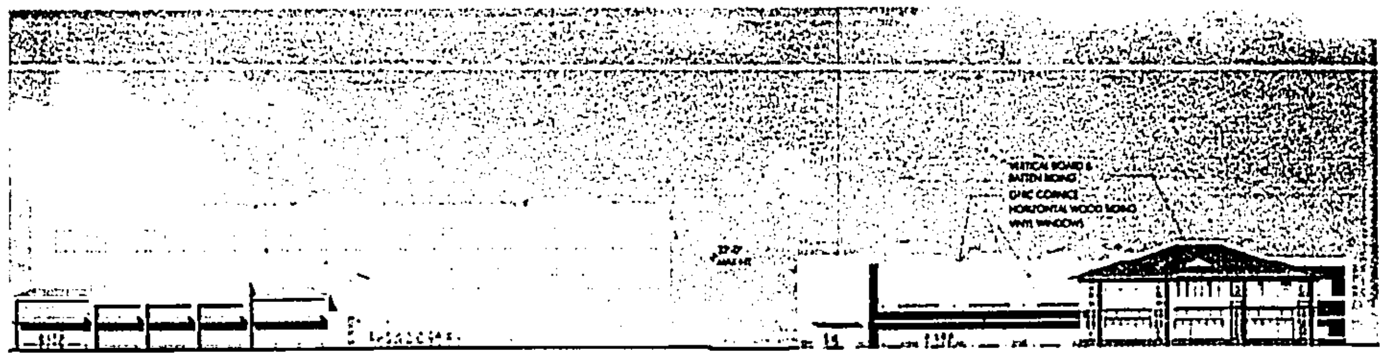
QUADRANT 4

EXTERIOR ELEVATION



QUADRANT 2

'ERIOR ELEVATION



QUADRANT 1

EXTERIOR ELEVATION

CENTER, MAUI

TIONS

200' 300'

Mc Architects

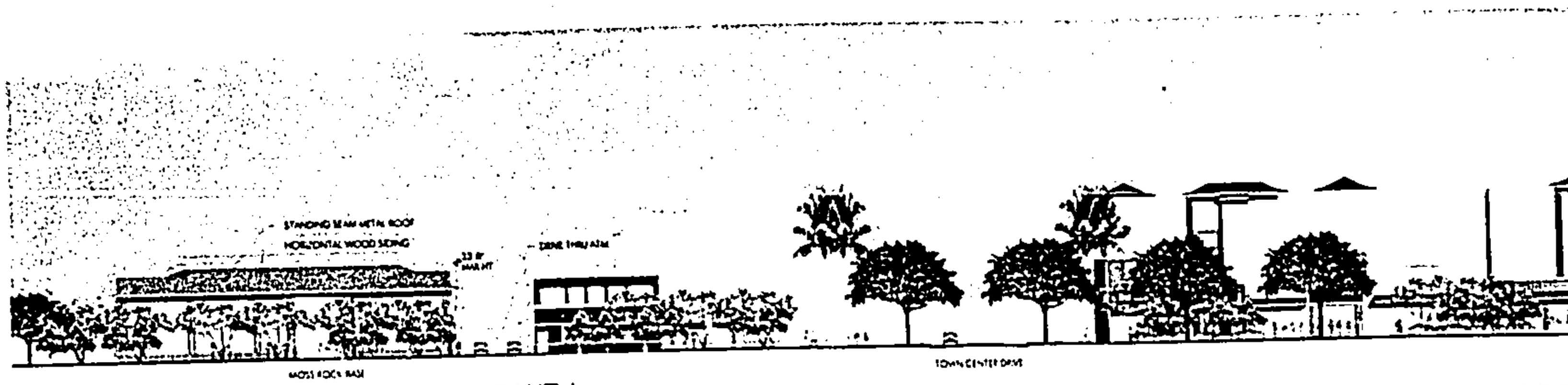
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA

NGA HAWAII LLP

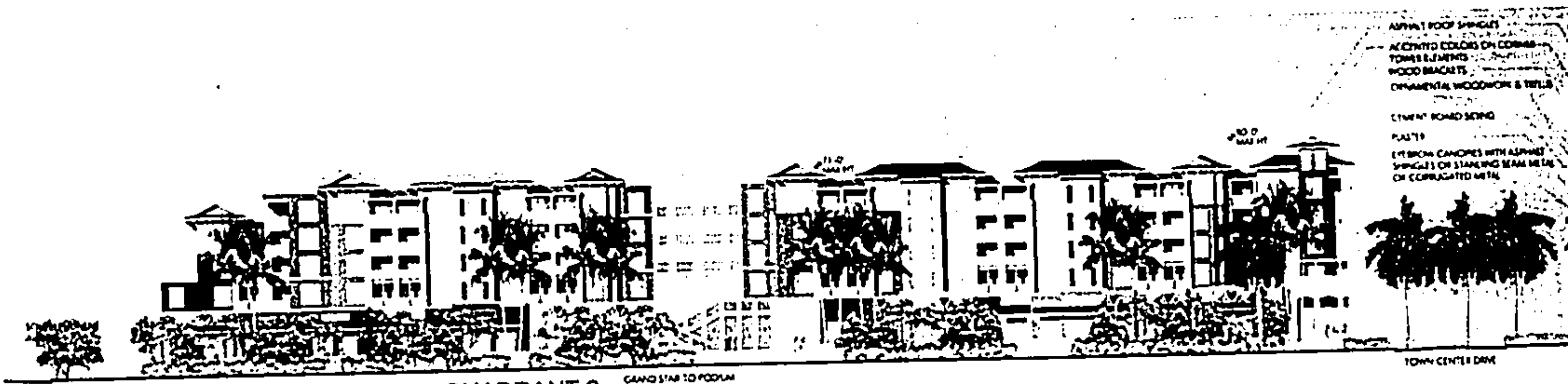
CHRIS HART

FIGURE 17I
ARCHITECTURAL DRAWINGS



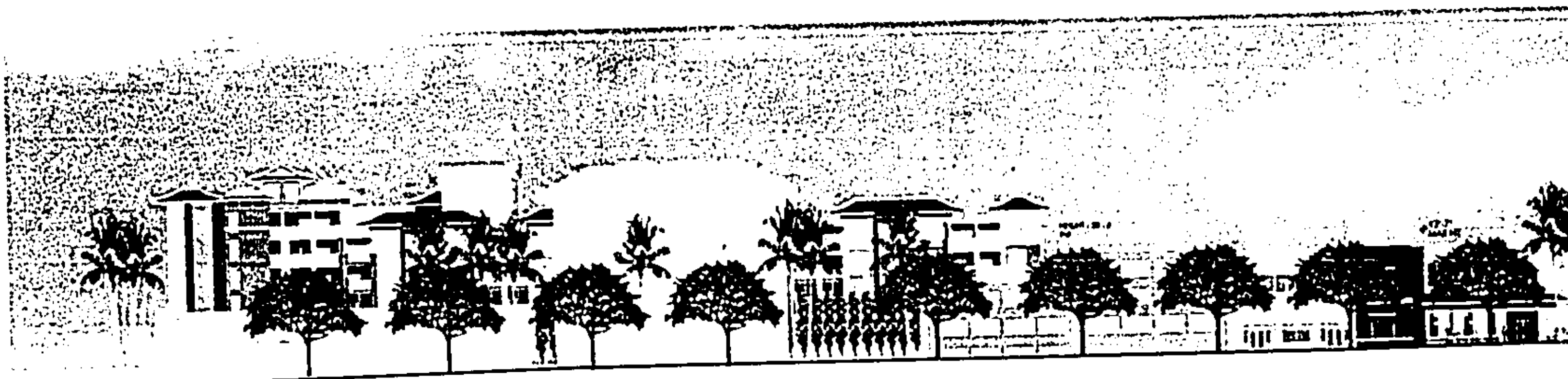
QUADRANT 1

SOUTH PUUNENE AVENUE EXTERIOR



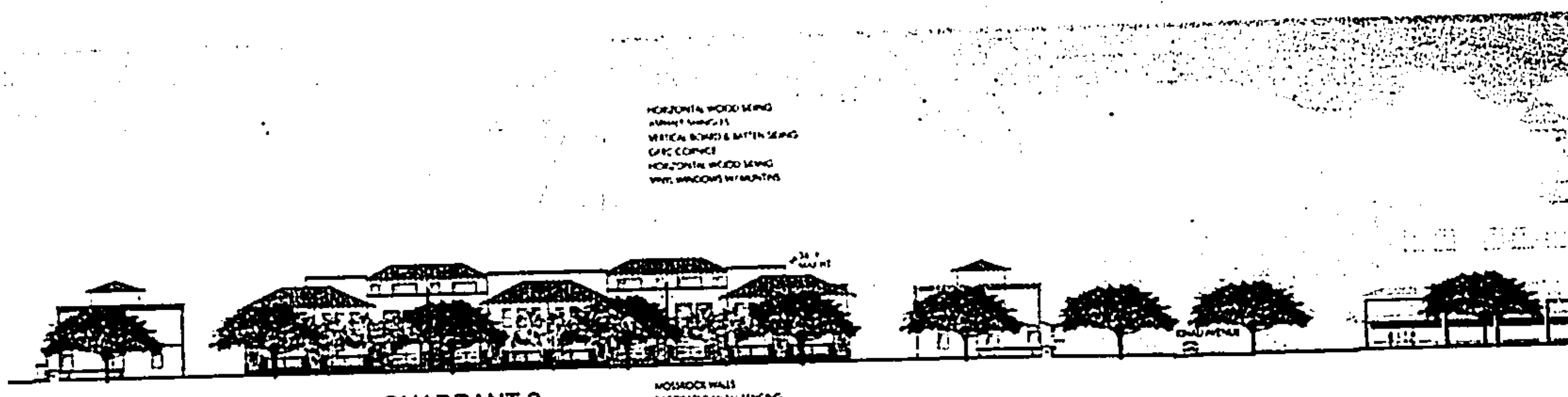
QUADRANT 3

KAAHUMANU AVENUE EXTERIOR



QUADRANT 4

LONO AVENUE EXTERIOR ELE



QUADRANT 2

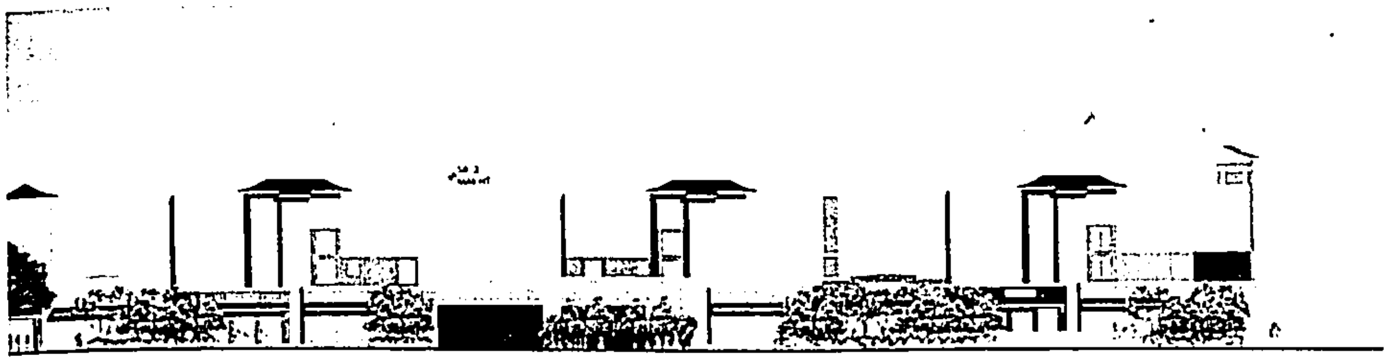
KAMEHAMEHA AVENUE EXTERIOR

KAHULUI TOWN CENTE

EXTERIOR ELEVATIONS

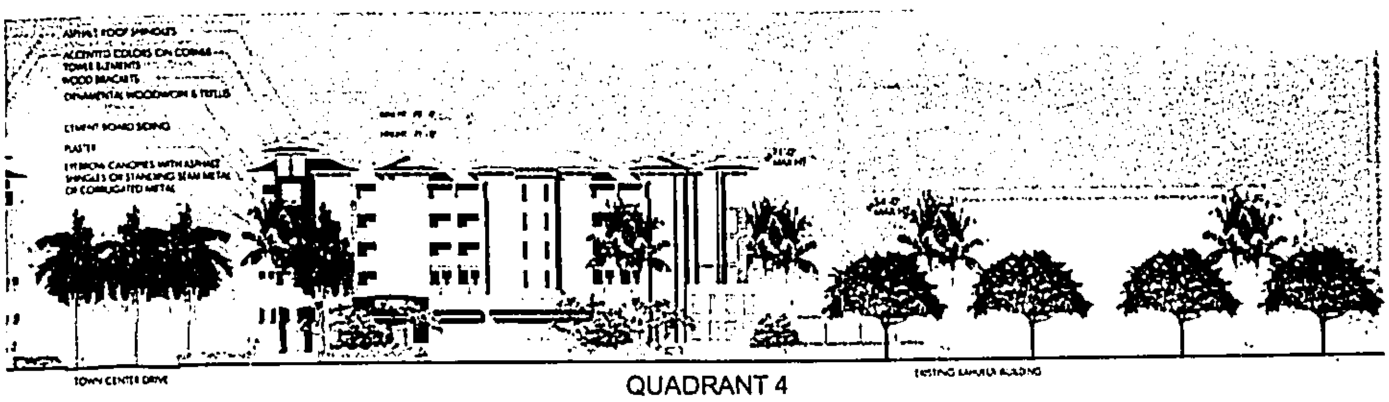
0' 10' 25' 50' 100' 200'

A&B PROPERTIES, INC.



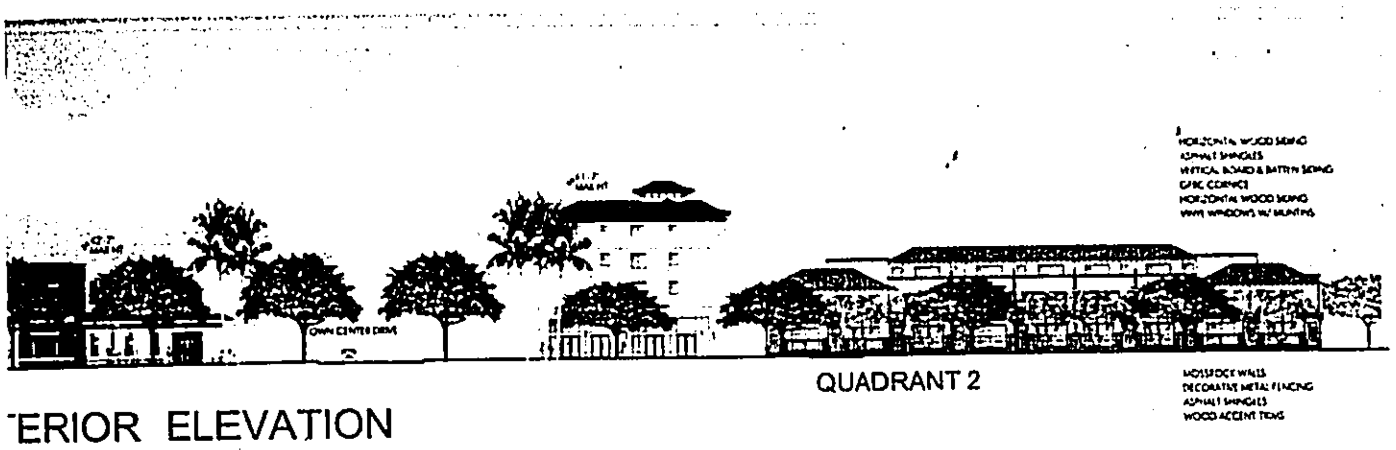
QUADRANT 3

JE EXTERIOR ELEVATION



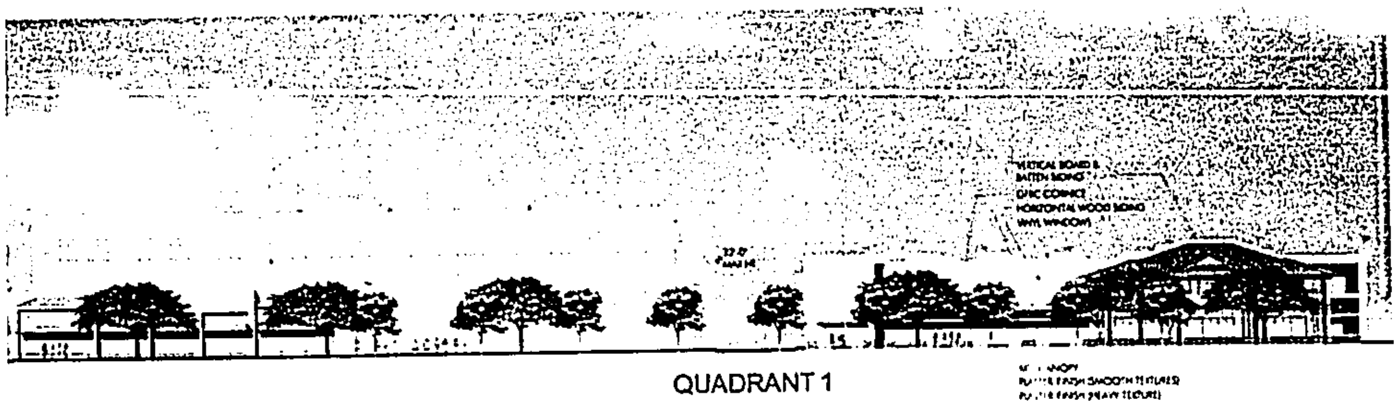
QUADRANT 4

EXTERIOR ELEVATION



QUADRANT 2

'ERIOR ELEVATION



QUADRANT 1

EXTERIOR ELEVATION

CENTER, MAUI

.TIONS

200' 300'

Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

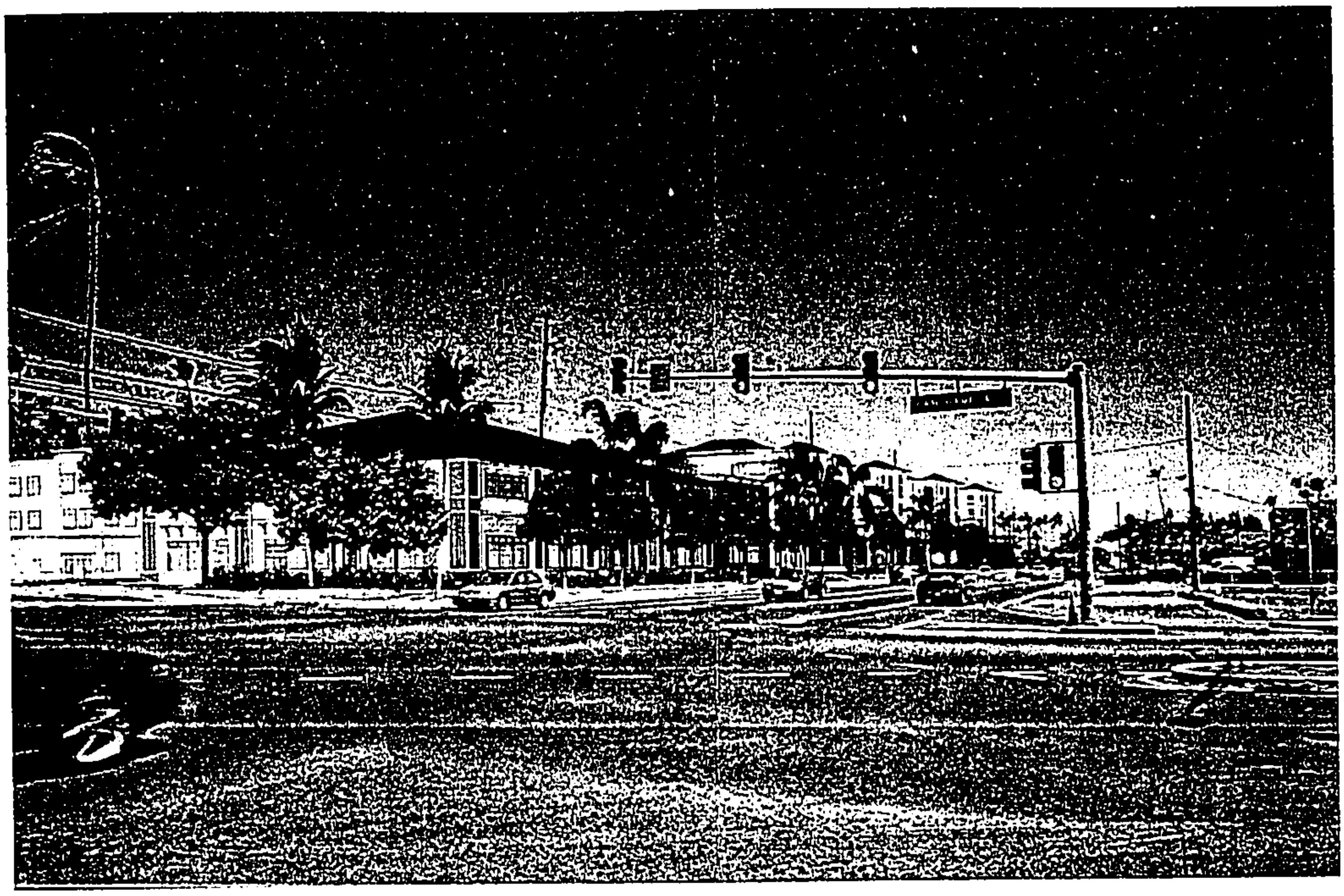
FIGURE 17m
ARCHITECTURAL DRAWINGS

EXISTING CONDITIONS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC

KAHULUI TOWN CEN

VIEW FROM KAMEHAMEHA AND



PROPOSED DEVELOPMENT

FIGURE 17n
ARCHITECTURAL DRAWINGS

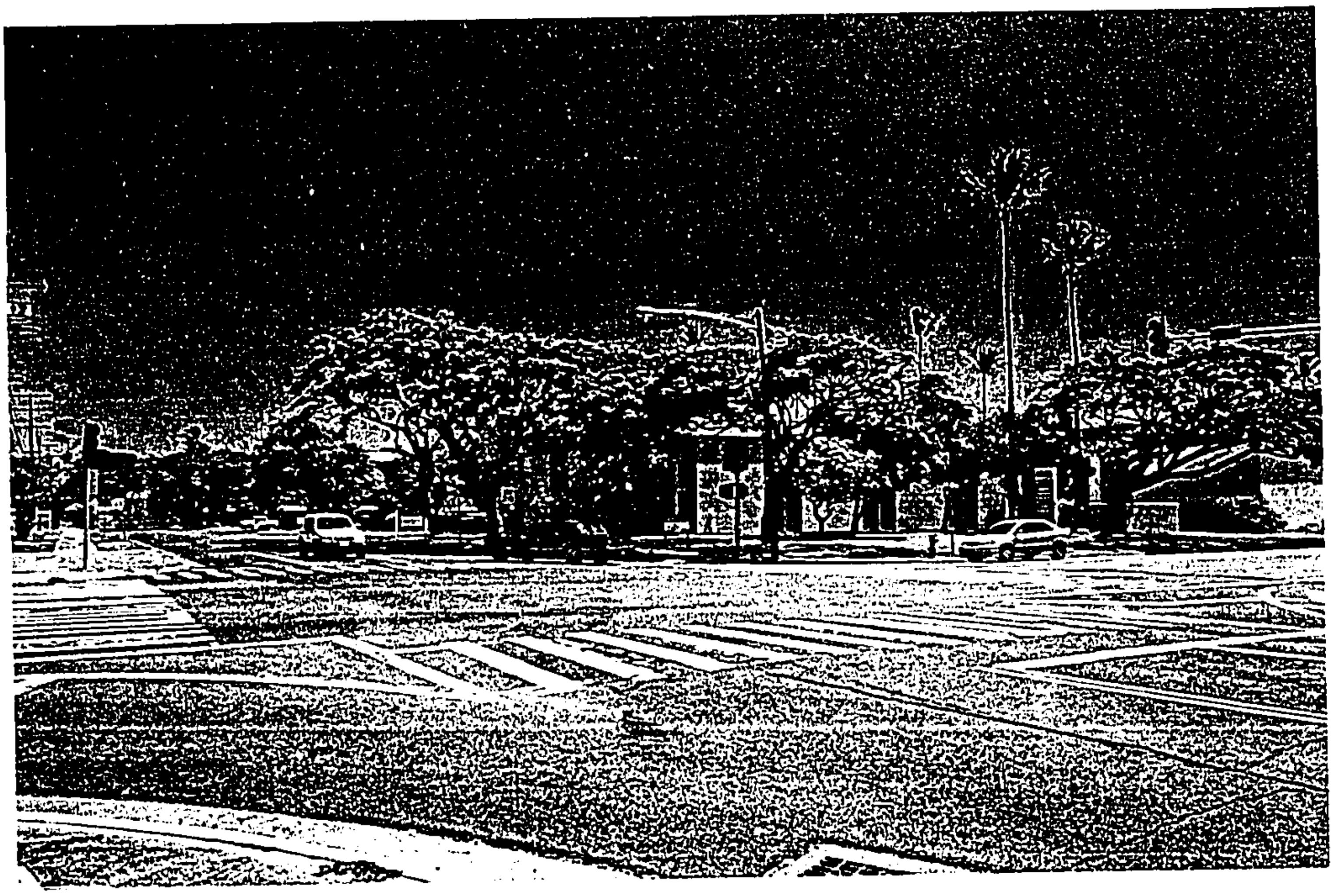
CENTER, MAUI
MEHA AND PUUNENE

Mc Architects Incorporated

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

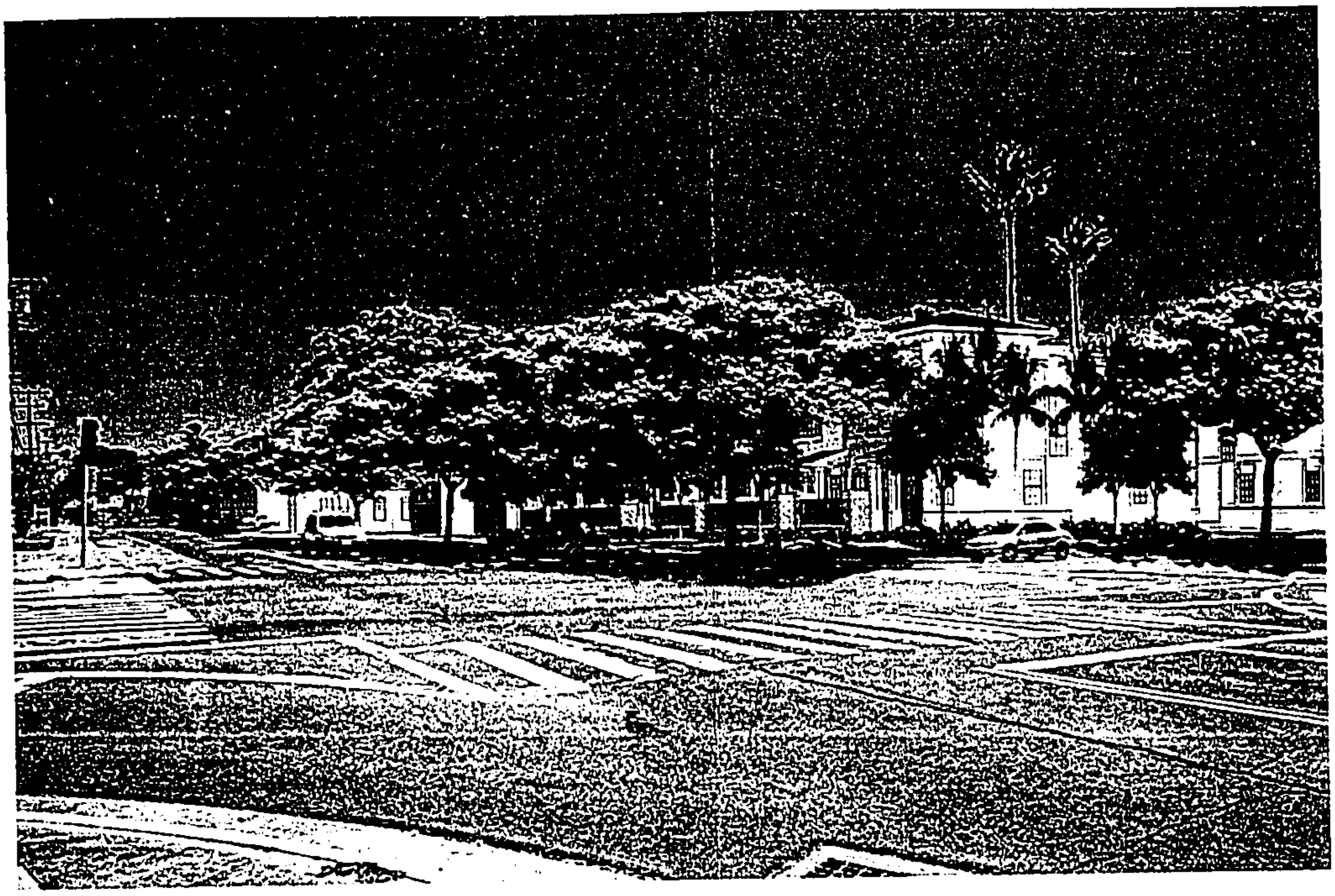


EXISTING CONDITIONS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC

KAHULUI TOWN CENT

VIEW FROM KAMEHAMEHA AN



PROPOSED DEVELOPMENT

FIGURE 17o
ARCHITECTURAL DRAWINGS

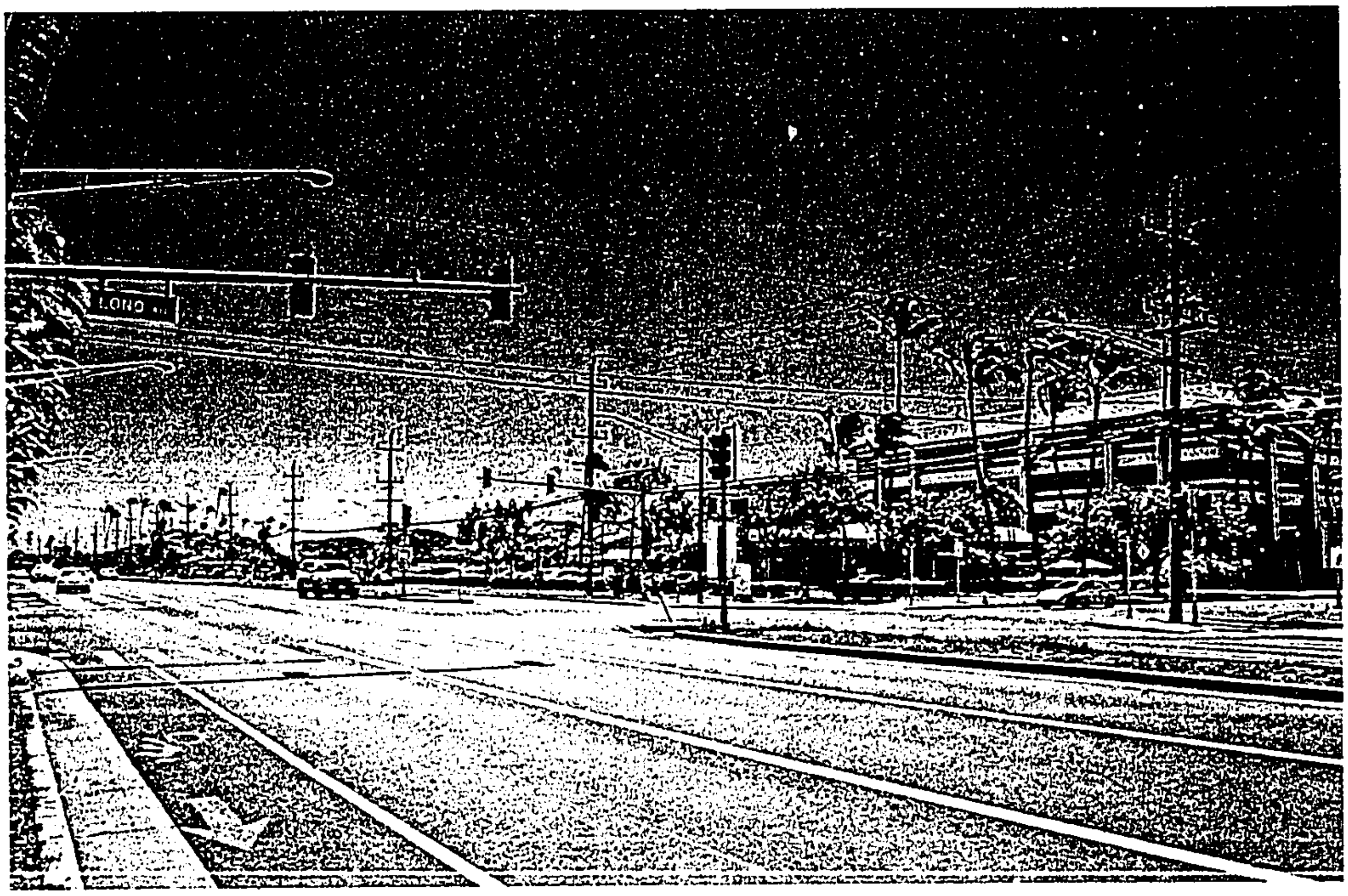
CENTER, MAUI

AMEHA AND LONO

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

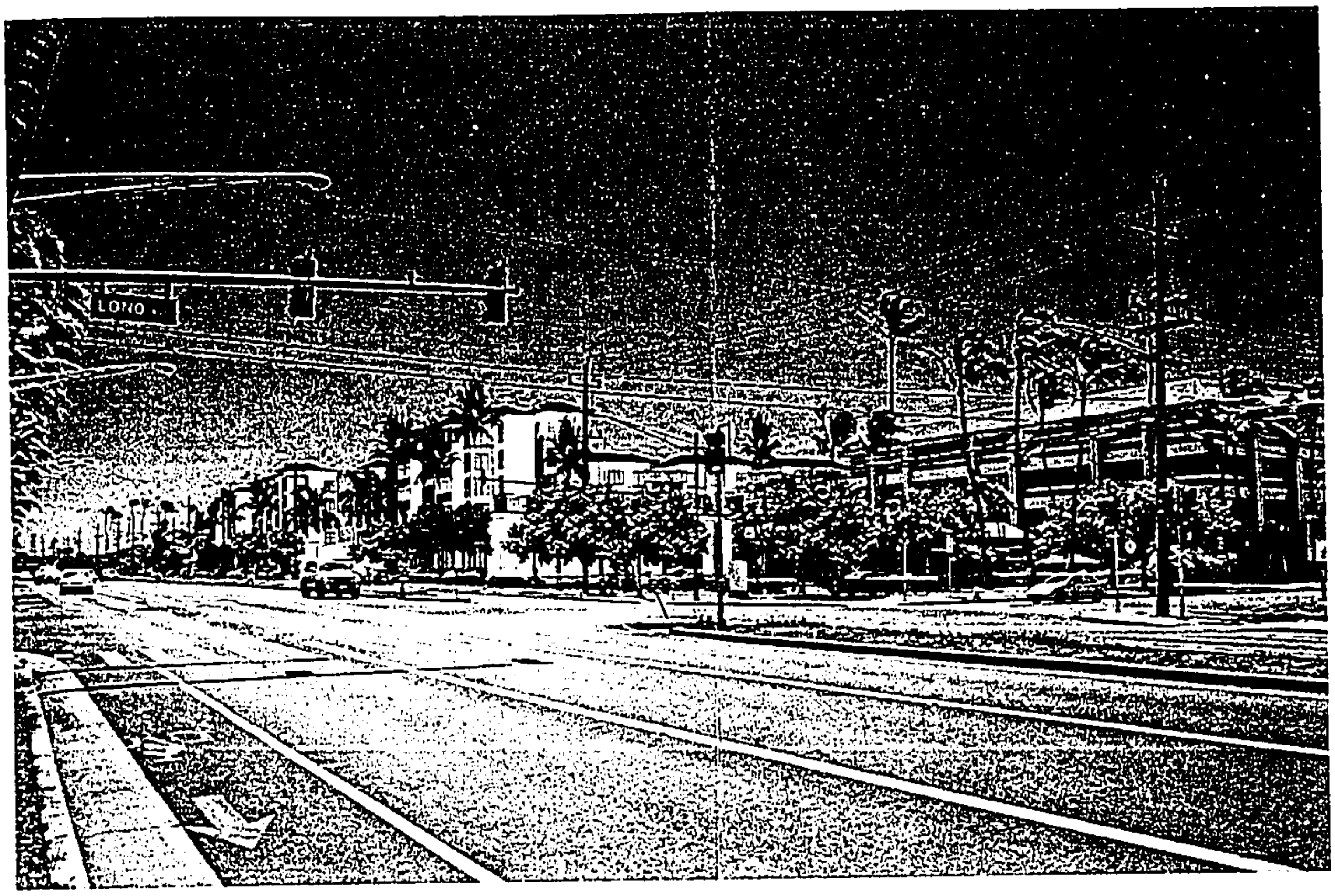


EXISTING CONDITIONS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC

KAHULUI TOWN CENT

VIEW FROM KAAHUMANU AND

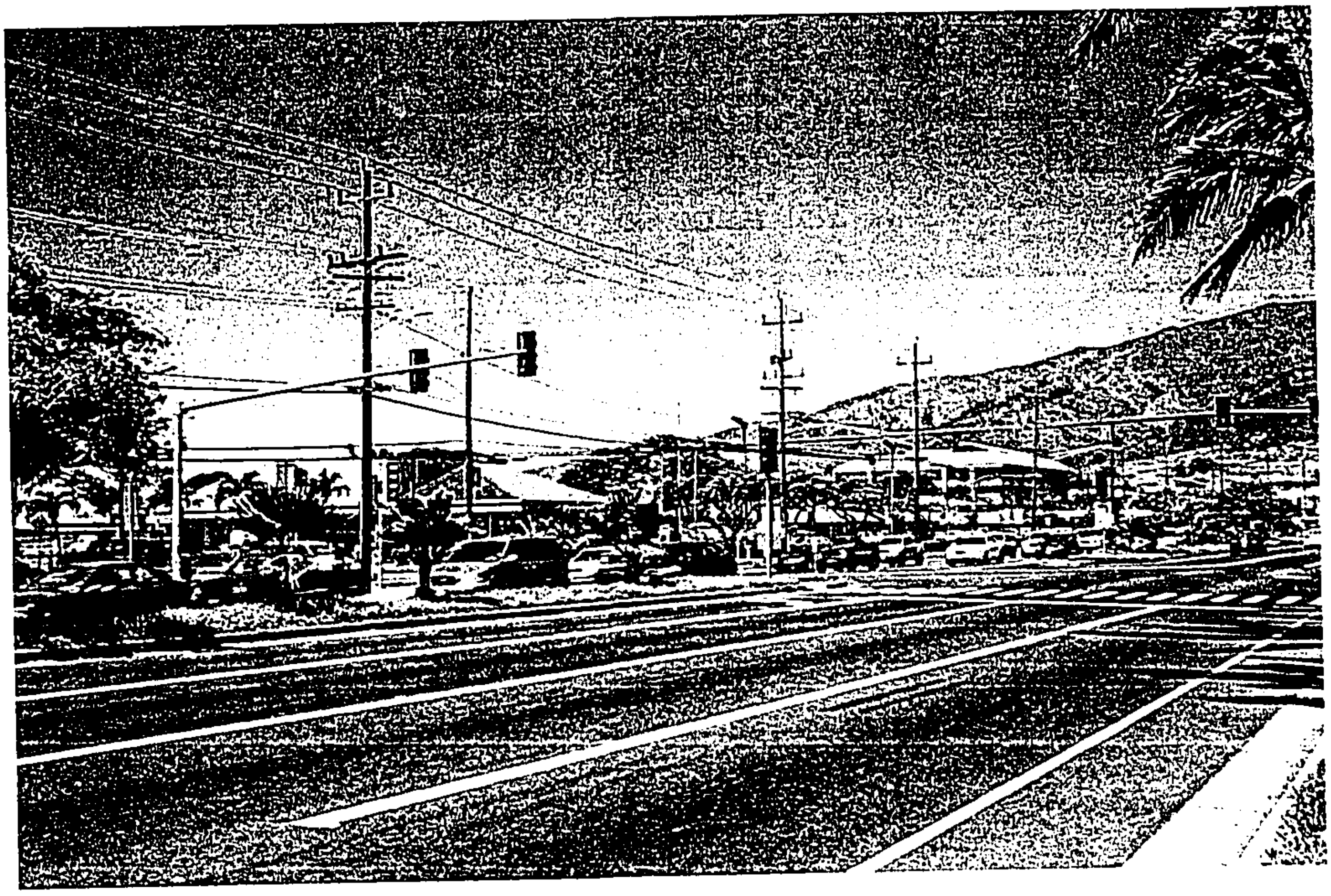


PROPOSED DEVELOPMENT

FIGURE 17p
ARCHITECTURAL DRAWINGS

CENTER, MAUI
MANU AND LONO

MC Architects Incorporated
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.
NGA
NGA HAWAII LLP
CHRIS HART & PARTNERS INC.

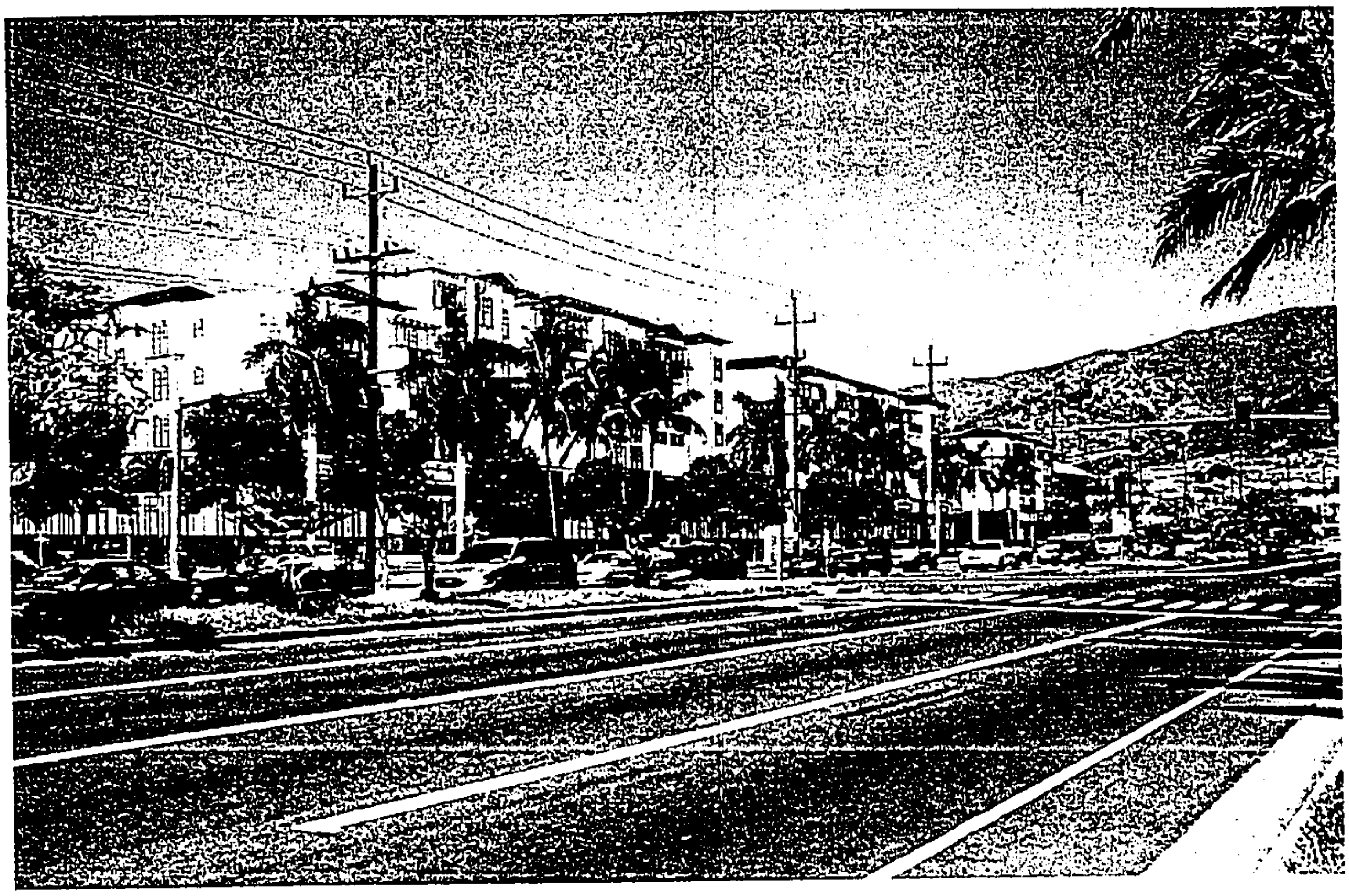


EXISTING CONDITIONS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC

KAHULUI TOWN CENT

VIEW FROM KAAHUMANU AND

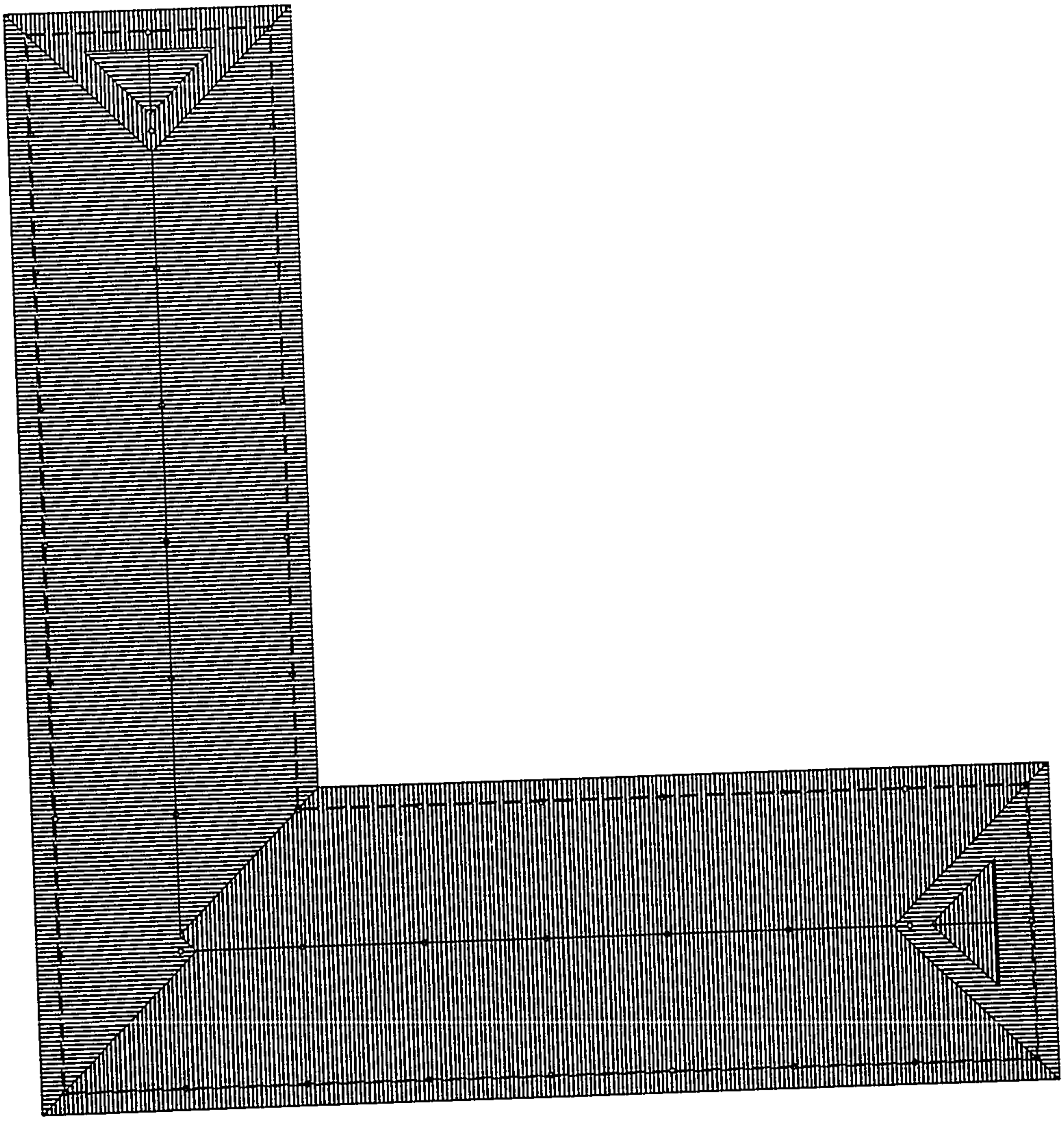


PROPOSED DEVELOPMENT

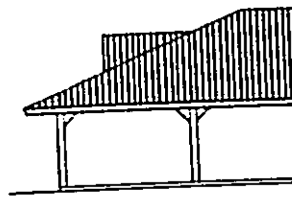
FIGURE 17q
ARCHITECTURAL DRAWINGS

CENTER, MAUI
ANU AND PUUNENE

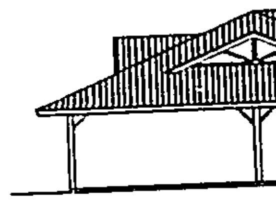
MC Architects Incorporated
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.
NGA HAWAII LLP
CHRIS HART & PARTNERS INC.



1 FARMER'S MARKET ROOF PLAN
30'=1'-0"



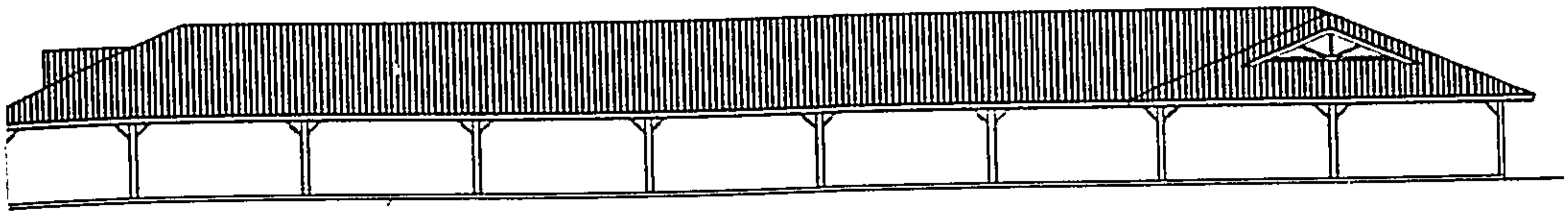
2 FARMER'S M



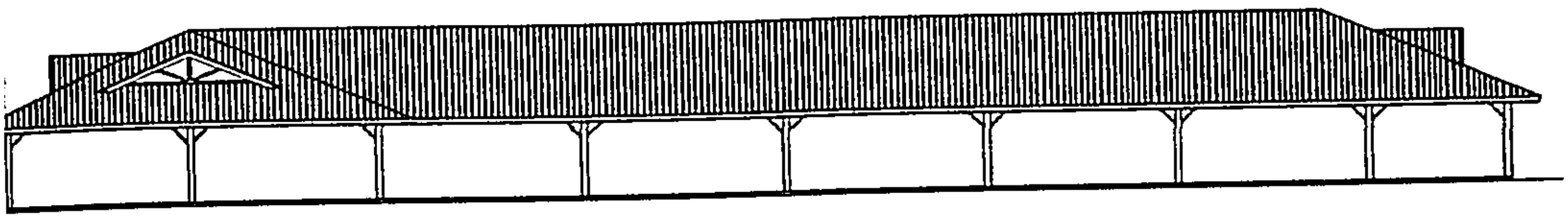
3 FARMER'S

KAHULUI TOWN CEN

A&B PROPERTIES, INC.



2 FARMER'S MARKET TOWN CENTER DRIVE ELEVATION



3 FARMER'S MARKET KINAU AVENUE EXTERIOR ELEVATION

FIGURE 17r
ARCHITECTURAL DRAWINGS

N CENTER, MAUI

Mc Architects

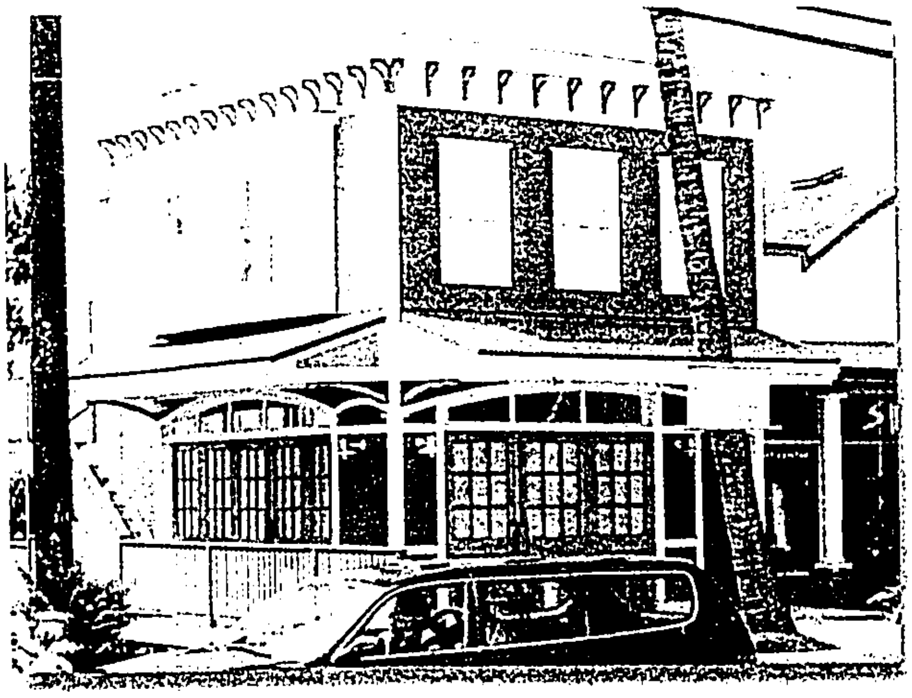
LESLIE LIPPICH
ARCHITECT & ASSOCIATES INC.

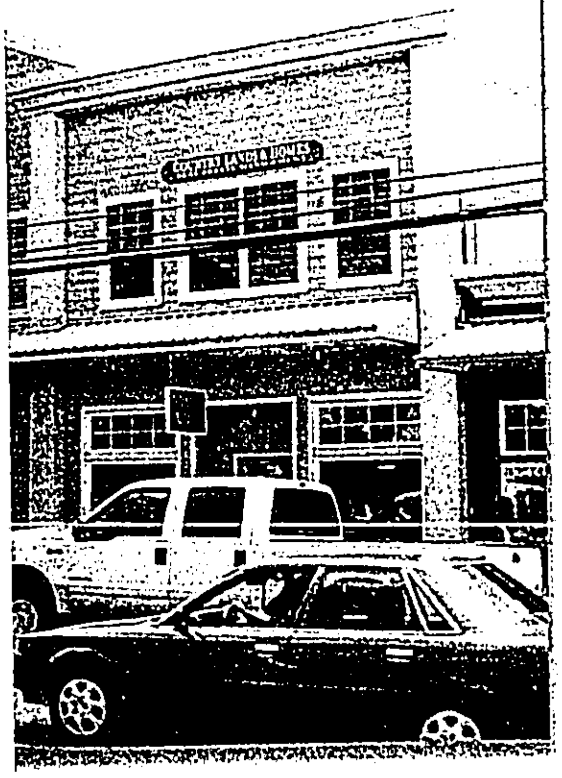
NGA HAWAII LLP

CHRIS HART

Mc Architects

ARCHITECTURAL CHA





, CHARACTER

APRIL 2006

FIGURE 17s
ARCHITECTURAL DRAWINGS

Mc Architects

ARCHITECTURAL CHAR

CHARACTER

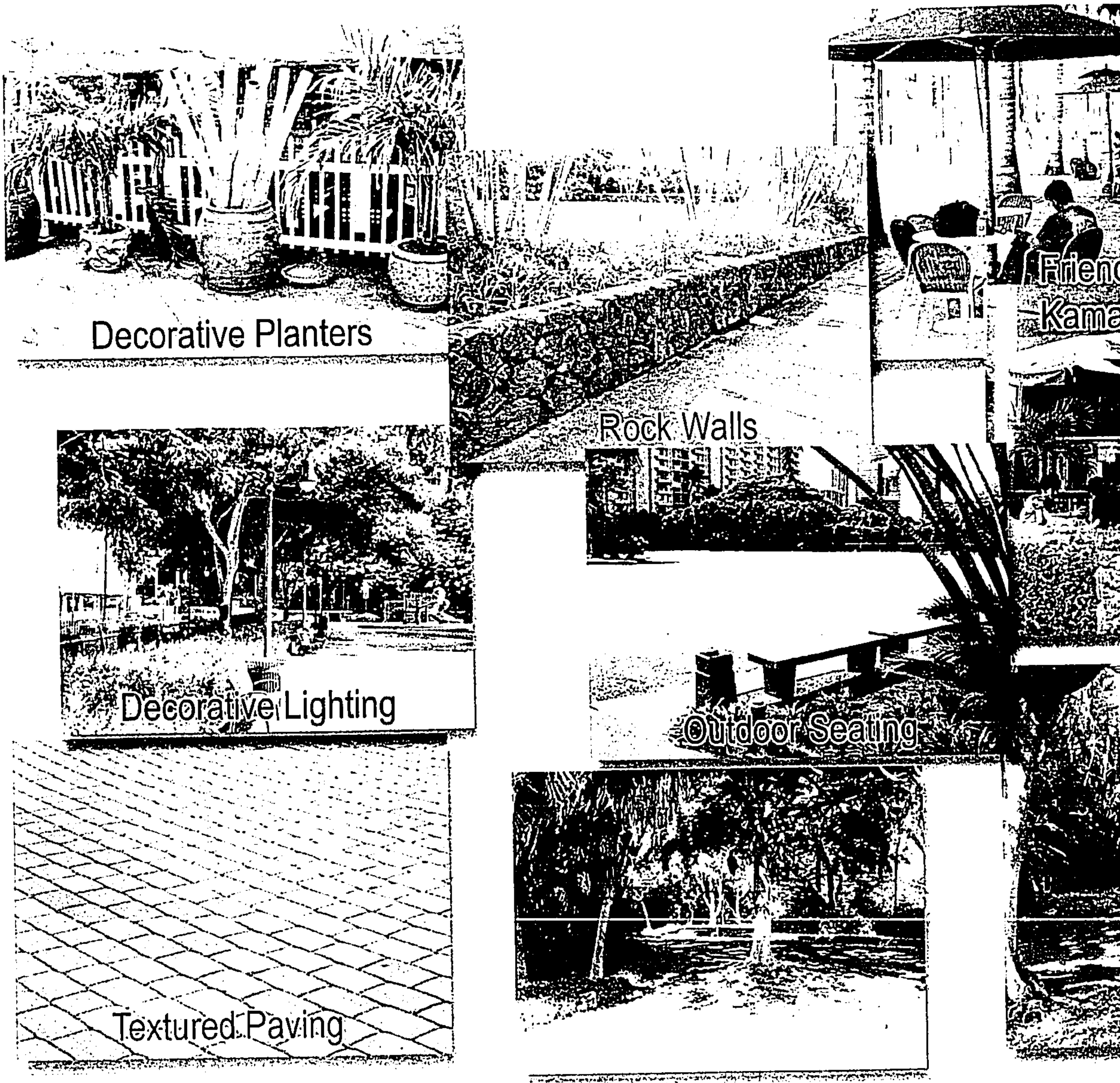
NGA

CHRIS HART

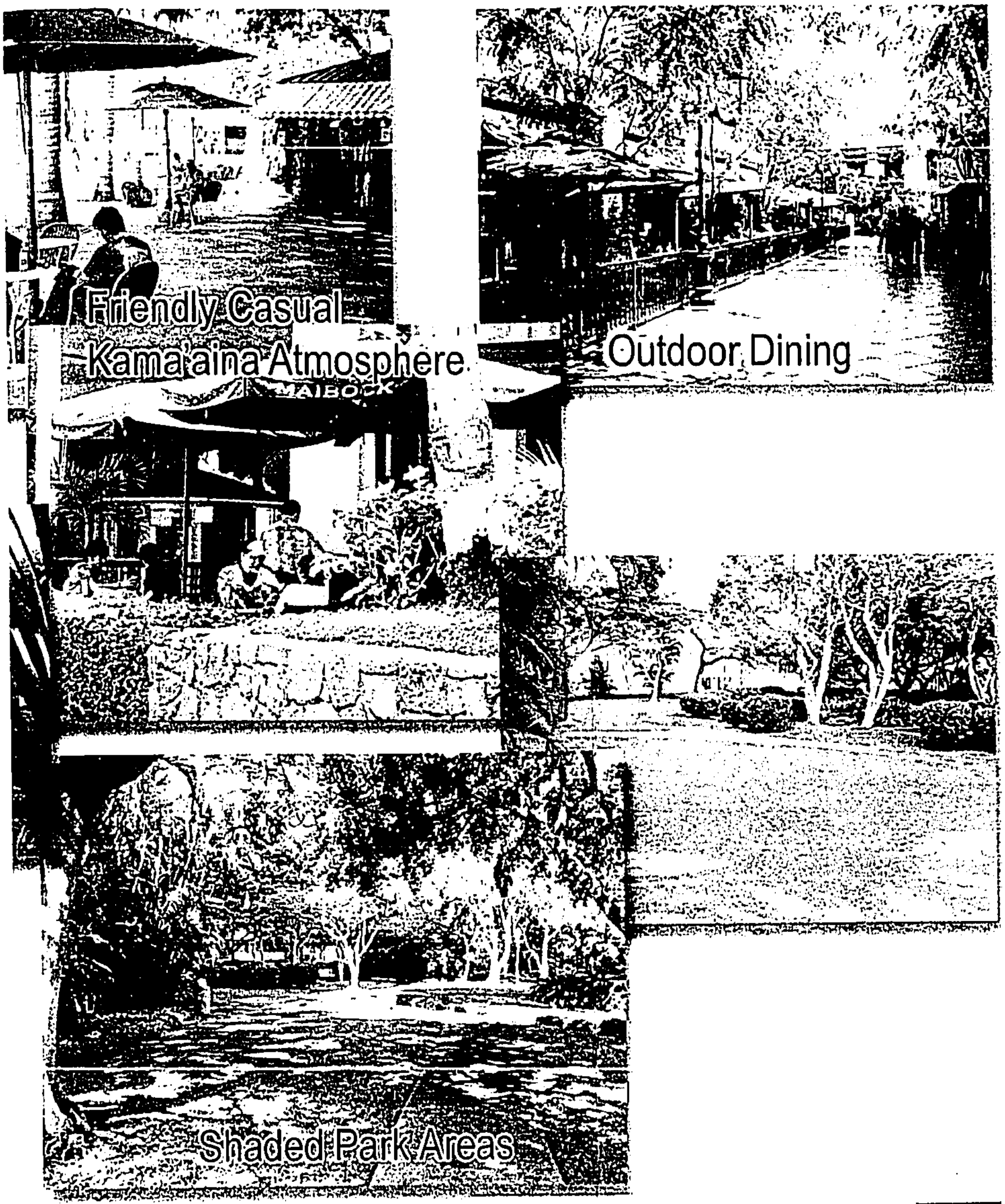
APRIL 2006

FIGURE 17t

ARCHITECTURAL DRAWINGS



PROJECT AMEN

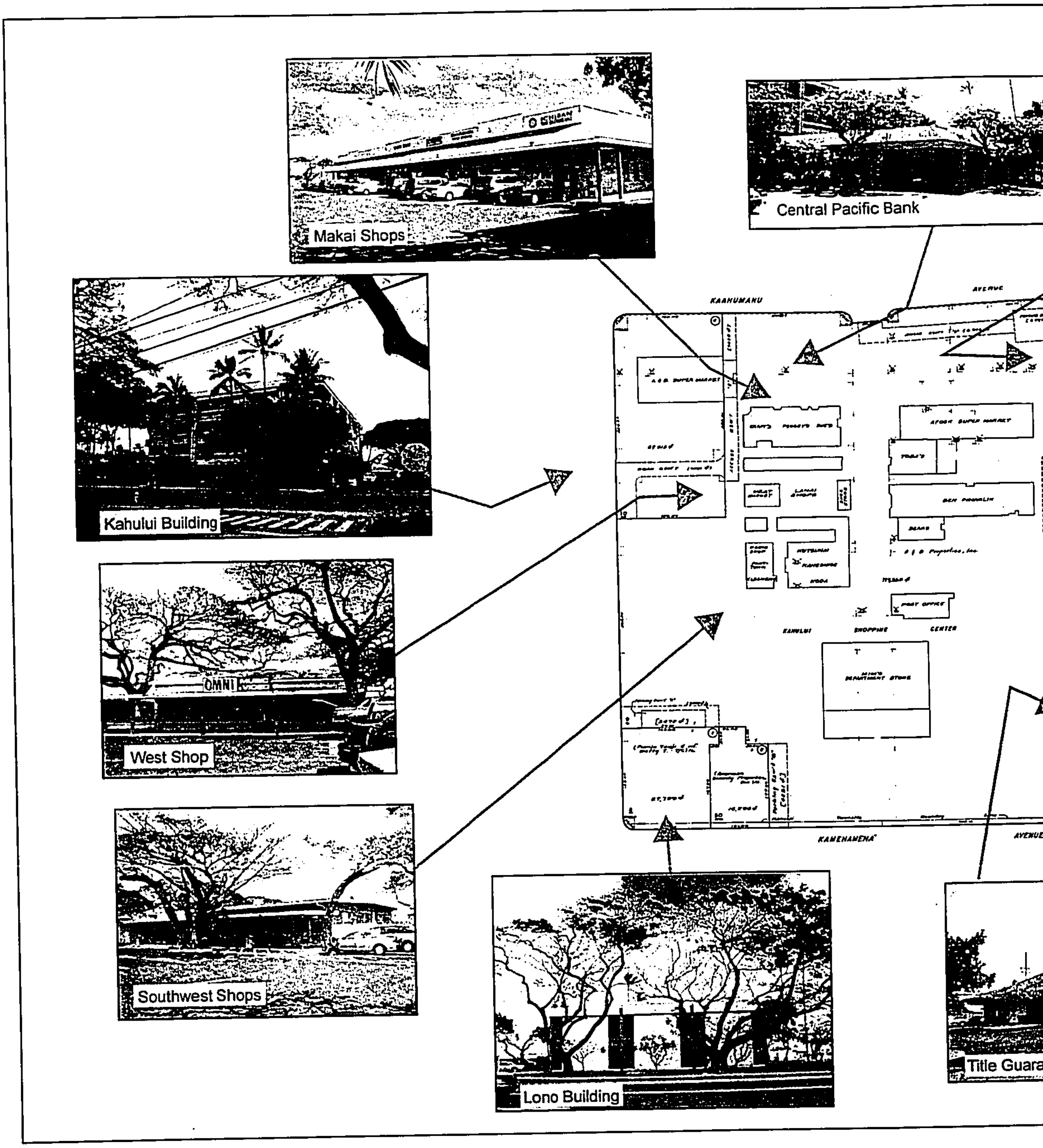


AMENITIES

APRIL 2006

FIGURE 17u

ARCHITECTURAL DRAWINGS



Makai Shops
Central Pacific Bank
Kahului Building
OMNI
West Shop
Southwest Shops
Lono Building
KAAHUMANU
AVENUE
KAMEHAMEHA
KAHULUI
SHOPPING
CENTER

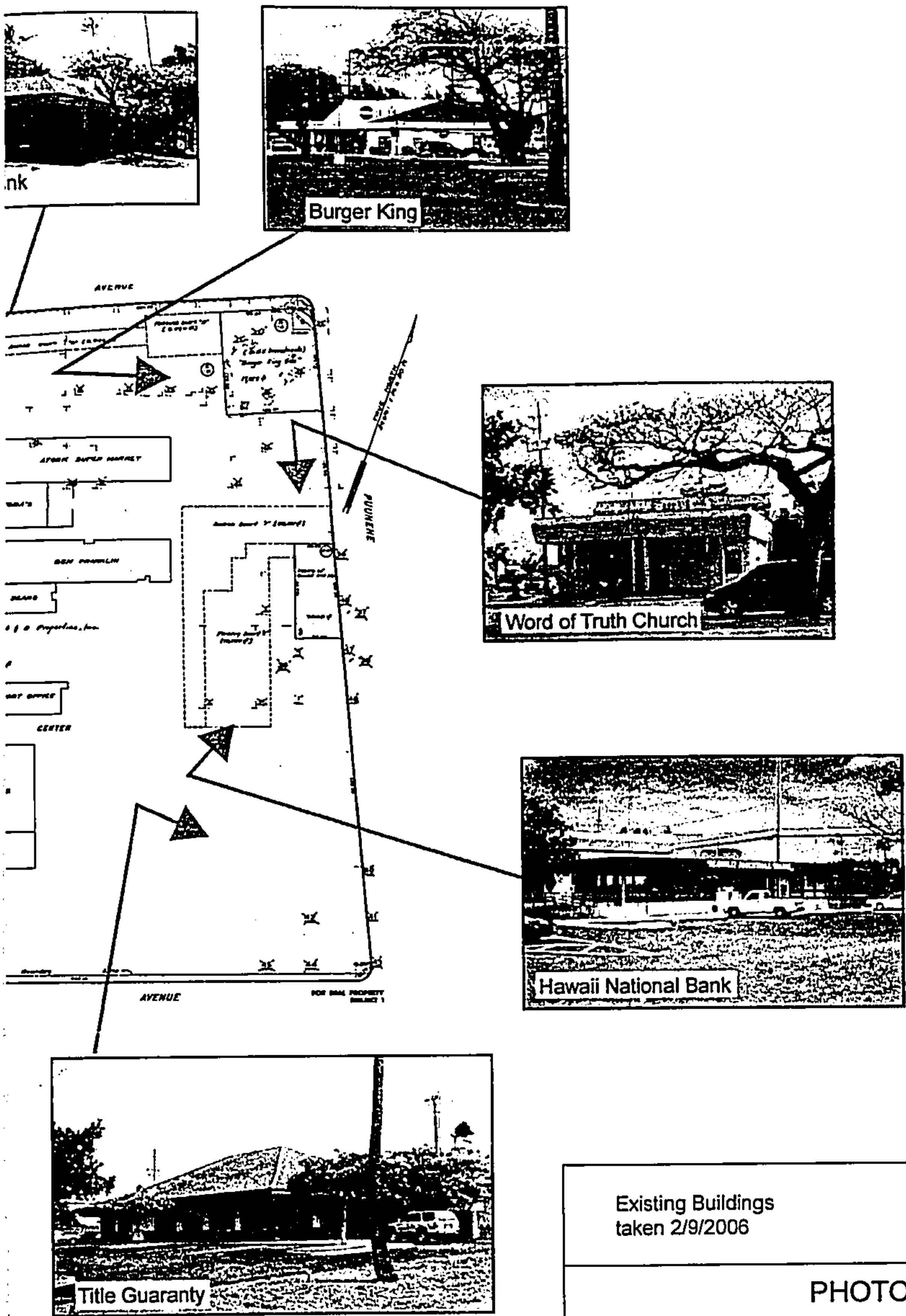


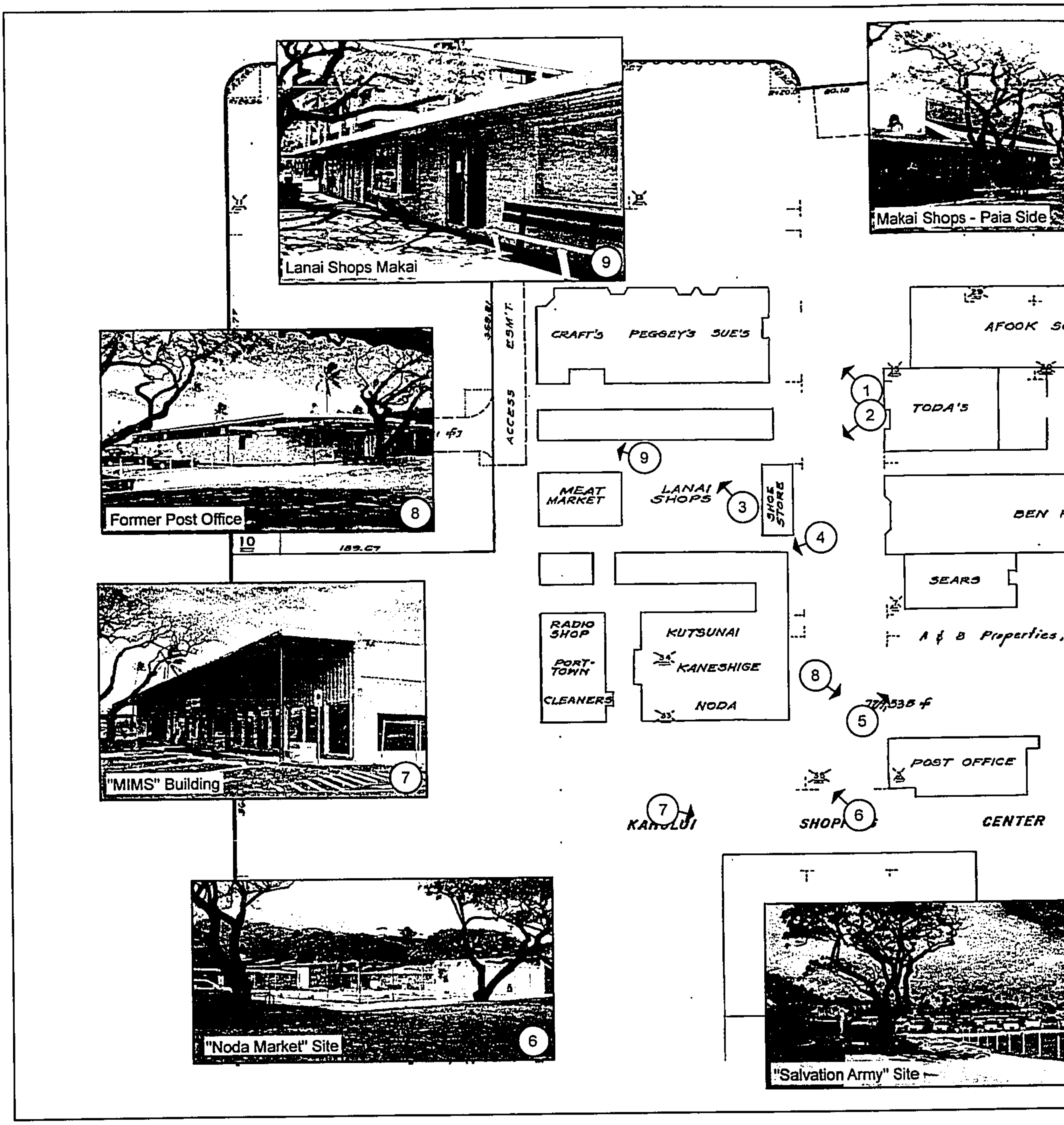
FIGURE 18.a

Existing Buildings
taken 2/9/2006

MARCH
2006

PHOTOGRAPHS
Kahului Town Center

CHRIS HART & PARTNERS, INC.


Lanai Shops Makai
Makai Shops - Paia Side
Former Post Office
"MIMS" Building
"Noda Market" Site
"Salvation Army" Site
CRAFT'S
PEGGEY'S
SUE'S
AFOOK
TODA'S
ACCESS
ESM'T.
358.81
189.67
10
MEAT MARKET
LANAI SHOPS
SHOE STORE
BEN
SEARS
A & B Properties,
RADIO SHOP
PORT-TOWN
CLEANERS
KUTSUNAI
KANESHIGE
NODA
POST OFFICE
CENTER

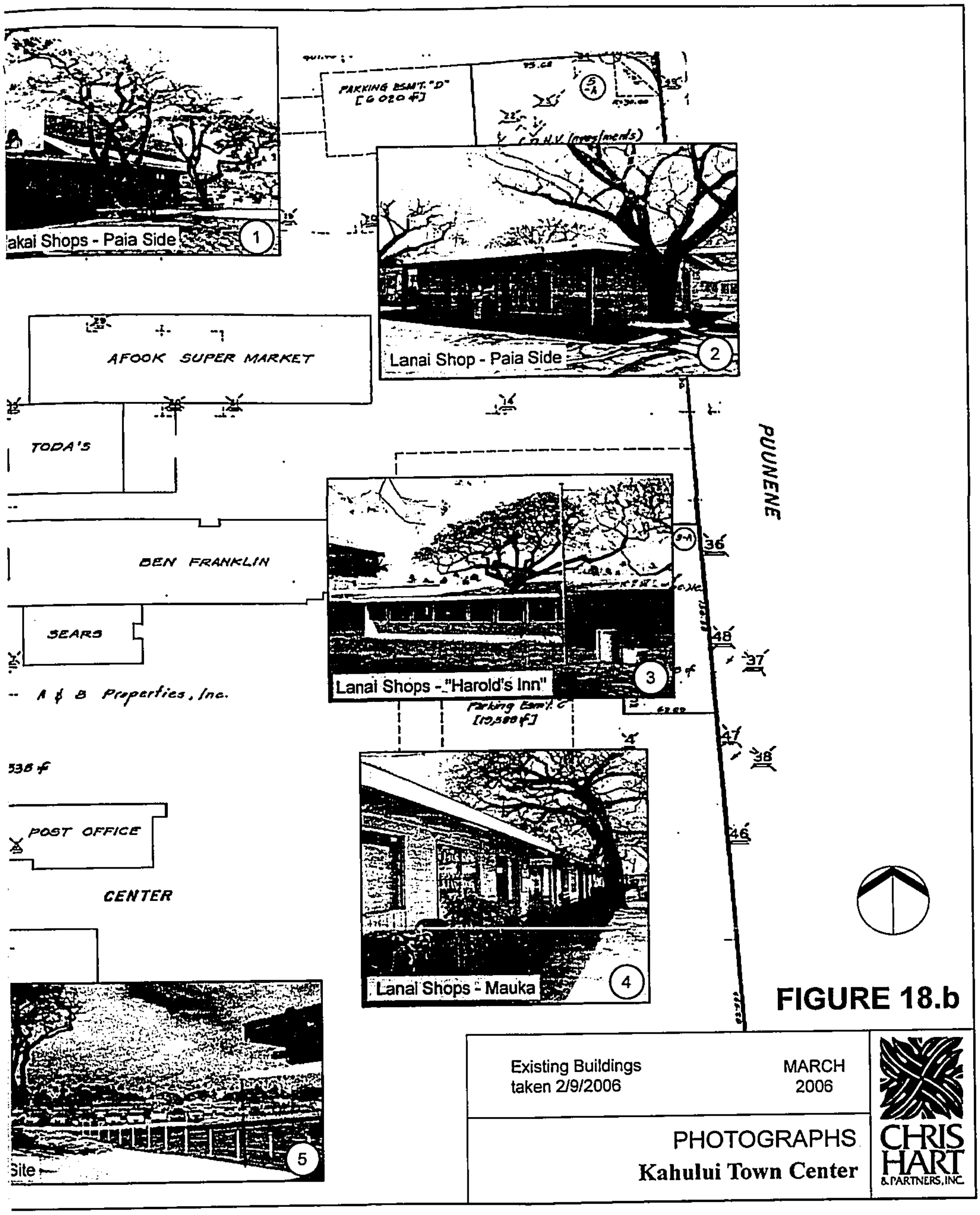


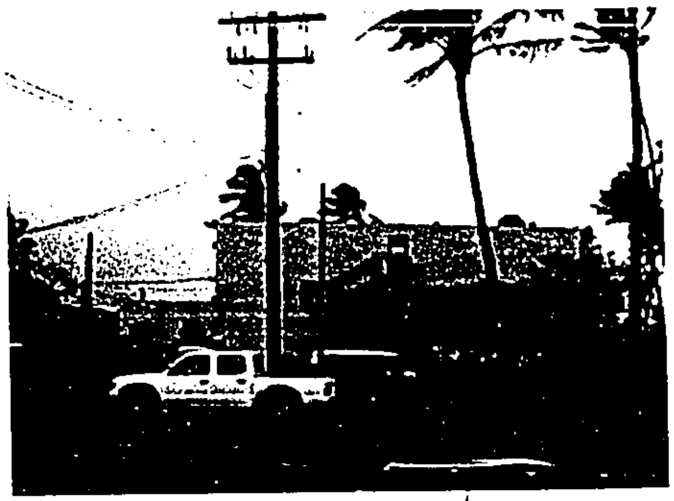
FIGURE 18.b

Existing Buildings
taken 2/9/2006

MARCH
2006

PHOTOGRAPHS
Kahului Town Center

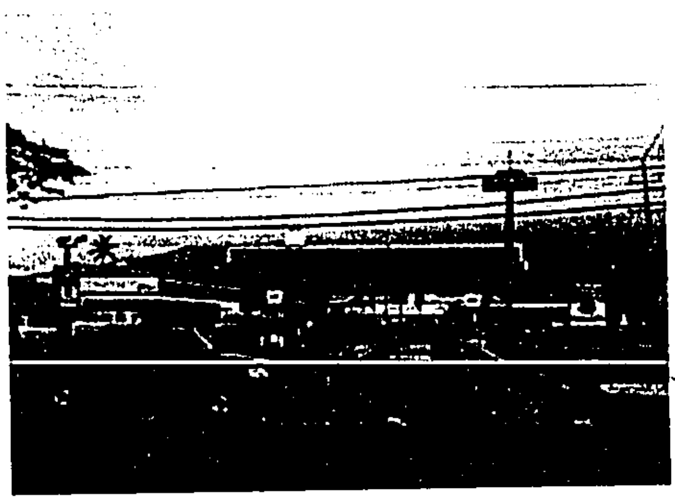
CHRIS HART & PARTNERS, INC.



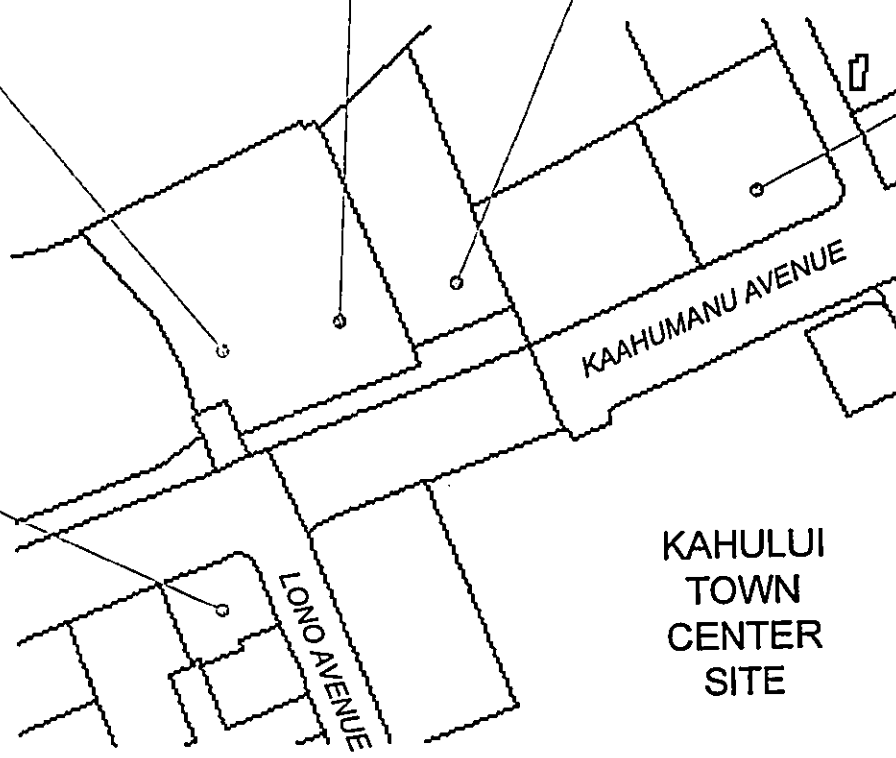
Maui Seaside Hotel

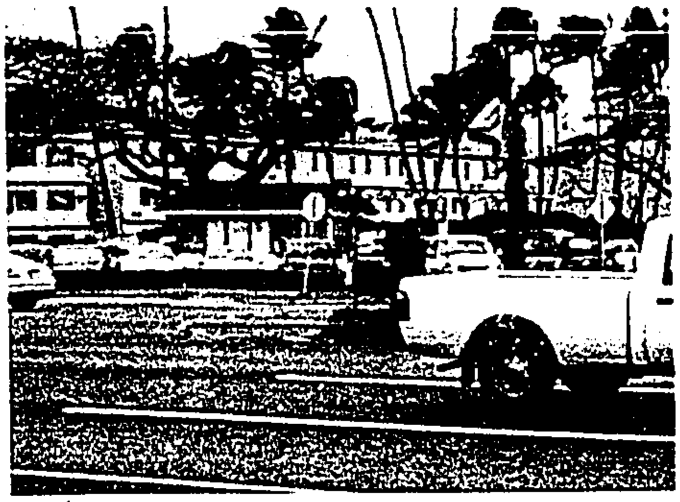
Use

Maui Seaside Hotel

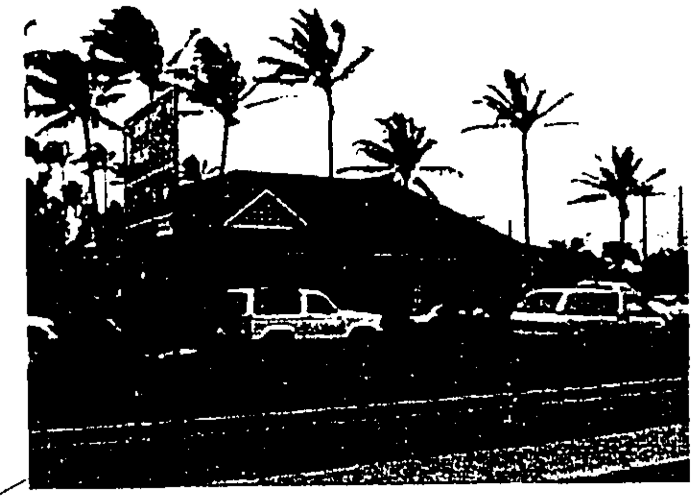


Kitagawa's Gas Station





Used Car Sales Office



First Hawaiian Bank

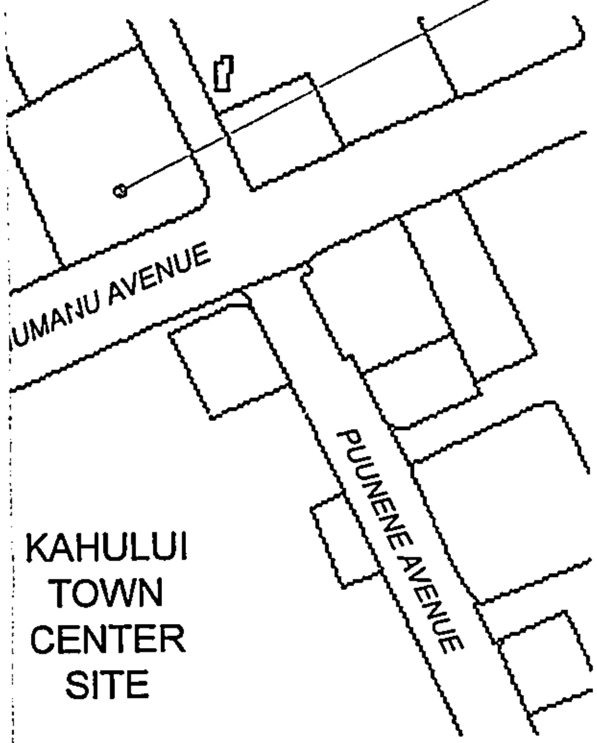
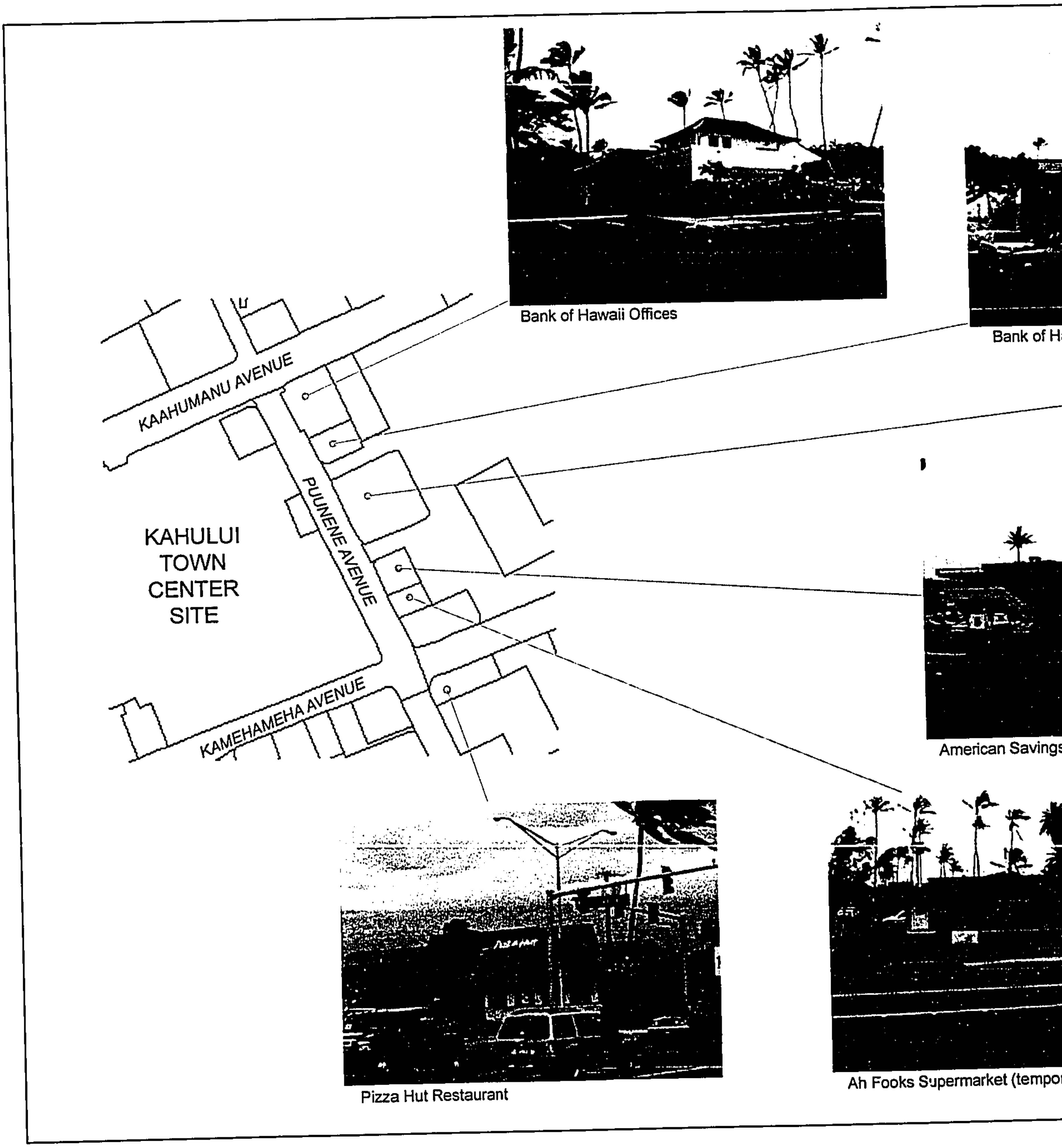


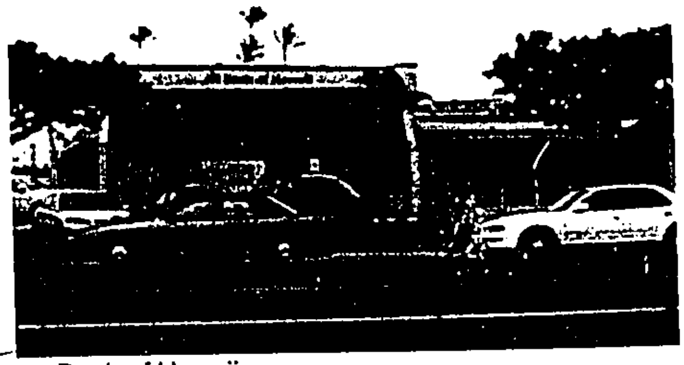
FIGURE 18.c

APRIL
2006

PHOTOGRAPHS
Kahului Town Center

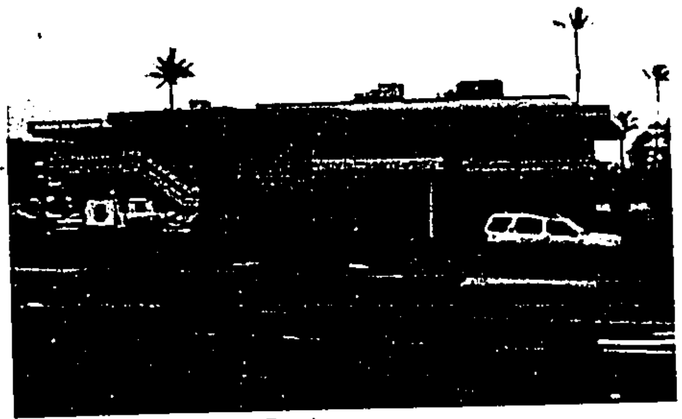
CHRIS HART & PARTNERS, INC.


KAAHUMANU AVENUE
PUUNENE AVENUE
KAMEHAMEHA AVENUE
KAHULUI
TOWN
CENTER
SITE
Bank of Hawaii Offices
Bank of H
American Savings
Pizza Hut Restaurant
Ah Fooks Supermarket (tempor

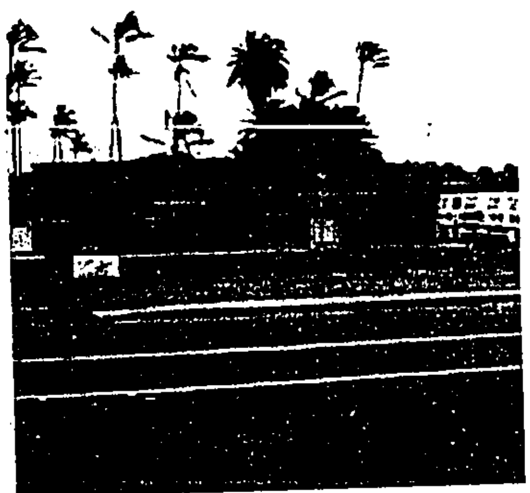


Bank of Hawaii

Maui Clinic Medical Center



American Savings Bank



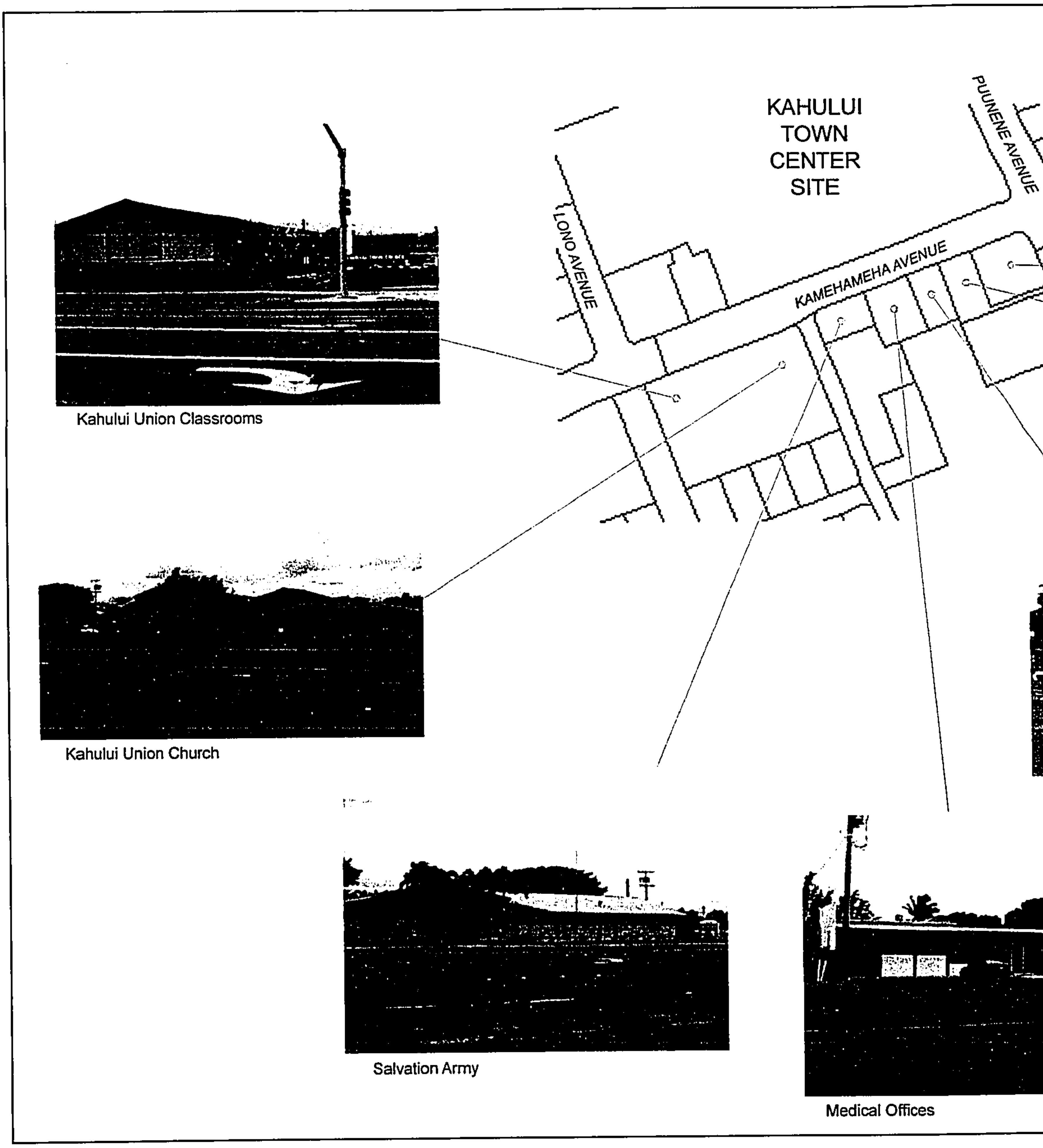
Supermarket (temporary location)

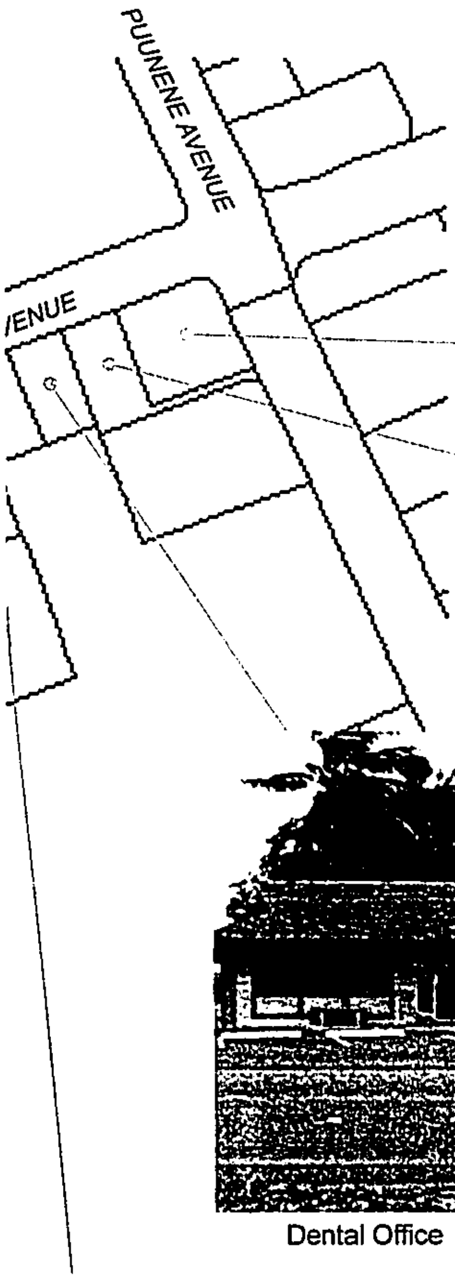
FIGURE 18.d

APRIL
2006

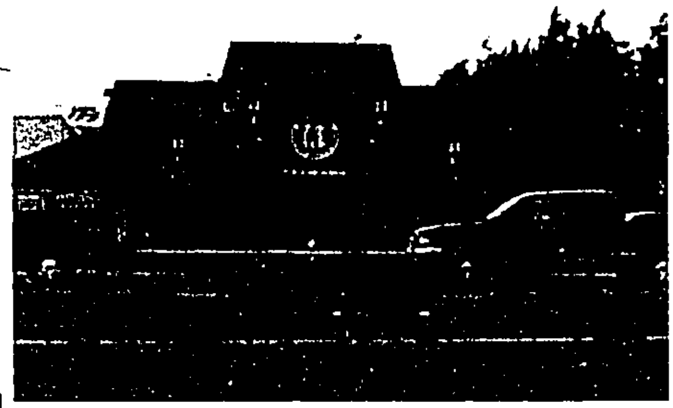
PHOTOGRAPHS
Kahului Town Center

CHRIS HART & PARTNERS, INC.


KAHULUI
TOWN
CENTER
SITE
PUUNENE AVENUE
LONO AVENUE
KAMEHAMEHA AVENUE
Kahului Union Classrooms
Kahului Union Church
Salvation Army
Medical Offices

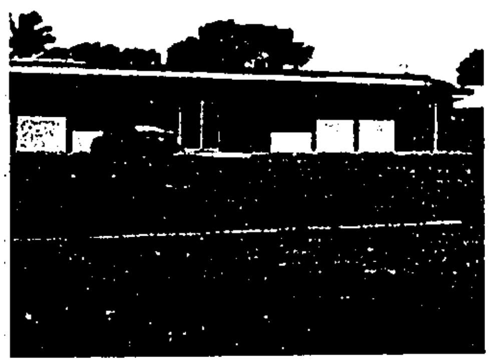


Aloha Shell Station



Kahului Credit Union

Dental Office



ces

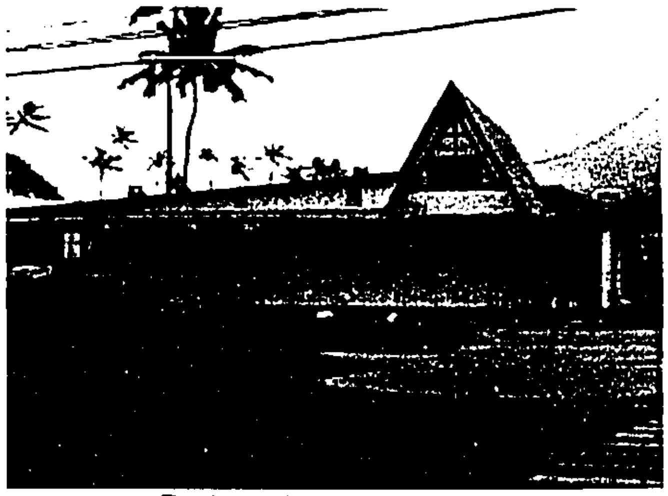
FIGURE 18.e

APRIL
2006

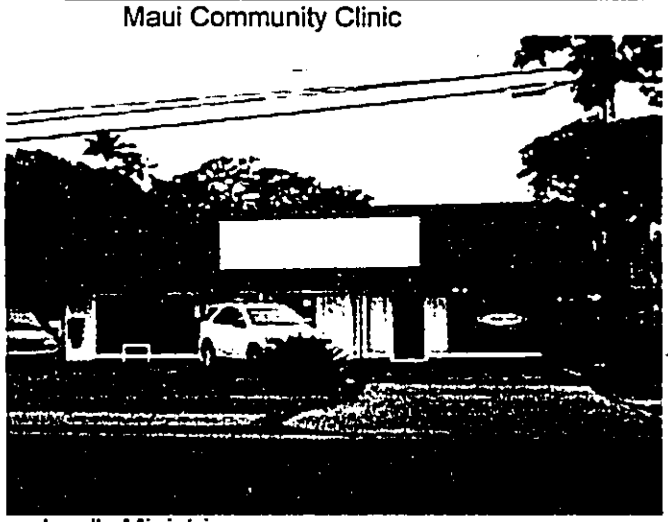
PHOTOGRAPHS
Kahului Town Center

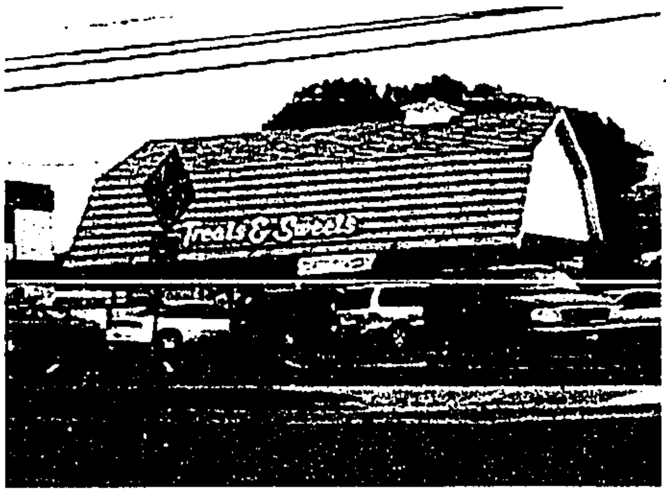
CHRIS HART & PARTNERS, INC.


Maui Community Clinic


Restaurant


Island D

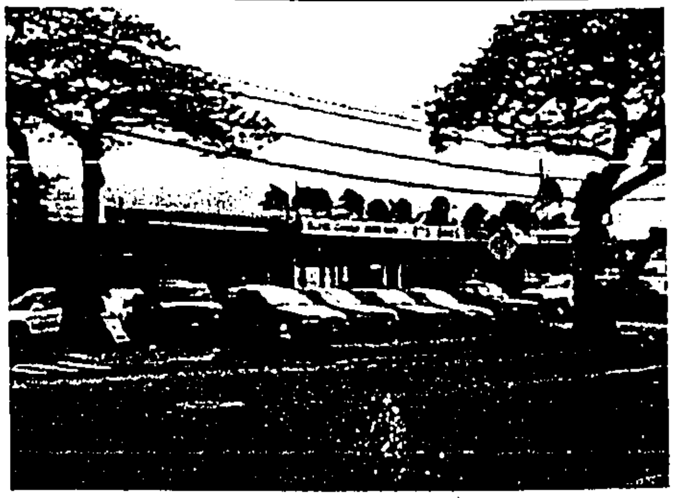

Lord's Ministries



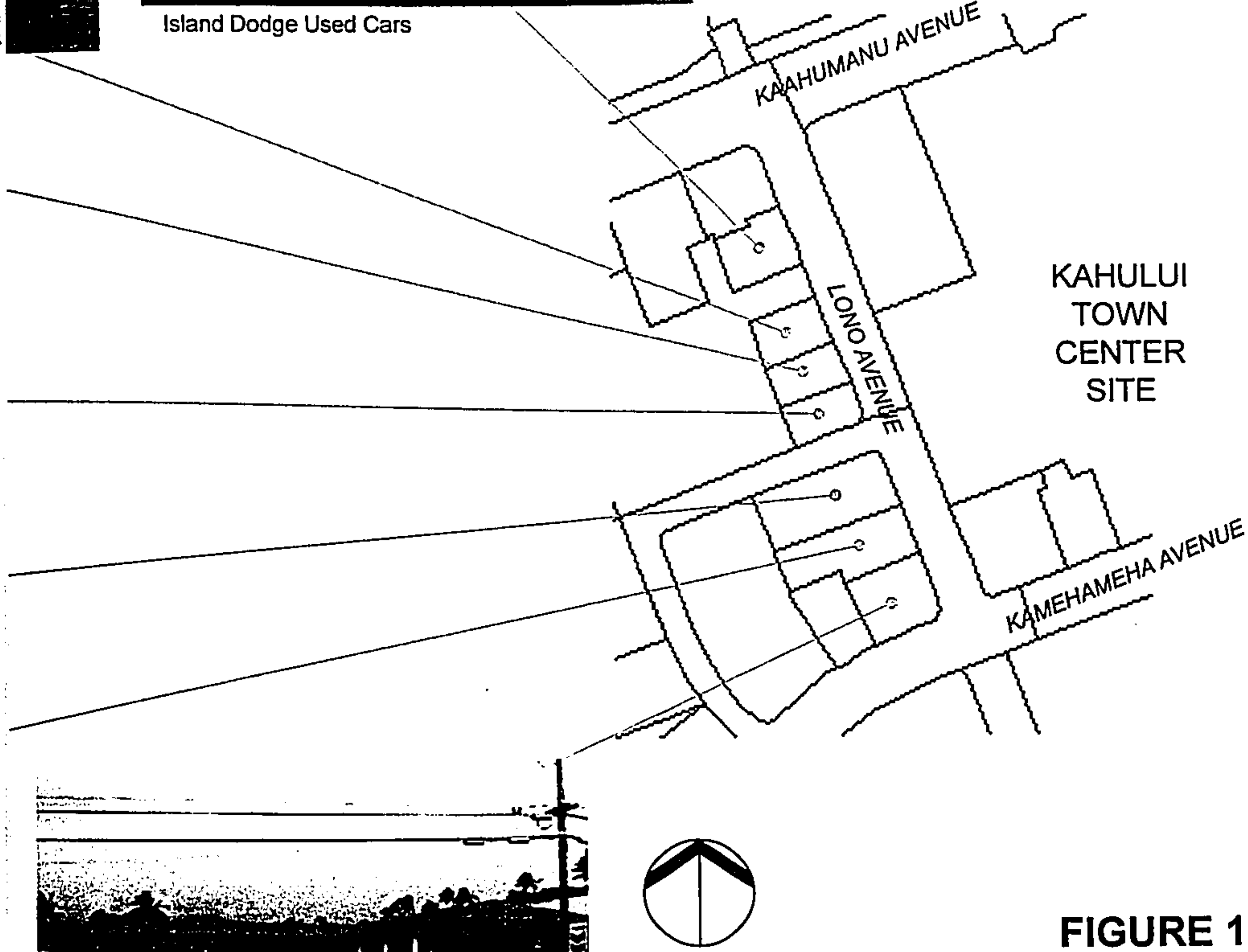
Treats & Sweets


74 Lono Avenue Offices


Kamehameha C



Island Dodge Used Cars



Kamehameha Chevron

FIGURE 18.f

APRIL
2006

PHOTOGRAPHS
Kahului Town Center

CHRIS HART & PARTNERS, INC.

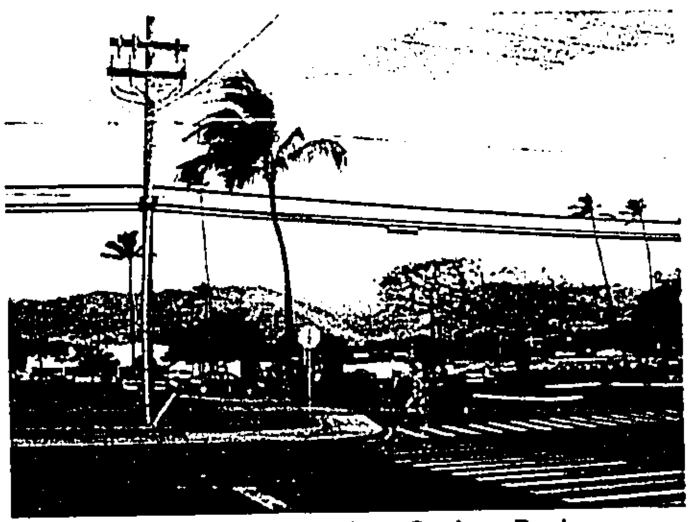


Photo V1: View from American Savings Bank parking lot.

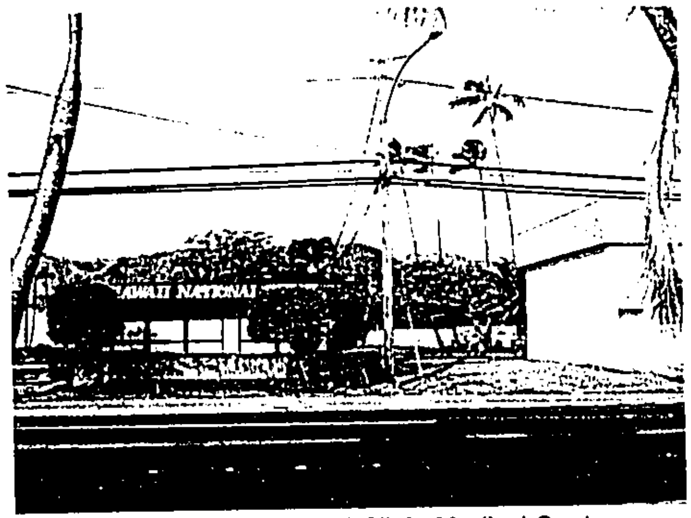


Photo V2: View from Maui Clinic Medical Center.

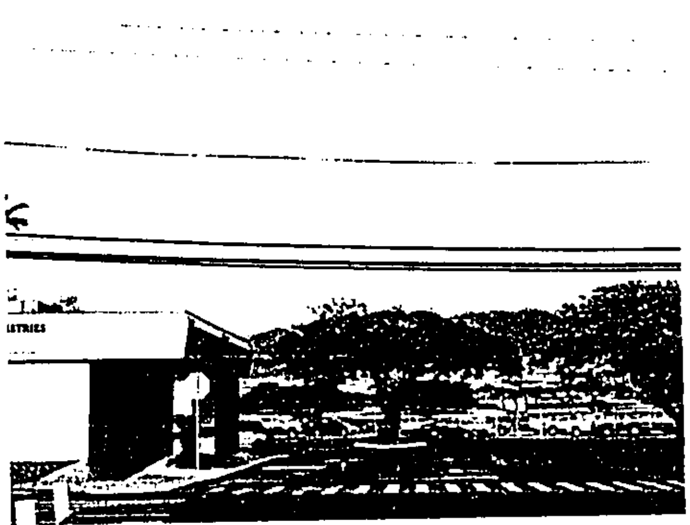
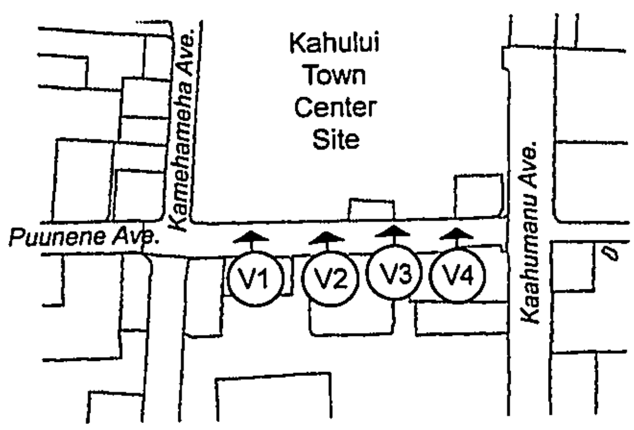


Photo V3: View from Bank of Hawaii driveway.

Photo V4: View from Bank of Hawaii office driveway.



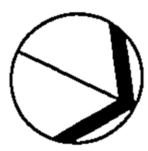
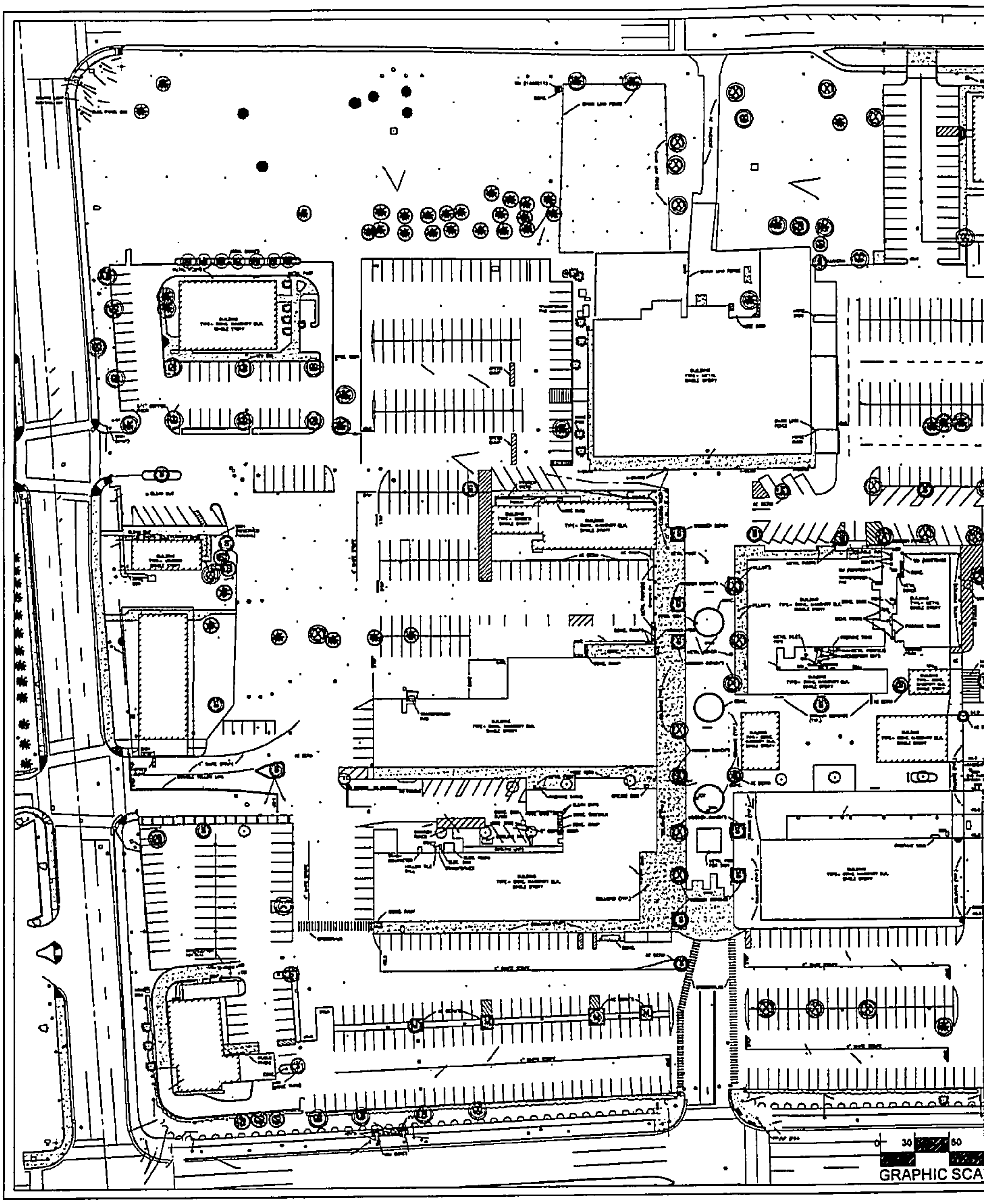


FIGURE 18.g

Views from Puunene Avenue toward the West Maui Mountains	APRIL 2006
PHOTOGRAPHS	
Kahului Town Center	

CHRIS HART & PARTNERS, INC.


0 30 60
GRAPHIC SCA

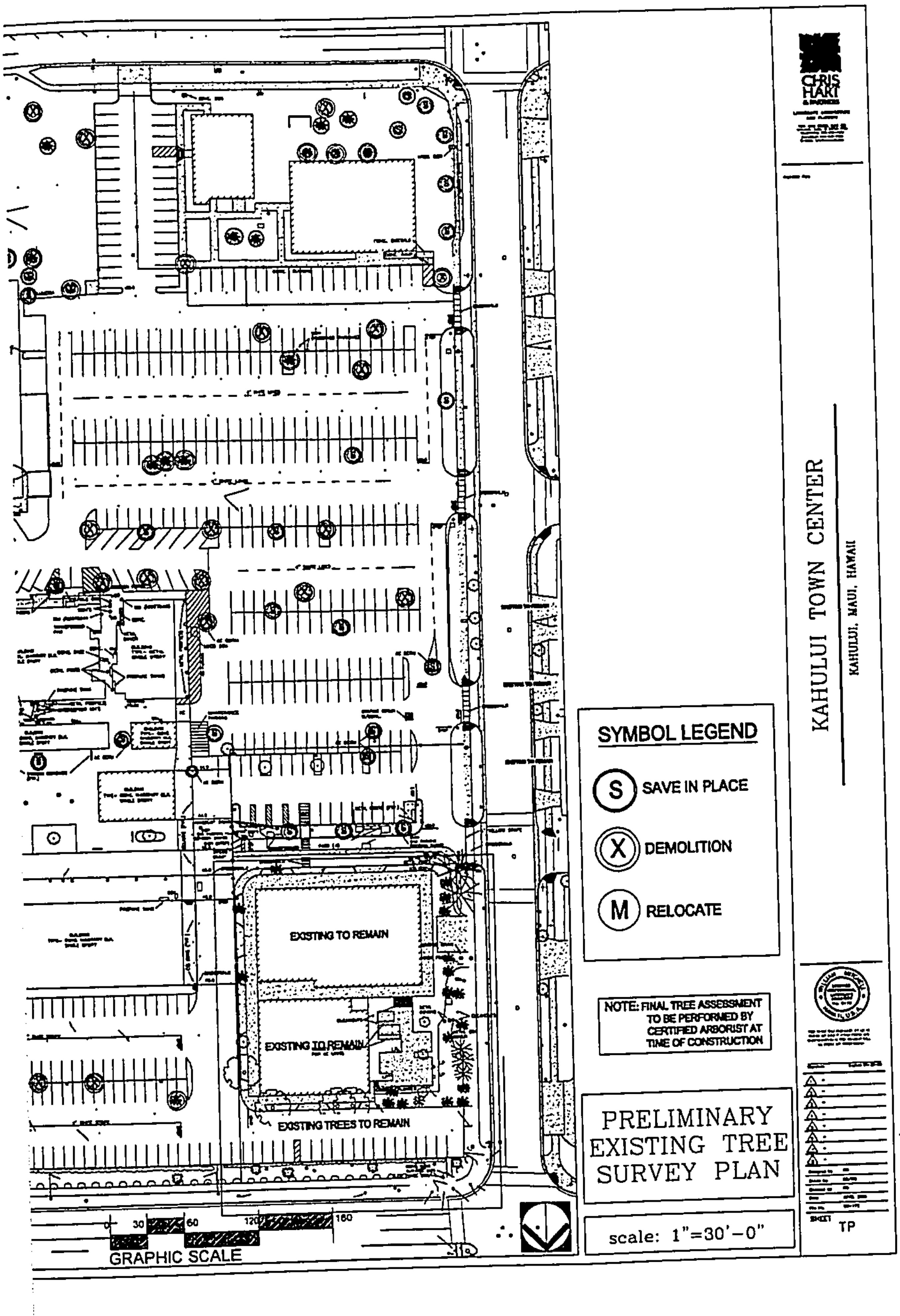
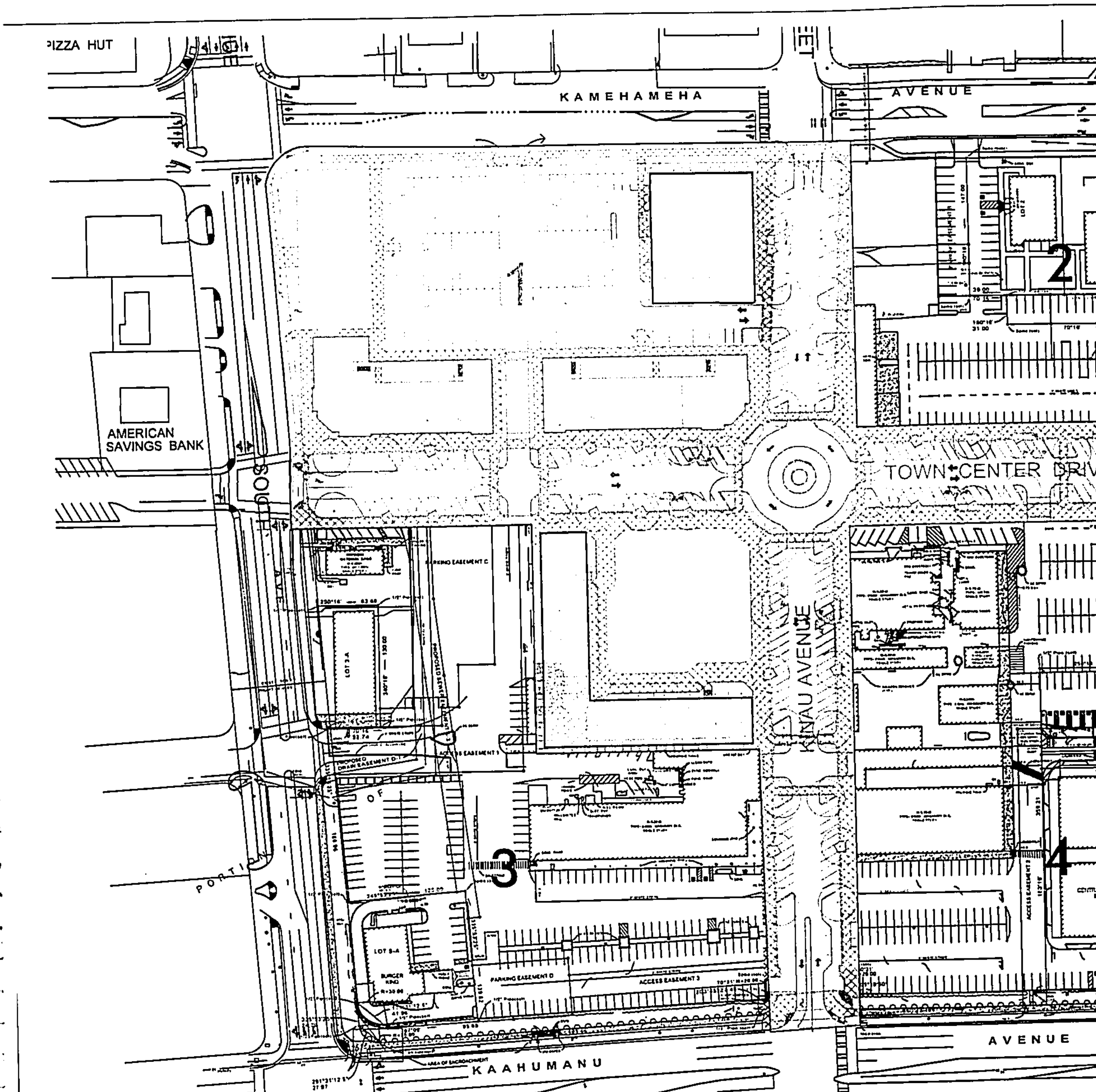

CHRIS HART
KAHULUI TOWN CENTER
KAHULUI, MAUI, HAWAII
SYMBOL LEGEND
S SAVE IN PLACE
X DEMOLITION
M RELOCATE
NOTE: FINAL TREE ASSESSMENT TO BE PERFORMED BY CERTIFIED ARBORIST AT TIME OF CONSTRUCTION
PRELIMINARY EXISTING TREE SURVEY PLAN
scale: 1"=30'-0"
EXISTING TO REMAIN
EXISTING TO REMAIN
EXISTING TREES TO REMAIN
30
60
120
160
GRAPHIC SCALE
TP

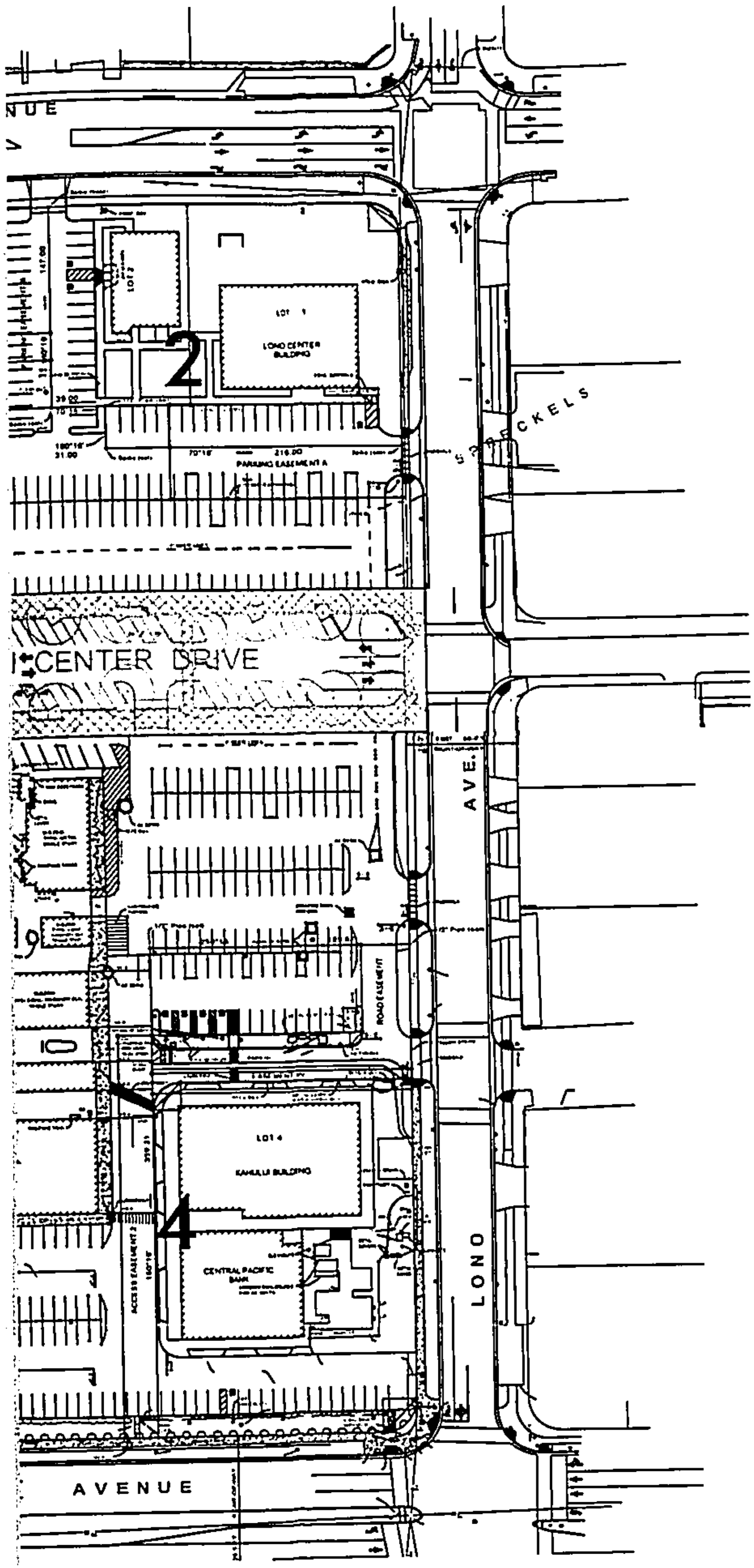
FIGURE 19



A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

KAHULUI TOWN CENTE

SITE PLAN



PHASE I
YR 2008

CONSTRUCTION AREA

TEMPORARY FARMER'S MARKET STRUCTURES

STAGING AREA

I CENTER, MAUI

PLAN

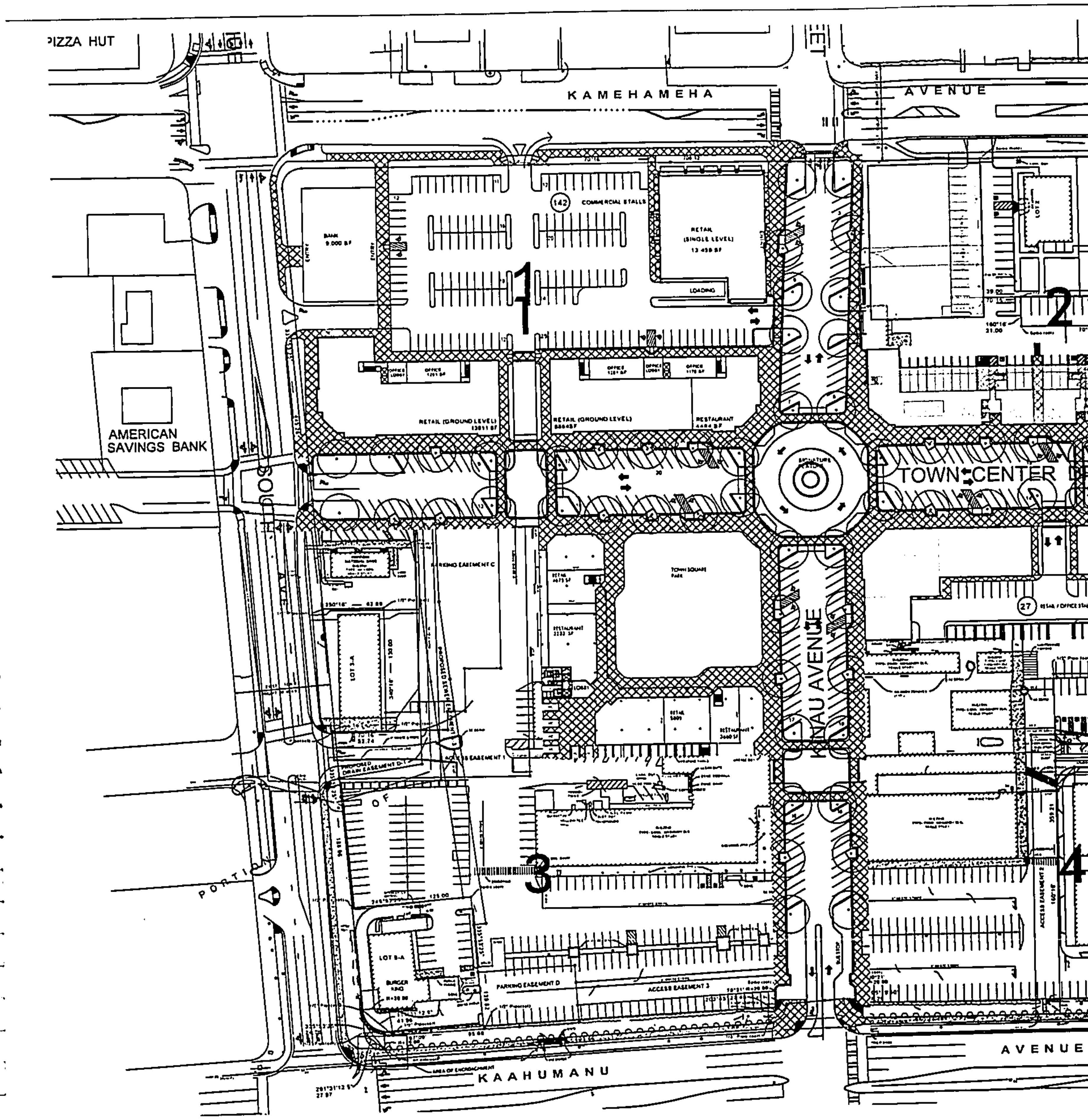
FIGURE 20a

Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

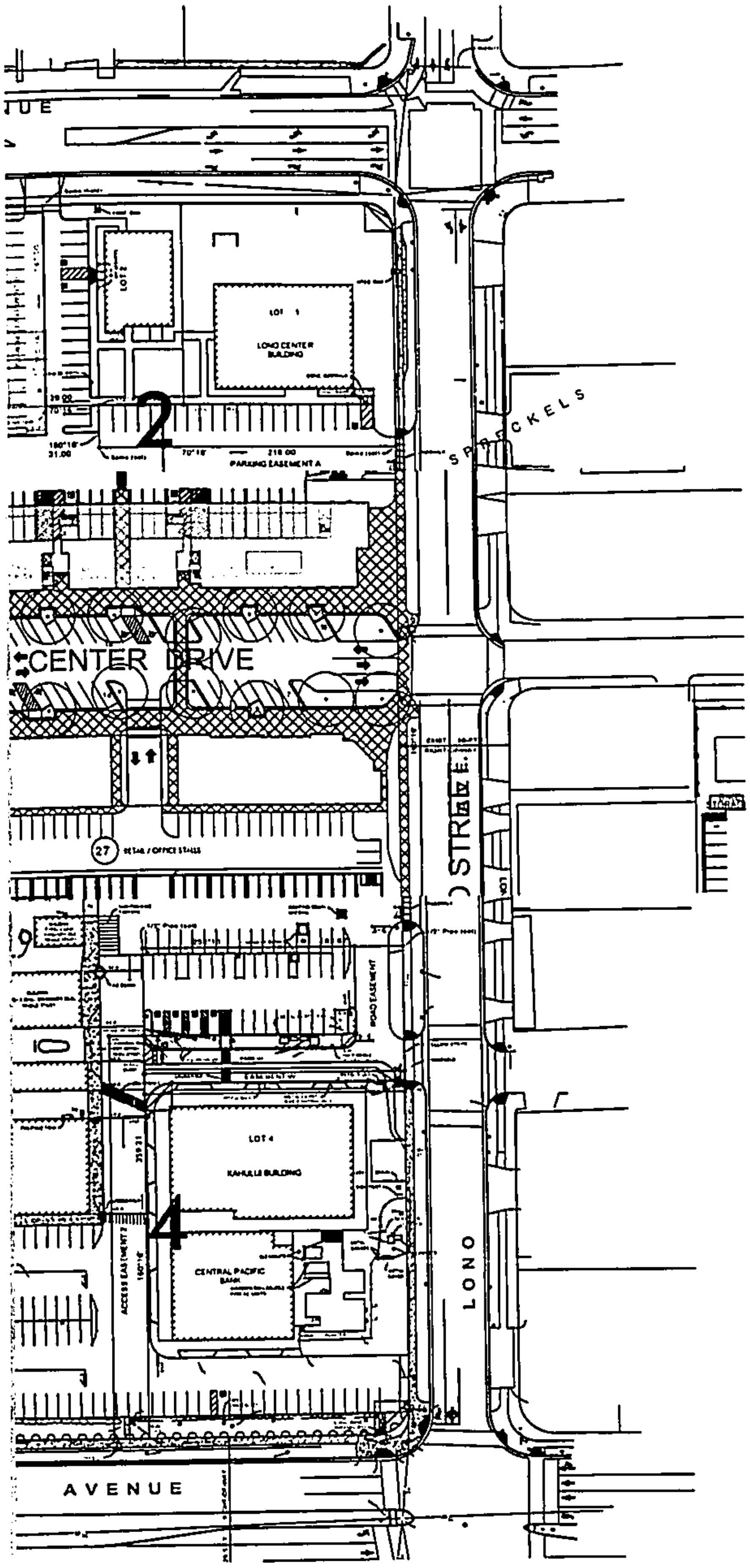


KAHULUI TOWN CENT

SITE PLAN

A&B PROPERTIES, INC.

A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.



PHASE IIA
YR 2009

CONSTRUCTION AREA

STAGING AREA

CENTER, MAUI

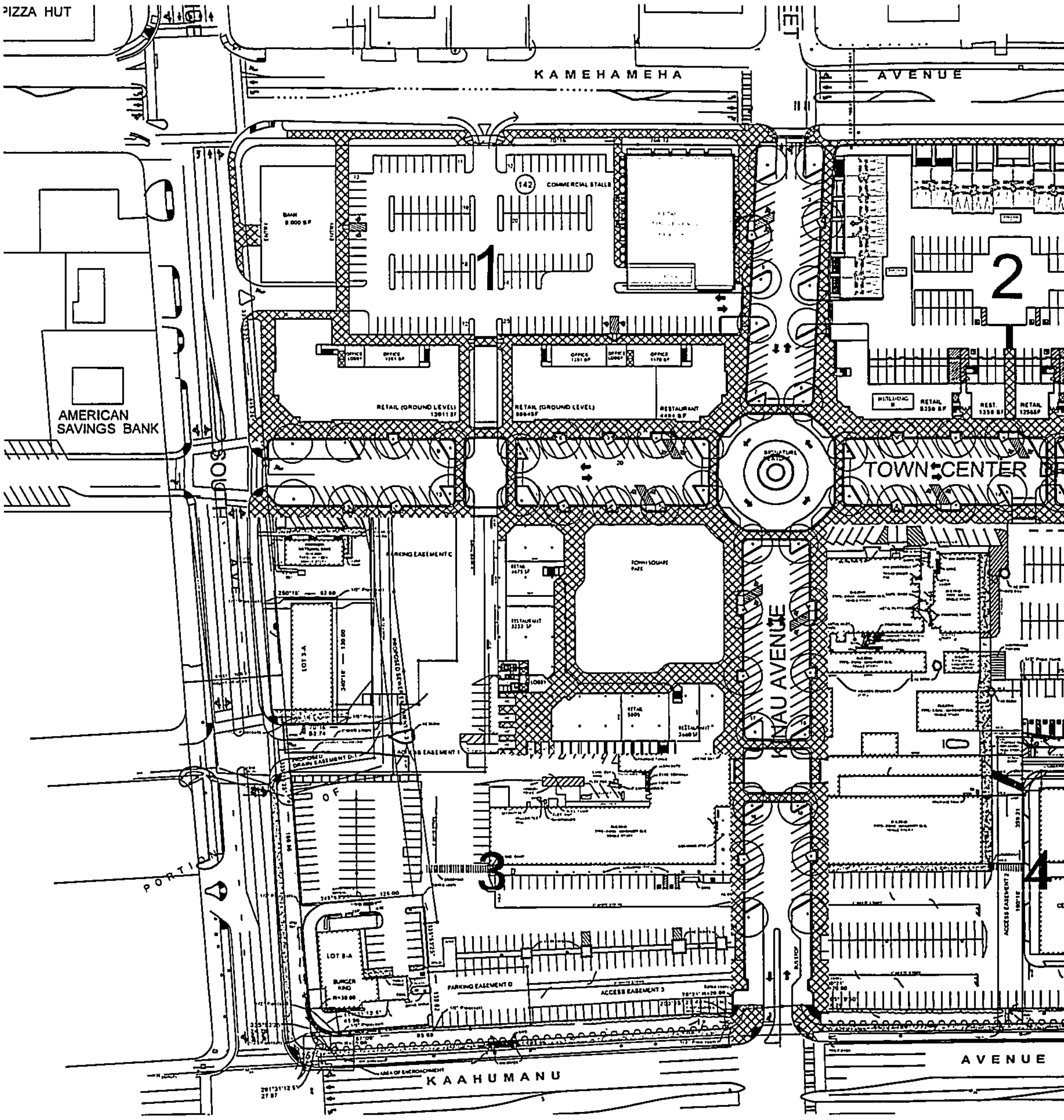
PLAN

FIGURE 20b

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART



A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

KAHULUI TOWN CENTE

SITE PLAN

PHASE IIB
YR 2009-2011

CONSTRUCTION AREA

STAGING AREA

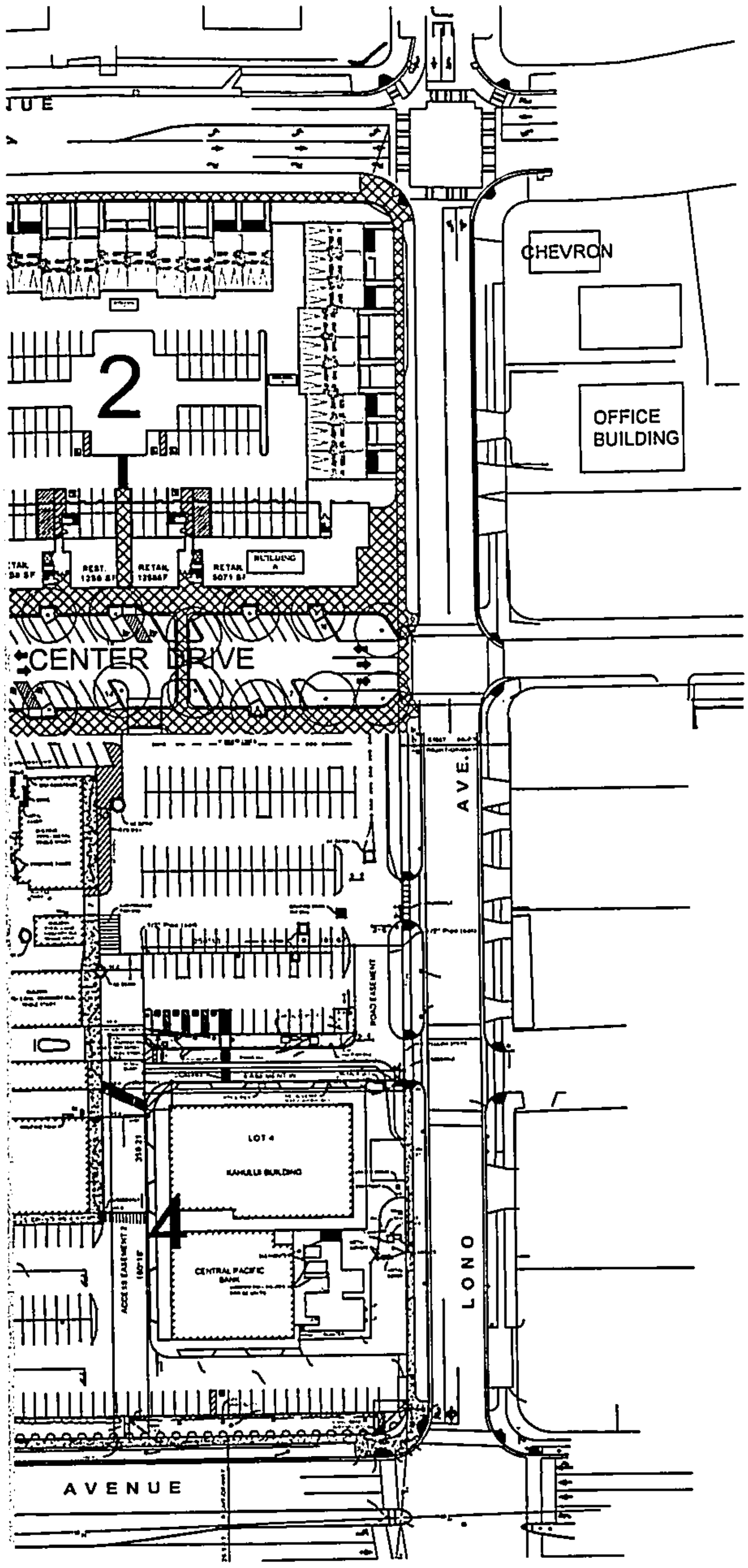


FIGURE 20c

CENTER, MAUI

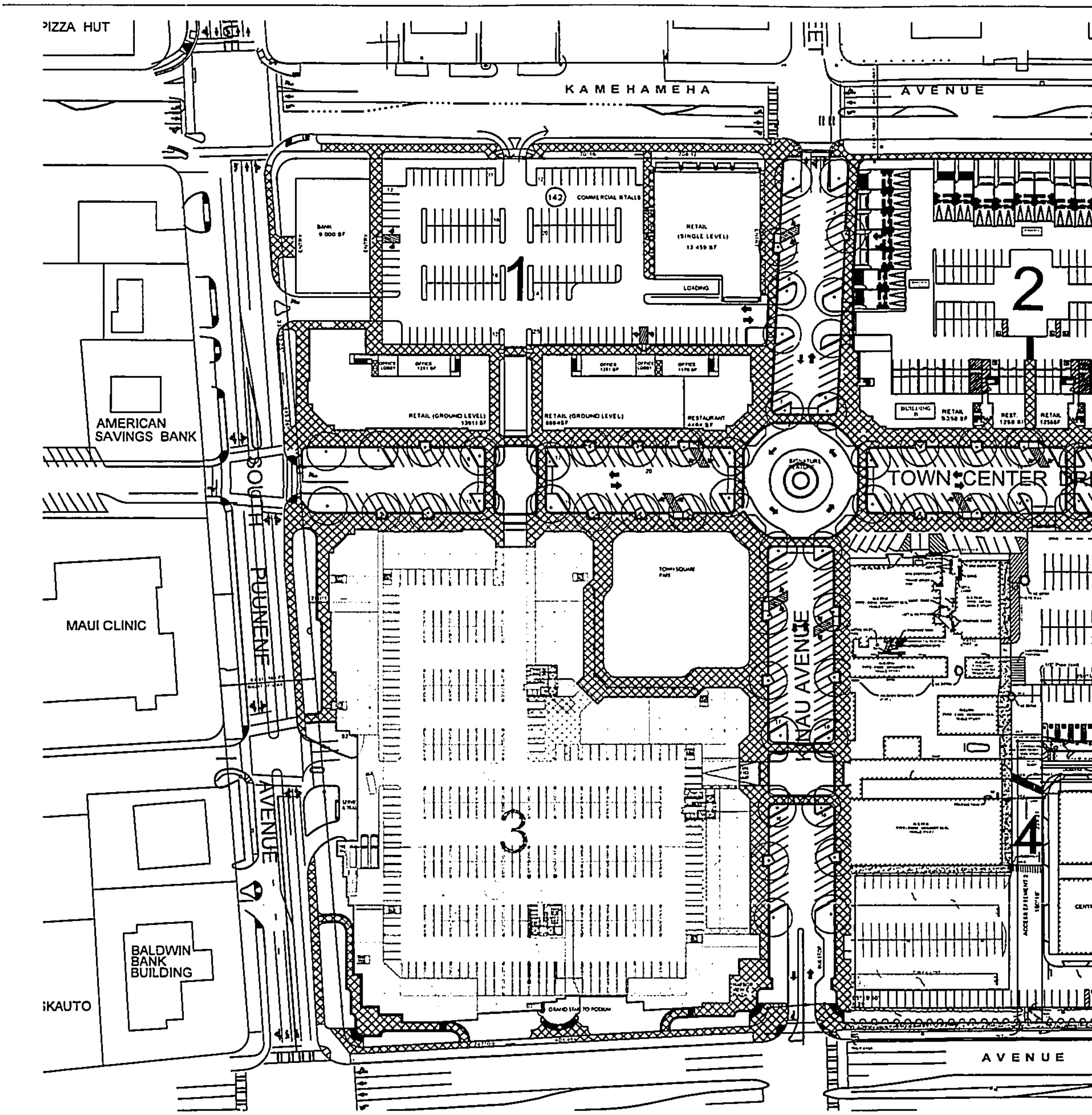
PLAN

Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

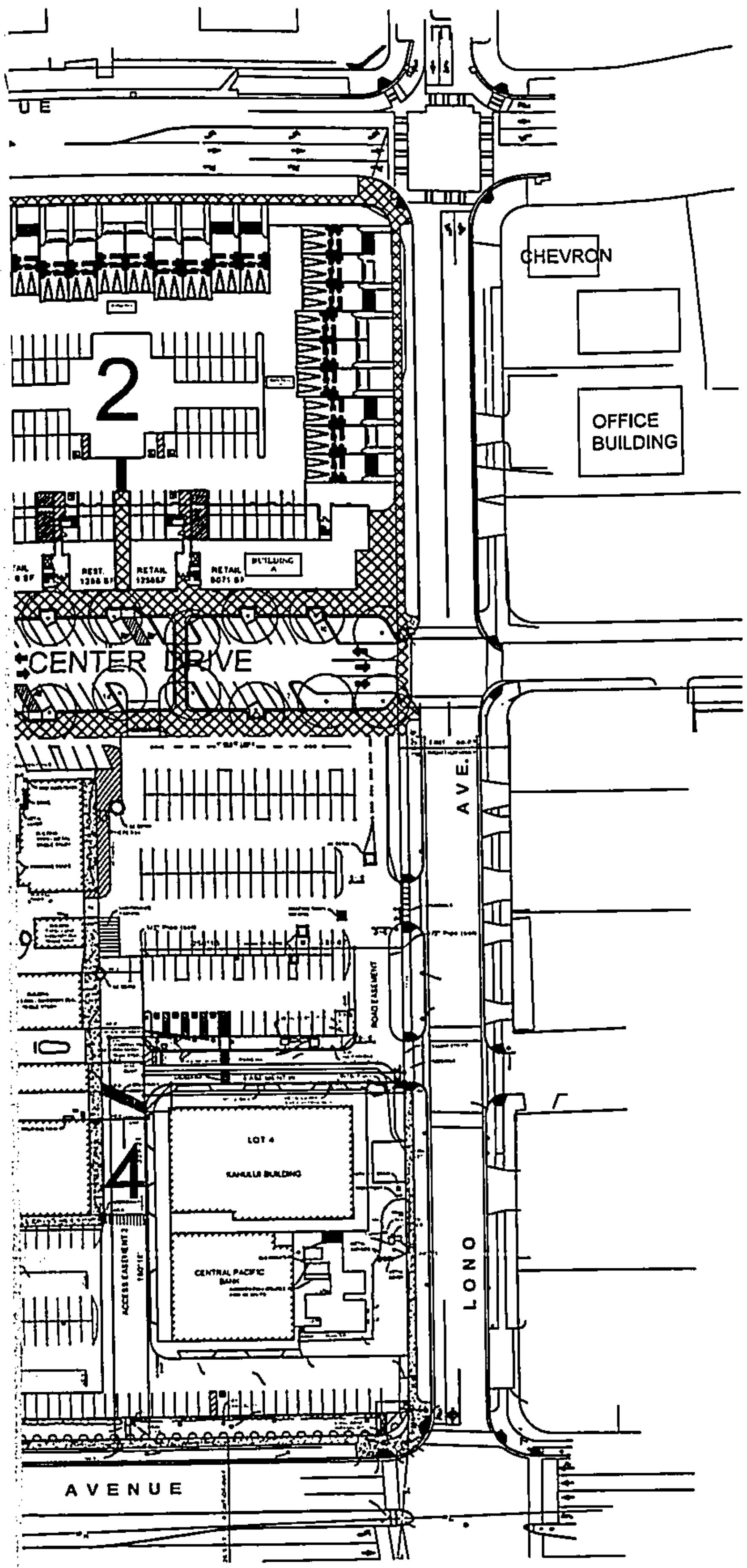
CHRIS HART



A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

KAHULUI TOWN CENTE

SITE PLAN



CENTER, MAUI
PLAN

PHASE III
YR 2011

CONSTRUCTION AREA

STAGING AREA

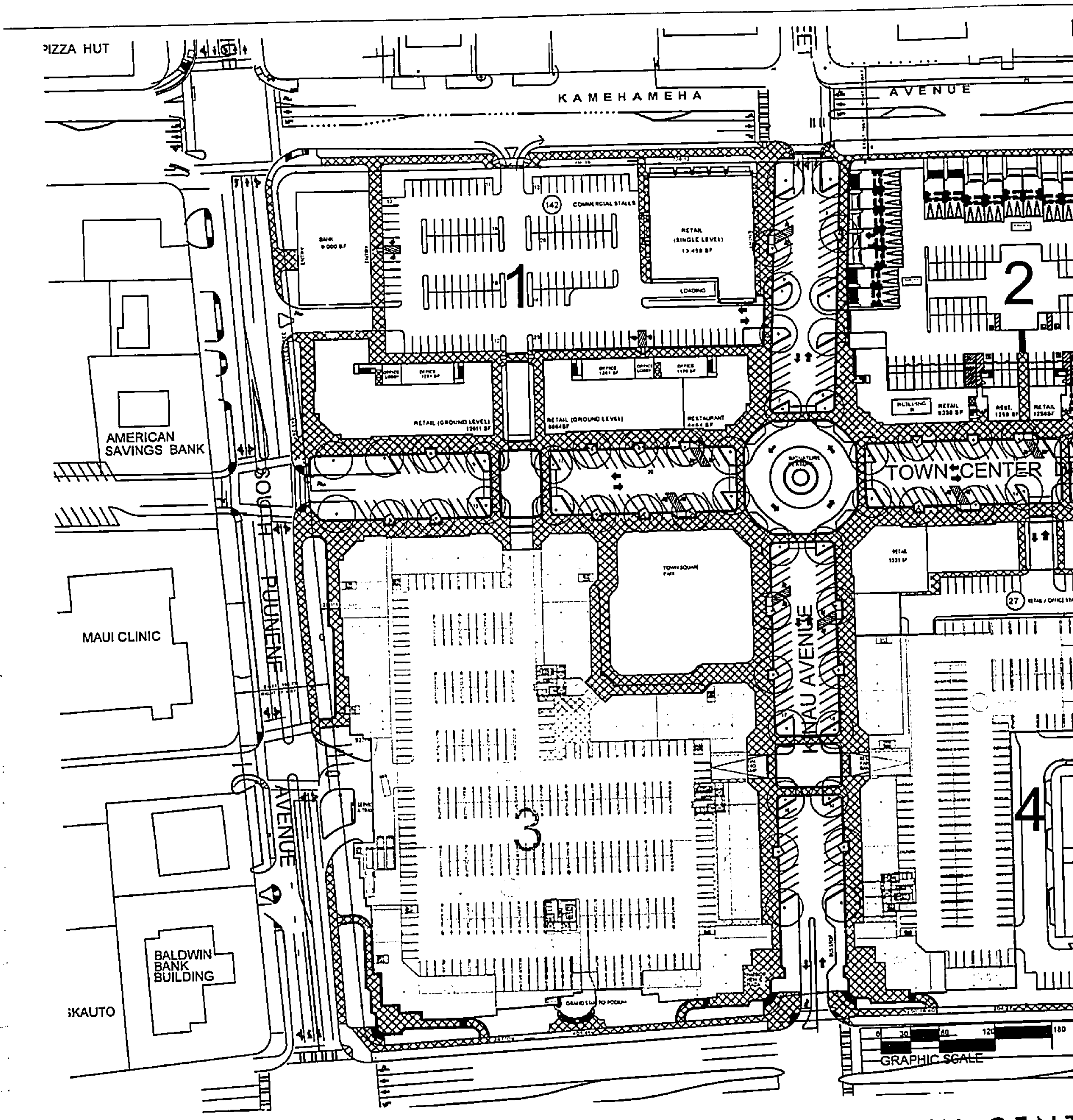
FIGURE 20d

Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP ARCHITECTURE + PLANNING

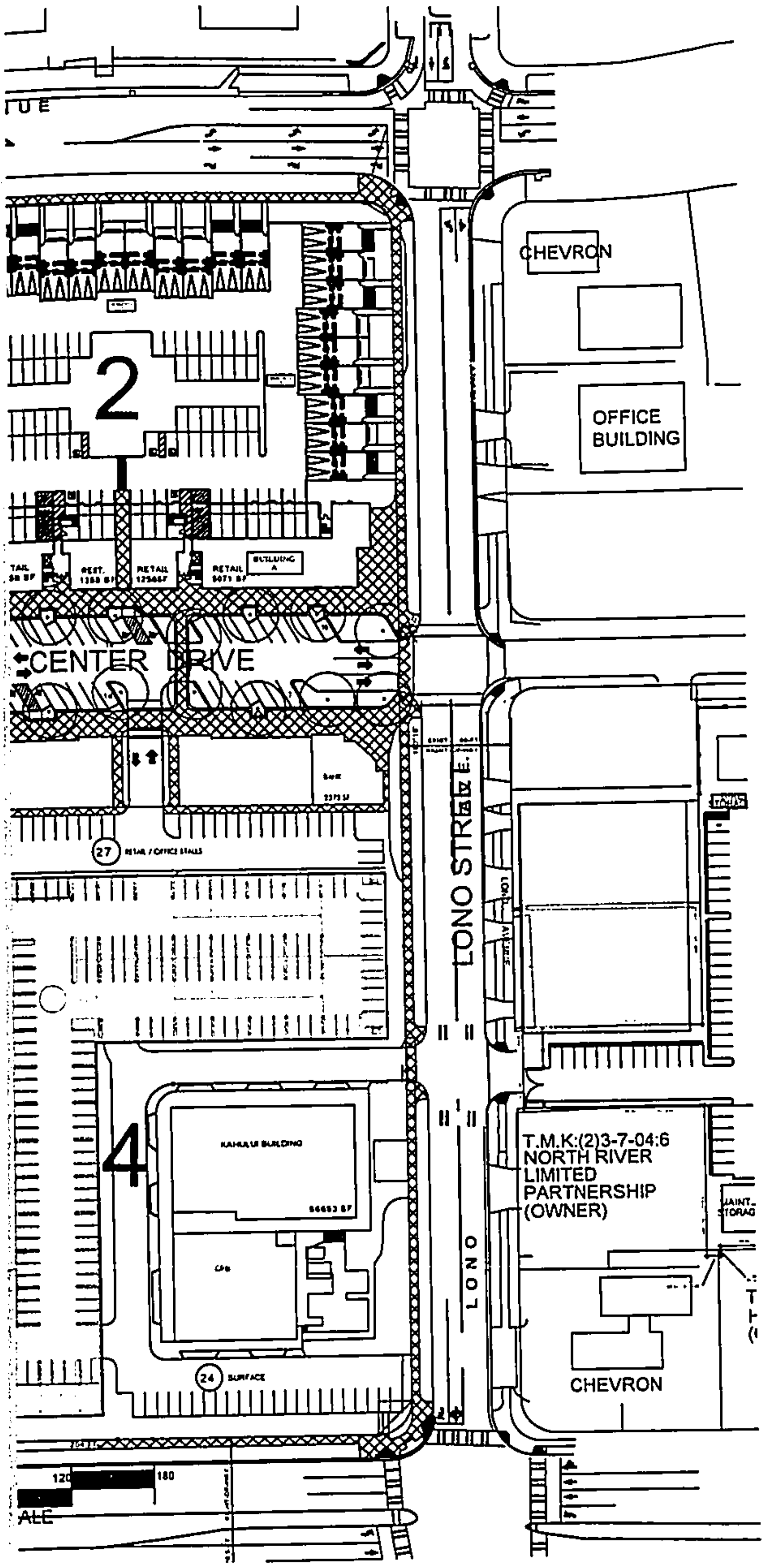
CHRIS HART



KAHULUI TOWN CENT

SITE PLAN

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.



PHASE IV
YR 2012

CONSTRUCTION AREA

STAGING AREA

CENTER, MAUI
PLAN

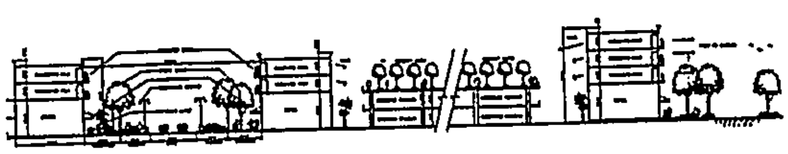
FIGURE 20e

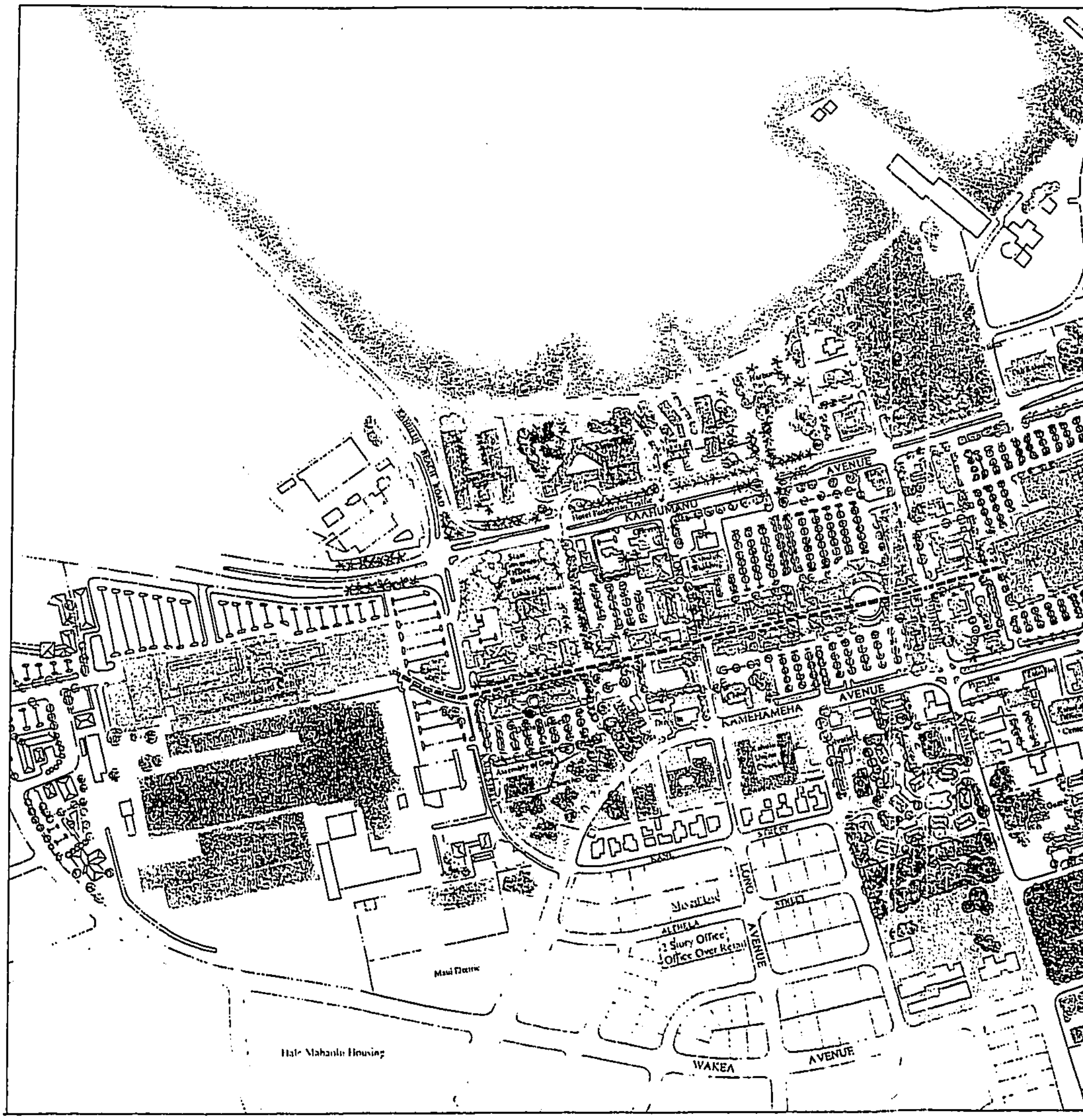
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.
NGA HAWAII LLP
CHRIS HART

Appendices

Appendix A

1992 Conceptual Design Plan
Downtown Area





CONCEPTUAL DESIGN PLAN - DOWNTOWN AREA

A & B KAHULUI MASTER PLAN PHASES I & II

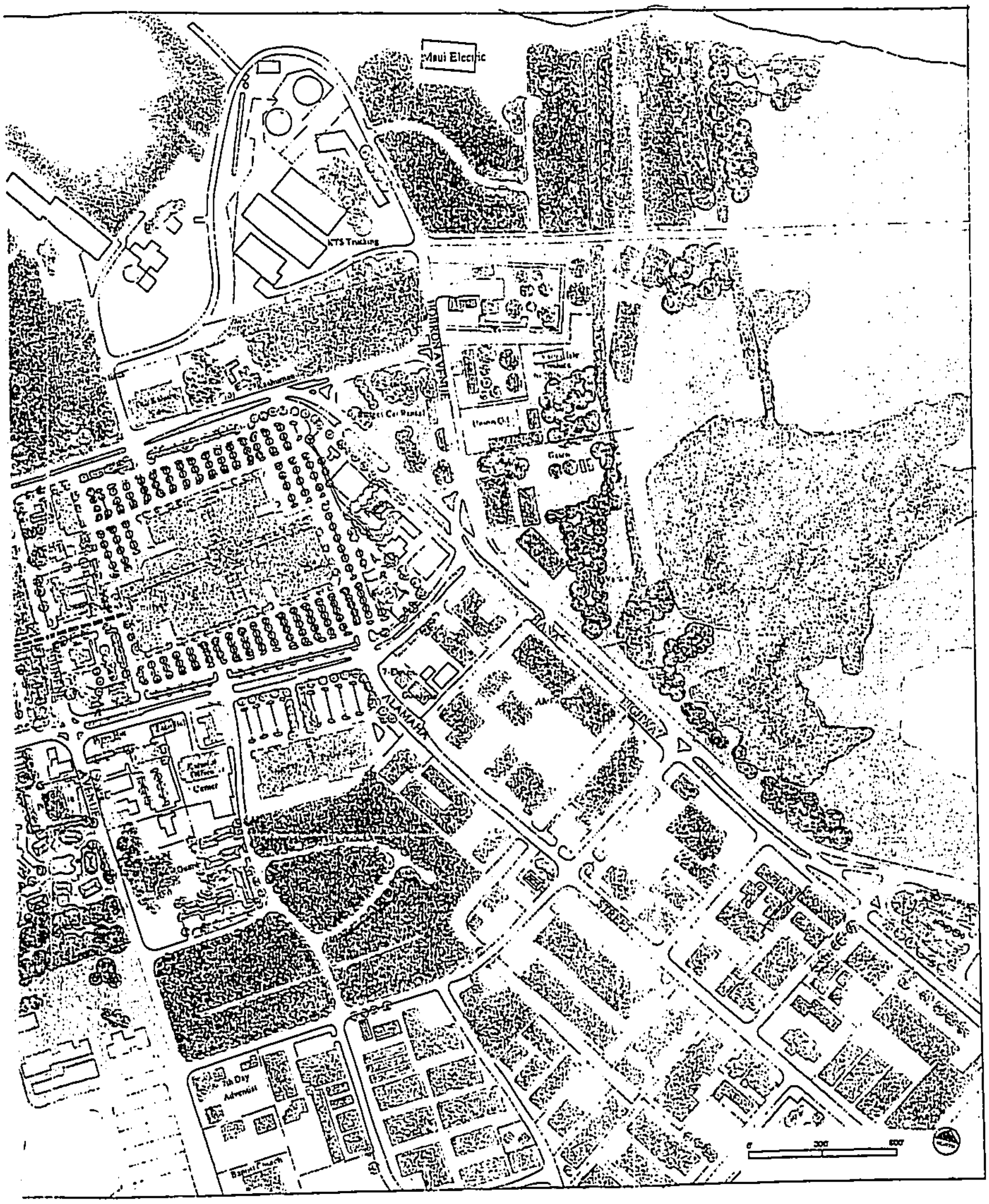


FIGURE 6

GROUP 70

Appendix B

Articles Relating to Pedestrian Malls

A pedestrianised city is not the answer

MANY cities have turned to banning vehicles from sections of their streets, creating pedestrianised malls. However, this frequently fails to revive an ailing downtown.

Neil Fraser

June 6, 2005

Places and spaces 2

I will include a bit of our history regarding these issues. The City of Buffalo (population 300 000) closed about 10 city blocks of its Main Street in 1984 to create a pedestrian-transit mall in conjunction with the extension of an existing light-rail rapid transit system. The pedestrian mall proved not to be an economic success and, in fact, may have contributed to the broader economic decline experienced in downtown Buffalo.

Since 1987, property values in the Main Street pedestrianised mall decreased by 48 percent; occupancy rates decreased by 47 percent, vacancy rates increased by 28 percent. Surveys indicated poor access and perceived safety concerns as the most negative aspects of the downtown area.

There are a number of lessons that can be learned from the research undertaken by Buffalo into the pros and cons of reopening the mall to vehicular traffic. An environmental assessment produced as part of the research sets out the three purposes against which a decision to reverse the previous pedestrian *scheme should be tested. Would reopening* stimulate economic development; increase multi-modal access options; and improve the quality of life for users of downtown?

In looking at quality of life it was felt that it would be critical to economic success that access be simple and understandable that, to attract more pedestrians, it would be essential to improve streetscape appearance and to make it a more attractive destination for downtown employees and residents. Main Street should be made more animated and lively.

In addition to the environmental assessment, Buffalo researched the experiences of 72 other cities regarding pedestrian malls. While acknowledging that each city was unique, it found that there was a consistency in the experiences gained by other cities.

- 83 percent (60) have completely or partially reopened the pedestrian malls to vehicular traffic;
- 6 percent (4) are considering reopening their pedestrian malls to vehicular traffic; and
- 11 percent (8) consider their pedestrian malls to be successful.

From the research it appears that pedestrian malls have generally only been successful in three settings.

- Tourist destinations (Aspen, Colorado);
- University towns with large numbers of people without vehicles (Charlottesville, Virginia); and
- Large cities with large numbers of employees and residents within walking distance of the pedestrian mall (Minneapolis, 160 000 employees and 30 000 residents within a five-minute walk of the pedestrian mall.)

Retail

The research also highlighted certain issues regarding retail; namely that downtown pedestrian malls are much more dependent on consumers in the immediate vicinity than retail areas open to vehicles.

A pedestrian mall changes the economy of downtown commercial areas, firstly by shrinking its market base from the overall community to just the downtown commercial area itself and secondly by shifting the retail focus from comparison and destination goods and services, to convenience goods and services.

If the concentration of workers, residents and visitors is not sufficiently large, vacancies increase, the image of downtown deteriorates and the city suffers from the presence of the pedestrian mall.

I found another interesting comment in *Cities Back from the Edge* by Roberta Brandes Gratz, with Norman Mintz. The authors stress that, "Downtown needs cars", and go on to say, "Recognition of the necessary 'role reversal' or balanced transportation policy can go too far. Cars should not be banned from a downtown. Handled properly, cars can be a positive thing.

"They provide action and movement. They belong downtown. Cars are essential for some pickups and deliveries and, certainly, for servicing downtown merchants. But regulation of hours for car use, slowing traffic to a pedestrian pace, locating parking lots behind stores and not in front, instituting angled and parallel street parking instead of prohibiting on-street parking, and placing great value on sidewalk amenities - all can go a long way to keeping the car from undermining a downtown street," write Gratz and Mintz.

"Streets should almost never be totally closed to traffic. This might work on some short, narrow streets that would not attract much traffic anyway. Closing streets to all traffic for the sake of creating a pedestrian mall has proved unsuccessful in most places for this very reason. Many pedestrian malls have been reopened to vehicular traffic. Oak Park near Chicago; State Street in Chicago; Riverside, California; Milwaukee, Dubuque and Burlington Iowa and others have put the street back but added amenities and traffic calming ... slowing cars is a centerpiece of the multiple efforts.

"Numerous people walking on the sidewalk and slow cars passing by can be signs of downtown health. Similarly, cars parked along the street provide a frame for the streetscape and a barrier between moving vehicles and people walking on the sidewalks. Wide streets offer the opportunity for angled parking, giving the street a narrower appearance, providing more spaces than parallel parking and slowing passing traffic."

Kalamazoo

The first pedestrian mall in the US, in Kalamazoo, reopened to traffic some five years ago. I received the following email from Kenneth Nacci, the president of Downtown Kalamazoo Inc, in response to a question about the success of the reopening.

"I would say that the opening of the Kalamazoo Mall to vehicular traffic was quite successful. It was done in a very pedestrian friendly way. One vehicular lane, one-way with very, very wide walkways on both sides and a few parallel parking spaces. Both road and walkways are constructed of brick pavers with fairly intricate patterns that give you a sense of a special place. Both the road and walkways have a snowmelt system under them.

"Having said all that, I have no retail sales or square-foot rental rate comparisons pre- or post-opening to document 'success' but rather anecdotal reports and observations. The mall has been nearly 100 percent occupied at ground level for the past three years. With the ability to drive down the mall, it is much more visible to many more people than just those who work downtown and use it during their lunch hours," he wrote.

"The mall also is closed to vehicular traffic and uses a special event space for things such as sidewalk sales and new car shows. And while the opening of the mall was a very divisive issue in Kalamazoo five years ago, I believe that both sides are quite pleased with the outcome."

Johannesburg

So, where are we regarding such issues?

Nigel Mandy in his book, *A City Divided - Johannesburg and Soweto*, provides a fascinating overview of the changes made to Eloff Street. He records that the City council of the time - 1973 - unilaterally tried to convert Eloff Street into a temporary pedestrian mall from 10am to 2pm, Mondays to Fridays.

There was no proper consultation either in planning the intervention nor in its implementation. There were no changes made to street furniture, flowerbeds or pedestrian activities other than at 10am portable "No entry" signs were erected where Eloff intersected with cross streets. These were supervised by "whistle blowing traffic policemen".

Mandy comments, "The result was disastrous. Retail turnovers dropped sharply. People stayed on the narrow pavements because the street's tarmac surface clearly identified it as the natural habitat of the motor vehicle ... The concept of a pedestrian mall was discredited and the project was hastily terminated."

In 1974/5 a group of architects, planners (including some from the City council) and property owners formed the Johannesburg Downtown Improvement Group and recommended that Eloff Street should become a transitway for buses only.

Mandy records, "The council was in fact keen to create a bus priority route or transitway through the heart of Johannesburg in a north-south direction, to which the east-west transit services would also be linked."

But a few more years were to pass until, in August 1977, the Johannesburg CBD Association (CBDA) was established under Nigel Mandy's chairmanship. It resolved that, "An Eloff Street Busway concept offered a good opportunity for rapid material input in conditions in the CBD." The busway was predicated on Minneapolis's Nicollet Mall, interestingly one of the few dedicated busways evidently still operating in the US.

Eloff Street

The CBDA and council officials undertook extensive consultation with all parties and the scheme was approved in June 1978 and inaugurated on 23 September 1979. It was completed within its budget of R600 000 - but then that was 25 years ago. Clearly the scheme was a success for quite some time and I don't have a record of exactly when it started to deteriorate.

I imagine, though, that it would have been in the late 1980s or early 1990s when the council of that time turned a blind eye to informal trading. The high pedestrian traffic of Eloff Street attracted hawkers like bees to a honey pot. Formal retailers fled the street and the city. From being recognised as the most exclusive retail street in South Africa (Remember the phrase, "I'll buy you a farm in Eloff Street"?) it had become a total disaster.

Today it is dirty, filthy and unkempt and the time is ripe for an upgrade - provided that the hawker issue can at least be ameliorated.

Hill Street, Randburg

In 1978, another portion of a roadway was pedestrianised - this time totally so. Hill Street, in Randburg was closed to traffic and became a pedestrian mall, stretching across three large blocks. This was largely an attempt to shift the activity patterns in the area by taking advantage of the relatively flat topography in the east-west direction.

This made the success of the mall at the time heavily dependent on a strong anchor at its western end, a function that was filled for some time by a large supermarket. Over time, however, the anchor tenant moved out.

By the late 1980s the Randburg CBD was negatively affected by the same property trends that had come to dominate the landscape of Johannesburg just as they had in American cities.

These were, firstly, the development of large enclosed malls under single ownership with well-maintained internal pedestrian environments. This made the outdoor Randburg Mall seem increasingly unfashionable and progressively less attractive. This perception was reinforced by the failure of the council to maintain or upgrade the public environment within the mall.

Secondly, the development of office parks in other suburban locations within greater Johannesburg had an effect. Whereas Randburg had initially enjoyed an advantage as one of the few decentralised office nodes, other suburban office parks soon provided stiff competition to Randburg. Significantly, these new developments offered the convenience associated with a new commercial typology - the "office park" included enhanced security, privately landscaped surroundings and generous parking provisions.

Randburg's standalone office buildings, located within a poorly maintained public environment, could no longer compete. The whole Randburg CBD has deteriorated considerably over the past decade and one of the interventions under consideration is the possible reopening of Hill Street.

Kerk Street

Kerk Street was partially pedestrianised at the same time as the Eloff Street busway was created. Mandy records, "One block of Kerk Street east of its intersection with Eloff Street has been closed to traffic to become a fully pedestrianised mall. That was possible because Kerk comes to a dead end at Von Brandis Street in front of the Supreme Court building, instead of being a cross-town thoroughfare."

I seem to remember that the Kerk Street Mall was extended westwards right down to Bank City again by the last nondemocratically elected council, probably in 1989 or 1990. A council official at the time told me that it was motivated in the council as a solution to getting rid of a huge pile of paving bricks that were redundant from another project!

Again hawkers were allowed to move in en masse and the street deteriorated dramatically as no enforcement regarding either hawkers or vehicles was instituted.

Smal Street

The only success story that emerges from this old tale of woe was the pedestrianisation of Smal Street. Discussions had been initiated way back in 1983 by property owners, the council and the CBDA. The street was eventually pedestrianised in time for the centenary celebrations in 1986 and the retail attracted the highest rentals in the city for many years. It still appears to be going strong.

But the mall is unrecognisable as a street - the first section is enclosed and greatly narrowed so that it is far more like an arcade than a pedestrianised street.

To round off, a quote that relates to the planning and design of urban streets and their function in the complex city of today.

"Since around 1980, we have seen a renewed interest in planning and design of urban streets. Urban streets are probably a key element of a humane city with encounters among strangers in public space and with differences, as well as the possibility of unforeseen events taking place.

"The understanding of humane aspects of street life has been hampered by fear of urban complexity. The physical complexity of the city, first of all has to be seen as a street phenomenon. Streets are at the same time the general ordering structure of the city and the kind of space where urban encounters can take place on a wide scale in everyday life.

"Physically complex urban space in the form of urban streets increases 'outwardness', the meeting of strangers, coincidence of trajectories, etc. The complexity of urban streets contain the possibilities of incremental change and thus economic development."

Ciao till next week, Neil

- Visionaries sought to revive core area
- Mall's success has some costs
- Chain stores edge out mom-and-pops
- Thriving mall beats the odds
- Mall helped spark nearby development
- Architecture, art, flowers add to ambience
- Timeline
- 25 hours on Pearl Street
- Where Boulder ate
- Panhandlers, others mostly get along
- Nightlife runs gamut
- Mall spawns diverse 'cultures'
- Buskers transform mall into theater

PEARL ST. MALL 1977 COLORADO BOULDER 2002 25 ANNIVERSARY

More pedestrian malls fail than succeed, observers say

By Matt Branaugh, Camera Business Writer

When Madison, Wis., officials started hashing out the future of the city's most recognized street, several citizens attending public forums pointed to Boulder's Pearl Street Mall as the model for success.

Mary Lang Sollinger, who chairs a downtown Madison committee, decided talking wasn't nearly as good as walking: She rounded up several city planners in March and ventured here so they could see it themselves.

The three-day visit made a strong impression, encouraging some proposed changes to the 25-year-old State Street Mall, a six-block stretch in Madison mixing buses and pedestrians much like Denver's 16th Street Mall does.

"Because of Pearl Street, we're looking into building one of the blocks completely into pedestrian," Sollinger said.

But as Pearl Street embarks on its 25th anniversary, and often makes believers of other cities nationwide, observers say the landmark's success is a rarity.

Many cities have tried pedestrian malls. Most have failed.

The city of Greeley opted earlier this year to spend $2.6 million to scrap its downtown pedestrian mall — a project that cost more than $4 million to build 20 years ago. And Eugene, Ore., is spending $2.4 million to reconnect streets through its troubled outdoor mall.

"Most of the pedestrian malls in the country have not succeeded," said Kennedy Smith with the National Trust for Historic Preservation's National Main Street Center, a Washington, D.C.-based group focused on downtown areas. "It's really a credit to Boulder that it has succeeded."

Of the 200 or so pedestrian malls built during the past 40 years, Smith estimates only 30 remain today.

So what makes Pearl Street work?

"An enclosed shopping mall is an enclosed shopping mall. You could take a mall like Crossroads when it was healthy, or Flatiron Crossing, and you could pick up the whole thing and plunk it down in Boulder, Idaho, or Boulder, Ohio, or Boulder, Colo., and it would be the same thing," said Art Mart's General Manager Lou Patterson, whose family also ran The Printed Page on Pearl Street for more than 80 years. "This place is different."

No doubt the district boasts several characteristics that few — if any — can replicate. The four blocks are buttressed by historic, two-story brick buildings separated by an expanse of red brick walkway that's dissected by mature trees, shrubs, grassy spots and flowers.

Heading east, shoppers eventually work themselves out from under the dense tree cover, where recent renovations opened up the 1300 block for group events and a water fountain.

And heading west leads people to views of the Flatirons.

"The mall has maintained its quaint, small-town feeling," said Jean Gorton, manager of the Maclaren Markowitz Gallery on the west end of Pearl Street. "It's a unique setting with the beautiful views and with the mall leading to the mountains."

But for all of the things that make Pearl Street distinct, a look at the other successful pedestrian malls reveals each share some common traits, too.

Like many other successful malls, Pearl Street receives specially earmarked funding for maintenance and management each year. The money keeps the streets clean and organizes the many monthly events needed to draw people into the shopping districts.

At Burlington, Vermont's Church Street Marketplace, a 20-year-old center, a management group handles a $500,000 annual budget for maintenance, a jazz festival, a marathon and a Mardi Gras parade, among other events.

In Boulder, a $2 million budget comes from the city, Downtown Boulder Inc. and the city's Business Improvement District — a broad area of businesses including Pearl Street that tax themselves for services. The revenue helps maintain the area's aesthetics and pays for annual events ranging from an art fair to "Bands on the Bricks," Fourth of July activities to August sidewalk sales.

"The successful downtowns are the ones where property owners and merchants have stepped up to help fund ongoing programming, maintenance and marketing," said Ron Redmond, executive director for Church Street.

But money is only a starting point. Observers say a mall works best in a community that loves walking, and has a multitude of walkers nearby.

Boulder's fondness for biking and walking combines with its proximity to the University of Colorado and its roughly 17,000 Boulder students. The University of Vermont and about 9,000 students call Burlington home. And Ithaca, N.Y., home to the successful Commons pedestrian plaza, boasts two institutions of higher education: Ithaca College and Cornell University.

All three offer varying degrees of office space, adding downtown employees to the area.

Still, colleges alone can't carry pedestrian plazas. Eugene houses the University of Oregon, but that was not enough to keep its pedestrian mall viable. The right mix of retailers, and the right access to those merchants, are also vital, observers say.

Ithaca, Burlington and Boulder each emphasize locally owned businesses, although Ithaca offers more national chains — one official calls them a godsend — than the latter two do. Restaurants often use outdoor seating in each, helping create ambiance and intimacy along walkways.

"Our retail mix is a positive as well as the mix of employees. Our customers are built-in markets," said Jane Jenkins, executive director of Downtown Boulder. "We have a good market for this kind of facility."

And creating traffic flow to those places is also essential. Eugene officials often blame the mall's demise on a lack of street access to merchants.

In Boulder, one of the city's main arteries, Broadway, as well as 11th, 13th, 14th and 15th streets, slice through Pearl Street.

Despite the failures of pedestrian malls nationwide, Sollinger said she sees opportunity for the pedestrian concept at Madison's State Street.

The University of Wisconsin bookends one end of State Street while the state capitol neighbors the other end. Several streets intersect State Street. Local shops line the district.

State Street merchants want more city funding, she said, and communication between both sides must improve. Boulder has done a worthy job on those fronts, she said.

Sollinger also recognizes State Street must use its uniqueness, just as Boulder did.

"Unfortunately, we can't move those mountains over here," she said.

Camera Business Writer Carlotta Mast contributed to this report. Camera Business Writer Matt Branaugh can be reached at (303) 473-1363 or branaughm@thedailycamera.com.

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The New York Times
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Cars Trickle Back To Pedestrian Malls

By MARY MCALEER VIZARD

DOWNTOWN pedestrian malls, which spread across the country in the 1960's and '70's, have been plagued in recent years with slumping sales and a severe image problem.

It is estimated that there are 200 of them, and many were unable to compete successfully in the 80's with the more modern malls and shopping centers on the cities' outskirts. Shoppers tended to dismiss many of the pedestrian malls -- sometimes little more than repaved older streets closed to traffic -- as inconvenient and inaccessible.

But the cities have not stopped trying to find ways to attract shoppers to their pedestrian malls -- often part of the main street in a smaller community or, in a big city, a major commercial street functioning as the downtown of a large neighborhood. Now many of the smaller cities that have created downtown malls, among them Poughkeepsie, N. Y., Oak Park, Ill., and Santa Monica, Calif., think they have the solution: reopening all or part of them to traffic.

In Poughkeepsie, in Dutchess County, it was a case of returning a section of the mall to the way it was before 1974. At that time, the city connected shops and department stores, some dating to the mid-1800's, with a concrete walkway. This linear shopping corridor, with benches and landscaping, and gazebos at each end, starts at Market Street, the city's main artery, and stretches east for three blocks.

For a while it thrived, with large department stores, like Wallace Company and Luckey Platt, which had a loyal following in the city since 1867. But the mall soon felt a sharp business decline as anchors and other stores left, some moving to shopping centers and enclosed malls being built on Route 9. The easternmost block of the mall was hit hardest and never really recovered.

Then, in July, the city decided to open the block up to traffic. The street now accommodates one lane of traffic and has free one-hour parking for more than 50 cars.

"Even though it's only been opened a short time, we've already seen very positive results," said Kathryn LaVanche, executive director of the Poughkeepsie Partnership, a group dedicated to revitalizing the city's downtown.

On an average weekday, merchants have clocked 160 cars on the street every hour. "The fact that the parking is free seems to be really important," said Ms. LaVanche. She explained that the mall now has several parking lots and garages, and all charge around 40 cents an hour to park. "It's laughable," she said, "but even that small a price seems to make a difference to people."

The street's opening has also attracted new businesses, resulting in its vacancy rate's declining from 31 percent to 10.7 percent. And seven formerly vacant properties now have new owners or tenants.

One of those new tenants is the Dutchess County Health Department, which now occupies a 35,000-square-foot building. The department, with 125 employees, signed a five-year lease on the building in November 1990 when the street's reopening was still in the planning stages.

"THE building has a parking lot in the back, but the idea that people would also be able to drive up to the front of the building and park was a real positive for us," said Richard C. Sewell, acting commissioner of health for Dutchess County. "Especially for our night clinics when people might feel safer parking in front of the building."

Mr. Sewell said that the department has been so happy with the location that it has just extended its lease to 10 years.

Merchants on the street think the reopening helped bolster Christmas sales this year.

"I think we did better than some of the malls, from what I've been hearing," said Stephen Browne, store manager for Woolworth's, the largest retailer on the street. "We've always attracted customers who live in the city and who walk over. But now we're also getting ones who would rather drive over here than head out to the highway to an outside mall."

Shopkeepers also believe the street's novelty worked in their favor.

"People came down just to see the change," said Paul S. Mancarella, co-owner of De's Jewelers. "I think there's a curiosity factor that's drawing customers."

"Once they're here," he said, "we have the chance to hold them by offering the kind of individualized service not available at large chain stores in modern malls."

When Poughkeepsie was considering reopening its mall, it wanted to find out what other cities with similar malls were doing. It hired Hyett Palmer, a commerical business consulting firm based in Washington, to survey cities across the country. The study, completed in 1989, took in Santa Monica, Calif.; Eugene, Ore.; Oak Park, Ill.; Sioux Falls, S. Dak.; Vicksburg, Miss.; Baltimore; Ithaca, N.Y.; Memphis, Miami Beach and St. Joseph, Mo.

Most of the malls were built in the late 60's and early 70's. The only exception is the one in Miami Beach, which was built in 1959.

In seven of the cities, the malls were successful for a few years after they built. Then business declined, due in large part to the growth of shopping centers outside the city's downtown areas. Of the 10 cities surveyed, five had either totally or partially opened their pedestrian malls to traffic in the last three or four years, and two others were considering doing so.

Only Baltimore and Ithaca believed their downtown malls were fine just the way they were. And instead of opening its mall to traffic, Memphis was considering developing a trolley system to take shoppers around.

Of the cities that reopened their malls, all reported business gains. In Oak Park, three of four blocks of the mall were opened to traffic in November 1988. This resulted in an increase in sales of 6.3 percent from 1988 to 1989. In the same period, retail occupancy went from 75 percent to 80 percent.

"We now have a lease pending that would increase retail occupancy to almost 90 percent," said Christine Burdick, executive director of Downtown Oak Park, a group that manages the mall's retail businesses. "That lease would not even have been a possibility if we hadn't opened up the streets."

IN Santa Monica, opening the mall to traffic attracted many new businesses, including restaurants, movie houses and comedy clubs. So many people now use the mall that the city has temporarily banned cars.

"There are just too many pedestrians," said Tom Carroll, executive director of the Bayside District Corporation, which manages the city's downtown. "It's not practical to have traffic passing through."

Since the road is what first drew the new businesses to the mall, "it's ironic that we're not even using it," Mr. Carroll said. "But we might again if business slows down."

Opening a mall to traffic is a major job, usually involving building a road and new sidewalks and installing new lighting and other amenities. In Poughkeepsie, it took three months to complete and cost almost $1 million. The city financed 60 percent of the project with Federal Community Development funds; the rest came from a bond issue to be repaid by the merchants on the street with tax assessments over 12 years.

A major thrust behind the project was provided by Karl Ehmer, a meat retailer known for his television commercials. In keeping with his high profile, he promised publicly to reopen his meat market, which closed in 1986, if the block was opened to traffic and to donate $250,000 to charity if the city agreed to the project.

"He's not the first merchant to suggest it," Ms. LaVance said. "But he was the first one to bring the issue before the public and that helped move things along."

When Bruce McIlravy, owner of Haber House of Wheels, a bicycle shop, was looking to move his business from another part of the city, the opening of the east block was attractive for several reasons. He wanted to be in the center of the city, but not stuck in the middle of the mall.

"I need to be in a free-standing structure," he said. "People don't want to shlep a broken bike through a mall."

MR. McIlravy's business has been in Poughkeepsie since 1919. "It keeps moving as the city grows and changes," he said, "and I think this location is the city's current hot spot." All his regular customers have managed to find him at his new location, he said, and "I'm also getting people who haven't been downtown in 10 or 15 years."

Mr. McIlravy bought two buildings on the street. He plans to use the ground floors for the bicycle business and renovate the rest for offices or apartments. "That would require a zoning use change," he said. "But I think there's a market for housing in the mall."

In most of the cities surveyed, opening the malls to traffic is only the latest attempt to revitalize their downtown shopping areas. In Poughkeepsie, $30 million has been spent on such things as rehabilitating storefronts and in new construction since 1989. In that period, 45 new businesses started up or moved downtown, and 17 closed or left. "That's a net gain of 28, which in the present economy isn't bad," said Ms. La Vanche of the Poughkeepsie Partnership.

Started four years ago, the partnership comprises an amalgam of public and private interests. On its board of directors are John E. Mack 3d, C.E.O. and chairman of Central Hudson Gas & Electric Company, and Robert A. Bleakley, the mayor of Poughkeepsie. Membership includes representatives of 160 local businesses. All will be watching closely for the success or failure of east block to determine if the process should continue throughout the rest of the mall.

"Some of the other blocks on the mall are doing better than east block did," said Ms. LaVanche. "But if the success is compelling enough, we probably will open up the rest."

The Mayor seems ready and eager for that to happen. "If the merchants on the street want it and they are willing to pay for 40 percent of it," he said, "we'll do it."

Post Modern or Post-Mortem? The Kalamazoo Mall Revisited

By Greg Flisram

When it was completed in October 1998, the reopening of the Kalamazoo Mall to vehicle traffic marked the final chapter of what is generally considered to be a failed experiment in U.S. city planning. The reopening of Burdick Street, as it had previously been known, came at a substantial psychic cost for the City of Kalamazoo, which for over 40 years boasted the nation's first of its kind pedestrian mall — a fact that found its way into most of the city's promotional literature, and gave rise to the city's dubious moniker, "Mall City." So it was with muted fanfare, and even some lament, that the mall was reopened in October 1998. The Mall, it seemed, had finally surrendered to the inexorable force that it had stood as a symbol against for so many years. The city, it appeared, had lost its major claim to fame.

Built at the modest cost $60,000, the Kalamazoo Mall was seen as marking a new paradigm in American city planning when it was constructed in 1958. The two-block-long prototype represented a new era of city building premised on the recognition that the automobile had irreversibly changed the physical fabric and social dynamics of the city. Adapted from European vernacular tradition, the pedestrian street, it was thought, would return to *downtown a degree of civility and decorum that had all but vanished* with mass automobile ownership and the reclusive habits it encouraged. From a more cynical standpoint, the concept of the pedestrian mall was viewed by some as little more than a thinly veiled attempt to make traditional commercial streets look and function more like the suburban "shopping courts" they were increasingly competing against during the period after World War II.

In the beginning

The initial fanfare caused by the Kalamazoo Mall spawned a flurry of copycat pedestrian mall construction throughout the U.S. In communities as diverse in morphology and climate as Minneapolis, Minnesota, and Santa Cruz, California, the ubiquitous pedestrian malls of the 1960s and 1970s stood as the *Piazza Del Campo* of the new American downtown. Serving as both fashion statement and town commons, the primary beneficiaries of these new public spaces were to be the legions of downtown merchants whose livelihoods were being undermined by he frenzy of commercial "motor plaza" construction taking place on the urban periphery.

As originally conceived, the Kalamazoo Mall was to be the centerpiece of Victor Gruen's 1958 plan for the city entitled *Kalamazoo 1980*. The watershed plan was underwritten by Kalamazoo's progressive-minded and increasingly desperate downtown merchants, whose successors, nearly 40 years later, spearheaded the effort to remove it.

Gruen, best known for his plan of Fort Worth Texas, sought to introduce provincial Kalamazoo to a brand of European modernity inspired by the likes of LeCorbusier and his *"Radiant City"* school of planning. As with Forth Worth, Gruen conceived of the downtown as a primarily pedestrian district accessed and surrounded by superhighways and massive municipal parking garages. Perhaps fortuitously, a lack of available funding prevented the entire plan from ever coming to fruition. Only a reduced scale version of the pedestrian mall was ever built; although the argument could be made that redundant system of one-way streets and surface highways that plague the city today also owe their existence to his vision.

In the first several years of its existence, the Kalamazoo Mall seemed to deliver on its promise to reclaim the downtown for the pedestrian, and to bolster retail activity. In fact, supported by complementary projects such as Kalamazoo Center—a mixed use convention and hotel facility developed in 1975— business along the Mall, for a time, held its own against the region's persistent tide of suburbanization..

By the end of the 1980s, however, it seemed that the Mall, as in most other cities, had become an anachronism; a tired piece of urban design fashion whose novelty had long worn thin. Worst still was the reputation these spaces were earning throughout the country as being magnets for the urban underclass—a situation no doubt made worse by the high number of social service agencies and thrift stores that took up residence on the malls when no one else would.

Because of their variety of concrete surfaces, and by the chronic lack of night-time activity, recent years have also seen these spaces used as de facto skateboard parks — a use that has done little to enhance their already tarnished image. Acknowledging failure, many of the 200 or so cities that rushed to build malls in the 1960s and 1970s in the name of downtown revitalization have been in even a greater hurry to remove them for the same purpose.

Opportunities

As with other cities, persistent business failures, a chronic lack of nigh-time activity, and pressure from the downtown business community signaled the beginning of the end for the Kalamazoo Mall in its original form. Along the way, there were also many missed opportunities, including the decision of the local community college (which anchors the northern end of the Mall) to relocate most of its classes to a distant satellite campus. Lost were the many students who helped enliven the Mall during the day and early evening.

Even the construction of the handsome new Kalamazoo Valley Museum building, also at the northern end of the Mall, has not been enough to reinvigorate the space leading to it. The building's off-axis orientation does not provide the street with a strong visual end statement to help draw curious visitors across the chasm formed by the state highway that slices through the middle of the city. With few students pouring in and out of the campus area, the Arcadia Commons (as this area is referred to) has taken on the limpid appearance of another dated leftover of the modernist tradition, the civic center.

Recognizing that something had to be done, but not wanting to completely part with its piece of urban planning history, Kalamazoo planners have employed another imported planning concept — the shared street or *"woonerf"* — in their new treatment of Burdick Street. Still more a pedestrian space than a conduit for traffic, the newly reclaimed street retains many of the pedestrian appointments of the original Mall, including a new snow-melt system, but now features a central alley and parking bays to accommodate the formerly forbidden automobiles.

A consistent paving treatment, and shallow rollover curbs, help to blur the distinction between pedestrian and vehicle spaces. Twin pairs of 12-foot-tall monuments, designed in an Art Deco motif, mark each end of the Mall, and serve as symbolic traffic bollards to ward off most through traffic. With its narrow *"cartway"* and head-on collision of one-way streets, the reintroduction of vehicle traffic is more a matter of perception than of function, and clearly this was the intent.

What next?

It is too early to tell just how successful a reclaimed Burdick Street will be in breathing new life into downtown Kalamazoo. Anecdotal evidence suggests that activity on the Mall has picked up slightly since its reopening. However, if recent closure of the former Mall's (and downtown's) last remaining department store is any indication, the future of the street seems somewhat less than sanguine. Gilmore's closure, coming less than nine months after the Mall's reopening, follows that of Jacobson's Department Store two years earlier.

These closures leave the city with enormous holes in its retail base that will be difficult to fill under any circumstances. Ironically, it was Gilmore's and Jacobsen's that were the most vocal proponents of the theory that the key to a revitalized downtown rested in the reopening of the Mall. Apparently unsure of its own conviction, Jacobson's closure came well after discussions concerning the Mall's reopening had begun in earnest. Gilmore's, whose president was a key member of the planning task force that spearheaded the redevelopment effort, closed less than a year after the street was reopened to traffic. Both cited changes in national retailing trends in their decision to abandon downtown Kalamazoo.

Smarting from the recent closures, the city seems to be pinning its hopes on the new Epic Center, a half-block long, mixed use project directly along Burdick Street, to infuse new life into the erstwhile mall. It is hoped that the activities generated by this project, which includes space for the performing arts, will help to animate the street in the evening.

Despite these efforts, it seems that the downtown's center of gravity is shifting away from Burdick Street to the city's Haymarket and Arcadia Creek districts to the north of the historic commercial district. However, until more housing is developed in the city's core, it seems that it will be difficult for any renaissance to take hold anywhere in the downtown area despite the best efforts of planners.

In the final analysis, the failure of pedestrian malls in the U.S. says less about the supposed infertility of European planning ideals on American soil than it does about a lack of understanding of the ingredients of their success. The few pedestrian malls that have fared well generally share certain characteristics including: shortness, mixed uses, a large population of "captive" users (including residents), heavily programmed activities, incorporation of public transit, and strong anchors that both serve as pedestrian generators and help enclose the street space. Again, features not dissimilar to those of the regional shopping malls that they were a response to. The Kalamazoo Mall managed to survive for many years because it did have many of these characteristics; however, few exist to support it now.

In some respects, the notion of banning vehicles from a major downtown street in a state whose economy owes its existence to the auto, and where winter can last for up to six months, may have been simply nave. Many local residents were undoubtedly ambivalent toward the Mall from the outset, and saw it as the frivolous work of a small group of high-minded dilettantes, set out to Europeanize middle-America.

This cynicism is likely to continue with the street's new "user-friendly" gesture, if not all out embrace of automobile traffic. To others with loftier aspirations, it represented a statement about a higher order of civilization that our cities should strive to become. The Mall is gone, but the lessons it taught will remain with us for some time.

Will Fllsram is a planning consultant with Langworthy Stader LeBlanc & Associates in Grand Rapids, Michigan.

March 2000

What of the future of downtown?

31 May 2005

Johannesburg News Agency - Inet Bridge

Many efforts to restore city centres across the US and Europe have failed, with many valuable lessons to learn

By Neil Fraser

I have not had time yet to study the budget delivered by Executive Mayor Councillor Amos Masondo on Wednesday, 25 May. However, from the brief reports I have read it looks good. It appears to provide the wherewithal to increase the momentum developed over the past five years while addressing some of the city's critical needs. It is certainly great to see the massive (31,5%) increase in the capital budget.

Places and spaces 1 "Places have an impact on our sense of self, our sense of safety, the kind of work we get done, the ways we interact with other people, even our ability to function as citizens in a democracy. In short, the places where we spend time affect the people we are and can become."

The experience of place

Over the next couple of weeks I want to have a look at how we measure up regarding public space - surely a critical ingredient in our quest for world class city status. There are a number of debates taking place at present, ranging from the proposed square within the Gauteng Provincial Government Precinct to the informal trading structures that have been erected recently on many of the city's pavements to transit streets such as Eloff Street and pedestrianised streets such as Hill Street in Randburg.

Let's start with the last two and firstly look at what has happened in relation to such street interventions in cities in North America and, to a lesser extent, in Western Europe. Certainly there are clear parallels for us with the USA in the background to the development of pedestrian and semi-pedestrian streets.

In the American city of the late nineteenth century, retail

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was the magnet that drew people downtown and was the glue that held it together. The most critical part of that magnet and glue was the department store - the downtown department store became the engine for mass merchandising. It did this by capitalising on the increase in urban populations and in personal wealth, bringing these two aspects together to absorb the output of the then new phenomenon of large scale manufacturing.

Department stores

Department stores acted as educators of the rapidly emerging American middle class by providing elaborate displays that showed their clientele how to dress, how to furnish homes, and so forth, while providing choice by clearly indicating price and quality. Department stores made shopping quite magnificent by providing spaces that were palatial in design. Department stores tried to make shopping fun.

They targeted women, treating them as their major customers and focusing on how to make them comfortable. This attracted huge numbers of middle-class women downtown, who spent a substantial amount of time on shopping trips. As more potential buyers thronged the pavements so speciality shops, restaurants and variety stores created shopping thoroughfares around the big department stores.

Local authorities concentrated on the streetscapes so that stores and streets together made downtown a cleaner and safer place for everyone.

By the turn of the nineteenth century, the heart of most big cities was the retail district. The attraction of more and more people downtown had an important effect on transportation technology. The horse-cart was succeeded by the electric trolley and then by the subway - all designed to bring the mass market to the downtown retailer.

The end of the Second World War in 1945 changed the US city's domination of the retail market. Returning war veterans were given cheap housing grants that resulted in the number of housing starts accelerating from 300 000 a year before the war to one million in 1946 and two million by 1950.

However, the new home owners wanted single-family homes in areas that were not crowded and so elected to move into the suburbs rather than make their homes in the dense cities. Cars were cheap, petrol even cheaper and the population's dependence on public transport started to wane dramatically.

Moving to the suburbs

Companies began moving to the suburbs, where their executives lived, manufacturing followed and, in turn, retail started to follow. By the early 1960s department stores were closing their doors in downtowns and reopening them in the suburbs. Cities were in decline and considered by many to be obsolete.

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The emergence of decentralised shopping malls in the 1950s was to be the final nail in the coffin for many downtowns. They were places planned around the consumer and were more attractive than the bustle and helter-skelter of the cities' main streets.

They also offered one-stop convenience in spacious, weatherproof surroundings. Consumers could shop at their leisure and comfort instead of travelling downtown with all its irritations and delays - and then having to walk through crowded and noisy streets. Shopping centres became sanctuaries for shopping.

The cities fought back. Cities all over the US, in the UK, Europe and Australia, started to develop dedicated pedestrian streets as they believed that the complete separation of pedestrians and vehicular movement created the most attractive environment for people, as well as served the retailers.

Spiro Kostof, The City Assembled, reflects that, "Downtown business leaders and city officials fought the flood of shopping malls with elaborate pedestrian street schemes and the Malling of Main Street began in earnest.

"The earliest examples come from Kalamazoo, Michigan, Miami Beach, and Pomona, California. In these and dozens of other towns, asphalt was replaced by concrete or tile pavements, punctuated by shade trees and planter boxes, fountains, benches and kiosks. It is an artificial and sanitised design vocabulary, launched with much fanfare, but without a coherent long range programme of urban improvement ... by the 1980s the fad had lost its steam."

Failure of pedestrian malls

The fad had lost its steam and so in the 1980s we find the following reports appearing in the media:

"Pedestrian malls twenty years later" - "Some 150 pedestrian malls - including transit malls - have been built in the United States in the last two decades. Most have failed outright, but a few have lived up to their billing as the salvation of downtown retailing.

"Just about as many department stores and first-run movie theatres have closed in towns with malls as without, and just as many wig-stores, fast food places and video game arcades have opened up." (Planning Magazine, December 1982.

An article in the New York Times on 13 December 1987 entitled "Replacing the downtown mall with traffic" noted that "Eugene, Oregon; Independence, Missouri; Jackson, Michigan; and Champaign, Illinois have turned their malls back into streets again and several other cities, including Chicago, Illinois and Decatur, Illinois, are studying major redesigns of their downtown malls."

Laurie M Grossman writing in The Wall Street Journal in June 1987 stated that most of the pedestrian malls, "failed to reverse the decline - and in some cases hastened it", adding that, "city pedestrian malls fail to fulfill the promise of revitalising downtown".

Roberta Grandez Gratz in The Living City states that, "the pedestrian mall was one of the early planning gimmicks offered as quick-fix solution for economically troubled downtowns that does not address fundamental reasons for downtown activity".

Weak retail mix

Although the pedestrian mall concept attracted shoppers, it failed to keep them coming back because its land use and retail mix were weak. Many pedestrian streets also failed largely because their design - especially in the earlier years - ignored the special character of the urban street.
Instead of emphasizing the traditional street's architecture, sense of human scale, spatial enclosure and linear continuity, the design of the pedestrian street often took the elements that characterised the public spaces of suburban shopping centres - berms, informal planting areas, raised planters, fixed seating, fountains and play sculptures - and used them to fill the street space.

Often, the scale of pedestrian space created by closing the street to vehicles presented a problem. Compared with a traditional shopping area, the pedestrian street, when vehicles were excluded, seemed to be out of scale with the volume of pedestrians, leaving it looking empty rather than lively and bustling with activity.

Many pedestrian streets also failed on a more detailed design level because they used paving material, street furniture and planting approaches that impaired the space's flexibility for use for a variety of functions, created a sense of visual clutter and ignored the goals of durability and maintainability.

Lessons

The application of suburban design concepts to city centre spaces was destined to fail because it did not recognise the essential characteristics that make the urban street an attractive and social space. Most US cities removed their pedestrian malls when public officials and property owners realised the need for accessibility and visibility.
This failure carries two important lessons for designers of the city centre's pedestrian system.

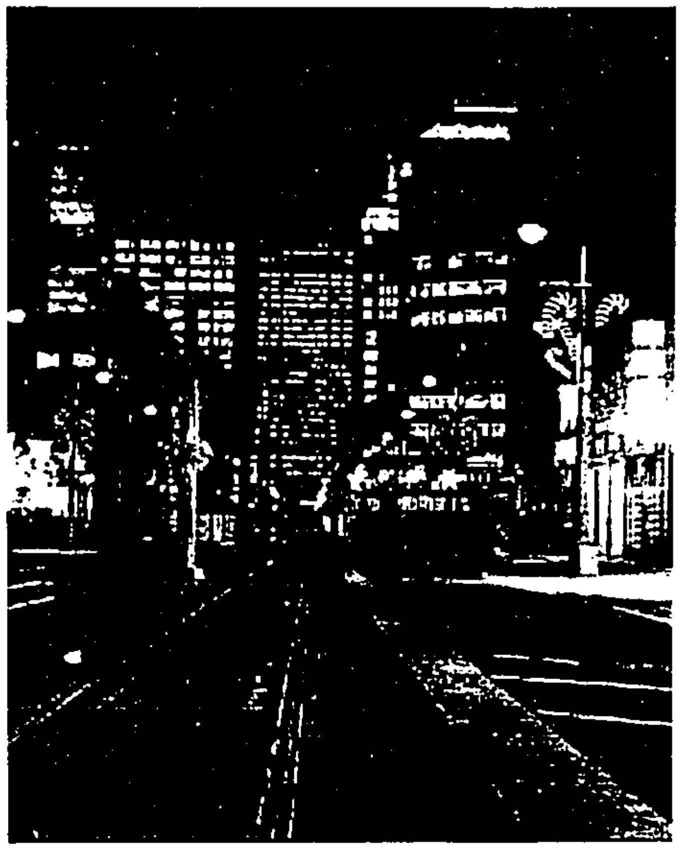
It is dangerous to import imitative solutions unless the basic conditions that contributed to the original success are clearly present in the city centre.

The special characteristics and resources of the city centre can enhance its identity, its sense of place and its competitiveness without such imports.

Next week we'll pick up on some of the emerging international research findings regarding pedestrianisation of streets, and then examine where we stand locally.

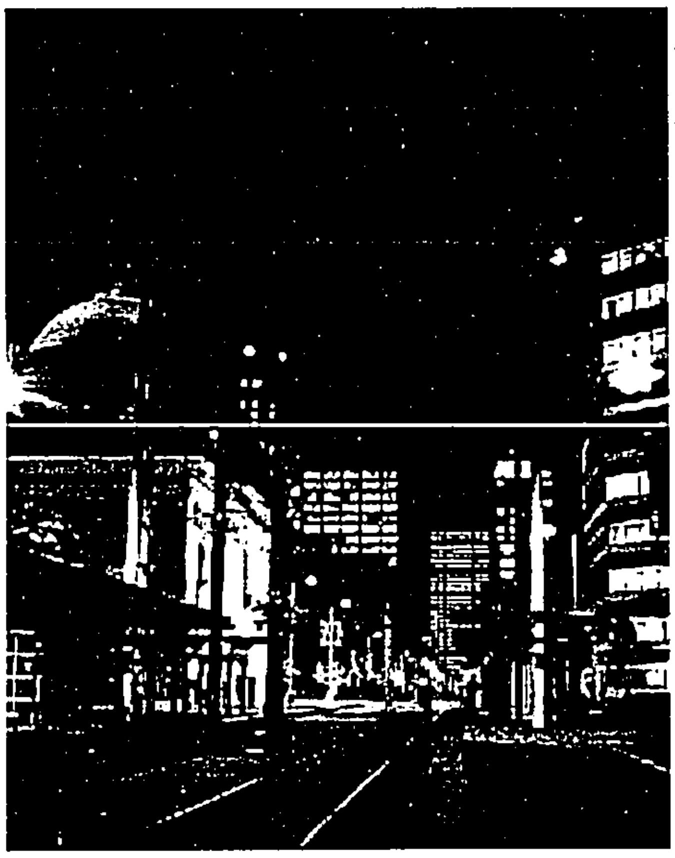
Johannesburg News Agency

The Free Fare Zone



The zone from the start of the Metro Rail line at its southernmost point to where it goes underground and actually becomes a subway, has a few names, some fancy, some just plain and descriptive. It is called the "free fare zone" by the NFTA because that's what it is, the zone where one can ride the train for free. Some call it the "pedestrian mall" because all traffic except emergency vehicles are banned from using this portion of Main Street. The City of Buffalo decided to call several blocks which surround and include the above ground section of the Metro Rail, "Buffalo Place," I guess in an effort to make the area sound trendy. Still a lot of other people just call the area a huge mistake or a ghost town. True, you'd be hard pressed to find any people down there after 6pm on any given night but the place does look rather nice.

The above ground section, or free fare zone was first envisioned in the 60's, long before the line was even close to being built. It was some urban planner's idea at the time to turn Main Street, in downtown Buffalo, into an open-air shopping mall. Their reasoning was, people could take the train downtown, get dropped off and do their shopping without the hassle of dodging traffic. The suburban shopping mall was becoming quite popular throughout the nation and the Western New York area wasn't any different than the rest of the country. These urban planning gurus figured downtown pedestrian malls would be the preferred alternative to the sterile, climate controlled, suburban shopping mall.

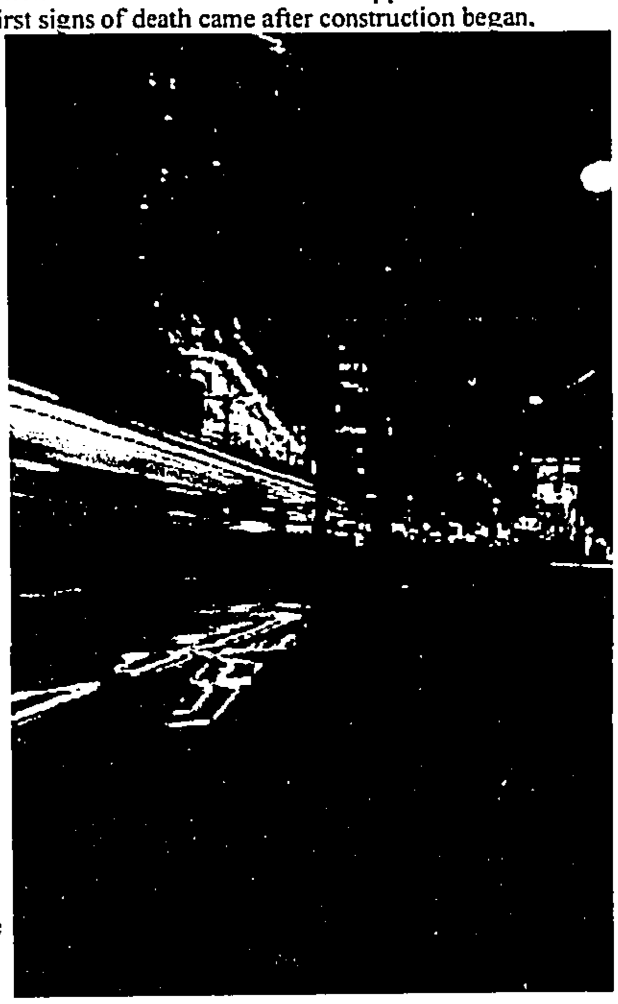


Well one thing these urban planning geniuses of the sixties didn't count on was that maybe the reason so many people flock to these climate controlled malls in the suburbs is that one can't control the climate, outside. Downtown Buffalo, especially in the non summer months, isn't very pedestrian friendly. Although some say Buffalo not as cold as its reputation, let me tell you, I for one don't like walking around outside downtown in the winter. I think by the sign of life after 6pm, most people feel the same way. The warm, pleasant, summer months aren't much different, unless there's a concert in Laffeyette Square. The only bright spot seems to be the "theater district" near the portal, at the northern end of the free fare zone. Live theater and Broadway style shows keep this part of the pedestrian mall alive. At the southern end is the Marine Midland Arena, where sporting events and major concerts and events are held. These events do little to enhance a feeling of energy along the pedestrian mall however, as all the people are inside the arena during the events and promptly leave the area when the events are over.

This section of Main Street in downtown Buffalo wasn't always this way. In the time before the Metro Rail line was built, Main Street was the place to be. Cars ran up and down Main Street continuously and stores and shops lined both sides of the street. The Christmas holiday season was a treat for young and old alike as storefront windows were decorated to entice and entertain all who happened to pass by. The Adam, Meldrum and Anderson department store, or AM&A's as it was called, usually had the grandest

Christmas display. Main Street, back then, was a magic place.

This all sadly started to end when the first shovel went into the ground for construction of the Metro Rail. It didn't happen all at once, it was more like a slow death, very similar to watching someone die of cancer. The first signs of death came after construction began, causing downtown Buffalo to resemble downtown Beruit. Plastic, orange, construction fences strung all around made it difficult for folks to get around on Main Street and buisinesses began to suffer. Shop owners sensing that the pedestrian mall was a mistake, complained but were told, "hang on, when it's finished, it'll be packed with people down there." Well they hung on and after it was built, it was no different. The loss of vehicular traffic gave one an uneasy sense of abandonment. Shops and stores closed,one by one, until now, ironicaly, the climate controled Main Place Mall remains as the lone shopping center on Main Street.



There's talk now of opening up Main Street once again to vehicular traffic on a limited basis. The pedestrian mall is a failure in design and function and by looking for ways to open up Main Street to traffic is the city and the NFTA's way of admitting its mistakes. If the city of Buffalo would have done some research on pedestrian malls, they could have avoided this tragedy. The City of Millwaukee, Wisconsin had a similar pedestrian mall, that was until they tore it up and reintroduced vehicular traffic back in the 1970's.

Luckily, a city is not like a living body, that is anyway that you can bring what is dead back to life. It seems that Buffalo, with the help of New York State and the Federal government is finally bringing new development, with more emphasis on entertainment and less on retail shopping to downtown Buffalo. Chippawa Street, which runs perpendicular to Main and was once the home of the seedy underbelly of Buffalo has been transformed into a trendy, happening place, bursting with nightlife. At the southern end of Main, where it meets the waterfront, work is under way to add life around the Marine Midland Arena. Who knows, maybe people will want to stay downtown after that Sabres game? Here's a tip for the powers that be over at the NFTA; instead of worrying about web sites, why don't you sell off all of that land you own on the outer harbor and use some of that money that has been set aside for expansion of the Metro Rail and actually run the subway out to the suburbs? Don't you think that that would bring more people (riders) downtown? Maybe Main Street will never be what it once was but it can be something magic again.

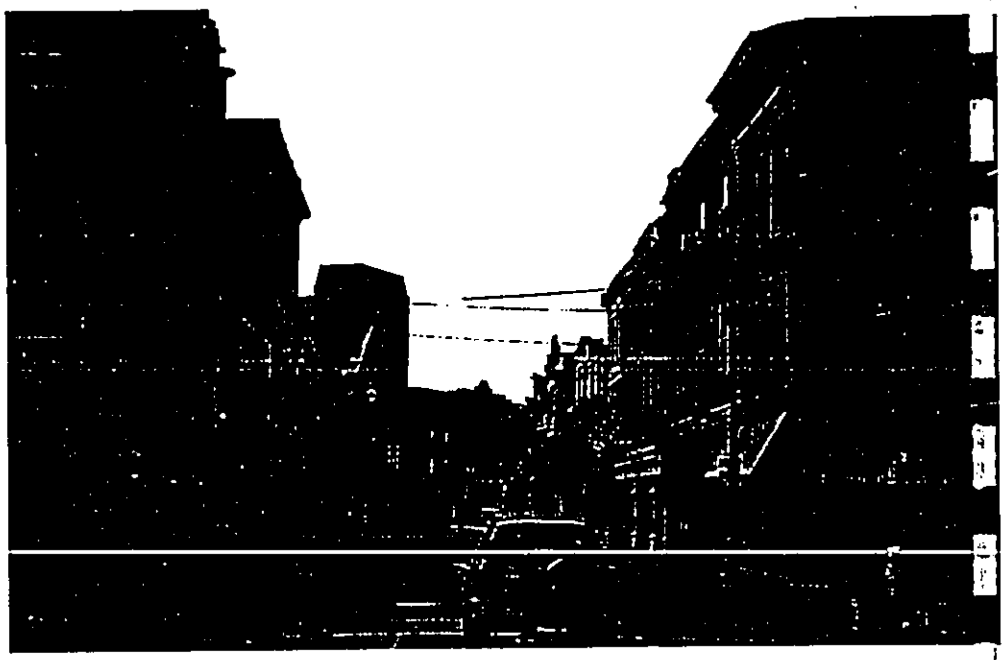
Home

The spatial definition of relatively wide urban streets, such as this one in Georgetown, in Washington, D.C., can be enhanced through deflected vistas.

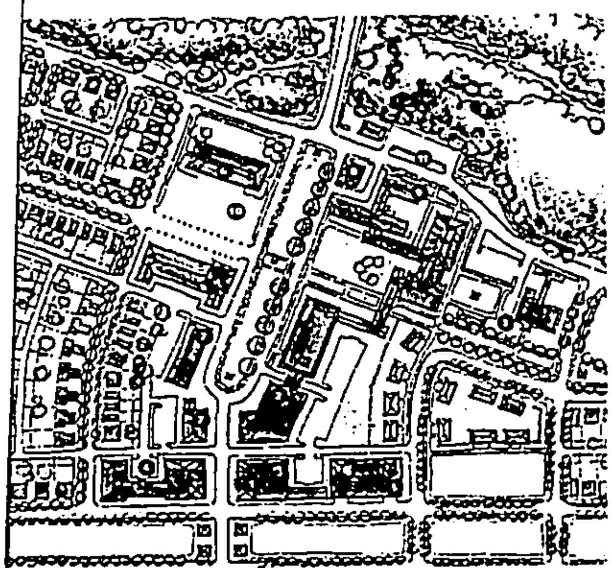
active in California and the Southwest, has observed the "daylighting" of streets in these towns, meaning that the street grid opens out in such a way that vistas terminate in the natural landscape of mountains, fields, and bodies of water.

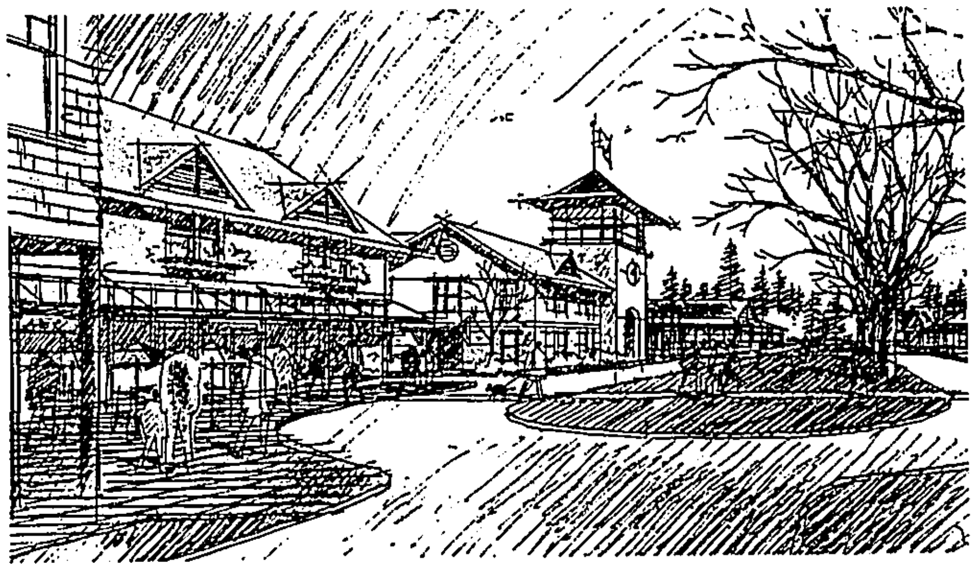
Almost as important as the main street itself are the alleyways, side streets, and walkways that usher pedestrians to and from the main street and other destinations. Frequent side streets and other through-block passageways (paseos) enable pedestrians to access the main street without having to walk around large blocks or across major thoroughfares. The small, irregular blocks and intricate, organic web of streets, paths, and alleys in medieval villages represent some of the most porous networks for pedestrian movement.

Since the success of town center projects depends heavily on their ability to create a pedestrian-friendly atmosphere, developers and designers should carefully consider examples of older traditional boulevards, promenades, streets, and alleyways designed primarily for pedestrian use. At the same time, however, as the pedestrian-only plazas built in the 1960s and 1970s proved, it rarely makes sense to completely exclude vehicular traffic, which helps support businesses and makes use of on-street parking. On-street parking, in turn, provides convenient access to shops, helps slow traffic, and creates a buffer that shields pedestrians on the sidewalk from street traffic. Some of the best



King Street, Charleston's main street.





Town centers are being planned for redeveloped public housing projects such as Salishan, in Tacoma, Washington. *Torti Gallas and Partners•CHK, Inc.*

Existing Main Streets Reinvented

Throughout the United States, the past decade has witnessed the rediscovery and revitalization of both the older main streets of cities and towns, and the relatively newer main streets of suburban downtowns. The now-vibrant Park Avenue, in Winter Park, Florida, and Clematis Street, in West Palm Beach, Florida, are examples of older main streets. One of the most dramatic reinventions of an older main street is the Third Street Promenade, in Santa Monica, California. By the 1970s, Third Street had devolved into a moribund pedestrian mall, and the construction of Santa Monica Place, an enclosed shopping mall, had left the surrounding Bayside District virtually lifeless. After five years of planning and a year of construction, Third Street Promenade opened in 1989 and became a runaway success story. Much more than a main street revitalization program, the project involved a complete redesign and redevelopment of the three-block pedestrian mall, an undertaking that was facilitated by a strong public/private partnership.

As project master planners, the Roma Design Group, reintroduced automobile traffic for portions of the day; developed a coordinated program of signage, landscaping, and street furniture; and created expansive sidewalks (up to 30 feet—10 meters—wide) to accommodate outdoor dining, kiosks, and pedestrian amenities. To boost the concentration of nighttime

Appendix C

Pre-Consultation Activities Prior to Public Hearing

List of Pre-Consultation Activities with Agencies and Community Organizations prior to Application Submittal

Government Agencies

1. Department of Planning: Meetings on September 1, 2005, September 6, 2005, December 15, 2005, January 18, 2006 and March 10, 2006 with the Planning Department staff to discuss the project and address planning related requirements and concerns. These meetings were held with the Director and staffs of the Current Planning Division, Long Range Planning Division and Zoning Administration and Enforcement Division.

2. Department of Public Works and Environmental Management: January 27, 2006 meeting with the Deputy Director and Engineering Division staff to discuss the project and address traffic circulation issues.

3. State Department of Transportation – Highways Division: January 23, 2006 meeting with the Maui District Engineer and staff, State Department of Transportation, Highways Division, to discuss transportation related issues affecting Puunene Avenue, Kamehameha Avenue, and Kaahumanu Avenue.

4. Members of the Maui County Council: Briefing sessions to discuss project plans were held with individual members of the Council on December 7, 2005, December 28, 2005, December 29, 2005, January 5, 2006, January 12, 2006, and January 16, 2006.

5. Maui County Urban Design Review Board: A presentation was made to the Board on February 21, 2006.

6. Maui Planning Commission: A presentation was made to the Commission on February 28, 2006.

7. Housing Division of the Department of Housing and Human Concerns: A presentation was made on January 27, 2006.

8. Arborist Committee: A presentation was made to the Arborist Committee on May 17, 2006.

Community Outreach

1. Residential Broker Focus Group: July 7 and 8, 2006, meeting with a group of realtors to solicit comments on early versions of the Kahului Town Center plans.

2. Community Open House: A half-day long open house was held on January 21, 2006 to provide residents, businesses, community leaders and other interested persons with the opportunity to review project plans, provide comments, and ask questions regarding the project.

3. Rotary Club of Wailuku: Meeting held with club members to discuss project plans.

ALAN M. ARAKAWA
Mayor
MICHAEL W. FOLEY
Director
WAYNE A. BOTEILHO
Deputy Director

RECEIVED
FEB 28 2006
CHRIS HART & PARTNERS
Landscape Architecture & Planning
cc: Mike CHP 05/173

COUNTY OF MAUI
DEPARTMENT OF PLANNING

February 24, 2006

Mr. Michael J. Summers
Chris Hart & Partners
1955 Main Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Summers:

Re: Early Pre-consultation Comments by the Maui Urban Design Review Board Comments on the Kahului Shopping Center Mixed Use Redevelopment Project at TMK 3-7-007: 009, 10, 27, 5, 8 and 50, Kahului, Maui, Hawaii

At its regular meeting on February 21, 2006, the Maui Urban Design Review Board (UDRB) was presented with a conceptual scheme for a mixed use redevelopment project at the Kahului Shopping Center. The Board offered the following comments on the project:

1. Members of the Board liked the inclusion of a round about within the project as they believed this project would be a good project to initiate this traffic measure.

2. Members of the Board looked favorably on the inclusion of a water feature at the center of a round about as they felt that the water provides a calming and cooling effect.

3. The development should consider the use of R-1 water for irrigation.

4. That mitigative measures should be incorporated to facilitate ingress and egress traffic movements along Kaahumanu Avenue.

5. A member of the Board expressed strong concerns about the incorporation of new streets through the development which brings the automobile to the forefront of the project. This member encourages a pedestrian only center for this project.

6. Another Board member favored the new streets through the project as he felt that the mix of pedestrian and vehicular movement through the project will provide more viability.

7. The proposed one acre park area should incorporate a colonnade into its design.

If additional clarification is required, please contact Ann Cua, Staff Planner, of the Maui Planning Department at 270-7521.

Sincerely,

Mike Foley

MICHAEL W. FOLEY
Planning Director

MWF:ATC:lar
c: Clayton Yoshida, AICP, Planning Program Administrator
Ann Cua, Staff Planner
Darren Lake, A&B Properties
Kivette Caigoy, Environmental Planner
UDRB File
Project File
General File
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CHRIS
HART
& PARTNERS, INC.

July 27, 2006

Mr. Michael W. Foley
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

RE: Response to Early Pre-consultation Comments by the Maui Urban Design Review Board regarding the Kahului Town Center Project located at the site of the existing Kahului Shopping Center, Kahului, Maui, Hawaii (TMK Nos: (2) 3-7-007: 005, 008, 009, 010, 027, and 050).

Thank you for your letter dated February 24, 2006, regarding the above-referenced project. In response to your letter, please find the following comments:

1. Roundabout. The Applicant acknowledges that members of the Board liked the inclusion of a roundabout within the project as they believed the roundabout would be a good project to initiate this traffic calming measure.

2. Water Feature. The Applicant acknowledges that the Board looks favorably on the inclusion of a water feature at the center of the roundabout as they feel it will provide a calming and cooling effect.

3. R-1 Water. At the present time there are no available reclaimed water lines around the site. However, when reclaimed water becomes available it will be utilized for irrigation purposes.

4. Kaahumanu Avenue. Ingress and egress along Kaahumanu Avenue will occur at Kinau Avenue (project driveway). Pursuant to pre-consultation with the State Department of Transportation, the signalization of this intersection is not viable. However, in the interest of safety, and maintaining an acceptable level-of-service, left turns from the project driveway onto Kaahumanu Avenue will be prohibited.

5. Concern Regarding Incorporation of New Streets within the Development. The Applicant acknowledges that concerns were raised by a member of the Board regarding the incorporation of new streets within the development. As a result of these concerns, the Applicant conducted a thorough alternatives analysis of alternative design scenarios. The alternatives analysis specifically evaluated the costs and benefits associated with developing a pedestrian mall at the project site, as opposed to the proposed main street concept. The analysis included an evaluation of an earlier pedestrian mall plan prepared for the site in 1992, a review of the performance of pedestrian malls nationally, and consideration of the increasing market demand for mixed-use retail, commercial, and residential developments. Based upon the conclusions of the analysis, the Applicant will continue to pursue development of the site as a "main street" oriented development. The alternatives analysis has been incorporated into the Draft Environmental Assessment.

6. Support for the Incorporation of New Streets within the Development. The Applicant acknowledges that a member of the Board expressed support for the incorporation of streets into the project since they would facilitate a mix of pedestrian and vehicular movement through the project, which would provide more viability.

7. Colonnade. The Applicant concurs with the comment from the Urban Design Review Board regarding the incorporation of a colonnade into the commercial spaces fronting on the park. The proposed colonnade will provide a 12' wide covered area that will provide a comfortable shaded outdoor space for pedestrians utilizing the park, as well as the potential for outdoor seating area within the colonnade for designated restaurant spaces.

Thank you for your assistance with this project. Should you have any questions, please contact myself, or Mr. Michael Summers, Chris Hart & Partners, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Darren Lake, A&B Properties
Project File

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

RECEIVED
MAY 05 2006
CHRIS HART & PARTNERS
Landscape Architecture & Planning
cc: WMU 05173

COUNTY OF MAUI
DEPARTMENT OF PLANNING

May 3, 2006

Mr. Christopher L. Hart, ASLA
Chris Hart & Partners, Inc.
1955 Main Street, Suite 200
Wailuku, HI 96793

Dear Mr. Hart;

RE: Preconsultation for the Proposed Kahului Town Center Redevelopment Located at TMK: 3-7-007: 005, 008, 009, 010, 027, and 050, Kahului, Island of Maui, Hawaii (EA 2006/0008)

The Maui Planning Department (Department) has reviewed the Pre-Draft Environmental Assessment (EA) document voluntarily prepared for review in accordance with Chapter 343, HRS, and 11-200, HAR, for the proposed redevelopment of the Kahului Town Center.

The Department requires the following additions to the document in order to continue processing:

1. Chapter I, Project Information

    a. As indicated, the proposed action may require off-site infrastructure improvements. Please be advised that if these improvements occur on county/state land, then compliance with Chapter 343, HRS, will be required. As such, the Department recommends fully disclosing all potential improvements within the scope of this Environmental Assessment (EA) for a comprehensive review of the proposed action and to prevent the need for supplemental documents at a later date.

    b. List whether the proposed action will require building, grading, and demolition permits. Further, confirm whether the proposed action will require an NPDES permit and flood development permits.

2. Chapter II, Description of the Property and Proposed Action

   a. Discuss and further research alternative Architectural Designs to incorporate the following:

      i. Include a larger "representative" sample of Maui architecture in the project, including NeoClassical and Mission Revival.

      ii. Provide rationale as to the use of wood clapboard and board and batten (Plantation style) for the majority of the facades in the project given the fact that NeoClassical and Mission Revival styles on Maui were almost equally prominent and were almost always articulated in concrete or plaster.

      iii. In lieu of using EFISS (plaster coating) for the exterior wall system, the Department recommends that GFRC (glass fiber reinforced concrete) be used because of its ability for high detail areas such as cornices, moldings, pilasters, etc., and longevity.

      iv. Discuss alternatives to the two-story "town homes" with front yards in as much as, the units are not necessarily an urban house type, but of suburban character. The exteriors allude to an architectural design non-characteristic of Maui.

   b. As requested by the Urban Design Review Board (UDRB), discuss incorporating a colonnade into the design of the proposed one-acre park.

   c. Parking Analysis

      i. Sidewalks measuring 20 feet in width are proposed to accommodate sidewalk dining and retail displays. Discuss how this additional floor area was considered in the parking analysis.

      ii. The Town Square Park is proposed for public activities which could generate more vehicular activity above the established services of the proposed action. Discuss how this service was considered in the parking analysis.

iii. Angled parking is proposed along interior streets. Discuss any potential impacts to traffic circulation within the project and potential secondary impacts on feeder roads.

iv. Clarify the intent of "permanent structured parking".

v. Include or reference the Table on Page 67 in the parking discussion in Chapter II for clarity.

d. The residential component of the proposed action provides for approximately 442 residential units.

i. Provide a breakdown and discuss the anticipated sales price for the various unit types.

e. Identify the Monkey Pod trees on an existing site plan that will be retained, removed, and relocated. Include comments and recommendations by the Arborist Committee at the scheduled meeting of May 17, 2006, as preconsultation.

f. A project master plan and design guidelines are proposed to guide the development of the proposed action. Discuss the entity responsible for ensuring compliance with these guidelines.

g. Correct the typographical error relative to the first and second paragraphs on Page 17.

h. Alternatives Discussion

i. Provide definitions for "regional mall," "pedestrian mall," "shopping center," and "town center."

ii. Discuss the alternative of designing the drainage system to manage more than the net increase of stormwater runoff generated by the proposed action.

iii. Discuss design alternatives for the proposed drainage system to incorporate pervious surfaces, bioswales, etc. to further capture and retain stormwater runoff generated by the proposed action.

3. Chapter III, Description of the Existing Environment, Potential Impacts, and Mitigation Measures

   a. Flood and Tsunami Hazard

      i. Provide further discussion as to the flood hazard mitigation measures required for the proposed action per structure.

      ii. Provide a proposed site plan with the flood zones delineated.

      iii. Discuss potential impacts in the event of a tsunami.

   b. Air Quality

      Identify the ages of the existing structures and whether any regulated building materials (i.e., asbestos, lead-based paint, and arsenic-containing canec board) are present. Discuss potential impacts and proposed mitigative measures should these building materials be present and require demolition.

   c. Visual Resources

      i. Provide a visual analysis with overlays on existing photographs of the proposed project from the bordering roadways.

      ii. Although the majority of the overhead lines are located along the property's frontage and the County only requires relocating these lines underground in concert with road widening improvements, discuss the potential of relocating the lines underground to further improve the visual effect on the proposed action.

      iii. Discuss the proposed lighting plan, potential impacts, and proposed mitigative measures.

   d. Socio-Economic Environment

      i. Discuss whether the proposed action may require the development of affordable housing in accordance with the County of Maui's policy.

ii. The discussion references a study prepared by SMS Research and Marketing Services, Inc., June 2002. Clarify whether this study was prepared for the proposed action. Include the study as an appendix within the document, if appropriate.

iii. Provide further discussion as to how the proposed action will be "designed to specifically target Maui residents" for housing opportunities.

e. Infrastructure

i. Discuss the feasability of using reclaimed water for irrigation purposes.

ii. Discuss designing the drainage system to incorporate filtration and pollutant removal devices.

iii. Traffic Impact Analysis Report

(1) Disclose all mitigation measures referenced in regards to the MCC and Kane Street projects.

(2) The statement regarding the Superferry on page 20 of the TIAR is inadequate. Provide additional documentation, research, and analysis supporting the conclusions of the TIAR.

(3) The proposed action is likely to become a tourist destination for cruise ship passengers and the Superferry. As a result, pedestrian and vehicular activity may potentially increase during peak and non-peak hours. Provide further discussion as to how the proposed action intends to address this increase in activity. Further discuss how the proposed action intends to provide pedestrian connectivity between the harbor and the subject property.

iv. Provide conclusions as to whether the proposed action will impact schools and discuss potential mitigation measures.

v. Provide a detailed solid waste disposal and recycling plan during the demolition and construction phases of the proposed action.

f. Construction-related Impacts: Discuss the phasing and staging of construction areas for the build-out span of the proposed action.

4. Letters received during preconsultation should be incorporated in the document as an appendix. At a minimum, include comment letters from UDRB, Arborist Committee, and the Department (a copy of this letter).

5. Figures, Site Plans, and Drawings

   a. Figure 12: Include the estimated date of the photographs.

   b. Figure 17.k: The Kamehameha Avenue Exterior Elevation shows Quadrant Two on both sides of Kinau Avenue.

   c. Provide a proposed Grading Plan, which identifies the cut and fill areas by +/- elevation notations.

   d. Specify the height of each building from grade.

Upon completion of the foregoing, please submit two (2) copies to the Department for further review. Please note that the Department requires a copy ten (10) calendar days prior to the anticipated OEQC Submission Deadlines.

Should you require further clarification, please contact Ms. Kivette Caigoy, Environmental Planner, by email at kivette.caigoy@co.maui.hi.us or 270-7735. For questions regarding the Special Management Area (SMA) Use Permit application, please contact Ms. Ann Cua, Staff Planner, or by email at ann.cua@co.maui.hi.us or 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:KAC:ATC:bv
c: Wayne A. Boteilho, Deputy Planning Director
Clayton I Yoshida, Planning Program Administrator
Kivette A. Caigoy, Environmental Planner
Ann T. Cua, Staff Planner
Stanley C. Solamillo, Staff Planner
EA Project File
General File
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ALAN M. ARAKAWA
Mayor
MICHAEL W. FOLEY
Director
DON COUCH
Deputy Director

RECEIVED
MAY 26 2006
CHRIS HART & PARTNERS
Landscape Architecture & Planning

COUNTY OF MAUI
DEPARTMENT OF PLANNING

May 23, 2006

Mr. Bill Mitchell
Chris Hart & Partners
1955 Main Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Mitchell:

Re: Arborist Committee Comments on the Kahului Shopping Center Mixed Use Redevelopment Project at TMK 3-7-007:009, 10, 27, 5, 8 and 50, Kahului, Maui, Hawaii

At its regular meeting on May 17, 2006, the Maui Arborist Committee was presented with a conceptual scheme for a mixed use redevelopment project at the Kahului Shopping Center. Specifically, the committee discussed the proposed landscape planting plans for the project which includes removal of a number of existing mature trees. The Committee offered the following comments on the project:

1. The Committee recognized the significance of Monkeypod trees to the site and its relationship to the community.

2. A number of mature trees exist on site. The Committee indicated that a small number of these trees are healthy and many may be too old to be moved. As such, the Committee prefers planting of new field stock trees as opposed to relocation of existing trees onsite.

3. A certified and qualified arborist shall assess the health and structural integrity of all existing trees prior to each phase of development. For those trees found to be healthy and structurally sound, relocation of these trees could occur onsite or at another location of public benefit.

4. There is insufficient planting area identified on the project plans for the proposed Monkeypod Trees that will line the roadways that will eventually form a canopy over the streets. The Committee recommends that the Monkey Pod Trees be planted in a minimum 15'x 15' space to promote the health of the tree. The proposed 12'x12' space is not adequate. The Committee further noted that the actual appropriate planting area for such a tree type is 30'x30'.

5. The proposed Monkeypod Trees within the one (1) acre park site shall be set back 15 feet from the edge of pavement.

6. When trees are planted the natural soil should be amended as opposed to bringing in new soil.

If additional clarification is required, please contact Ms. Ann Cua, Staff Planner, of the Maui Planning Department at 270-7521.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:ATC:lar
c: Clayton Yoshida, AICP, Planning Program Administrator
Ann Cua, Staff Planner
Michael Summers, Chris Hart & Partners
Kivette Caigoy, Environmental Planner
UDRB File
Project File
General File
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CHRIS HART & PARTNERS, INC.

June 29, 2006

Mr. Michael W. Foley
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

RE: Draft Environmental Assessment and Special Management Area (SMA) Permit for the Kahului Town Center Project located at the site of the existing Kahului Shopping Center, Kahului, Maui, Hawaii (TMK Nos: (2) 3-7-007: 005, 008, 009, 010, 027, and 050).

Thank you for your letter dated May 3, 2006, regarding the above-referenced project. In response to your letter, please find the following comments:

1. Chapter 1, Project Information

   a. Use of State and/or County lands could include, but will not be limited to, offsite infrastructure improvements relating to roadway, traffic, water, sewer, utility and drainage facilities affecting State and/or County roadways or other lands. While the specific nature of each improvement is not known at this time, the EA is intended to address all current and future instances involving use of State and/or County lands relating to offsite infrastructure improvements in support of the proposed project.

   b. The proposed action will require building, grading, and demolition permits. In addition, an NPDES permit will be required as well as flood development permits.

2. Chapter 11, Description of the Property and Proposed Action

a.i-iv. Alternative Architectural Designs.

Architectural Style

The majority of the facades reflect a "plantation style" motif due to the fact that Kahului's past is steeped in plantation history. Additionally, this motif was appropriate for creating a livable, comfortable, and humble sense of place for the local community with a connection to the site history. While Neo Classical and Mission Revival architecture does have a place in the architectural fabric of Maui and the state in general, it is far more representative of the aristocratic architecture, seats of government, and larger commercial buildings.

The plantation motif was an appropriate request of the developer, as it would attempt to hearken back to the plantation camps that existed on the site in the 20's and 30's, such as Fish Camp, Filipino Camp, and Store Camp. As such, it was felt the plantation vernacular would be a good fit for housing developed for the local community. Both the commercial and portions of the larger residential buildings incorporate plaster, akin to the Baldwin Bank and the Old Kahului Store as an example of context.

The project is large enough to support multiple aesthetics and does. The project applies many specific details that are reminiscent of some of the more prominent Neo Classical and Mission Revival buildings in Maui without creating a "revival" kind of place. This approach considers the Secretary of the Interior's guidelines for Historic Buildings, we should not wholesale recreate historic buildings; we should create new buildings that are informed by our past but not slaves to it.

Construction Materials

GFRC will be used in some places within the project that require greater architectural detailing, but this is an expensive material and the benefits of its use will be balanced against the impact on the project budget. EFISS, in general will be avoided due to issues relating to its longevity and potential for warranty issues. The current design of the project mixes different styles and building materials with a cost effective level of detail that is strong enough to communicate a "Maui" mix of architectural styles while still making the project financially feasible at the proposed residential price points.

Town Home Rationale

Town Homes were considered for the project as an alternate form of housing that is currently not present within the Kahului area. The town homes would target larger families that cannot afford the typical detached single family home but have space needs beyond the typical attached condominium product available on the market. The town homes also serve as a scale transition area between the existing neighborhood, including churches and single family detached homes located directly across Kamehameha Avenue, and the larger scale building within the proposed project.

Loft residences were considered in the master planning of the project but were ultimately dismissed. A loft style unit with an open floor plan appeals to a limited buyer group, significantly reducing the pool of potential buyers. The needs of a potential loft style unit buyer can be accommodated by the other unit types within the project. Whereas families with multiple children may not be accommodated by the other unit types that are proposed to be offered within this project, the town home design seeks to fill this niche. As design development continues, loft style layouts and finishes will be considered for a portion of the units within the project to satisfy this potential market demand.

The development and architectural design team will work closely with County officials to further develop the exterior design of the town homes. Included in this submittal are changes meant to make the design more characteristic of Maui, including the use of NeoClassical and Mission Revival styles for individual unit facades.

b. <u>Urban Design Review Board</u>

We took the comment from the Urban Design Review Board about incorporating a colonnade into the project as a good one and appropriate to the commercial spaces fronting on the park area. A 12' wide covered collonade has been incorporated in the commercial spaces fronting on the park. The colonnade will provide a comfortable shaded outdoor area for pedestrians utilizing the park as well as the potential for covered outdoor seating area within the colonnade for designated restaurant spaces.

c. <u>Parking Analysis</u>

i. In the analysis of different uses within the project with respect to parking requirements, we took what we consider a reasonable assumption for calculating the parking requirement for the typical restaurant space. Maui County's requirement for restaurants is 1 stall

/ 100 sf of dining area plus 3 stalls for employees of the restaurant. Our more recent experience with restaurants is that most smaller restaurants (1,000 sf – 1,500 sf) such as Bale Sandwich, Quizno's, Subway, L&L Drive have very little indoor seating area and are roughly 60% kitchen area and 30% dining area. Mid sized sit-down restaurants (2,000 sf – 4,000 sf) such as Auntie Pasto's or similar have roughly 50% kitchen to 50% dining area. Larger sit-down restaurants will be 33% kitchen area to 66% dining area. In our calculations for parking we conservatively figured that all designated restaurant space will be parked for 30% kitchen area and 70% dining area which should allow for excess stalls available to be designated outdoor seating areas fronting the restaurant. Again, this is our best guess based on our experience with restaurants and not knowing who the final restaurant user will be and how much seating area they will have. The parking requirement will need to be adjusted during final construction documents for the restaurant users and outdoor seating will eventually be limited by available parking.

It is not envisioned that any permanent retailing for non-restaurant users will be done within the 20' wide sidewalk areas and have not included any provisions for additional parking for exterior retailing within the calculations for parking.

ii. The Town Square Park will primarily serve as a gathering place for residents of the project and for customers of the project's various restaurants and retailers. Occasionally, the park may be utilized for special events, such as a farmers or crafters market, musical performances, etc. Such events will be typically scheduled during non-peak traffic hours, such as during weekend mornings and evenings. If it is anticipated that an event will overlap into the peak periods, a traffic and parking management plan will be developed. Since each event may be unique, it is not possible to anticipate these events in preparing the TIAR or the parking analysis. Based on the traffic engineer's experience with the Hawaii Convention Center, after several events, a library of traffic and parking management plans is amassed.

iii. During the 70's and 80's, many jurisdiction removed on-street angled parking in response to safety concerns. More recent experience is that angled parking should be assessed on a case-by-case basis in the context of specific situations and the goals of the community. One of the conditions in which angled parking is acceptable is on low volume, low speed streets, such as those planned for this project.
From a site design and function perspective, there are four (4) reasons why angled parking has been incorporated into the project: 1) On-

street parking significantly benefits retailers and restaurateurs by providing conveniently located parking fronting their businesses; 2) On-street parking creates a "Main Street" appearance and atmosphere within the project; 3) On-street angled parking has been demonstrated to calm traffic, to the benefit of pedestrians, by creating friction along the roadway; and 4) Angled parking is more efficient than parallel parking.

In order to mitigate the potential for vehicular congestions arising from vehicles backing into traffic, the total pavement width has been widened to 64 feet, including the area required for angled stalls, with two 14-feet wide travel lanes.

iv. Permanent structured parking refers to parking that is located within a parking structure.

v. The table on page 67 has been referenced in the discussion of parking in Chapter II.

d. <u>Affordable Housing</u>

i. Market conditions and construction costs will dictate the actual pricing of the residential units at the time of sales. The residential units are anticipated to range from the upper-$200,000's to the $600,000's.

e. <u>Monkey Pod Trees / Arborist Committee Comments</u>

The Monkey Pod trees that will be retained, removed, and relocated on the property are shown on Attachment No. 1. Attachment No. 2 is the Arborist Committee comment letter dated May 23, 2006. This letter will be incorporated into the Draft EA.

f. Project Master Plan and Design Guidelines

Design guidelines are being prepared to guide the build-out of the project site through its four phases. We would rccommend that the Planning Department assume the responsibility for ensuring compliance with the design guidelines, as the Planning Department has a similar responsibility to administer the County's various other Country Town Design Guidelines.

g. Typographical Error

The typographical error on Page 17 has been corrected.

h. Alternatives Discussion

i. The following are definitions of different shopping center configurations:

- Shopping Mall – A shopping center with a pedestrian focus where customers park in private parking lots located around the mall, or in outlying areas and walk to stores.

- Pedestrian Mall – A large or small shopping area, typically in a town center, where a narrow pedestrian only street or plaza provides access to the stores. Customers typically park in private parking lots located around the mall, or in outlying areas and walk to the stores.

- Regional Mall / Shopping Center –A shopping mall which is designed to service a larger area than a conventional mall. Typically provides general merchandise and services in full depth and variety. Parking typically occurs in private parking lots or structures, or in outlying areas and customers walk to stores.

- Town Center / Main Street – The central business district located in the traditional shopping area of smaller towns, or a secondary business district in a suburb or within a larger city. Mixed-use development is becoming more common in Town Centers. Mixed-use development combines several uses in one complex or area – for example retail, office, hotel, residential, and business and personal services.

ii. At a minimum, the additional storm runoff created by the project will be retained on site. The project will try to retain as much runoff by incorporating pervious surfaces and retention swales as well as underground retention piping.

iii. The project will try to incorporate pervious surfaces and retention swales as well as underground retention piping in order to retain and filter storm water on site.

3. <u>Chapter III. Description of the Existing Environment, Potential Impacts, and Mitigation Measures</u>

a. Flood and Tsunami Hazard

i. The "V-line" of the tsunami inundation zone passes through a small portion of Quadrant 3 fronting on Kaahumanu Ave. This portion of the structure has been designed to be approximately 3.8 feet above the existing grade and supported on structural piers above the existing grade such that Tsunami waters can pass under this portion of the structure with minimal obstruction to the flow of water.

Flood Zone A4 is outside of the tsunami inundation zone and is an area of 100-year flood with base elevations determined. Floor elevations for buildings within Flood Zone A4 will have elevations equal to or higher than the known base flood elevation.

ii. A site plan has been incorporated into the report that delineates flood zones (See: Attachment No. 3).

iii. During a Tsunami event, water will pass under the portions of the structures that have been elevated with minimal obstruction to the flow of water. Structures outside of the inundation zone, will be elevated equal to or higher than the known base flood elevation.

b. Air Quality

Prior to demolition of the existing structures, a comprehensive survey by a certified asbestos inspector will be undertaken to identify any asbestos-containing materials that may be present, as required by state and federal regulations. A pre-demolition survey for other potential hazardous materials, including but not limited to lead-based paint, fluorescent light bulbs, and PCB-light ballasts, will also be conducted.

All asbestos-containing building materials will be removed and properly disposed of by a licensed asbestos abatement contractor prior to demolition. Any lead-based paint identified during the inspection will be addressed as necessary to ensure compliance with state and federal environmental and health and safety regulations and to control lead exposure during the demolition; lead-based paint that is in good condition will generally not require abatement. Other hazardous materials (fluorescent light bulbs, PCB light ballasts, etc.) will be removed and properly managed prior to the demolition so as to ensure compliance with applicable state and federal environmental regulations. Arsenic-containing canec board, where present, will be carefully removed and handled prior to or during the demolition in order to minimize damage, control any potential for arsenic exposure during the demolition, and ensure compliance with applicable state and federal regulations.

c. Visual Resources

i. Attachment No. 4, A-D, is a visual analysis with overlays on existing photographs of the proposed project from the bordering roadways.

ii. Since Puunene Avenue is being widened, the overhead lines along the Puunene frontage will be relocated underground. New service connections will be designed and constructed underground because the existing systems are near capacity.

The overhead lines along Kaahumanu Avenue are transmission lines and would be cost prohibitive to relocate underground.

iii. The Kahului Town Center site lighting will consist of pole mounted fixtures with a downward directed light source in parking areas and a combination of pole mounted and bollard lights in pedestrian areas. Pole mounted light fixtures will be kept at a pedestrian related height of 12'-15'. All site light fixture design will be coordinated with building architectural fixtures and finishes to compliment one another and add visual unity to the project during the day and at night. The light elements will be specified to maximize energy efficiency and provide the necessary lighting for safety and circulation.

d. Socio-Economic Environment

i. Currently the site is Zoned B-2. Since no change in zoning is required, the site does not require the development of affordable housing. On a site that is currently used exclusively for commercial use, the project proposes to increase the available supply of residential housing by 442 units that will be targeted to Maui residents and as such will help to reduce the existing pent-up demand for housing within the County. Additionally, we are currently working with the County's Department of Housing & Human Concerns to prepare an affordable housing agreement for the project. This agreement will mirror the affordable housing ordinance proposed for Maui County.

ii. The SMS study was prepared in support of the General Plan 2030 update. This document has been referenced in the Draft Environmental Assessment. It is unnecessary to include the report as an appendix.

iii. The housing within the project will specifically target Maui residents by first providing housing that is priced at levels that would generally be considered affordable to the gap-group. Additionally, priority will be given to owner-occupants and to Maui residents for sale of all of the residential units. The number of units that can be offered with first priority to Maui residents is currently restricted by the Owner-occupant provision of the condominium law which prohibits priority from being given to anyone when offering the required 50% Owner-occupant units to the public.

e. Infrastructure

i. At the present time there are no available reclaimed water lines around the site. However, when it becomes available the project will use reclaimed water for irrigation purposes.

ii. Mechanical filtering devices will be analyzed during the design process to also be incorporated into the drainage system.

iii. Traffic Impact Analysis Report

1) All the mitigation measures proposed were provided in the TIAR with the exception of the intersection of Kaahumanu Avenue at Kane Street. SDOT asked that the proposed mitigation be reassessed in response to some topographic constraints. This reassessment is being done as part of the traffic study for the Kane Street Commercial Mixed Use project.

2) Attachment No. 5 is the draft traffic study for the Superferry. The assumptions used for the trip generation analysis are documented in this draft.

3) According to those who are preparing the TIAR for the Superferry, no pedestrian activity will occur between the port and the Kahului Town Center, so the Superferry project has made no provision that we are aware of. However, as part of the Kahului Town Center, we have proposed several measures to enhance pedestrian safety relative to crossing the major streets adjacent to the project. These enhancements include the following:

A. Widening Puunene Avenue and installing a pedestrian refuge island along the median.

B. Modification of the intersection of Kaahumanu Avenue at Puunene Avenue to provide additional capacity and therefore more pedestrian crossing time.

C. Conversion of the intersection of Lono Street at Town Center Drive (Vevau Street) to a four-way STOP to enhance pedestrian safety.

iv. The proposed action will have an impact upon public schools as documented in the Draft Environmental Assessment. The Applicant will work with the Department of Education to determine appropriate mitigation measures to address the project's impact on school facilities.

v. All solid wastes generated during demolition and construction will be managed in accordance with state and federal regulations. Asbestos-containing materials will be disposed of at the Central Maui Sanitary Landfill. Fluroescent light bulbs and any PCB-containing light ballasts will be shipped to mainland disposal or recycling facilities. A detailed plan for recycling of construction/demolition materials will be developed prior to the start of the demolition and construction phases. All other construction/demolition waste that is not suitable for recycling and does not require special management will be disposed of at the Maui Demolition and Construction Landfill.

f. Attachment No. 6 identifies the proposed phasing and staging of construction areas for the build-out period of the project. As documented in the Draft Environmental Assessment, during construction standard mitigation measures will be implemented to construction related impacts including dust and noise from construction vehicles and site work.

4. Pre-consultation letters

Pre-consultation letters from the UDRB, Arborist Committee, and Planning Department have been incorporated into Appendix C of the report.

5. Figures, Site Plans, and Drawings

a. The date of photographs has been identified on Figure 12.

b. The Kamehameha Avenue exterior elevation has been corrected to indicate the correct designation for Quadrant 1 on Figure 17k.

c. A proposed Grading and Drainage Plan showing proposed grades and existing grades has been incorporated into the Draft Environmental Assessment.

d. Building heights (Maximum) have been shown on the exterior elevations for each building.

Thank you for your assistance with this project. Should you have any questions, please contact myself, or Mr. Michael Summers, Chris Hart & Partners, at 242-1955.

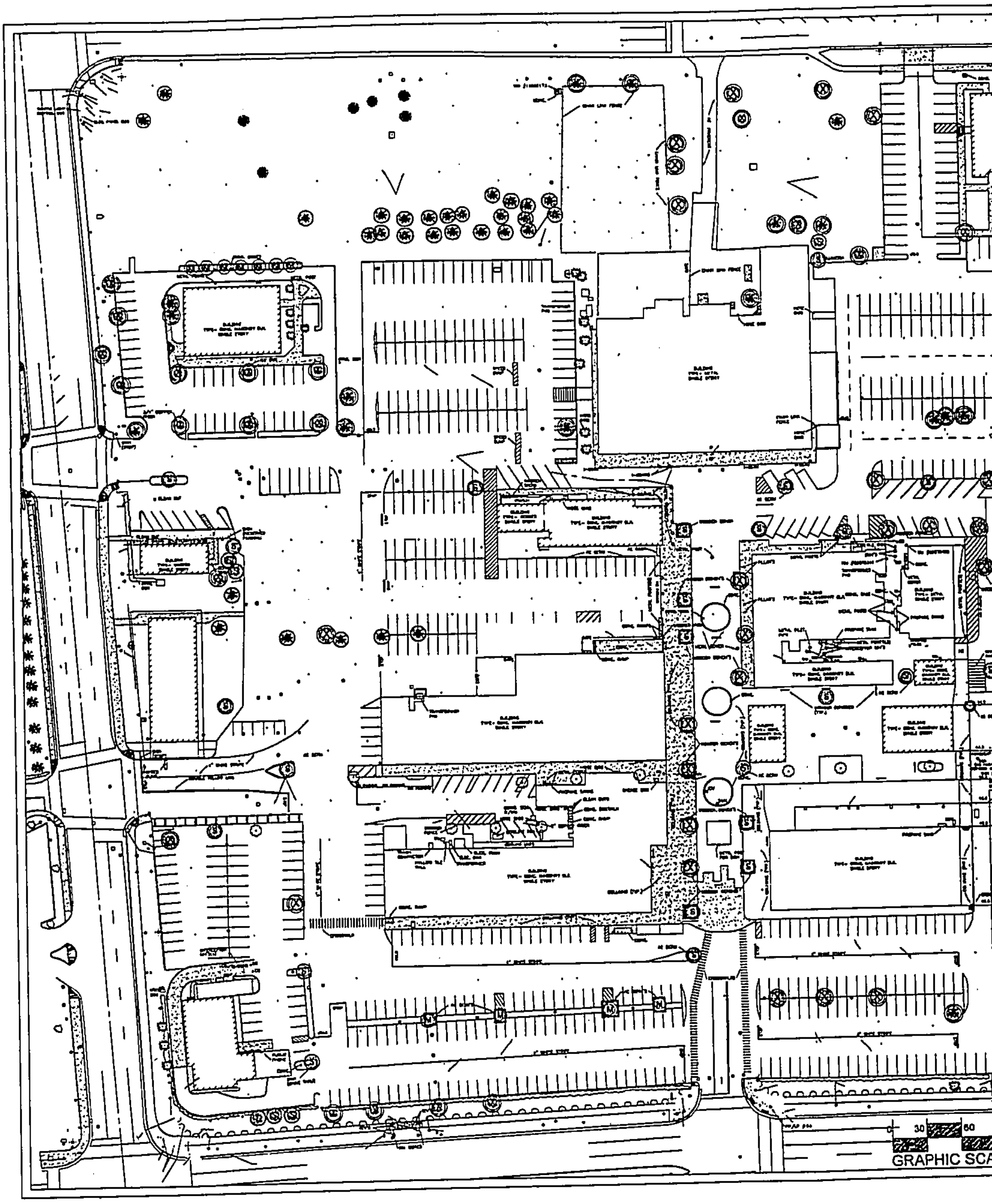
Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

Attachments

cc. Mr. Michael Foley, Department of Planning
Mr. Darren Lake, A&B Properties
Project File



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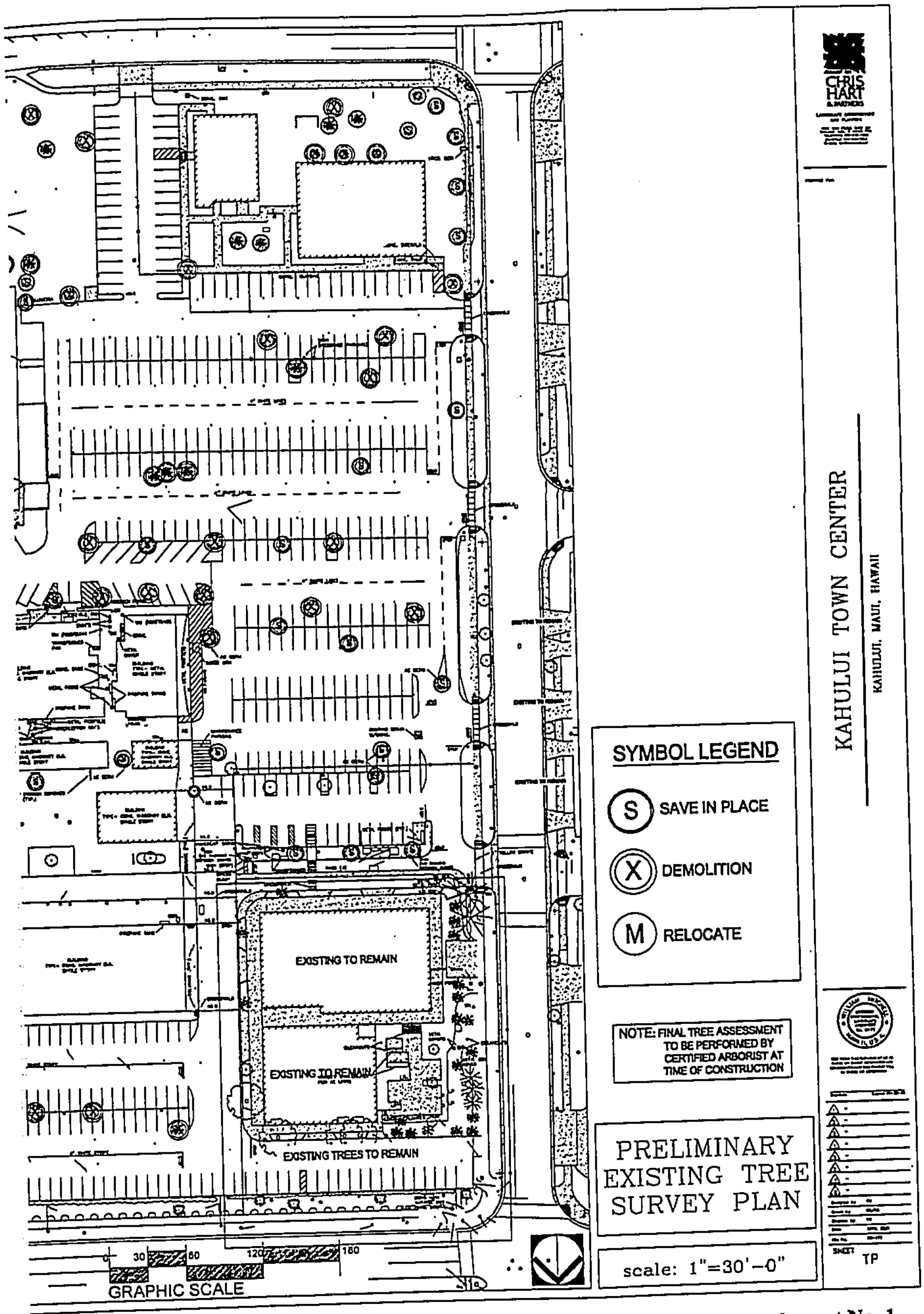

Attachment No. 1

ALAN M. ARAKAWA
Mayor
MICHAEL W. FOLEY
Director
DON COUCH
Deputy Director

RECEIVED
MAY 26 2006
CHRIS HART & PARTNERS
Landscape Architecture & Planning

COUNTY OF MAUI
DEPARTMENT OF PLANNING

May 23, 2006

Mr. Bill Mitchell
Chris Hart & Partners
1955 Main Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Mitchell:

Re: Arborist Committee Comments on the Kahului Shopping Center Mixed Use Redevelopment Project at TMK 3-7-007:009, 10, 27, 5, 8 and 50, Kahului, Maui, Hawaii

At its regular meeting on May 17, 2006, the Maui Arborist Committee was presented with a conceptual scheme for a mixed use redevelopment project at the Kahului Shopping Center. Specifically, the committee discussed the proposed landscape planting plans for the project which includes removal of a number of existing mature trees. The Committee offered the following comments on the project:

1. The Committee recognized the significance of Monkeypod trees to the site and its relationship to the community.

2. A number of mature trees exist on site. The Committee indicated that a small number of these trees are healthy and many may be too old to be moved. As such, the Committee prefers planting of new field stock trees as opposed to relocation of existing trees onsite.

3. A certified and qualified arborist shall assess the health and structural integrity of all existing trees prior to each phase of development. For those trees found to be healthy and structurally sound, relocation of these trees could occur onsite or at another location of public benefit.

4. There is insufficient planting area identified on the project plans for the proposed Monkeypod Trees that will line the roadways that will eventually form a canopy over the streets. The Committee recommends that the Monkey Pod Trees be planted in a minimum 15'x 15' space to promote the health of the tree. The proposed 12'x12' space is not adequate. The Committee further noted that the actual appropriate planting area for such a tree type is 30'x30'.

5. The proposed Monkeypod Trees within the one (1) acre park site shall be set back 15 feet from the edge of pavement.

6. When trees are planted the natural soil should be amended as opposed to bringing in new soil.

If additional clarification is required, please contact Ms. Ann Cua, Staff Planner, of the Maui Planning Department at 270-7521.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:ATC:lar

c: Clayton Yoshida, AICP, Planning Program Administrator
Ann Cua, Staff Planner
Michael Summers, Chris Hart & Partners
Kivette Caigoy, Environmental Planner
UDRB File
Project File
General File

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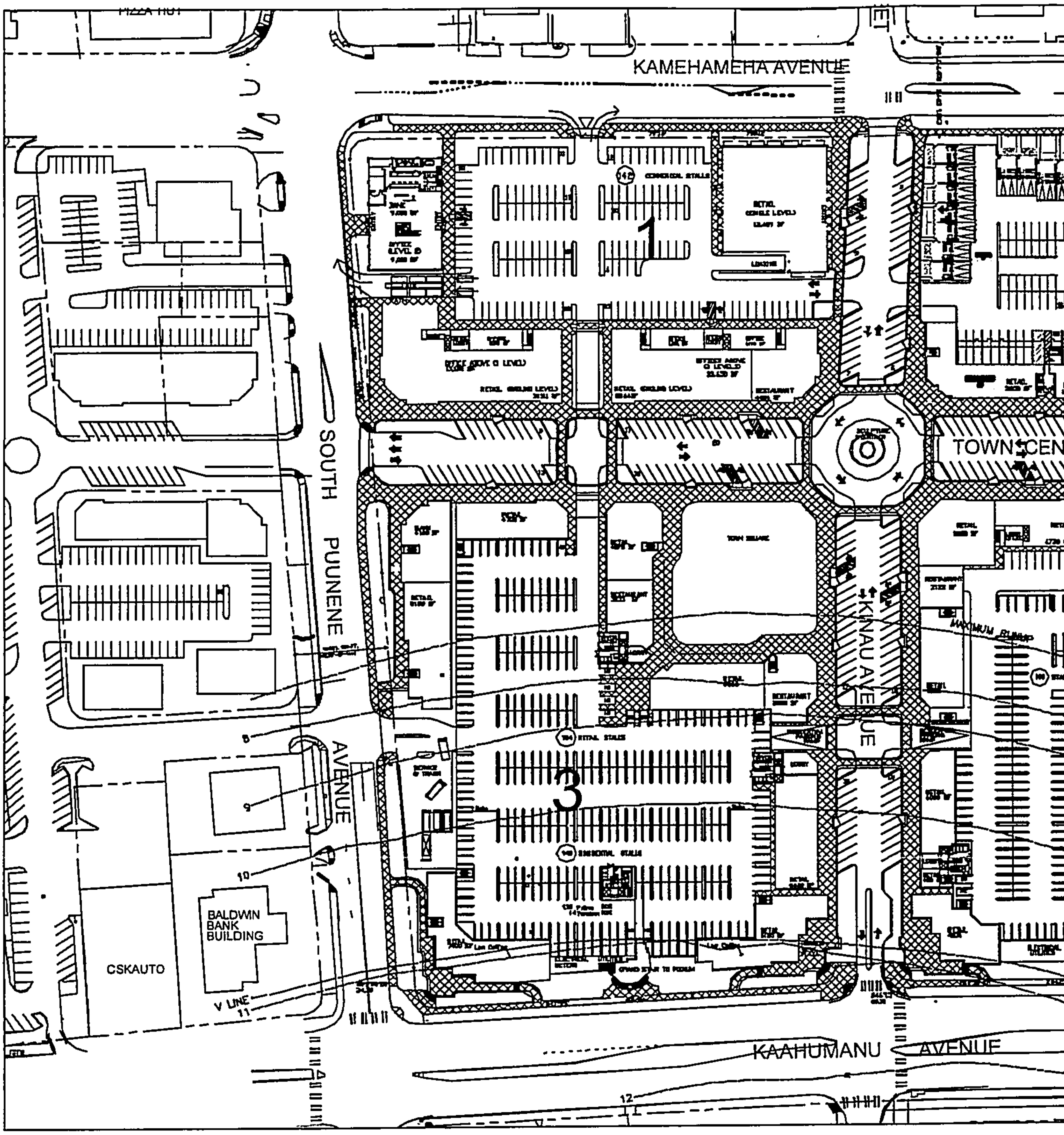
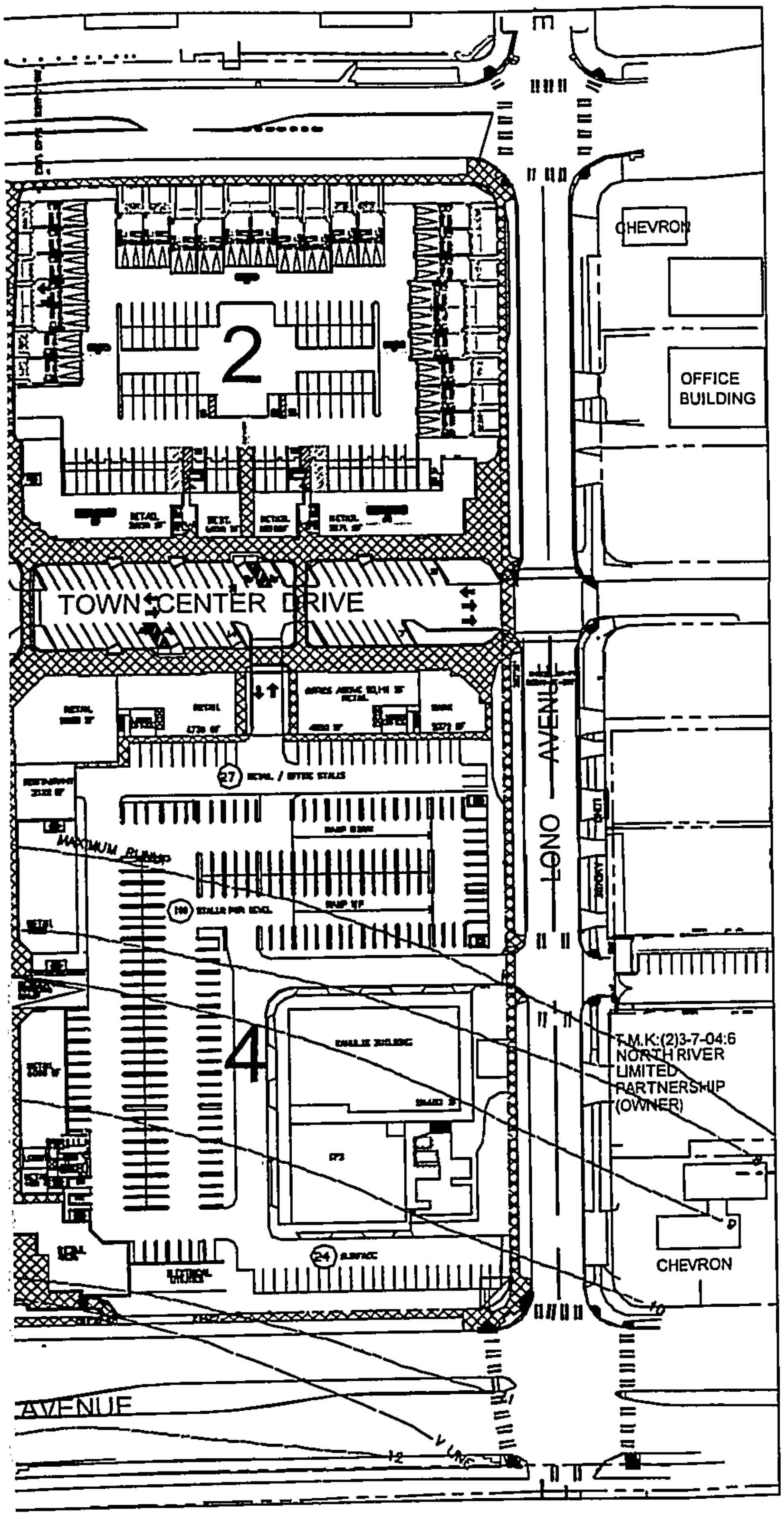


KAMEHAMEHA AVENUE
SOUTH PUUNENE AVENUE
TOWN CEN
KINAU AVENUE
KAAHUMANU AVENUE
BALDWIN BANK BUILDING
CSKAUTO
V LINE
1
3



Kahului Town Center-
Conceptual Site Plan
EXHIBIT B

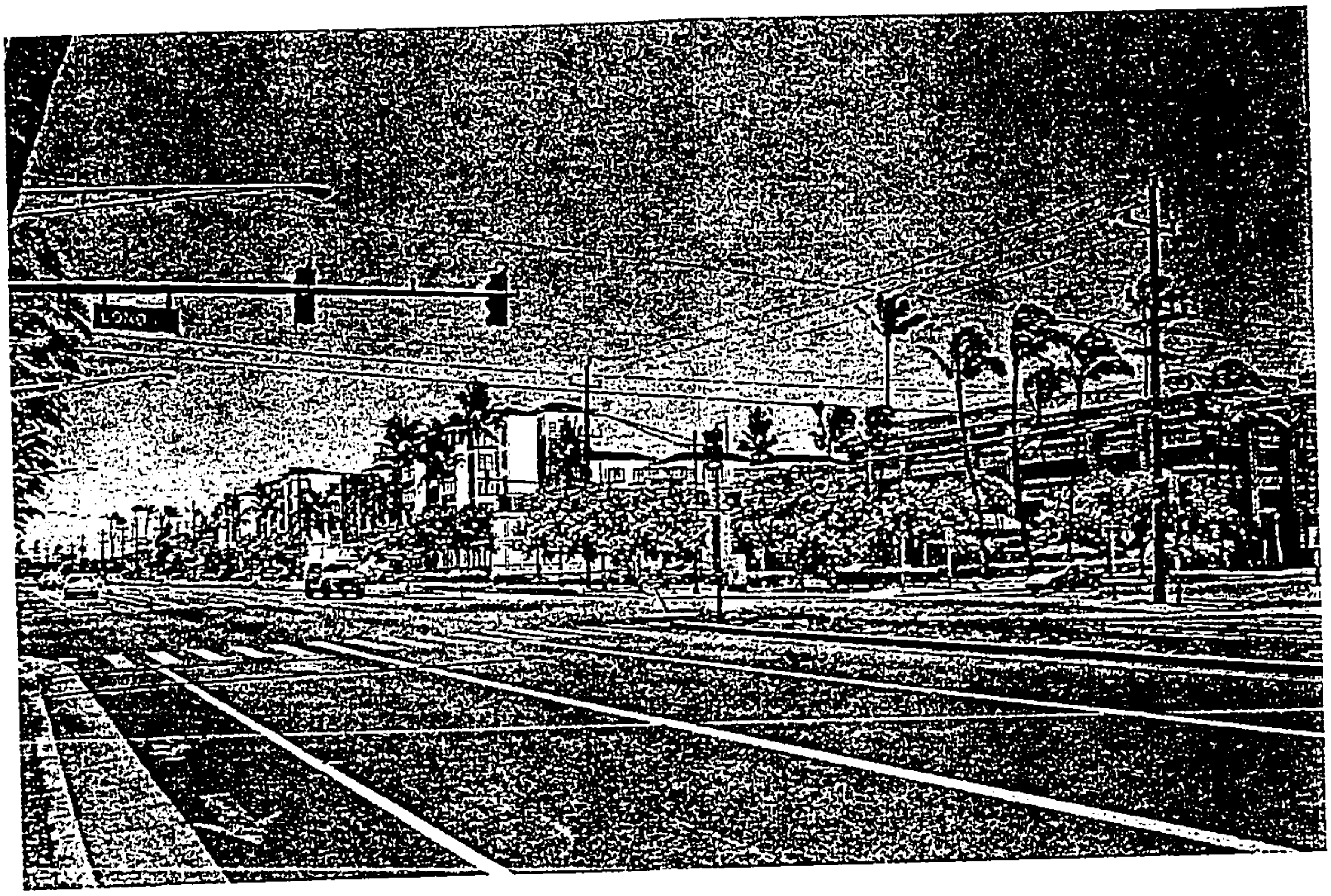
Attachment No. 3

EXISTING CONDITIONS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

KAHULUI TOWN CENT

VIEW FROM KAAHUMANU AND



PROPOSED DEVELOPMENT

CENTER, MAUI

JMANU AND LONO

Mc Architects Incorporated

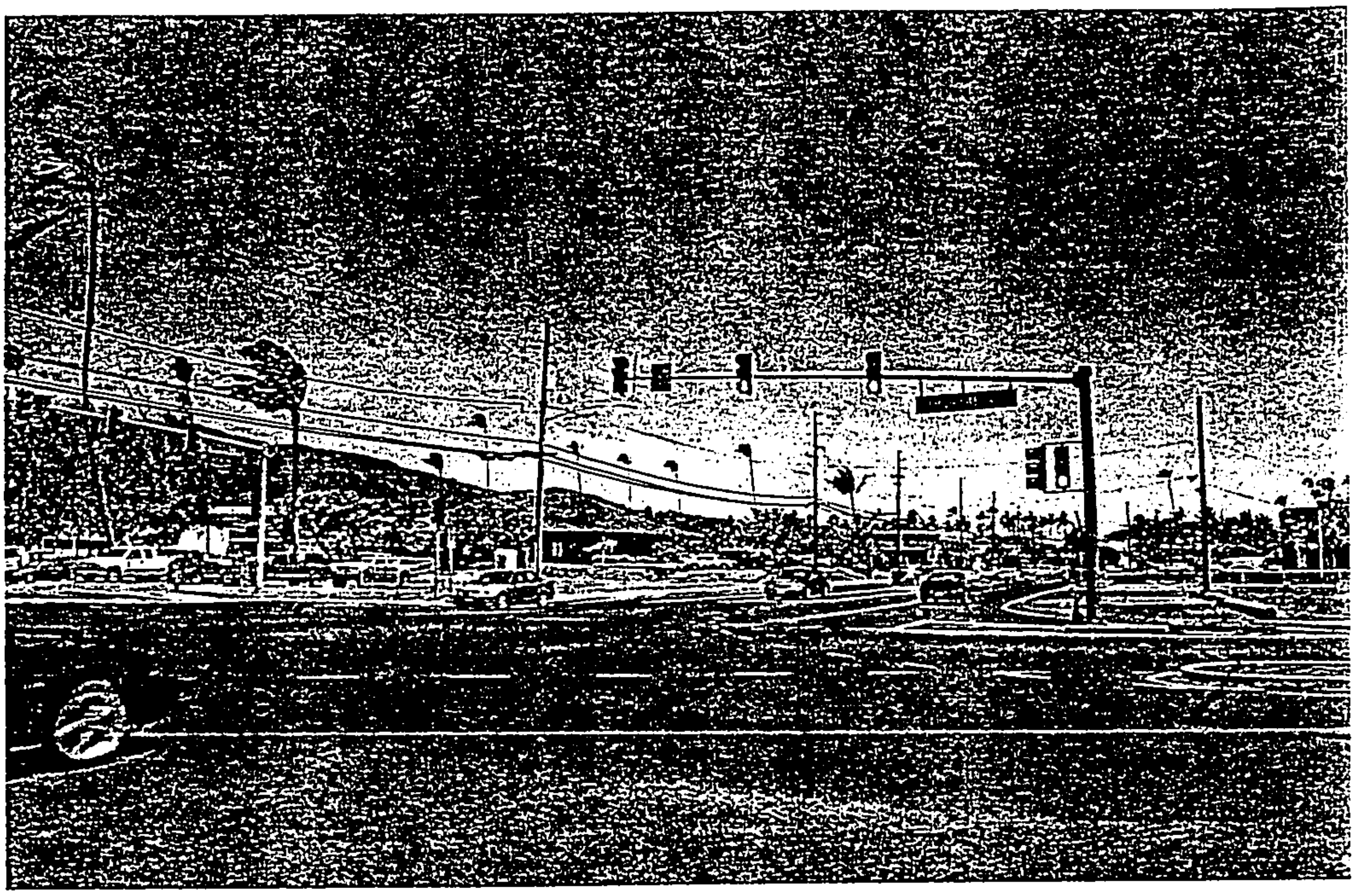
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA

NGA HAWAII LLP

CHRIS HART & PARTNERS INC.

Attachment No. 4, A

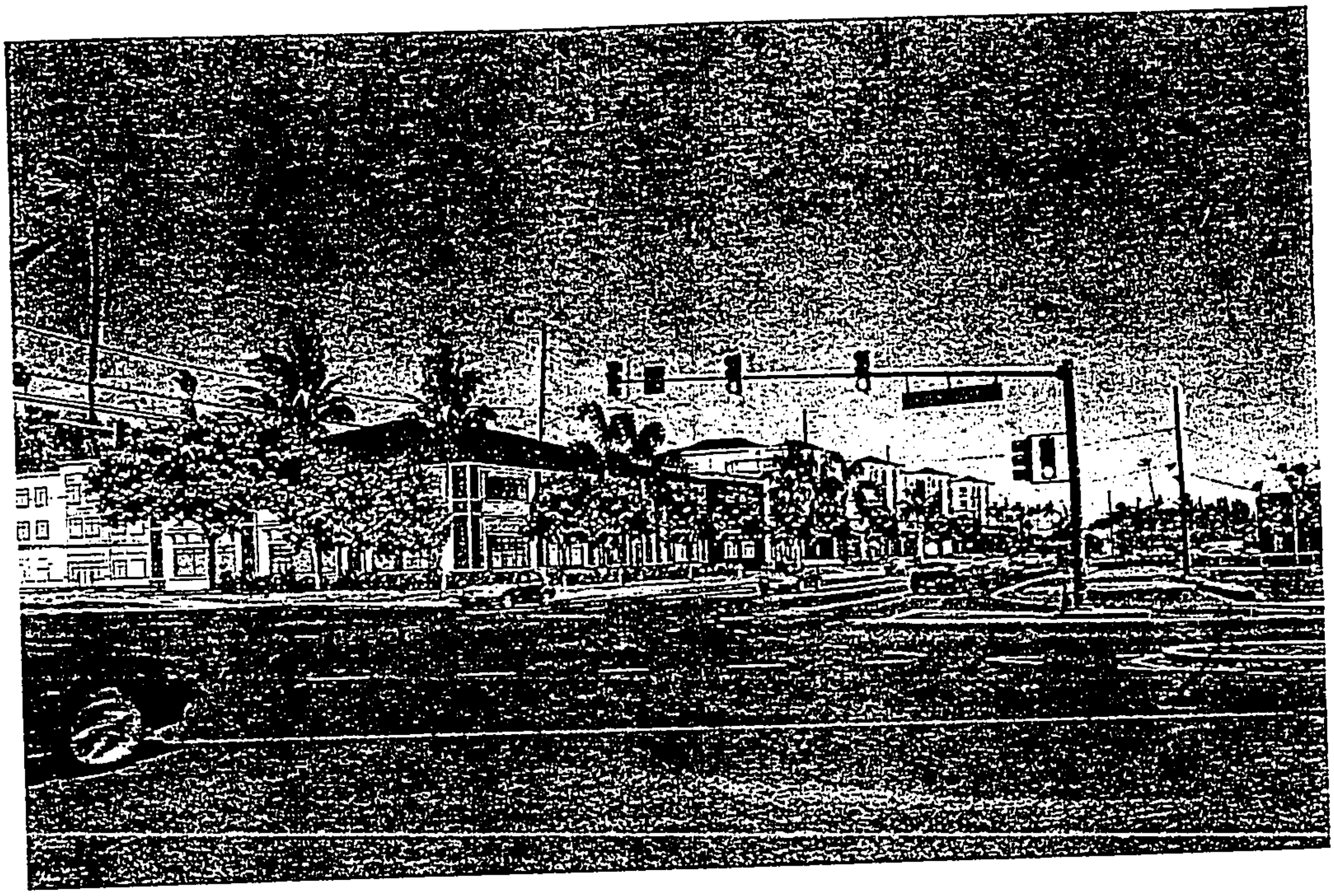


EXISTING CONDITIONS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC

KAHULUI TOWN CENT

VIEW FROM KAMEHAMEHA AND



PROPOSED DEVELOPMENT

I CENTER, MAUI

.MEHA AND PUUNENE

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

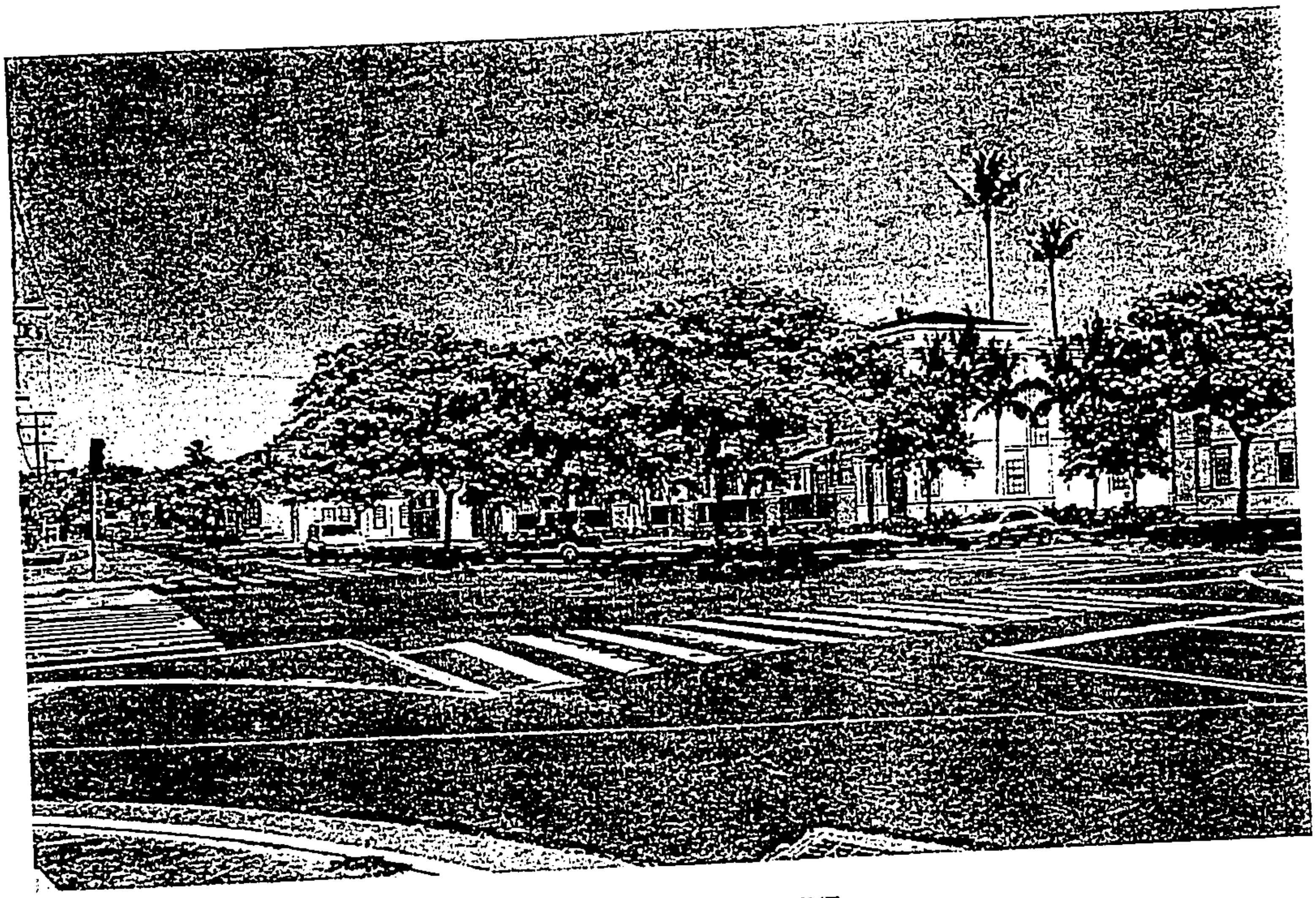
Attachment No. 4, B

EXISTING CONDITIONS

A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC

KAHULUI TOWN CENT

VIEW FROM KAMEHAMEHA AND



PROPOSED DEVELOPMENT

! CENTER, MAUI

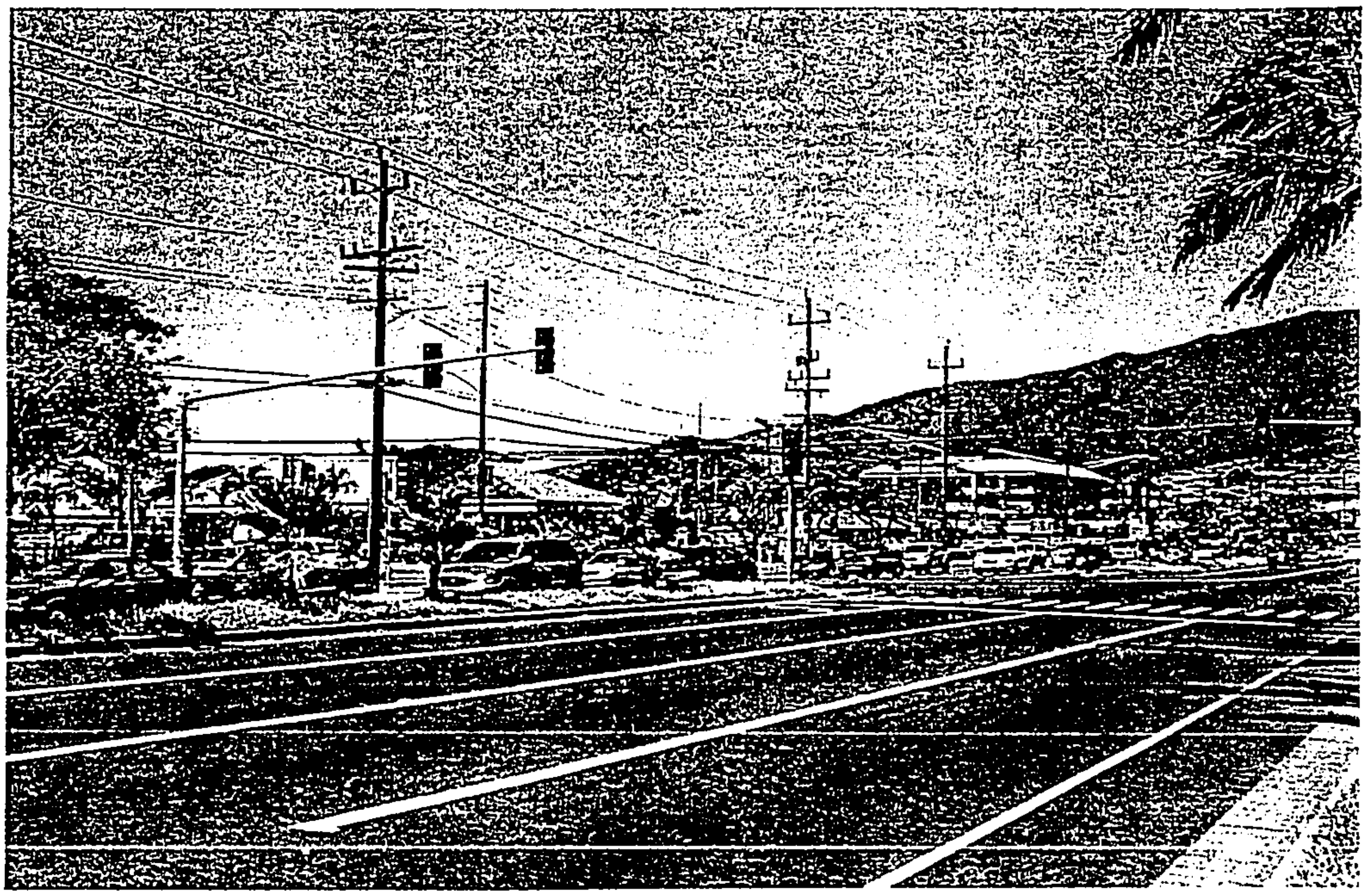
IAMEHA AND LONO

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

Attachment No. 4, C

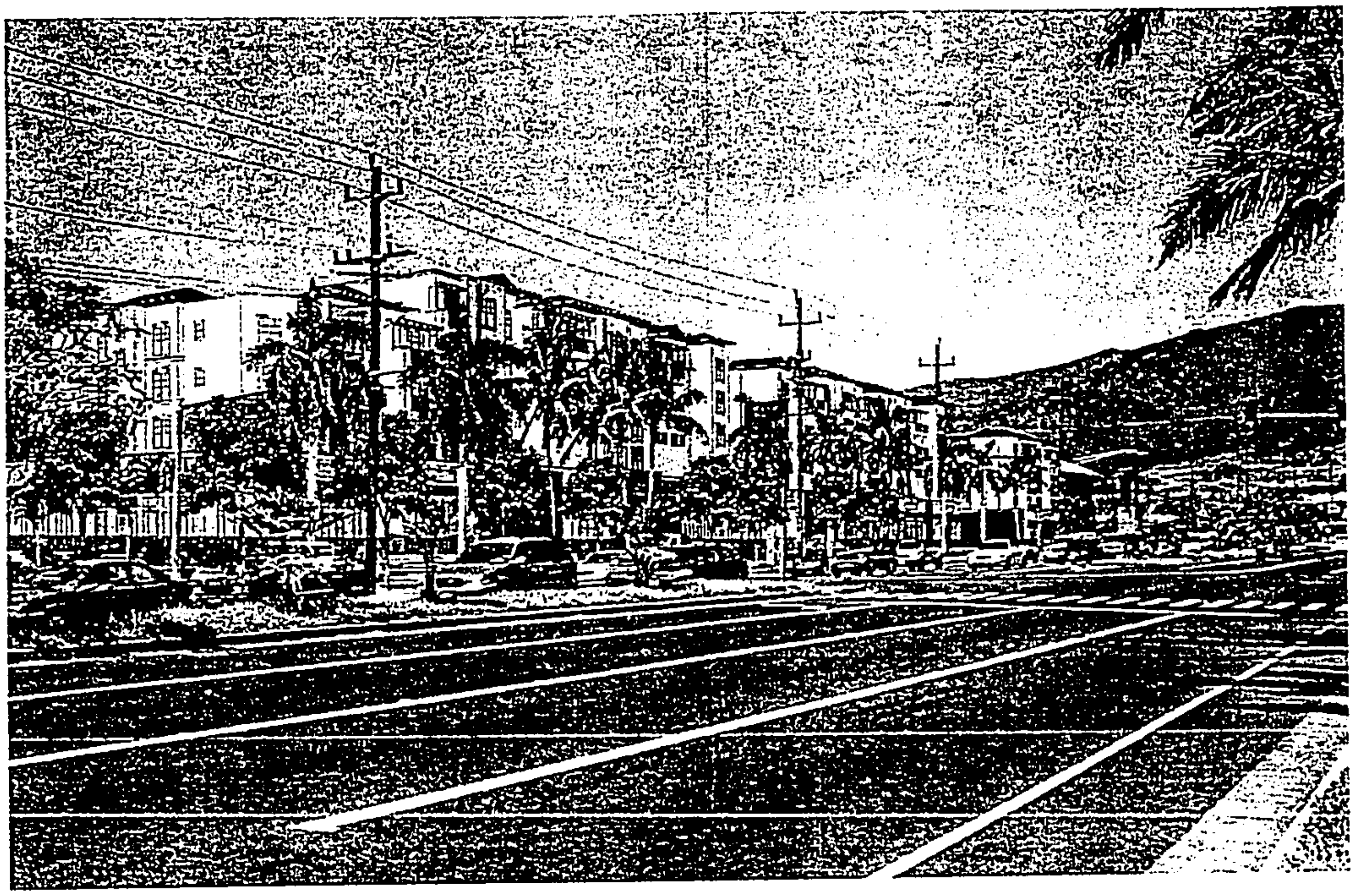


EXISTING CONDITIONS

A&B PROPERTIES, INC.

KAHULUI TOWN CENT

VIEW FROM KAAHUMANU AND P



PROPOSED DEVELOPMENT

CENTER, MAUI

ʌANU AND PUUNENE

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

NGA HAWAII LLP

CHRIS HART

Attachment No. 4, D

Draft

Traffic Study

for

Kahului Ferry Terminal

Pier 2, Kahului Harbor, Maui

Prepared for

Hawaii Superferry

One Waterfront Plaza
500 Ala Moana Boulevard, Suite 302
Honolulu, HI 96813

May 2006

CH2MHILL
CH2M HILL
1585 Kapiolani Boulevard, Suite 1420
Honolulu, HI 96814-4530

Attachment No. 5

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Abbreviations

ADA	American with Disabilities Act
FY06	Fiscal Year 2006
HDOT	Hawaii Department of Transportation
HDOT-Maui	Hawaii Department of Transportation, Maui District
HDOT-Harbors	Hawaii Department of Transportation, Harbors Division
HDOT-HWY	Hawaii Department of Transportation, Highways Division
HSF	Hawaii Superferry, Inc.
LOS	Level of Service
MARSEC	Maritime Security
USCG	United States Coast Guard

1 Introduction

1.1 Project Description

Hawaii Superferry (HSF) will provide interisland vehicle and passenger ferry service between four of the main Hawaiian Islands. The four ports of call are Honolulu Harbor (Piers 19 & 20) on Oahu, Kahului Harbor (Pier 2) on Maui, Nawiliwili Harbor (Pier 1) on Kauai, and Kawaihae Harbor (Pier 1) on the Big Island of Hawaii. HSF proposes to provide interisland ferry service between Honolulu and Kahului once per day. Initial operations will be conducted with one ferry vessel. A second vessel will be put in service in early 2009.

The Kahului Ferry Terminal will be situated in two separate areas due to space limitations within the harbor. Partial operations will occur on Pier 2 and on a lot adjacent to Kaahumanu Avenue (bound by Pu'unene Avenue and Wharf Street). Pier 2 is located on the west side of Kahului Harbor. Figure 1 identifies the location of the Kahului Ferry Terminal operations.

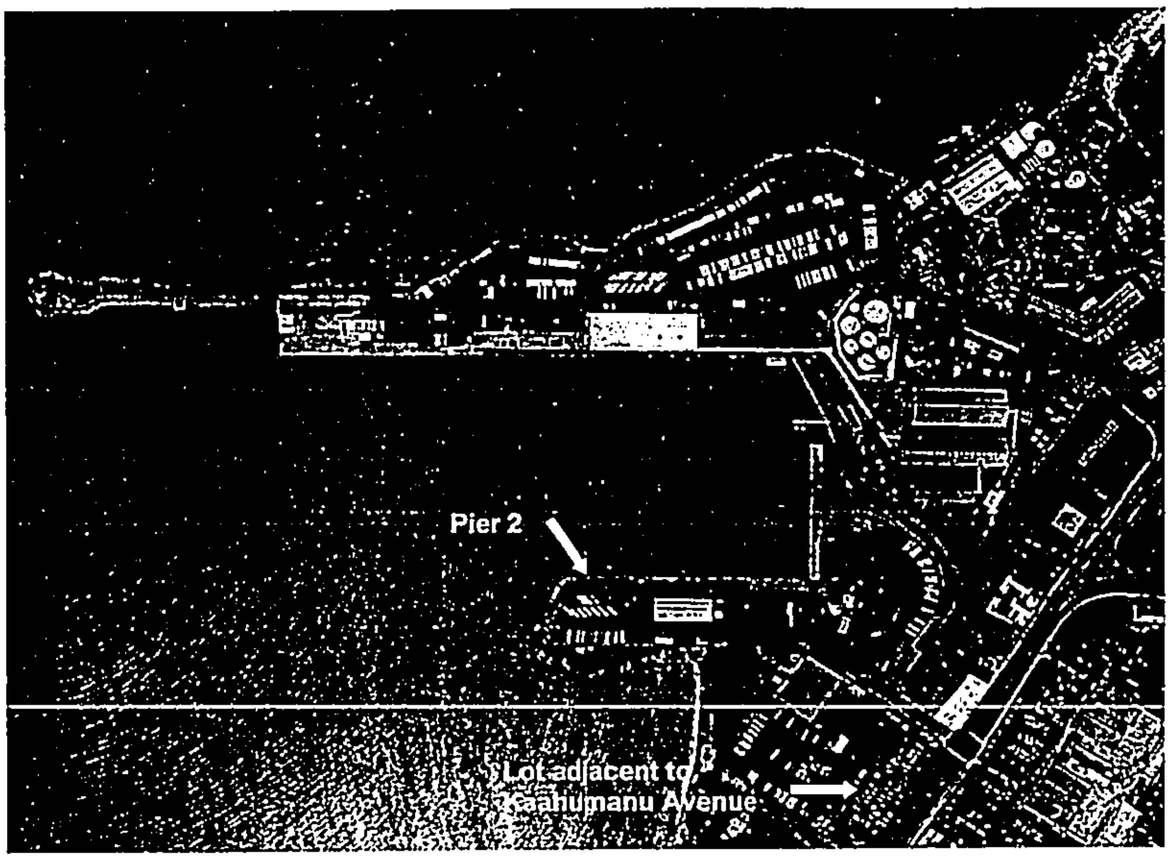


Figure 1. Location of Kahului Ferry Terminal in Kahului Harbor

The Kahului Ferry Terminal will consist of:

- A vehicle check-in and security check area,
- A passenger check-in and security check area, and
- A passenger pick-up and drop off area.

The terminal area and operations will be secured as required by the United States Coast Guard (USCG) regulations.

1.2 Purpose of the Report

The purpose of this traffic study is to analyze the transportation operations within the vicinity of the ferry terminal and to determine the potential transportation impacts associated with the HSF operations:

Specific steps for developing this report included:

- Analysis of the existing traffic conditions.
- Development and analysis of the HSF trip generation and terminal operations.
- Development and analysis of the forecast year (2009) traffic conditions with and without the ferry.
- Recommendations of mitigation actions to address the impacts of the proposed HSF operations.

2 Existing Conditions

This section discusses existing site conditions, transportation facilities, traffic volumes, and peak hour operations as they currently exist.

2.1 Land Use

Kahului is the only commercial harbor on the Island of Maui. It is located on the north side of the island within Kahului Bay. It is approximately 89 nautical miles from Honolulu Harbor. A full range of maritime services and facilities are provided at Kahului Harbor, including a cruise ship terminal. Kahului Harbor consists of three piers with over 3,000 feet of berthing space. Figure 2 shows the harbor layout.

The entrance channel to the harbor is 660 feet wide and 40 feet deep. The harbor basin is 2,050 feet wide by 2,400 feet long and has a project depth of 35 feet. HSF will operate from Pier 2B and have a loading barge located along Pier 2C, at the makai end of the pier. The overall length of Pier 2A and 2B is 894 feet, the length of Pier 2C is 295 feet.

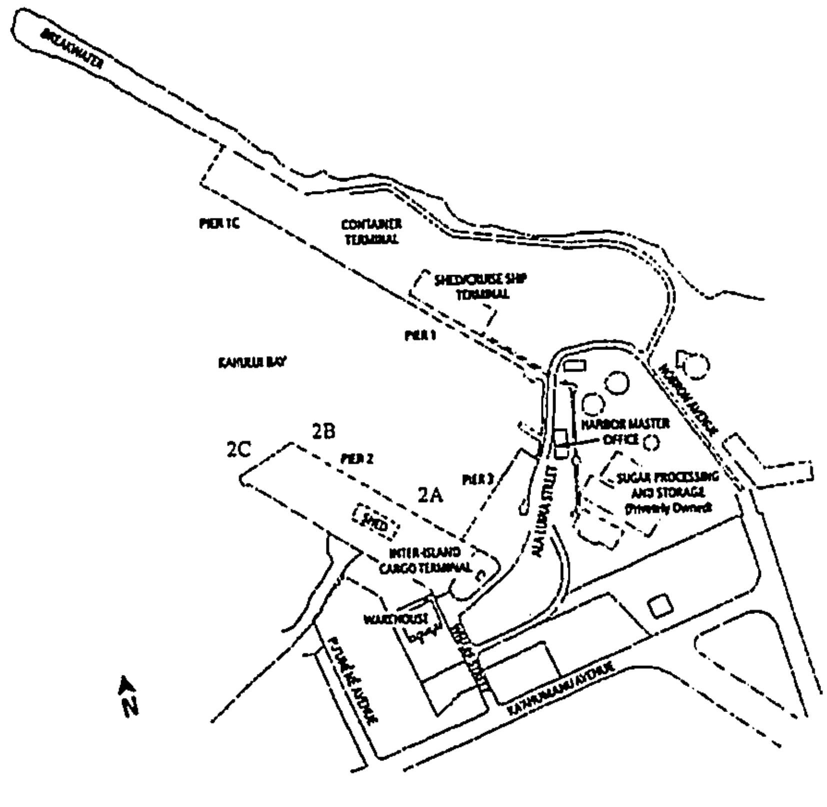


Figure 2: Kahului Harbor

Source: Port Hawaii Handbook

2.2 Transportation Facilities

Direct access to the Kahului Ferry Terminal will occur from Pu'unene Avenue, north of Kaahumanu Avenue.

Pu'unene Avenue north of Kaahumanu Avenue is a Maui County-owned roadway providing access to several businesses. Adjacent to the Kaahumanu Avenue intersection, Pu'unene Avenue widens to three lanes to accommodate one northbound lane, a southbound shared left/through lane and a right-turn lane. Within this section, curb gutter and sidewalk are present. The northern portion of the roadway consists of a 16 foot wide asphalt roadway with gravel shoulders. The gravel shoulder adjacent to the Pu'unene storage yard fence is currently utilized for parking.

Figure 3. Pu'unene Ave north of Kaahumanu Ave

Figure 4.Puunene Ave south of Kamehameha Ave

South of Kaahumanu Avenue, Pu'unene Avenue is a state owned roadway. It extends through the Pu'unene community to Kuihelani Highway and Mokulele Highway which connects to the Lahaina and Kihei areas respectively.

Pu'unene Avenue connects to the local transportation system at Kaahumanu Avenue. In the direct vicinity of Pu'unene Avenue, Kaahumanu Avenue consists of three travel lanes in each direction, with a center median and bicycle lanes. Kaahumanu Avenue has sidewalks on both sides of the roadway with the exception of north side of the roadway between Pu'unene Avenue and Wharf Street. Kaahumanu Avenue has a posted speed of 30 mph.

Kaahumanu Avenue provides access through Kahului and to Wailuku to the west. It also provides access to Hana and Haleakala Highways to the east.

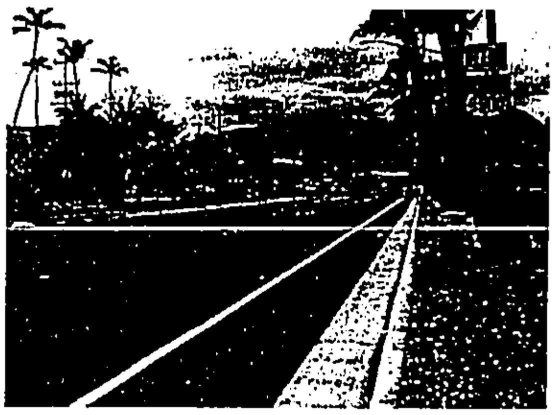


Figure 5. Kaahumanu Avenue

Limited transit service is provided within the study area. Transit can be accessed at the Maui Mall or Kaahumanu Shopping Center for Routes 1 & 2 (Wailuku) and Route C (Kihei), respectively. Routes are generally on a two-hour headway schedule.

Figure 6 shows the study area roadways.

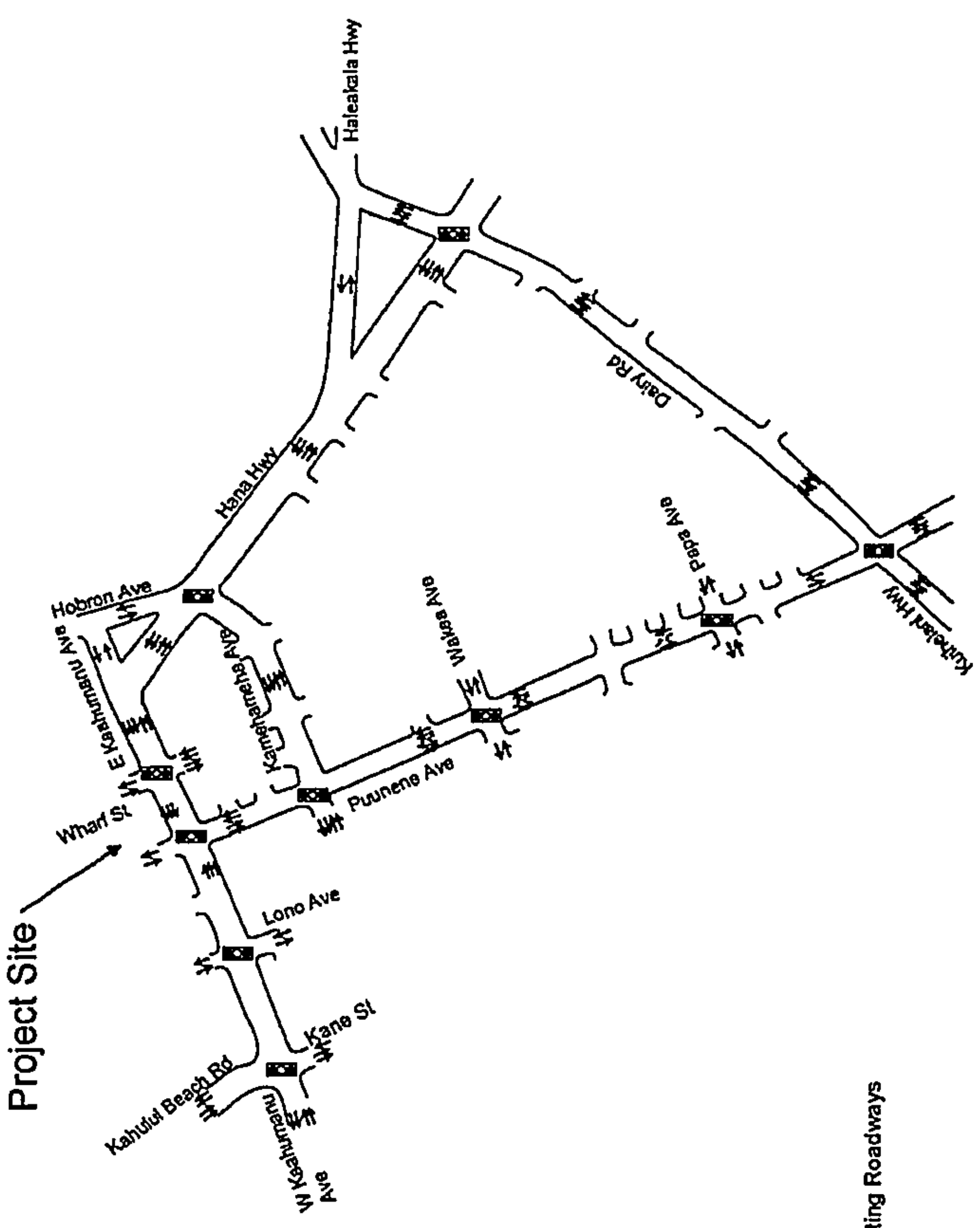


Figure 6. Existing Roadways

2.3 Traffic Volumes and Conditions

Historical twenty-four hour traffic counts were examined to understand the traffic patterns within the study area. HDOT's bi-annual traffic data were available throughout most of the study area for the period between 1999 and 2003. The data examined included the following stations:

Along Kaahumanu Avenue:

Kahului Beach Road/Kane Street (Station 1),
Lono Avenue (Station 1-D),
Pu'unene Avenue (Station 1-C),
Wharf Street (Station 1-F) and
Hana Highway (Station 1-B).

Along Pu'unene Avenue:

Kuihelani Highway/Dairy Road (Station 8-C),
Papa Avenue (Station 8-E),
Wakea Avenue (Station 8-F) and
Kamehameha Avenue (Station 8-D).

Along Hana Highway:

Kamehameha Avenue (Station 2-B),
Haleakala Highway (Station 2-F) and
Dairy Road (Station 2).

Under the one-vessel operation, there will be one departure time at the Kahului Ferry Terminal, seven days a week. Under the two-vessel operation, there will be two departure times at the Kahului Ferry Terminal, seven days a week.

Based on discussions with HDOT-HWY's regarding the proposed HSF sailing schedules, the midday departure was identified as the greatest impact to the transportation system. To assess the highest potential impacts, the ferry related traffic was assumed to occur concurrently with the midday peak hour of traffic.

Based on the historical traffic counts, the midday peak period occurs between 11:30 am and 1:30 pm.

Major intersections along Pu'unene Avenue, Kaahumanu Avenue and Hana Highway (which Kaahumanu turns directly into) were identified by HDOT-HWY's to be included as study intersections for this traffic analysis. HDOT provided midday peak hour traffic counts at the following study intersections from their recent Congestion Evaluation project:

- West Kaahumanu Avenue/Wharf Street
- West Kaahumanu Avenue/Pu'unene Avenue
- West Kaahumanu Avenue/Lono Street
- West Kaahumanu Avenue/Kahului Beach Road
- Pu'unene Avenue/Kamehameha Avenue
- Pu'unene Avenue/Wakea Avenue

- Pu'unene Avenue/Papa Avenue

Traffic turning movement counts were conducted on March 14, 15 and 16, 2006 by The Traffic Group at the remaining study intersections listed below:

- Hana Highway/Hobron Avenue/Kamehameha Avenue
- Hana Highway/Haleakala Highway
- Hana Highway/Dairy Road
- Pu'unene Avenue /Kuihelani Highway

Intersection counts were conducted between 11:30 am and 1:30 pm. The manual traffic counts reflected the midday peak occurring between 12:15 and 1:15 pm. The peak hour turning movements are summarized in Figure 7 and Appendix A.

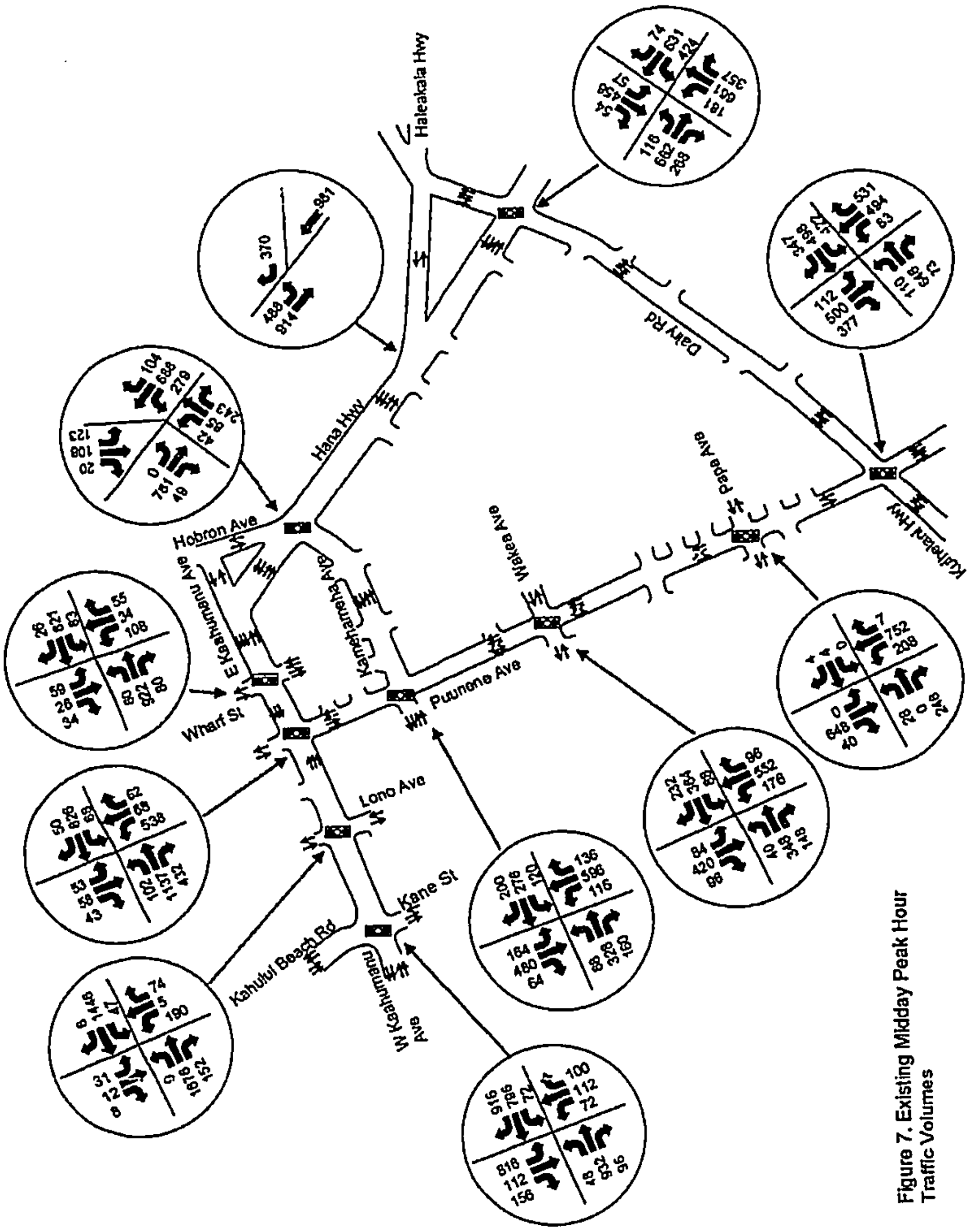


Figure 7. Existing Midday Peak Hour Traffic Volumes

High traffic demand occurs along both directions of Kaahumanu Avenue/Hana Highway. Volumes ranged between 900 and 1800 vehicles per hour in both the east and westbound directions. During the red signal phases, queues exceeding 10 vehicles per lane were frequently observed. The majority of the traffic signal green time was assigned to this major corridor, thus the observed queues generally dissipated in a single signal cycle. Three of the cross streets along the corridor also experience high demand; Kahului Beach Road, which provides access to/from the Wailuku area, Pu'unene Avenue, which connects to both Kuihelani and Mokulele Highways, and Dairy Road which accesses the airport and turns into Kuihelani Highway. The intersection of Kaahumanu Avenue/Pu'unene Avenue was observed to have the longest queues and delays, which can be partially attributed to the split phase traffic signal cycle for the north and southbound approaches to the intersection. The split phase cycle accommodates the lane channelization (northbound left and a left/through/right shared lane) for the uneven travel demand through the intersection.

Volumes along Pu'unene Avenue ranged from 600 to 1100 vehicles per hour in both the north and southbound directions. The Pu'unene Avenue corridor exhibited a slightly higher travel demand in the northbound direction during the midday peak. Cross streets within the business district at the Kamehameha Avenue and Wakea Avenue intersections were observed to be heavily utilized, but queues on all approaches were accommodated within a single traffic signal cycle.

2.4 Traffic Operations

All intersection Level of Service (LOS) analyses described in this report were performed in accordance with the procedures developed in the Highway Capacity Manual (HCM 2000) for signalized and unsignalized intersections. The Synchro version 6 software, which is based on the HCM 2000 methodologies, was utilized. LOS worksheets for all scenarios are contained in Appendix B.

Level of Service is a qualitative measure describing operational conditions of traffic and the perception of the operations by motorists. LOS is assigned under guidelines used by transportation professionals to indicate the overall degree of delay and congestion associated with specific intersections. Six LOS are defined by letter designations A through F, with LOS A representing the best operating conditions. LOS definitions are summarized in Table 1.

The LOS criteria for stop controlled and signal controlled intersections are different primarily because drivers expect different levels of performance between a signalized and unsignalized intersection. Additionally, an aggregate intersection delay and LOS is not defined for stop controlled intersections. LOS are provided for the individual movements.

TABLE 1
Intersection Level of Service Definitions

Level of Service	Signalized Average Delay (seconds per vehicle) [a]	Unsignalized Average Delay (seconds per vehicle) [b]	Traffic Flow Characteristics
A	≤ 10	≤ 10	Few or no traffic delays - individual users are virtually unaffected by the presence of other vehicles.
B	> 10 - ≤ 20	> 10 - ≤ 15	Short traffic delays – traffic flow is stable, but the presence of other users begins to be noticeable.
C	> 20 - ≤ 35	> 15 - ≤ 25	Average traffic delays - traffic flow is stable, but other traffic begins to significantly affect individual users.
D	> 35 - ≤ 55	> 25 - ≤ 35	Long traffic delays – traffic flow is dense but stable. Other users restrict individual driver maneuverability.
E	> 55 - ≤ 80	> 35 - ≤ 50	Very long traffic delays – operations are at or near capacity levels and unstable. Freedom to maneuver is difficult.
F	> 80	> 50	Extreme traffic delays - operations are at breakdown levels where demand exceeds capacity. Delays and queuing may cause severe congestion affecting others in the traffic stream. This condition usually warrants improvements to the intersection.

[a] Control delay reported for signalized intersections

[b] Includes deceleration time, stopped time, and acceleration time due to intersection controls

Source: Highway Capacity Manual, National Academy of Sciences Transportation Research Board, Special Report 209

In addition to LOS, traffic operations were quantified with queue lengths, which represent the number of vehicles waiting due to the intersection control. The 95th percentile queue length is the accepted measurement in the transportation industry for determining the necessary storage lengths. The 95th percentile queue represents the distance that would be exceeded 5 percent of the time during the peak hour.

Peak Hour Operations –

Traffic operations during the midday peak hour of traffic at the study intersections are summarized below and in Tables 2 and 3.

Generally, through the study area, long traffic delays are experienced during the midday peak. Traffic flow is dense, but stable. The main corridors of traffic (Kaahumanu Avenue/Hana Highway and Pu'unene Avenue) are provided priority with the existing signal timing plans. These corridors generally operate with fewer delays than the cross-street approaches. Thus, overall intersection operations remain at LOS D or better.

Several intersections, however, experience higher overall levels of delay.

The Pu'unene Avenue/Dairy Road/Kuihelani Highway intersection operates at LOS E, and experiences long delays on all intersection approaches as a result of high traffic demand.

The stop controlled movement at the Hana Highway and Haleakala Highway intersection operates near movement capacity due to the high opposing traffic that the vehicles must maneuver through.

TABLE 2
2006 Midday Peak Hour Traffic Operations

Intersection	Level-of-Service	Delay (sec/veh)
W Kaahumanu Ave/Kahului Beach Rd/Kane St	D	45
W Kaahumanu Ave/Lono St	B	18
W Kaahumanu Ave/Pu'unene Ave	D	45
W Kaahumanu Ave/Wharf St	B	19
Hana Hwy/Kamehameha Ave/Hobron Ave	C	32
Hana Hwy/Haleakala Hwy[1]		
South-eastbound left	**E**	**38**
Hana Hwy/Dairy Rd	D	43
Pu'unene Ave/Kamehameha Ave	D	38
Pu'unene Ave/Wakea Ave	D	44
Pu'unene Ave/Papa Ave	B	14
Pu'unene Ave/Kuihelani Hwy/Dairy Rd	**E**	**63**

[1]Delay and LOS for the stop controlled movements
Bold text indicates movements operating near or at capacity.

Table 3 summarizes the calculated 95th percentile queues at the study intersections.

Due to high traffic demands on the main travel corridors, extensive queues are experienced. Generally, queues remain within the available storage capacities, and clear the intersection within a single traffic signal cycle. The 95th percentile queues that exceed available capacities are hi-lighted. In the direct vicinity of the Kahului Ferry Terminal, the eastbound left-turn movement is at the capacity of the turn pocket during the midday peak (Kaahumanu Avenue/Pu'unene Avenue intersection). The westbound movement at the intersection is also nearing capacity limits.

TABLE 3
2006 Midday Peak Hour Traffic Queues

Intersection	95th Percentile Queue (Vehicles per lane)
W Kaahumanu Ave/Kahului Beach Rd/Kane St	
Eastbound Left	**4**
Eastbound Through (2 lanes)	25
Eastbound Right	Free
Westbound Left	**7**
Westbound Through (2 lanes)	20
Westbound Right	Free
Southbound Left	32
Southbound Through/Left	35
Southbound Right	3

TABLE 3
2006 Midday Peak Hour Traffic Queues

Intersection	95th Percentile Queue (Vehicles per lane)
Northbound Left	6
Northbound Through	8
Northbound Right	3
W Kaahumanu Ave/Lono St	
Eastbound Left	1
Eastbound Through (3 lanes)	24
Westbound Left	4
Westbound Through (3 lanes)	15
Southbound Left/Through/Right	3
Northbound Through/Left	10
Northbound Right	2
W Kaahumanu Ave/Pu'unene Ave	
Eastbound Left	8
Eastbound Through (3 lanes)	26
Westbound Left	7
Westbound Through (3 lanes)	14
Southbound Through/Left	8
Southbound Right	2
Northbound Left	22
Northbound Left/Through/Right	20
W Kaahumanu Ave/Wharf St	
Eastbound Left	5
Eastbound Through (2 lanes)	13
Eastbound Right	1
Westbound Left	4
Westbound Through (3 lanes)	7
Southbound Through/Left	5
Southbound Right	1
Northbound Left	6
Northbound Through/Right	3
Hana Hwy/Kamehameha Ave/Hobron Ave	
Eastbound Through (2 lanes)	15
Westbound Left (2 lanes)	9
Westbound Through (2 lanes)	9
Westbound Right	1
Southbound Through (2 lanes)	6
Southbound Right	1
Northbound Through/Left	7
Northbound Right	7
Hana Hwy/Haleakala Hwy[1]	

TABLE 3
2006 Midday Peak Hour Traffic Queues

Intersection	95th Percentile Queue (Vehicles per lane)
South-Eastbound left	10
Hana Hwy/Dairy Rd	
Eastbound Left	8
Eastbound Through (3 lanes)	15
Westbound Left (2 lanes)	11
Westbound Through (2 lanes)	15
Westbound Right	2
Southbound Left	5
Southbound Through (2 lanes)	13
Northbound Left	11
Northbound Through (2 lanes)	16
Northbound Right	6
Pu'unene Ave/Kamehameha Ave	
Eastbound Left	5
Eastbound Through (2 lanes)	10
Westbound Left	7
Westbound Through	13
Westbound Right	3
Southbound Left	8
Southbound Through (2 lanes)	9
Northbound Left	6
Northbound Through (2 lanes)	14
Pu'unene Ave/Wakea Ave	
Eastbound Left	4
Eastbound Through	20
Eastbound Right	5
Westbound Left	7
Westbound Through	20
Westbound Right	7
Southbound Left	6
Southbound Through (2 lanes)	11
Northbound Left	11
Northbound Through (2 lanes)	12
Northbound Right	3
Pu'unene Ave/Papa Ave	
Eastbound Through/Left	2
Eastbound Right	3
Westbound Left/Through/Right	1
Southbound Left	0
Southbound Through/Right	17

TABLE 3
2006 Midday Peak Hour Traffic Queues

Intersection	95th Percentile Queue (Vehicles per lane)
Northbound Left	2
Northbound Through/Right	12
Pu'unene Ave/Kuihelani Hwy/Dairy Rd	
North-Eastbound Left	6
North-Eastbound Through (2 lanes)	15
South-Westbound Left (2 lanes)	13
South-Westbound Through (2 lanes)	10
South-Westbound Right	3
South-Eastbound Left	**23**
South-Eastbound Through (2 lanes)	9
South-Eastbound Right	2
North-Westbound Left	5
North-Westbound Through (2 lanes)	10
North-Westbound Right	**20**

[1]Queues for the stop and yield controlled movements.
Bold text indicates 95th percentile queue lengths that exceed the available storage length.
N/A indicates queue length could not be calculated due to excessive delay.

3 Forecast Background Conditions

This section develops the traffic demand levels for the forecast 2009 study timeframe. The background conditions will be utilized to distinguish between impacts related to general area growth and impacts related to HSF.

3.1 Traffic Volumes

Background traffic volumes for the 2009 forecast year were derived from historical traffic growth patterns within the area. Historical twenty-four hour traffic counts were examined at the HDOT count stations listed in Section 2.3.

The historical growth rates were found to fluctuate throughout the study area. To capture these fluctuations, average annual growth rates were calculated along the three major corridors as follows:

Kaahumanu Avenue/Hana Highway 0.6%

Dairy Road 6.0%

Pu'unene Avenue 0.8%.

The derived annual growth rates were applied to the existing midday peak hour traffic counts. Figure 8 depicts the 2009 background (no HSF ferry) peak hour traffic volumes.

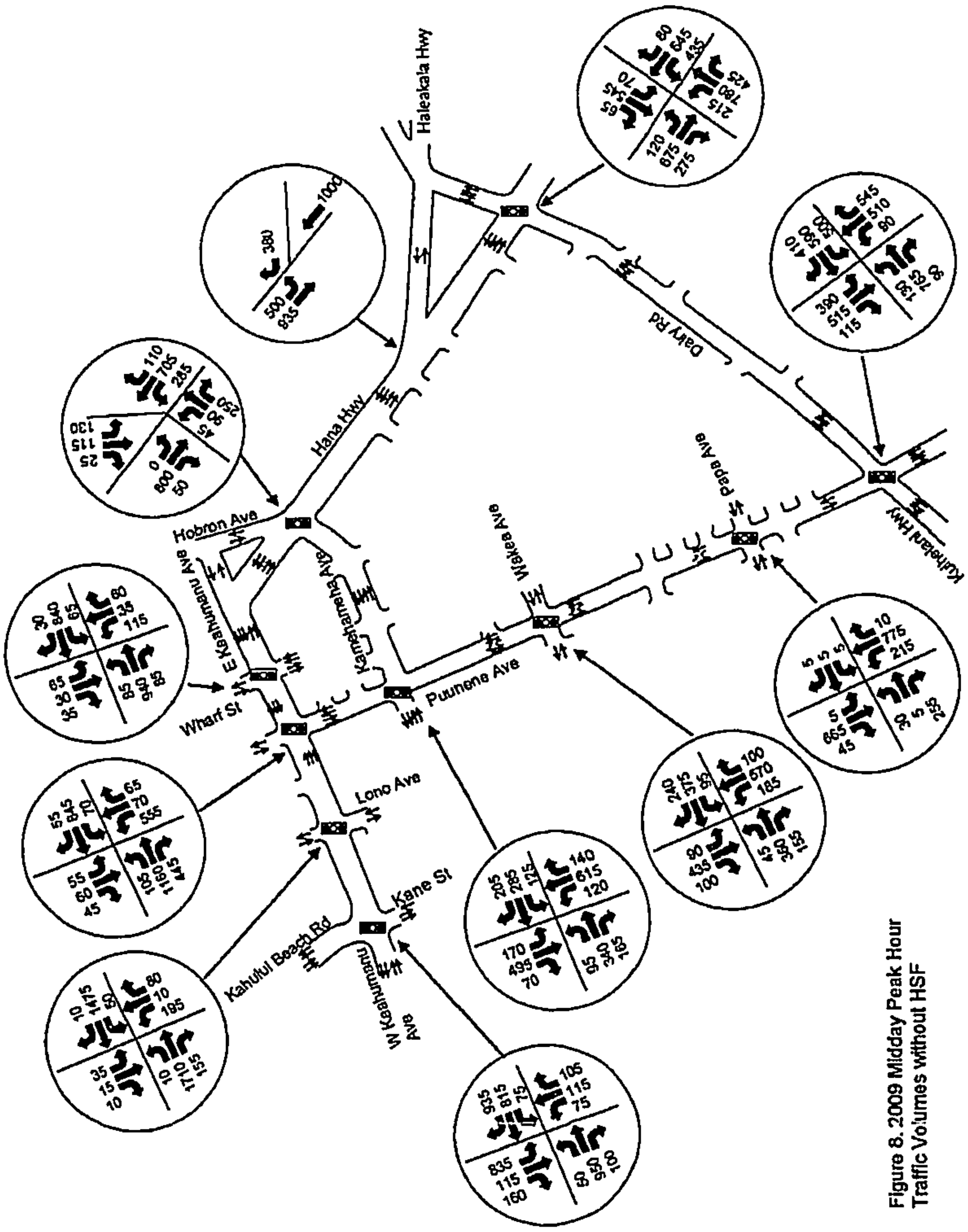


Figure 8. 2009 Midday Peak Hour Traffic Volumes without HSF

3.2 Transportation Facilities

The FY2006 to FY2008 Statewide Transportation Improvement Program was reviewed. In the vicinity of the project, there was only one programmed construction project: Pu'unene Avenue Safety Improvements, Kaahumanu Avenue to Kamehameha Avenue. No capacity changes were assumed to occur with this project. Thus for the purposes of this analysis, the forecast 2009 traffic operations were performed with the existing roadway geometrics.

3.3 Background Traffic Operations

Table 4 summarizes the forecast 2009 peak traffic operations without the proposed HSF traffic development.

The 2009 peak hour operations without HSF are projected to be similar to existing conditions through the study area. Average vehicle delays increase slightly, however intersection LOS is projected to remain at the same levels as existing conditions.

TABLE 4

2009 Midday Peak Hour Traffic Operations without HSF

Intersection	Level-of-Service	Delay (sec/veh)
W Kaahumanu Ave/Kahului Beach Rd/Kane St	D	46
W Kaahumanu Ave/Lono St	B	20
W Kaahumanu Ave/Pu'unene Ave	D	47
W Kaahumanu Ave/Wharf St	B	20
Hana Hwy/Kamehameha Ave/Hobron Ave	C	34
Hana Hwy/Haleakala Hwy[1]		
South-eastbound left	**E**	**44**
Hana Hwy/Dairy Rd	D	48
Pu'unene Ave/Kamehameha Ave	D	39
Pu'unene Ave/Wakea Ave	D	45
Pu'unene Ave/Papa Ave	B	15
Pu'unene Ave/Kuihelani Hwy/Dairy Rd	**E**	**77**

[1]Delay and LOS for the stop and yield controlled movements.
Bold text indicates movements operating near or at capacity.

Table 5 summarizes the calculated 95th percentile queues at the intersection for the 2009 forecast year. Queuing of vehicles due to the intersection control is expected to be similar to existing conditions for the majority of the study area.

TABLE 5
2009 Midday Peak Hour Traffic Queues without HSF

Intersection	95th Percentile Queue (Vehicles per lane)
W Kaahumanu Ave/Kahului Beach Rd/Kane St	
Eastbound Left	5
Eastbound Through (2 lanes)	25
Eastbound Right	Free
Westbound Left	7
Westbound Through (2 lanes)	21
Westbound Right	Free
Southbound Left	34
Southbound Through/Left	36
Southbound Right	3
Northbound Left	6
Northbound Through	8
Northbound Right	3
W Kaahumanu Ave/Lono St	
Eastbound Left	1
Eastbound Through (3 lanes)	25
Westbound Left	4
Westbound Through (3 lanes)	15
Southbound Left/Through/Right	3
Northbound Through/Left	11
Northbound Right	2
W Kaahumanu Ave/Pu'unene Ave	
Eastbound Left	8
Eastbound Through (3 lanes)	27
Westbound Left	7
Westbound Through (3 lanes)	14
Southbound Through/Left	8
Southbound Right	2
Northbound Left	23
Northbound Left/Through/Right	22
W Kaahumanu Ave/Wharf St	
Eastbound Left	5
Eastbound Through (2 lanes)	14
Eastbound Right	1
Westbound Left	4
Westbound Through (3 lanes)	8
Southbound Through/Left	5
Southbound Right	1
Northbound Left	6

TABLE 5

2009 Midday Peak Hour Traffic Queues without HSF

Intersection	**95th Percentile Queue (Vehicles per lane)**
Northbound Through/Right	3
Hana Hwy/Kamehameha Ave/Hobron Ave	
Eastbound Through (2 lanes)	16
Westbound Left (2 lanes)	9
Westbound Through (2 lanes)	10
Westbound Right	1
Southbound Through (2 lanes)	6
Southbound Right	1
Northbound Through/Left	7
Northbound Right	8
Hana Hwy/Haleakala Hwy[1]	
South-Eastbound left	11
Hana Hwy/Dairy Rd	
Eastbound Left	8
Eastbound Through (3 lanes)	16
Westbound Left (2 lanes)	12
Westbound Through (2 lanes)	15
Westbound Right	2
Southbound Left	5
Southbound Through (2 lanes)	16
Northbound Left	13
Northbound Through (2 lanes)	19
Northbound Right	10
Pu'unene Ave/Kamehameha Ave	
Eastbound Left	6
Eastbound Through (2 lanes)	10
Westbound Left	7
Westbound Through	13
Westbound Right	3
Southbound Left	9
Southbound Through (2 lanes)	10
Northbound Left	6
Northbound Through (2 lanes)	15
Pu'unene Ave/Wakea Ave	
Eastbound Left	4
Eastbound Through	21
Eastbound Right	5
Westbound Left	7
Westbound Through	21
Westbound Right	8

TABLE 5
2009 Midday Peak Hour Traffic Queues without HSF

Intersection	95th Percentile Queue (Vehicles per lane)
Southbound Left	6
Southbound Through (2 lanes)	12
Northbound Left	12
Northbound Through (2 lanes)	12
Northbound Right	3
Pu'unene Ave/Papa Ave	
Eastbound Through/Left	3
Eastbound Right	3
Westbound Left/Through/Right	1
Southbound Left	1
Southbound Through/Right	18
Northbound Left	2
Northbound Through/Right	18
Pu'unene Ave/Kuihelani Hwy/Dairy Rd	
North-Eastbound Left	8
North-Eastbound Through (2 lanes)	21
South-Westbound Left (2 lanes)	16
South-Westbound Through (2 lanes)	12
South-Westbound Right	5
South-Eastbound Left	**24**
South-Eastbound Through (2 lanes)	9
South-Eastbound Right	2
North-Westbound Left	5
North-Westbound Through (2 lanes)	11
North-Westbound Right	**22**

[1]Queues for the stop and yield controlled movements.
Bold text indicates 95th percentile queue lengths that exceed the available storage length.
N/A indicates queue length could not be calculated due to excessive delay.

4 Forecast Conditions with Hawaii Superferry

The traffic impact generated by the proposed Hawaii Superferry was analyzed as follows:

- The total number of project related trips was estimated based on the maximum ferry loading of 282 passenger vehicles/866 passengers.
- The distribution of the HSF traffic was based on the existing directional distribution of traffic entering/exiting the study area boundaries.
- The estimated ferry-generated traffic was added to the background volumes to determine the total traffic volume levels at the study intersections.
- Traffic operations at the study intersection were analyzed using the forecast traffic plus the project-generated traffic.

The methodology summarized above and the results of the analysis performed are presented in detail in the remainder of this section.

4.1 Ferry Capacity

The total passenger capacity of the Hawaii Superferry vessel is 866 persons.

The maximum vehicle capacity is 282 passenger cars with an average length of 16 feet per vehicle with no tall vehicles present.

4.2 Trip Generation

Based on the HDOT-Highway's request, a full ferry load, assuming all passenger vehicles (no trucks) is to be utilized for the traffic impact analyses. Hawaii Superferry's business plan estimates an average load of 110 vehicles and 410 passengers.

Data was collected from various existing ferry operations to estimate the operating characteristics for the Hawaii Superferry. The Lake Express Ferry provides service between Milwaukee, Wisconsin and Muskegon, Michigan (bypassing the Chicago traffic). The ferry has two roundtrips daily during the spring and fall, and expands to three daily roundtrips during the summer. The one-way crossing time for the ferry run is approximately 2.5 hours. Vehicle trip generation for the HSF was estimated based on the Lake Express vehicle occupancy rates. The Lake Express operation is characterized by a vehicle occupancy rate of 2.7.

Table 6 summarizes the HSF trip generation for a full load of passenger vehicles and walk-ons. As stated previously, this is a conservative analysis, as any tall vehicle would require a minimum of one of the mezzanine decks to be raised.

HSF will operate on an advanced ticketing system, therefore additional vehicular traffic accessing the study area will be minimal.

TABLE 6
Hawaii Superferry Trip Generation

	Occupancy Rate	Total Vehicles	Total Passengers
Travel from Kahului to Honolulu (outbound)			
Passengers with Vehicles	2.7	282(1)	761
Passenger Walk-on	2.7	39 (2)	105
Total	-	*360*	*866*
Travel from Honolulu to Kahului (inbound)			
Passengers with Vehicles	2.7	282(3)	761
Passenger Walk-on	2.7	39 (2)	105
Total	-	*360*	*866*

(1) Vehicles to ferry check-in and security check area
(2) Vehicles to/from passenger drop-off and pick-up area.
(3) Vehicles from ferry

Outbound Traffic: Vehicle and passenger check-in is proposed to occur over a 1 ½ hour period prior to the scheduled ferry departure. HSF patron arrivals were based on the passenger arrival patterns documented for a large aircraft (Sizing of Airport Departure Lounge for NLA, TRB Record no. 1622, 1998). Ninety percent of the total vehicles generated are projected to arrive during a one hour period. For analysis purposes, this one hour period of impact is assumed to coincide with the peak traffic hour of the local roadway system. The vehicle arrival curve is shown in Appendix C.

Inbound Traffic: All vehicles arriving on the ferry are assumed to access the local transportation network within the aforementioned study hour. Vehicles exiting the ferry terminal will be metered by the rate of ferry unloading. Ferry unloading will occur on a two-lane ramp, however, traffic is required to merge to a single lane prior to accessing the local transportation network. Data from various Washington State Ferry terminals indicated an unloading rate varying from 6 to 15 vehicles per minute per lane. For the purposes of this analysis, the slowest processing rate was assumed to account for the restricted maneuvering within the ferry and onto the ramp apron. Table 7 summarizes the unloading characteristics.

TABLE 7
Hawaii Superferry Unloading Operations

Number of Lanes (1)	Unloading Rate (veh/min/lane)	Total Vehicles	Total time (minutes)
1.5	6	282	32

(1) 1.5 lanes assumed due the lane merge prior to exiting the harbor property.

4.3 Trip Distribution

The entrance and exit locations to the Kahului Ferry Terminal are shown in Figure 9. Vehicles entering the site to drive onto the ferry or for passenger pick-up/drop-off will access from the Pu'unene Avenue. Vehicles exiting the ferry will exit the terminal from an existing gate at the Pu'unene container storage yard. Vehicles exiting the terminal for pick-up/drop-off of passengers will utilize an existing driveway along Wharf Street.

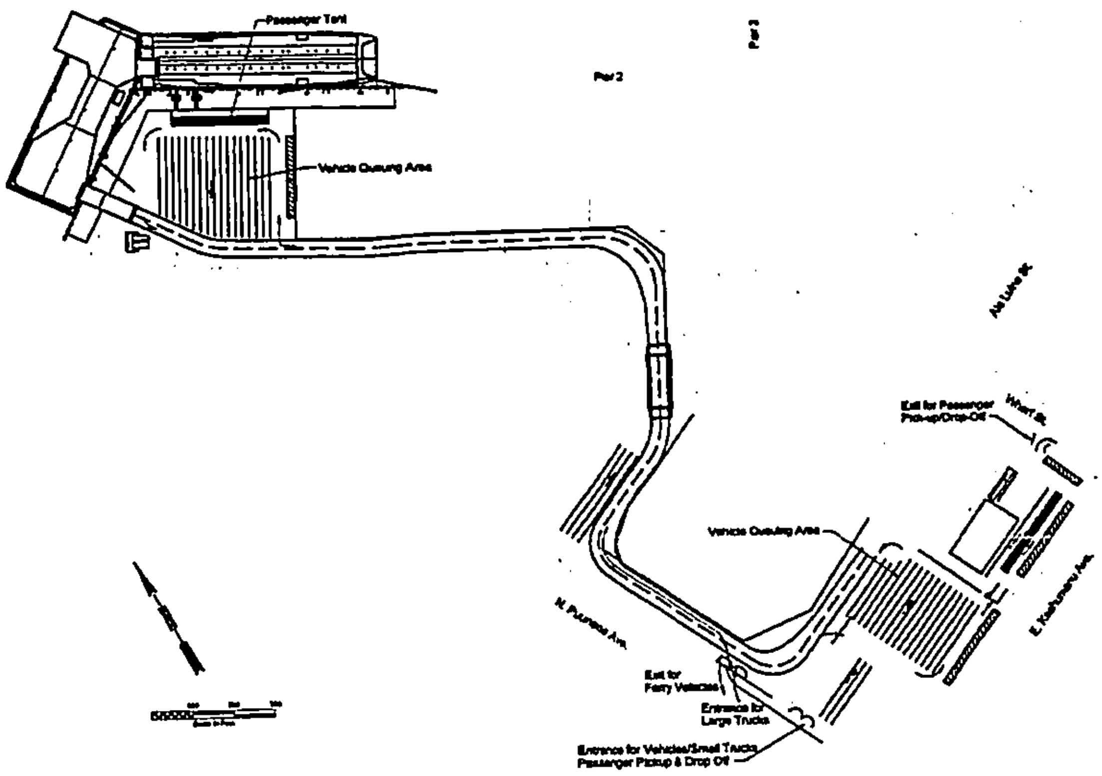


Figure 9. HSF Terminal Access

Trip distribution of site-generated traffic onto the roadway system was estimated based on the distribution of traffic entering/exiting the study area from major regional activity centers.

Trips to/from Wailuku and west Maui via Honoapiilani Highway accessed the study area through the Kaahumanu Avenue/Kahului Beach Road intersection.

Trips to/from west Maui via Kuihelani Highway and south Maui via Mokulele Highway accessed the study area through the Pu'unene Avenue/Kuihelani Highway/Dairy Road intersection.

Trips to/from the airport and upcountry accessed the study area through the Hana Highway/Haleakala Highway intersection.

Trips to/from the north-east side of the island accessed the study area through the Hana Highway/Dairy Road intersection.

The trip distribution for the proposed HSF traffic is shown in Figure 10. The distribution is also summarized in Appendix A.

4.4 Traffic Volumes with Hawaii Superferry

The project trip distribution was incorporated with the background traffic volumes to estimate demand with the proposed HSF traffic. Figure 11 depicts the peak hour 'with project' traffic volumes.

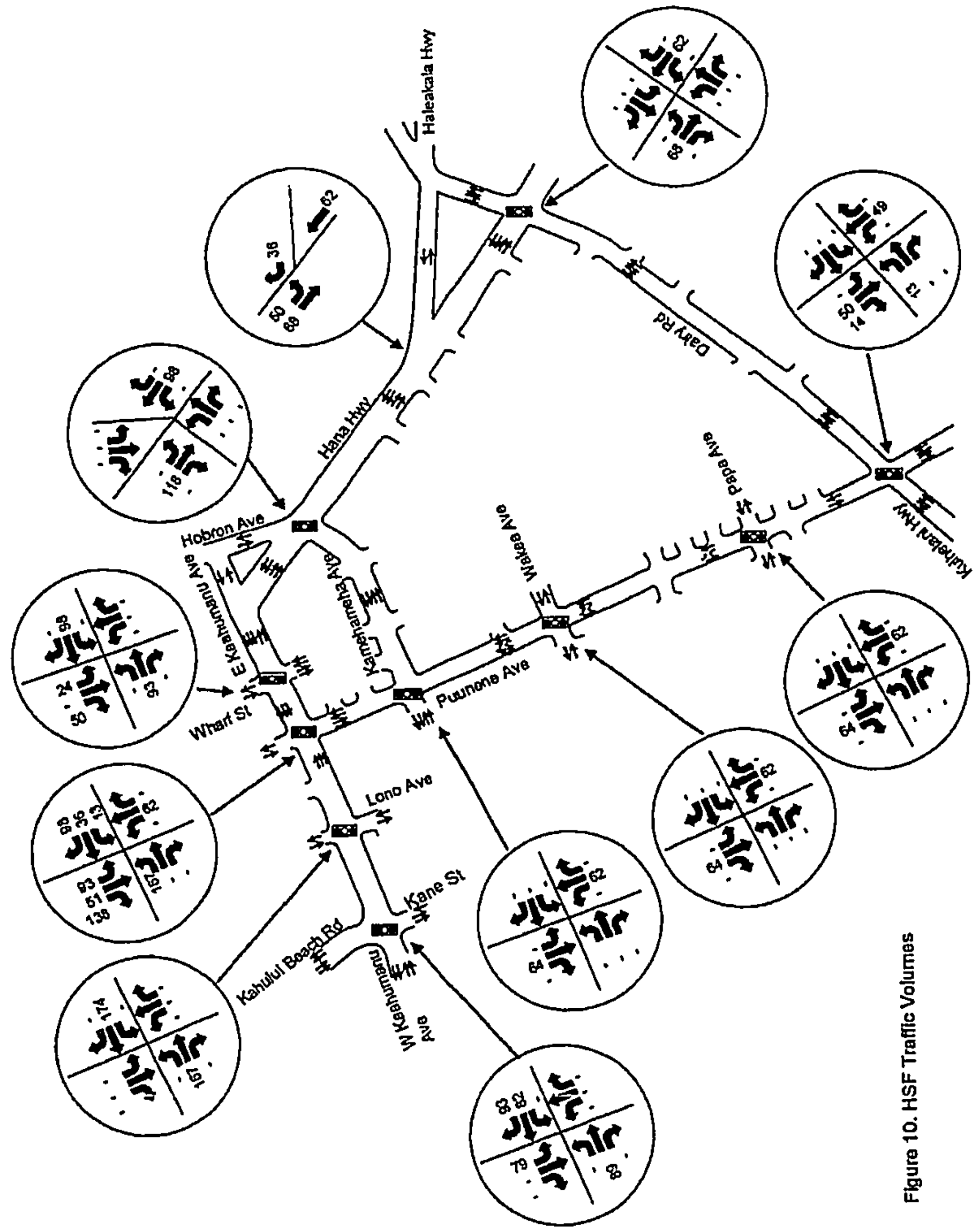


Figure 10. HSF Traffic Volumes

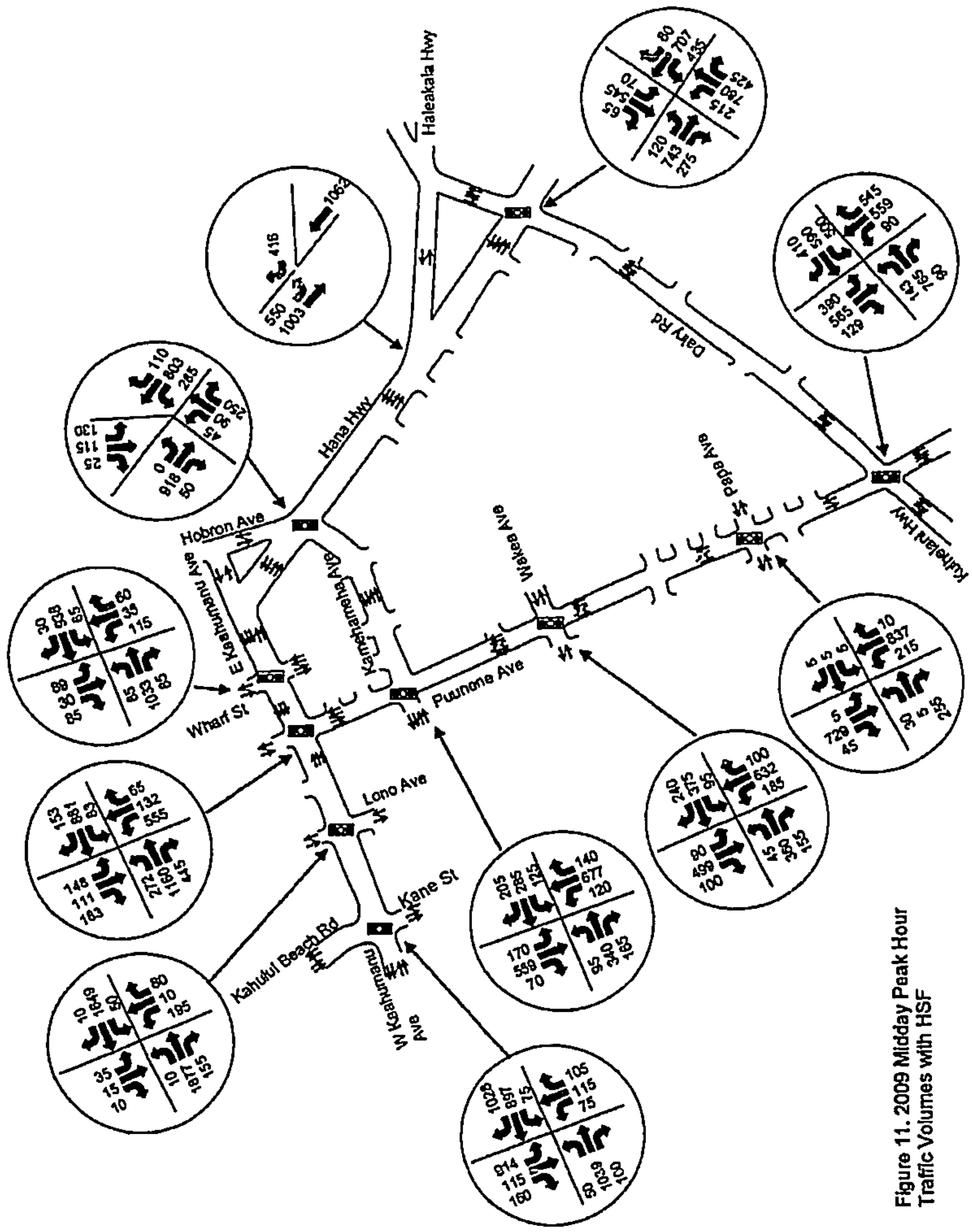


Figure 11. 2009 Midday Peak Hour Traffic Volumes with HSF

4.5 Traffic Operations with Hawaii Superferry

The background and with project intersection LOS operations and delay are shown in Table 8.

The stop-controlled left-turn movement from Hana Highway to Haleakala Highway would experience increased delays causing it to fall to LOS F.

The Kaahumanu Avenue at Pu'unene Avenue intersection would also experience increased delays and decline to LOS F operations.

HSF passenger pick-up/drop-off traffic is projected to have minor impacts to vehicle delays at the Wharf Street intersection.

TABLE 8

2009 Midday Peak Hour Traffic Operations with HSF

	Without HSF		With HSF	
Intersection	Level-of-Service	Delay (sec/veh)	Level-of-Service	Delay (sec/veh)
W Kaahumanu Ave/Kahului Beach Rd/Kane St	D	46	D	52
W Kaahumanu Ave/Lono St	B	20	B	20
W Kaahumanu Ave/Pu'unene Ave	D	47	F	>80
W Kaahumanu Ave/Wharf St	B	20	C	21
Hana Hwy/Kamehameha Ave/Hobron Ave	C	34	C	34
Hana Hwy/Haleakala Hwy[1]				
Hana Hwy (south-eastbound left)	E	44	F	>50
Hana Hwy/Dairy Rd	D	48	D	49
Pu'unene Ave/Kamehameha Ave	D	39	D	40
Pu'unene Ave/Wakea Ave	D	45	D	45
Pu'unene Ave/Papa Ave	B	15	B	15
Pu'unene Ave/Kuihelani Hwy/Dairy Rd	E	77	E	77

[1]Delay and LOS for the stop and yield controlled movements.
Bold text indicates movements operating near or at capacity.

95th percentile queue lengths occurring with the addition of project trips are shown in Table 9.

Queues throughout the study area would remain the same as the 2009 background queues or increase by a few vehicles with the exception of the Kaahumanu Avenue/Pu'unene Avenue intersection. Queues on the Kaahumanu Avenue east and westbound through lanes are projected to increase by approximately 4 vehicles. North and southbound Pu'unene Avenue approaches are projected to increase by approximately 5 vehicles per lane. The extended queue would impact access to businesses along Pu'unene Avenue. The greatest impact, however, is the eastbound left-turn movement from Kaahumanu Avenue to Pu'unene Avenue (where vehicles enter the ferry terminal). This queue is projected to increase by almost 20 vehicles, which would create significant backups into the eastbound through traffic lanes. The westbound left turn lane at the intersection would also reach its capacity.

HSF passenger pick-up/drop-off traffic is projected to have minor impacts to queues on Wharf Street.

TABLE 9
2009 Midday Peak Hour Traffic Queues with HSF

Intersection	95th Percentile Queue (Vehicles per lane)	95th Percentile Queue with HSF Traffic (Vehicles per lane)
W Kaahumanu Ave/Kahului Beach Rd/Kane St		
Eastbound Left	5	5
Eastbound Through (2 lanes)	25	29
Eastbound Right	Free	Free
Westbound Left	7	7
Westbound Through (2 lanes)	21	23
Westbound Right	Free	Free
Southbound Left	34	38
Southbound Through/Left	36	40
Southbound Right	3	3
Northbound Left	6	6
Northbound Through	8	8
Northbound Right	3	3
W Kaahumanu Ave/Lono St		
Eastbound Left	1	1
Eastbound Through (3 lanes)	25	30
Westbound Left	4	4
Westbound Through (3 lanes)	15	19
Southbound Left/Through/Right	3	3
Northbound Through/Left	11	11
Northbound Right	2	2
W Kaahumanu Ave/Pu'unene Ave		
Eastbound Left	8	27
Eastbound Through (3 lanes)	27	30
Westbound Left	7	9
Westbound Through (3 lanes)	14	18
Southbound Through/Left	8	12
Southbound Right	2	5
Northbound Left	23	28
Northbound Left/Through/Right	22	27
W Kaahumanu Ave/Wharf St		
Eastbound Left	5	6
Eastbound Through (2 lanes)	14	16
Eastbound Right	1	1
Westbound Left	4	5
Westbound Through (3 lanes)	8	9
Southbound Through/Left	5	7

TABLE 9
2009 Midday Peak Hour Traffic Queues with HSF

Intersection	95th Percentile Queue (Vehicles per lane)	95th Percentile Queue with HSF Traffic (Vehicles per lane)
Southbound Right	1	2
Northbound Left	6	6
Northbound Through/Right	3	3
Hana Hwy/Kamehameha Ave/Hobron Ave		
Eastbound Through (2 lanes)	16	19
Westbound Left (2 lanes)	9	9
Westbound Through (2 lanes)	10	11
Westbound Right	1	1
Southbound Through (2 lanes)	6	6
Southbound Right	1	1
Northbound Through/Left	7	7
Northbound Right	8	8
Hana Hwy/Haleakala Hwy[1]		
South-Eastbound left	11	17
Hana Hwy/Dairy Rd		
Eastbound Left	8	8
Eastbound Through (3 lanes)	16	17
Westbound Left (2 lanes)	12	12
Westbound Through (2 lanes)	15	16
Westbound Right	2	2
Southbound Left	5	5
Southbound Through (2 lanes)	16	16
Northbound Left	13	13
Northbound Through (2 lanes)	19	19
Northbound Right	10	10
Pu'unene Ave/Kamehameha Ave		
Eastbound Left	6	6
Eastbound Through (2 lanes)	10	10
Westbound Left	7	7
Westbound Through	13	13
Westbound Right	3	3
Southbound Left	9	9
Southbound Through (2 lanes)	10	11
Northbound Left	6	6
Northbound Through (2 lanes)	15	16
Pu'unene Ave/Wakea Ave		
Eastbound Left	4	4
Eastbound Through	21	21
Eastbound Right	5	5

TABLE 9
2009 Midday Peak Hour Traffic Queues with HSF

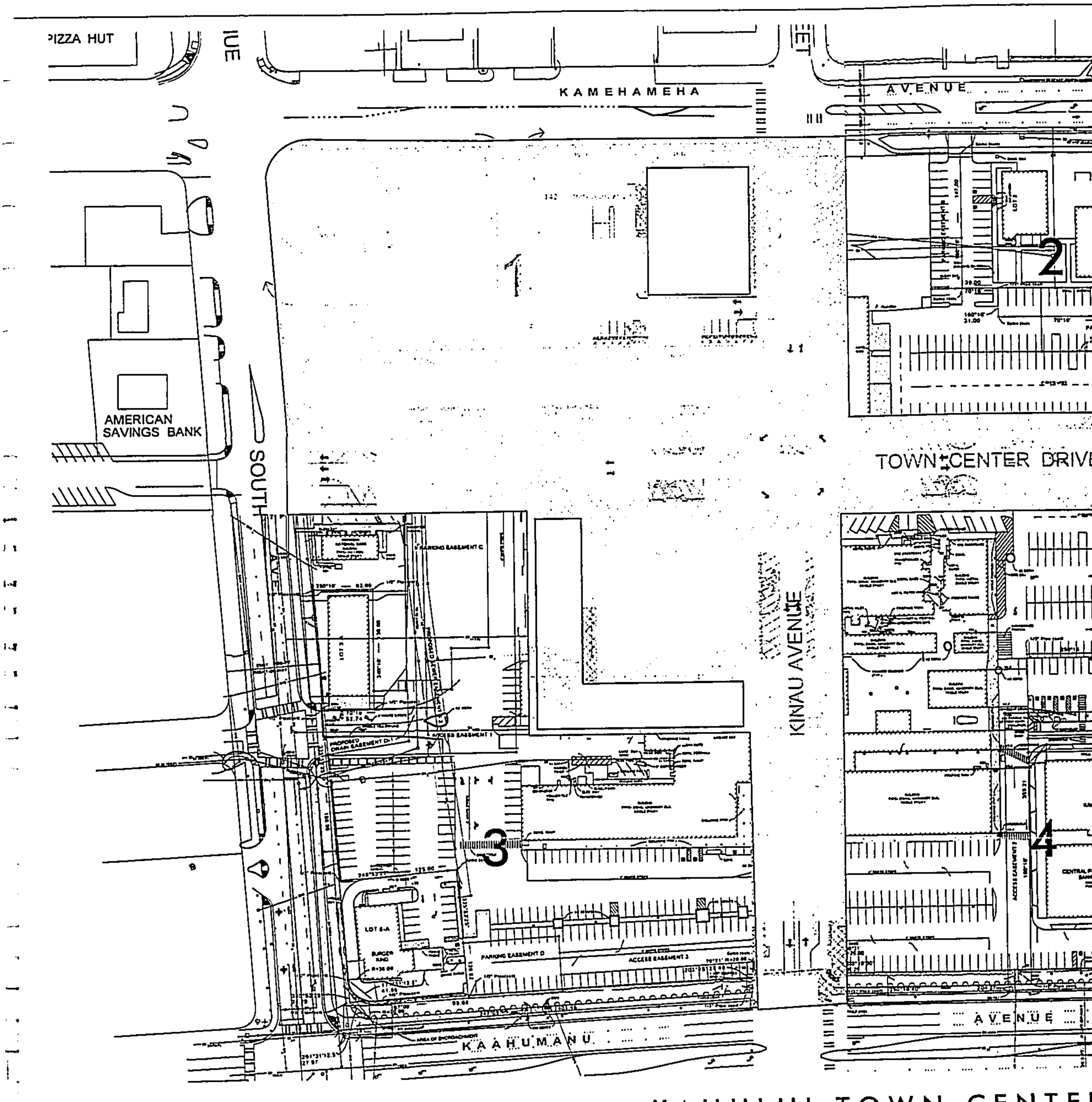
Intersection	95th Percentile Queue (Vehicles per lane)	95th Percentile Queue with HSF Traffic (Vehicles per lane)
Westbound Left	7	7
Westbound Through	21	21
Westbound Right	8	8
Southbound Left	6	6
Southbound Through (2 lanes)	12	13
Northbound Left	12	12
Northbound Through (2 lanes)	12	13
Northbound Right	3	3
Pu'unene Ave/Papa Ave		
Eastbound Through/Left	3	3
Eastbound Right	3	3
Westbound Left/Through/Right	1	1
Southbound Left	1	1
Southbound Through/Right	18	21
Northbound Left	2	2
Northbound Through/Right	18	21
Pu'unene Ave/Kuihelani Hwy/Dairy Rd		
North-Eastbound Left	8	9
North-Eastbound Through (2 lanes)	21	21
South-Westbound Left (2 lanes)	16	16
South-Westbound Through (2 lanes)	12	12
South-Westbound Right	5	6
South-Eastbound Left	24	24
South-Eastbound Through (2 lanes)	9	10
South-Eastbound Right	2	2
North-Westbound Left	5	5
North-Westbound Through (2 lanes)	11	12
North-Westbound Right	22	22

[1]Queues for the stop and yield controlled movements.
Bold text indicates 95th percentile queue lengths that exceed the available storage length.
N/A indicates queue length could not be calculated due to excessive delay.

4.6 Vehicle Check-in Operations

Vehicle arrival rates were estimated utilizing the large aircraft passenger arrival rates (TRB Record no 1622). Appendix C shows the graphical representation of the calculated maximum arrival rate of 4.6 vehicles per minute. This rate is estimated to occur for approximately 15 minutes out of the 1 ½ hour check-in period.

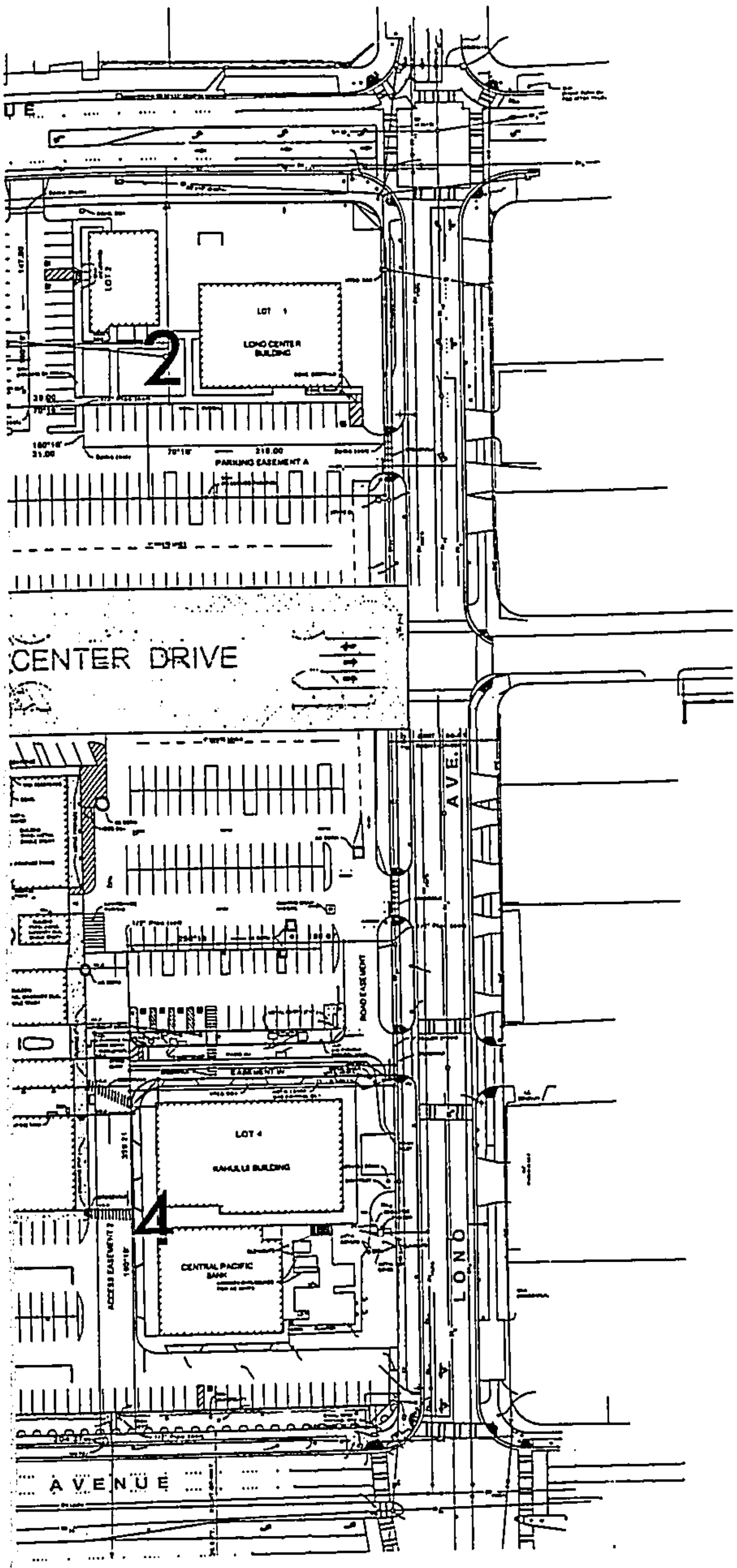
As vehicles arrive, they will be directed into the Kahului Ferry Terminal where check-in activities will occur. There will be no delays incurred at or near the entrance gate, thus traffic will not back out onto Pu'unene Avenue or Kaahumanu Avenue.



A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

KAHULUI TOWN CENTER

SITE PLAN



PHASE I
YR 2008

CONSTRUCTION AREA

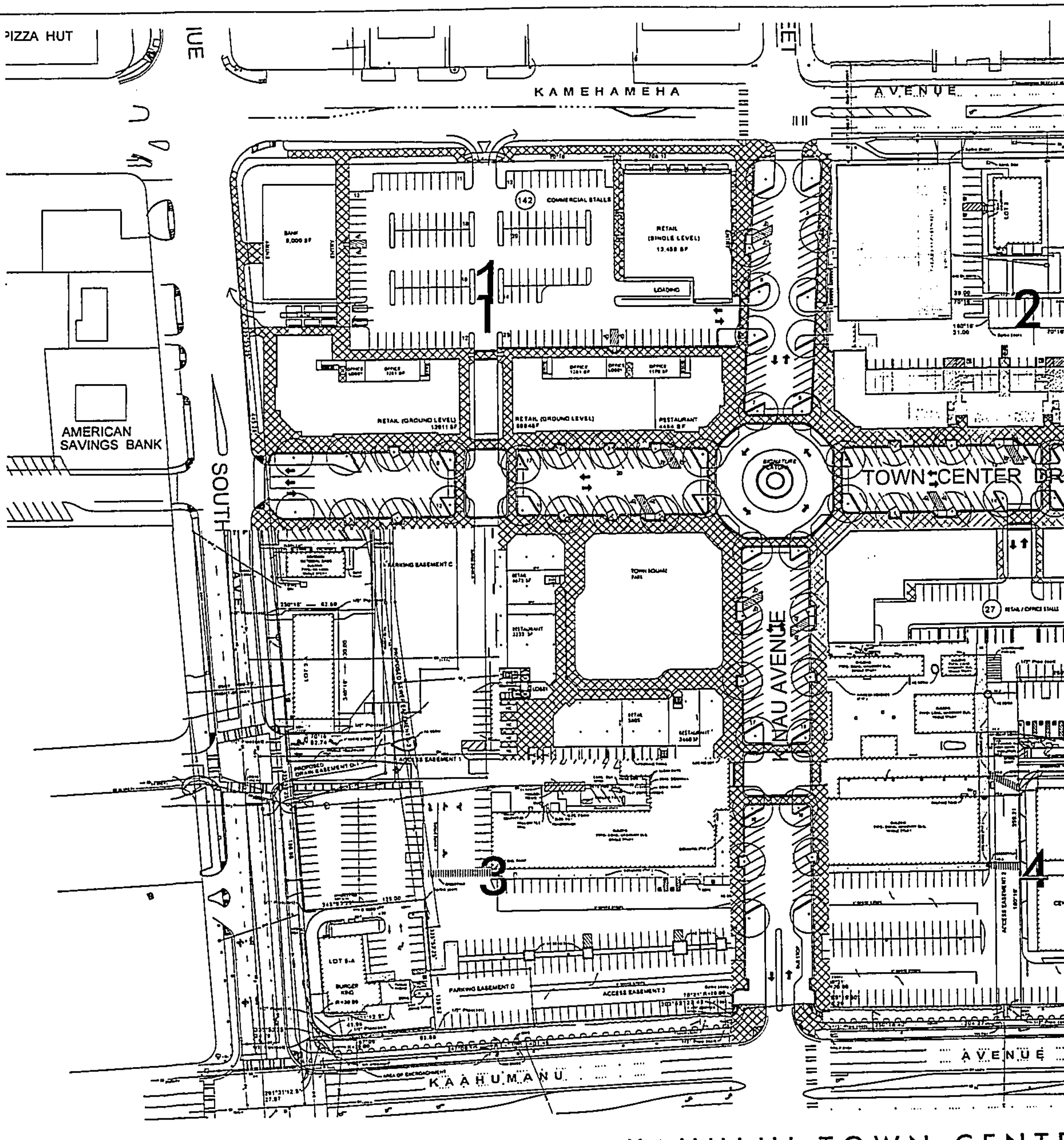
TEMPORARY FARMER'S MARKET STRUCTURES

STAGING AREA

CENTER, MAUI
PLAN

Attachment No. 6, A

Mc Architects Incorporated
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.
NGA HAWAII LLP
CHRIS HART & PARTNERS INC.



A&B PROPERTIES, INC.

A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

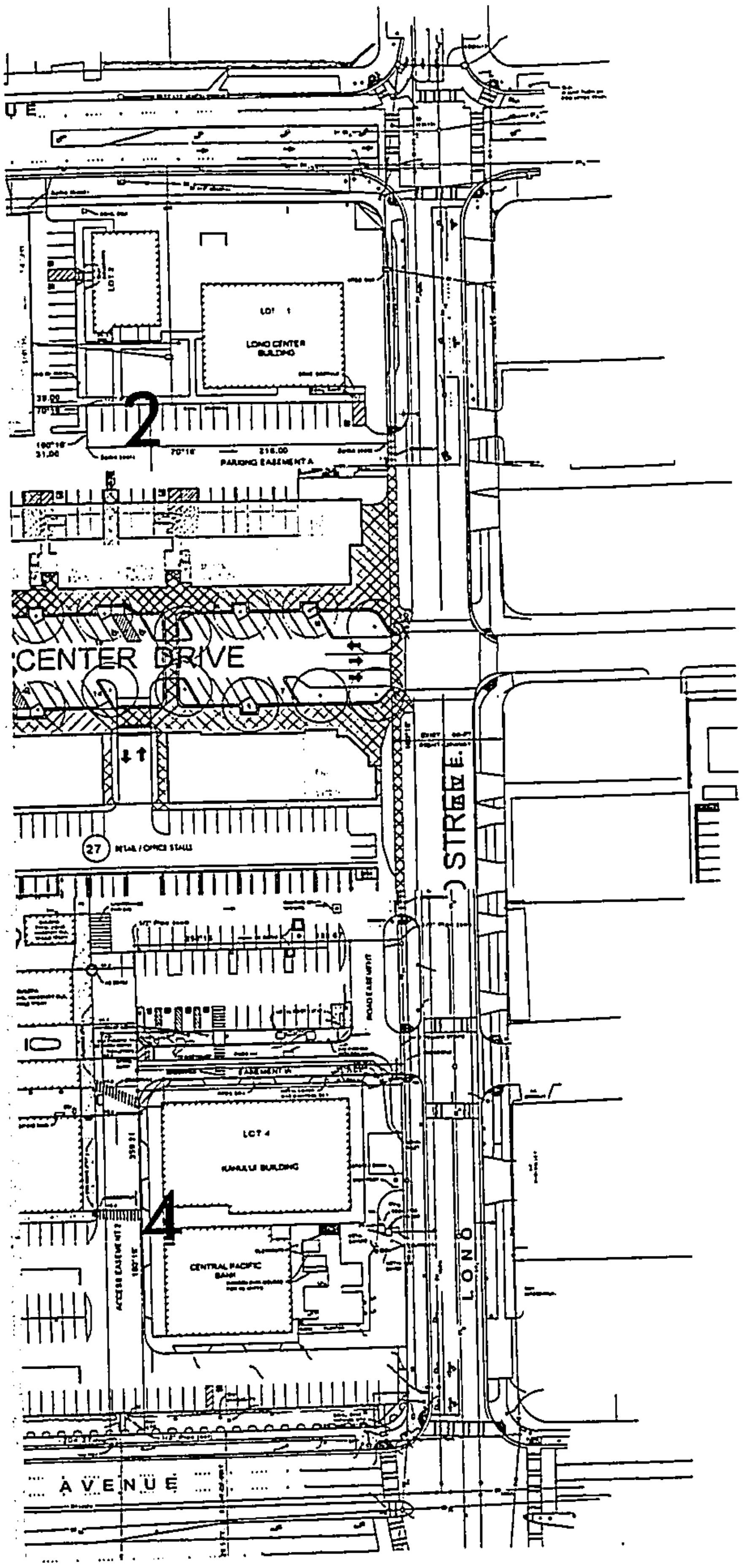
KAHULUI TOWN CENTE

SITE PLAN

PHASE IIA
YR 2009

CONSTRUCTION AREA

STAGING AREA



CENTER, MAUI

PLAN

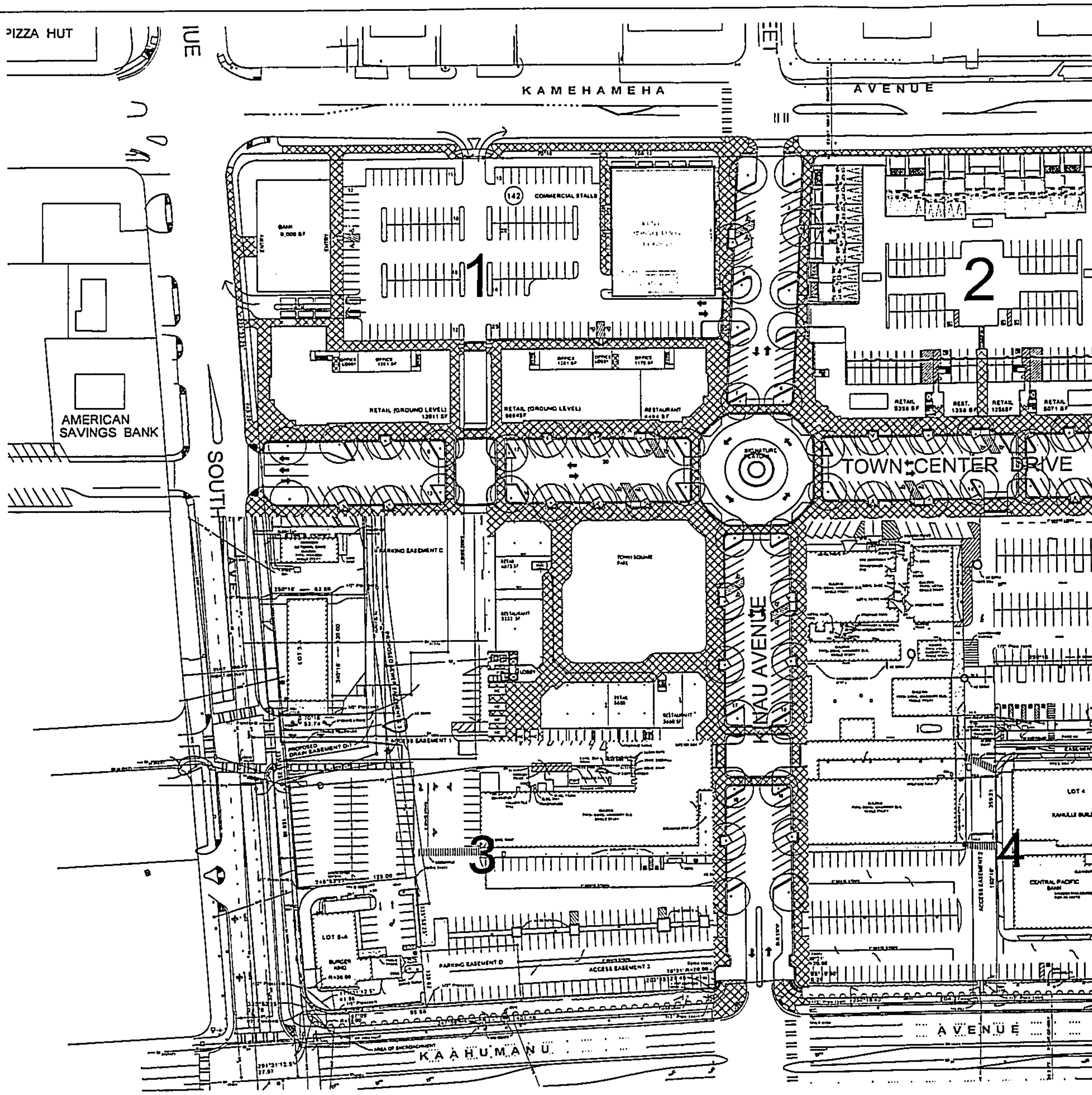
Attachment No. 6, B

Mc Architects

LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.

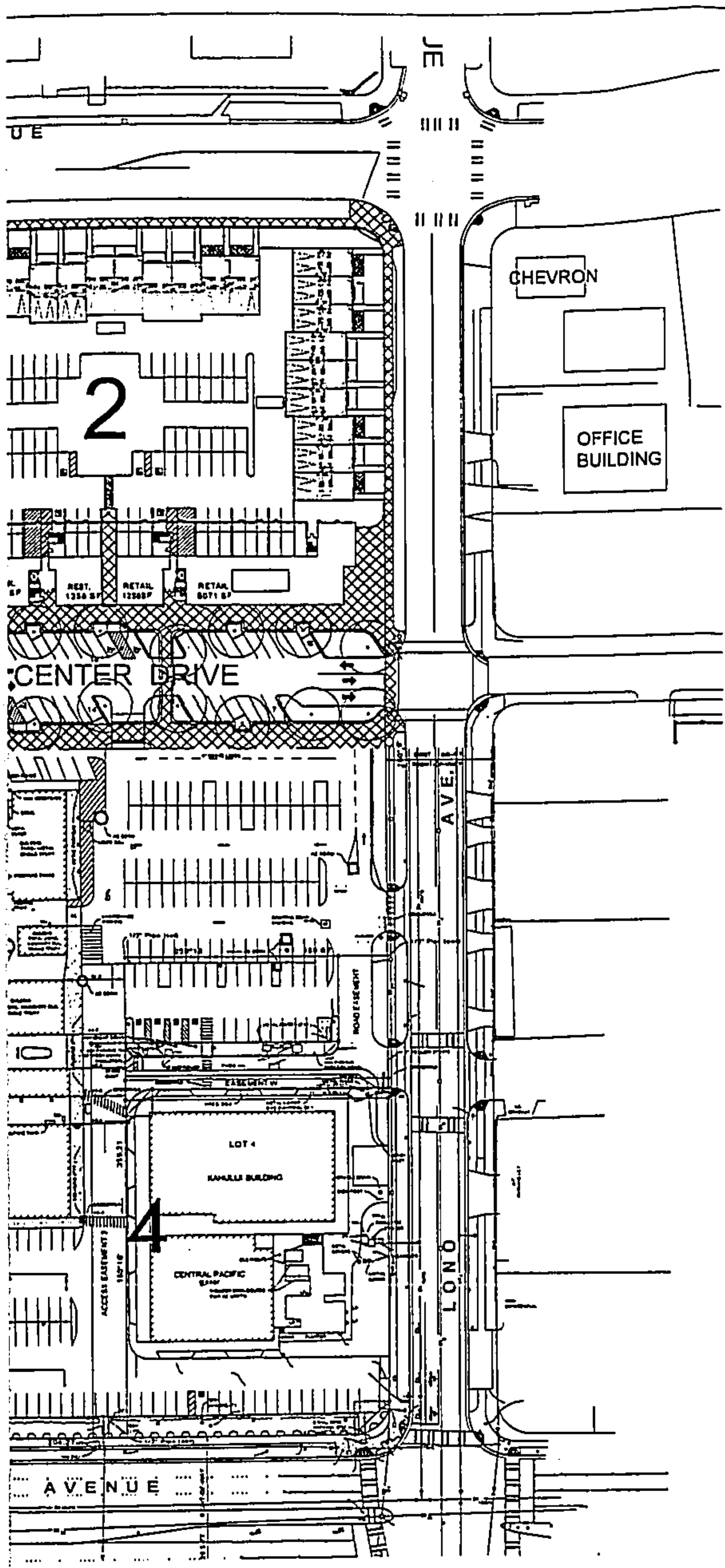
NGA HAWAII LLP

CHRIS HART



A&B PROPERTIES, INC.
A SUBSIDIARY OF ALEXANDER & BALDWIN, INC.

KAHULUI TOWN CENTER,
SITE PLAN



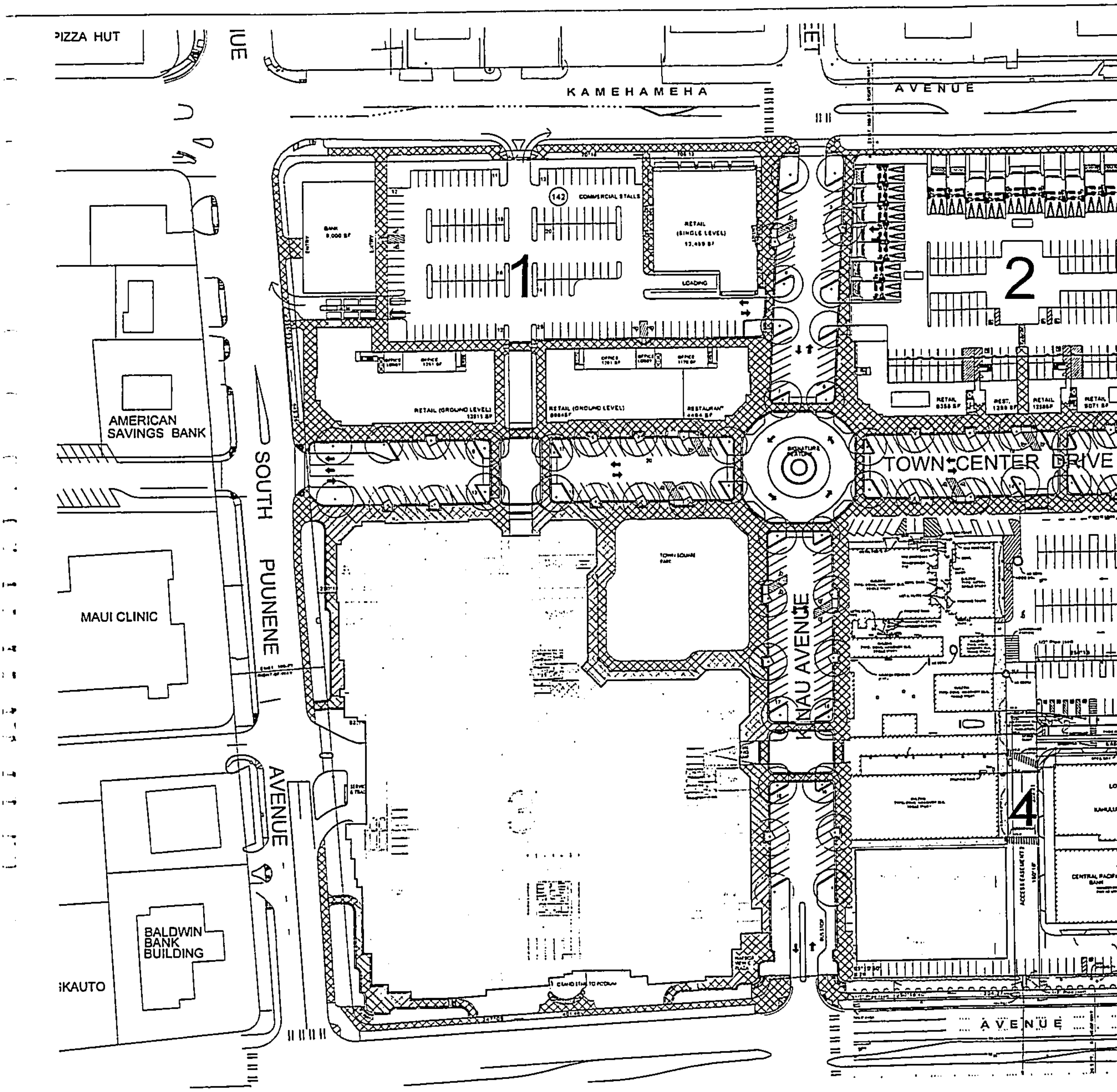
PHASE IIB
YR 2009-2011

☐	CONSTRUCTION AREA
☐	STAGING AREA

CENTER, MAUI
PLAN

Attachment No. 6, C

Mc Architects
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.
NGA HAWAII LLP
CHRIS HART



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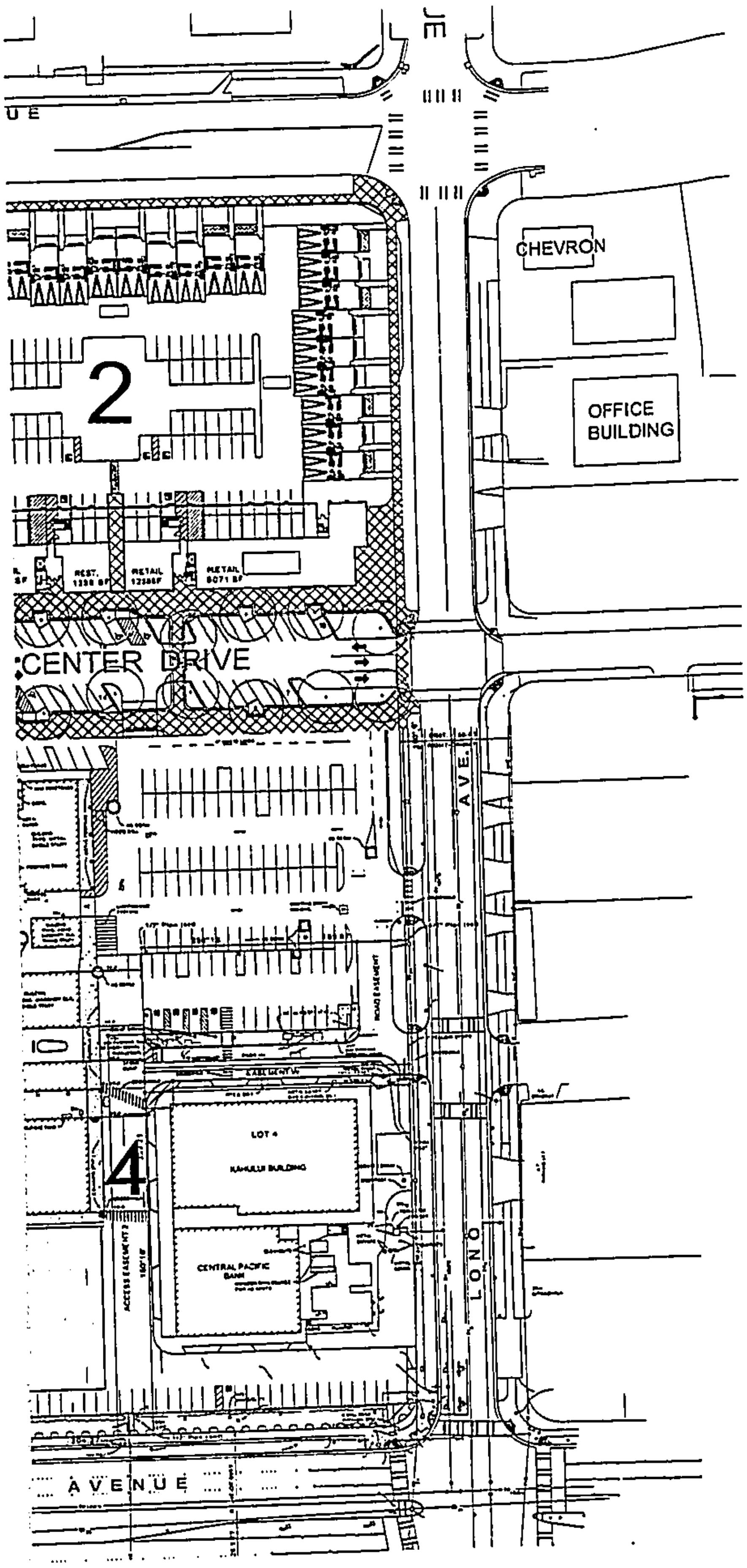
KAHULUI TOWN CENTER
SITE PLAN



PHASE III
YR 2011

CONSTRUCTION AREA

STAGING AREA

CENTER, MAUI
PLAN

Attachment No. 6, D

Mc Architects

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NGA HAWAII LLP

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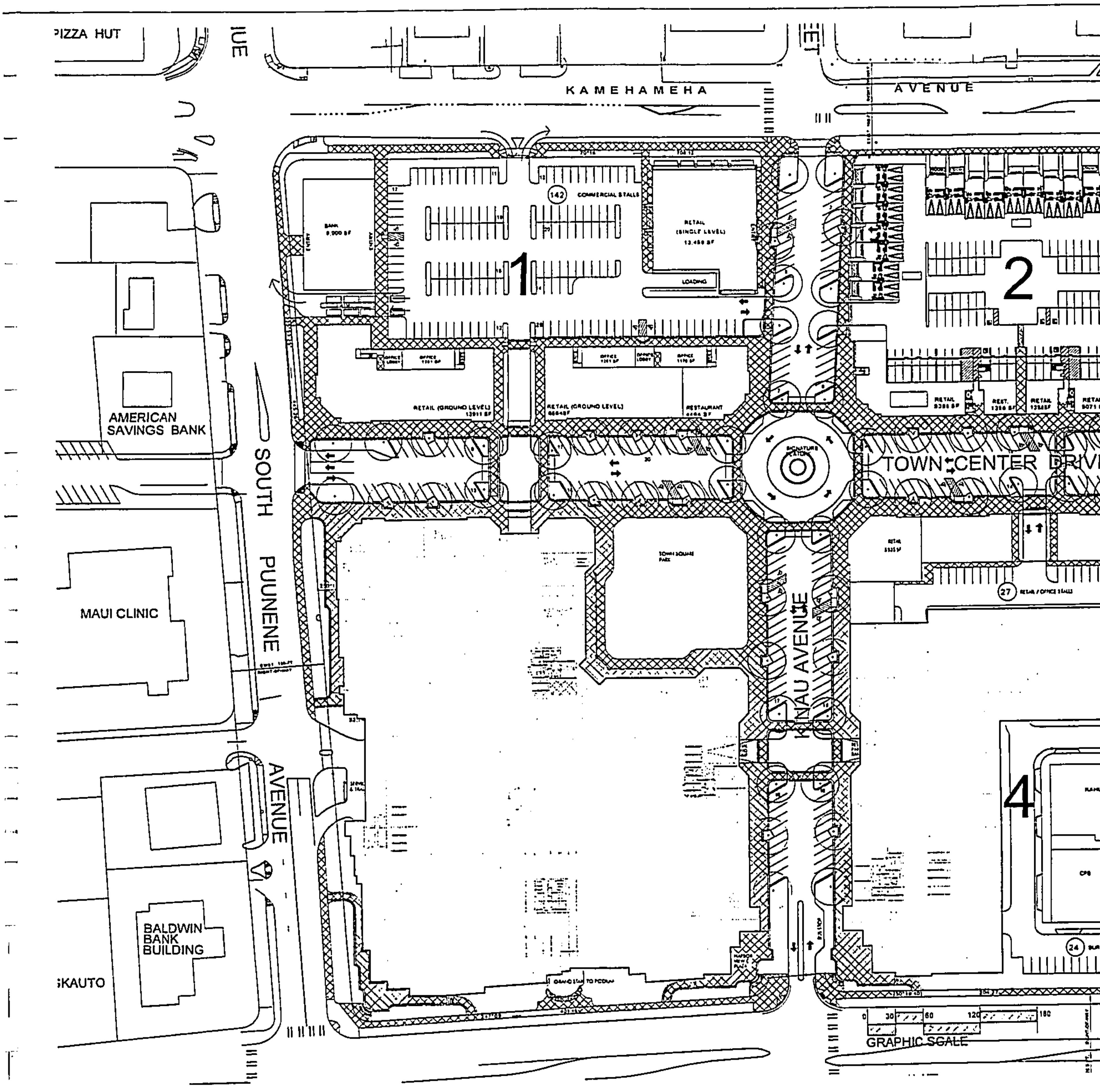

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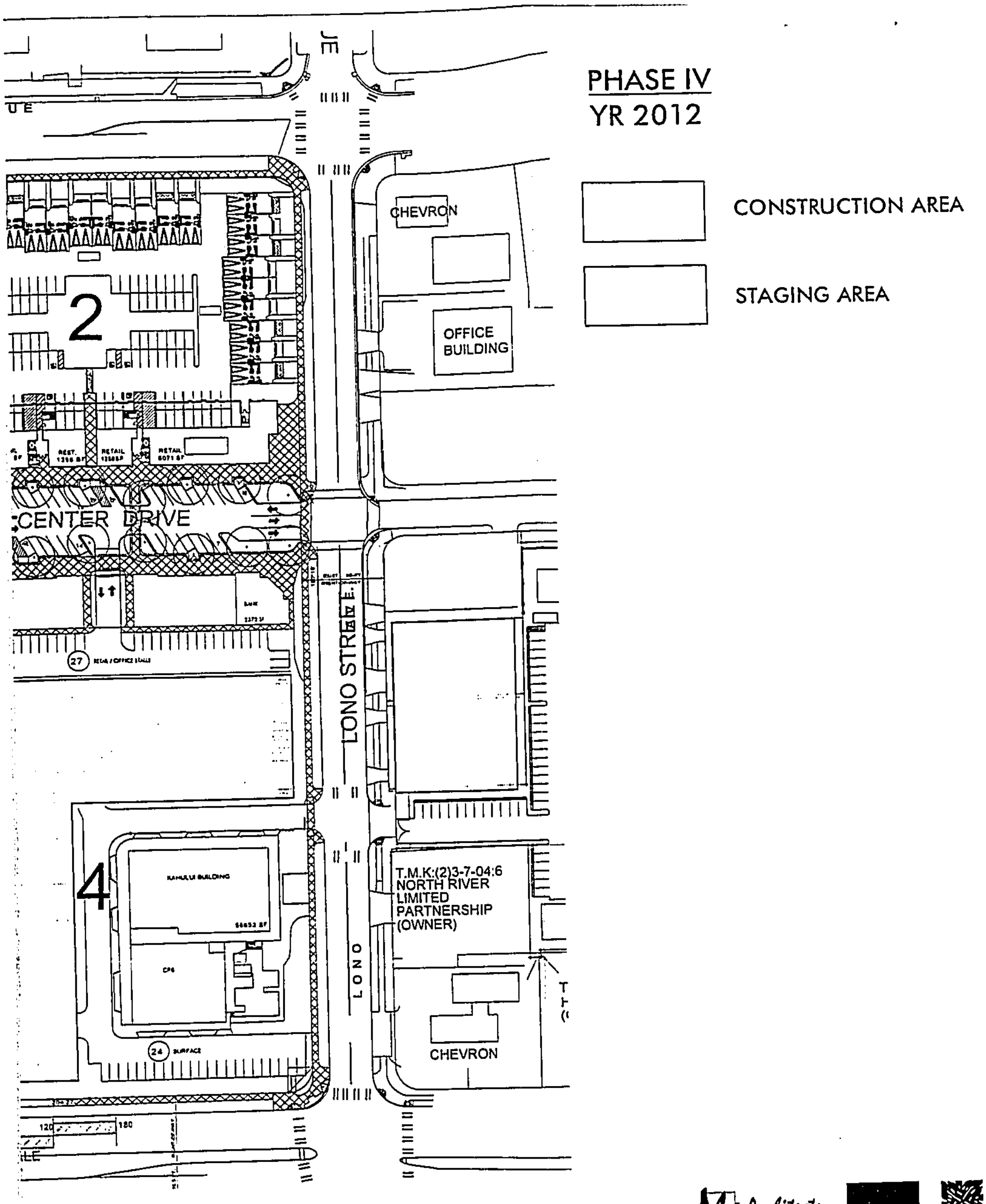
KAHULUI TOWN CENTER
SITE PLAN



CENTER, MAUI

PLAN

Attachment No. 6, E

Mc Architects
LESLIE LIPPICH ARCHITECT & ASSOCIATES INC.
NGA HAWAII LLP
CHRIS HART & PARTNERS INC.

ALAN M. ARAKAWA
Mayor
MICHAEL W. FOLEY
Director
DON COUCH
Deputy Director

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MAY 26 2006
CHRIS HART & PARTNERS
Landscape Architecture & Planning

COUNTY OF MAUI
DEPARTMENT OF PLANNING

May 23, 2006

Mr. Bill Mitchell
Chris Hart & Partners
1955 Main Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Mitchell:

Re: Arborist Committee Comments on the Kahului Shopping Center Mixed Use Redevelopment Project at TMK 3-7-007:009, 10, 27, 5, 8 and 50, Kahului, Maui, Hawaii

At its regular meeting on May 17, 2006, the Maui Arborist Committee was presented with a conceptual scheme for a mixed use redevelopment project at the Kahului Shopping Center. Specifically, the committee discussed the proposed landscape planting plans for the project which includes removal of a number of existing mature trees. The Committee offered the following comments on the project:

1. The Committee recognized the significance of Monkeypod trees to the site and its relationship to the community.

2. A number of mature trees exist on site. The Committee indicated that a small number of these trees are healthy and many may be too old to be moved. As such, the Committee prefers planting of new field stock trees as opposed to relocation of existing trees onsite.

3. A certified and qualified arborist shall assess the health and structural integrity of all existing trees prior to each phase of development. For those trees found to be healthy and structurally sound, relocation of these trees could occur onsite or at another location of public benefit.

4. There is insufficient planting area identified on the project plans for the proposed Monkeypod Trees that will line the roadways that will eventually form a canopy over the streets. The Committee recommends that the Monkey Pod Trees be planted in a minimum 15'x 15' space to promote the health of the tree. The proposed 12'x12' space is not adequate. The Committee further noted that the actual appropriate planting area for such a tree type is 30'x30'.

5. The proposed Monkeypod Trees within the one (1) acre park site shall be set back 15 feet from the edge of pavement.

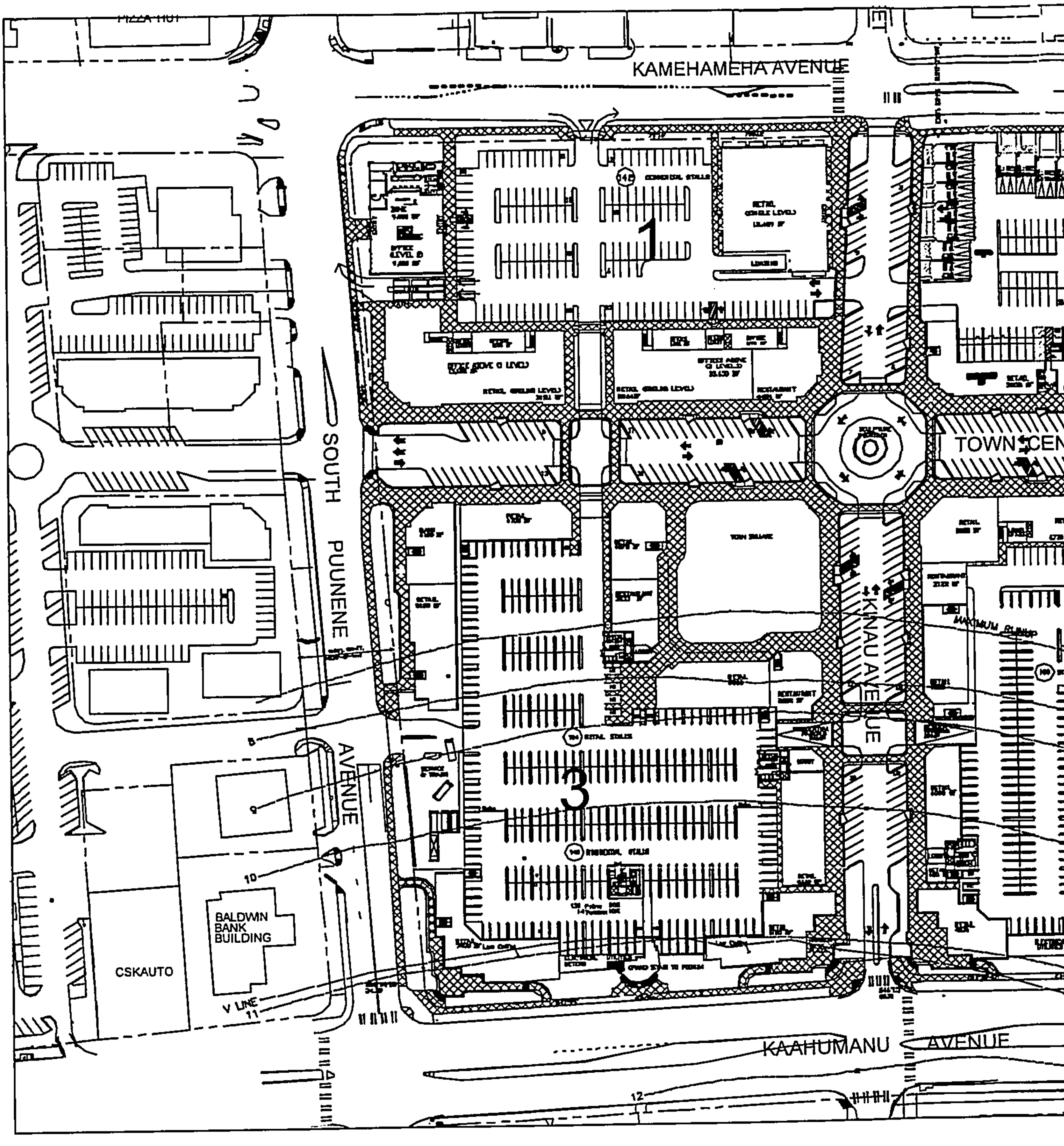
6. When trees are planted the natural soil should be amended as opposed to bringing in new soil.

If additional clarification is required, please contact Ms. Ann Cua, Staff Planner, of the Maui Planning Department at 270-7521.

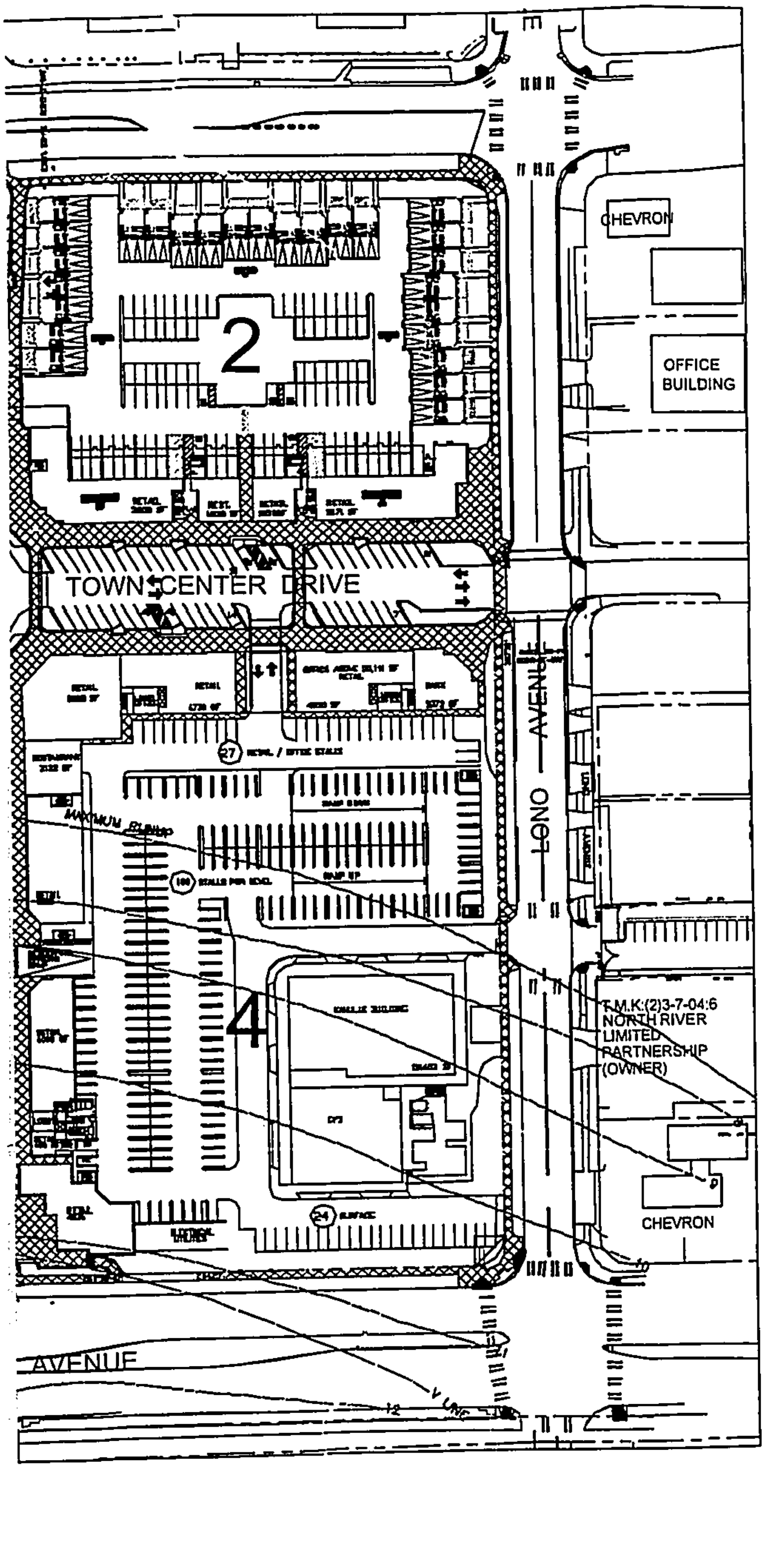
Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:ATC:lar
c: Clayton Yoshida, AICP, Planning Program Administrator
Ann Cua, Staff Planner
Michael Summers, Chris Hart & Partners
Kivette Caigoy, Environmental Planner
UDRB File
Project File
General File
K:\WP_DOCS\PLANNING\SM1\2006\0010_KahuluiTownCenter\ArboristCommComments.wpd



KAMEHAMEHA AVENUE
SOUTH PUUNENE AVENUE
TOWN CEN
KINAU AVENUE
KAAHUMANU AVENUE
1
3
BALDWIN BANK BUILDING
CSKAUTO
V LINE
8
9
10
11
12



Kahului Town Center-
Conceptual Site Plan

EXHIBIT B

CHRIS HART & PARTNERS, INC.

July 27, 2006

Mr. Michael W. Foley
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

RE: Response to Arborist Committee Comments regarding the Kahului Town Center Project located at the site of the existing Kahului Shopping Center, Kahului, Maui, Hawaii (TMK Nos: (2) 3-7-007: 005, 008, 009, 010, 027, and 050).

Thank you for your letter dated May 23, 2006, regarding the above-referenced project. In response to your letter, please find the following comments:

1. Monkeypod Trees. The Applicant acknowledges that the existing Monkeypod trees are significant to the site and the community. As such, the Applicant is committed to incorporating Monkeypod trees throughout the project as the feature tree, and wherever feasible, will relocate the existing Monkeypod trees to other areas within the site.

2. Relocation of Existing Trees. The Applicant acknowledges that the Committee prefers planting new field stock trees as opposed to relocation of existing trees onsite. However, the Applicant understands that existing healthy Monkeypod trees, that are structurally stable, may be relocated onsite.

3. Health of Existing Trees. The Applicant will retain a certified and qualified arborist to assess the health and structural integrity of all existing trees prior to each phase of development. For those trees that are found healthy and capable of relocation, the Applicant will make efforts to relocate the trees onsite, or at another location of public benefit.

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 · WAILUKU, MAUI, HAWAII 96793-1706 · PHONE: 808-242-1955 · FAX: 808-242-1956

4. Tree Wells. The Applicant, where feasible, will create tree wells that have a minimum size of 15'x15' for the Monkeypod trees.

5. Monkeypod Tree Setback. The proposed Monkeypod trees will be setback at least 15-feet from the edge of pavement within the one-acre park site.

6. Soil. When planting trees, wherever feasible, the natural soil will be amended rather than brining in new soil.

Thank you for your assistance with this project. Should you have any questions, please contact myself, or Mr. Michael Summers, Chris Hart & Partners, at 242-1955.

Sincerely yours,

Bill Mitchell
Principal Landscape Architect

cc. Mr. Darren Lake, A&B Properties
Project File

CHRIS
HART
& PARTNERS, INC.

July 28, 2006

Mr. Michael W. Foley
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

RE: Revised Response to Arborist Committee Comments regarding the Kahului Town Center Project located at the site of the existing Kahului Shopping Center, Kahului, Maui, Hawaii (TMK Nos: (2) 3-7-007: 005, 008, 009, 010, 027, and 050).

This is a supplement to our letter dated July 27, 2006, in response to the Arborist Committee's comments regarding the above-referenced project. As noted in our July 27 letter, the Applicant, where feasible, will create tree wells that have a minimum size of 15'x15' for the Monkeypod trees. In addition, please note that the revised landscape plan will be submitted to the Arborist Committee for review.

Thank you for your assistance with this project. Should you have any questions, please contact myself, or Mr. Michael Summers, Chris Hart & Partners, at 242-1955.

Sincerely yours,

Bill Mitchell
Principal Landscape Architect

cc. Mr. Darren Lake, A&B Properties
Project File

Appendix D

Archaeological Inventory Survey and Monitoring Plan

SCS Project Number 656-1

AN ARCHAEOLOGICAL ASSESSMENT OF THE KAHULUI SHOPPING CENTER PROJECT, WAILUKU AHUPUA`A, KAHULUI, ISLAND OF MAUI, HAWAI`I [TMK 3-7-7:5, 8-10, 27 and 50]

Prepared By:
Kirk Johnson, B.A.,
and
Michael Dega, Ph.D.

March 2006

Prepared for:
Chris Hart and Partners, Inc.
1955 Main Street, Suite 200
Wailuku, HI 96793-1706

SCIENTIFIC CONSULTANT SERVICES Inc.

711 Kapiolani Blvd. Suite 975 Honolulu, Hawai`i 96813

ABSTRACT

Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on a property proposed for development which is currently referred to as the Kahului Shopping Center (KSC) block, owned by A&B Properties, and located within the city limits of Kahului, Wailuku Ahupua`a, on the Island of Maui, Hawaii (TMK 3-7-7:5, 8-10, 27 and 50). As the results of the Inventory Survey were negative, this report is being written as an Archaeological Assessment, per SHPD rules.

Trenches were excavated across representative portions of the entire Kahului Shopping Center (KSC) block, an entirely built landscape. The current investigations revealed no evidence of traditional Hawaiian or historic occupation. All excavation units did exhibit an average of approximately 0.80 m of recent and/or historic deposits which could have truncated earlier deposits. Nearly all of the trenches were also excavated into, or to, their contact point with gleyed sand. This sedimentary series indicates the long term presence of the water table in the area, making the occurrence of earlier cultural deposits below these excavations highly unlikely. The gleyed sand is thought to represent a mixing of marine and terrestrial sediments within a former wetland-type environment. This environment has become filled through time, allowing for historic-modern use of the Kahului area. Laboratory analysis indicates that all artifacts removed from these excavations originated in the 1920s or later.

A program of Archaeological Monitoring is recommended for all further excavation/ground altering activities conducted in the project area.

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INTRODUCTION

At the request of C. Hart and Partners Inc., and pursuant to recommendations by the Hawai'i State Historic Preservation Division (SHPD), Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on a c. 20-acre property proposed for the development of the Kahului Town Center. The property on which these investigations were performed is currently referred to as the Kahului Shopping Center (KSC) block, owned by A&B Properties, and located within the city limits of Kahului, on the Island of Maui, Hawaii (TMK 3-7-7:5, 8-10, 27 and 50). Field work was conducted during a four day period from January 30 through February 2 of 2006 by Kirk Johnson, B.S. and Bill Fortini, B.A., under the direction of Principle Investigator, Michael Dega, PhD (Figure 1). As the project area was a built environment, Inventory Survey was primarily conducted through mechanical backhoe testing. The results of this testing was negative, this report has been re-classified as an Archaeological Assessment. However, this report retains most elements on an Inventory Survey report for completeness.

PHYSICAL SETTING

The project area is a 19.9 acre site bounded by Kaahumanu Avenue to the north, Puunene Avenue to the east, Kamehameha Avenue to the south and Lono Avenue to the west. The parcel is at present nearly completely covered by buildings, landscaped areas, and asphalt and concrete parking lots (Figure 2). Complimentary utilities and other infrastructure are strewn throughout the property. Only the southeast corner of the parcel is seemingly undeveloped, although an aerial photograph shows structures in this area during the first half of the last century (Figure 3).

CULTURAL AND HISTORIC SETTING

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu'u Kukui, forming the west end of the island (1,215m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems watering fertile agricultural lands that extend to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted, productive landscapes.

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (moku) and sub-districts was performed by a kahuna (priest, expert) named Kalaiha'ōhia, during the time of the ali'i Kaka'alaneo (Beckwith 1940:383; Fornander places Kaka'alaneo at the end of the 15th century

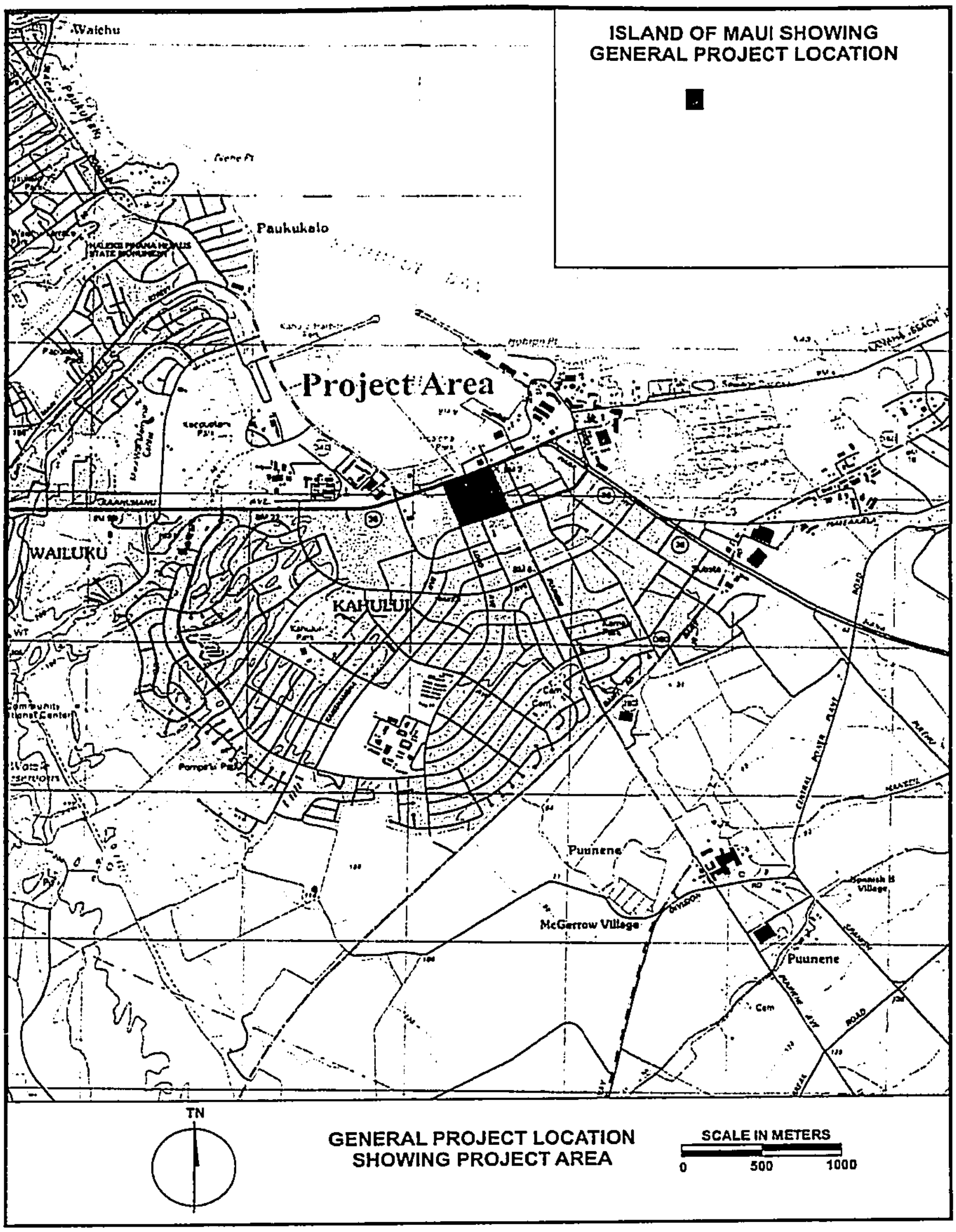

Figure 1: USGS Quadrangle Showing Project Area.

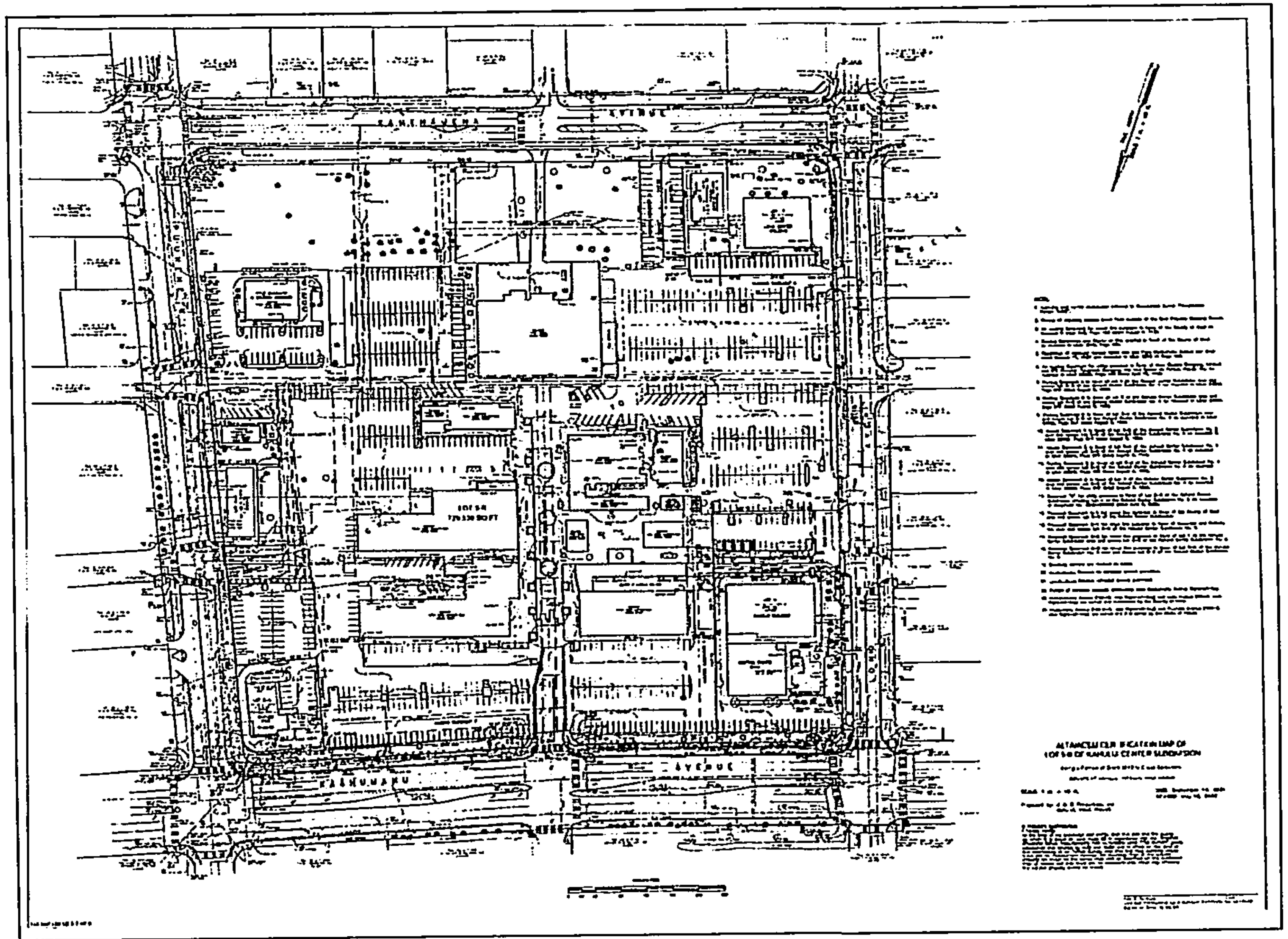

Figure 2: Plan View Map of Current Project Area.

Figure 3: Early Aerial Photo (n.d.) Showing Project Area.

or the beginning of the 16th century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali`i `ai moku* (the *ali`i* who eats the island/district), which he held in trust for the gods. The title of *ali`i `ai moku* ensured rights and responsibilities pertaining to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku, ahupua`a, `ili* or *`ili`ā ina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili `āina* or *`ili* were smaller land divisions next in importance to *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (*ibid*:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in a *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in the *ahupua`a* of Kahului, which translated literally means "the winning" (Pukui *et al.*:67).

Kahului Town is part of Wailuku Ahupua`a and Wailuku District, which collectively have yielded a substantial archaeological and historic record. The following is a brief summary of the salient aspects of these data.

In traditional times, it appears that Kahului was a relatively marginal settlement location, compared with Wailuku Town and areas to the north of Wailuku. Handy (1940) described the low-lying coastal areas east of Wailuku (including Kahului) as having scattered fishing settlements, which usually implies a relatively low population density or limited socio-economic status.

The Wailuku District was once known as "The Four Streams Area" (*Na Wai Eha*), which refers to the four main valleys that drain the eastern slopes of West Maui, including the massive Iao Valley (Handy and Handy 1972). The area from Waihe`e to Wailuku was formally the most extensive continuous area of wet taro cultivation in the Hawaiian Islands. Wailuku, itself, has been described as a "chiefly center" (Sterling 1998:90), although the seat of power was almost certainly concentrated in and around the Iao Valley, on the other (west) side of Wailuku from the project area. Areas upslope and west of the project area, including Wailuku Town, were once covered with *lo`i* (irrigated stone terraces) and house sites. Areas downslope and closer to the project area were burial grounds in traditional times.

Areas around the Waihe`e and Waiehu Streams, although a few miles north of the project area, have yielded some of the earliest settlement dates in Maui (Kirch 1985). Cordy *et al.* (1978) have proposed that the coast and lower valleys in this area were first settled by A.D. 300 to 600. Closer to the project area, the Wailuku Sand Hills, about a mile to the west, have yielded substantial numbers of burials and other evidence of traditional Native Hawaiian settlement (see Previous Archaeology section below).

Sterling's (1998) compendium of traditional archaeological sites on Maui has much to say about the Wailuku District, in general, and the Wailuku Ahupua`a, in particular. Documented *heiau* from Wailuku Ahupua`a include:

- Kaluli Heiau (Walker Site 42)—since destroyed
- Pihana Heiau (Walker Site 43)—located just west of the Sand Hills (Wailuku)
- Halekii Heiau (Walker Site 44)—located just north of the Sand Hills (Wailuku)
- Various Heiau (Walker Sites 45–54)—ten named *heiau* in Wailuku, all destroyed

A major inland fishpond was located at the present day spot of Kanaha Pond and Bird Sanctuary, just east of the project area. In traditional times, this was sometimes referred to as two, artificially joined ponds (Kanaha and Mauoni).

There is an interesting passage about Kahului during the middle 19th century by G.W. Bates (1854), cited in Sterling (1998). Bates' interpretation of a major battleground site in Kahului may not have been accurate, although there are many oral traditions about battles in this general area, but the rest of his description is instructive and worth quoting at length:

> Leaving Wai-lu-ku, and passing along toward the village Kahului, a distance of three miles, the traveler passes over the old battle-ground named after the village. It is distinctly marked by moving sand hills, which owe their formation to the northeast trades. Here these winds blow almost with the violence of a sirocco, and clouds of sand are carried across the northern side of the isthmus to a height of several hundred feet... In places laid bare by the action of winds, there were human skeletons projecting...(Sterling 1998:92)

HISTORIC SETTING

Literally hundreds of Land Commission Awards (LCA) are documented for Wailuku Ahupua'a (see, *e.g.,* Sterling 1998:86; Burgett and Spear 2003), although, in keeping with the broad settlement pattern outlined above, most of these were located in and around Iao Valley, west of the Wailuku Town and well removed from the project area. The existence of such large numbers of LCAs, however, does attest to the large settled population in the lower Iao Valley during the middle 19th century, and residents of Kahului were no doubt drawn into this sphere of influence.

There are no LCAs for the project area, which is owned by Alexander and Baldwin, Inc., according to TMK data (see Figure 2). The soil map by Foote *et al.* (1972) defines more or less the entire northern parcel as 'fill land", presumably, in this case, to stabilize coastal Kahului Bay (see Figure 1). Two older gentlemen living (homelessly) on the northern parcel described the southern parcel as previously having numerous, small houses (more like shacks, according to one of the informants).

Traditional land utilization was rapidly and dramatically supplanted by sugar cane cultivation during the 1850s (Dorrance and Morgan 2000). Many of the awarded LCAs in Wailuku Ahupua'a were under sugar cane cultivation by the mid 19th century. Sites and features built during this period include water irrigation ditches, terraces, free standing walls, historic houses, and mill structures. Cultivation of sugar cane dominated land use in Wailuku Ahupua'a well into the middle 20th century.

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various ahupua'a. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and *mai'a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *'uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Between A.D. 600-1100, sometimes referred to as the Developmental Period, the major focus of permanent settlement continued to be the fertile and well-watered windward valleys, such as those in the West Maui mountains in close proximity to Kahului (Kirch 1985).

WAHI PANI (LEGENDARY PLACES)

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama`āina* of the district. Near the current project area were the *kuapa* (fishponds) of Kanaha and Mau`oni, also known as the twin ponds of Kapi`ioho (a chief of O`ahu and half of Moloka`i in the early 18th century; Cordy 2002). It was told that stones were passed hand-to-hand by a line of men extending from Makawela to Kanaha during the building of the banks. Kapi`ioho was killed before they were finished and Kamehamehanui (brother of Kahekili) finished their construction and placed a *kapu* on the bank dividing the two ponds (Sterling 1998). Another version published in *Ka Nupepa Kuokoa* stated that after Kapi`ioho was killed, Kihapi`ilani began the construction of the ponds and it was he who separated the water with a wall, giving it two names (August 23, 1884). The twin ponds supplied mullet to the population during the times of fishing *kapu* (Bartholomew 1994).

Wailuku was a center of political power often at war with its rival in Hana. By the end of the 18th century, Kahekili resided with his entourage in Wailuku and it was on the sand dunes that Kahekili and his warriors engaged those of Kalani`ōpu`ū, Chief from Hawai`i Island. George W. Bates recounted his journey from Wailuku to Kahului in 1854:

> Leaving Wai-lu-ku, and passing along toward the village Kahului, a distance of three miles, the traveler passes over the old battle-ground named after the village. It is distinctly marked by moving sand-hills, which owe their formation to the action of the northeast trades. Here these winds blow almost with the violence of a sirocco, and clouds of sand are carried across the northern side of the isthmus to a height of several hundred feet. These sand-hills constitute a huge "Golgotha" for thousands of warriors who fell in ancient battles. In places laid bare by the action of the winds, there were human skeletons projecting, as if in the act of struggling for resurrection from their lurid sepulchers. In many portions of the plain who cart-loads were exposed in this way. Judging of the numbers of the dead, the contest of the old Hawaiians must have been exceedingly bloody. . . .[*Sandwich Island Notes*, 309]

The1776 encounter between Kahekili and Kalani`ōpu`ū resulted in a temporary truce which was broken in 1790 by the battle of Kepaniwai, when Kamehameha I consolidated his control over Maui Island. There were so many people and canoes invading from Hawai`i Island that it was called the Great Fleet. During Kahmehameha's campaign, it was recorded that the bay from Kahului to Hopukoa was filled with war canoes and they extended to Kalae`ili`ili at Waihe`e and below Pu`uhele and Kamakailima:

> . . . Kamehameha and his chiefs went on to the principal encounter at Wailuku. The bay from Kahului to Hopukoa was filled with war canoes. For two days there was constant fighting in which many of the most skilful warriors of Maui took part, but Kamehameha brought up the cannon, Lopaka, with men to haul it and the white men, John Young and Isaac Davis, to handle it; and there was great slaughter. (Kamakau 1961: 148).

From Kahului, Kamehameha marched on to Wailuku where Kalanikupule, Kahekili's son, waited with his warriors.

In 1837, the village of Kahului consisted of twenty-six *pili*-grass houses living close to the sea and depending on fishing in the coastal waters for the majority of their food (Bartholomew 1994). Mullet was still harvested from the twin ponds in the early 1900s and people swam in the spring waters that were continuously refreshed (*ibid.*). Thomas Hogan built the first western building, a warehouse, near the shoreline of Kahului in 1863 (Clark 1980). The dredging of Kahului harbor through the years filled in large sections of the ponds, eventually blocking the outlet to the sea.

As the sugar industry developed, Kahului became a cluster of warehouses, stores, wheelwright and blacksmith shops close to the harbor. A small landing was constructed in 1879 to serve the sugar company (Clark 1980). In the late 1800s, Kahului possessed a new custom house, a saloon, Chinese restaurants, a railroad and a small population of residents. Kahului 's main focus was shipping. The 1900 bubonic plague outbreak destroyed much of the town as officials decided to burn down the Chinatown area in an effort to contain the epidemic. The Chinese, Japanese and Hawaiian residents were displaced by this action. To further insure isolation, authorities encircled the entire town with corrugated iron rat-proof fences which ended the spread of the plague (Bartholomew 1994). The Kahului Railroad Company built a 1,800 foot long rubble-mound breakwater in 1910 and dredging of the harbor now allowed ships with a 25-foot draft to dock at the new 200-foot wharf (Clark 1980).

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy

(Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

There were over 400 *kuleana* awarded in the district of Wailuku, but none were identified in the project area.

HISTORIC LAND USE

Kahului was Maui's main harbor during the 20th century and provided employment to residents through the railroad, as dock workers, clerks, cannery workers and in the cane fields (Bartholomew 1994). Pu`unēnē Avenue bordering the project area to the east, sported Kahului Store a retail operation owned by Hawaiian Commercial & Sugar Company and Pu`unēnē Store, which supplied all of the plantation camp stores. The section of Kahului where the project is located contained commercial establishments and homes that spread *makai*, down Pu`unēnē Avenue to the former Maui County Fairgrounds. Stands of *kiawe* and plantation camps were scattered across Kahului town (*ibid.*).

In January of 1942, Japanese submarines shelled Kalului Harbor as part of a harassment scheme and 75 mm shoreline artillery returned fire (Clark 1980). After WW II, the Kahului development company built houses that were sold to the employees of HC&S. In 1950, Kahului shopping center was open for business catering to the new homeowners. In February of 2005, a fire destroyed approximately 50% of the 99,563 square feet of retail space in the Kahului Shopping Center.

PREVIOUS ARCHAEOLOGY

Only a modest number of archaeological investigations have been conducted over the past few years near the present project area in Kahului, Maui. Inventory Survey and Monitoring programs have yielded variable results. To date, Fredericksen and Fredericksen (1988, 1989) conducted the most intensive study of the area through Inventory Survey. The survey led to the documentation of several volcanic glass concentrations, historic irrigation ditches, and old stream gravels. No subsurface deposits were identified near Dairy Road in the former sugarcane lands to the south of the present project area. A significant amount of archaeological work has been conducted to the southwest, in the Maui Lani area of Wailuku. This area is characterized by sand dunes/sandy substrata similar to the present project area. Rotunno-Hazuka *et al.* (1995:i) discuss the findings as being predominantly "scattered human skeletal remains." However, there appeared to also be concentrations of burials; the manuscripts on the project have not yet been prepared. Few other studies directly adjacent to the project area have yielded significant deposits. These results may be a function of sampling, depth of required construction excavations, the predominance of fill in the area overlying sand, or the intrusive nature of sugarcane soils (clay and silty clay bordering the area).

Archaeological Monitoring was conducted during building construction on an approximately. 30,000 square foot parcel located in Kahului, Wailuku Ahupua`a, Wailuku District, Island of Maui, Hawai`i (TMK:3-7-12:017). Five trenches were excavated for footings around the property allowing for an examination of subsurface cultural materials and analysis of project area strata. No cultural deposits or isolated cultural materials were identified during this project. The strata varied from mostly fill layers to natural, sandy sediment sterile of all organics and cultural material (Dega and Risedorf 2004).

More recently, Dega *et al.* (in progress) conducted Monitoring work at the Pu`unene Container Yard at Kahului Harbor. One historic-period burial was identified near fill strata. Traditional-period artifacts were also identified but had been displaced during previous grading and filling of the area. The artifacts, consisted of an adze blank, octopus lure, and poi pounder fragment, were all identified in secondary context.

As summarized by McGerty and Spear (2001), for the Kahului area and Hawai`i in general (see also Kirch 1985), there is an acute positive relationship between the presence of sandy substrate and traditional native Hawaiian burials. Archaeological studies conducted around the perimeter of Kahului Bay and slightly inland (inclusive of the current project area) have led to the identification of deposits related to remnants of the old Kahului Railroad bed, historic refuse, pre-Contact artifacts, midden, and isolated findspots of human remains. The depth of these cultural resources varies depending on previous construction activities in an area but often, these deposits have been identified from 0.20-2.00 meters below the ground surface. Similar to the present project area, many of these resources are associated with sandy substrata.

In keeping with previous archaeological work in the area, most cultural signatures dating to pre-Contact and historic times in the Kahului area are present in subsurface contexts. As the current parcel and environs has been subject to much modern construction, most of these deposits would be partially truncated. Based on previous archaeological work in the Kahului area, both traditional and historical features and deposits may still be present in the Kahului area.

POSSIBLE SITE TYPES TO BE ENCOUNTERED

While the surface of the project area has been completely altered (built environment), the potential for subsurface cultural materials remained a possibility. Prior to fieldwork, it was suspected that numerous classes of archaeological sites could be identified during this research. Traditional deposits dating from the *c.* A.D. 1400s (or even earlier) could include signatures for habitation (hearths, possible living floors, postholes, subterranean alignments, and associated artifacts (*i.e.*, food preparation tools, debitage of tool manufacture, and fishing tool kits) and midden (*i.e.*, consumption products such as fish remains, shell, and terrestrial remains). There was the great possibility that human burials could be identified within subsurface strata. Historic use of the parcel would be indicated by burning episodes, the presence of historic artifacts (such as metals, glass, ceramics), and historic burials, among others. In total, prior to fieldwork there appeared to be a modest chance that these cultural materials could be identified in the project area and allow for documenting both continuous occupation and use of the parcel from traditional through historic times.

FIELD PROCEDURES

The current investigations began by assessing the project area for buried utility and water lines, resulting in the designation of six excavation areas where multiple trenches could be excavated safely (Figure 4). Trenches were also placed to cause only minimal disruption to an active business area and shopping center. Representative backhoe trenches were excavated in each of these six areas, their quantity dependant on the results of each area's initial trench. All trenches were placed on a map, photographed and had at least one wall profiled, with all observed diagnostic artifacts, in addition to general representative artifacts, collected in order to undergo laboratory analysis. Each trench was backfilled immediately after recordation.

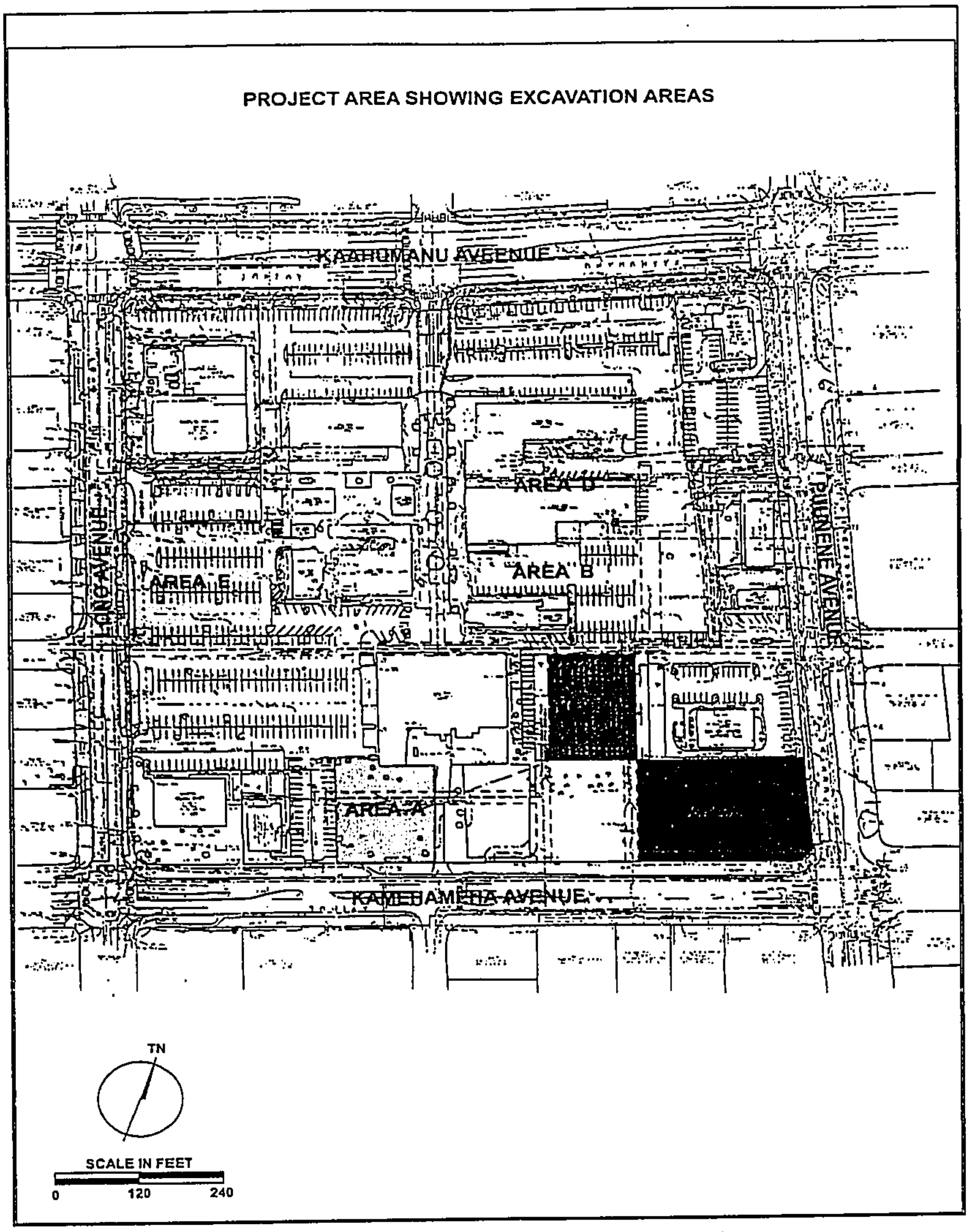

Figure 4: Project Area Plan View Map Showing Areas of Excavation.

TRENCH DESCRIPTIONS AND RESULTS

AREA A

Excavation Area A is presently a level, landscaped quadrangle adjacent to Kamehameha Avenue, on the project area's south margin. It lies approximately 90.0 m east of Lono Avenue and is bounded by parking lots on its west and northwest, a building on its northeast, and a driveway on its east. Three trenches were excavated in this area (Figure 5).

TRENCH 1

Trench 1 was an 8.00 x 0.50 m excavation, oriented 162°-342° and placed in the northwestern portion of Area A. The trench exhibited three discrete soil units or stratigraphic layers and was taken to a maximum depth of 1.40 m below ground surface, where the trench was determined to be well into non-cultural soils and terminated (Figure 6). Soil Unit I was composed of very dark gray (10YR 3/2) medium to fine grained loamy sand averaging a depth of 0.12 m below ground surface. Soil Unit II consisted of brown (10YR 5/3) medium-grained sand extending to a depth of 0.90 m below ground surface. Soil Unit III was composed of brown (10YR 4/3) medium grained sand extending beyond the bottom of the trench (1.40+ mbs). Both Soil Units I and II were recent to historic fill, with Soil Unit I being a sod zone and Soil Unit II exhibiting an abrupt lower boundary. Artifact distribution within the trench was not dense, with the recovered artifacts primarily derived from Soil Unit II. These included a medicine bottle, a lock, a dark green kick-up bottle base, unidentified metal, and bottle glass body shards.

TRENCH 2

Trench 2 was a 7.50 x 0.50 m excavation, oriented 78°-258° and placed near the northern margin of the Area A, approximately 10.00 m east of Trench 1. The trench exhibited four soil units and was taken to a depth of 2.00 m below ground surface, where the bottom of the trench began filling with water (see Figure 6). Soil Unit I was the sod layer of very dark gray (10YR 3/2) medium to fine-grained loamy sand averaging a depth of 0.16 m below ground surface. Soil Unit II was composed of brown (10 YR 5/3) medium-grained sand extending to a depth of 0.80 m below ground surface. Soil Unit III consisted of brown (10YR 4/3) medium-grained sand extending to a depth of 1.20 m below ground surface. Soil Unit IV was composed of light gray (10YR 7/2) medium-grained gleyed sand extending below the water line. As in Trench 1, both Soil Units I and II were recent to historic fill, but the abrupt boundary between Units II and III in Trench 1 was not seen in this trench. No artifacts were collected from Trench 2, but observed cultural material included pipe and concrete rubble, primarily from Soil Unit II, but also from Soil Unit III, near its interface with II. Considering the clear to gradual nature of the boundary

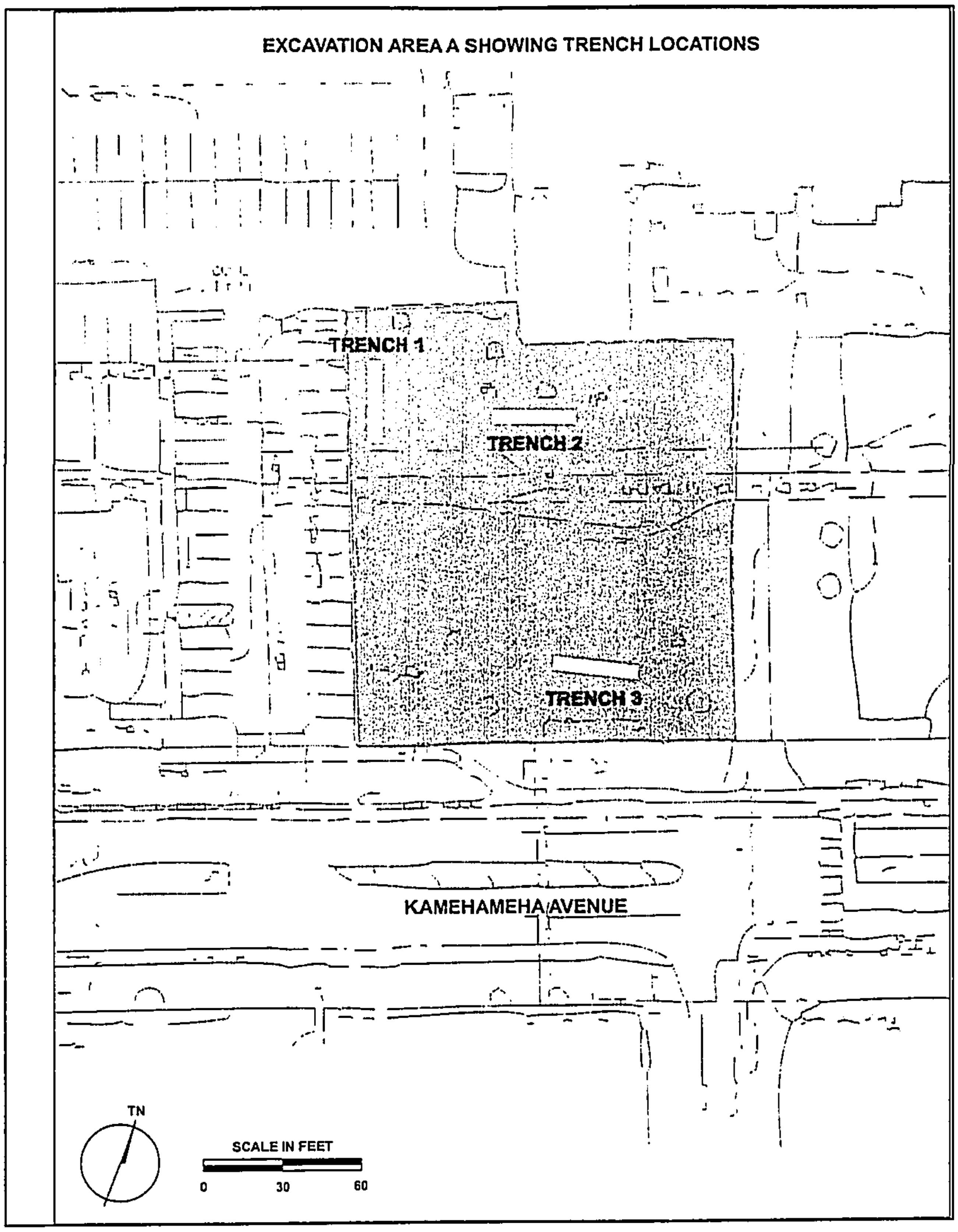

Figure 5: Project Area Map Showing Area A.

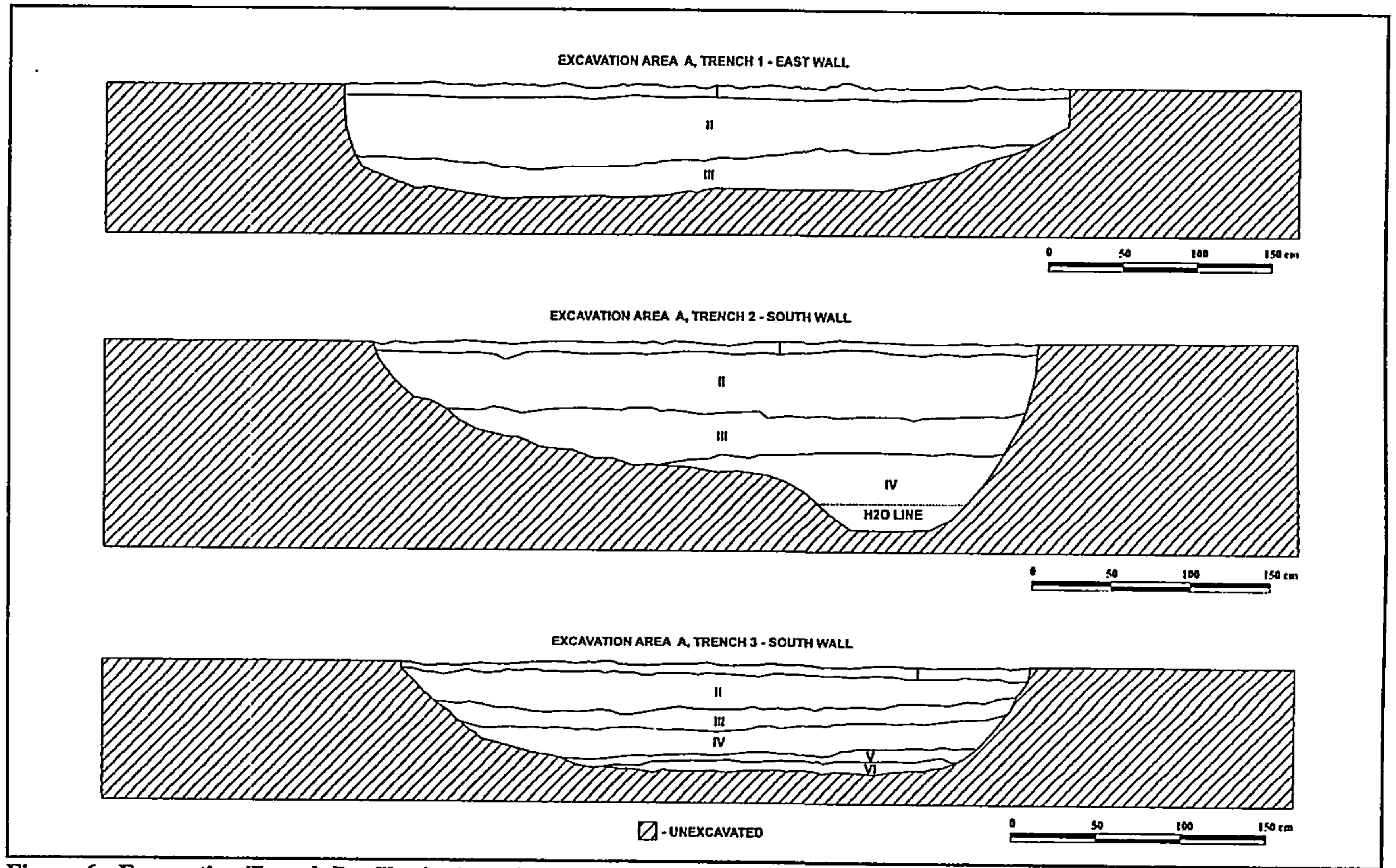

Figure 6: Excavation Trench Profiles in Area A.

between Units III and IV, however, – IV undoubtedly being non-cultural - it is fairly certain that III is also non-cultural, with its artifacts being impressed into it from Soil Unit II.

TRENCH 3

Trench 3 was a 7.00 x 0.50 m trench oriented 65°-245° and placed in the southwestern quadrant of Area A, approximately 90.00 m southeast of Trench 2. The trench exhibited six soil units and was taken to a maximum depth of 1.16 m below ground surface, where gleyed sand began to be exposed (Figure 6). Soil Unit I was composed of brown (10YR 3/2) loamy sand reaching a maximum depth of 0.10 m below ground surface. Soil Unit II was composed of brown (10YR 4/4) coarse sand mixed with gravel and extending to a depth of 0.52 m below ground surface. Soil Unit III consisted of dark brown (10YR 3/4) medium sand achieving a depth of 0.70 m below the ground surface. Soil Unit IV was a unit of brown (10YR 5/3) medium-grained sand extending to approximately 1.00 m below ground surface. Soil Unit V consisted of a narrow band of dark brown (10YR 3/3) clay loam reaching a depth of 1.10 m below surface. Lastly, Soil Unit VI was composed of grayish brown (10YR 5/2) medium-grained gleyed sand extending below the trench base. The break between recent or historic fill and the area's natural deposits was difficult to determine in this trench, although the occurrence of a clay loam deep in the profile was interesting and likely a marine-based basal sediment. Based on the nature of this boundary in Trenches 1 and 2, however, it was believed to occur between Soil Units III and IV. This trench excavation yielded no cultural material.

AREA B

Excavation Area B is presently an "L" shaped parking lot located toward the center of the project area, in its southeast quadrant. The area is bounded on its north by an enclosed, chain link fence (Area D), its east by a parking easement, its southeast by another parking area (Area C), its southwest by a small building, and its west by a landscaped promenade. Three trenches were excavated in this area (Figure 7).

TRENCH 1

Trench 1 was a 4.50 x 0.50 m excavation unit oriented 62°-242° and placed approximately 15.00 m north from the northeast corner of the building. Discounting the asphalt of the parking lot, the trench exhibited four soil units and was taken to a maximum depth of 1.30 m below ground surface (Figure 8). At the base, the trench had exposed the gleyed sand previously established to be non-cultural and associated with the present water table. Soil Unit I was composed of dark reddish brown (5YR 3/4) mixed gravelly sandy clay reaching a depth of 0.64 m below ground surface. Soil Unit II consisted of light yellowish brown (10YR 6/4)

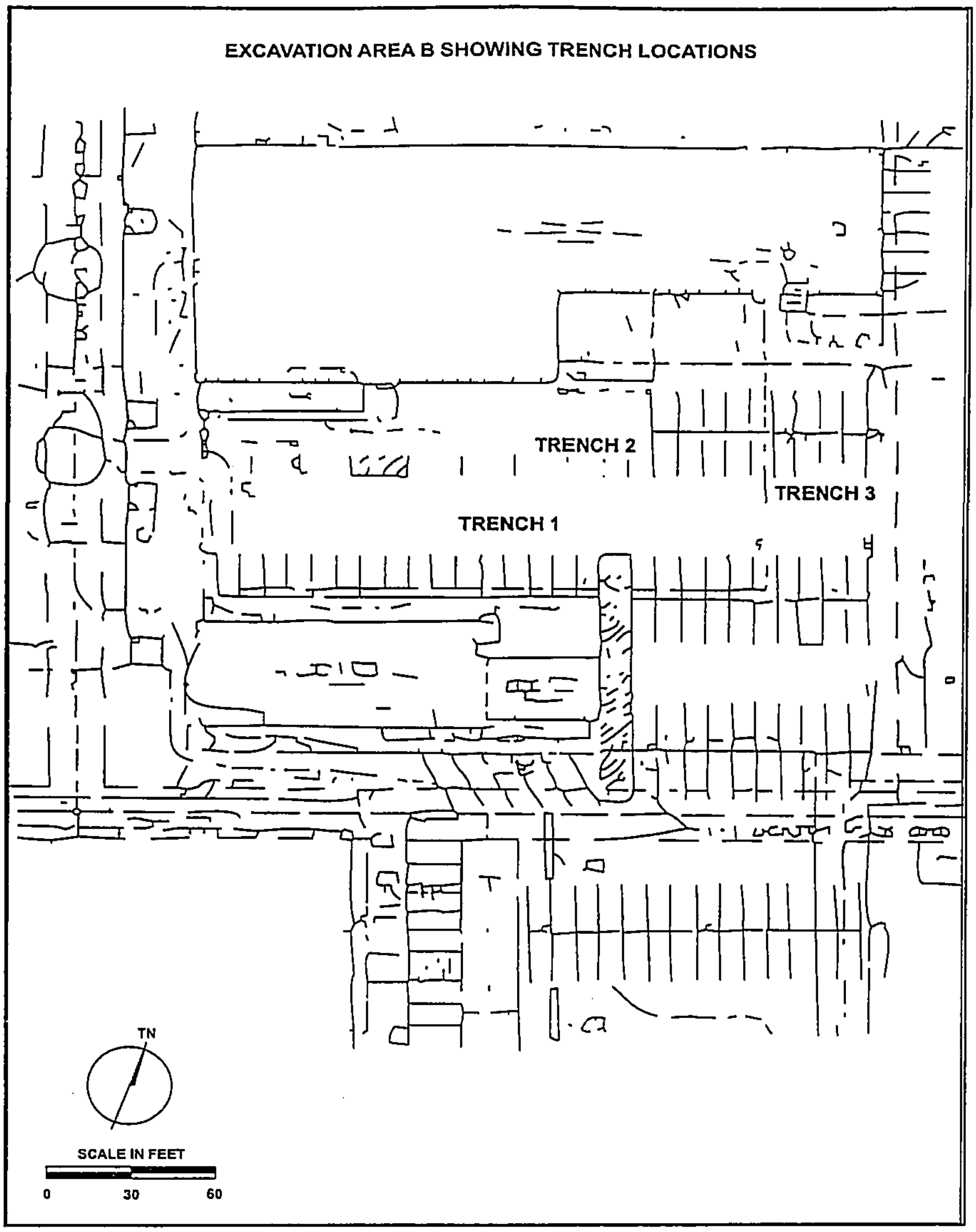

Figure 7: Project Area Map Showing Area B.

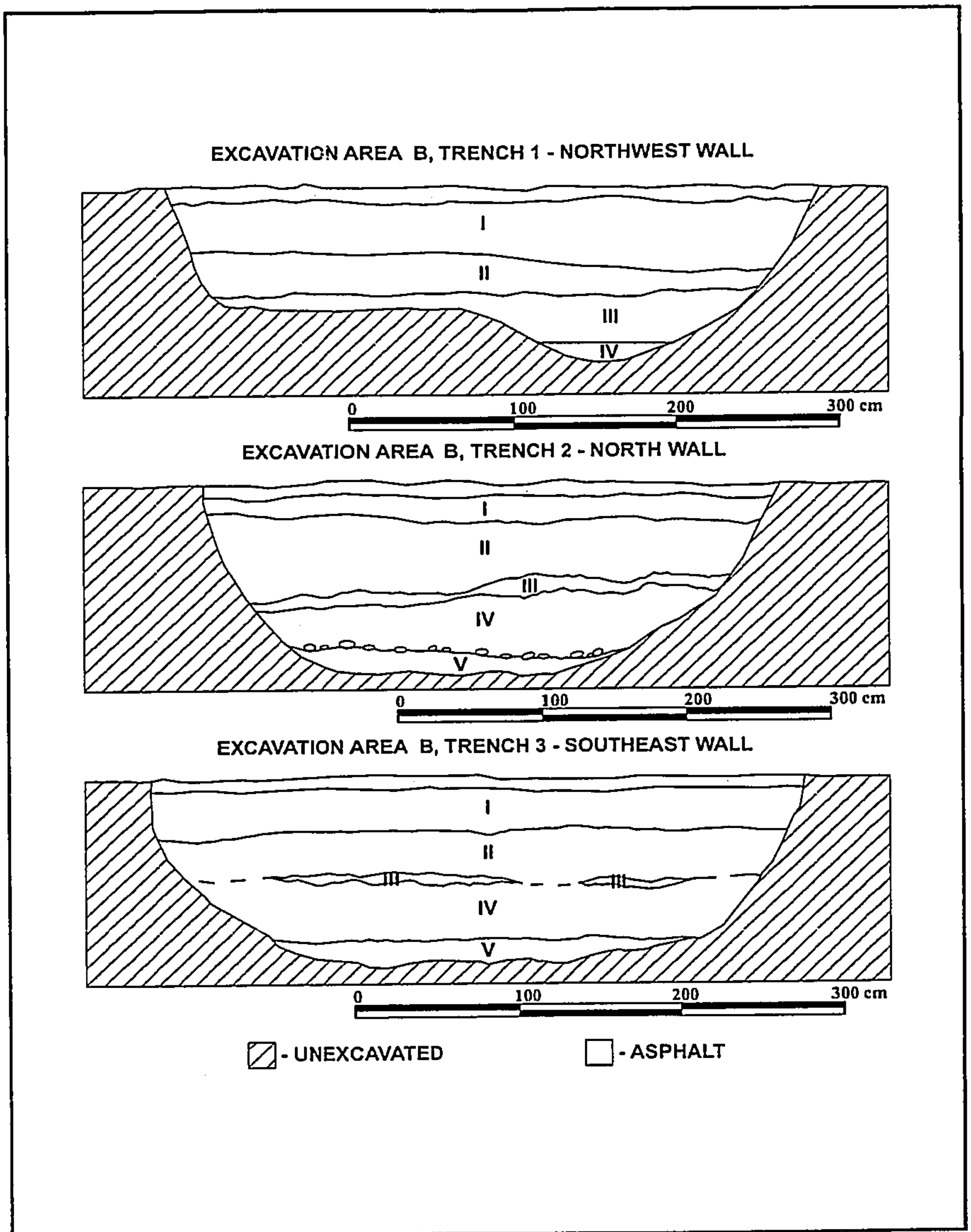

Figure 8: Excavation Trench Profiles in Area B.

medium-grained sand extending to a depth of 0.80 m below ground surface. Soil Unit III was composed of yellowish brown (10YR 5/4) medium-grained sand extending to a depth of 1.16 m below ground surface. Soil Unit IV consisted of pale gray (10YR 6/3) medium-grained, gleyed sand extending beyond the trench base. None of these units contained cultural material, Soil Unit II exhibited several large coral fragments and had a relatively abrupt lower boundary. Both Soil Units I and II were consequently determined to be recent or historic fill, while Units III and IV were determined to be non-cultural, natural strata.

TRENCH 2

Trench 2 was a 4.00 x 0.50 m excavation unit oriented 65°-245° and placed approximately 15.00 m to the northeast of Trench 1. The trench exhibited five soil units beneath the asphalt of the parking lot. The trench was taken to a maximum depth of 1.44 m below ground surface where a good exposure of the gleyed sand had been achieved (see Figure 8). Soil Unit I was composed of dark reddish brown (5YR 3/4) mixed, gravelly sandy clay reaching a maximum depth of 0.30 m below ground surface. Soil Unit II was composed of yellowish brown (10YR 5/4) medium-grained sand extending to a depth of about 0.90 m below ground surface. Soil Unit III was another narrow band of dark reddish brown (5YR 3/4) mixed, gravelly sandy clay achieving a depth of 0.96 m below the ground surface. Soil Unit IV was also another unit of yellowish brown (10YR 5/4) medium-grained sand extending to approximately 1.30 m below ground surface. Lastly, Soil Unit V was composed of pale gray (10YR 6/3) medium-grained gleyed sand extending below the trench base of excavation. Based on the nature of Soil Unit III, and the abruptness of the boundary between Soil Units III and IV, Units I, II and III were determined to be recent or historic fill strata. Of note, however, was a dispersed layer of large pebbles of a natural geomorphic origin at the IV/V contact. A single sherd of blue Chinese transfer ware was the only cultural item observed from the trench, derived from Soil Unit II.

TRENCH 3

Trench 3 was a 4.50 x 0.50 m excavation oriented at 68°-248° and located in the northeastern corner of the parking lot. The trench exhibited five soil units beneath asphalt and reached a depth of 1.40 m below the ground surface. The trench exposed a significant area of gleyed sand determined to be non-cultural (see Figure 8). Soil Unit I was composed of dark reddish brown (5YR 3/4) mixed, gravelly sandy clay reaching a maximum depth of 0.46 m below the ground surface. Soil Unit II was composed of brown (10YR 4/3) medium-grained sand extending to a depth of approximately 0.80 m below the ground surface. Soil Unit III consisted of a discontinuous narrow lens of the previous dark reddish brown (5YR 3/4) mixed, gravelly sandy clay achieving a maximum depth of 0.10 m. Soil Unit IV was another unit of brown

(10YR 4/3) medium-grained sand extending to 1.20 m below the ground surface. Lastly, Soil Unit V was composed of pale gray (10YR 6/3) medium-grained gleyed sand extending below the trench base. Because of the lens in Soil Unit III, it is quite obvious that Unit II is simply redeposited Soil Unit IV. Soil Units IV and V, however are non-cultural deposits, with IV truncated. No cultural material was observed in Trench 3.

AREA C

Excavation Area C consisted of a square parking lot located in the southeast quadrant of the project area, approximately 55.00 m north of Kamehameha Avenue. Area C is bounded on its north by another parking lot, its east by a narrow landscaped rise, its south by an unpaved vacant lot (Area F), and on its west by a large single story building. Only one trench was excavated in this area (Figure 9).

TRENCH 1

Trench 1, located in the southern half of Area C, was a 4.00 x 0.50 m excavation unit oriented 73°-253° and exhibited four soil units beneath parking lot asphalt (Figure 10). The trench was taken to a maximum depth of 1.64 m below the ground surface where a significant exposure of the gleyed sand (sterile, basal) made further excavation unnecessary. Soil Unit I was composed of dark reddish brown (5YR 3/4) mixed, gravelly sandy clay averaging a depth of 0.22 m below the ground surface. Soil Unit II was composed of brown (10YR 4/3) medium-grained sand extending to a depth of 1.00 m below the ground surface. Soil Unit III consisted of very dark grayish brown (10YR 3/2) medium-grained sand extending to a depth of 1.12 m below the ground surface. Soil Unit IV was composed of pale gray (10YR 6/3) medium-grained gleyed sand extending below the base of the trench. While there is no doubt that Soil Units I and II are recent or historic fill, because of the gradual nature of the contact between Units II and III, it is uncertain as to whether Soil Unit III was fill or natural. Soil Unit IV, however was definitely natural. All cultural materials derived from the trench came from Soil Unit III and consisted of two sherds of undecorated white ware and a single amber bottle finish.

AREA D

Excavation Area D is presently a quadrilateral vehicle storage area enclosed by a chain link fence and is located in the southwest corner of the project area's northeast quadrant. Area D is bounded by parking lots on its north, east, and south flanks and a promenade on its western flank. Three trenches were excavated in Area D (Figure 11).

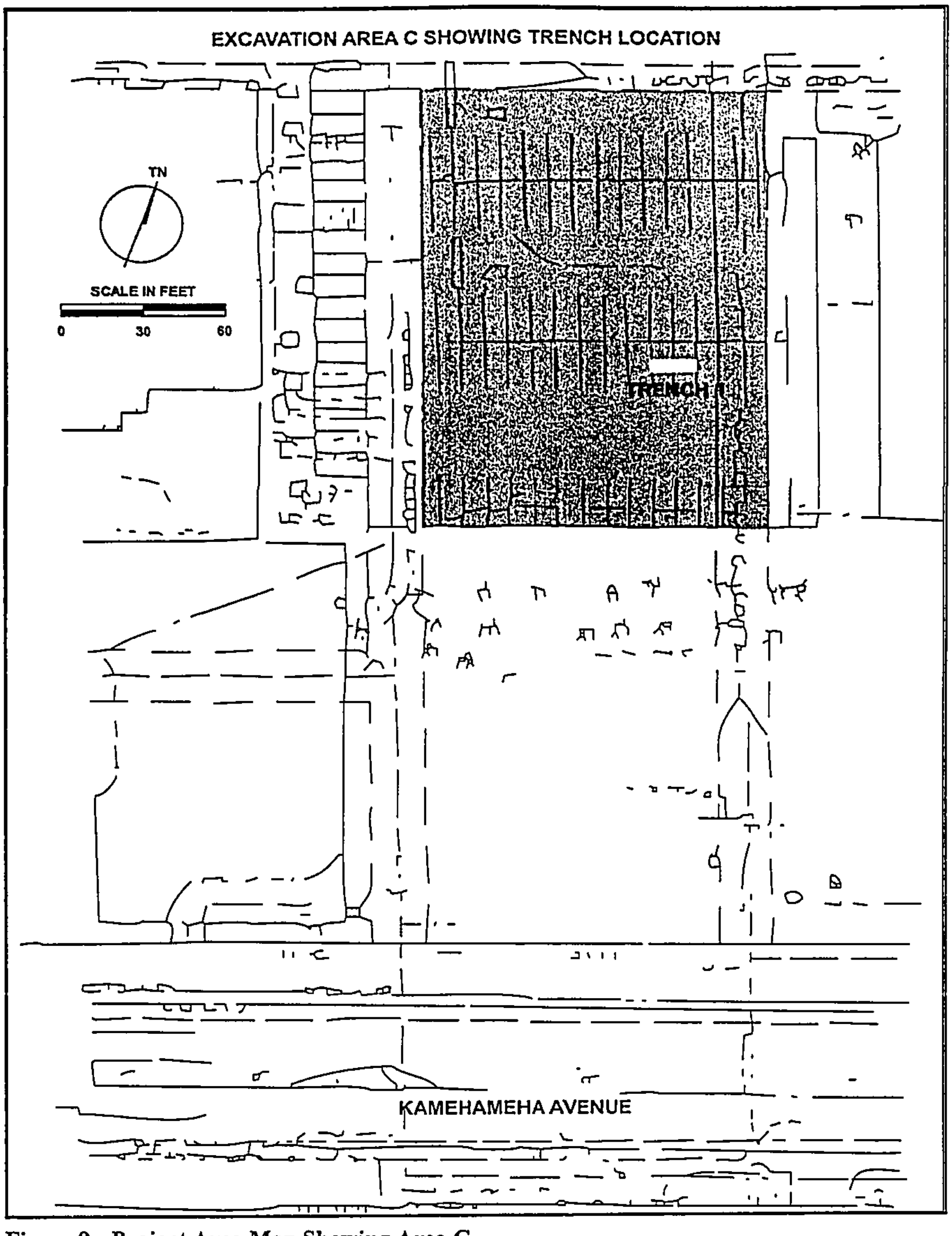

Figure 9: Project Area Map Showing Area C.

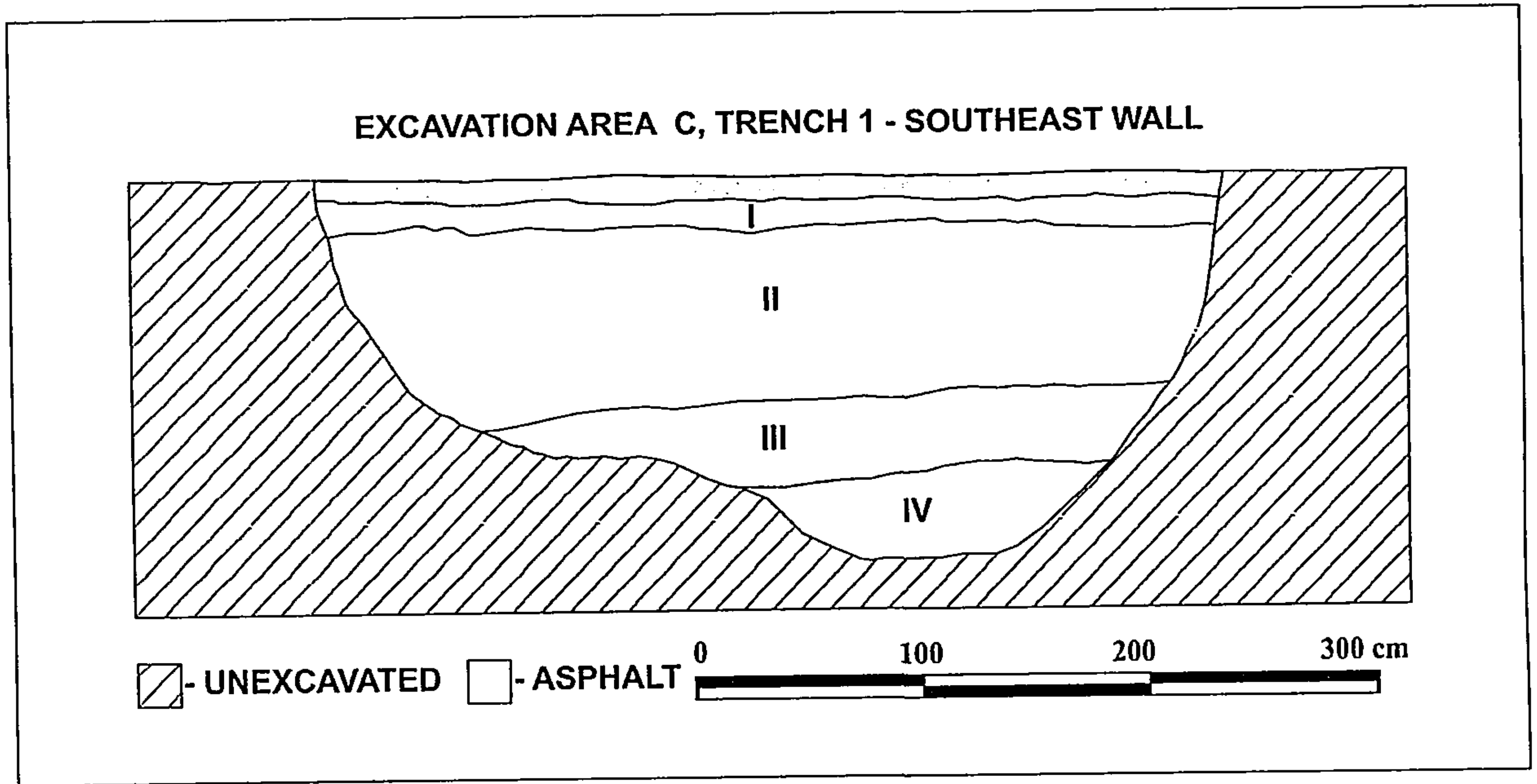

Figure 10: Excavation Trench Profile in Area C.

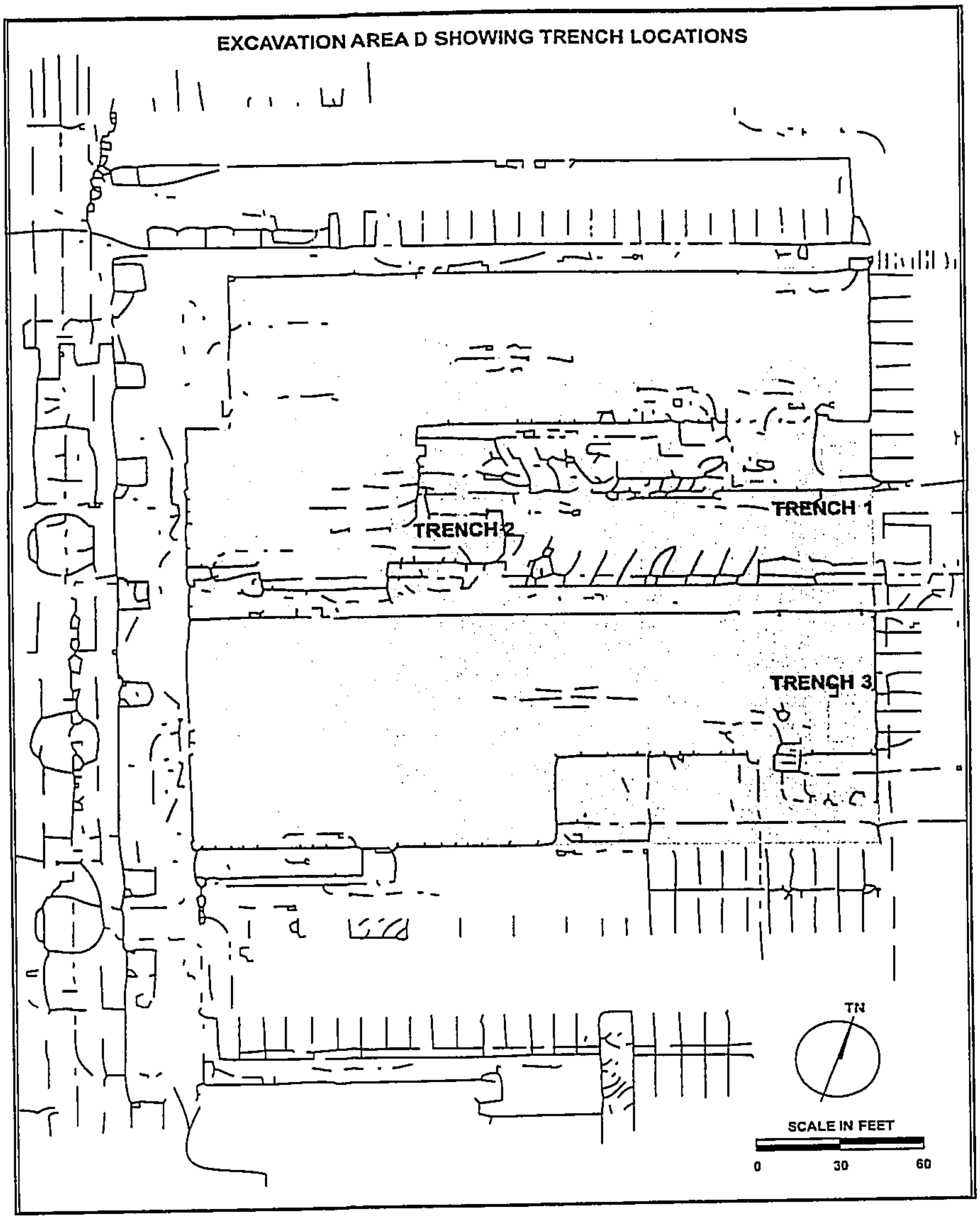

Figure 11: Project Area Map Showing Area D.

TRENCH 1

Trench 1 was a 4.00 x 0.50 m excavation unit oriented at 150°-330° and placed in the northeast portion of Area D, approximately 5.00 meters west of the eastern fence. The trench exhibited five soil units beneath a thick layer of asphalt and was taken to a maximum depth of 1.70 m below the ground surface where the matrix began turning a gray (water-induced) hue (Figure 12). Soil Unit I was composed of brown (10YR 5/3) medium-grained sand reaching a maximum depth of 0.60 m below the ground surface. Soil Unit II consisted of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay achieving a depth of 0.80 m below the ground surface. Soil Unit III was another unit composed of brown (10YR 5/3) medium sand achieving a maximum depth of 1.34 m below the ground surface. Soil Unit IV was a narrow band of brown (10YR 4/3) fine silt/clay mixed with some sand about 0.08 m in depth. Lastly, Soil Unit V was composed of brown (10YR 5/3) coarse sand becoming grayer toward the base of the trench. The gray coloration is likely a function of the waterlogged nature of the sediment with some mixing of marine soils. The abrupt boundary between Soil Units IV and V marks the assumed boundary between fill and non-cultural matrices, although Unit IV is unique, not occurring at any other location in the project area. However, no cultural materials were observed during the course of Trench 1 excavation.

TRENCH 2

Trench 2 was a 4.00 x 0.50 m excavation, oriented 67°-247°, and placed approximately 40.00 m west of Trench 1. The trench exhibited six soil units beneath parking lot asphalt and was taken to a maximum depth of 1.70 m below ground surface where the matrix again became gray (see Figure 12). Soil Unit I was composed of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay reaching a maximum depth of 0.22 m below the ground surface. Soil Unit II consisted of brown (10YR 5/3) medium-grained sand extending to a depth of 0.60 m below the ground surface. Soil Unit III was another narrow band of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay with some asphalt and achieving a depth of 0.70 m below the ground surface. Soil Unit IV was also another unit of brown (10YR 5/3) medium-grained sand extending to 0.97 m below the ground surface. Soil Unit V was a third band of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay measuring 0.07 m thick. Soil Unit VI was composed of brown (10YR 5/3) coarse sand becoming gray toward the trench base. Based on the nature of Soil Unit V, and the abruptness of the boundary between Soil Units V and VI, Units I through V were determined to be recent or historic fill. This trench also yielded no observable cultural material.

TRENCH 3

Trench 3 was an 4.00 x 0.50 m excavation, oriented at 165°-345°, and placed in the southeastern portion of the enclosure. The trench was located approximately 90.00 m south of

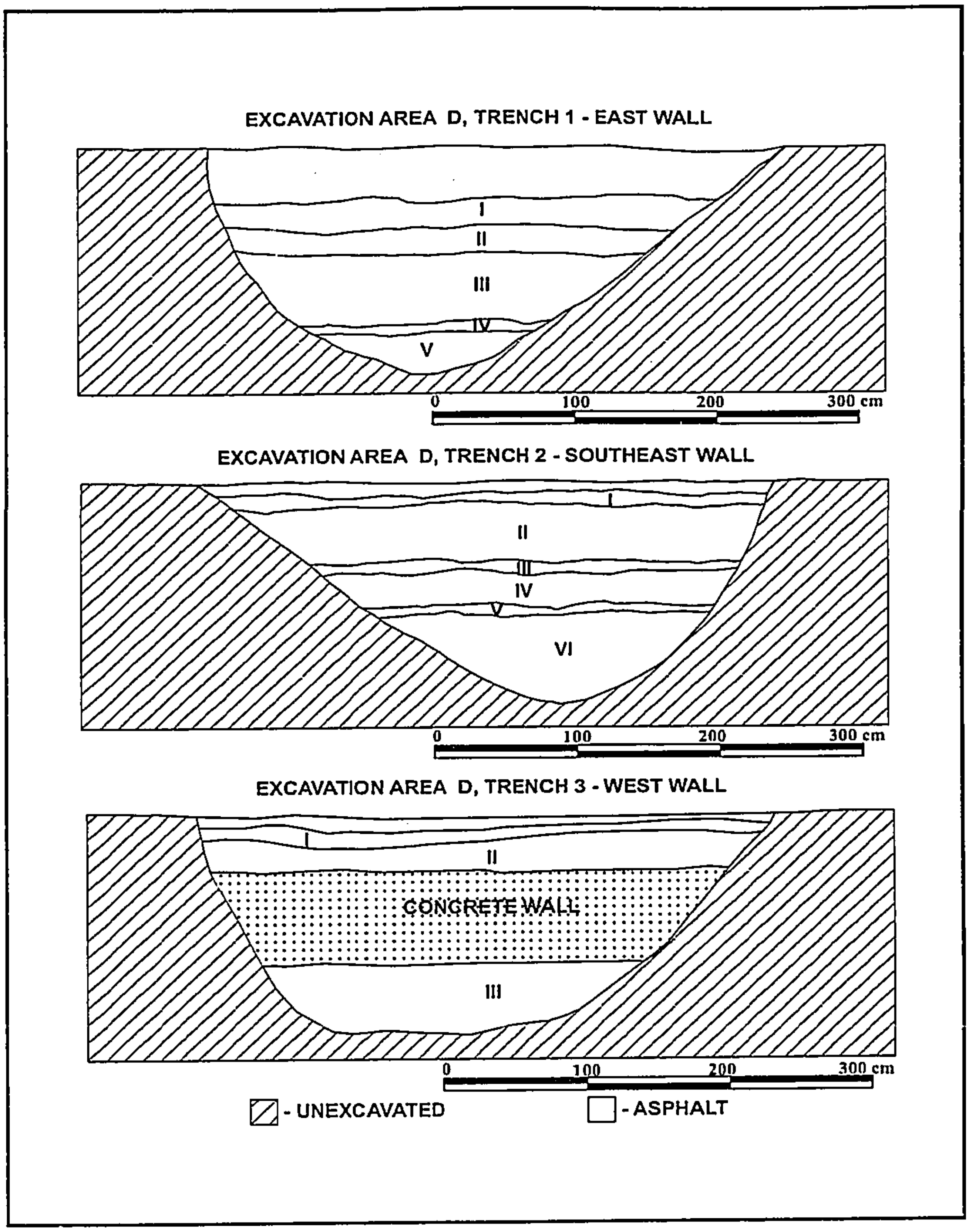

Figure 12: Excavation Trench Profiles in Area D.

Trench 1 and about 5.00 m west of the eastern fence. The trench exhibited three soil units below the asphalt and was taken to a maximum depth of 1.65 m below ground surface, with the second and third soil units separated by a 0.70 m high concrete wall (see Figure 12). At this point the lowest unit began to become gray, indicating a non-cultural, marine-infused matrix. Soil Unit I was composed of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay averaging a depth of 0.22 m below the ground surface. Soil Unit II consisted of dark yellowish brown (10YR 4/4) medium-grained sand extending to a depth of 0.40 m below the ground surface. Soil Unit III occurred below the concrete wall and was composed of brown (10YR 4/3) medium-grained sand becoming gray toward the trench base. Both Soil Units I and II were recent to historic fill, with Soil Unit III being a non-cultural sedimentary unit. Cultural material observed in the trench included metal pipes of various sizes, dressed stone, and a single piece of cut bone, none of which was collected. It is uncertain as to whether the excavation was on the interior or exterior of the wall. The occurrence of the dressed stone may indicate a non-concrete floor. The concrete may represent a historic-recent foundation, post 1950s. The concrete wall was not "chased" through additional excavation.

AREA E

Excavation Area E is presently a large, rectangular parking lot adjacent to Lono Avenue on the project area's west margin. Area E is bounded by the Kahului Building on its north, low single story buildings with a covered walkway on its east, another large parking lot on its south, and Lono Avenue to its west. Three trenches were excavated in this area (Figure 13).

TRENCH 1

Trench 1 was a 7.00 x 0.50 m excavation unit, oriented 142°-322°, and placed in the southern half of Area E. The trench exhibited five soil units below parking lot asphalt and was taken to a depth of 1.60 m below the ground surface, well into non-cultural soils (Figure 14). Soil Unit I was composed of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay averaging a depth of 0.16 m below the ground surface. Soil Unit II consisted of brown (10YR 5/3) medium-grained sand extending to a depth of 0.80 m below the ground surface. Soil Unit III was another band of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay limited to the northwestern end of the trench and averaging 0.10 m in depth. Soil Unit IV was composed of brown (10YR 4/3) medium-grained sand mixed with lenses of various colored silts and extending to a depth of 1.30 m below the ground surface. A prominent, though limited lens of silt occurred within the southeastern half of this unit. Soil Unit V was also composed of brown (10YR 4/3) medium-grained sand containing approximately 75 per cent small to large pieces of coral extending below the trench base. Soil Units I through III were easily recognized as recent to historic fill, but the

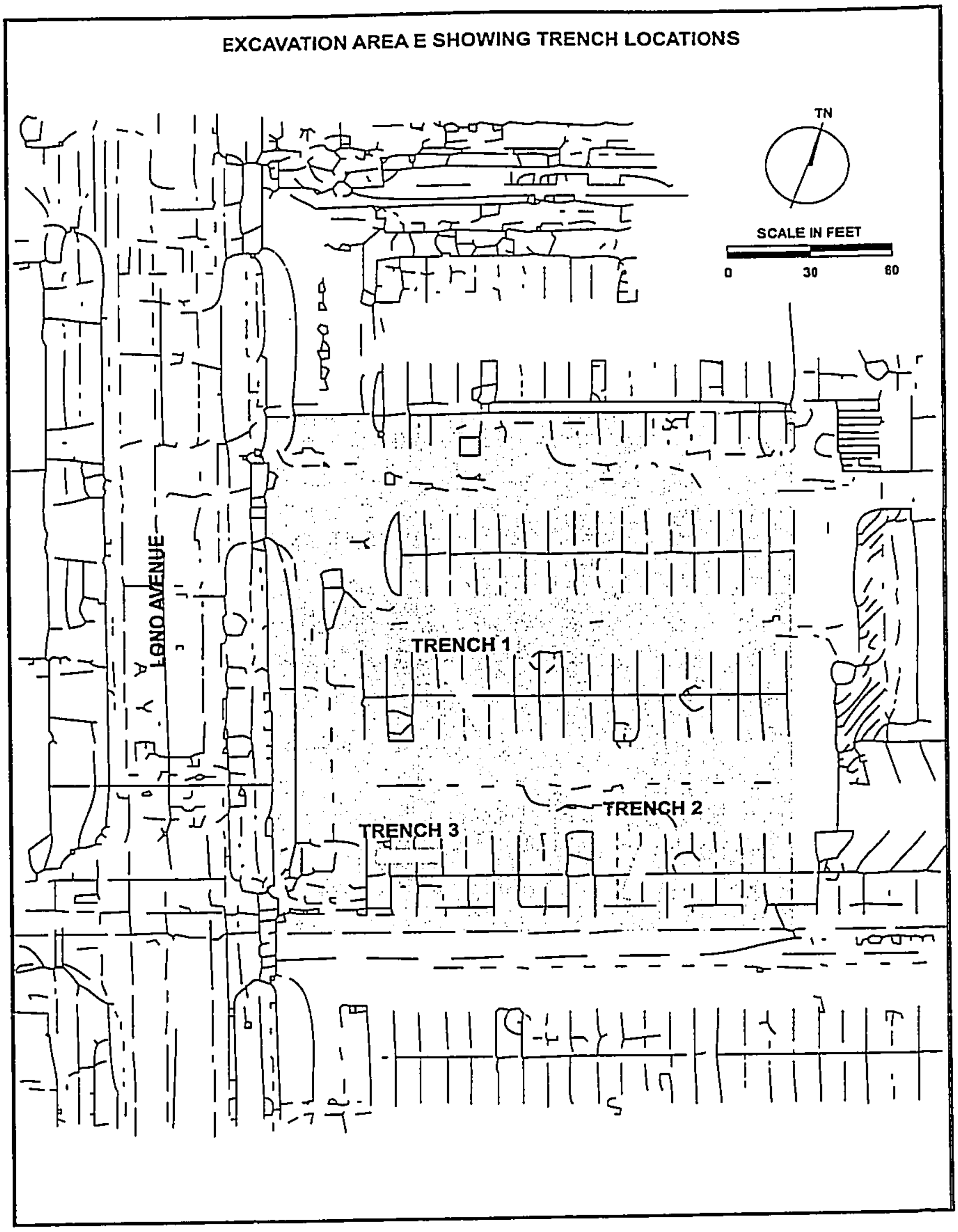

Figure 13: Project Area Map Showing Area D.

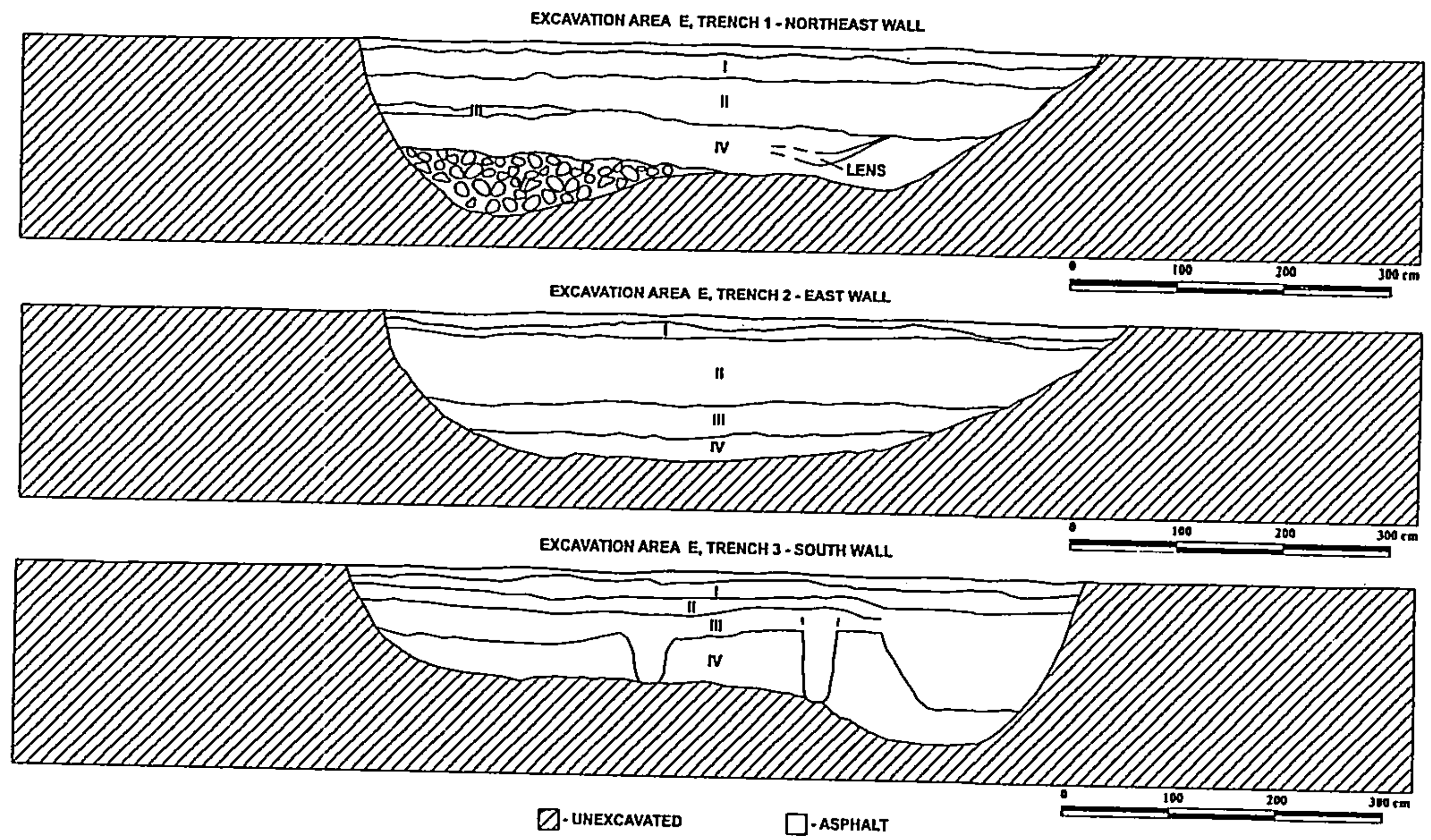

Figure 14: Excavation Trench Profiles in Area E.

mixed nature of Unit IV was interesting. It is thought that Unit IV represents a non-cultural, although very active deposit, perhaps at one time located adjacent to a body of water. This interpretation is reinforced by the clear nature of the boundary between Soil Unit IV and Soil Unit V below. A single ceramic sherd was collected from this trench, originating in Soil Unit II.

TRENCH 2

Trench 2 was a 7.00 x 0.50 m excavation unit oriented 3°-183° and also placed in the south half of the area, approximately 25.00 m to the southeast of Trench 1. The trench exhibited four soil units beneath asphalt and was taken to a maximum depth of 1.30 m below the ground surface into known, non-cultural soils (see Figure. 14). Soil Unit I was a thin band of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay reaching a maximum depth of 0.20 m below the ground surface. Soil Unit II was composed of brown (10YR 5/3) medium-grained sand extending to a depth of 0.84 m below the ground surface. Soil Unit III consisted of brown (10YR 4/3) medium-grained sand mixed with silt/clay lenses and exhibiting extensive root disturbance. This unit also contained a few small boulders and extended to a maximum depth of 0.84 m below the ground surface. Soil Unit IV was composed of brown (10YR 4/3) medium-grained sand extending below the trench base. Based on the abrupt nature of the boundary between Soil Units II and III, Units I and II were determined to be recent or historic fill. The character of Unit III, however, again appears to correspond with Soil Unit IV of Trench I in this area. However, the trench yielded no cultural material.

TRENCH 3

Trench 3 was also located in the southern half of Area E, placed about 25.00 m west of Trench 2 and 20.00 m east of Lono Avenue. The trench measured 7.00 x 0.50 m and was oriented at 76°-256°. Trench 3 exhibited four soil units beneath parking lot asphalt and was taken to a maximum depth of 1.54 m below the ground surface. At this point, the soil began to become gray, signaling basal sediment (see Figure 14). Soil Unit I was composed of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay averaging a depth of 0.28 m below the ground surface. Soil Unit II consisted of brown (10YR 4/3) medium-grained sand extending to a depth of 0.42 m below the ground surface. Soil Unit III was composed of dark yellowish brown (10YR 3/4) sandy loam extending to a maximum, undisturbed depth of 0.68 m below the ground surface. Soil Unit IV was composed of brown (10YR 5/3) medium sand becoming gleyed toward the base of the trench. The profile of this excavation unit exhibited much disturbance, with prominent intrusions extending into Soil Unit IV. A large pit was observed in the western end of the trench, while a deep, straight-sided intrusion adjacent was thought to represent a posthole, and a cone-shaped intrusion located near the center of the trench, thought to represent a tree molding. These two later intrusions were not observed in the boundary between Units II and III and were consequently interpreted as originating in III. The large pit, however, obscures the II/III boundary, and was thus interpreted as originating in Soil Unit II. These intrusions firmly established the limit of recent and historic fill, making Soil Unit IV the only unit in the trench to be natural. Artifacts recovered from the trench included a pewter die, part of a shoe sole, a ceremic sherd and a near complete Maui Soda Works bottle. The majority of this material was derived from Soil Unit III.

AREA F

Excavation Area F is a large, rectilinear, unpaved vacant lot located in the project area's southeastern corner, immediately adjacent to Kamehameha and Puunene Avenues. The Title Guaranty and Escrow Building lie to its northeast, a parking lot (Area C) to its northwest, and a level landscaped area occurs to its west. Three trenches were excavated in Area F, which is presently used for informal parking, making much of the surface bare (Figure 15).

TRENCH 1

Trench 1 was an 8.00 x 0.50 m excavation unit oriented at 146°-326° and located in the eastern half of Area F, approximately 15.00 m to the south of Title Guaranty and Escrow Building. The trench exhibited three soil units and was taken to a maximum depth of 1.40 m below ground surface where water began to fill the trench base (Figure 16). Soil Unit I consisted of a sod zone of brown (10YR 4/3) loamy sand averaging a depth of 0.10 m below the ground surface. Soil Unit II was composed of brown (10YR 4/3) medium-grained sand extending to a maximum depth of 0.80 m below the ground surface. Soil Unit III was composed of light brownish gray (10YR 6/2) gleyed sand extending below the water line. Both Soil Units I and II were recent to historic fill, with Soil Unit III interpreted as being natural sediment. Cultural material observed in the trench included amber bottle finishes, aqua glass, roofing material, and a metal spike, all occurring mainly near the II/III contact area.

TRENCH 2

Trench 2 was an 8.00 x 0.50 m excavation unit oriented 66°-246° and placed approximately 15.00 m to the east of Trench 1. The trench exhibited four soil units and was taken to a maximum depth of 1.02 m below ground surface where the matrix became gray at its basal point (see Figure 16). Soil Unit I was composed of dark grayish brown (10YR 4/2) medium-grained sand mixed with some loam and extending to a depth of 0.46 m below the ground surface. Soil Unit II was composed of a sloping, uneven band of dark reddish brown (2.5YR 3/3) mixed, gravelly sandy clay reaching a maximum depth of 0.50 m below the ground surface. Soil Unit III consisted of very dark grayish brown (10YR 3/2) compacted medium-

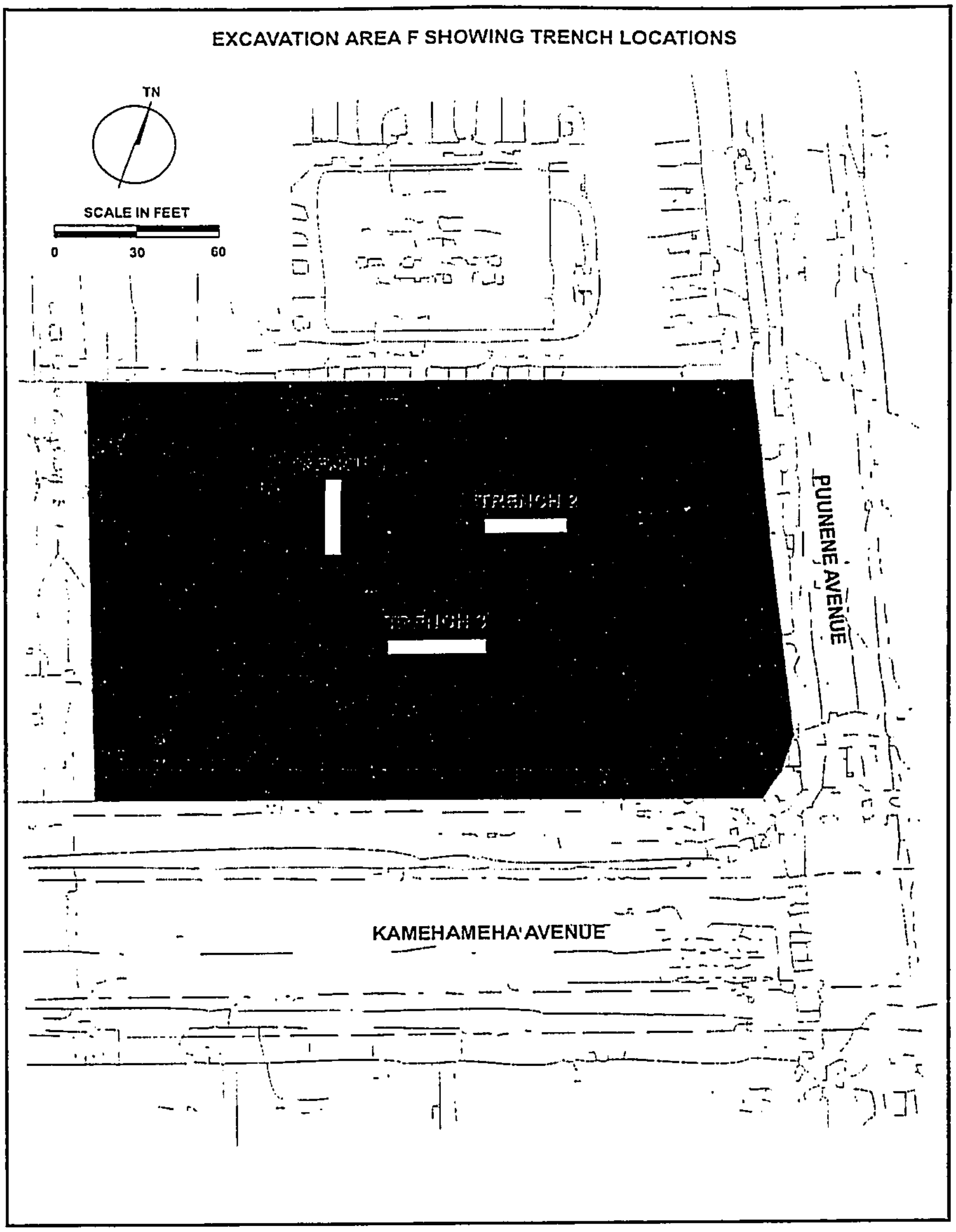

Figure 15: Project Area Map Showing Area F.

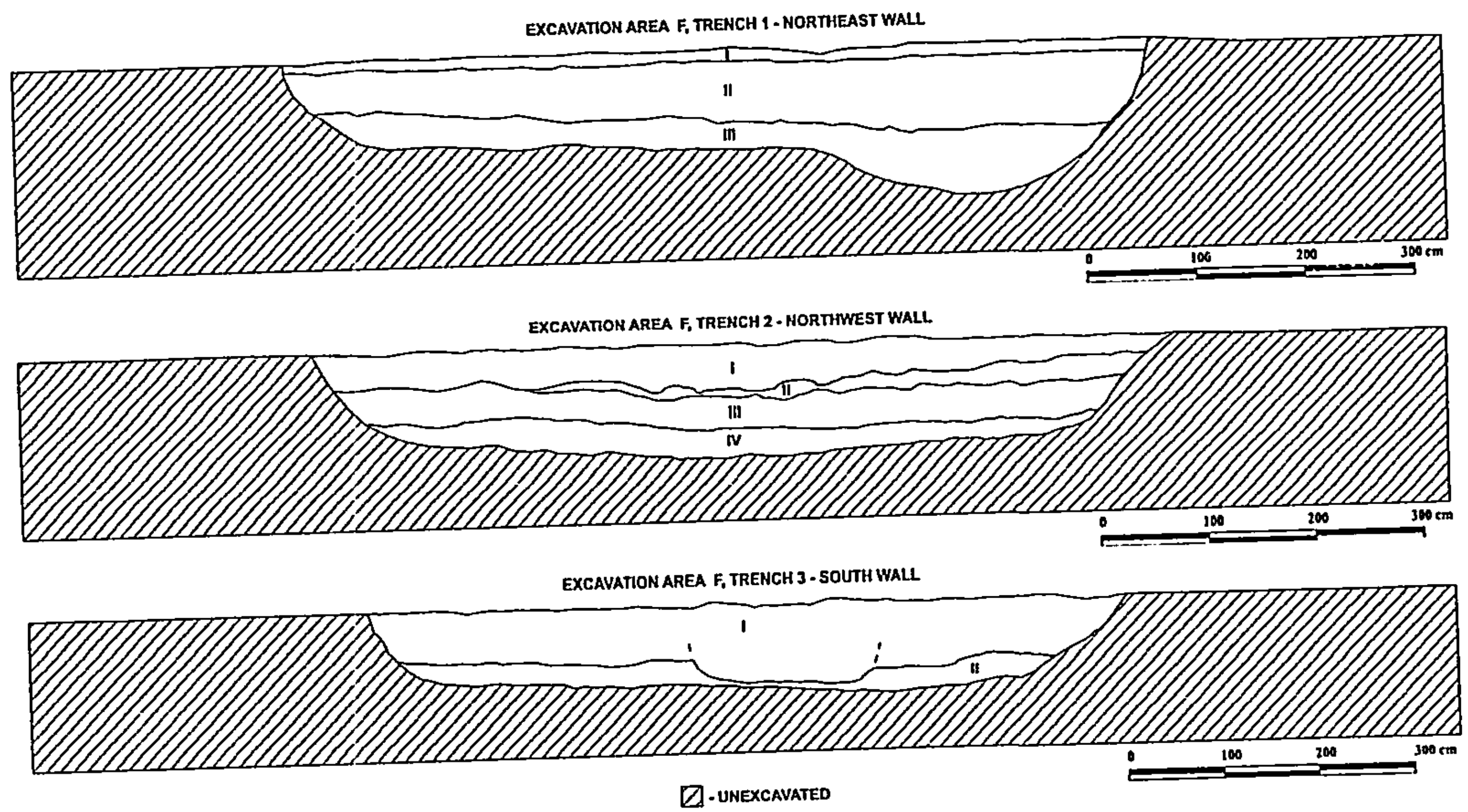

Figure 16: Excavation Trench Profiles in Area F.

grained sand extending to 0.76 m below the ground surface. Soil Unit IV was composed of light brownish gray (10YR 6/2) gleyed sand extending beyond the trench base. Cultural material observed in this trench was quite dense, with recovered items including many diagnostic bottle fragments of various colors, milk glass jar fragments, and a complete Maui Soda Works bottle with an inserted cork (see Appendix A). The artifacts likely came from Units I through III, which were recent or historic fill series. These artifacts either were re-located to secondary context during massive grading and filling of the area or were brought into the project area *en masse* during a filling event. The highest density of glass came from the eastern portion of the trench. The excavation trench was essentially placed through a disturbed, secondary context historic refuse grouping.

TRENCH 3

Trench 3 was a 7.00 x 0.50 m excavation unit oriented at 80°-260° and was also placed in the eastern half of Area F, approximately 10.00 m south of Trench 1. The trench exhibited two soil units and was taken to a maximum depth of 0.80 m below ground surface, at a point where the gleyed sand observed at the base of Trenches 1 and 2 began to appear (see Figure 16). Soil Unit I was composed of brown (10YR 4/3) medium sand which attained an average depth of 0.55 m below the ground surface. Soil Unit II consisted of light brownish gray (10YR 6/2) medium-grained sand extending to 80 cm below the surface. Recovered artifacts consisted of two ceramic sherds, one of which was thick stoneware, and both of which originated in Soil Unit I. Soil Unit I was a fill layer and demonstrated a fairly abrupt lower boundary. Soil Unit II was a natural sedimentary unit.

DISCUSSION AND CONCLUSIONS

Trenches were excavated across representative portions of the entire Kahului Shopping Center (KSC) block, and revealed no evidence of traditional Hawaiian occupation. Although various artifact types associated with the 1920s through present day were recovered, the artifacts were identified in secondary context, most likely having been brought into the area with fill.

All excavation units did exhibit an average of approximately 0.80 m of recent and/or historic deposits which could have truncated earlier deposits. Consequently, there remains the slight possibility that intrusive cultural features originating from removed surfaces may yet occur beneath these late deposits in areas not trenched. However, nearly all of the trenches were also excavated into or to their contact point with a gleyed sand. This sedimentary series indicates the long term presence of the water table, making the occurrence of earlier cultural deposits below these excavations highly unlikely. The gleyed sand is thought to represent a mixing of marine and terrestrial sediments within a former wetland-type environment. This environment has become filled through time, allowing for historic-modern use of the Kahului area.

SIGNIFICANCE ASSESSMENT AND RECOMMENDATIONS

As no sites were identified during this phase of research, no significance assessments are required. However, the entire area remains significant as it is part of the Kahului Historic District and there is always the possibility that significant sites and/or burials may occur in the area's subterranean reaches.

Based on the above conclusions, and the presence of sandy deposits in the area, a program of Archaeological Monitoring is recommended for all further excavation/ground altering activities conducted in the project area. This program would focus on the identification of intrusive Native Hawaiian features that might contain human remains and the location of intact historic deposits. If located, these deposits would then be documented and assessed for significance as outlined in Hawai'i Administrative Rules §13-275-6.

Figure 17: Suspected Building Remnant in Excavation Area D, Trench 3.

REFERENCES CITED

Bartholomew, Gail
1994 *Maui Remembers, A Local History*. Mutual Publishing. Taiwan.

Beckwith, Martha
1940 *Hawaiian Mythology*. University of Hawai'i Press: Honolulu.

Chinen, Jon
1961 *Original Land Titles in Hawaii.* Copyright 1961 Jon Jitsuzo Chinen. Library of Congress Catalogue Card No. 61-17314.

Clark, John
1980 *The Beaches of Maui County.* A Kolowalu Book, University Press of Hawaii: Honolulu.

Cordy, Ross
2002 *The Rise and Fall of the O'ahu Kingdom.* Mutual Publishing. Australia.

Daws, G.
1968 *Shoal of Time: History of the Hawaiian Islands.* University of Hawai'i Press. Honolulu.

Fornander, Abraham
1919 *Hawaiian Antiquities and Folklore*. Bishop Museum Press: Honolulu.

Kamakau, Samuel
1964 *Ka Po'e Kahiko.* Bishop Museum Special Publication 51. Honolulu.

Kame'eleihiwa, Lilikal□
1992 *Native Land and Foreign Desires*: Pehea La E Pono Ai. Bishop Museum Press. Honolulu.

Kelly, Marion
1983 *Nā Māla o Kona: Gardens of Kona.* Dept. of Anthropology Report Series 83-2. Bishop Museum. Honolulu.

1998 *A Gunboat Diplomacy, Sandalwood Lust and National Debt.* In Ka Wai Ola o OHA, Vol. 15, No. 4, April 1998.

Kirch, Patrick
1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory.* University of Hawaii Press, Honolulu.

Kirch, Patrick V. and Marshall Sahlins
1992 *Anahulu. Vol. 1 and 2.* University of Chicago Press. Chicago.

Kuykendall, R.S.
1938 *The Hawaiian Kingdom. Vol. 1.* University of Hawai'i Press. Honolulu.

Lucas, Paul F. Nahoa
1995 *A Dictionary of Hawaiian Legal Land-terms.* Native Hawaiian Legal Corporation. University of Hawai'i Committee for the Preservation and Study of Hawaiian Language, Art and Culture.. University of Hawai'i Press.

Lyons, C.J.
1875 Land Matters in Hawaii. *The Islander, Vol. I.* Honolulu.

Pukui, Mary Kawena, Samuel Elbert, Esther Mookini
1974 *Place Names of Hawaii.* University of Hawai'i Press: Honolulu.

Sterling, Elspeth
1998 *Sites of Maui.* Bishop Museum Press. Honolulu.

APPENDIX A: LABORATORY ANALYSIS AND TABLES

<table>
<tr><th colspan="9">PROJECT 656 KAHULUI TOWN DEVELOPMENT ALL MIDDEN INVENTORY</th></tr>
<tr><th>Field Bag</th><th>Area</th><th>Unit</th><th>Layer</th><th>Depth</th><th>Collected Material</th><th>Measurements</th><th>Count</th><th>Remarks</th></tr>
<tr><td colspan="9"></td></tr>
<tr><td>1</td><td>A</td><td>ST-1</td><td>-</td><td>-</td><td>Bottle Glass Finish Sherd</td><td>Mouth Diameter (inner): 1.7 cm</td><td>1</td><td>Clear</td></tr>
<tr><td>1</td><td>A</td><td>ST-1</td><td>-</td><td>-</td><td>Bottle Glass Body Sherds</td><td>-</td><td>8</td><td>Clear</td></tr>
<tr><td>1</td><td>A</td><td>ST-1</td><td>-</td><td>-</td><td>Bottle Glass Base Sherd</td><td>-</td><td>1</td><td>Olive green kick-up base</td></tr>
<tr><td>1</td><td>A</td><td>ST-1</td><td>-</td><td>-</td><td>Bottle Glass Base Sherd</td><td>Base Diameter: 5.4 cm</td><td>1</td><td>See below.</td></tr>
<tr><td colspan="9">Clear, body near base embossed, base textured and also embossed. Body near base embossment: NO DEPOSIT ☆ NO RETURN NOT TO BE REFILLED. Base embossment: 1st line: manufacturer's stamp, 2nd line: 9 4, 3rd line: 17. The manufacturer's stamp is a capital I encompassed by a vertical oval. Manufacturer: Owens Illinois Glass Company (1929-1966). Bottle manufacture date (based on manufacturer's stamp): post 1954.</td></tr>
<tr><td>1</td><td>A</td><td>ST-1</td><td>-</td><td>-</td><td>Bottle Glass Base Sherd</td><td>-</td><td>1</td><td>See below.</td></tr>
<tr><td colspan="9">Clear, body near base embossed, base also embossed. Body near base embossment: NET CONTENTS 6 OZ. Base embossment: 1st line: a five-point star burst pattern, 2nd line: K.T.</td></tr>
<tr><td>1</td><td>A</td><td>ST-1</td><td>-</td><td>-</td><td>Bottle Glass Finish/ Body Sherd</td><td>-</td><td>1</td><td>Clear, crown top finish, five point star burst pattern above shoulder</td></tr>
<tr><td>1</td><td>A</td><td>ST-1</td><td>-</td><td>-</td><td>Glass Bottle</td><td>Without plastic cap. Overall Height: 10.5 cm Body Height: 6.0 cm Mouth Diameter (inner): 1.2 cm Base Diameter: 2.5 x 3.8 cm</td><td>1</td><td>See below.</td></tr>
<tr><td colspan="9">Complete, clear glass bottle, automatic machine made (based and two sides), screw top finish with black plastic cap, raised ring collar, sloped shoulders, golden gate oval body, body embossed with numeral gradations amongst other word embossment, base also embossed. Bottle back embossment near shoulder: unknown symbol with two lower case i on the right. Bottle base embossment: 1st line (in cursive): Duraglas, 2nd line: 23 manufacturer's stamp 0, 3rd line: 13B. The manufacturer's stamp is a capital I encompassed by a vertical oval. Bottle manufacturer is Owens Illinois Glass Company.</td></tr>
</table>

Bottle manufacture date (based on manufacturer's stamp): post 1954.								
1	A	ST-1	-	-	Non-Diagnostic Non-Ferrous Metal	-	1	-
1	A	ST-1	-	-	Brass Lock	-	1	Horse head stamp on lock front
2	A	ST-2	IV	-	Soil Sample	≈292.2 g	-	-
3	A	ST-3	-	-	Bottle Glass Finish Sherd	Mouth Diameter (inner): 1.9 cm	1	Champagne finish with hand applied lip (1840–1860)
3	A	ST-3	-	-	Bottle Glass Body Sherds	-	2	Amber
3	A	ST-3	-	-	Bottle Glass Body Sherd	-	1	Aqua-marine

PROJECT 656 KAHULUI TOWN DEVELOPMENT ALL MIDDEN INVENTORY								
Field Bag	**Area**	**Unit**	**Layer**	**Depth**	**Collected Material**	**Measurements**	**Count**	**Remarks**
3	A	ST-3	-	-	Non-Diagnostic Rubber	-	2	Black
3	A	ST-3	-	-	Non-Ferrous Metal Spike	-	1	Corroded
4	A	ST-4	-	-	Bottle Glass Neck Sherd	-	1	
4	A	ST-4	-	-	Bottle Glass Body Sherds	-	2	
4	A	ST-4	-	-	Bottle Glass Base Sherd	-	1	

4	A	ST-4	-	-	Bottle Glass Body/ Base Sherd	Existing Height: 16.5 cm Body Height: 11.0 cm Base Diameter: 5.4 cm	1	See below.
Rounded shoulders, cylindrical body, embossed base. Base embossment: **N.P.B. Co.** Bottle manufacturer unknown.								
4	A	ST-4	-	-	Milk Glass Body Sherd	-	1	-
4	A	ST-4	-	-	Porcelain Tea Cup Rim Sherd	-	1	Exterior decorated under glaze with pink and green floral design
4	A	ST-4	-	-	Porcelain Tea Cup Sherd	-	1	Rim/body/base sherd, exterior decorated under glaze with pink and green floral design, manufacturer's stamp enclosed by ring foot base
4	A	ST-4	-	-	Bottle Glass Body Sherd	-	1	Amber
5	A	ST-4	-	-	Glass Bottle	Overall Height: 19.9 cm Body Height: 12.2 cm Mouth Diameter (inner): 2.0 cm Base Diameter: 5.1 cm	1	See below.
Complete, pale greenish aqua glass bottle, 4-piece tooled Hutchinson, embossed body, base flat and embossed. Body embossment: 1st line: **MAUI**, 2nd line: **SODA WORKS**. Base embossment: **W.** Bottle manufacturer unknown. Bottle manufacture date (based on publication): c.1902.								
5	A	ST-4	-	-	Bottle Glass Body/ Base Sherd	Existing Height: 24.0 cm Body Height: 14.5 cm Base Diameter: 6.6 cm	1	See below.

Aqua-marine, automatic machine made (base and two sides), sloped shoulders, cylindrical body, flat and embossed base. Base embossment: 1st line: manufacturer's stamp, 2nd line: **K 6**. The manufacturer's stamp is a capital **A** abutted on its right side by a capital **B**. Bottle manufacturer: Adolphus Busch Glass Manufacturing Company. Bottle manufacture date (based on manufacturer's stamp): 1904–1907.

PROJECT 656 KAHULUI TOWN DEVELOPMENT ALL MIDDEN INVENTORY

Field Bag	Area	Unit	Layer	Depth	Collected Material	Measurements	Count	Remarks
6	A	ST-4	-	-	Bottle Glass Finish Sherd	-	1	Light green crown top finish (post 1904)
6	A	ST-4	-	-	Bottle Glass Finish Sherd	-	1	Olive green champagne finish with applied collar (1840–1920)
6	A	ST-4	-	-	Bottle Glass Body Sherd	-	1	Amber
6	A	ST-4	-	-	Bottle Glass Body Sherds	-	2	Olive green
6	A	ST-4	-	-	Bottle Glass Base Sherd	-	1	Light green
6	A	ST-4	-	-	Bottle Glass Base Sherd	-	1	Amber push-up base sherd, single piece mold
6	A	ST-4	-	-	Bottle Glass Base Sherd	-	1	Olive green push-up base sherd, single piece mold
6	A	ST-4	-	-	Bottle Glass Base Sherd	-	1	Olive green kick-up base sherd, single piece mold
6	A	ST-4	-	-	Bottle Glass Base Sherd	-	1	Olive green, slight push-up base sherd, embossed, single piece mold. Base embossment: 1st line: N & Co., 2nd line: 3172. Manufacturer: Nuttall &

								Company (1872–1913).
6	A	ST-4	-	-	Milk Glass Base Sherd	-	1	
7	A	ST-5	-	-	Bottle Glass Neck Sherd	-	1	Amber
7	A	ST-5	-	-	Stoneware Neck/ Body Sherd	-	1	Interior and exterior glazed brown, interior displays threading
8	B	ST-2	II	-	Porcelain Ring foot Sherd	-	1	Interior and exterior glazed, exterior hand painted blue and gold avian and vegetation design under glaze.
9	C	ST-1	-	-	Bottle Glass Finish Sherd	-	1	Amber crown top finish (post 1904)
9	C	ST-1	-	-	Whiteware Rim Sherd	-	1	Plate sherd, glazed
9	C	ST-1	-	-	Whiteware Body Sherd		1	-

PROJECT 656 KAHULUI TOWN DEVELOPMENT ALL MIDDEN INVENTORY								
Field Bag	**Area**	**Unit**	**Layer**	**Depth**	**Collected Material**	**Measurements**	**Count**	**Remarks**
10	E	ST-1	-	-	Whiteware Ring foot Sherd	-	1	Bowl sherd, glazed aqua-marine, exterior hand painted blue under glaze
11	E	ST-3	III	-	Bottle Glass Body/ Base	-	1	See below.

					Sherd			
Pale greenish aqua, 2-piece tooled Hutchinson, body cylindrical and embossed, base also embossed. Body embossment: 1st line: **MAUI**, 2nd line: **SODA WORKS**. Base embossment: **W**. Bottle manufacturer unknown. Bottle manufacture date (based on publication): c.1906.								
11	E	ST-3	III	-	Plastic Cap	-	1	Yellow
11	E	ST-3	III	-	Porcelain Rim Sherd	-	1	Exterior hand painted blue under glaze
11	E	ST-3	III	-	Lead Die	1 x 1 x 1 cm	1	-
11	E	ST-3	III	-	Foam Shoe Sole Fragment	-	1	-

LAB REFERENCES

Deats, Stewart
1998 *Historic Glass Artifacts.* Prepared for the Workshop on Historic Artifact Identification. Arizona Archaeological Council. Pueblo Grande Museum, Phoenix.

Elliot, R.R. and S.C. Gould
1988 *Hawaiian Bottles of Long Ago.* Revised Edition. Hawaiian Service, Inc., Honolulu, Hawai`i.

Fike, Richard E.
1987 *The Bottle Book: A Comprehensive Guide to Historic, Embossed Medicine Bottles.* Gibbs M. Smith, Salt Lake City.

Rock, Jim
1981 *Glass Bottles: Basic Identification.* Klamath National Forest Region 5. USDA.

Toulouse, Julian.
1971 *Bottle Makers and Their Marks.* Thomas Nelson, New York.

SCS Project Number 656-AMP-1

ARCHAEOLOGICAL MONITORING PLAN FOR THE KAHULUI SHOPPING CENTER PROJECT, WAILUKU AHUPUA`A, KAHULUI, ISLAND OF MAUI, HAWAI`I [TMK: 3-7-7:5, 8-10, 27 and 50]

Prepared By:
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October 2006

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INTRODUCTION

Scientific Consultant Services (SCS), Inc. has prepared this Archaeological Monitoring Plan (AMP) at the request of Chris Hart & Partners in advance of construction work to occur on a c. 20-acre commercial property proposed for the development of the Kahului Town Center. The property covered by this plan is currently referred to as the Kahului Shopping Center (KSC) block, owned by A&B Properties, and located within the city limits of Kahului, on the Island of Maui, Hawaii (TMK 3-7-7:5, 8-10, 27 and 50) (Figures 1, 2, and 3).

Archaeological field work, to test for presence/absence of sites, was conducted on this parcel during a four day period early in 2006 by SCS (Johnson and Dega 2006). As the project area was a built environment, Inventory Survey was primarily conducted through mechanical backhoe testing. The results of this testing were negative. The report for this work was re-classified as an Archaeological Assessment. In addition, documentation of the parcel's historic structures was completed simultaneous with the Inventory Survey work (Dillon and Dega 2006).

Archaeological Monitoring, as recommended in the Assessment report and in concurrence with recommendations by the State Historic Preservation Division (SHPD), is being conducted on the parcel due to the potential for the inadvertant discovery of human remains and/or traditional or historic cultural deposits, particularly if sandy substrate are encountered below existing fill layers. Sandy substrata in the Hawaiian Islands are well known to contain pre-Contact native Hawaiian burials and habitation loci. Multiple sites have been identified in subterranean contexts in the Kahului area, particularly in locations near the coastline (see Johnson and Dega 2006). The subject parcel itself does not represent a Land Commission Award (LCA).

This Monitoring program will ensure that if human remains are identified during subsurface work, appropriate and lawful protocol concerning the Inadvertent Discovery of Human Remains (pursuant to 13-300-40a, b, c, HAR) is followed. Archaeological Monitoring will also ensure that identified significant cultural resources are sampled, adequately documented, and evaluated for their historical significance, per discussions with, and recommendations by, the SHPD

This AMP is being prepared for Chris Hart & Partners and will require the approval of the State Historic Preservation Division (Dr. Melissa Kirkendall, SHPD-Maui) prior to the commencement of any excavation activities on the parcel. The following text provides more detailed information on the reasons for monitoring, potential site types to be encountered during excavation, monitoring conventions, and methodology for both field and laboratory work, and discusses curation and reporting.

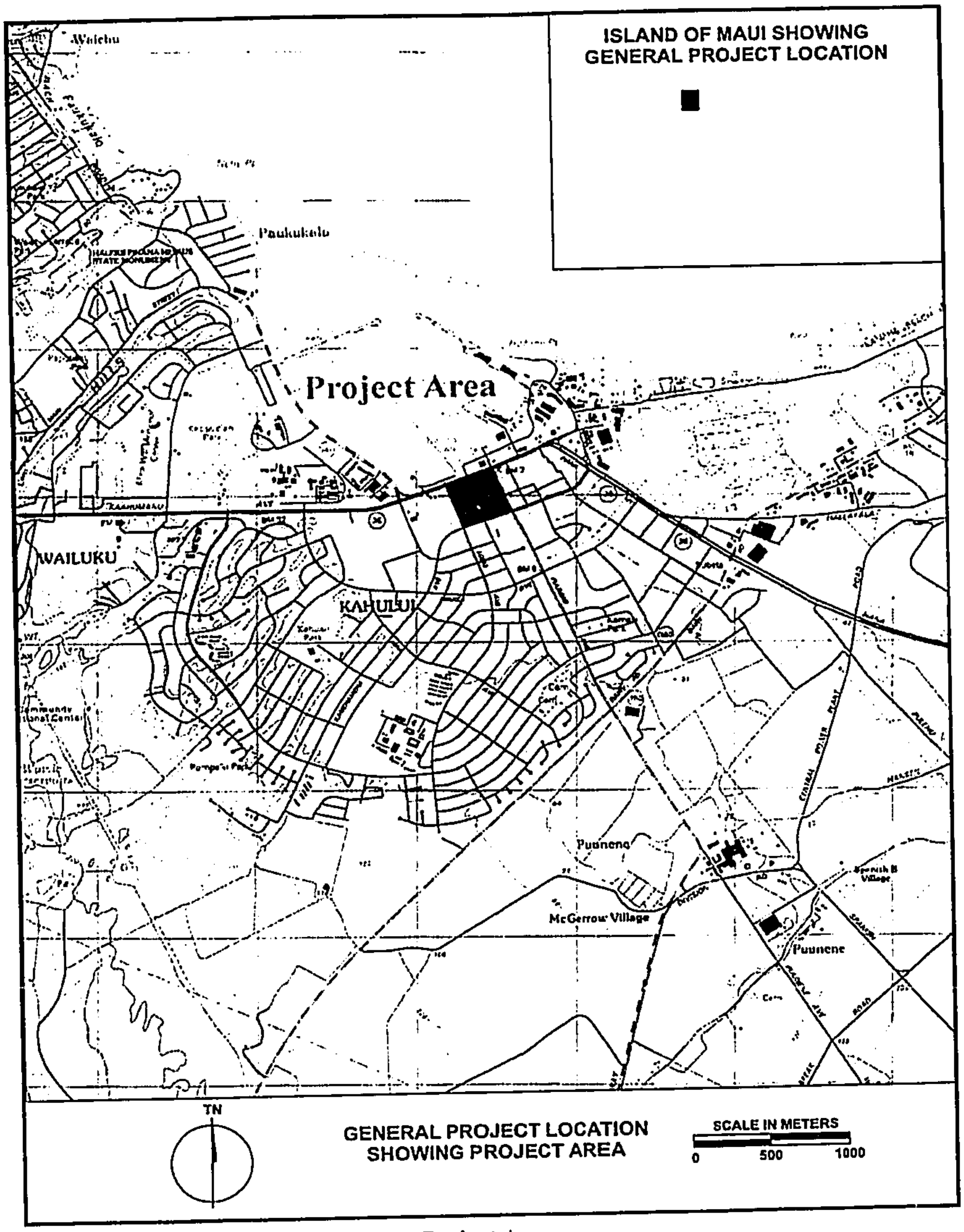

Figure 1: USGS Quadrangle Showing Project Area.

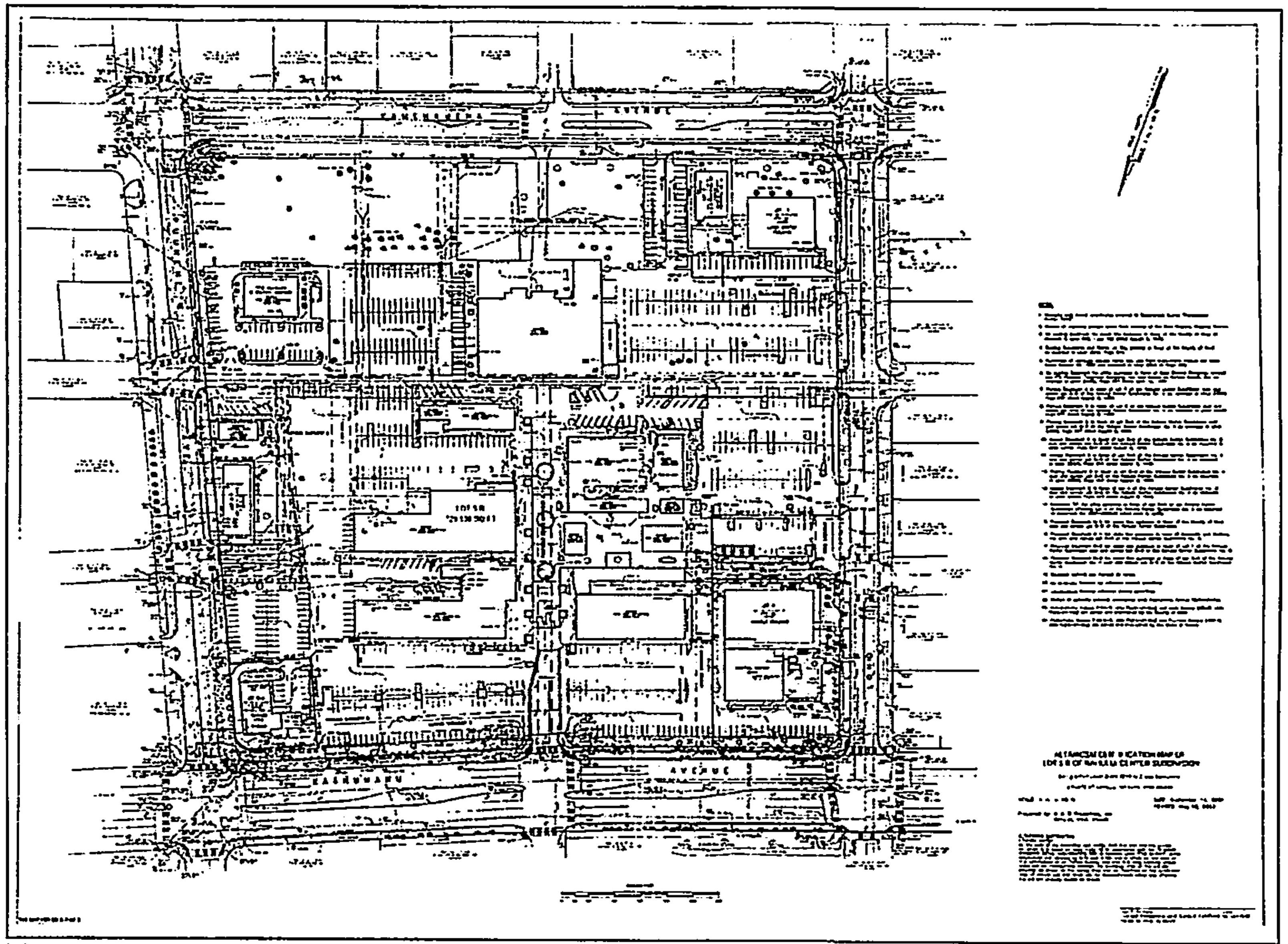

Figure 2: Plan View Map of Current Project Area.

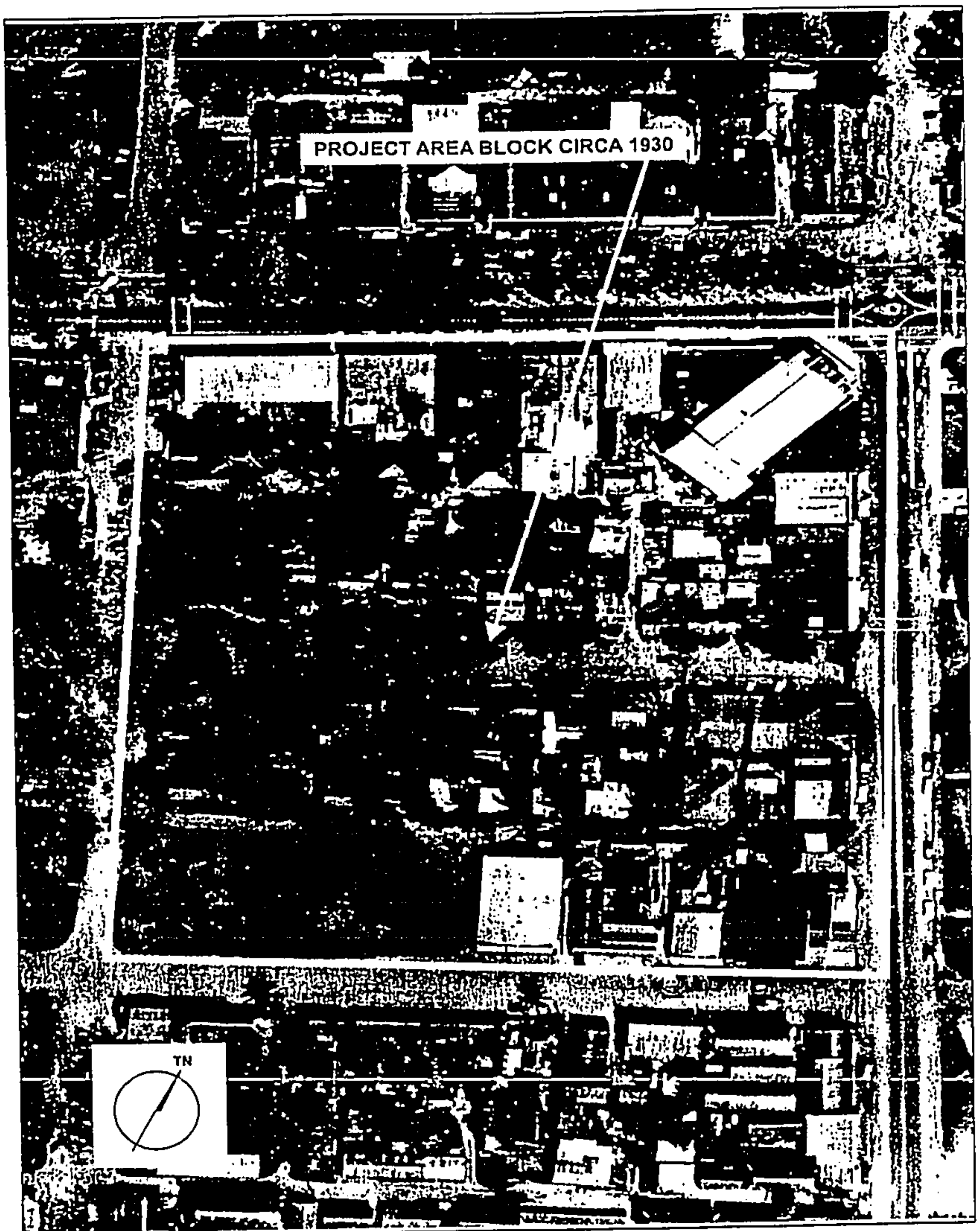

Figure 3: Early Aerial Photo (n.d.) Showing Project Area.

PHYSICAL SETTING

The project area is a 19.9 acre site bounded by Kaahumanu Avenue to the north, Puunene Avenue to the east, Kamehameha Avenue to the south and Lono Avenue to the west. The parcel is at present nearly completely covered by buildings, landscaped areas, and asphalt and concrete parking lots (see Figure 2). Complimentary utilities and other infrastructure are strewn throughout the property. Only the southeast corner of the parcel is seemingly undeveloped, although an aerial photograph shows structures in this area during the first half of the last century (see Figure 3).

CULTURAL AND HISTORIC SETTING

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu'u Kukui, forming the west end of the island (1,215m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems watering fertile agricultural lands that extend to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted, productive landscapes.

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha'ōhia, during the time of the *ali'i* Kaka'alaneo (Beckwith 1940:383; Fornander places Kaka'alaneo at the end of the 15th century or the beginning of the 16th century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali'i 'ai moku* (the *ali'i* who eats the island/district), which he held in trust for the gods. The title of *ali'i 'ai moku* ensured rights and responsibilities pertaining to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka'āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku, ahupua'a, 'ili* or *'ili'ā ina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua'a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua'a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua'a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *'ili 'āina* or *'ili* were smaller land divisions next in importance to *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (*ibid*:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in a *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in the *ahupua`a* of Kahului, which translated literally means "the winning" (Pukui *et al.*:67).

Kahului Town is part of Wailuku Ahupua`a and Wailuku District, which collectively have yielded a substantial archaeological and historic record. The following is a brief summary of the salient aspects of these data.

In traditional times, it appears that Kahului was a relatively marginal settlement location, compared with Wailuku Town and areas to the north of Wailuku. Handy (1940) described the low-lying coastal areas east of Wailuku (including Kahului) as having scattered fishing settlements, which usually implies a relatively low population density or limited socio-economic status.

The Wailuku District was once known as "The Four Streams Area" (*Na Wai Eha*), which refers to the four main valleys that drain the eastern slopes of West Maui, including the massive Iao Valley (Handy and Handy 1972). The area from Waihe`e to Wailuku was formally the most extensive continuous area of wet taro cultivation in the Hawaiian Islands. Wailuku, itself, has been described as a "chiefly center" (Sterling 1998:90), although the seat of power was almost certainly concentrated in and around the Iao Valley, on the other (west) side of Wailuku from the project area. Areas upslope and west of the project area, including Wailuku Town, were once covered with *lo`i* (irrigated stone terraces) and house sites. Areas downslope and closer to the project area were burial grounds in traditional times.

Areas around the Waihe`e and Waiehu Streams, although a few miles north of the project area, have yielded some of the earliest settlement dates in Maui (Kirch 1985). Cordy *et al.* (1978) have proposed that the coast and lower valleys in this area were first settled by A.D. 300 to 600. Closer to the project area, the Wailuku Sand Hills, about a mile to the west, have yielded substantial numbers of burials and other evidence of traditional Native Hawaiian settlement (see Previous Archaeology section below).

Sterling's (1998) compendium of traditional archaeological sites on Maui has much to say about the Wailuku District, in general, and the Wailuku Ahupua`a, in particular. Documented *heiau* from Wailuku Ahupua`a include:

- Kaluli Heiau (Walker Site 42)—since destroyed
- Pihana Heiau (Walker Site 43)—located just west of the Sand Hills (Wailuku)
- Halekii Heiau (Walker Site 44)—located just north of the Sand Hills (Wailuku)
- Various Heiau (Walker Sites 45–54)—ten named *heiau* in Wailuku, all destroyed

A major inland fishpond was located at the present day spot of Kanaha Pond and Bird Sanctuary, just east of the project area. In traditional times, this was sometimes referred to as two, artificially joined ponds (Kanaha and Mauoni).

There is an interesting passage about Kahului during the middle 19th century by G.W. Bates (1854), cited in Sterling (1998). Bates' interpretation of a major battleground site in Kahului may not have been accurate, although there are many oral traditions about battles in this general area, but the rest of his description is instructive and worth quoting at length:

> Leaving Wai-lu-ku, and passing along toward the village Kahului, a distance of three miles, the traveler passes over the old battle-ground named after the village. It is distinctly marked by moving sand hills, which owe their formation to the northeast trades. Here these winds blow almost with the violence of a sirocco, and clouds of sand are carried across the northern side of the isthmus to a height of several hundred feet… In places laid bare by the action of winds, there were human skeletons projecting…(Sterling 1998:92)

HISTORIC SETTING

Literally hundreds of Land Commission Awards (LCA) are documented for Wailuku Ahupua`a (see, *e.g.*, Sterling 1998:86; Burgett and Spear 2003), although, in keeping with the broad settlement pattern outlined above, most of these were located in and around Iao Valley, west of the Wailuku Town and well removed from the project area. The existence of such large numbers of LCAs, however, does attest to the large settled population in the lower Iao Valley during the middle 19th century, and residents of Kahului were no doubt drawn into this sphere of influence.

There are no LCAs for the project area, which is owned by Alexander and Baldwin, Inc., according to TMK data (see Figure 2). The soil map by Foote *et al.* (1972) defines more or less the entire northern parcel as 'fill land", presumably, in this case, to stabilize coastal Kahului Bay (see Figure 1). Two older gentlemen living (homelessly) on the northern parcel described the southern parcel as previously having numerous, small houses (more like shacks, according to one of the informants).

Traditional land utilization was rapidly and dramatically supplanted by sugar cane cultivation during the 1850s (Dorrance and Morgan 2000). Many of the awarded LCAs in Wailuku Ahupua'a were under sugar cane cultivation by the mid 19th century. Sites and features built during this period include water irrigation ditches, terraces, free standing walls, historic houses, and mill structures. Cultivation of sugar cane dominated land use in Wailuku Ahupua'a well into the middle 20th century.

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various ahupua'a. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and *mai'a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *'uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Between A.D. 600-1100, sometimes referred to as the Developmental Period, the major focus of permanent settlement continued to be the fertile and well-watered windward valleys, such as those in the West Maui mountains in close proximity to Kahului (Kirch 1985).

WAHI PANI (LEGENDARY PLACES)

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama'āina* of the district. Near the current project area were the *kuapa* (fishponds) of Kanaha and Mau'oni, also known as the twin ponds of Kapi'ioho (a chief of O'ahu and half of Moloka'i in the early 18th century; Cordy 2002). It was told that stones were passed hand-to-hand by a line of men extending from Makawela to Kanaha during the building of the banks. Kapi'ioho was killed before they were finished and Kamehamehanui (brother of Kahekili) finished their construction and placed a *kapu* on the bank dividing the two ponds (Sterling 1998). Another version published in *Ka Nupepa Kuokoa* stated that after Kapi'ioho was killed, Kihapi'ilani began the construction of the ponds and it was he who separated the water with a wall, giving it two names (August 23, 1884). The twin ponds supplied mullet to the population during the times of fishing *kapu* (Bartholomew 1994).

Wailuku was a center of political power often at war with its rival in Hana. By the end of the 18th century, Kahekili resided with his entourage in Wailuku and it was on the sand dunes that Kahekili and his warriors engaged those of Kalani`ōpu`ū, Chief from Hawai`i Island. George W. Bates recounted his journey from Wailuku to Kahului in 1854:

> Leaving Wai-lu-ku, and passing along toward the village Kahului, a distance of three miles, the traveler passes over the old battle-ground named after the village. It is distinctly marked by moving sand-hills, which owe their formation to the action of the northeast trades. Here these winds blow almost with the violence of a sirocco, and clouds of sand are carried across the northern side of the isthmus to a height of several hundred feet. These sand-hills constitute a huge "Golgotha" for thousands of warriors who fell in ancient battles. In places laid bare by the action of the winds, there were human skeletons projecting, as if in the act of struggling for resurrection from their lurid sepulchers. In many portions of the plain who cart-loads were exposed in this way. Judging of the numbers of the dead, the contest of the old Hawaiians must have been exceedingly bloody. . . .[*Sandwich Island Notes*, 309]

The1776 encounter between Kahekili and Kalani`ōpu`ū resulted in a temporary truce which was broken in 1790 by the battle of Kepaniwai, when Kamehameha I consolidated his control over Maui Island. There were so many people and canoes invading from Hawai`i Island that it was called the Great Fleet. During Kahmehameha's campaign, it was recorded that the bay from Kahului to Hopukoa was filled with war canoes and they extended to Kalae`ili`ili at Waihe`e and below Pu`uhele and Kamakailima:

> . . . Kamehameha and his chiefs went on to the principal encounter at Wailuku. The bay from Kahului to Hopukoa was filled with war canoes. For two days there was constant fighting in which many of the most skilful warriors of Maui took part, but Kamehameha brought up the cannon, Lopaka, with men to haul it and the white men, John Young and Isaac Davis, to handle it; and there was great slaughter. (Kamakau 1961: 148).

From Kahului, Kamehameha marched on to Wailuku where Kalanikupule, Kahekili's son, waited with his warriors.

In 1837, the village of Kahului consisted of twenty-six *pili*-grass houses living close to the sea and depending on fishing in the coastal waters for the majority of their food (Bartholomew 1994). Mullet was still harvested from the twin ponds in the early 1900s and people swam in the spring waters that were continuously refreshed (*ibid.*). Thomas Hogan built the first western building, a warehouse, near the shoreline of Kahului in 1863 (Clark 1980). The dredging of Kahului harbor through the years filled in large sections of the ponds, eventually blocking the outlet to the sea.

As the sugar industry developed, Kahului became a cluster of warehouses, stores, wheelwright and blacksmith shops close to the harbor. A small landing was constructed in 1879 to serve the sugar company (Clark 1980). In the late 1800s, Kahului possessed a new custom house, a saloon, Chinese restaurants, a railroad and a small population of residents. Kahului's main focus was shipping. The 1900 bubonic plague outbreak destroyed much of the town as officials decided to burn down the Chinatown area in an effort to contain the epidemic. The Chinese, Japanese and Hawaiian residents were displaced by this action. To further insure isolation, authorities encircled the entire town with corrugated iron rat-proof fences which ended the spread of the plague (Bartholomew 1994). The Kahului Railroad Company built a 1,800 foot long rubble-mound breakwater in 1910 and dredging of the harbor now allowed ships with a 25-foot draft to dock at the new 200-foot wharf (Clark 1980).

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame'eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka'āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *'okipū* (on O'ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame'eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

There were over 400 *kuleana* awarded in the district of Wailuku, but none were identified in the project area.

HISTORIC LAND USE

Kahului was Maui's main harbor during the 20th century and provided employment to residents through the railroad, as dock workers, clerks, cannery workers and in the cane fields (Bartholomew 1994). Pu`unēnē Avenue bordering the project area to the east, sported Kahului Store a retail operation owned by Hawaiian Commercial & Sugar Company and Pu`unēnē Store, which supplied all of the plantation camp stores. The section of Kahului where the project is located contained commercial establishments and homes that spread *makai*, down Pu`unēnē Avenue to the former Maui County Fairgrounds. Stands of *kiawe* and plantation camps were scattered across Kahului town (*ibid.*).

In January of 1942, Japanese submarines shelled Kalului Harbor as part of a harassment scheme and 75 mm shoreline artillery returned fire (Clark 1980). After WW II, the Kahului development company built houses that were sold to the employees of HC&S. In 1950, Kahului shopping center was open for business catering to the new homeowners. In February of 2005, a fire destroyed approximately 50% of the 99,563 square feet of retail space in the Kahului Shopping Center.

PREVIOUS ARCHAEOLOGY

As stated previously, the current parcel was subject to an Archaeological Assessment in early 2006 (Johnson and Dega 2006). Trenches were excavated across representative portions of the entire Kahului Shopping Center (KSC) block, an entirely built landscape. Those investigations revealed no evidence of traditional Hawaiian or historic occupation. All excavation units did exhibit an average of approximately 0.80 m of recent and/or historic deposits which could have truncated earlier deposits. Nearly all of the trenches were also excavated into, or to, their contact point with gleyed sand. This sedimentary series indicates the long term presence of the water table in the area, making the occurrence of earlier cultural deposits below these excavations highly unlikely. The gleyed sand is thought to represent a mixing of marine and terrestrial sediments within a former wetland-type environment. This environment has become filled through time, allowing for historic-modern use of the Kahului area. Laboratory analysis indicates that all artifacts removed from these excavations originated in the 1920s or later.

In more general terms, a modest number of other archaeological investigations have been conducted over the past few years near the present project area in Kahului, Maui. Inventory Survey and Monitoring programs have yielded variable results. To date, Fredericksen and

Fredericksen (1988, 1989) conducted the most intensive study of the area through Inventory Survey. The survey led to the documentation of several volcanic glass concentrations, historic irrigation ditches, and old stream gravels. No subsurface deposits were identified near Dairy Road in the former sugarcane lands to the south of the present project area. A significant amount of archaeological work has been conducted to the southwest, in the Maui Lani area of Wailuku. This area is characterized by sand dunes/sandy substrata similar to the present project area. Rotunno-Hazuka *et al.* (1995:i) discuss the findings as being predominantly "scattered human skeletal remains." However, there appeared to also be concentrations of burials; the manuscripts on the project have not yet been prepared. Few other studies directly adjacent to the project area have yielded significant deposits. These results may be a function of sampling, depth of required construction excavations, the predominance of fill in the area overlying sand, or the intrusive nature of sugarcane soils (clay and silty clay bordering the area).

Archaeological Monitoring was conducted during building construction on an approximately. 30,000 square foot parcel located in Kahului, Wailuku Ahupua'a, Wailuku District, Island of Maui, Hawai'i (TMK:3-7-12:017). Five trenches were excavated for footings around the property allowing for an examination of subsurface cultural materials and analysis of project area strata. No cultural deposits or isolated cultural materials were identified during this project. The strata varied from mostly fill layers to natural, sandy sediment sterile of all organics and cultural material (Dega and Risedorf 2004).

More recently, Dega *et al.* (in preparation) conducted Monitoring work at the Pu'unene Container Yard at Kahului Harbor. One historic-period burial was identified near fill strata. Traditional-period artifacts were also identified but had been displaced during previous grading and filling of the area. The artifacts, consisted of an adze blank, octopus lure, and poi pounder fragment, were all identified in secondary context.

As summarized by McGerty and Spear (2001), for the Kahului area and Hawai'i in general (see also Kirch 1985), there is an acute positive relationship between the presence of sandy substrate and traditional native Hawaiian burials. Archaeological studies conducted around the perimeter of Kahului Bay and slightly inland (inclusive of the current project area) have led to the identification of deposits related to remnants of the old Kahului Railroad bed, historic refuse, pre-Contact artifacts, midden, and isolated findspots of human remains. The depth of these cultural resources varies depending on previous construction activities in an area but often, these deposits have been identified from 0.20-2.00 meters below the ground surface. Similar to the present project area, many of these resources are associated with sandy substrata.

In keeping with previous archaeological work in the area, most cultural signatures dating to pre-Contact and historic times in the Kahului area are present in subsurface contexts. As the current parcel and environs has been subject to much modern construction, most of these deposits would be partially truncated. Based on previous archaeological work in the Kahului area, both traditional and historical features and deposits may still be present in the project area.

MONITORING CONVENTIONS AND METHODOLOGY

This Archaeological Monitoring Plan has been prepared in accordance with DLNR-SHPD rules governing standards for Archaeological Monitoring (DLNR-SHPD Draft Rules 1996). SCS monitors will adhere to the following guidelines during monitoring:

1. A qualified archaeologist from SCS intimately familiar with the project area as well as the results of previous archaeological work conducted on the parcel and in the Kahului-Wailuku area in general will conduct full-time monitoring of subsurface construction activities on the parcel. If significant deposits or features are identified and additional field personnel are required, SCS will notify the contractor or representatives before additional personnel are brought to the site.

2. If features or cultural deposits are identified during Monitoring, the on-site archaeologist will have the authority to temporarily suspend construction activities at the significant location so that the cultural feature(s) or deposit(s) may be fully evaluated and appropriate treatment of the cultural deposit(s) is conducted. SHPD (Dr. M. Kirkendall) will be contacted to establish feature significance and potential mitigation procedures. Treatment activities primarily include documenting the feature/deposit through plotting its location on an overall site map, illustrating a plan view map of the feature/deposit, profiling the deposit in three dimensions, photographing the finds—with the exception of human burials—artifact and soil sample collection, and triangulation of the finds. Construction work and/or back-filling of excavation pits or trenches will only continue in the sample location when all documentation has been completed.

3. Control stratigraphy in association with subsurface cultural deposits will be noted and photographed, particularly those containing significant quantities or qualities of cultural materials. If deemed significant by SHPD and SCS, these deposits will be sampled.

4. In the event that human remains are encountered, all work in the immediate area of the find will cease; the area will be secured from further activity until burial protocol has been completed. The SHPD island cultural historian (H. Rodrigues) and SHPD-Burial Sites Program (located in Kapolei, O'ahu) will both be immediately identified as to the inadvertent discovery of human remains on the property. Notification of the inadvertent discovery will also be made to the Maui/Lanai Islands Burial Council by either SHPD (H. Rodrigues) or SCS (Michael Dega). A determination of minimum number of individuals (MNI), age(s), and ethnicity of the burial(s) will be ascertained in the field by SCS.

Rules outlined in Chapter 6e, Section 43 shall be followed. Profiles, plan view maps, and illustrative documentation of skeletal parts will be recorded to document the burial(s). The burial location will be identified and marked. If a burial is disturbed during trench excavations, materials excavated from the vicinity of the burial(s) will be manually screened through 1/8-inch wire mesh screens to recover any displaced skeletal material. If the remains are to be removed, the work will be in compliance with HRS 6.E-43.6, Procedures Relating to Inadvertent Discoveries after approval from all parties (SHPD, Burial Council).

5. To ensure that contractors and the construction crew are aware of this Archaeological Monitoring Plan and possible site types to be encountered on the parcel, a brief coordination meeting will be held between the construction team and monitoring archaeologist prior to initiation of the project. The construction crew will also be informed as to the possibility that human burials could be encountered and how they should proceed if they observe such remains.

6. SCS will provide all coordination with the contractor, SHPD, and any other group involved in the project. SCS will coordinate all monitoring and sampling activities with the safety officers to ensure that proper safety regulations and protective measures meet compliance. Close coordination will also be maintained with construction representatives in order to adequately inform personnel of the possibility that open archaeological units or trenches may occur in the project area.

7. As necessary, verbal reports will be made to SHPD and any other agencies as requested.

LABORATORY ANALYSIS

All samples collected during the project, except human remains, will undergo analysis at the SCS laboratory in Honolulu. In the event that human remains and associated grave goods are identified and the SHPD and Maui/Lanai Islands Burial Council authorize their removal, they will be curated on Maui. Photographs, illustrations, and all notes accumulated during the project will be curated at the Honolulu laboratory. All retrieved artifact and midden samples will be thoroughly cleaned, sorted, and analyzed. Significant artifacts will be photographed, sketched, and classified (qualitative analysis). All metric measurements and weights will be recorded (quantitative analysis). These data will be presented in tabular form within the final monitoring report. Midden samples will be minimally identified to major class (*e.g.*, bivalve, gastropod mollusk, echinoderm, fish, bird, and mammal). All data will be clearly recorded on standard laboratory forms which also include number and weight (as appropriate) of each constituent category. These counts will also be included in the final report.

Should any samples amenable to dating be collected from a significant cultural deposit, they will be prepared in the SCS laboratory and submitted for specialized radiocarbon analysis. While primary emphasis for dating is placed on charcoal samples, we do not preclude the use of other material such as marine shell or nonhuman bone materials. SCS will consult with SHPD and the client if radiocarbon dates are deemed necessary.

All stratigraphic profiles will be drafted for presentation in the final report. Representative plan view sketches showing the location and morphology of identified sites/features/deposits will be compiled and illustrated.

CURATION

If requested by the landowner, SCS will curate all recovered materials in Honolulu (except human remains, which would remain on-island) until a permanent, more suitable curation center is identified. The landowner may request to curate all recovered cultural materials once analysis has been completed.

REPORTING

An Archaeological Monitoring report documenting the project findings and interpretation, following SHPD guidelines for Archaeological Monitoring reports, will be prepared and submitted 180 days after the completion of fieldwork. This time line is requested to account for any radiocarbon age determinations (typically 30–45 days), if necessary.

If cultural features or deposits are identified during fieldwork, the sites will be evaluated for historical significance and assessed under State and Federal Significance Criteria. The Archaeological Monitoring report will be drafted until accepted by SHPD and will be submitted to both SHPD and the client.

REFERENCES CITED

Bartholomew, Gail
1994 *Maui Remembers, A Local History*. Mutual Publishing. Taiwan.

Beckwith, Martha
1940 *Hawaiian Mythology*. University of Hawai'i Press: Honolulu.

Chinen, Jon
1961 *Original Land Titles in Hawaii*. Copyright 1961 Jon Jitsuzo Chinen. Library of Congress Catalogue Card No. 61-17314.

Clark, John
1980 *The Beaches of Maui County*. A Kolowalu Book, University Press of Hawaii: Honolulu.

Cordy, Ross
2002 *The Rise and Fall of the O'ahu Kingdom*. Mutual Publishing. Australia.

Daws, G.
1968 *Shoal of Time: History of the Hawaiian Islands*. University of Hawai'i Press. Honolulu.

Dillon, D., and M. Dega
2006 *A Limited Archival Survey Documentation: Kahului Town Center, Kahului, Wailuku Ahupua'a, Wailuku District, Island of Maui, Hawai'i, [TMK:3-7-7:5, 8-10, 27 and 50]*. Scientific Consultant Services, Inc., Honolulu.

Fornander, Abraham
1919 *Hawaiian Antiquities and Folklore*. Bishop Museum Press: Honolulu.

Johnson, K. and M. Dega
2006 *An Archaeological Assessment of The Kahului Shopping Center Project, Wailuku Ahupua'a, Kahului, Island Of Maui, Hawai'i [Tmk: 3-7-7:5, 8-10, 27 and 50].* Scientific Consultant Services, Inc., Honolulu.

Kamakau, Samuel
1964 *Ka Po'e Kahiko*. Bishop Museum Special Publication 51. Honolulu.

Kame'eleihiwa, Lilikal□
1992 *Native Land and Foreign Desires*: Pehea La E Pono Ai. Bishop Museum Press. Honolulu.

Kelly, Marion
1983 *Nā Māla o Kona: Gardens of Kona*. Dept. of Anthropology Report Series 83-2. Bishop Museum. Honolulu.

1998 *A Gunboat Diplomacy, Sandalwood Lust and National Debt.* In Ka Wai Ola o OHA, Vol. 15, No. 4, April 1998.

Kirch, Patrick
1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory.* University of Hawaii Press, Honolulu.

Kirch, Patrick V. and Marshall Sahlins
1992 *Anahulu. Vol. 1 and 2.* University of Chicago Press. Chicago.

Kuykendall, R.S.
1938 *The Hawaiian Kingdom. Vol. 1.* University of Hawai'i Press. Honolulu.

Lucas, Paul F. Nahoa
1995 *A Dictionary of Hawaiian Legal Land-terms.* Native Hawaiian Legal Corporation. University of Hawai'i Committee for the Preservation and Study of Hawaiian Language, Art and Culture.. University of Hawai'i Press.

Lyons, C.J.
1875 Land Matters in Hawaii. *The Islander, Vol. I.* Honolulu.

Pukui, Mary Kawena, Samuel Elbert, Esther Mookini
1974 *Place Names of Hawaii.* University of Hawai'i Press: Honolulu.

Sterling, Elspeth
1998 *Sites of Maui.* Bishop Museum Press. Honolulu.

Appendix E

Cultural Impact Assessment

SCS Project Number 657-CIA

CULTURAL IMPACT ASSESSMENT OF A 19.9-ACRE PARCEL, KAHULUI AHUPUA`A, WAILUKU DISTRICT, MAUI ISLAND, HAWAI`I [TMK 3-7-07:005, 008, 010, 027, 050]

Prepared by:
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February 2006

Prepared for:
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INTRODUCTION

Scientific Consultant Services (SCS), Inc. has been contracted by Chris Hart and Partners, Inc. to conduct a Cultural Impact Assessment a 19.9-acre parcel in Kahului, Ahupua'a, Wailuku District, Maui Island, Hawai'i [TMK 3-7-07: 005, 008, 010, 027, 050] (Figure 1 and 2). Based on documents supplied by Chris Hart and Partners, the master plan proposes creating a town center on the Kahului Shopping Center block with a mix of residential, retail and office uses to be implemented and developed over several phases within the next five years (Figure 3).

The Constitution of the State of Hawai'i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (2000). Beginning in 1850 with establishment of Hawai'i Revised Statutes (HRS) 7-1, native Hawaiians were given access rights to undeveloped private property and waterways in order to gather specific natural resources for customary uses. In 1992, the State of Hawai'i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, "native Hawaiian rights...may extend beyond the ahupua'a in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner" (Pele Defense Fund v. Paty, 73 Haw.578, 1992).

Act 50, enacted by the Legislature of the State of Hawaii (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

> ...there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights...[H.B. No. 2895].

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shoreline developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other

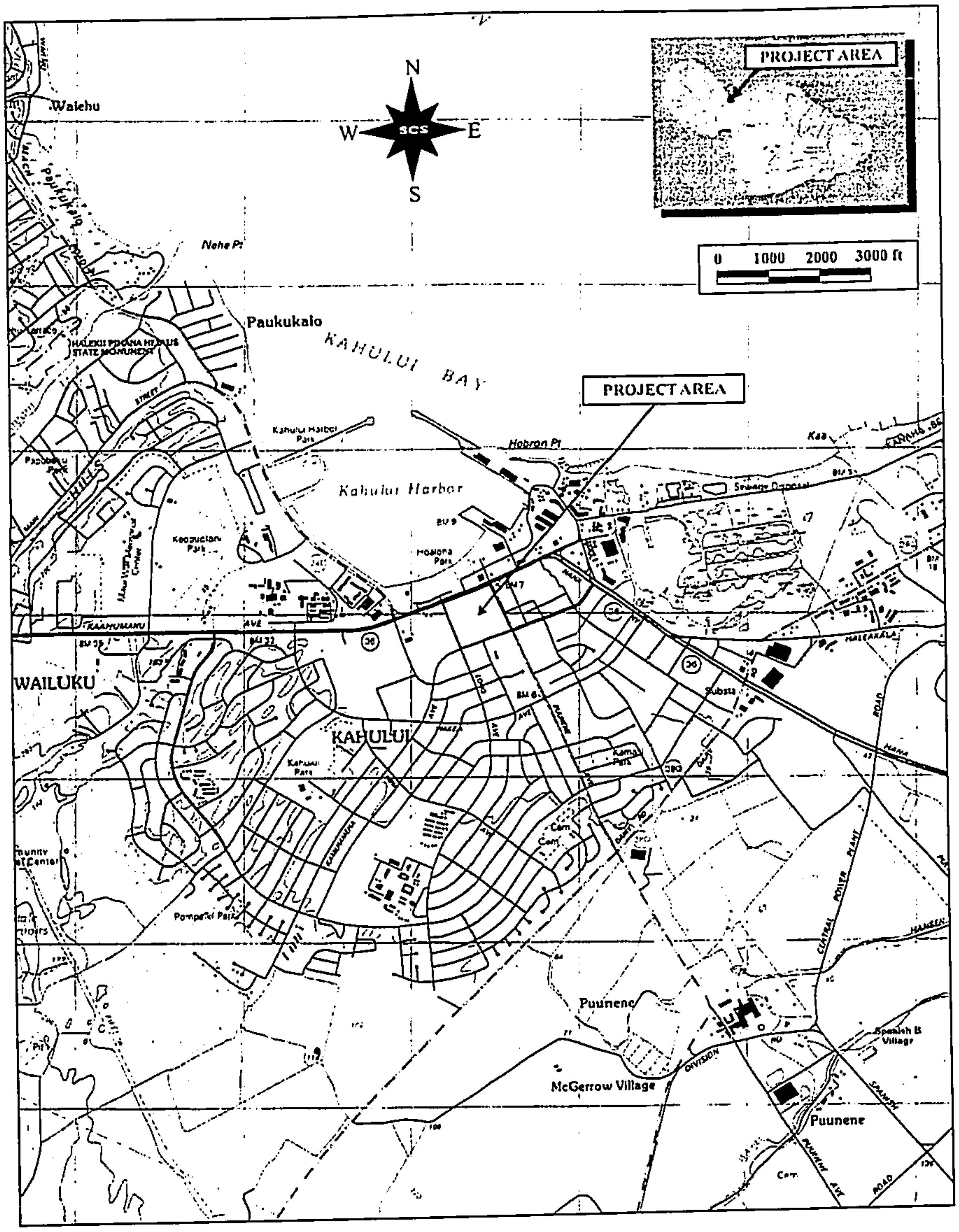

Figure 1: USGS Quadrangle Map Showing Project Area Location.

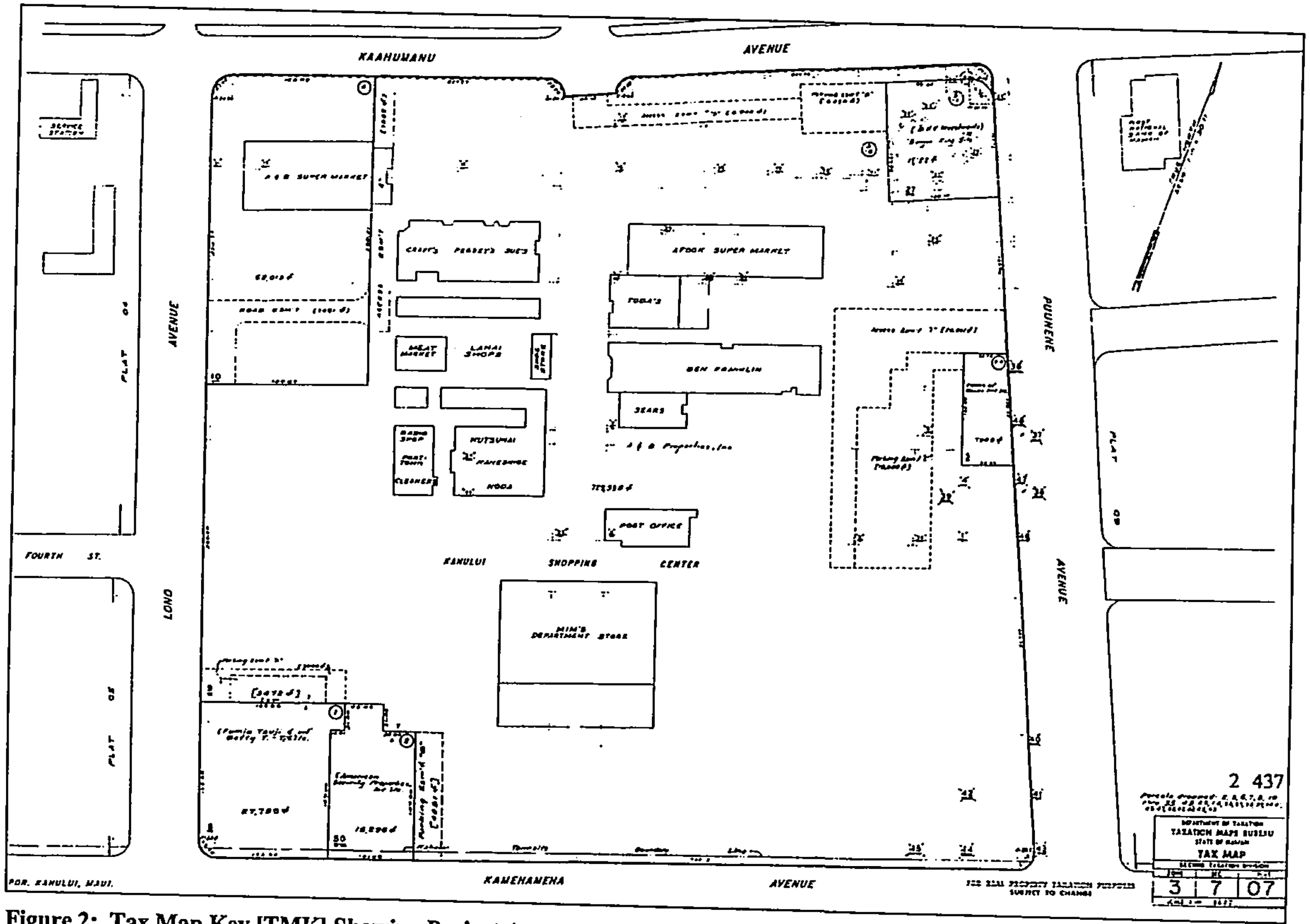

Figure 2: Tax Map Key [TMK] Showing Project Area.

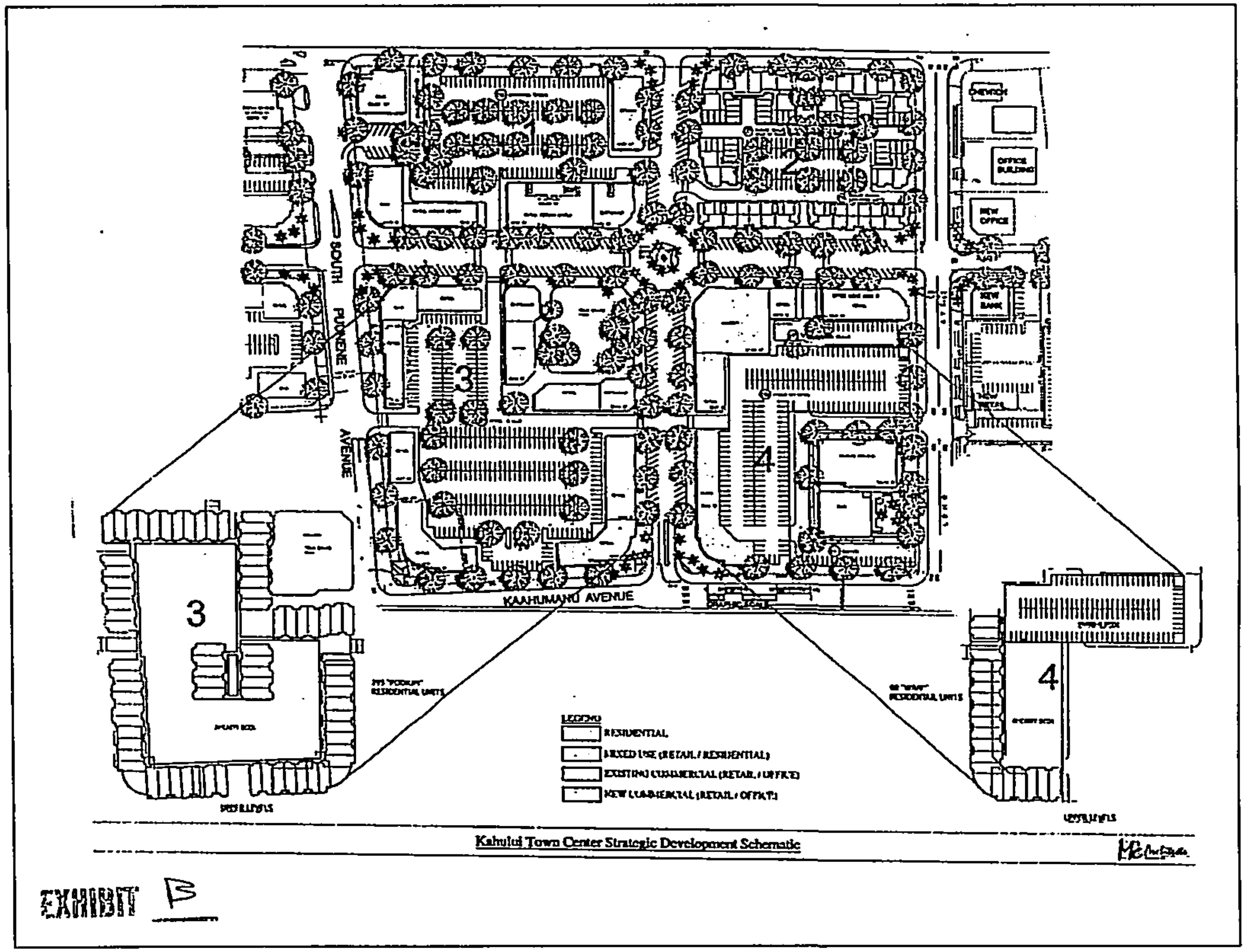

Figure 3: Proposed Development for the Kahului Town Center.

ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are...contrary to the State's environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000). Thus, not only are properties evaluated for impact to Native Hawaiians, but also for other ethnic groups as well.

Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua'a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997):

> The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religions and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural values and rights within the project area and its vicinity.

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Methodology", the OEQC state:

> ...information may be obtained through scoping, community meetings, ethnographic interviews and oral histories...[1997].

This report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

(1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints of limitations which might have affected the quality of the information obtained;

(2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;

(3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;

(4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

(10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;

(11) the inclusion of bibliography of references, and attached records of interviews which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

INTERVIEW METHODOLOGY

When appropriate, interviews are conducted in accordance with Federal and State laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise or can be located by visiting the area. Organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail clubs, and Planning Commissions are invited to contribute their input and suggest further avenues of inquiry, as well as specific individuals to interview.

When interviewees are identified, a standard procedure follows. Personal interviews are taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua'a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites;

place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, the project area had been under development for over 50 years. Letters, briefly outlining the development plans along with maps of the project area, were sent to organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O'ahu; Cultural Resource Planner for the Maui Planning Department; and the Central Maui Civic Club. Based on this research, an assessment of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

PROJECT AREA AND VICINITY

The Kahului Town Center (KTC) is 19.9 acres located in Kahului, Maui. It is bound by Ka'ahumanu Avenue to the north, Pu'unēnē Avenue to the east, Kamehameha Avenue to the south, and Lono Avenue to the west. The area surrounding the KTC is heavily developed for commercial use with residential development extending to the east and south.

CULTURAL HISTORICAL CONTEXT

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu'u Kukui, forming the west end of the island (1,215m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems that watered fertile agricultural lands extending to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted productive landscapes.

PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui's lands into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha'ōhia, during the time of the *ali'i* Kaka'alaneo (Beckwith 1940:383; Fornander places Kaka'alaneo at the end of the 15th century or the beginning of the 16th century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali'i 'ai moku* (the *ali'i* who eats the island/district), which he held in trust for the gods. The title of *ali'i 'ai moku* ensured rights and responsibilities pertaining to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka'āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku*, *ahupua'a*, *'ili* or *'ili'ā ina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua'a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua'a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua'a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *'ili 'āina* or *'ili* were smaller land divisions next to importance to the *ahupua'a* and were administered by the chief who controlled the *ahupua'a* in which it was located (*ibid*:33; Lucas 1995:40). The *mo'o'āina* were narrow strips of land within an *'ili*. The land holding of a tenant or *hoa 'āina* residing in a *ahupua'a* was called a *kuleana* (Lucas 1995:61). The project area is located in the *ahupua'a* of Kahului, which translated literally means "the winning" (Pukui *et al.*:67).

TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua'a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugar cane, *Saccharum officinaruma*) and *mai'a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *'uala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Between A.D. 600-1100, sometimes referred to as the Developmental Period, the major focus of permanent settlement continued to be the fertile and well-watered windward valleys, such as those in theWest Maui mountains in close proximity to Kahului (Kirch 1985).

WAHI PANI (LEGENDARY PLACES)

Scattered amongst the agricultural and habitation sites were other places of cultural significance to the *kama'āina* of the district. Near the project area were the *kuapa* (fishponds) of Kanaha and Mau'oni, also known as the twin ponds of Kapi'ioho (a chief of O'ahu and half of Moloka'i in the early 18th century; Cordy 2002). It was told that stones were passed hand-to-hand by a line of men extending from Makawela to Kanaha during the building of the banks.

Kapi`ioho was killed before they were finished and Kamehamehanui (brother of Kahekili) finished their construction and placed a *kapu* on the bank dividing the two ponds (Sterling 1998). Another version published in *Ka Nupepa Kuokoa* stated that after Kapi`ioho was killed, Kihapi`ilani began the construction of the ponds and it was he who separated the water with a wall, giving it two names (August 23, 1884). The twin ponds supplied mullet to the population during the times of fishing *kapu* (Bartholomew 1994).

Wailuku was a center of political power often at war with its rival in Hana. By the end of the 18th century, Kahekili resided with his entourage in Wailuku and it was on the sand dunes that Kahekili and his warriors engaged those of Kalani`ōpu`ū, Chief from Hawai`i Island. George W. Bates recounted his journey from Wailuku to Kahului in 1854:

> Leaving Wai-lu-ku, and passing along toward the village Kahului, a distance of three miles, the traveler passes over the old battle-ground named after the village. It is distinctly marked by moving sand-hills, which owe their formation to the action of the northeast trades. Here these winds blow almost with the violence of a sirocco, and clouds of sand are carried across the northern side of the isthmus to a height of several hundred feet. These sand-hills constitute a huge "Golgotha" for thousands of warriors who fell in ancient battles. In places laid bare by the action of the winds, there were human skeletons projecting, as if in the act of struggling for resurrection from their lurid sepulchers. In many portions of the plain who cart-loads were exposed in this way. Judging of the numbers of the dead, the contest of the old Hawaiians must have been exceedingly bloody. . . .[*Sandwich Island Notes*, 309]

The1776 encounter between Kahekili and Kalani`ōpu`ū resulted in a temporary truce which was broken in 1790 by the battle of Kepaniwai, when Kamehameha I consolidated his control over Maui Island. There were so many people and canoes invading from Hawai`i Island that it was called the Great Fleet. During Kahmehameha's campaign, it was recorded that the bay from Kahului to Hopukoa was filled with war canoes and they extended to Kalae`ili`ili at Waihe`e and below Pu`uhele and Kamakailima:

> . . . Kamehameha and his chiefs went on to the principal encounter at Wailuku. The bay from Kahului to Hopukoa was filled with war canoes. For two days there was constant fighting in which many of the most skilful warriors of Maui took part, but Kamehameha brought up the cannon, Lopaka, with men to haul it and the white men, John Young and Isaac Davis, to handle it; and there was great slaughter. (Kamakau 1961: 148).

From Kahului, Kamehameha marched on to Wailuku where Kalanikupule, Kahekili's son, waited with his warriors.

In 1837, the village of Kahului consisted of twenty-six *pili*-grass houses living close to the sea and depending on fishing in the coastal waters for the majority of their food (Bartholomew 1994). Mullet was still harvested from the twin ponds in the early 1900s and people swam in the spring waters that were continuously refreshed (*ibid.*). Thomas Hogan built the first western building, a warehouse, near the shoreline of Kahului in 1863 (Clark 1980). The dredging of Kahului harbor through the years filled in large sections of the ponds, eventually blocking the outlet to the sea.

As the sugar industry developed, Kahului became a cluster of warehouses, stores, wheelwright and blacksmith shops close to the harbor. A small landing was constructed in 1879 to serve the sugar company (Clark 1980). In the late 1800s, Kahului possessed a new custom house, a saloon, Chinese restaurants, a railroad and a small population of residents. Kahului 's main focus was shipping. The 1900 bubonic plague outbreak destroyed much of the town as officials decided to burn down the Chinatown area in an effort to contain the epidemic. The Chinese, Japanese and Hawaiian residents were displaced by this action. To further insure isolation, authorities encircled the entire town with corrugated iron rat-proof fences which ended the spread of the plague (Bartholomew 1994). The Kahului Railroad Company built a 1,800 foot long rubble-mound breakwater in 1910 and dredging of the harbor now allowed ships with a 25-foot draft to dock at the new 200-foot wharf (Clark 1980).

THE GREAT MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O'ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame'eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

There were over 400 *kuleana* awarded in the district of Wailuku, but none were identified in the project area.

HISTORIC LAND USE

Kahului was Maui's main harbor during the 20th century and provided employment to residents through the railroad, as dock workers, clerks, cannery workers and in the cane fields (Bartholomew 1994). Pu'unēnē Avenue bordering the project area to the east, sported Kahului Store a retail operation owned by Hawaiian Commercial & Sugar Company and Pu'unēnē Store, which supplied all of the plantation camp stores. The section of Kahului where the project is located contained commercial establishments and homes that spread *makai*, down Pu'unēnē Avenue to the former Maui County Fairgrounds. Stands of *kiawe* and plantation camps were scattered across Kahului town (*ibid.*).

In January of 1942, Japanese submarines shelled Kalului Harbor as part of a harassment scheme and 75 mm shoreline artillery returned fire (Clark 1980). After WW II, the Kahului development company built houses that were sold to the employees of HC&S. In 1950, Kahului shopping center was open for business catering to the new homeowners. In February of 2005, a fire destroyed approximately 50% of the 99,563 square feet of retail space in the Kahului Shoppiang Center.

SUMMARY AND CULTURAL ASSESSMEMNT

As suggested in the "Guidelines for Accessing Cultural Impacts" (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

The "level of effort undertaken" (OEQC 1997) has not been officially defined and is left up to the investigator. To SCS, a good faith effort means contacting agencies by letter, interviewing people who may be affected by the project or who know its history, researching sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential. In the case of the present parcel that has been under development for 40 years, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from the Maui Office of Hawaiian Affairs, Community Resource Coordinator, Maui; the Office of Hawaiian Affairs, O'ahu; Cultural Resource Planner for the Maui Planning Department; and the Central Maui Civic Club. Archival research included historical and cultural resources.

Additionally, historical and cultural source materials were also consulted, extensively used, and can be found listed in the References Cited portion of the report. Such scholars as Thrum (1908, 1916 1917), Fornander (1919, 1969), Walker (1930), Kuykendall (1938), Beckwith (1940), Chinen (1961), Handy and Handy (1972), Puku'i *et al.* (1974), Kelly (1983, 1998), and Kame'eleihiwa (1992) have contributed, and continue to contribute, to our knowledge and understanding of Hawai'i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona 'Aina Data base (2005).

Analysis of the potential effect of the project on cultural resources, practices or beliefs, the potential to isolate cultural resources, maintain practices or beliefs in their original setting, and the potential of the project to introduce elements that may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). A Cultural resources can include sites, behaviors, values, beliefs, rights and stories, among other things. The project area was completely developed over 50 years ago and has been in continuous use as a commercial property.

Based on archival research and the lack of response from the various organizations that were contacted, development of the 19.9-acre parcel will not impact cultural resources. In addition, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering will not be affected by development activities on the 19.9-acre parcel. As there were no activities identified on, there are no adverse effects.

REFERENCES CITED

Bartholomew, Gail

1994 *Maui Remembers, A Local History.* Mutual Publishing. Taiwan.

Beckwith, Martha

1940 *Hawaiian Mythology.* University of Hawai'i Press: Honolulu.

Chinen, Jon

1961 Original Land Titles in Hawaii. Copyright 1961 Jon Jitsuzo Chinen. Library of Congress Catalogue Card No. 61-17314.

Clark, John

1980 *The Beaches of Maui County.* A Kolowalu Book, University Press of Hawaii: Honolulu.

Cordy, Ross

2002 *The Rise and Fall of the O'ahu Kingdom.* Mutual Publishing. Australia.

Daws, G.

1968 *Shoal of Time: History of the Hawaiian Islands.* University of Hawai'i Press. Honolulu.

Fornander, Abraham

1969 *An Account of the Polynesian Race, Its Origins and Migrations.* Vol. 1 to 3. Charles E. Tuttle Co. Inc.: Jutland.

1919 *Hawaiian Antiquities and Folklore.* Bishop Museum Press: Honolulu.

Handy, E.S. Craighill and E.G. Handy

1972 Native Planters in Old Hawai'i. *Bishop Museum Bulletin* 233. Honolulu.

Kamakau, Samuel

1964 Ka Po'e Kahiko. *Bishop Museum Special Publication* 51. Honolulu.

Kame'eleihiwa, Lilikalā

1992 *Native Land and Foreign Desires: Pehea La E Pono Ai?* Bishop Museum Press. Honolulu.

Kelly, Marion

1983 *Nā Māla o Kona: Gardens of Kona.* Dept. of Anthropology Report Series 83-2. Bishop Museum. Honolulu.

1998 "Gunboat Diplomacy, Sandalwood Lust and National Debt" In *Ka Wai Ola o OHA,* Vol. 15, No. 4, April 1998.

Kirch, Patrick
1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory.* University of Hawaii Press, Honolulu.

Kirch, Patrick V. and Marshall Sahlins
1992 *Anahulu.* Vol. 1 and 2. University of Chicago Press. Chicago.

Kuykendall, R.S.
1938 *The Hawaiian Kingdom.* Vol. 1. University of Hawai'i Press. Honolulu.

Lucas, Paul F. Nahoa
1995 *A Dictionary of Hawaiian Legal Land-terms.* Native Hawaiian Legal Corporation. University of Hawai'i Committee for the Preservation and Study of Hawaiian Language, Art and Culture.. University of Hawai'i Press.

Lyons, C.J.
1875 "Land Matters in Hawaii". *The Islander,* Vol. I. Honolulu.

OEQC (Hawaii State Office of Environmental Quality Control)
1997 "Guidelines for Assessing Cultural Impacts." Adopted by the Environmental Council, November 1997

Pukui, Mary Kawena, Samuel Elbert, Esther Mookini
1974 *Place Names of Hawaii.* University of Hawai'i Press: Honolulu.

Sterling, Elspeth
1998 *Sites of Maui.* Bishop Museum Press. Honolulu.

Thrum, Thomas
1908 Heiaus and Heiau Sites Throughout the Hawaiian Islands. *Hawaiian Almanac and Annual for 1909.* Honolulu

1916 Maui's Heiaus and Heiau Sites Revised. *Hawaiian Almanac and Annual for 1917.* Honolulu.

1917 More Heiau Sites. *Hawaiian Almanac and Annual for 1918.* Honolulu

Walker, W.M.
1930 *Archaeology of Maui.* Ms. On file State Historic Preservation Division. Honolulu.

Appendix F

Limited Archival Survey Documentation

SCS Project Number 656-histdoc-1

A LIMITED ARCHIVAL SURVEY DOCUMENTATION: KAHULUI TOWN CENTER, KAHULUI WAILUKU AHUPUA`A, WAILUKU DISTRICT ISLAND OF MAUI, HAWAI`I [TMK: 3-7-7:5, 8-10, 27 and 50]

Assembled by:
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May 2006

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LIST OF FIGURES

INTRODUCTION

This folio contains primary archival building documentation prior to proposed construction work to occur at the Kahului Shopping Center within Kahului, Wailuku Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK: 3-7-7:5, 8-10, 27 and 50] (Figure 1). This document, prepared by Scientific Consultant Services, Inc. (SCS) with the aid of archives at A&B Properties, Inc. and Maui County archives, represents the results of limited archival searches concerning the nature of past and existing structures on the grounds of the present-day Kahului Shopping Center (Figures 2 and 3). This briefing is meant as an information folio to be evaluated by the County (Stan Solamillo) and/or the State Historic Preservation Division (SHPD) prior to large-scale demolition or construction on the parcel. The field researcher for this project, D. Dillon of SCS, wishes to acknowledge members of the "Kahului Shopping Center Historic Society" (see below).

BACKGROUND TO PROJECT

The present archival work follows a full Archaeological Inventory Survey of the parcel conducted in January and February 2006 by SCS. The Inventory Survey report was submitted to Dr. Melissa Kirkendall at the SHPD for review in March 2006. Inventory Survey through survey and subterranean testing did not lead to the identification of any significant archaeological sites. However, the document does provide analysis of the cultural and historic setting for the subject parcel (see Johnson and Dega 2006).

The present document seeks to augment the information gleaned from Inventory Survey by addressing the nature of the standing or recently standing buildings in the project area. For brief background information referring to traditional-period Wailuku District and historic Kahului, the reader is referred to the Inventory Survey report (Johnson and Dega 2006). Please note that Archaeological Monitoring will be conducted during structural modifications and any ground altering activities associated with structural modification and/or construction of the project area.

DATA COLLECTION

The present documentation has occurred prior to any construction-related modifications to structures per the current project. Recent modifications in terms of the February 28, 2005 fire are discussed below. This folio contains several primary sources of information on buildings occurring on the parcel:

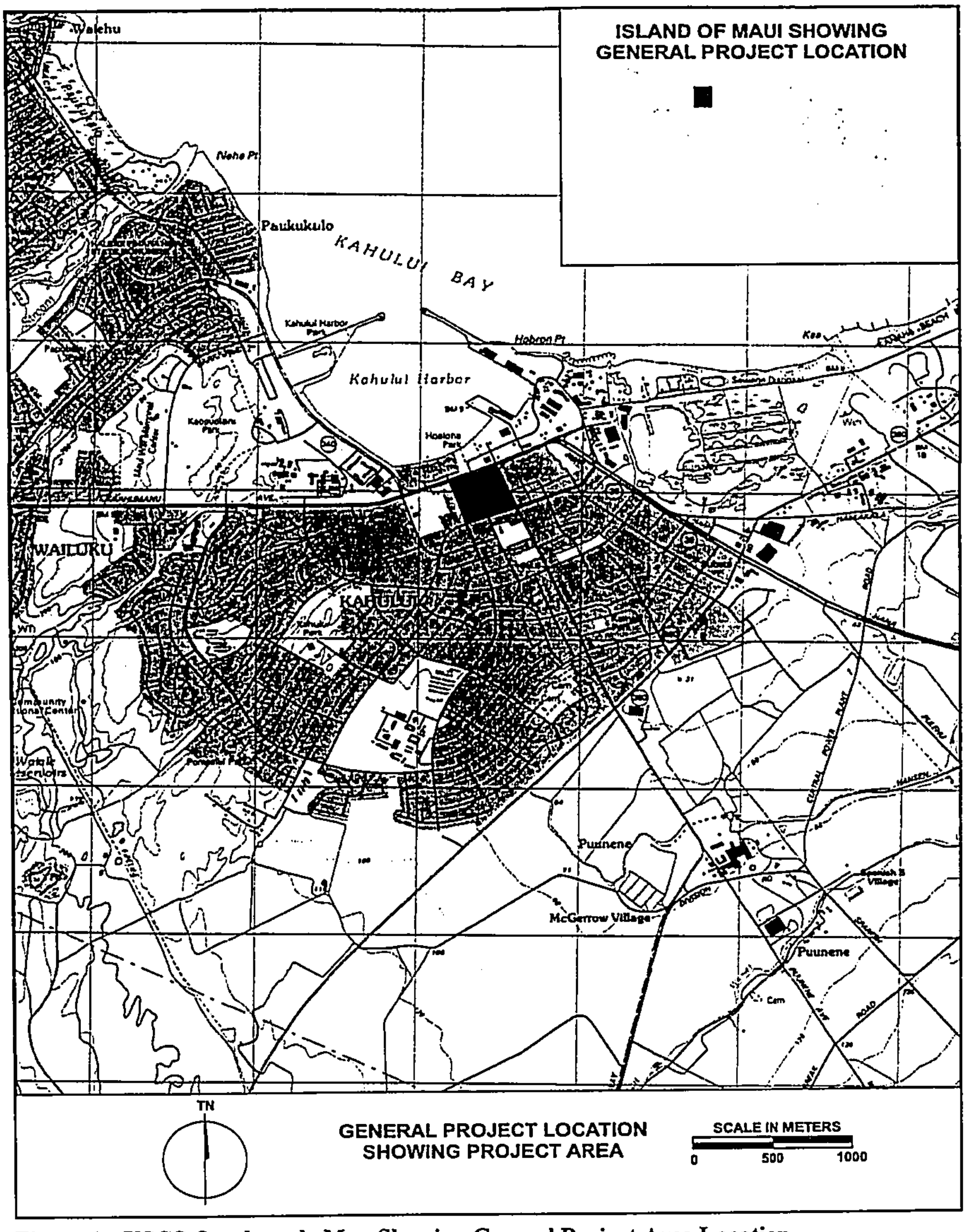


Figure 1: USGS Quadrangle Map Showing General Project Area Location.

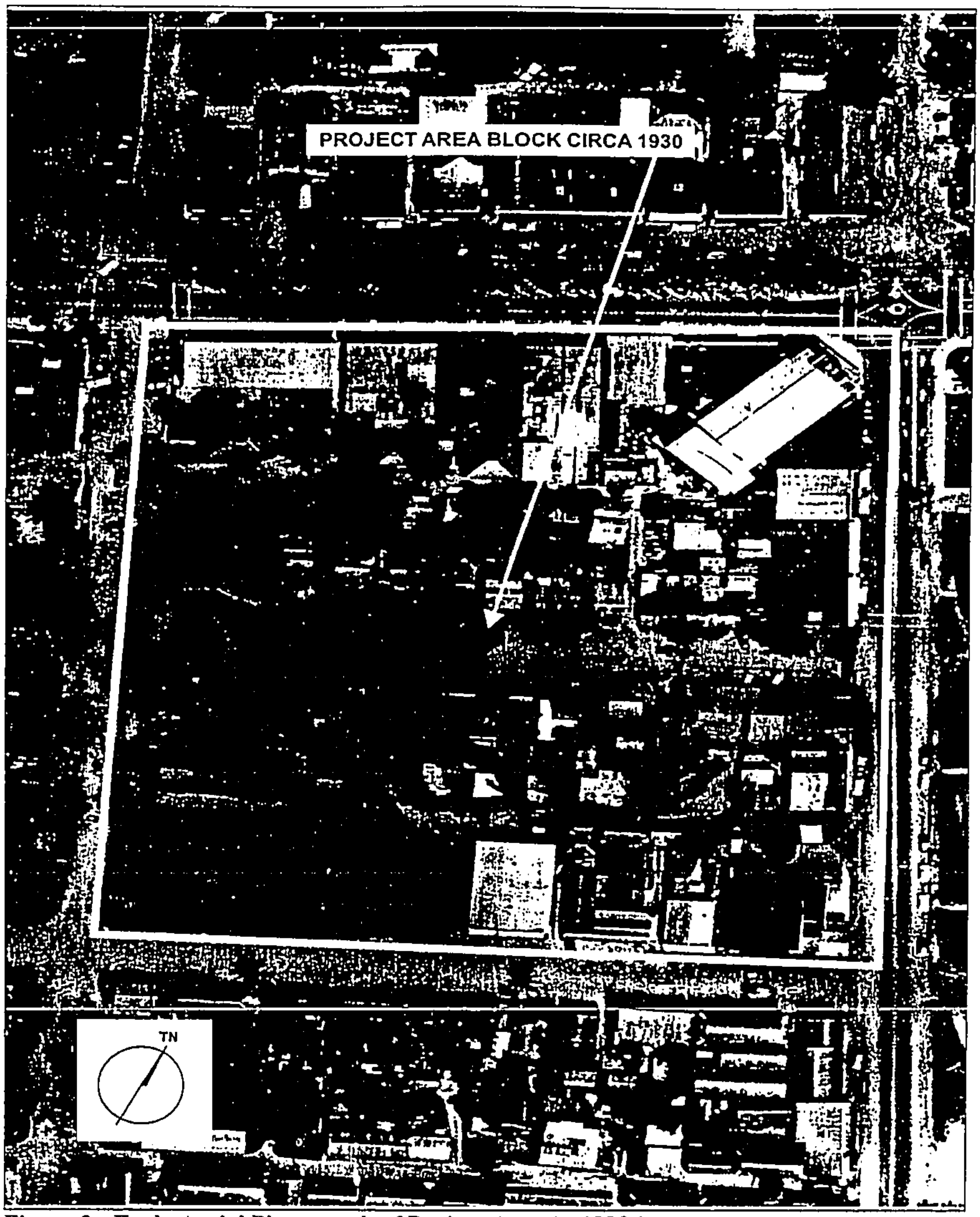


Figure 2: Early Aerial Photograph of Project Area (c. 1930s).

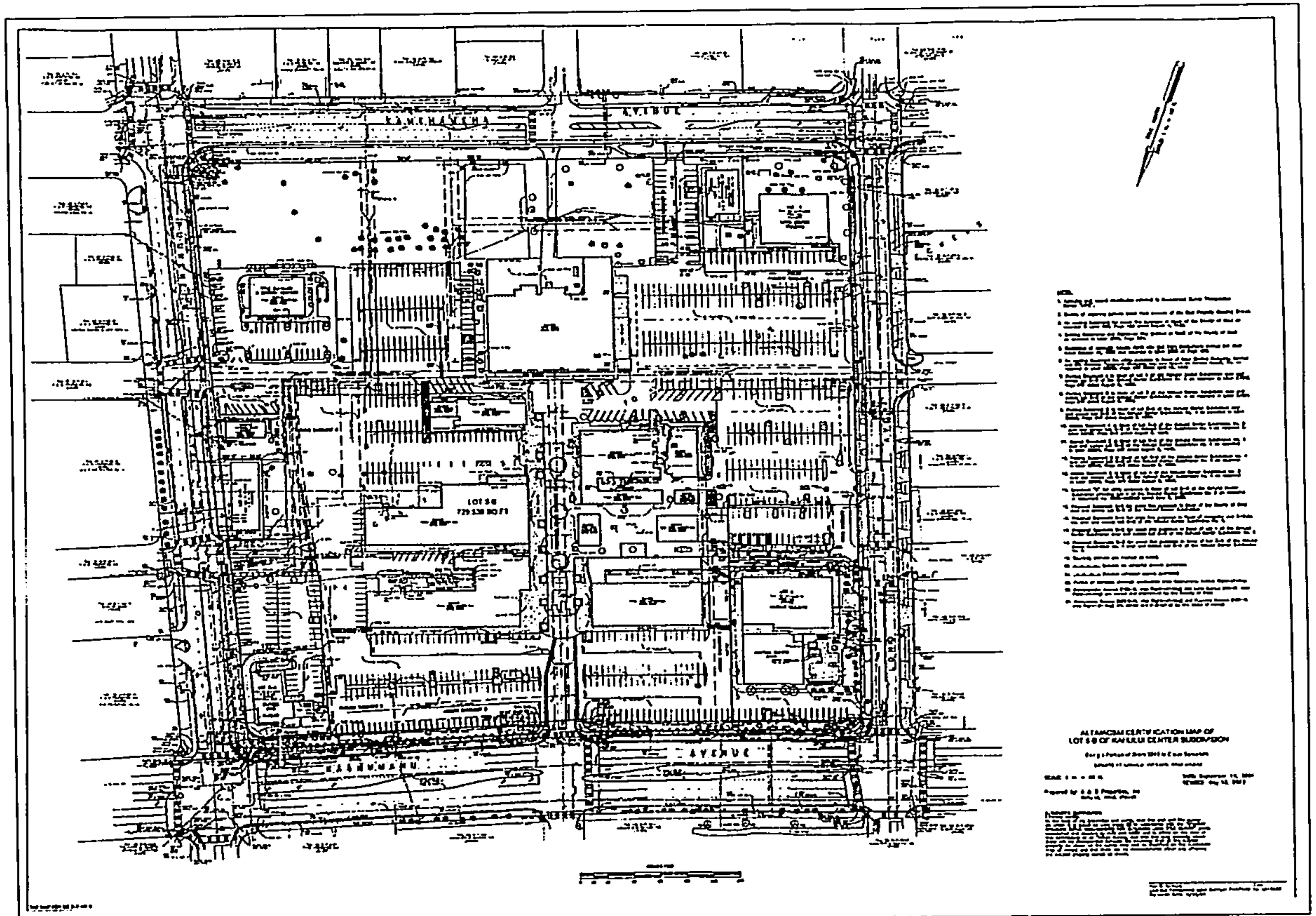


Figure 3: ALTA/ACSM Certification Map of Lot 5-B of Kahului Center Subdivision (2003).

1 Information gathered from the Department of Taxation Commercial and Industrial Appraisal Cards by date 1980-1985;
1. The Maui News articles concerning Kahului Shopping Center from May-September, 1950
2. Photographic and Infrastructural Plan Archives from the A&B Offices on Maui and Oahu
3. Photographs taken of all current buildings on the parcel (SCS).

No measured drawings have been illustrated for inclusion herein and all large-format photographs and maps of the shopping center are available from SCS. Field records are primarily of photogra phs of existing buildings in the project area. Archival research on these buildings augments the photographs themselves and provides an archival record of the current buildings.

Multiple copies of this documentation have been distributed to the State Historic Preservation Division (SHPD; Dr. Melissa Kirkendall), The County of Maui (Stan Solamillo), A&B Properties, Inc. and Chris Hart and Partners, Inc.

The following provides textual descriptions of the buildings as based on the aforementioned archival classifications. Photographs recently taken of the buildings are included in Appendix A. All larger aerial photographs/maps of the project area and infrastructure are available from SCS as most are far too large to adequately fit with this document. A discussion of the aerial photos and maps is however presented below.

INFORMATION GATHERED FROM THE DEPARTMENT OF TAXATION COMMERCIAL AND INDUSTRIAL APPRAISAL CARDS BY DATE 1980-1985

The A&B Supermarket was constructed in 1950. The location is presently the site of the Kahului Building and Bank.

Crafts Drugs and Peggy's & Johnny's were constructed in 1951. These businesses are now known as the Ichiban Restaurant area. The Kahului Shopping Center (Kahului SC) leasing plan (2006 records) depicts these as Building Nos. 1, 2, 3A, 3B, 3C, and 3D.

Ed & Don's Ice Cream was part of the existing *lanai* shops. The shop was believed to be the site of an old meat market constructed in 1954. The Kahului SC leasing plan (2006) shows these to be Building Nos. 11, 12, & 13.

Harold's Inn and the Kahului Barber Shop were constructed in 1955. The Kahului SC leasing plan (2006) shows these to be Building No. 8. Note: The building did appear on a revised 1961 TMK map. The building was not demarcated by name and only the mention of a "building" was present.

Roland's Shoes was constructed in 1955 as a *lanai* shop. The Kahului SC leasing plan (2006) shows this to be Building Nos. 14 & 15.

The Ben Franklin store was constructed in 1955. This building was destroyed by the fire of February 28, 2005.

Toda Drugs was constructed in 1955. This building was also destroyed by fire on February 28, 2005.

Ah Fook's Supermarket was constructed in 1955. The building was destroyed by fire on February 28, 2005.

Jean's Beauty Shop was constructed in 1955 as a *lanai* shop. The Kahului SC leasing plan (2006) shows it to be Building No. 10.

The Bank of Maui occupies the former Post Office building, which was constructed in 1955. The Kahului SC leasing plan (2006) shows it to be Building Nos. 31 and 32.

Noda Market was constructed in 1957. The building was destroyed by the fire of February 28, 2005.

Kahului Dry Cleaners and Porttown Delicatessen were constructed in 1958. The Kahului SC leasing plan (2006) shows these to be Building Nos. 24 and 25.

Repair & Alterations was constructed in 1959 as a *lanai* shop. The Kahului SC leasing plan (2006) shows it to be Building Nos. 20, 21, and 22.

Tire Warehouse, Big "G" Furniture, and NAPA all composed the former Mim's building, the latter which was constructed in 1951.

The records regarding Repair & Alterations to buildings at the Kahului SC are available from 1980-1985. All the buildings composing the shopping center seem to have been remodeled or altered in some way through time. However, many small alterations were not reported in these records and simply appear to be repairs and small changes made by shop lessees or by A&B maintenance staff. These include changing sidings, addition of storage facilities, changing facades, and such.

THE MAUI NEWS ARTICLES CONCERNING KAHULUI SHOPPING CENTER FROM MAY-SEPTEMBER, 1950

Wednesday May 24, 1950, Pages 1 & 3: "HC&S and KRR Will Combine Sales" P. 3, Item 7 of the report recommended construction of a modern supermarket in the new Kahului business district. This "modern" market was the A&B Supermarket.

Saturday May 27, 1950, Page 12: "Keeping Up With The Times" story reported that Mr. Roland Eastabrooks was to head a new organization which would launch a merchandising business 'implementing all of the most modern methods'.

Saturday August 19, 1950, Pages 1 & 3: "ABC Company Takes Place of Old Firm" story reports ground breaking for ABC Supermarket in September, 1950.

Wednesday September 6, 1950, Pages 1 & 3: "Modern Shopping Center Planned". Architect's drawing of the Kahului SC published for the first time.

DESCRIPTION OF PHOTOGRAPHIC ARCHIVES FROM THE A&B OFFICES ON MAUI AND OAHU (APPENDIX B)

Photo #1 Believed to have been taken between Ben Franklin and Toda's. View to North. According to the "KSCHS*", the photo shows Sheriff Ken, a radio and early local TV personality, at a Cinco de Mayo celebration, c. 1955-1960.

Photo #2 Cinco de Mayo celebration gathering c. 1955-1960. View to Northeast.

Photo #3 Cinco de Mayo celebration gathering c. 1955-1960. View to West. Note the "big pants" in the tree, which is a Ben Franklin advertisement for Levi's (D. Dillon remembered these from when his family operated a general store in Arizona in the 1960s).

Photo #4 A&B Supermarket. View from Ka|ahumanu Avenue to South. Note autos in the parking lot c. mid 1950s-early 1960s.

Photo #5 A&B Supermarket. View of entrance to West.

Photo #6 Ben Franklin and Craft Drugs. View from Ka`ahumanu Avenue to the South. Note 1955 Buick

Photo #7 A&B Supermarket. View to South from Ka'ahumanu Avenue, mid 1950s-early 1960s

Photo #8 Pu'unene Avenue. View to North. Building along road in the upper right corner of the photo is believed by the KSCHS to be the Kahului Theater. The photograph was most probably taken c. 1958-1960. An aerial photograph from 1962 shows this theater no surrounding shops or residences.

Photo #9 View of *lanai* shops to the East from Lono Avenue. Photograph early 1960-1969, according to KSCHS.

Photo #10 A&B Supermarket. View from corner of Ka`ahumanu and Lono Avenues, to Northwest. Bottom right corner of photo shows an area that is presently the site of the Maui Seaside Hotel (according to the KSCHS).

Photo #11 A&B Supermarket. View to South from Ka`ahumanu Avenue, late 1950s-mid 1960s (according to the KSCHS).

*The KSCHS or "Kahului Shopping Center Historic Society" is a slow moving parade of old time Kahului/port-town residents who congregate at the snack shop. Although their stories of the shopping center "back in the day" are sometimes contradictory, nonetheless they were indispensable for identifying the subject matter of some of these photographs, particularly regarding the functions/commercial enterprise of each building and the angle from which the photographs were taken. D. Dillon wishes to express many thanks to the KSCHS.

ARCHIVAL MAPS/AERIAL PHOTOGRAPHS FROM THE A&B OFFICES ON MAUI AND OAHU

Multiple sets of maps and aerial photos of the project area and environs were obtained from several sources, primarily those on file at the A&B offices on Maui and Oahu. The maps and plans in SCS possession include:

1. **ALTA/ACSM Certification Map of Lot 5-B of Kahului Center Subdivision (see Figure 3 above)**. The plan view map was originally illustrated on September 14, 2001 but was revised on May 12, 2003. The map shows a scaled architectural plan view drawing of all infrastructure in the project area, including buildings, parking spaces, and machinery to support functioning of the center. (Large Map)
2. **Two Aerial Photographs**: General Kahului and Shopping Center and immediate environs. The aerial photographs appear to have been taken recently and measures c. 36" long by 26" wide. (Large Photos).
3. ***Photo Contour Map 9/6/57***: *The photo map depicts Kahului Theatre as well as* shops and residences along the southern flank of the project area. Mim's and the Post Office did not exist at the time of this photo.
4. **Photo Contour Map 7/13/62** Mim's and the Post Office are present on this photograph. Kahului Theatre remains but the shops and residences along the southern flank of the parcel were removed for a parking lot. Warehouses, shops, and residents remain along what is now Kamehameha Avenue. These represent the last vestiges of the old Porttown. (Large Map)
5. **Photo Contour Map 9/16/65** Area "A" in the photograph consists of the Post Office and was to be expanded into Area "B" which was occupied by Horses R Us. The footprint of the map overlays the Kahului Building where A&B, West Maui Land Co., and other commercial companies are now located. Also shown on this map are: a) building footprint for the Lono Center; b) building footprint for American Security Bank (currently County of Maui housing); c) the building footprint for Lord's Team Missionaries and Honolulu Federal Bank (currently Hawaii National Bank); d) the building footprint for Title Guaranty Corp. Note that Kahului Theatre, warehouses, shops, and residences along present-day Kamehameha Avenue were razed. (Large Map)
6. **Kahului Town Center Plans**: This set of plan view maps shows infrastructure of several commercial enterprises on the property from various dates. These include: a) Ah Fook's Market, Toda Drug, Ben Franklin, and the Sears Building (1955); b) An Additional to the Tasaka Store (1957); c) K.D.—Shopping Center—Lanai Shops (1953); d) Store Buildings—Radio Shop, Porttown, and Laundary (1958); e) Variety and Drug Stores—A&B Supermarket, Craft's Drug, Peggy's, and Johnny's & Sue's Stationary (1950); f) Noda Market, Kaneshige's, and Kutsunai (1957). (Large Maps)

SUMMARY OF ARCHIVAL MAPS AND PHOTOS

The above noted list of plan view maps, drawings, and aerial photographs provide an archival past for the buildings that formerly and currently reside in the Kahului Town Center. This archival information pieces together the built environment of the Kahului Town Center through time. The maps and aerial photographs, both past and present, provide a visual evolution of the area as well as more intimate sketch illustrations of building plans and infrastructural settings in the area. These large maps, aerials, and plans may be seen by contacting SCS.

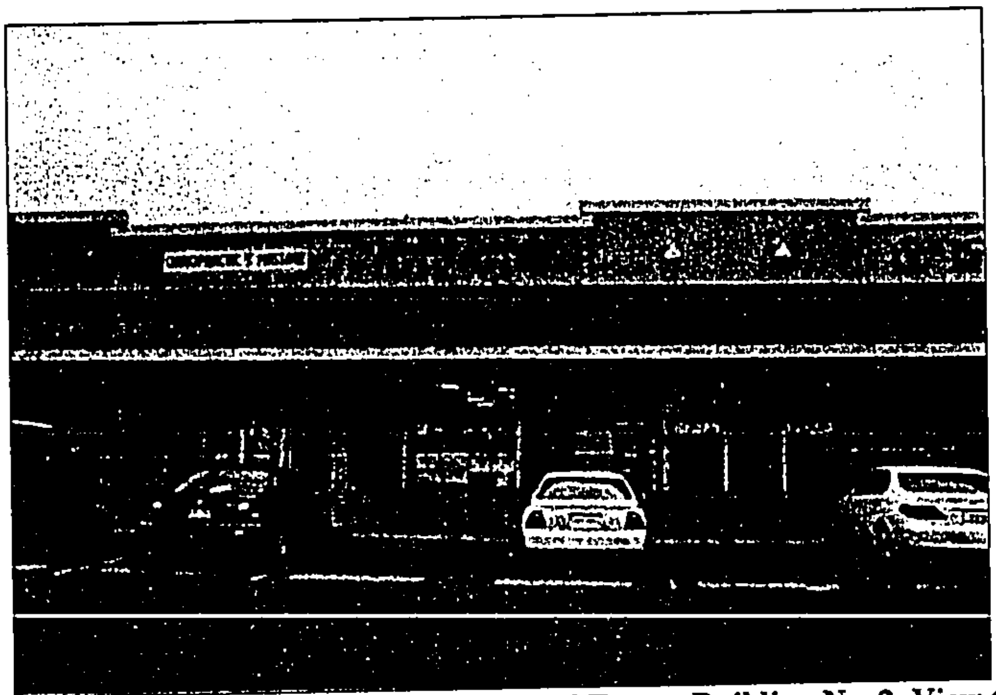
CLOSING

This folio contains a brief summary of archival information pertaining to the built landscape of the Kahului Town Center. While providing snapshots in the building history of the area, many repairs and other minor additions are not included in this archival search as many were not filed with the County of Maui. In all, it appears as though every building that currently exists at the Kahului Town Center, the project area, has been altered through time. The combined record of maps, plans, and photographs for the area, some of which are alluded to herein, will inevitably provide an endurable recordation of Kahului Town Center structures, regardless of future construction in the area. When combined with the Inventory Survey report of the parcel (Johnson and Dega 2006), a broader history of the area is availed.

Questions or comments on this archival briefing report may be submitted to Michael Dega, Ph.D. of Scientific Consultant Services, Inc. at 711 Kapiolani Blvd., Ste. 975, Honolulu, HI 96813 (808-597-1182; mike@scshawaii.com).

APPENDIX A REPRESENTATIVE PHOTOGRAPHS OF CURRENT BUILDINGS ON PARCEL (APRIL 2006)

Appendix A Figure 1: Ichiban Restaurant, Building No. 1. View to Southeast.

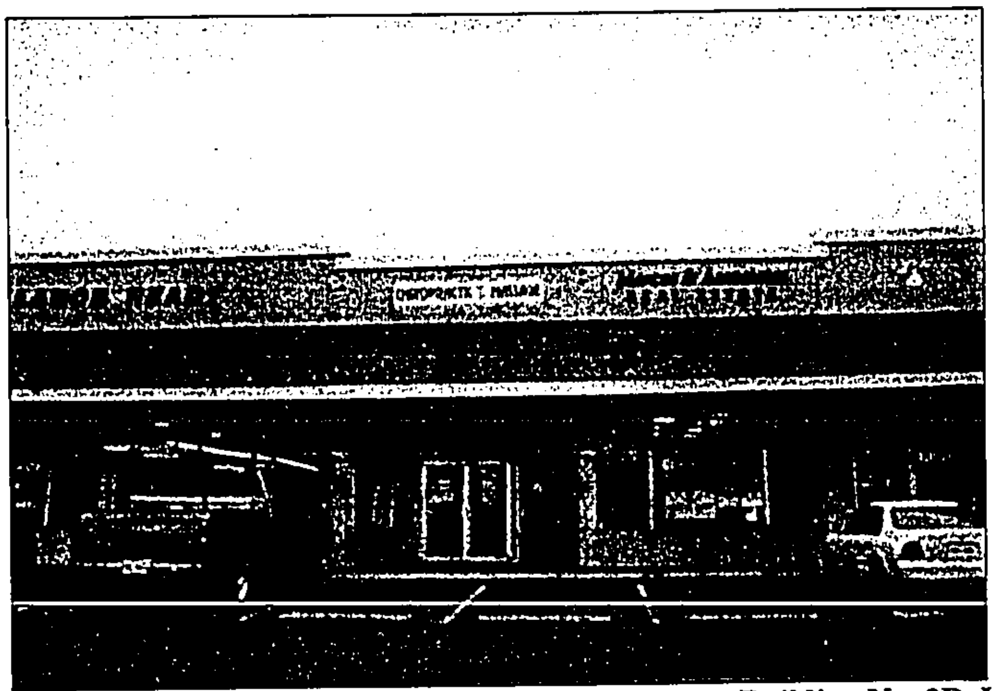


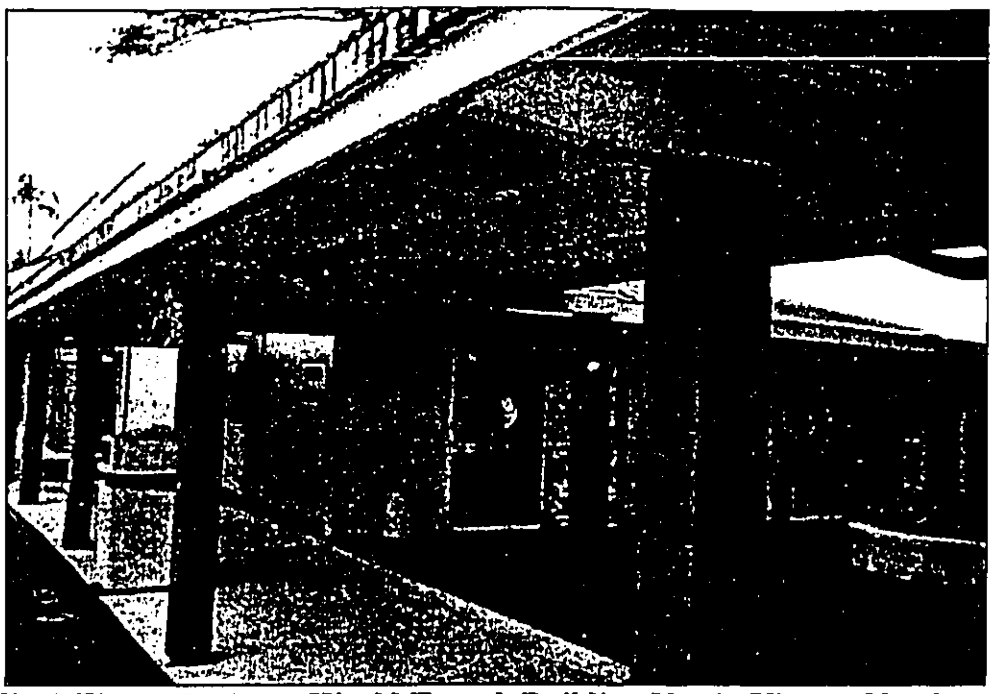
Appendix A Figure 2: Marcus and Associates Real Estate, Building No. 2. View to Southeast.

Appendix A Figure 3: Maui Home Furnishings, Imports, Building No. 3A. View to Southeast.

Appendix A Figure 4: Cost Less Realty, Building No. 3B. View to Southeast.

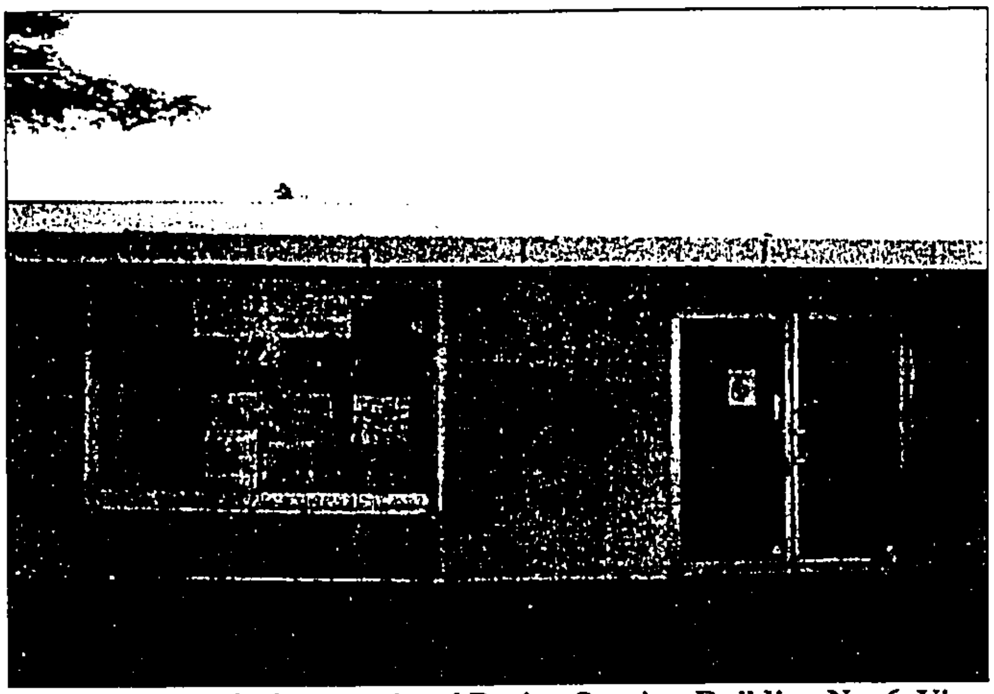
Appendix A Figure 5: Labor Ready, Building No. 3C. View to Southeast.


Appendix A Figure 6: P.A.C.E./Chiropractic Massage, Building No. 3D. View to Southeast.

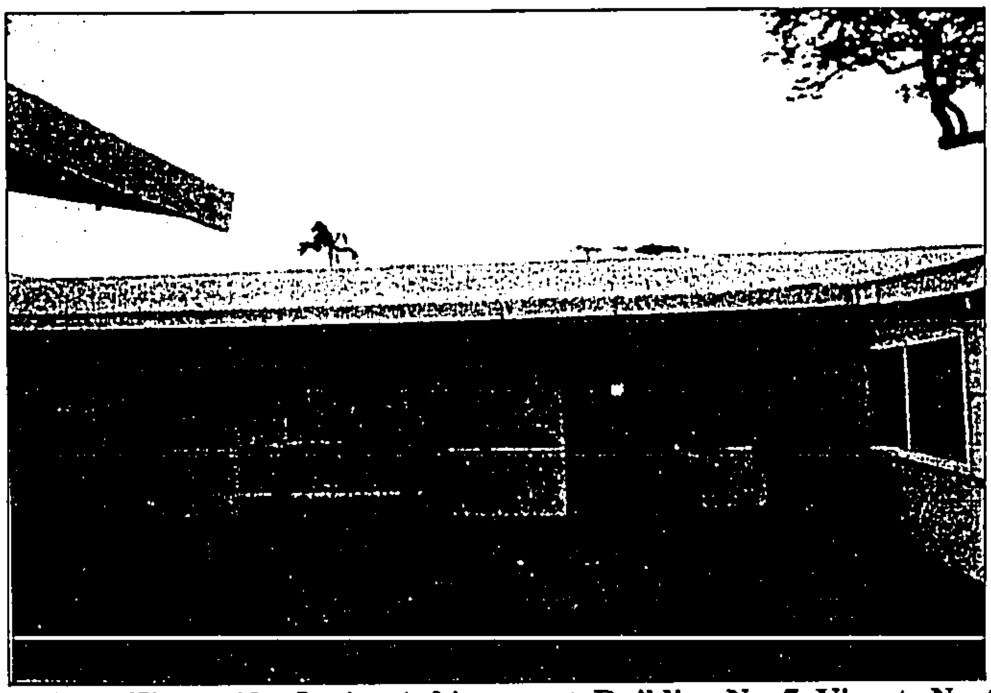


Appendix A Figure 7: Astro World Travel, Building No. 4. View to North.

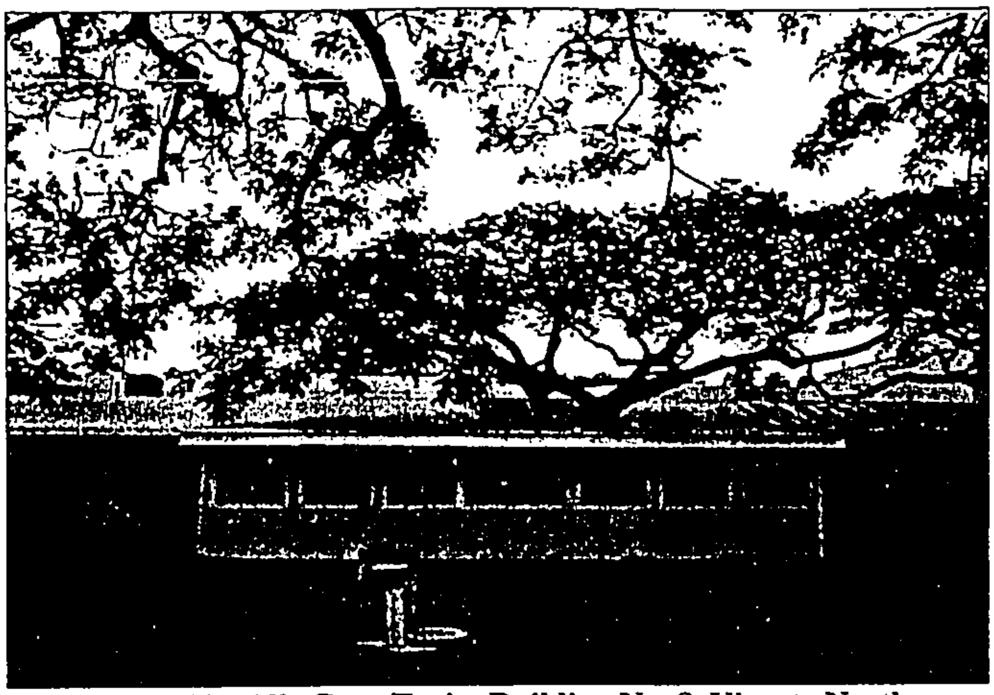
Appendix A Figure 8: Income Tax Prep., Building No. 5. View to North.



Appendix A Figure 9: International Design Service, Building No. 6. View to North.

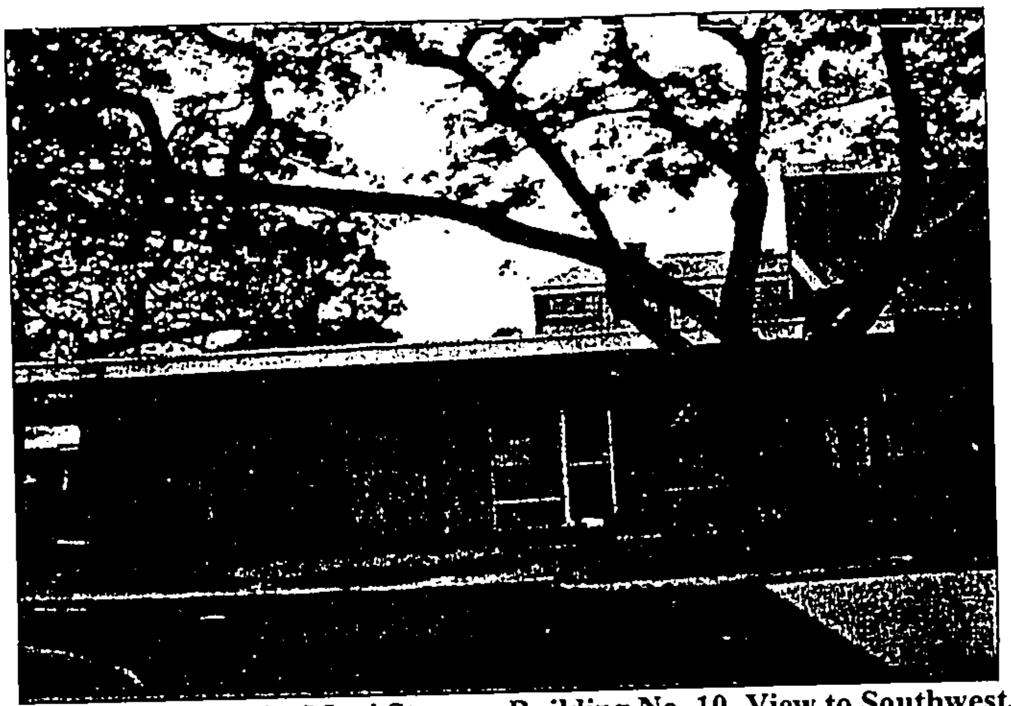


Appendix A Figure 10: Junior Achievement, Building No. 7. View to North.

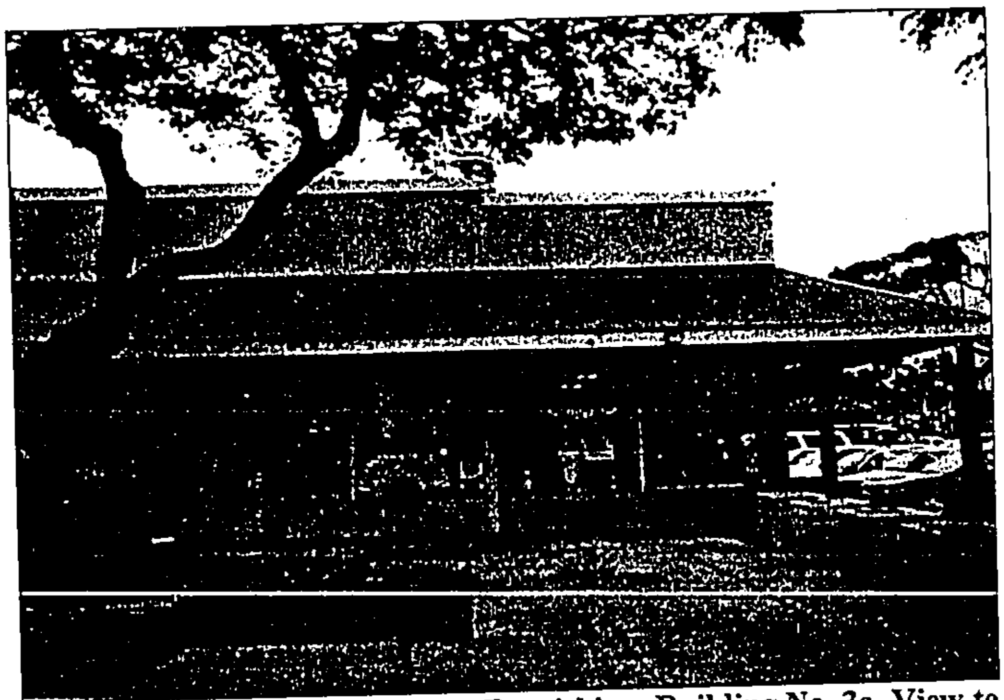


Appendix A Figure 11: Al's Cane Train, Building No. 8. View to North..

Appendix A Figure 12: Police, Building No. 9. View to North.

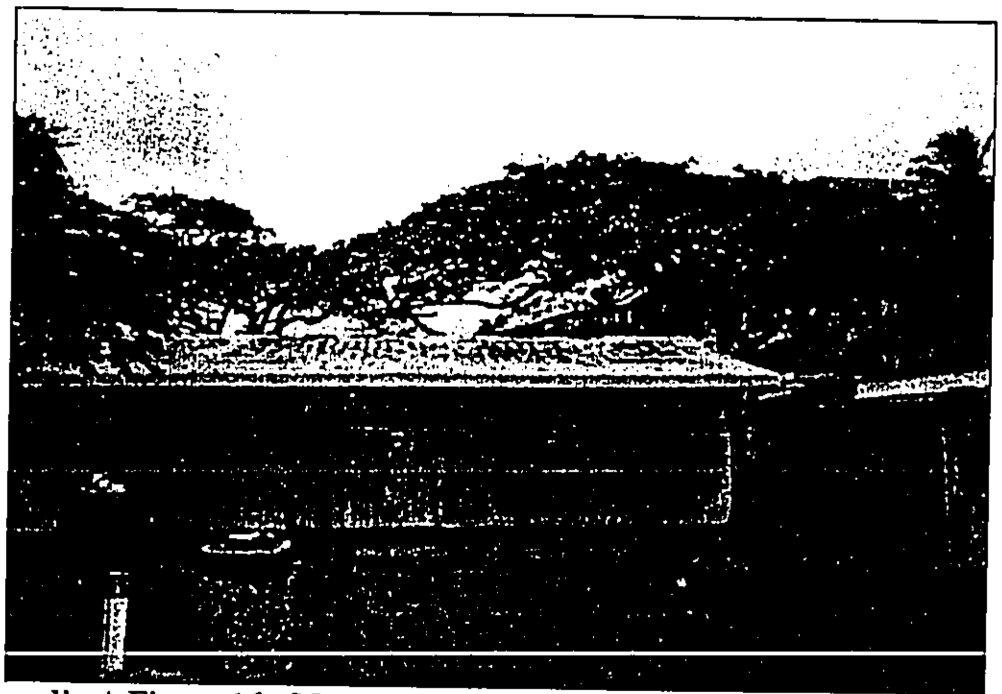


Appendix A Figure 13: Maui Stamps, Building No. 10. View to Southwest.



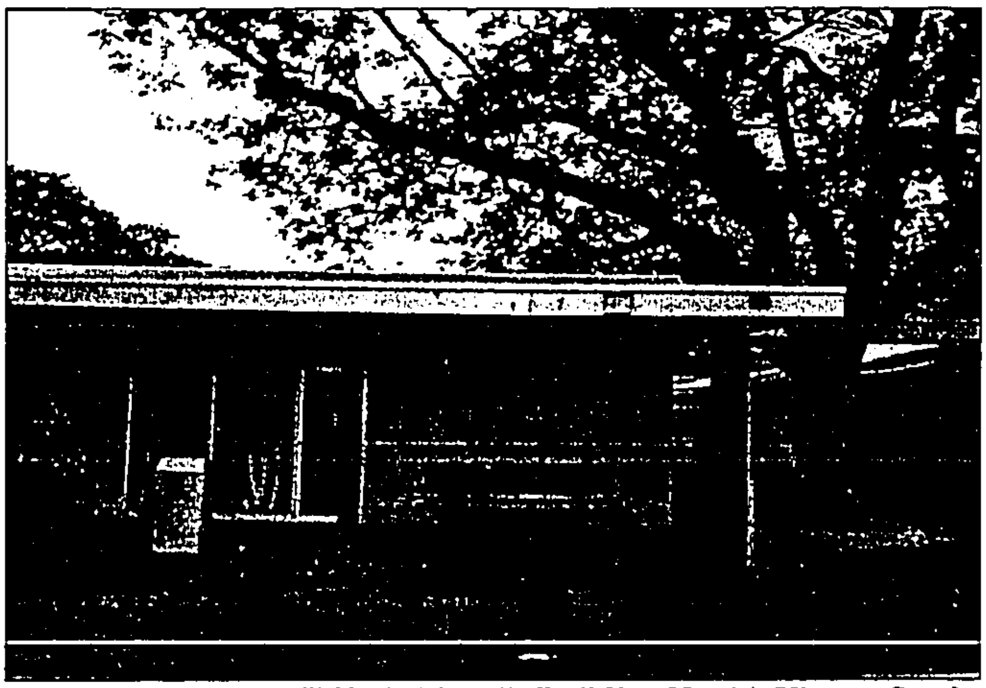
Appendix A Figure 14: Maui Home Furnishing, Building No. 3a. View to Southwest.

Appendix A Figure 15: Omni Music and Video, Building No. 11. View to Northeast.

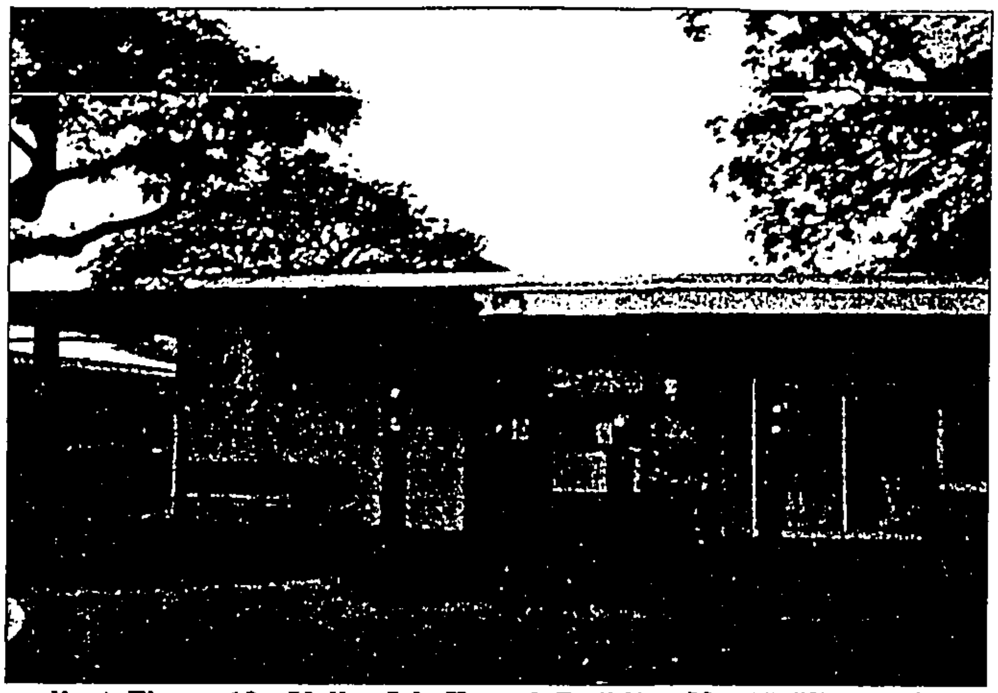


Appendix A Figure 16: Manana Garage/Centurion Security, Building No. 12. View to West.

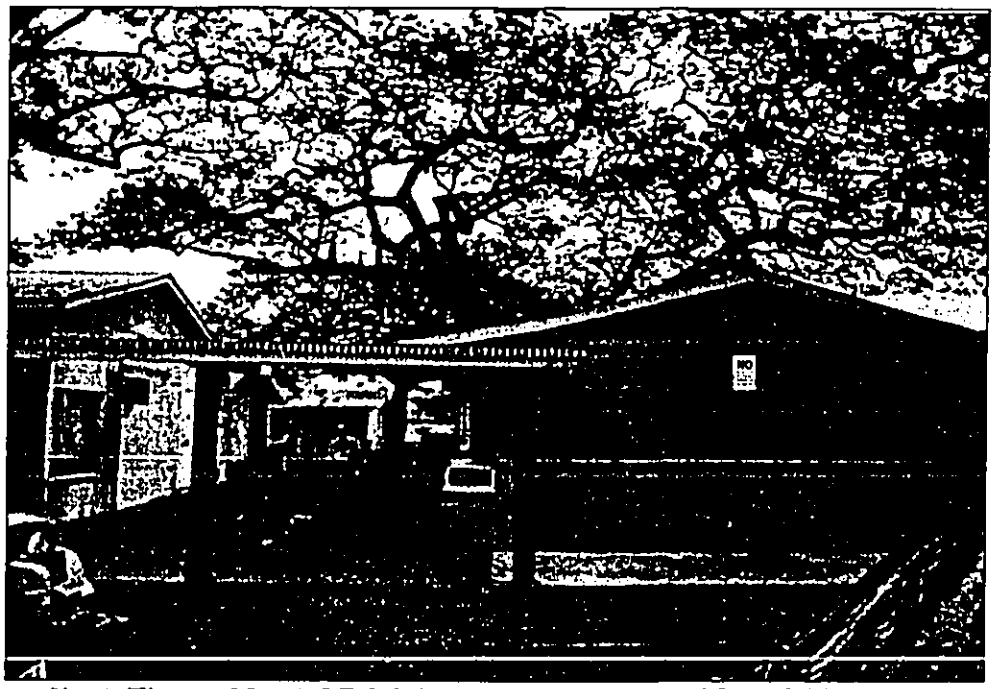
Appendix A Figure 17: Golden Palette, Building No. 13. View to West.



Appendix A Figure 18: Hi-Tech (closed), Building No. 14. View to Southwest.

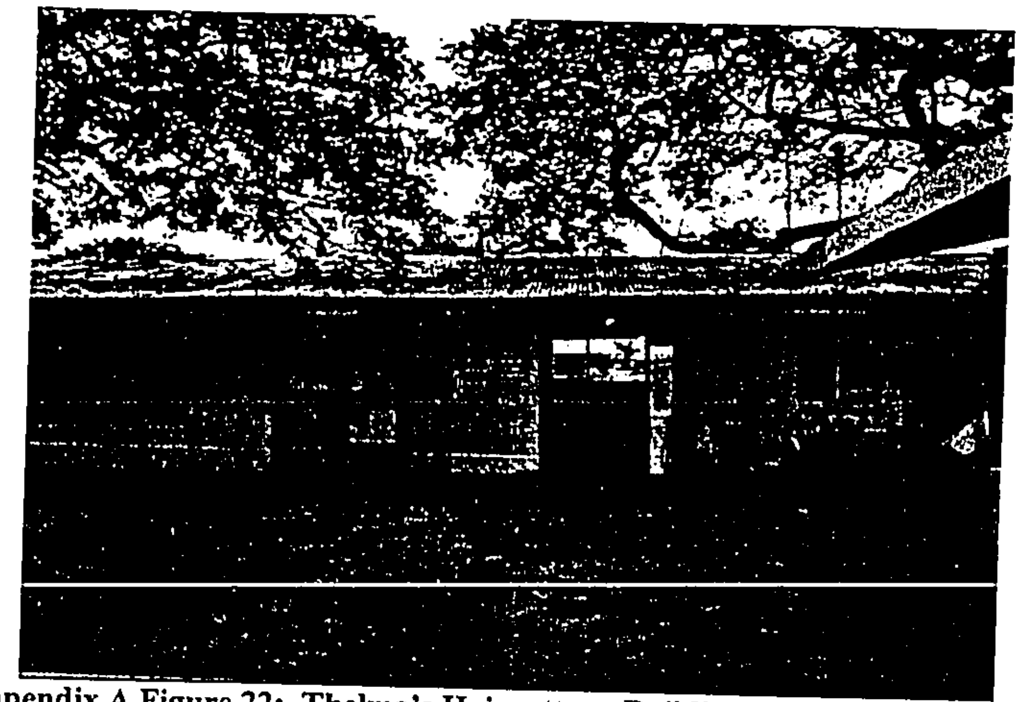


Appendix A Figure 19: Valley Isle Travel, Building No. 15. View to Southwest.

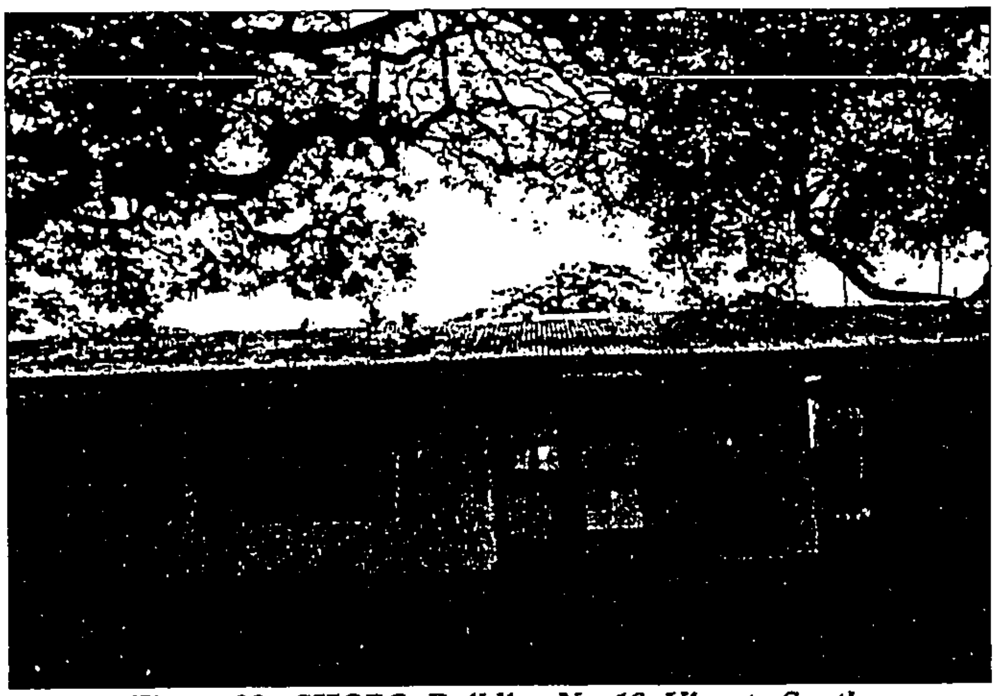


Appendix A Figure 20: A&B Maintenance, Building No. 16. View to Northeast.

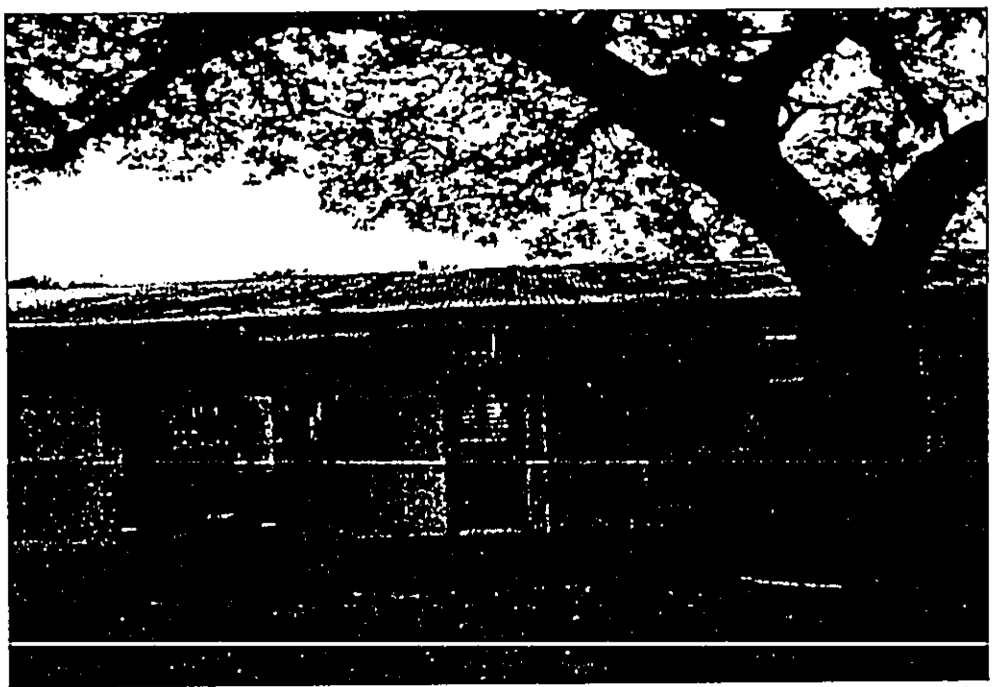
Appendix A Figure 21: Ohana Snack Shop, Building No. 17. View to South.



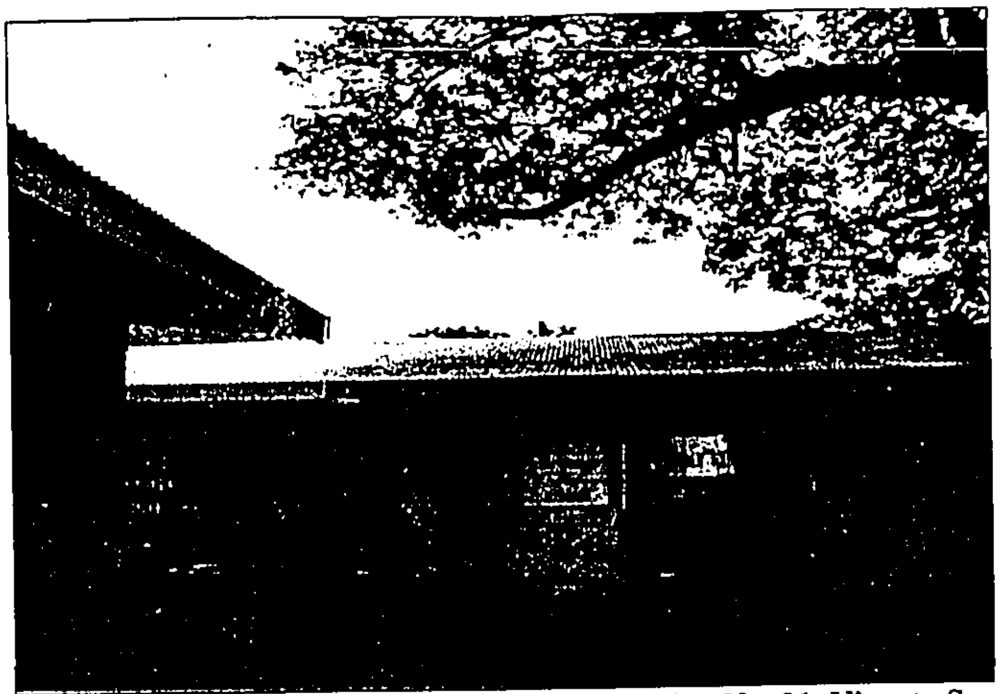
Appendix A Figure 22: Thelma's Haircutters, Building No. 18. View to South.



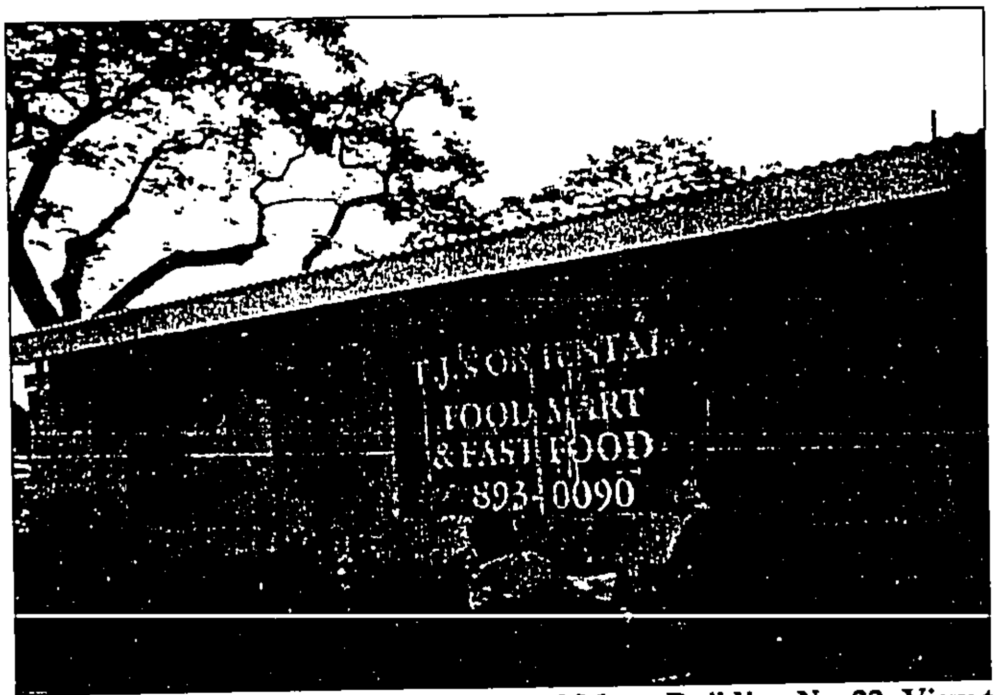
Appendix A Figure 23: SHOPO, Building No. 19. View to South.



Appendix A Figure 24: Alterations by Vicky, Building No. 20. View to South.



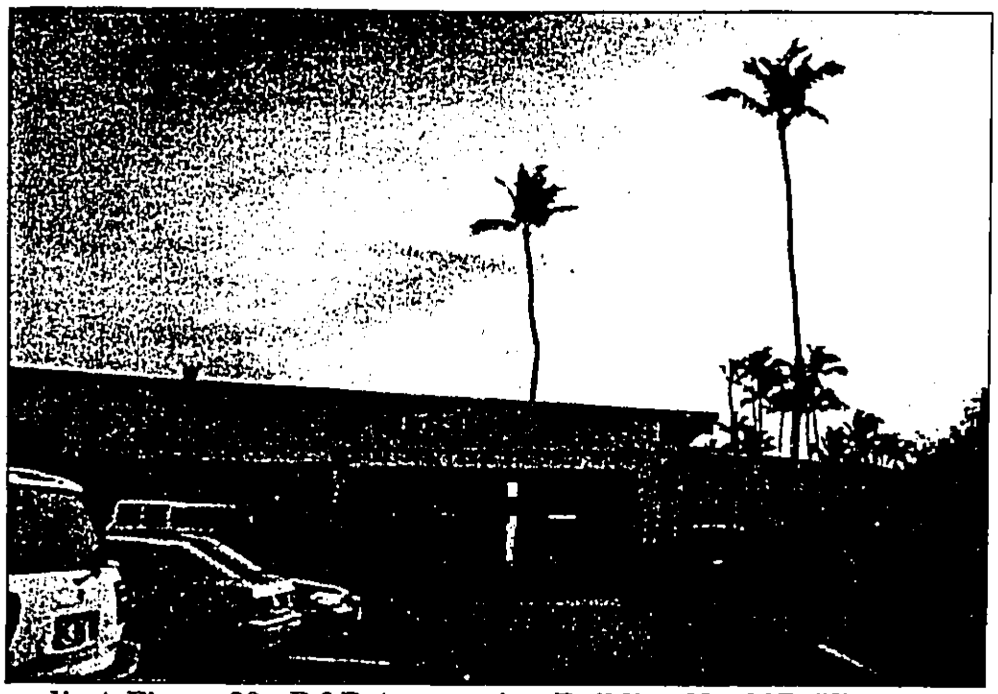
Appendix A Figure 25: Family Hair Design, Building No. 21. View to South.



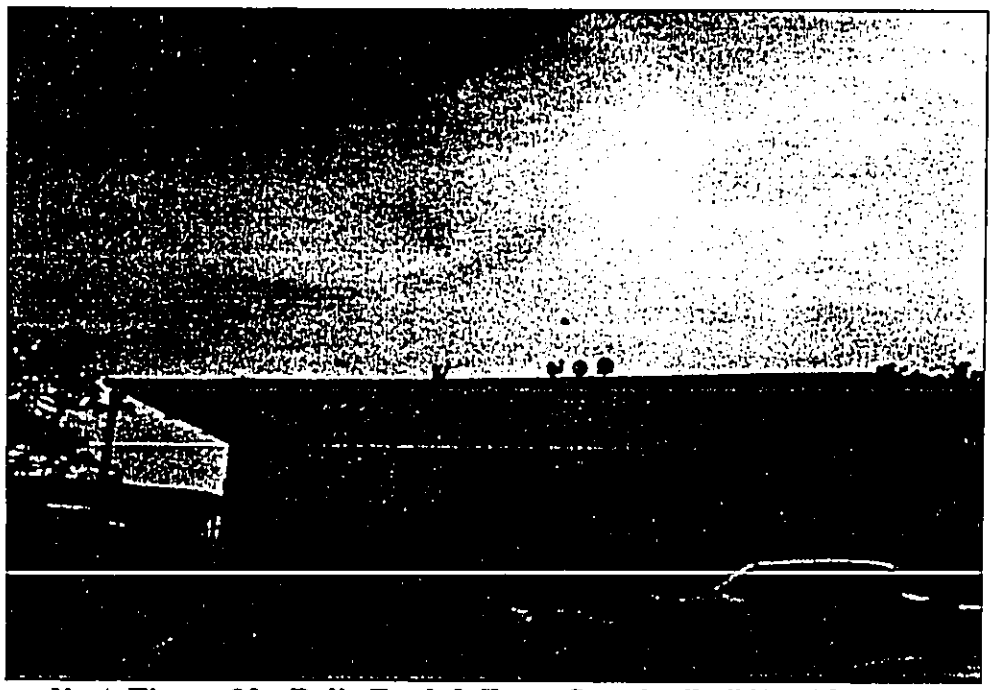
Appendix A Figure 26: TJ's Oriental Food Mart, Building No. 22. View to South.

Appendix A Figure 27: TJ's Oriental Food Mart, Building No. 22. View to West.

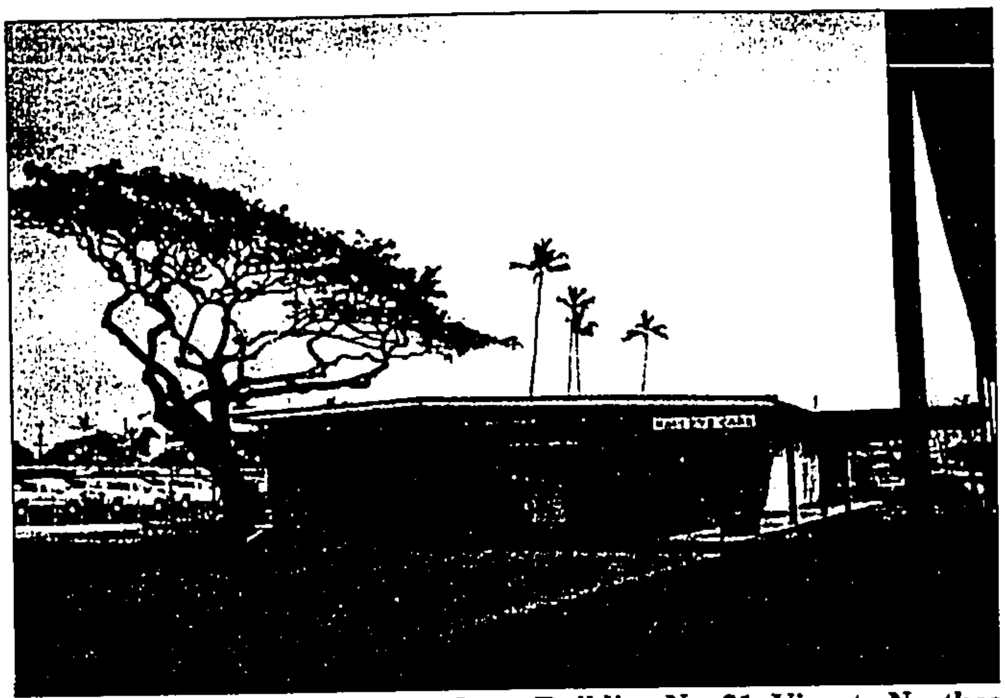
Appendix A Figure 28: Asian Cuisine/Sport's Bar, Building No. 23-24. View to Northeast.



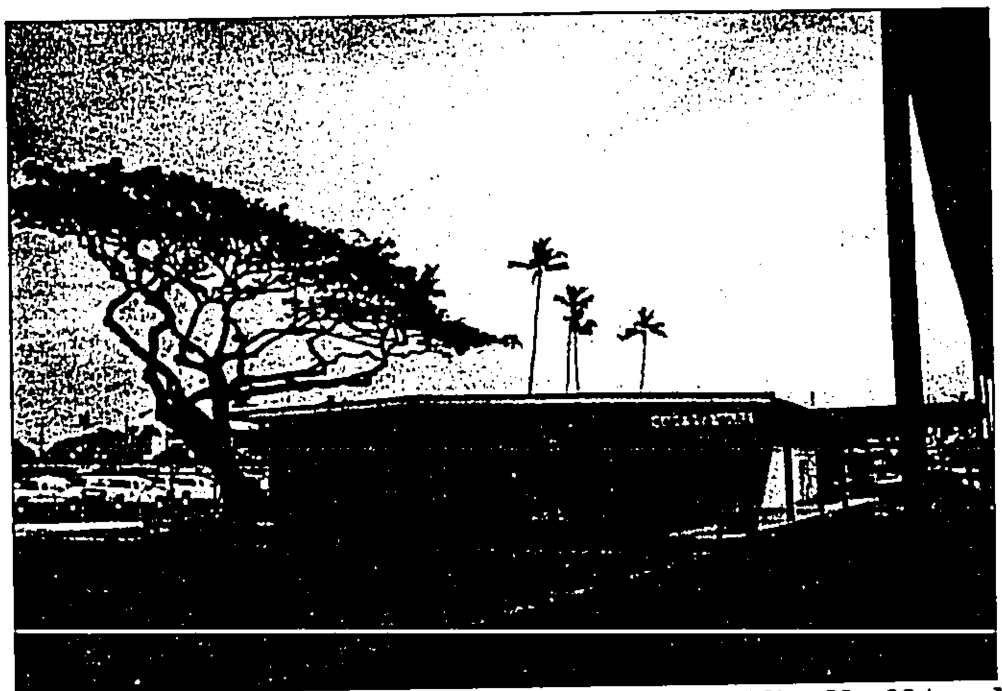
Appendix A Figure 29: R&R Automotive, Building No. 33B. View to Northeast.



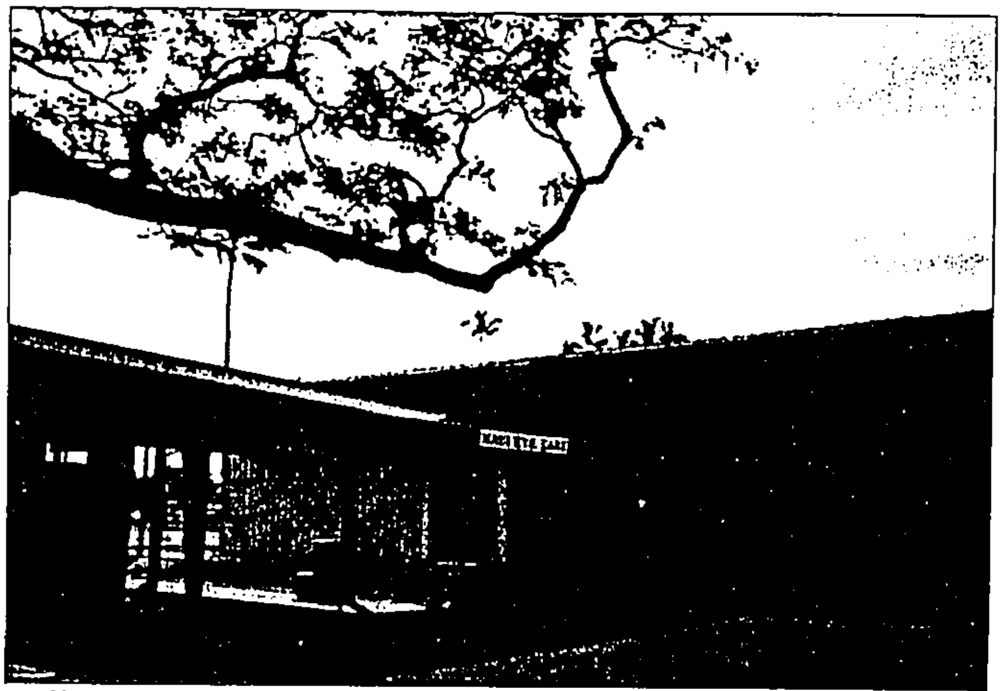
Appendix A Figure 30: Del's Feed & Farm Supply, Building No. 33A and 34. View to Northeast.



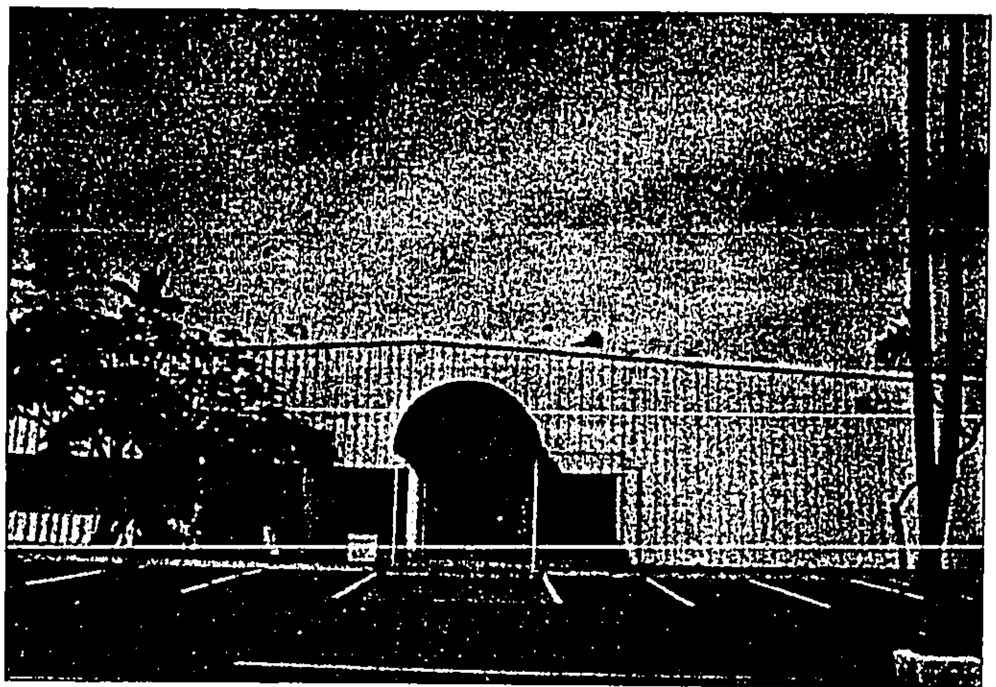
Appendix A Figure 31: Maui Eye Care, Building No. 31. View to Northeast.



Appendix A Figure 32: Del's Feed & Farm Supply, Building No. 33A and 34. View to South.

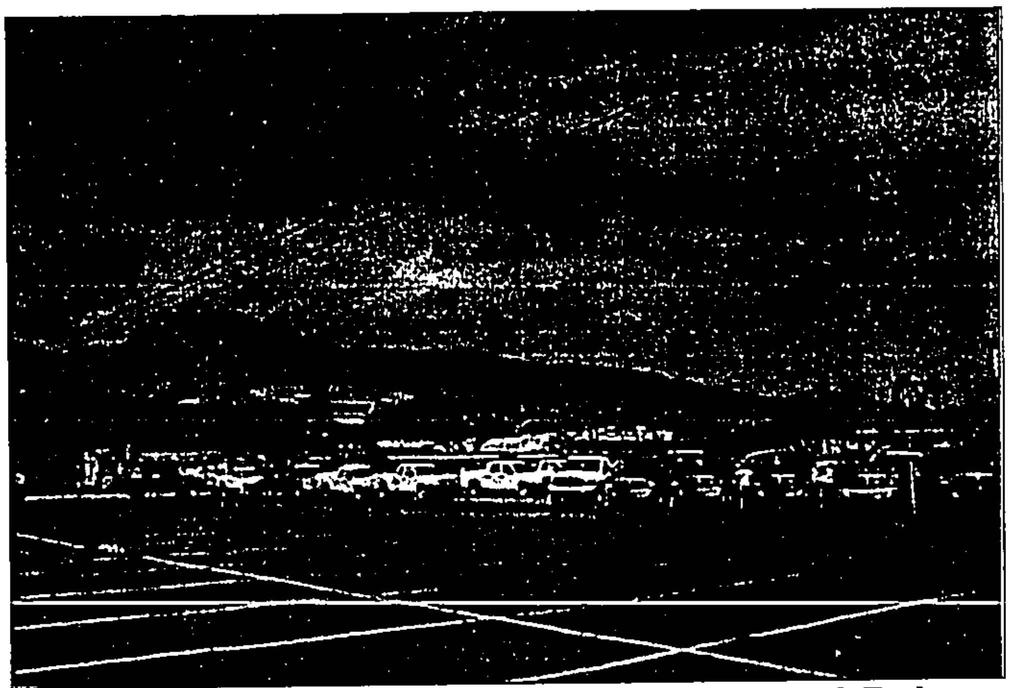


Appendix A Figure 33: Island Dodge/Maui Eye Care, Building No. 31&35. View to Southeast.



Appendix A Figure 34: Island Dodge, Building No. 35. View to Southwest.

Appendix A Figure 35: Employees Options/Horses "R" Us, Building No. 32. View to Northwest.

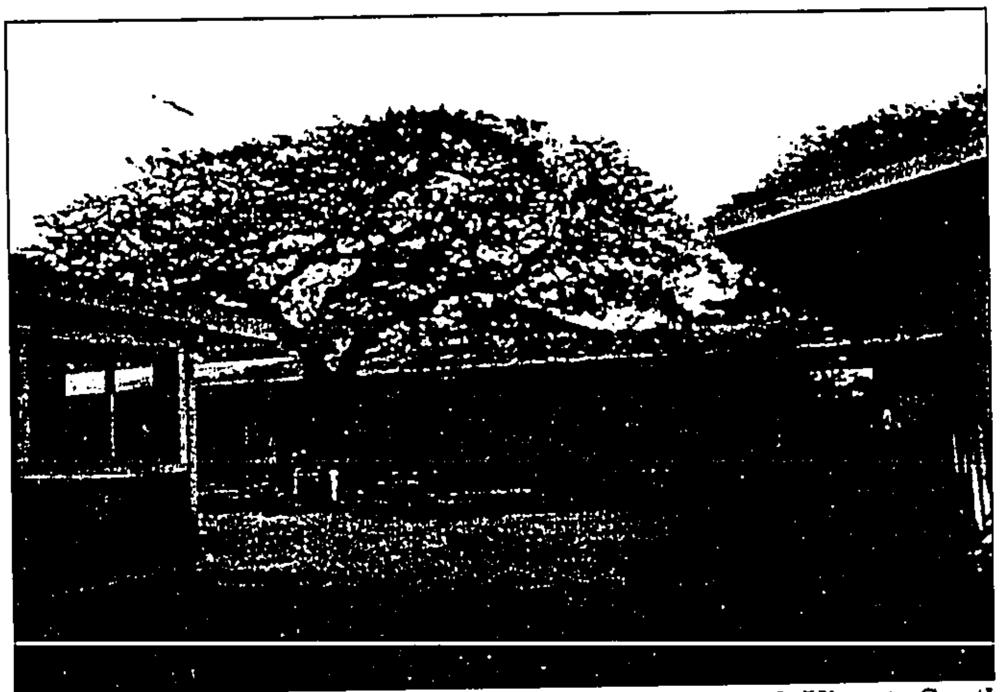


Appendix A Figure 36: Project Area Overview (toward old Ah Fooks area). View to Northwest.

Appendix A Figure 37: Project Area Overview (looking down Mall). View to Northwest.

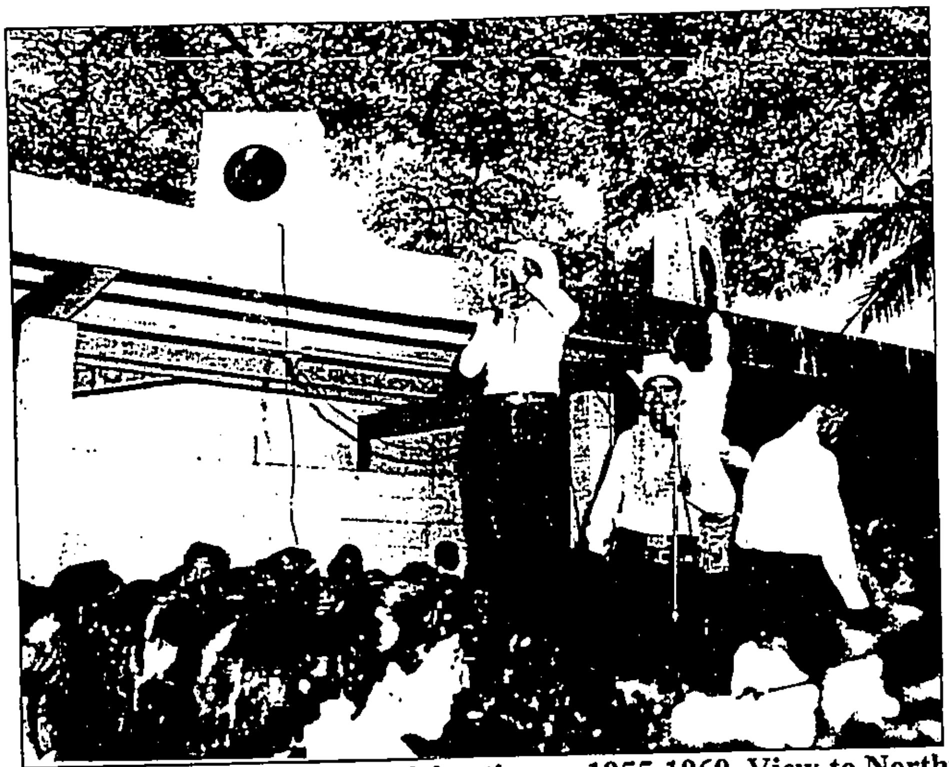
Appendix A Figure 38: Project Area Overview (backside of TJ's, Mall side). View to West.

Appendix A Figure 39: Project Area Overview (Asian Cuisine). View to Northwest.



Appendix A Figure 40: Overview of *lanai* shops courtyard. View to South.

APPENDIX B ARCHIVAL PHOTOGRAPHS OF EVENTS AND BUILDINGS IN PROJECT AREA

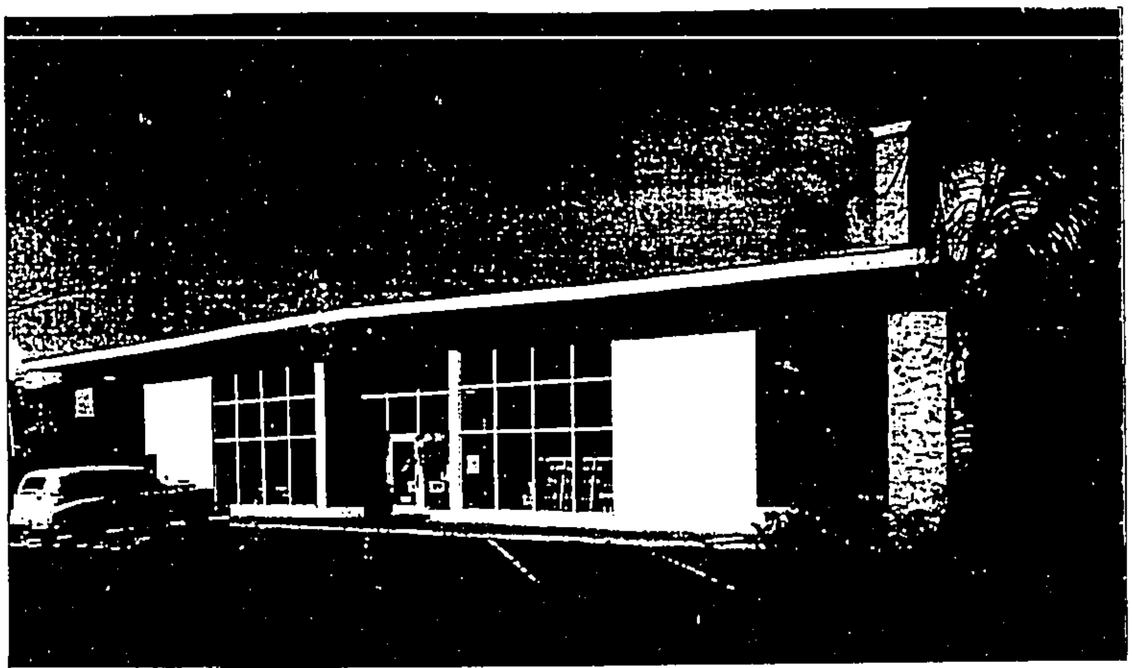


Appendix B Figure 1: Cinco de Mayo celebration, c. 1955-1960. View to Northwest.

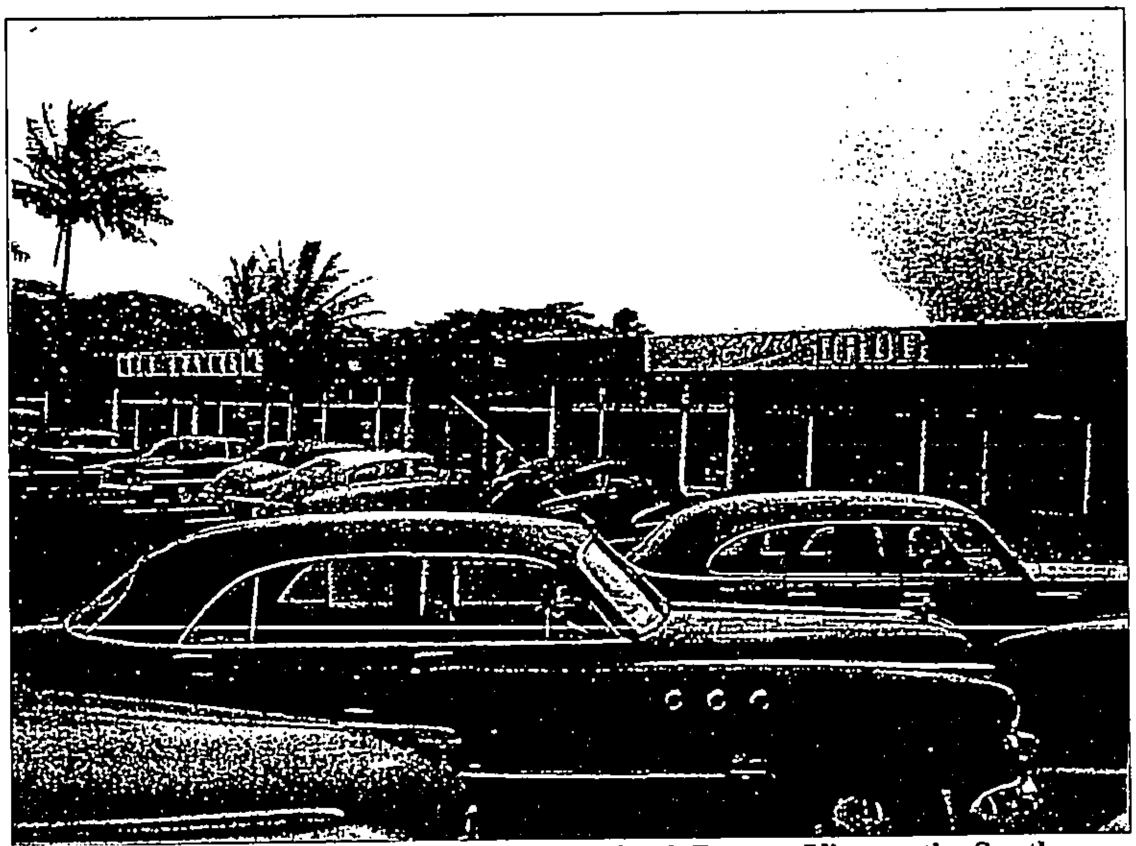
Appendix B Figure 2: Cinco de Mayo celebration c. 1955-1960. View to Northeast.

Appendix B Figure 3: Cinco de Mayo celebration c. 1955-1960. View to West.

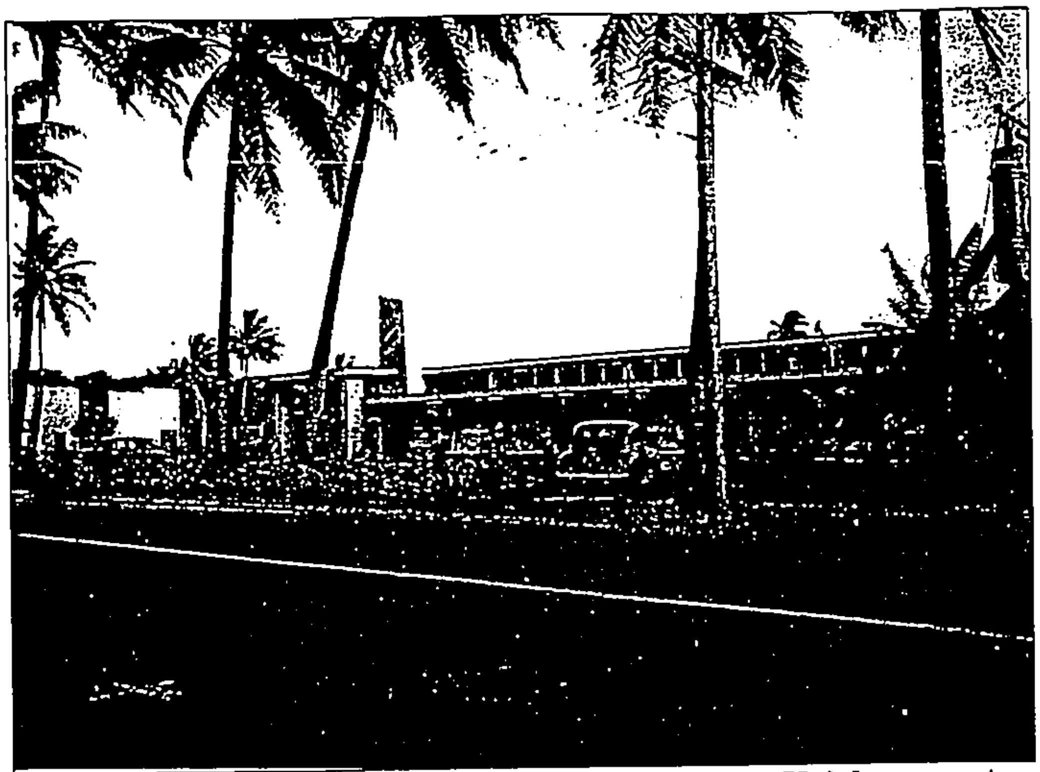
Appendix B Figure 4: A&B Supermarket. View to South.



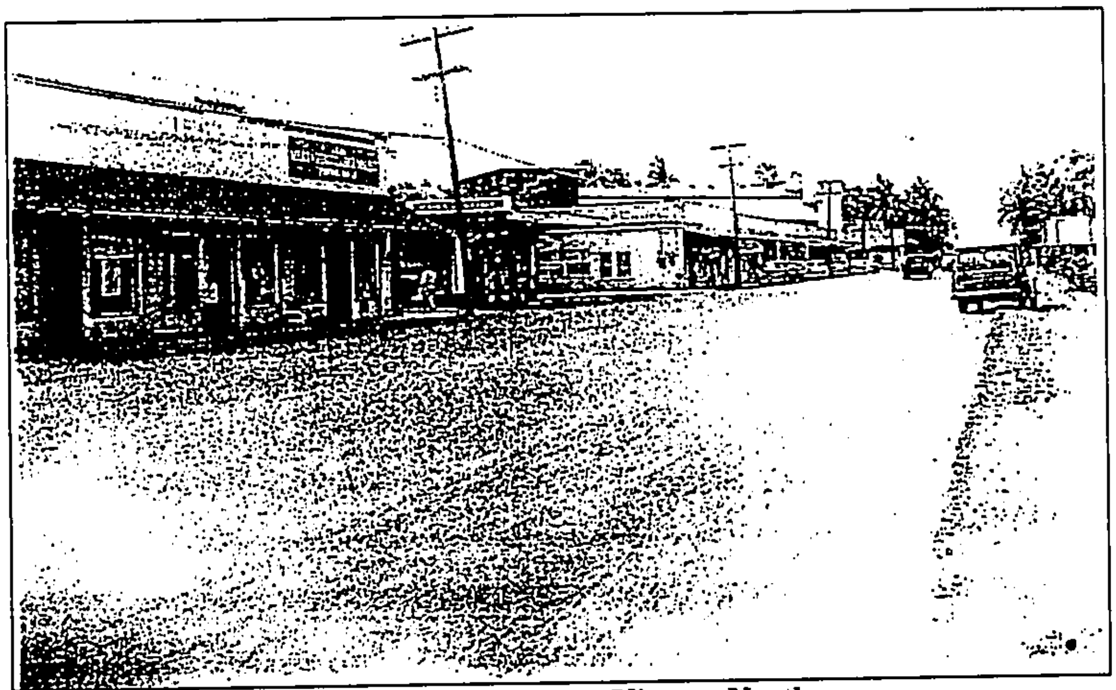
Appendix B Figure 5: A&B Supermarket. View to West.



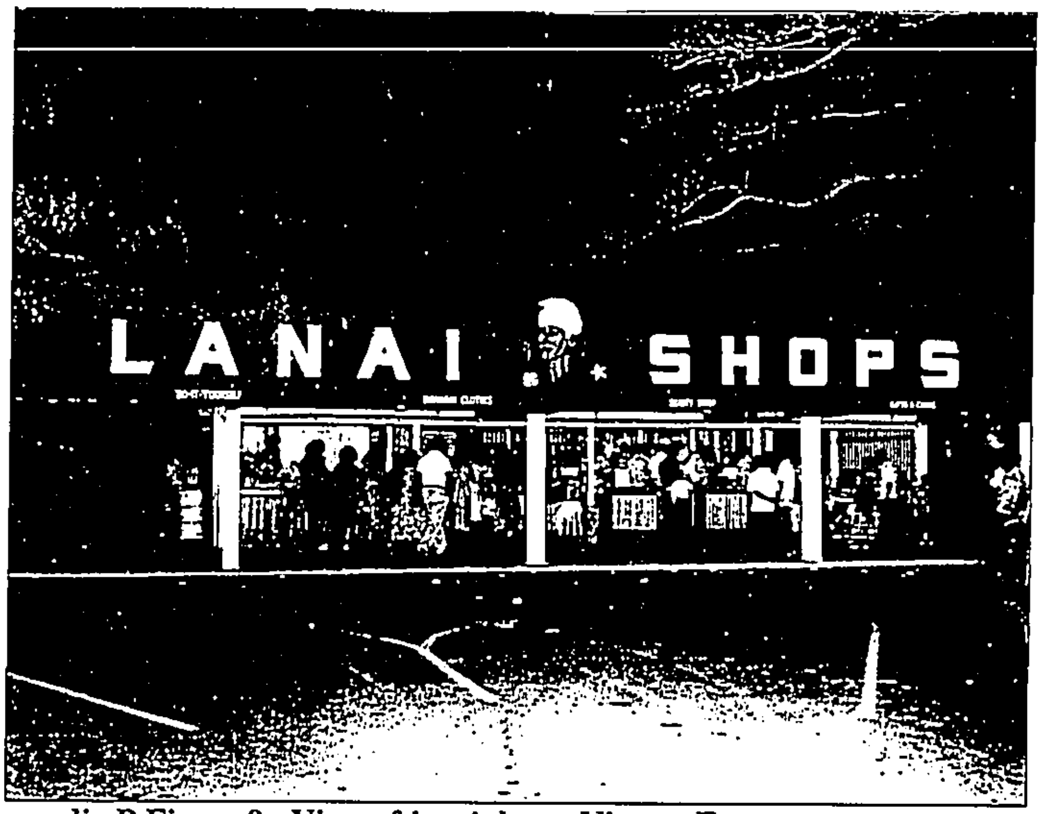
Appendix B Figure 6: Ben Franklin and Craft Drugs. View to the South.



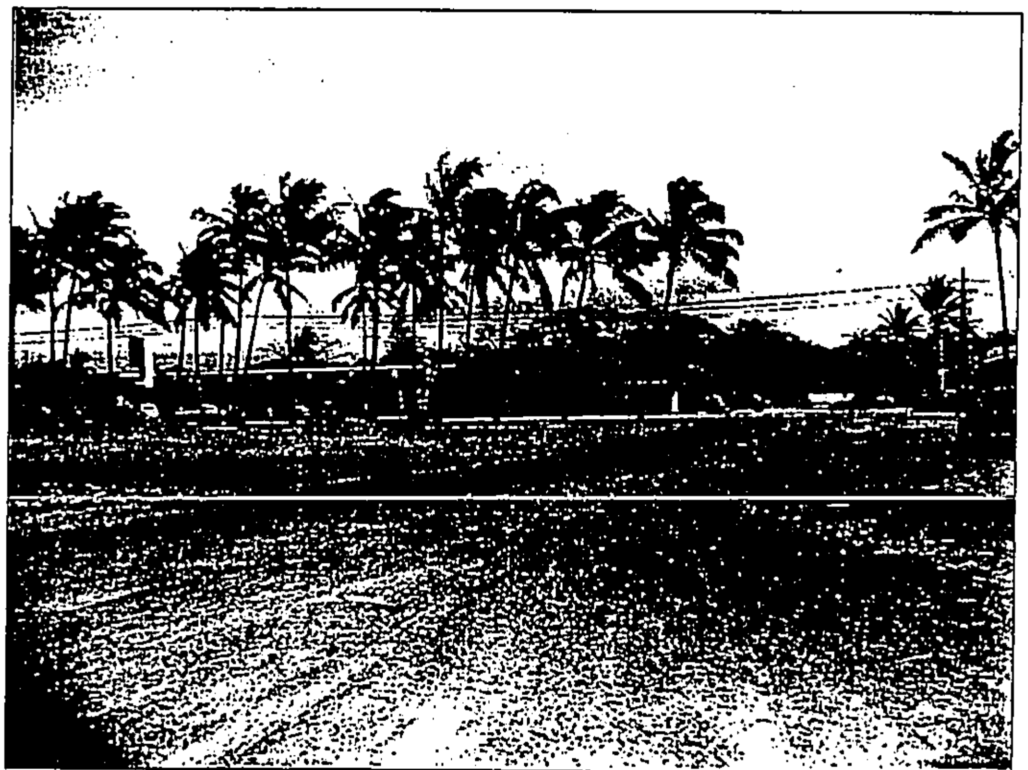
Appendix B Figure 7: A&B Supermarket. View to South from Ka'ahumanu Avenue, mid 1950s-early 1960s.

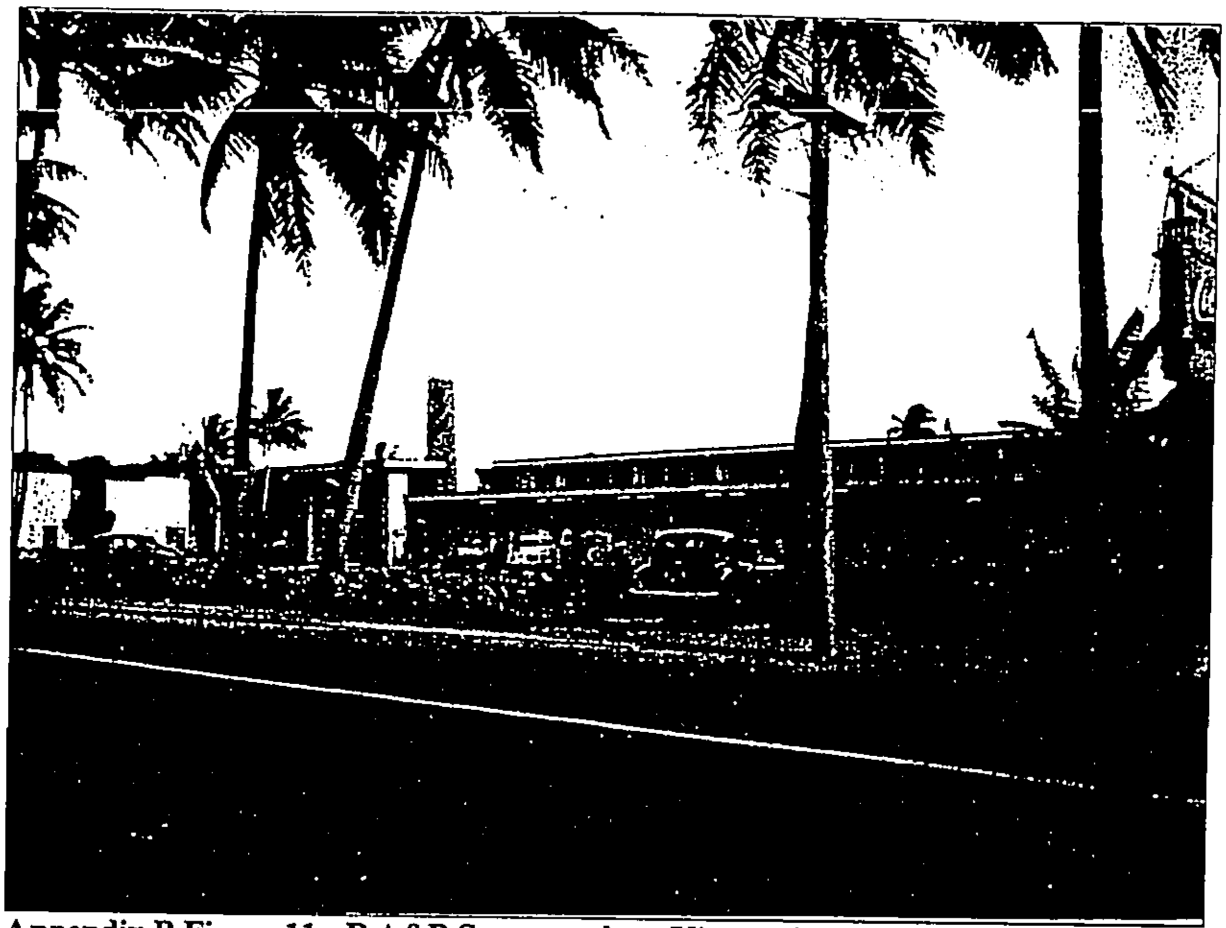


Appendix B Figure 8: Pu'unene Avenue. View to North.



Appendix B Figure 9: View of *lanai* shops. View to East.

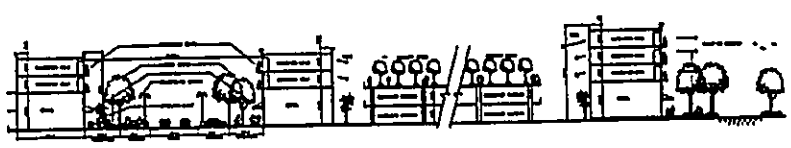

Appendix B Figure 10: A A&B Supermarket. View to Northwest.



Appendix B Figure 11: B A&B Supermarket. View to South.

Appendix G

Preliminary Engineering Report



PRELIMINARY ENGINEERING REPORT

FOR

KAHULUI TOWN CENTER PROJECT
KAHULUI, MAUI, HAWAII
TMK: (2) 3-7-07:09

Prepared for

A & B Properties, Inc.
822 Bishop Street
Honolulu, Hawaii 96813

Prepared by

Sato & Associates, Inc.
2046 South King Street
Honolulu, Hawaii 96826

May 2006

TABLE OF CONTENTS

I. INTRODUCTION

The purpose of this report is to anticipate the civil requirements for the proposed Kahului Town Center project. In doing so, this report will evaluate existing infrastructure conditions affecting the project site and anticipate what infrastructure improvements will be needed to support development of the site.

It is not the intent of this report to establish all of the improvements that will be required for the project, nor is this report intended to be comprehensive and complete. Only anticipated improvements based on limited discussions with County and State agencies are included.

II. PROPOSED PROJECT

A. Location

The project location is in Kahului, on the island of Maui. The proposed project comprises the entire block bounded by Kaahumanu Avenue, Puunene Avenue, Kamehameha Avenue, and Lono Avenue. This parcel is identified as Tax Map Key (TMK): (2) 3-7-07: 009. See Appendix A - Location Map.

B. Project Description

The project shall utilize a 19.9 acre parcel for the construction of the Kahului Town Center. The project consists of the demolition of existing buildings of the Kahului Shopping Center and the construction of new buildings for the Kahului Town Center. The new buildings within this parcel will accommodate retail/commercial and office space. Proposed improvements include paved driveways, parking, concrete curbs and sidewalks, landscaping, and underground utilities.

The project is broken down into 4 quadrants. Quadrant 1, located on the Kamehameha Avenue and Puunene Avenue frontage of the site, is anticipated to contain commercial space. Quadrant 2, located on the Kamehameha Avenue and Lono Avenue frontage, is expected to contain a fully residential area with some commercial space on the ground floor. Quadrant 3, located along the Kaahumanu Avenue and Puunene Avenue frontage, is expected to contain residential units with retail on the ground level. Quadrant 4, located on the remaining Kaahumanu Avenue and Lono Avenue frontage, will be designed as an expansion of the existing commercial office complex that includes the Kahului Building and Central Pacific Bank buildings. This quadrant is also planned to include residential units on the upper level of the buildings.

III. TOPOGRAPHY AND SOIL CONDITIONS

The site currently is occupied by the Kahului Shopping Center, Burger King Restaurant, Title Guaranty & Escrow Services Building, Lono Center Building, Hawaii National Bank Building, Kahului Building and the Central Pacific Bank Building. The site is developed except for the corner of Puunene Avenue and Kamehameha Avenue which is undeveloped.

The property slopes slightly from west to east with elevations ranging from 9.5 feet to 5.5 feet above mean sea level. The average slope through the site is 2% or less.

The soil is classified as Fill Land (Fd) by the United States Department of Agriculture Soil Conservation Service Soil Survey. This land type consists mostly of areas filled with bagasse and slurry from sugar mills. A few areas are filled with *material from dredging and soil excavations.*

IV. FLOOD AND TSUNAMI HAZARD

According to the Flood Insurance Rate Map a portion of the site fronting Kaahumanu Avenue is located in the Tsunami Zone with a depth of 3.8 feet. Another portion of the site is located in Flood Zone A4, areas of 100-year flood with base elevations and flood hazard factors determined. The rest of the site is located on land designated as Zone ACe. Areas with this designation are subject to minimal flooding.

Floor elevations for buildings within the Tsunami Zone will have a floor elevation above the required depth of 3.8 feet. The buildings will also be designed to allow the water to pass beneath the slab.

Floor elevations for buildings within the Flood Zone A4 will have a floor elevation equal to or higher than the known base flood elevation.

V. DRAINAGE

The project site is currently a shopping center. The lot consists mainly of AC pavement and concrete with landscaping. Slopes within the site are relatively flat and range no more than 2%. The storm runoff for this area has been calculated using the Rational Method and a 50-year, 1-hour storm. See Appendix C - Preliminary Drainage Report.

The development of the proposed project will produce a storm runoff of 104.37 cfs, a net increase of 21.55 cfs. At a minimum, the additional storm runoff created by the proposed project will be retained on site. The project will try to retain as much runoff by incorporating pervious surfaces and retentions swales as well as underground retention piping. Onsite runoff will be intercepted by swales, drain inlets and catch basins located within the paved and landscaped areas. Mechanical filtering devices will be analyzed during the design process to also be incorporated into the drainage system. The drainage design criteria shall be to minimize any alterations to the natural pattern of the existing onsite surface runoff.

Drainage calculations can be found in Appendix C - Preliminary Drainage Report.

VI. ROADWAYS

Kaahumanu Avenue and Puunene Avenue are under the jurisdiction of the State of Hawaii, Department of Transportation. Kamehameha Avenue and Lono Avenue are under the jurisdiction of the County of Maui.

No improvements are necessary for Kaahumanu Avenue and Lono Avenue. Puunene Avenue will be widened to accommodate new left turn lanes as recommended by the traffic study. Kamehameha Avenue frontage will need to be improved to current County standards, which include curb, gutter and sidewalk.

VII. WATER SYSTEM

Potable water for domestic consumption and fire flow in the Kahului area, comes from the 3.0 million gallon Waiale tank and 2.0 MG Kahului tank. Water for both tanks originates from the Iao aquifers. There are existing 12-inch waterlines on all streets around the project site, thus no upgrades to the distribution system are anticipated, except for the addition of fire hydrants to comply with current standards, refer to Exhibit E - Existing Water Distribution Map. As part of the building permit process, domestic water and fire flow calculations will be submitted to verify the adequacy of the existing system.

Based on conceptual plans, it is estimated that the project will use 245,000 gallons of water per day. This figure does not include water for irrigation purposes. Being that the project site is the old Kahului Shopping Center block, there are a number of existing water meters throughout the site. Some of these meters still serve existing tenants. With redevelopment of the site, most of these meters will be turned back to the County in exchange for credit towards new meters sized to adequately serve the various phases of the project.

In July 2003, the State Commission on Water Resource Management took over control of the Iao and Waihee aquifers. Since this time, additional sources have be been brought on line, although the Department of Water Supply will not guarantee the availability of water for this project.

At the present time there are no available reclaimed water lines around the site. However, when it becomes available the project will use reclaimed water for irrigation purposes.

VIII. SEWER SYSTEM

Once fully occupied, the project will generate approximately 144,315 gallons of raw sewage per day. Sewage from the project will be treated and processed at the County of Maui's Kahului Wastewater Treatment Plant in Naska. Preliminary wastewater contributions can be found in Appendix B - Preliminary Wastewater Contribution Calculations.

Based on current County of Maui assessment rates, the approximate wastewater assessment fee for the project would be $659,520.00. It should be noted that the assessment fee which is collected as part of the building permit process, may be higher at the time the project is constructed.

There are existing sewer lines of various sizes on all sides of the project site as well as through the site. One of the County's main trunk lines, an 18-inch gravity line also bisects the site, refer to Exhibit F - Existing Sewer Distribution Map. It is anticipated that wastewater from the project will be transported to the Kahului Wastewater Treatment Plant via connections to this main line.

During discussions with the County's Wastewater Reclamation Division, it was recommended that the developer make arrangements to have the existing sewer lines running through the site videoed to verify if the lines are still active. Any active sewer line which may conflict with the proposed improvements will need to be relocated. The County also indicated that as part of the building permit process, the developer will need to provide an analysis of the existing system to determine if there is capacity to accommodate the project's flow. Any upgrades if necessary, will be the responsibility of the developer.

IX. ELECTRIC, TELEPHONE AND CABLE TV SERVICES

Electric, telephone, and cable TV services are currently being provided by Maui Electric Company, Hawaiian Telcom, and Oceanic Time Warner, respectively. Service to the project is available via existing underground lines from Kamehameha Avenue and Lono Avenue.

The County of Maui normally requires that overhead lines be relocated underground in concert with road widening improvements, i.e. construction of curbs, gutters, and sidewalks. Since Puunene Avenue is being widened, the overhead lines on that frontage will be relocated underground. New service connections will be designed and constructed underground because the existing systems are near capacity.

EXHIBITS

EXHIBIT A - Location Map

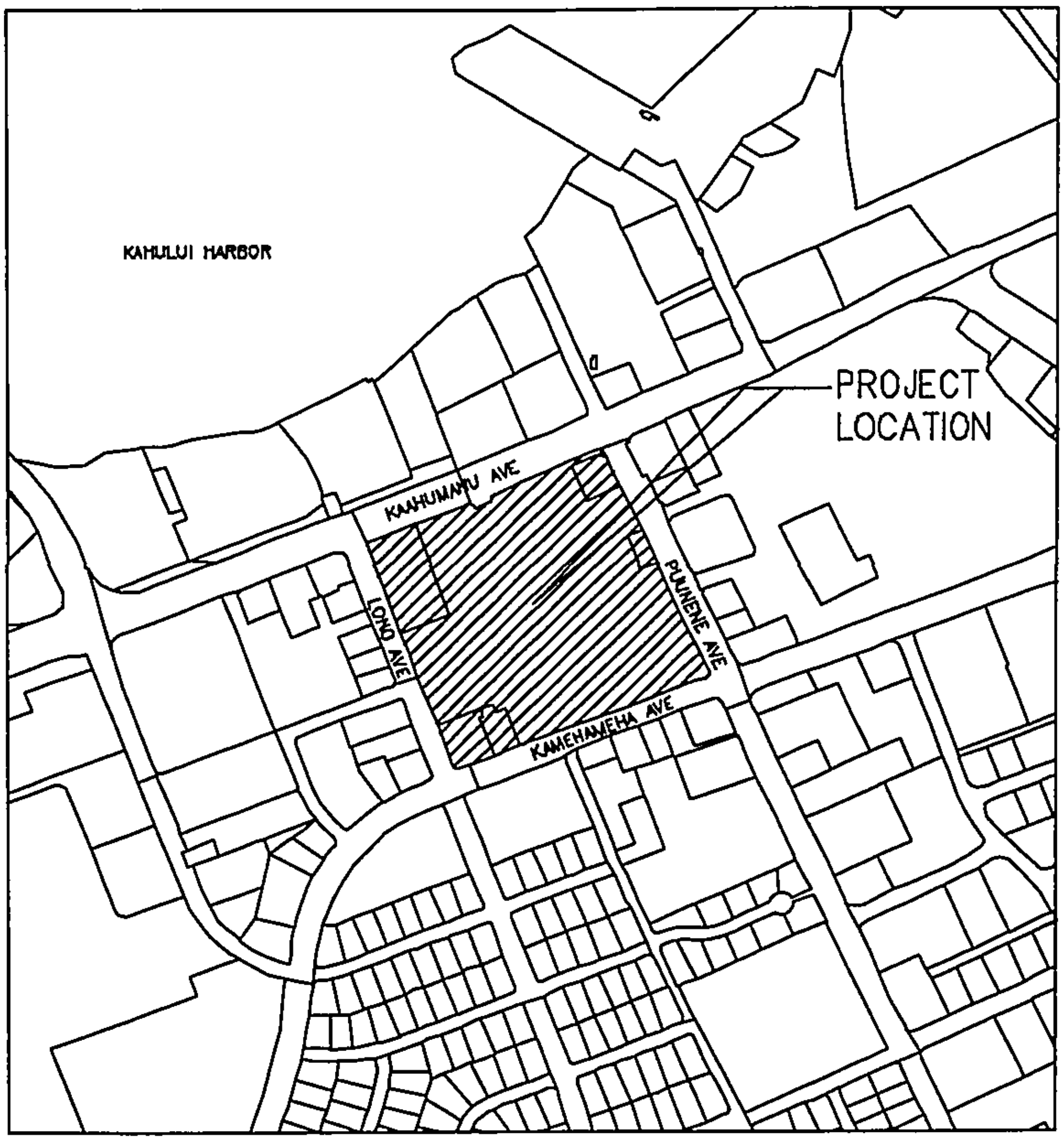
EXHIBIT B - Conceptual Site Plan

EXHIBIT C -Topographic Survey Map

EXHIBIT D - Flood Hazard Map

EXHIBIT E - Existing Water Distribution Map

EXHIBIT F - Existing Sewer Distribution Map

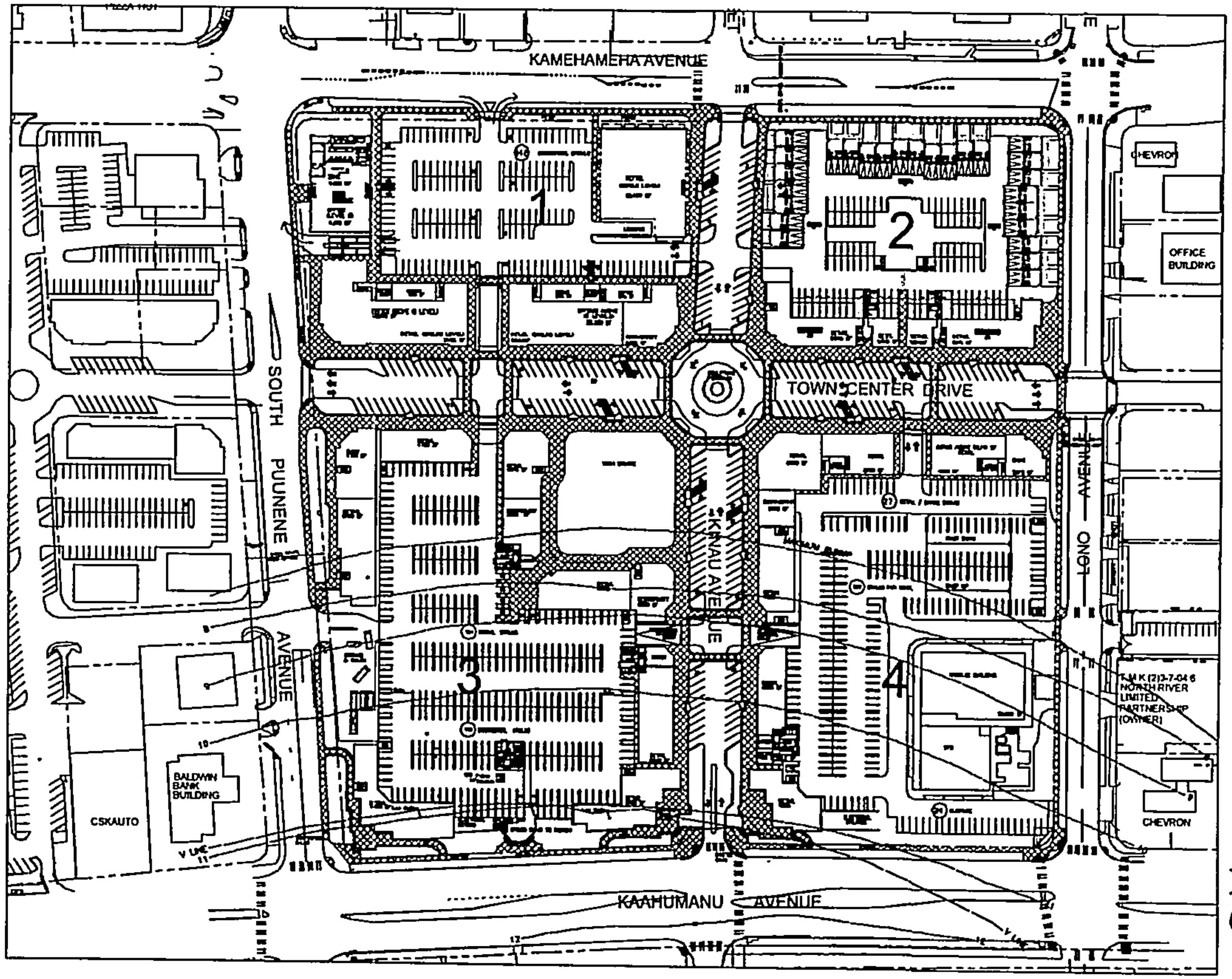


LOCATION MAP

NOT TO SCALE

T.M.K.: (2) 3-7-07: 09

EXHIBIT A



Kahului Town Center-
Conceptual Site Plan
EXHIBIT B

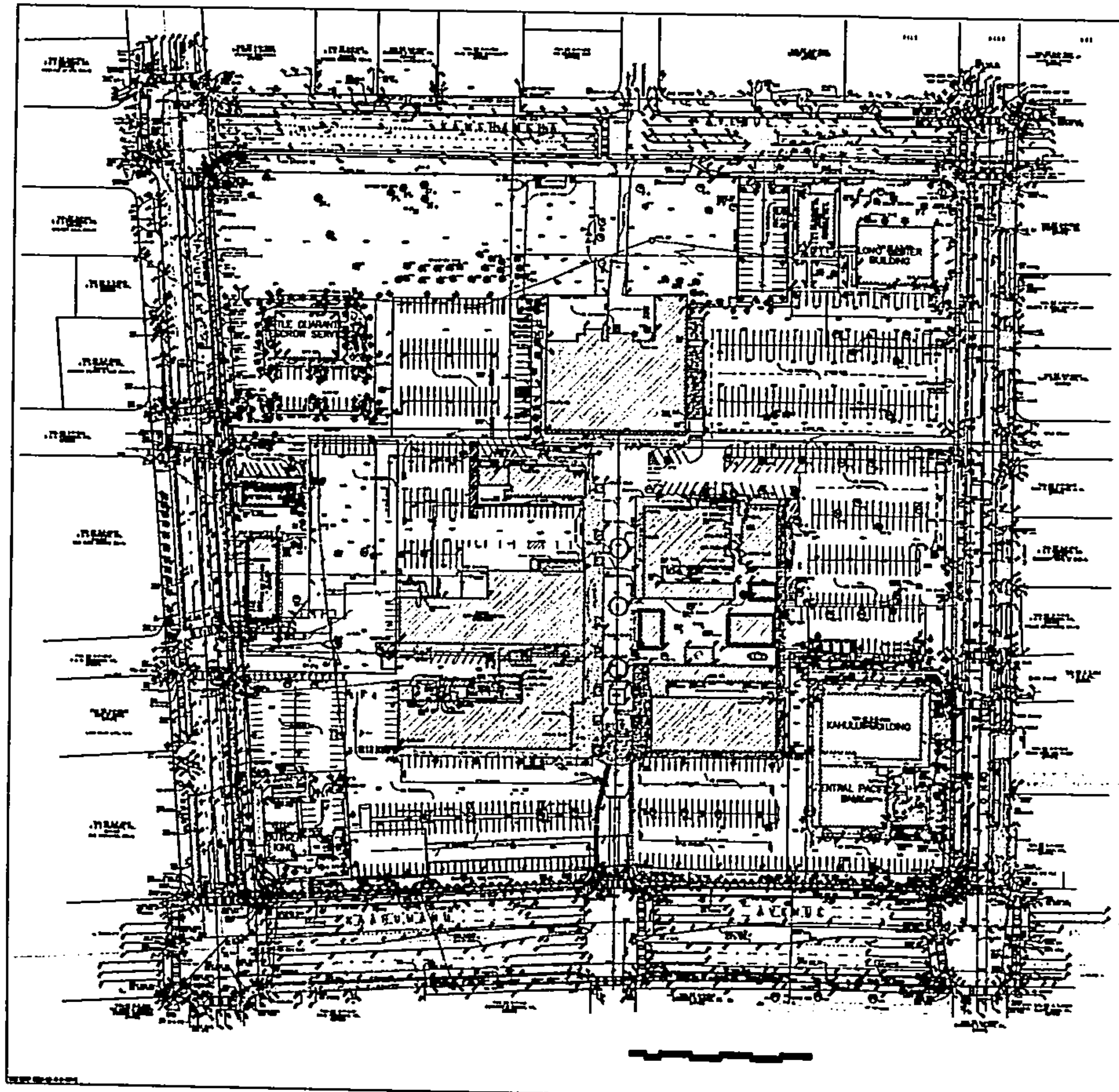
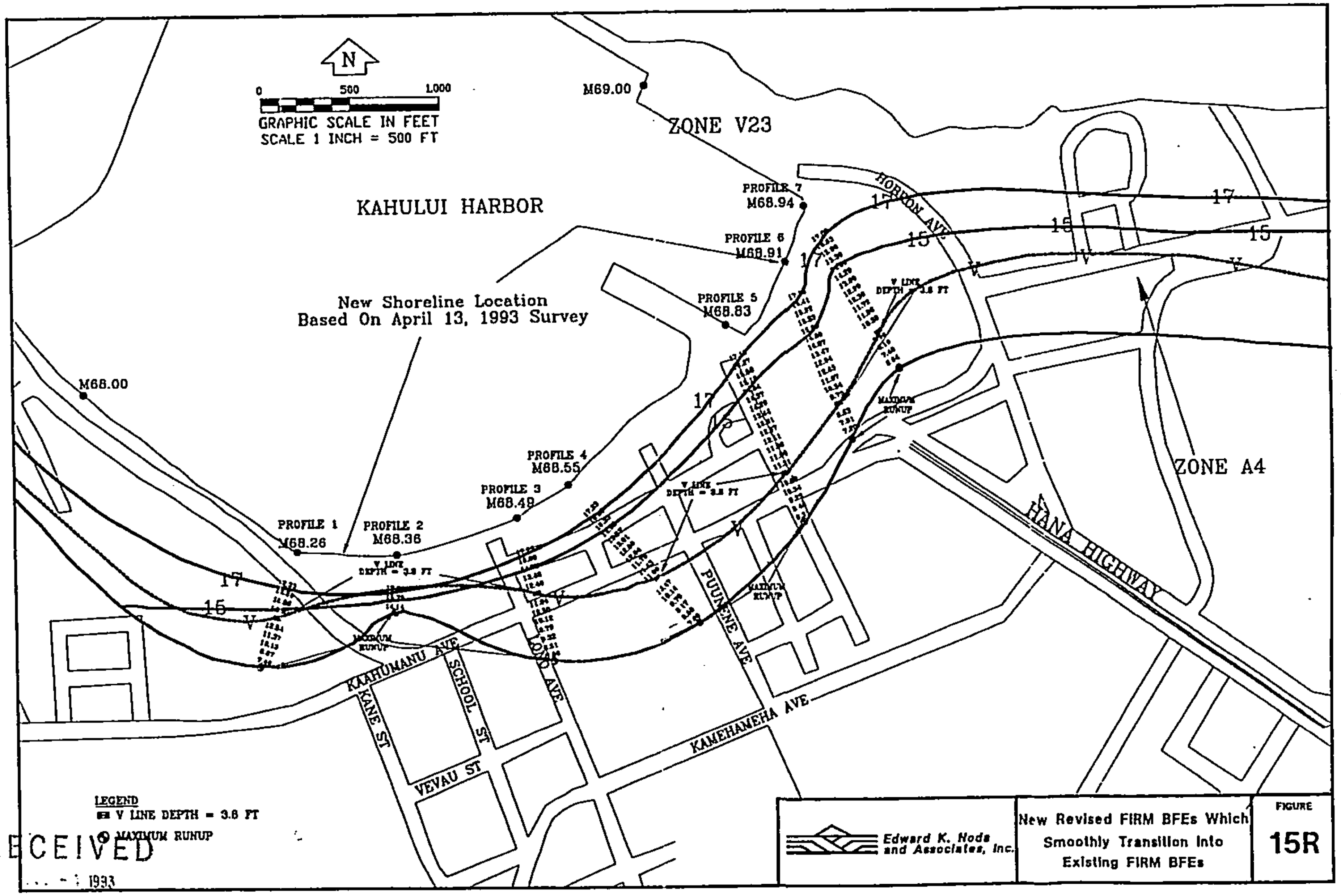


EXHIBIT C



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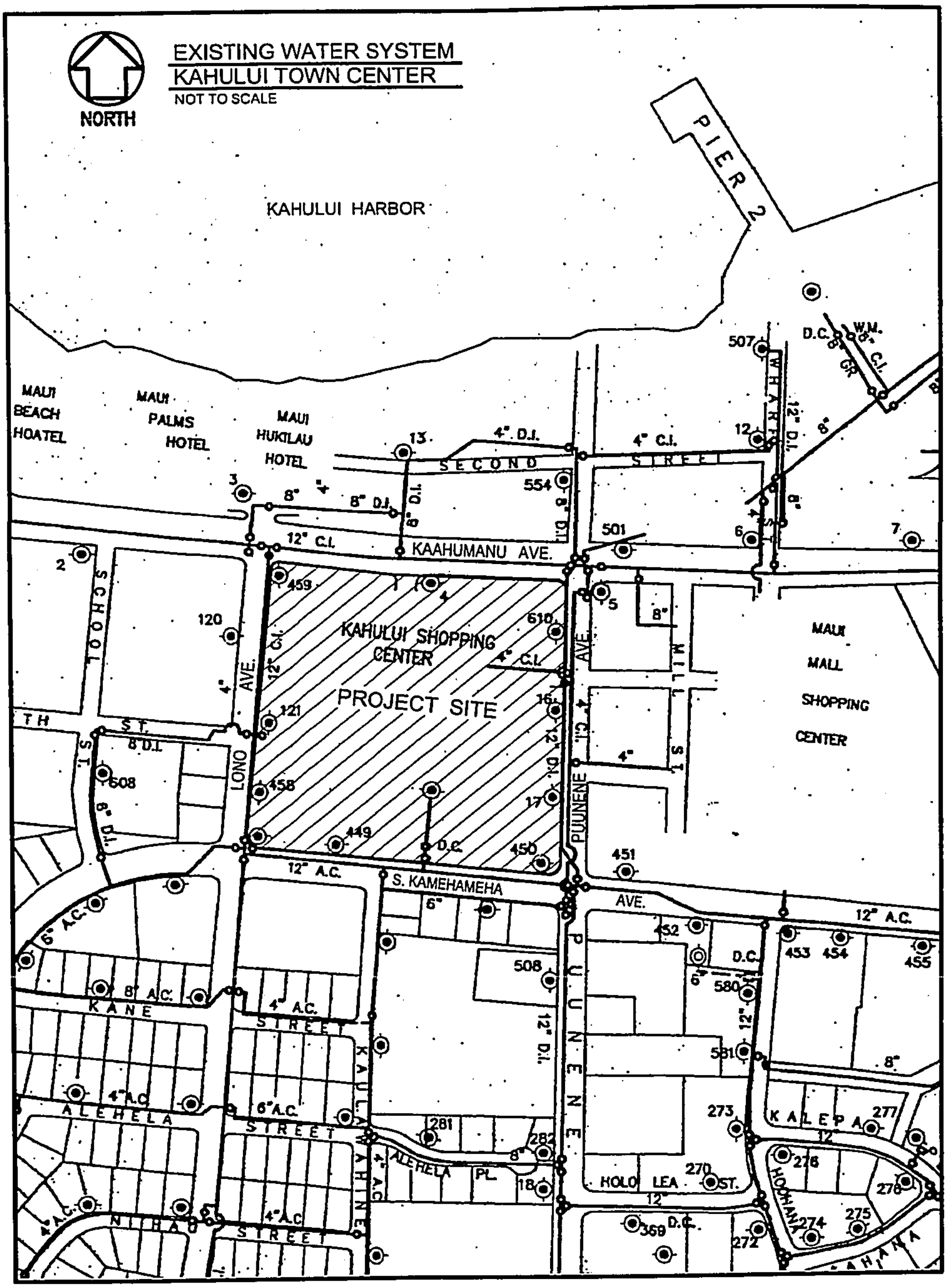
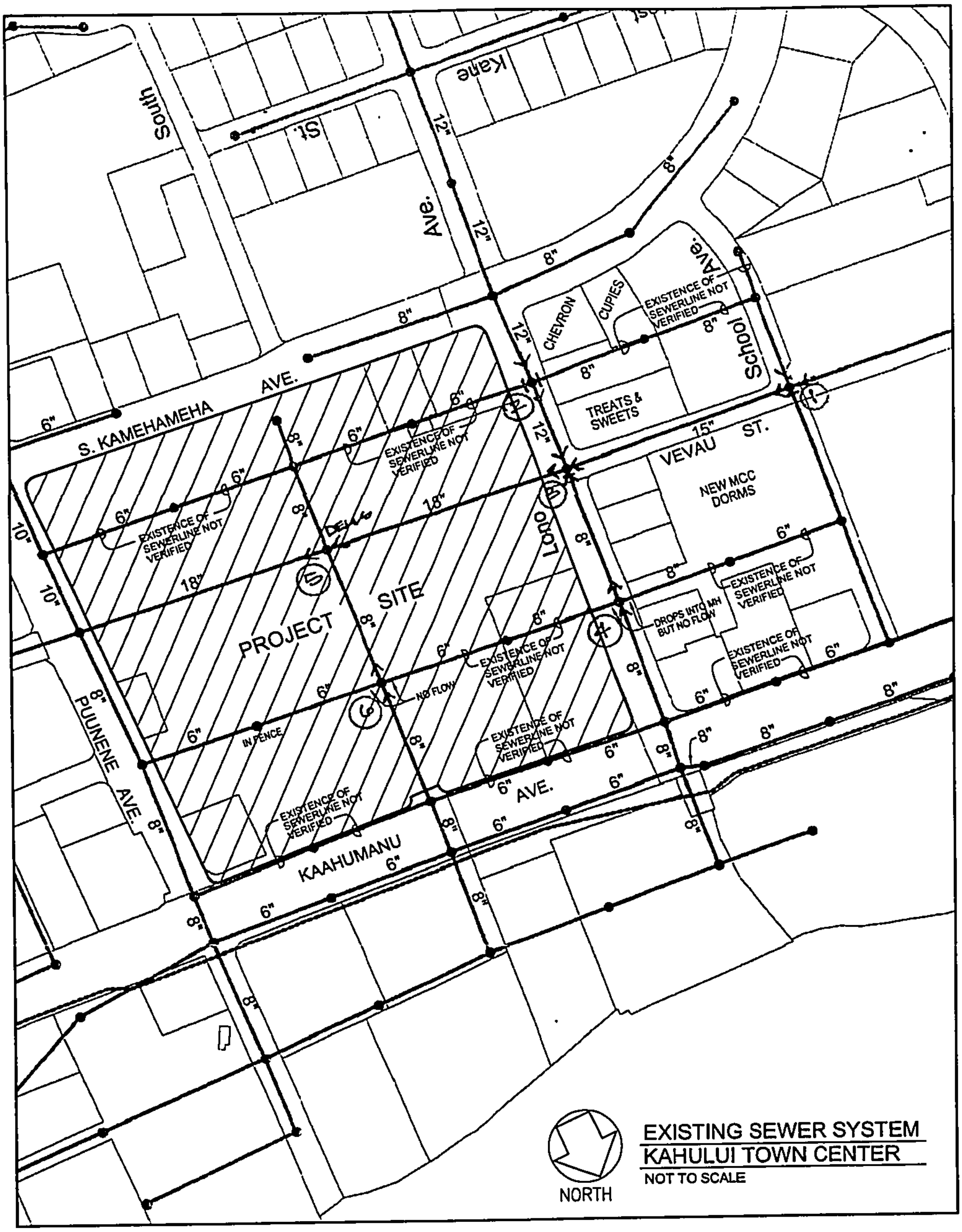

EXISTING WATER SYSTEM
KAHULUI TOWN CENTER
NOT TO SCALE
NORTH
KAHULUI HARBOR
PIER 2
MAUI BEACH HOATEL
MAUI PALMS HOTEL
MAUI HUKILAU HOTEL
SECOND STREET
KAAHUMANU AVE.
SCHOOL ST.
LONO AVE.
KAHULUI SHOPPING CENTER
PROJECT SITE
PUUNENE AVE.
MILL ST.
MAUI MALL SHOPPING CENTER
WHARF
S. KAMEHAMEHA AVE.
KANE STREET
ALEHELA STREET
ALEHELA PL.
KAULAWAHINE
NIHAU STREET
HOLO LEA ST.
KALEPA
HOOHANA
12" C.I.
12" D.I.
12" A.C.
8" D.I.
6" D.I.
4" C.I.
4" D.I.
4" A.C.
6" A.C.
8" A.C.
6" A.C.
D.C.
W.M.



EXISTING SEWER SYSTEM
KAHULUI TOWN CENTER
NOT TO SCALE

APPENDICES

APPENDIX A - Preliminary Domestic Water Consumption Estimate

APPENDIX B - Preliminary Wastewater Contribution Calculations

APPENDIX C - Preliminary Drainage Report

PRELIMINARY
DOMESTIC WATER CONSUMPTION ESTIMATE
FOR
KAHULUI TOWN CENTER
TMK: (2) 3-7-07: 009
March 28, 2006, 2006

Reference: County of Maui, Department of Water Supply
Water System Standards, 2002

Conceptual Site Plan, March 22, 2006

Description: The proposed project will ultimately consist of approximately 96,170 square feet (sf) of Office space, 130,878 sf of Retail space which includes approximately 12,335 sf for restaurant use (200 seats) and 442 Residential units. The construction of the project will be done in phases starting early 2007, with buildout estimated to be in 5 to 7 years.

Estimated Consumption:

Use	No Units	Area (sf)	Usage	Average Daily Demand
Office / Retail Space		227,048	140 Gal / 1000 sf	31,787 GPD
Residential Use	442		500 Gals / unit	211,500 GPD

Total Average Daily Consumption = **243,287 GPD**

Maximum Daily Demand = **364,930 GPD**

APPENDIX A

PRELIMINARY
WASTEWATER CONTRIBUTION ESTIMATE
FOR
KAHULUI TOWN CENTER
TMK: (2) 3-7-07: 009
MARCH 29, 2006

Reference: County of Maui, Department of Public Works and Environmental Management, Wastewater Reclamation Division, Wastewater Flow Standards

Conceptual Site Plan, March 22, 2006

Description: The proposed project will ultimately consist of approximately 96,170 square feet (sf) of new Office space, 130,878 sf of Retail space which includes approximately 12,335 sf for restaurant use (200 seats) and 442 Residential units. The construction of the project will be done in phases starting early 2007, with buildout estimated to be in 5 to 7 years.

Estimated Sewer Flow:

Office Space
96,170 sf x 1 Employee / 200 sf = 480.85 Employees
say 481

481 Employees x 20 Gal / Employee / Day = <u>9,620 GPD</u>

Retail Space
118,543 sf x 1 Employee / 350 sf = 338.7 Employees
say 339
339 Employees x 15 Gal / Employee / Day = <u>5,085 GPD</u>

Restaurant Space
1. 170 Seats x 80 Gal / Seat / Day = 13,600 GPD
2. 30 Seats x 100 Gal / Seat / Day = 3,000 GPD
3. 20 Employees x 15 Gal / Employee / Day = 300 GPD

Total Restaurant = <u>16,900 GPD</u>

Residential Space
442 Units x 255 Gal / Unit / Day = <u>112,710 GPD</u>

Total Estimated Average Wastewater Flow = **<u>144,315 GPD</u>**

APPENDIX B

Appendix H

Preliminary Drainage Report

PRELIMINARY DRAINAGE REPORT

FOR

KAHULUI TOWN CENTER
KAHULUI, MAUI, HAWAII
T.M.K.: (2) 3-7-07: 009

Prepared for

A & B Properties, Inc.
822 Bishop Street
Honolulu, Hawaii 96813

Prepared by

Sato & Associates, Inc.
2046 South King Street
Honolulu, Hawaii 96826

May 2006

TABLE OF CONTENTS

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A. Project Location

The project location is in Kahului, on the island of Maui. The proposed project for the Kahului Town Center comprises an entire block bounded by Kaahumanu Avenue, Puunene Avenue, Kamehameha Avenue, and Lono Avenue. This parcel is identified as Tax Map Key (TMK): (2) 3-7-07: 009. See Location Map in Appendix A.

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This project shall utilize a 19.9 acre parcel for the construction of the Kahului Town Center. This project consists of the demolition of existing buildings of the Kahului Shopping Center and the construction of buildings for the Kahului Town Center. The new buildings within this parcel will accommodate retail/commercial and office space. Proposed improvements include paved driveways, and parking, concrete curbs and sidewalks, landscaping, and underground utilities.

The project is broken down into 4 quadrants. See Runoff Map Appendix A. Quadrant 1 located on the Kamehameha Avenue and Puunene Avenue frontage of the site is anticipated to contain commercial space. Quadrant 2 located on the Kamehameha Avenue and Lono Avenue frontage is expected to contain a fully residential area with some commercial space on the ground floor. Quadrant 3 located along the Kaahumanu Avenue and Puunene Avenue frontage is expected to contain higher valued residential units with retail on the ground level. Quadrant 4 located on the remaining Kaahumanu Avenue and Lono Avenue frontage is designed as an expansion of the existing commercial office complex that includes the Kahului Building and Central Pacific Bank buildings. This quadrant is also planned to include residential units on the upper level of the buildings.

C. Flood Hazard

Flood Insurance Rate Maps (FIRM) published by the Federal Emergency Management Agency (FEMA), panel number 150003 0190D; indicate that a portion of the the project site is located within the Tsunami Zone and another portion is in Flood Zone A4 (BFE 8 ft.) and the southerly half within Flood Zone C. Zone A4 represents areas of 100-year flood with base flood elevations and flood hazard factors determined. Flood Zone C is designated as an area of minimal flooding.

D. Existing Drainage Conditions

The project site is currently a shopping center. The lot consists mainly of AC pavement and concrete with landscaping on the exterior of the lot. Slopes within the site are relatively flat and range no more than 2%. The storm runoff for this area has been calculated using the Rational Method and a 50-year, 1-hour storm (see hydrologic calculations Appendix A). The location of the project spans within drainage area 1 through 13. See Runoff Map-Existing Conditions in Appendix A Storm runoff sheet flows to various locations around the lot. In areas 6, 7, 8, 9, 11, 12, 13 storm runoff flow off the site to catch basins along the perimeter of the lot. In areas 1, 2, 3, 4, 5, 10 storm runoff flow toward drain inlets within the site.

E. Proposed Drainage System

The development of the proposed project will produce a storm runoff of 104.37 cfs, a net increase of 21.55 cfs. At a minimum, the additional storm runoff created by the proposed project will be retained on site. The project will try to retain as much runoff by incorporating pervious surfaces and retentions swales as well as underground retention piping. Onsite runoff will be intercepted by swales, drain inlets and catch basins located within the paved and landscaped areas. Mechanical filtering devices will be analyzed during the design process to also be incorporated into the drainage system. The drainage design criteria shall be to minimize any alterations to the natural pattern of the existing onsite surface runoff.

F. Hydrologic Design Criteria

Design criteria for the proposed drainage system is based on the methods outlined in the "Rules for the Design of Storm Drainage Facilities in the County of Maui" prepared by the Department of Public Works and Waste Management County of Maui, November 28, 1995. Hydrologic Calculations are based upon the Rational Method (see hydrologic calculations Appendix A).

Recurrence Interval (Tm)

A recurrence interval of 10 years is used.

Runoff Quantity

The rational method ($Q = CIA$) is used to estimate the storm runoff from drainage areas, where:

Q = design rate of flow in cubic feet per second
C = weight ration coefficient for the drainage area
I = rainfall intensity in inches per hour for a duration equal to the time of concentration
A = drainage area in acres

Runoff Coefficient (C)

Watershed Characteristics	Extreme	High	Moderate	Low
Infiltration	negligible 0.20	slow 0.14	medium 0.07	high 0.0
Relief	steep (>25%) 0.08	hilly (15-25%) 0.06	rolling (5-15%) 0.03	flat (0-5%) 0.0
Vegetal Cover	none 0.07	poor (<10%) 0.05	good (10-15%) 0.03	high (50-90%) 0.0
Development	industrial & business 0.55	hotel & apartment 0.45	residential 0.40	agricultural 0.15

Time of Concentration (Tc)
Overland flow time is determined by the hydraulic length and slope of the ultimately paved area to the intake point of the drainage system (Plate 1).

Rainfall Intensity (I)
Recurrence Interval = 50 years
1-Hour Rainfall = 2.5 inches (Plate 2)

Rainfall intensity is determined by applying a correction factor corresponding to the time of concentration (Plate 7).

G. CONCLUSION

The design discharge generated by the proposed development will generate a 50-year storm runoff of 104.37 cfs, an increase of 21.55 cfs. All onsite runoff will be captured by the proposed onsite drainage system which consists of drain inlets and swales. The addition runoff created by the development will be retained on site, therefore unaffecting the existing drainage system.

II. REFERENCES

1. Department of Public Works and Waste Management, County of Maui, Rules for the Design of Storm Drainage Facilities in the County of Maui, November 1995

2. Federal Emergency Management Agency, Federal Insurance Administration, "Flood Insurance Rate Map", County of Maui, Hawaii, effective date March 16, 1995

APPENDIX A

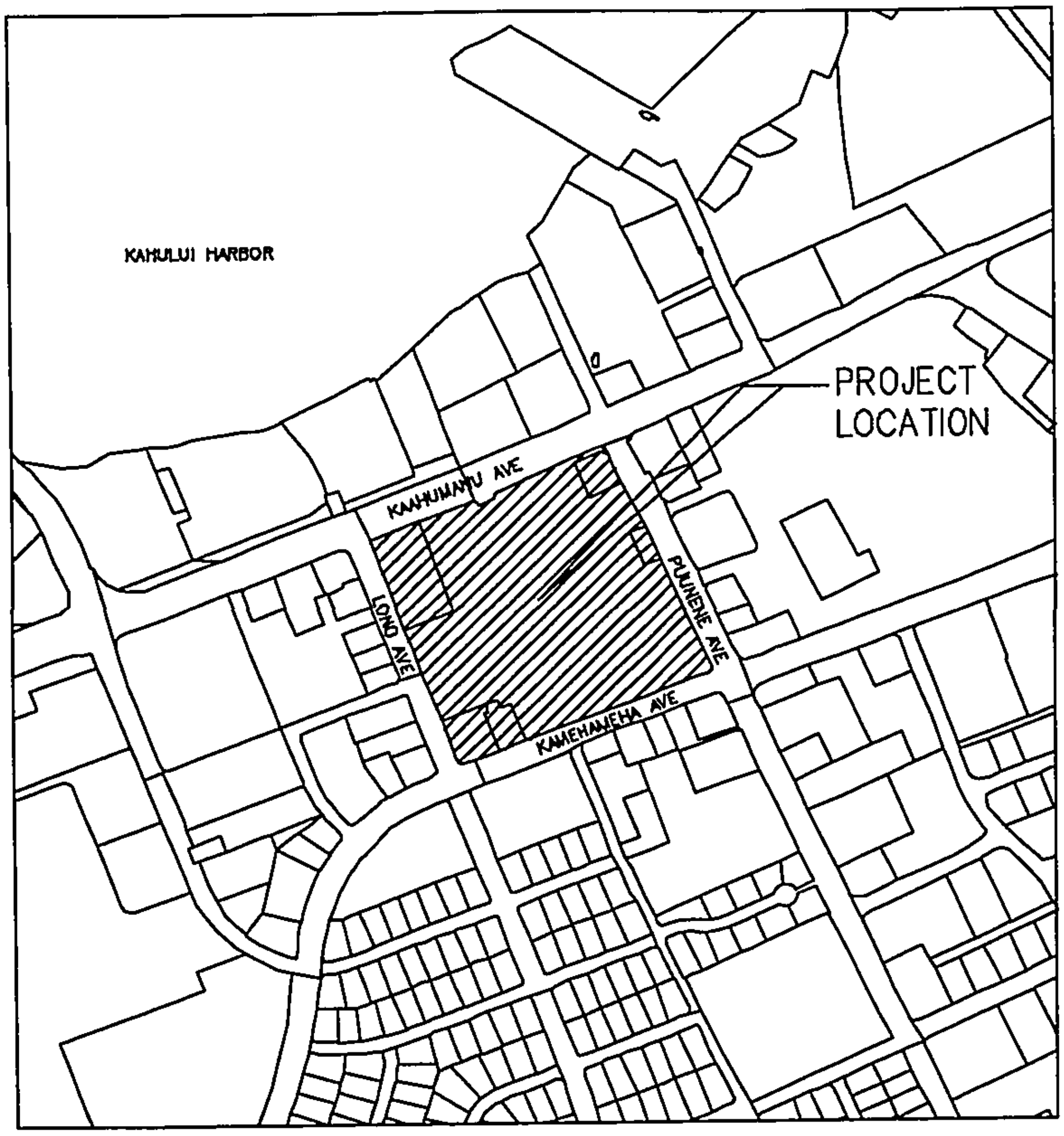
Hydrologic Runoff Calculations

Location Map

Runoff Map - Existing Conditions

Runoff Map - Developed Conditions

Hydrologic Calculations



NORTH

LOCATION MAP

NOT TO SCALE

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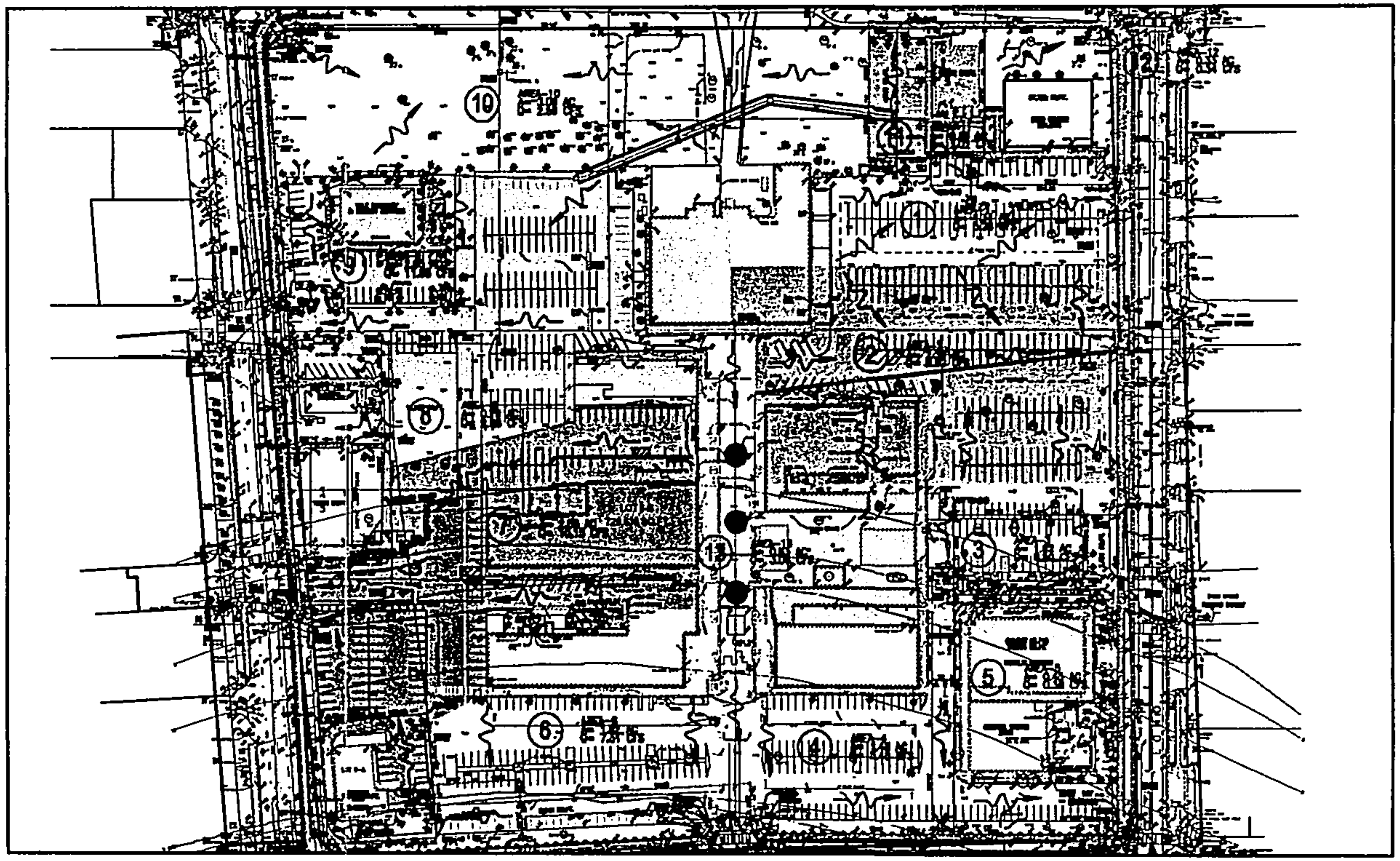
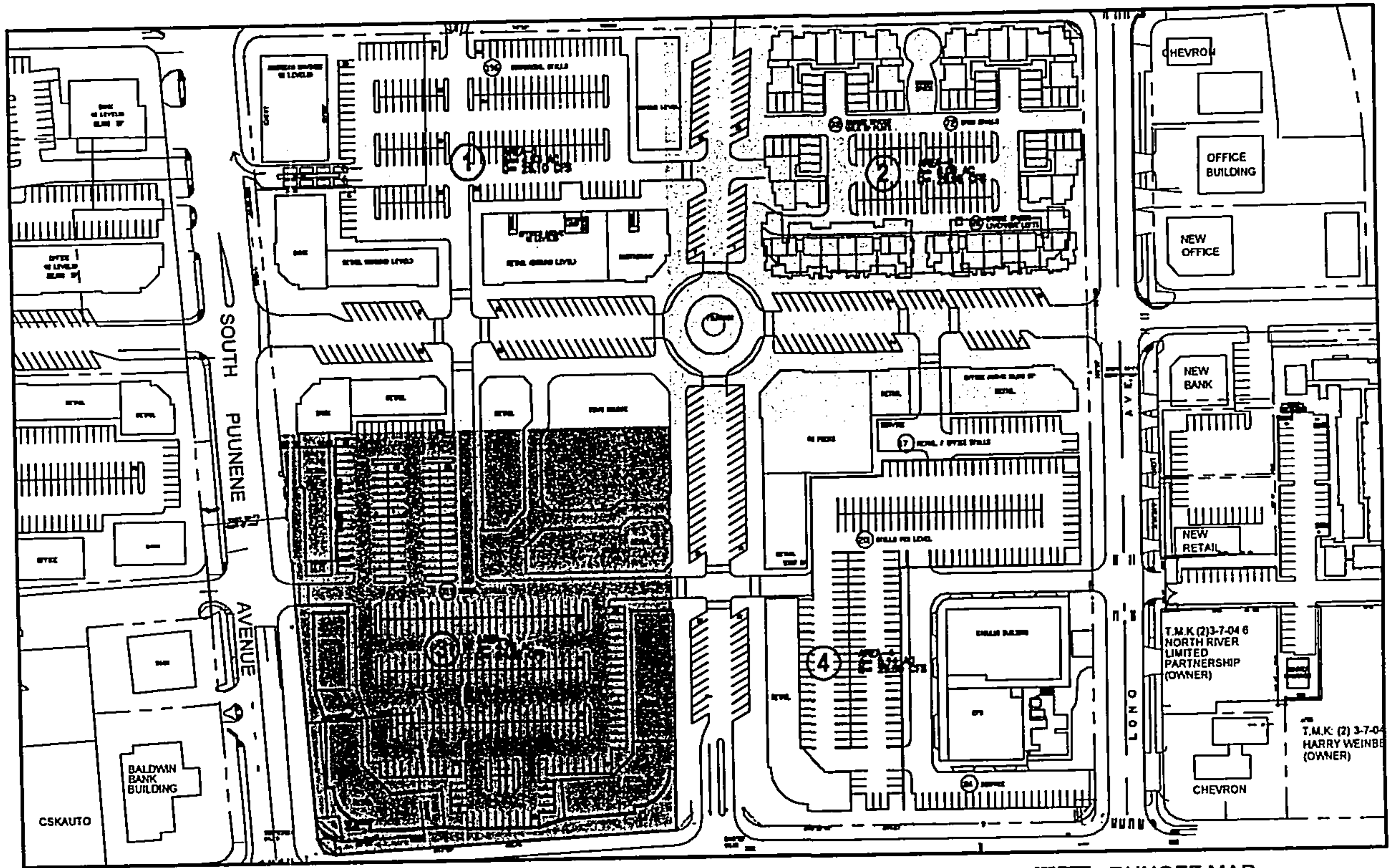


NORTH

RUNOFF MAP
EXISTING CONDITIONS
SCALE: 1" = 40'



NORTH

RUNOFF MAP
DEVELOPED CONDITIONS
SCALE: 1" = 100'

Hydrologic Calculations

KAHULUI TOWN CENTER
50 YEAR 1-HOUR STORM

Existing Conditions

Area	C	i	L	S	Tc	CF	I	Area	Q
		(IN/HR)	(FT)	(%)	(MIN)		(IN/HR)	AC	(CFS)
1	0.82	2.50	348	0.64	8.0	2.45	6.13	1.31	6.60
2	0.82	2.50	415	0.20	10.5	2.20	5.50	2.39	10.78
3	0.82	2.50	305	0.38	8.0	2.45	6.13	1.62	8.12
4	0.82	2.50	442	0.29	10.0	2.25	5.63	1.48	6.81
5	0.28	2.50	115	0.49	28.0	1.50	3.75	0.45	0.48
6	0.82	2.50	354	0.69	7.8	2.45	6.13	1.82	9.14
7	0.82	2.50	493	0.69	9.0	2.40	6.00	2.58	12.69
8	0.82	2.50	324	0.76	7.3	2.50	6.25	0.70	3.60
9	0.82	2.50	418	0.91	7.5	2.50	6.25	2.85	14.60
10	0.28	2.50	427	0.68	29.0	1.50	3.75	3.09	3.24
11	0.82	2.50	162	0.78	6.0	2.70	6.75	0.46	2.53
12	0.28	2.50	133	0.63	18.0	1.80	4.50	0.33	0.42
13	0.82	2.50	544	0.42	10.0	2.25	5.63	0.83	3.82
							Total	19.91	82.82

Developed Conditions

Area	C	i	Tc	CF	I	Area	Q
		(IN/HR)	(MIN)		(IN/HR)	AC	(CFS)
1	0.77	2.50	5.0	2.75	6.88	4.93	26.10
2	0.77	2.50	5.0	2.75	6.88	5.09	26.95
3	0.76	2.50	5.0	2.75	6.88	4.75	24.82
4	0.75	2.50	5.0	2.75	6.88	5.14	26.50
					Total	19.91	104.37

Hydrologic Calculations

See Runoff Coefficient Chart

Existing

Pavement Area

Infiltration	Negligible	0.20
Relief	Flat	0.00
Vegetal Cover	None	0.07
Development	Business	0.55
	SUM	0.82

C=0.82
I=2.5(2.45)=6.13
A=1.31

Q=CIA
Q=.82(6.13)(1.31)
Q=6.60 cfs

Developed

Pavement Area

Infiltration	Negligible	0.20
Relief	Flat	0.00
Vegetal Cover	None	0.07
Development	Business	0.55
	SUM	0.82

Landscape Area

Infiltration	Medium	0.07
Relief	Flat	0.00
Vegetal Cover	High	0.00

Pavement Areas=4.54 Acres
Landscaped Areas=0.39 Acres
Weighted C=0.77
I=2.5(2.75)=6.88
A=4.93

Q=CIA
Q=.77(6.88)(4.93)
Q=26.10 cfs

Appendix I

Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT FOR

KAHULUI TOWN CENTER AND MIXED USE PROJECT

IN KAHULUI, MAUI, HAWAII

Prepared For

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December 11, 2006

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1. INTRODUCTION

Phillip Rowell and Associates has been retained to prepare a traffic impact analysis for the proposed Kahului Town Center and Mixed Use Project in the Kahului area of Maui. The approximate location of the project on the Island of Maui is shown in Figure 1.

This introductory chapter discusses the location of the project, proposed development plan, the study methodology and order of presentation.

Purpose and Objectives of Study

1. Determine and describe the traffic characteristics of the proposed project.
2. Quantify and document the traffic related impacts of the proposed project.
3. If required, identify and evaluate traffic related improvements required to provide adequate access to and egress from the proposed project and to mitigate the project's traffic impacts.

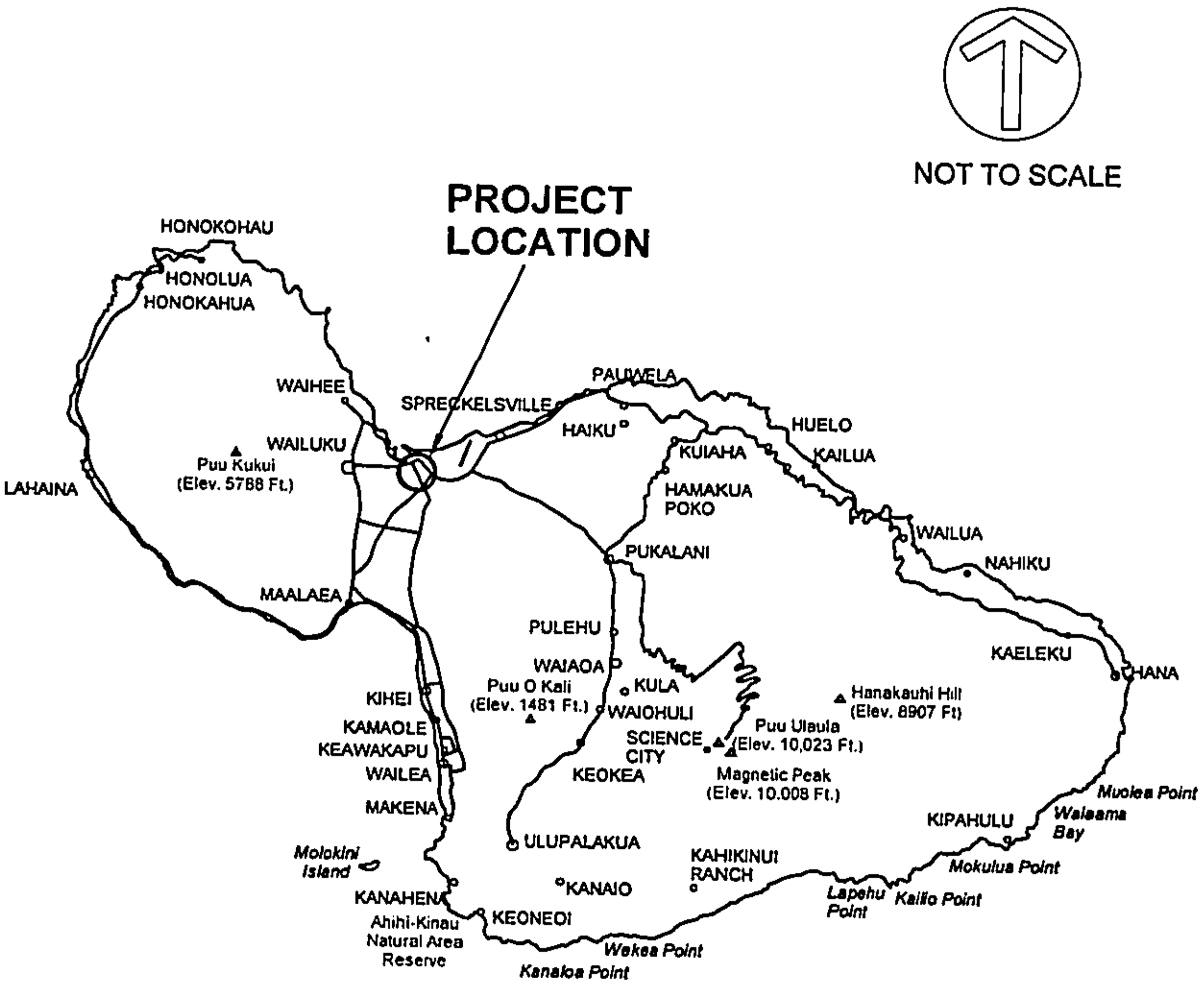

Figure 1
PROJECT LOCATION MAP

Project Location and Description

The location of the project within Kahului is shown schematically in Figure 2. This diagram indicates the streets bordering the project.

The project site is divided into four quadrants as shown. The proposed uses within each quadrant are summarized in Table 1.

Table 1 Summary of Proposed Development Plan

Proposed Use	Units	Quad 1	Quad 2	Quad 3	Quad 4	Total
Residential	Units	0	80	295	67	442
Existing Office Building	Gross Square Feet	0	0	0	56,653	56,653
New Office Building	Gross Square Feet	61,574	0	0	34,596	96,170
Bank	Gross Square Feet	9,000	0	0	4,180	13,180
Restaurant	Gross Square Feet	4,484	1,258	6,593	0	12,335
Retail	Gross Square Feet	36,234	12,163	40,732	29,414	118,543

Also shown on Figure 2 are Town Center Drive and Kinau Avenue, which divide the project into quadrants. Kinau Avenue is an extension of the existing entrance to Kahului Shopping Center through to Kamehameha Avenue. The proposed driveways serving the project's parking facilities are shown and designated Drives A through I.

Horizon Year

The design horizon year represents a date for which future background traffic projections were estimated. These projections include traffic generated by other planned projects within and adjacent to the study area and background traffic growth, for which a future year must be selected.

The year 2012 was used as the horizon year, even though the project will be developed in phases, with the fourth and final phase tentatively scheduled for completion in 2012. Rather than perform a traffic analysis for each phase, it was decided to use 2012 as the design year and analyze the total project.

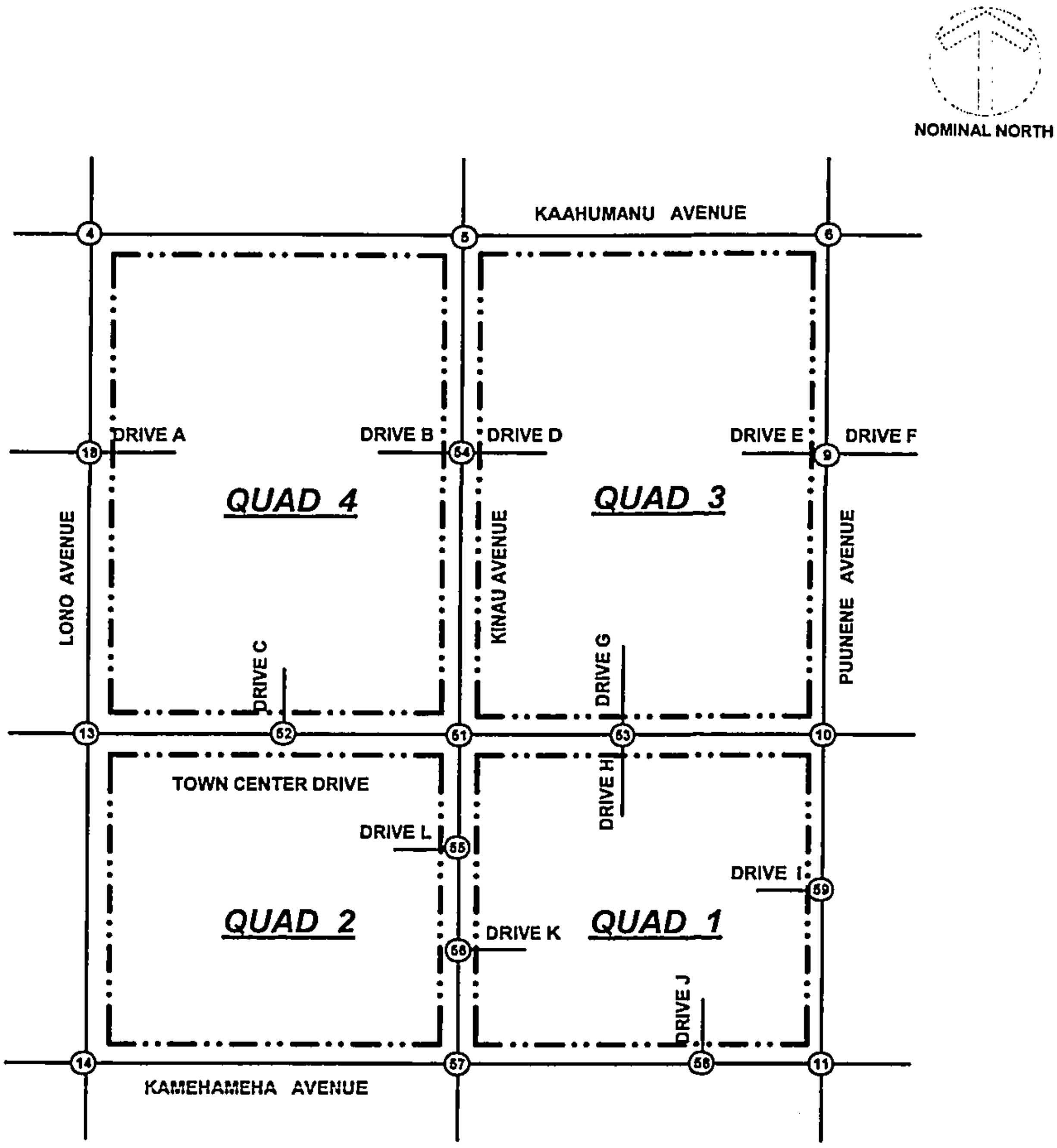

Figure 2
PROJECTION LOCATION IN KAHULUI

Study Methodology

The following is a summary list of the tasks performed:

1. The study area and the scope of work was defined using criteria established by the Institute of Transportation Engineers[1] for large developments. See Table 2.

2. A field reconnaissance was performed to identify existing roadway cross-sections, intersection lane configurations, traffic control devices, and surrounding land uses.

3. Existing traffic volumes were obtained from recently completed traffic studies in the area. As will be explained in Chapter 2, traffic counts from the MCC Student Housing and Kane Street Mixed Use Projects were used to be consistent with the findings of that study. With the exception of one intersection, all counts are less than two years old.

4. Existing levels-of-service of the study intersections were determined using the methodology described in the *2000 Highway Capacity Manual.*

5. A list of related development projects within and adjacent to the study area that will impact traffic conditions at the study intersections was compiled. This list included both development projects and anticipated highway improvement projects.

6. Future background traffic volumes at the study intersections without traffic generated by the study project were estimated.

7. Peak hour traffic that the proposed project will generate was estimated using trip generation analysis procedures recommended by the Institute of Transportation Engineers.

8. Project generated traffic was assigned to the adjacent roadway network for each of the four scenarios described previously.

9. A level-of-service analysis for future traffic conditions with traffic generated by the study project was performed.

10. The impacts of traffic generated by the proposed project at the study intersections was quantified and summarized.

11. Locations that project generated traffic significantly impacts traffic operating conditions were identified.

12. If required, improvements or modifications necessary to mitigate the traffic impacts of the project and to provide adequate access to and egress from the site were formulated.

13. A report documenting the conclusions of the analyses performed and recommendations was prepared.

---

[1] Institute of Transportation Engineers, *Transportation and Land Development, Second Edition*, Washington, D.C., 2002, pages 3-1 thru 3-16.

Table 2 Suggested Requirements for Various Types of Traffic Impact Analyses[2]

	Trip Generation Threshold			
	Access Location & Design Review	Small Development: Traffic Impact Assessment	Medium Development: Traffic Impact Statement	Large Development: Regional Traffic Analysis
	$T \leq 100$ Peak Hour Trips	$100 < T \leq 500$ Peak Hour Trips	$500 < T \leq 1000$ Peak Hour Trips	$T > 1000$ Peak Hour Trips
Pre-application meeting or discussion	✔	✔	✔	✔
Analysis of Roadway Issues				
Existing condition analysis within study area	✔	✔	✔	✔
Sight distance evaluation	✔	✔	✔	✔
Nearby driveway locations	?	✔	✔	✔
Existing traffic conditions at nearby intersections and driveways		✔	✔	✔
Future road improvements		?	✔	✔
Crash experience in proximity to site	?	✔	✔	✔
Trip generation of adjacent development		?	✔	✔
Trip distribution analysis		✔	✔	✔
Background traffic growth		?	✔	✔
Future conditions analysis at nearby intersections		?	✔	✔
Mitigation identification and evaluation		?	?	✔
Site Issues				
Traffic generation	✔	✔	✔	✔
Traffic distribution	?	✔	✔	✔
Evaluate number, location & spacing of access points	?	✔	✔	✔
Evaluate access design, queuing, etc.	✔	✔	✔	✔
Evaluate site circulation	✔	✔	✔	✔
Other Analyses				
Gap analysis for unsignalized locations		?	?	✔
TSM/TDM Mitigation measures (car- or van-pooling, transit, etc.)- transit agency participation			?	✔
Effect on traffic signal progression, analysis of proposed signal locations	(4)	(4)	?	✔

Notes:
(1) Key: ✔ = required, ? = may be appropriate on a case-by-case basis
(2) Source: Institute of Transportation Engineers, *Transportation and Land Development*, Washington, D.C., 2002, p.3-6
(3) TSM/TDM = Transportation System Management/Transportation Demand Management
(4) A traffic signal should not be permitted

Study Area

The study area for this study is consistent with the study area for the traffic impact study prepared for the MCC Student Housing and Kane Street Mixed Use Projects and recent direction from the County of Maui Department of Public Works. The study intersections are listed in Table 3. There are 18 existing intersections, one (1) proposed as part of the MCC Student Housing Project and (9) intersections and driveways proposed as part of the Kahului Town Center project.

Table 3 Study Intersections

Number	Intersection	Status
1	Wakea Avenue at Kaahumanu Avenue	Existing
2	Kahului Beach Road at Kaahumanu Avenue	Existing
3	School Street at Kaahumanu Avenue (1)	See Note Below
4	Lono Avenue at Kaahumanu Avenue	Existing
5	Kahului Shopping Center (Center Street) at Kaahumanu Avenue	Existing
6	Puunene Avenue at Kaahumanu Avenue	Existing
7	Maui Mall at Kaahumanu Avenue	Existing
8	Hana Highway at Kamehameha Avenue	Existing
9	Puunene Avenue at Kahului Shopping Center North	Existing
10	Puunene Avenue at Kahului Shopping Center South	Existing
11	Puunene Avenue at Kamehameha Avenue	Existing
12	Puunene Avenue at Wakea Avenue	Existing
13	Lono Avenue at Vevau Street	Existing
14	Lono Avenue at Kamehameha Avenue	Existing
15	Lono Avenue at Wakea Avenue	Existing
17	School Street at Kamehameha Avenue	Existing
18	Lono Street at Vevau Street	Existing
31	Kane Street at Kamehameha Avenue	Existing
32	Kane Street at Vevau Street	Existing
51	Town Center Drive at Kinau Avenue	Proposed as part of project
52	Town Center Drive at Drive C	Proposed as part of project
53	Town Center Drive at Drives G & H	Proposed as part of project
54	Kinau Avenue at Drives B & D	Proposed as part of project
55	Kinau Avenue at Drive L	Proposed as part of project
56	Kinau Avenue at Drive K	Proposed as part of project
57	Kinau Avenue at Kamehameha Avenue	Proposed as part of project
58	Kamehameha Avenue at Drive J	Proposed as part of project
59	Puunene Avenue at Drive I	Proposed as part of project

Notes:
(1) School Street at Kaahumanu Avenue was removed from the analysis because SDOT stated that they would not allow a connection to Kaahumanu Avenue.

Order of Presentation

Chapter 2 describes existing traffic conditions, the Level-of-Service (LOS) concept and the results of the Level-of-Service analysis of existing conditions.

Chapter 3 describes the process used to estimate 2012 background traffic volumes and the resulting background traffic projections. Background conditions are defined as future background traffic conditions without traffic generation by the study project.

Chapter 4 describes the methodology used to estimate the traffic characteristics of the proposed project, including 2012 background plus project traffic projections.

Chapter 5 describes the traffic impacts of the proposed project.

Chapter 6 describes the conclusions of the impact analysis and recommended mitigation measures.

2. ANALYSIS OF EXISTING CONDITIONS

This chapter presents the existing traffic conditions on the roadways adjacent to the proposed project. The level-of-service (LOS) concept and the results of the Level-of-Service analysis for existing conditions are also presented. The purpose of this analysis is to establish the base conditions for the determination of the impacts of the project which are described in a subsequent chapter.

Description of Existing Streets and Intersection Controls

The following is a summary of the major roadways in the study area:

Puunene Avenue

Puunene Avenue is a major State highway connecting Kahului with Mokulele Highway, with a north-south orientation. Within the study area, Puunene Avenue is a four-lane, two-way facility with separate left turn lanes. The intersections with Kaahumanu Avenue, Kamehameha Avenue and Wakea Avenue are signalized.

Kaahumanu Avenue

Kaahumanu Avenue is a six-lane, two-way east-west State roadway connecting Wailuku and Hobron Triangle. All intersections within the study area have separate left turn storage lanes. Major intersections are signalized.

Kamehameha Avenue

East of School Street, Kamehameha Avenue is a four-lane, divided roadway connecting Hobron Triangle and Kahului. There are separate left turn lanes at the intersection with Puunene Avenue. West of School Street, Kamehameha Avenue is a two-lane roadway.

Lono Avenue

Lono Avenue is located along the eastern boundary of the project. Within the study area, Lono Avenue is a two-lane, two-way roadway with a north-south orientation. Lono Avenue is a County roadway.

Kane Street

Kane Street ends at Kaahumanu Avenue and becomes Kahului Beach Road north of Kaahumanu Avenue. Between Kaahumanu Avenue and Vevau Street, Kane Street is four lanes wide. South on Vevau Street, Kane Street is two lanes wide. Kane Street is a County Roadway.

Wakea Avenue

Within the study area, Wakea Avenue is a two-lane, two-way roadway. Within the western half of the study area, Wakea Avenue has an east-west orientation. In the vicinity of Lono Avenue, the street turns north and intersects Kaahumanu Avenue with a north-south orientation. Wakea Avenue is a County roadway.

Existing Peak Hour Traffic Volumes

The existing morning and afternoon peak hour traffic volumes are shown in Figures 3 and 4.

1. The traffic counts include buses, trucks and other large vehicles. Mopeds and Bicycles were not counted.

2. All intersections were counted from 6:30 AM to 9:00 AM and from 3:30 PM to 6:00 PM on weekdays. Traffic counts were not performed during Wednesday afternoons.

3. The traffic volumes shown are the peak hourly volume of each movement rather than the peak sum of all approach volumes.

4. The traffic volumes of adjacent intersections may not match the volumes shown for an adjacent intersection because the peak hours of the adjacent intersections may not coincide and there are driveways between the intersections.

5. Pedestrian activity was negligible.

The existing traffic volumes shown are based on the traffic counts completed for the MCC Student Housing and Kane Street Mixed Use Projects as discussed with DPW&EM during pre-consultation discussions. This was to insure that the projections, analyses and conclusions are consistent with other traffic studies for projects in the area.

During review of the TIAR for the MCC Student Housing and Kane Street Mixed Use Project, DPW&EM questioned whether traffic counts conducted on Mondays and Fridays were representative of weekday traffic counts. In response, two continuous traffic counts were performed along Kane Street for a one week period. One week with school in session and one week with school out of session. The results determined that when schools are in session, there is little difference in the morning counts. There is little variation in the afternoon peak hour volumes except for Fridays, which are 5% higher than Monday and Thursday and 6.6% higher than Tuesday and Wednesday. The conclusion of this analysis is that when schools are in session, Fridays represent typical weekday traffic volumes. Schools were in session during the traffic counts. The analysis performed for the MCC and Kane Street project is reproduced as Appendix J.

Regarding State highways, SDOT recently provided comments on a traffic count project performed as part of the Kaneohe Circulation Study in Oahu. SDOT commented that typically Friday counts are higher than the other weekday counts. A copy of this comment letter is provided in Appendix J.

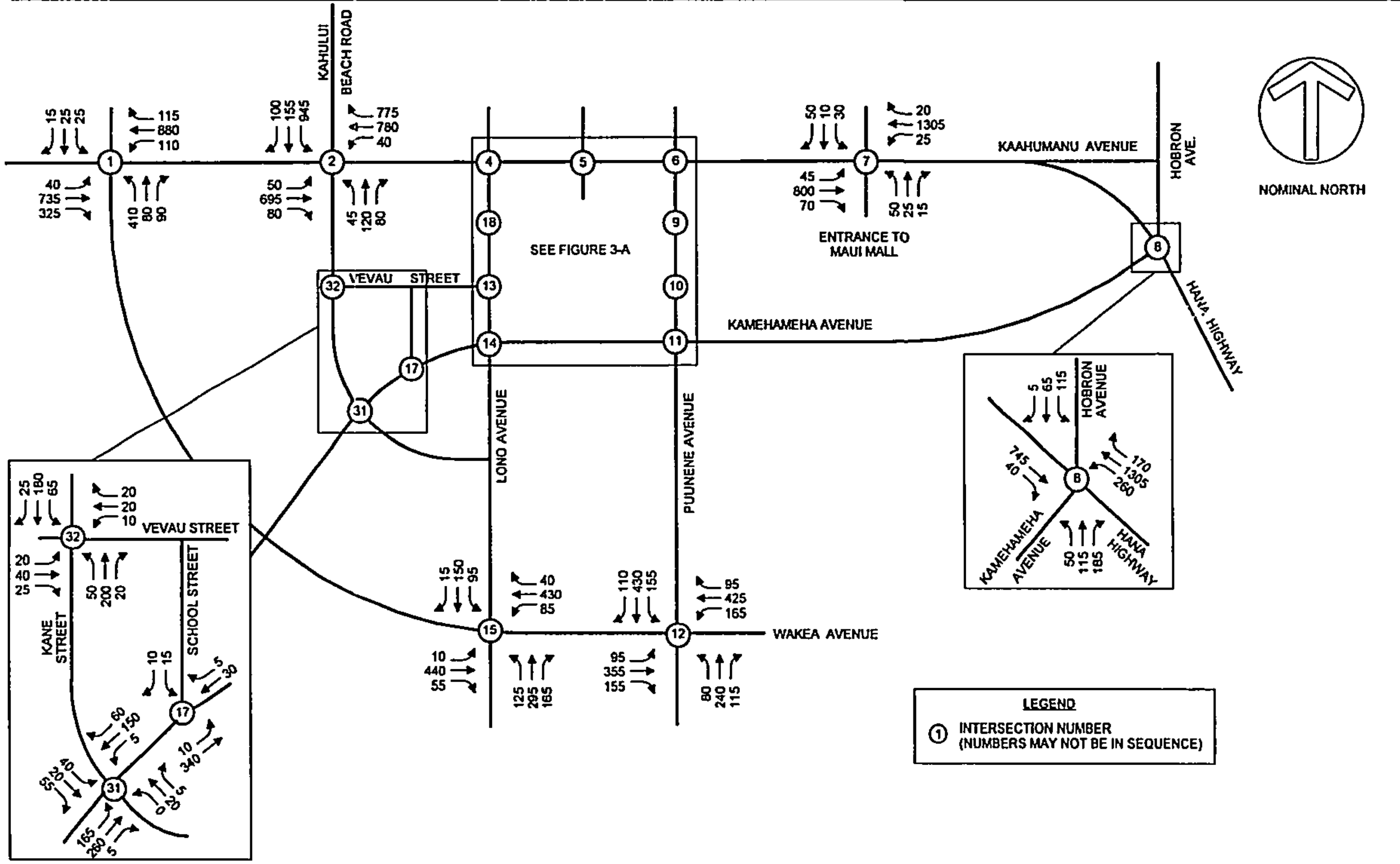

Figure 3
EXISTING (2004) AM PEAK HOUR TRAFFIC VOLUMES

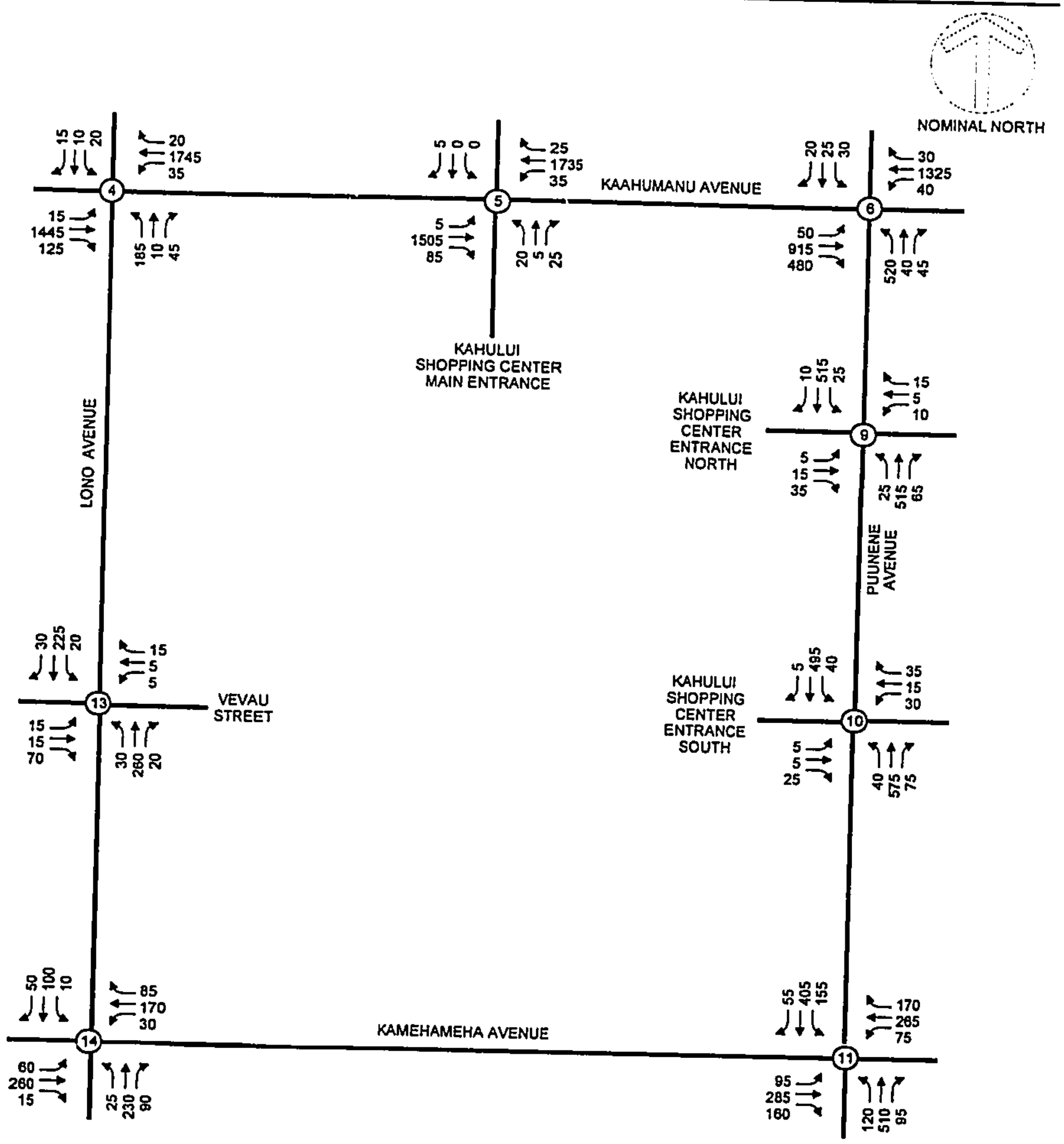

Figure 3A
EXISTING (2004) AM PEAK HOUR TRAFFIC VOLUMES INSET

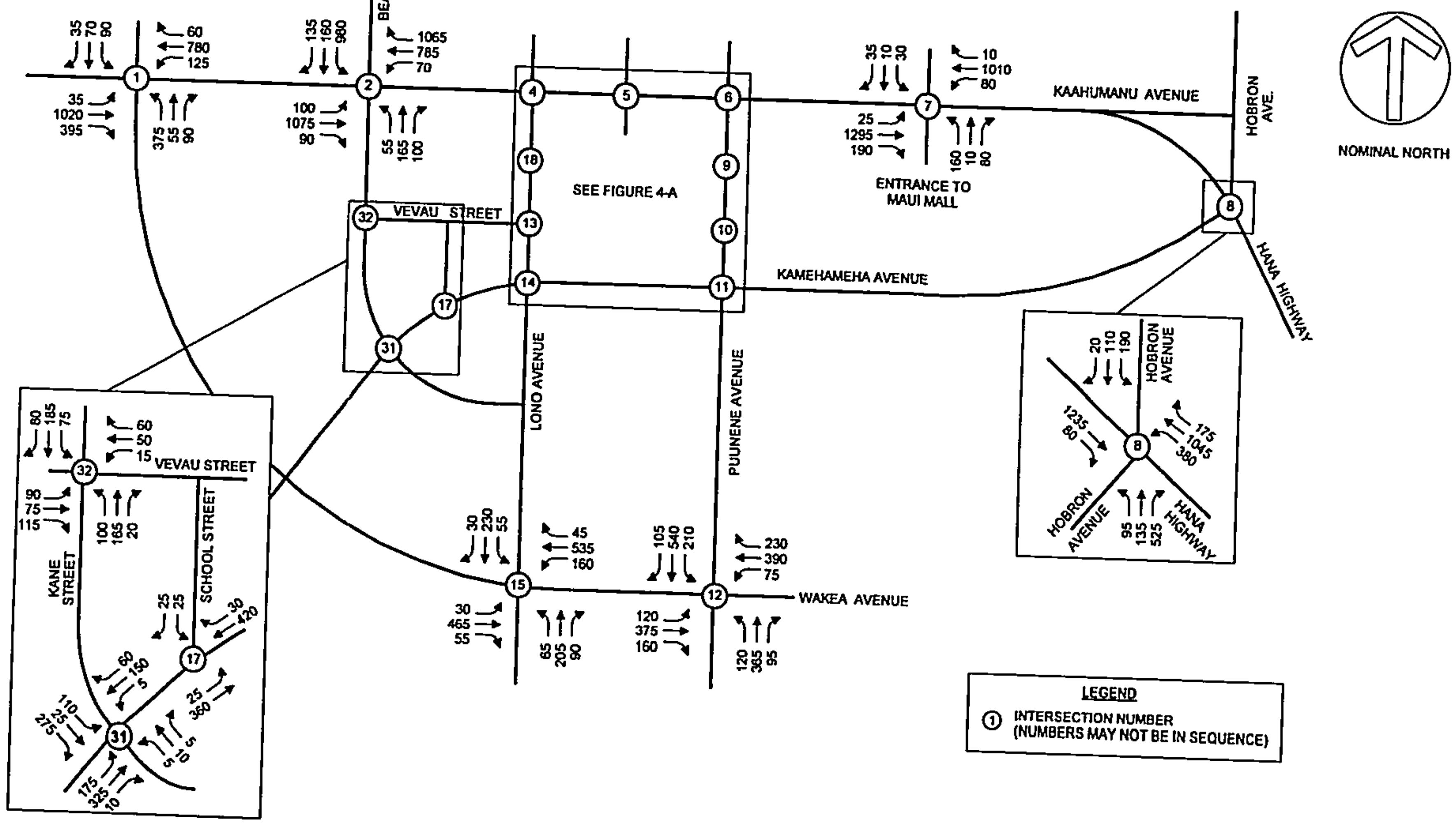

Figure 4
EXISTING (2004) PM PEAK HOUR TRAFFIC VOLUMES

Phillip Rowell and Associates

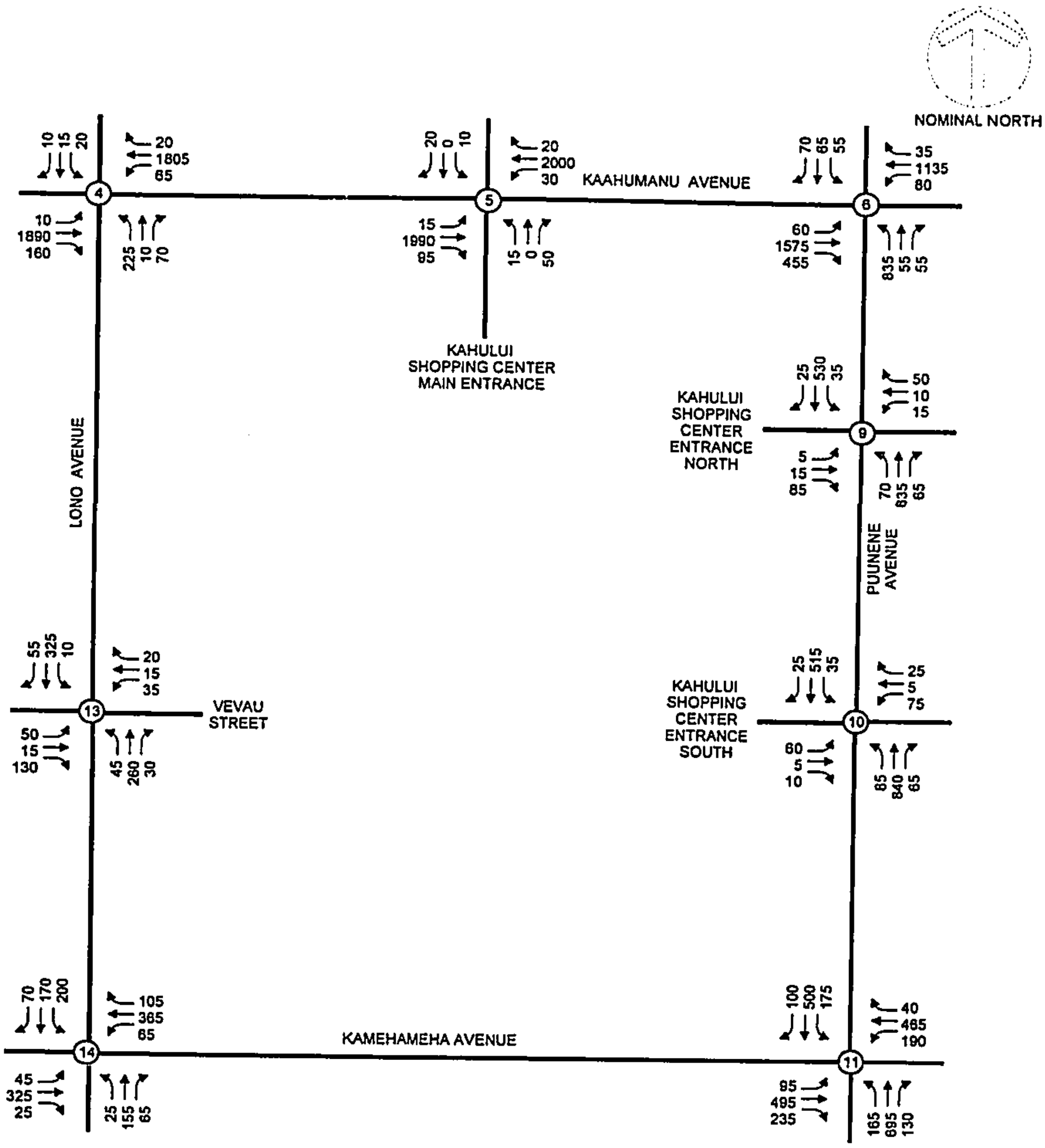

Figure 4A
EXISTING (2004) PM PEAK HOUR TRAFFIC VOLUMES INSET

Level-of-Service Concept

Signalized Intersections

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (Level-of-Service) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 4. In general, Level-of-Service A represents free-flow conditions with no congestion. Level-of-Service F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 4 Level-of-Service Definitions for Signalized Intersections[1]

Level of Service	Interpretation	Volume-to-Capacity Ratio[2]	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 5 summarizes the definitions for level-of-service and the corresponding delay.

Table 5 Level-of-Service Definitions for Unsignalized Intersections[1]

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

Level-of-Service Analysis of Existing Conditions

The existing levels-of-service of the study intersections are summarized in Table 6. State of Hawaii Department of Transportation requested that the level-of-service analysis be performed using the Synchro software. The level-of-service analysis of the signalized intersections was therefore performed using Synchro 6. The timing from Synchro was then download into the *Highway Capacity Software* to perform the level-of-service analysis. The results shown in the table are the volume-to-capacity ratios, delays and levels-of-service of the overall intersections as reported by the *Highway Capacity Software.*

For unsignalized intersections, the delays and levels-of-service of the lowest controlled lane groups are shown in the table. All the remaining controlled movements of the intersection operate at a higher level-of-service than that shown in the table. The *Highway Capacity Software* nor Synchro calculates the volume-to-capacity ratio of an unsignalized intersection.

Table 6 Existing (2004/2005) Levels-of-Service

Peak Hour and Movement	Right-of-Way Control	AM Peak Hour			PM Peak Hour		
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS
Kaahumanu Av. at Wakea Av.	Signalized	0.52	22.9	C	0.68	25.4	C
Kaahumanu Av. at Kahului Beach Rd.	Signalized	0.71	219.7	F	0.85	54.7	D
Kaahumanu Av. at Lono Av.	Signalized	0.60	22.2	C	0.74	19.5	B
Kaahumanu Av. at Kahului SC	Unsignalized		>999.9	F		>999.9	F
Kaahumanu Av. at Puunene Av.	Signalized	0.63	26.0	C	1.00	51.5	D
Kaahumanu Av. at Maui Mall	Signalized	0.37	15.2	B	0.61	18.2	B
Hana Highway at Kamehameha Av.	Signalized	0.58	31.8	C	0.88	52.7	D
Puunene Av at Kahului Shopping Center North	Unsignalized		19.8	C		49.6	E
Puunene Av at Kahului Shopping Center South	Unsignalized		32.3	D		257.3	F
Kamehameha Av. at Puunene Av.	Signalized	0.52	18.7	C	0.88	30.0	C
Puunene Av. at Wakea Av.	Signalized	0.69	45.9	D	0.73	38.7	D
Lono Av. at Vevau St.	Unsignalized		14.0	B		33.3	D
Kamehameha Av. at Lono Av.	Signalized	0.33	9.0	A	0.43	10.6	B
Lono Av. at Wakea Av.	Signalized	0.46	16.3	B	0.47	15.0	B
Kamehameha Av. at School St.	Unsignalized		13.0	B		18.0	C
Kamehameha Av. at Kane St.	Unsignalized		30.5	D		151.2	F
Kane St. at Vevau St.	Unsignalized		20.8	C		47.4	E

NOTES:
1. V/C denotes ratio of volume to capacity. V/C ratios are not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Detailed results of the level-of-service calculations indicating the delays and level-of-service of each movement are presented as Appendices A and B.

3. PROJECTED BACKGROUND TRAFFIC CONDITIONS

The purpose of this chapter is to discuss the assumptions and data used to estimate background traffic conditions. Background traffic conditions are defined as future traffic volumes without the proposed project.

Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. This growth factor also considers traffic associated with minor, or small, projects for which no traffic data are available.

The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project.

Design Year for Traffic Forecasts

The design, or horizon, year of a project is the future year for which background traffic conditions are estimated. As noted in Chapter 1, the anticipated completion date of the final phase of the project is 2012.

Background Traffic Growth

The *Maui Long Range Transportation Plan*[2] concluded that traffic in Maui would increase an average of 1.6% per year from 1990 to 2020. This growth rate was used to estimate the background growth between 2005 and 2012. The growth factor was calculated to be 1.1354 using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor
i = Average annual growth rate, or 0.016
n = Growth period in years

The growth factors were applied to all traffic movements at the study intersections.

Related Projects

The second component in estimating background traffic volumes is traffic resulting from other proposed projects in the vicinity. Related projects are defined as those projects that are likely to be constructed and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements.

Six projects were identified as related projects. The approximate locations of these projects are shown in Figure 5 and the number of estimated peak hour trips generated by each is summarized in Table 7.

Table 7 Related Projects

		AM Peak Hour Trips			PM Peak Hour Trips		
Letter[1]	Project Name/Description	In	Out	Total	In	Out	Total
A	Mercedes of Maui	55	44	99	41	44	85
B	Maui Oil Company Carwash	29	26	55	26	29	55
C	Maui Beach Hotel Renovation	39	32	71	48	35	83
D	Lono St and Kane St Projects	59	98	157	166	145	311
E	Maui Business Park Phase II	1172	471	1643	2099	2565	4664
F	Not Used						
G	Maui Lani	1224	1409	2633	1862	1786	3648
H	Maui Land & Pine Office Project	59	98	157	105	84	189

Notes:
(1) See Figure 5 for locations of projects.

Not shown on the list of related projects is the proposed Superferry. SDOT-Harbors and the EIS consultant were contacted regarding the traffic characteristics of the Superferry. We were advised that no peak hour traffic will be generated by the Superferry. Therefore, the Superferry will not impact peak hour traffic conditions in the study area. In response to comments from SDOT and County of Maui, an analysis of Superferry generated traffic superimposed on the afternoon peak hour traffic was performed. This analysis and the results are presented as Appendix F.

Also not shown is expanded services of at Kahului Harbor. Based on a review of the Kahului Harbor Master Plan report, the growth of traffic associated with the harbor is included in the background growth rate previously described as growth will be consistent with historical trends.

[2] Kaku Associates, October 1996

Traffic assignments for the related projects were obtained from their respective traffic studies if available. For projects that did not have a traffic impact study, the project descriptions were used to estimate the peak hour trips that the projects will generate. The trips were then distributed and assigned to the study intersections.

Background Traffic Projections

Background traffic projections were calculated by expanding existing traffic volumes by the appropriate growth rates (1.1354) and then superimposing traffic generated by related projects. The resulting peak hour traffic projections are shown on Figures 6 and 7.

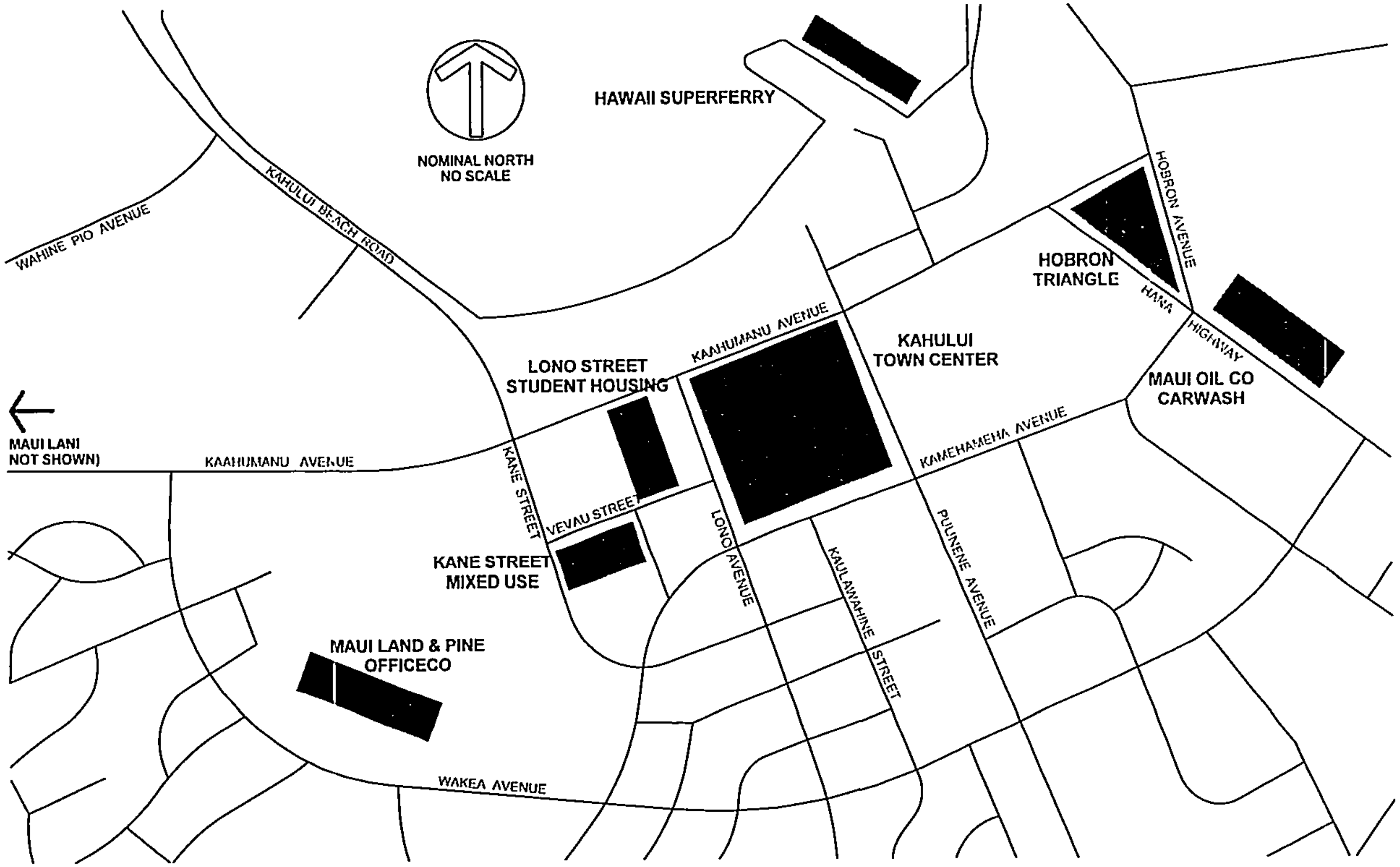

Figure 5
LOCATIONS OF RELATED PROJECTS

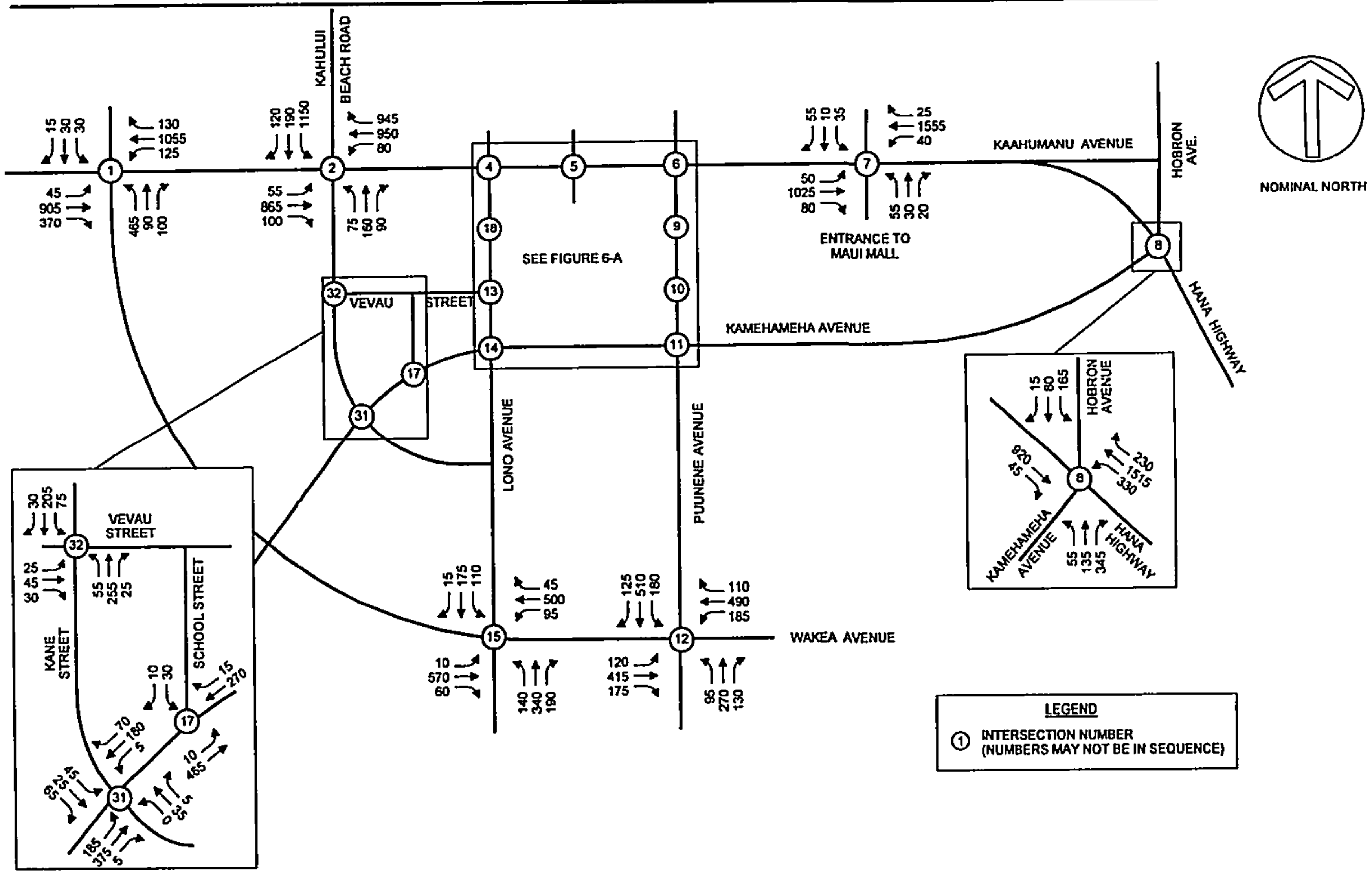

Figure 6
BACKGROUND (2012) AM PEAK HOUR TRAFFIC PROJECTIONS

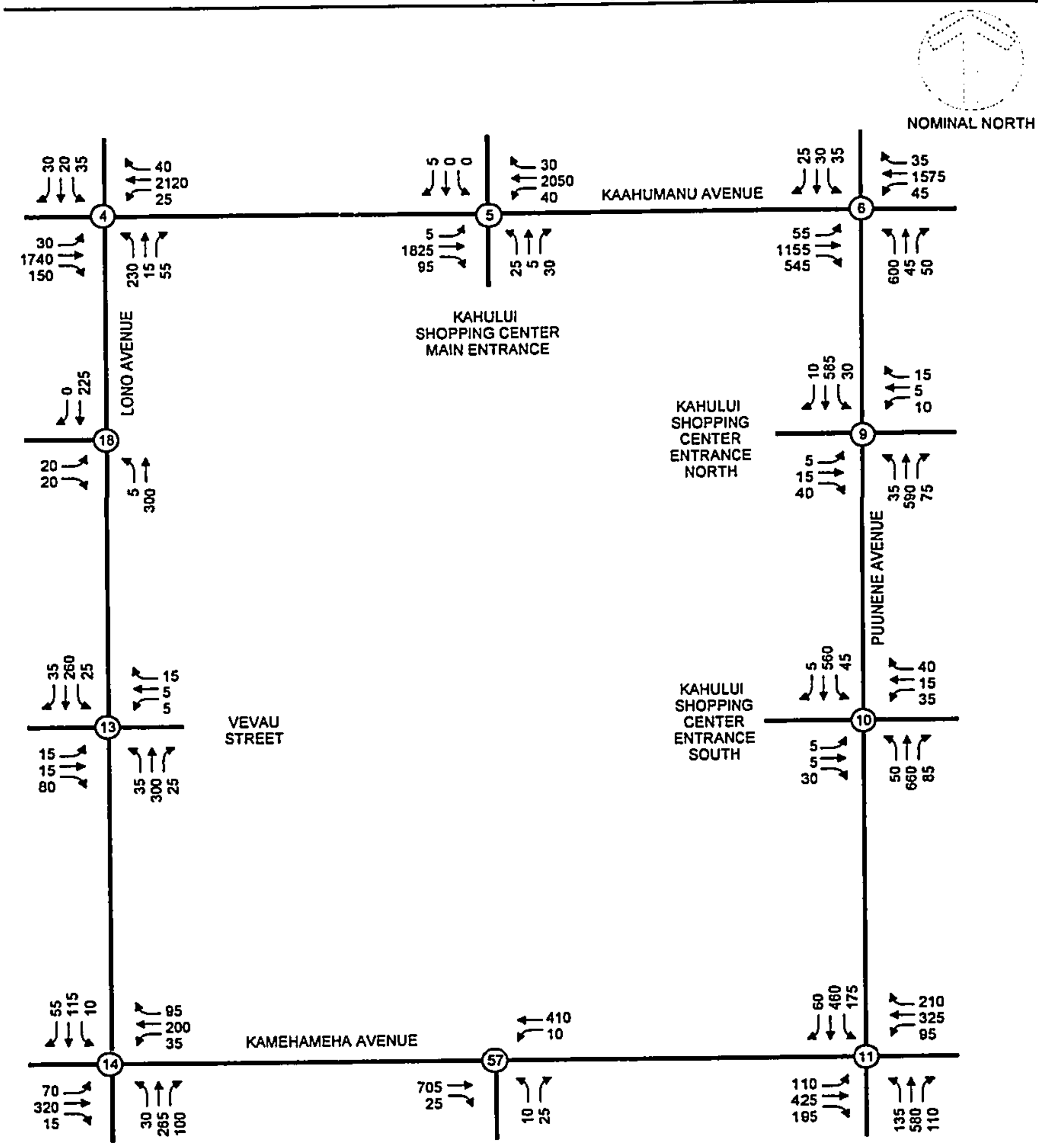

Figure 6A
BACKGROUND (2012) AM PEAK HOUR TRAFFIC PROJECTIONS INSET

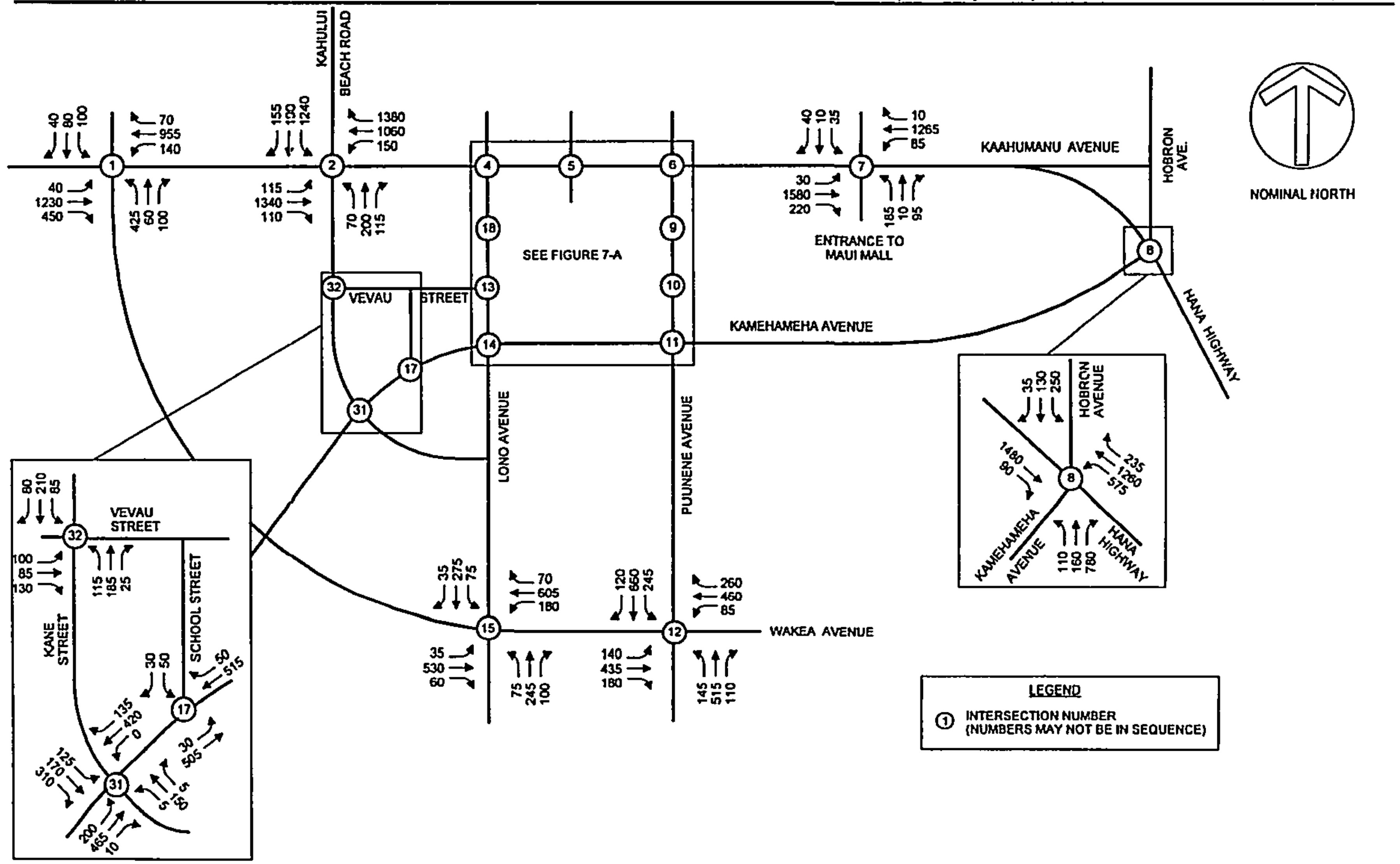

Figure 7
BACKGROUND (2012) PM PEAK HOUR TRAFFIC PROJECTIONS

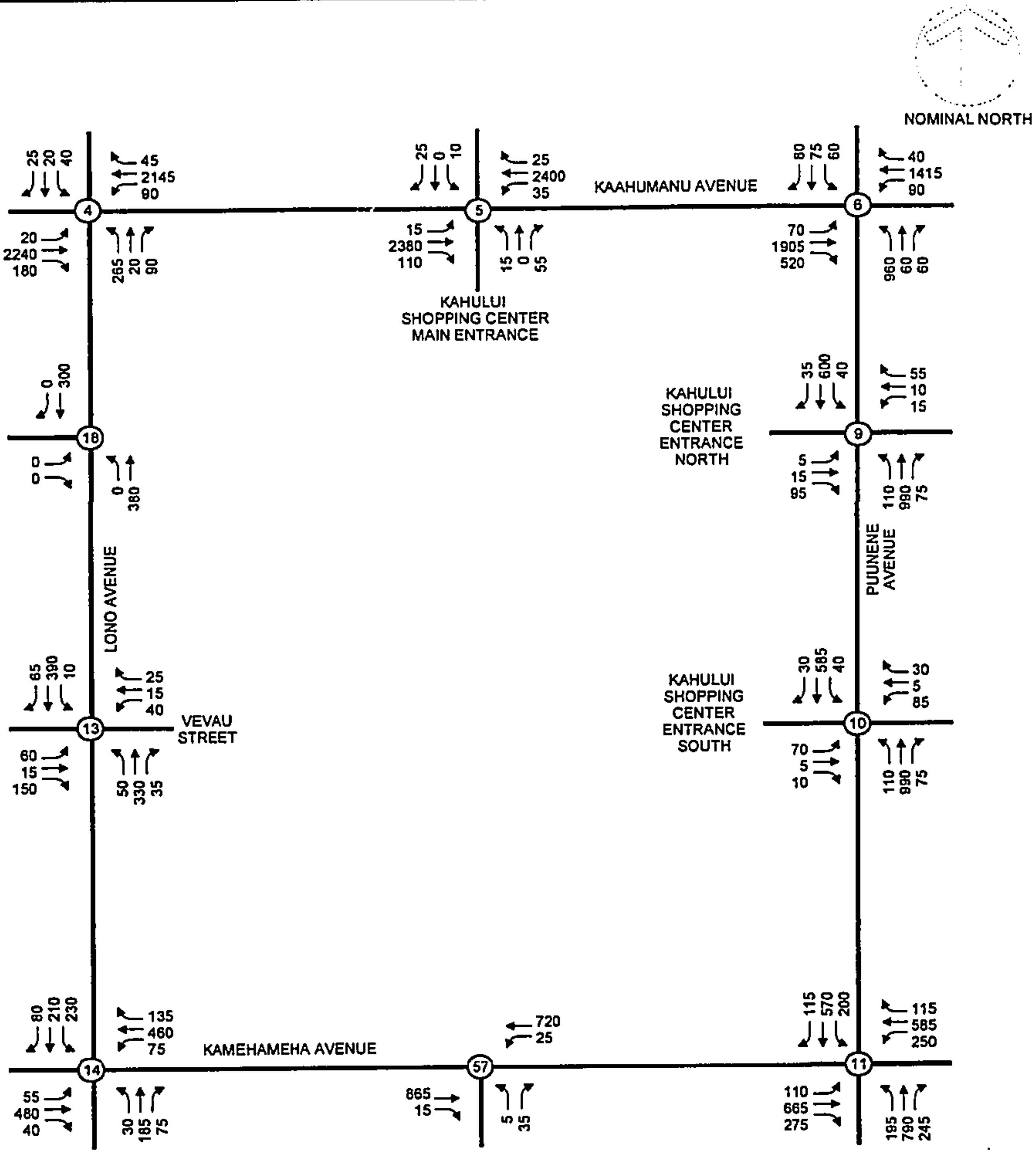

Figure 7A
BACKGROUND (2012) PM PEAK HOUR TRAFFIC PROJECTIONS INSET

4. PROJECT-RELATED TRAFFIC CONDITIONS

This chapter discusses the methodology used to estimate the amount of project generated traffic at the study intersections. Generally, the process involves the estimation of weekday peak-hour trips that would be generated by the proposed project, distribution and assignment of these trips on the approach and departure routes, and finally, determination of future background plus project traffic projections.

The results of the level-of-service analysis of background plus project conditions are presented in the following chapter.

Trip Generation Analysis Methodology and Assumptions

Traffic volumes generated by the project were estimated using the procedures described in the *Trip Generation Handbook*,[3] published by the Institute of Transportation Engineers. This method uses trip generation rates and equations to estimate the number of trips that a project will generate during the morning and afternoon peak hours. Trip generation analysis was performed using trip generation data provided by the Institute of Transportation Engineers.[4] Separate trip generation analyses were performed for each quadrant of the project.

3 Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

4 Institute of Transportation Engineers, *Trip Generation, Seventh Edition*, Washington, D.C., 2003

The proposed development within each quadrant is summarized in Table 8.

Table 8 Proposed Development Plan By Quadrant

Proposed Use	Land Use Code	Units	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	Totals
Residential	230	Units	0	80	295	67	442
Existing Office	710	Square Feet	0	0	0	56,653	56,653
New Office	710	Square Feet	61,574	0	0	34,596	96,170
Bank	912	Square Feet	9,000	0	0	4,180	13,180
Restaurant	832	Square Feet	4,484	1,258	6,593	0	12,335
Retail	820	Square Feet	36,234	12,163	40,732	29,414	118,543

Notes:
(1) Source:

The assumptions used for the trip generation analysis are:

1. Trip generation rates for condominiums were used to estimated the number of peak hour trips generated by the condominium. These trip rates are based on the number of units.

2. The trip generation rates for general office buildings were used to estimate the peak hour trips generated by the existing and proposed office buildings. These rates are based on the gross square feet of floor area.

3. The trip generation rates for walk-in banks were used to estimate the peak hour trips generated by the banks. These rates are based on the gross square feet of floor area.

4. The trip generation rates for sit-down restaurants were used to estimate the peak hour trips generated by the restaurants. These rates are based on the gross square feet of floor area.

5. Trip generation rates for shopping centers were used to estimate the number of peak our trips generated by the retail portion of the project. These rates are based on the leasable floor area. It was assumed that the leasable floor area is 85% of the gross floor area.

The trip generation rates and equations are summarized in Table 9.

Table 9 Trip Generation Rates Used for the Trip Generation Analysis

Propose Use		Residential Condominiums	Office (New and Existing)	Bank	Restaurant	Retail
Land Use Code		230	710	912	832	820
Period & Direction		Trips per Unit or %				
AM Peak Hour	Total	0.44	1.55	12.34	9.27	Ln (T) = 0.60Ln(A)+2.29
	Inbound	18%	88%	56%	52%	61%
	Outbound	82%	12%	44%	48%	39%
PM Peak Hour	Total	0.52	1.49	45.74	10.86	Ln (T) = 0.66Ln(A)+3.40
	Inbound	64%	17%	50%	60%	48%
	Outbound	36%	83%	50%	40%	52%

Note: T = Trips, A = 1,000 gross leasable square feet

Discount for Mixed Used Development

The total number of trips was discounted to account for reduced trips generated by the mixed use development. This discount was estimated separately for each type of use within the project. The discount for the retail trips was estimated by comparing the sum of the trips generated by each quadrant to the trips generated by the total retail within the project. Since the number of trips generated by retail projects is non-linear, the difference between the two calculations is the discount applicable for the overall development. The estimated discount was applied to both new retail trips and pass-by retail trips.

The discount for the remaining elements of the project was estimated by comparing the estimated number of trips generated by each component of the project and allocating 5% of the trips as internal-internal trips. This is a small percentage as compared to the discount allowed by other jurisdictions for multi-use developments, which typically range between 10% and 15%. Therefore, the discounts that were used for this project are conservative.

The discounts used are summarized in Table 10.

Table 10 Discounts for Mixed Use Development

Proposed Use	Land Use Code	Mixed Use Discount AM	Mixed Use Discount PM
Residential	230	5%	5%
Existing Office	710	5%	5%
New Office	710	5%	5%
Bank	912	5%	5%
Restaurant	832	5%	5%
Retail	820	40%	35%

Trips Generation Analysis Results

The total trips generated by the project are summarized in Table 11. Detailed trip generation calculations for each quadrant and the total project are provided as Appendix C.

Table 11 Total Trips Generated by Proposed Project

Total Trips Generated By Project - Unadjusted for Mixed Use Development

Period & Direction		Residential	Existing Office	New Office	Bank	Restaurant	Retail			Project Totals		
							Total	Pass By	Net	Total	Pass By	Net
AM Peak Hour	Total	194	88	149	163	115	268		268	977	0	977
	In	33	77	132	91	60	163		163	556	0	556
	Out	161	11	17	72	55	105	0	105	421	0	421
PM Peak Hour	Total	230	84	144	603	135	990	574	416	2186	574	1612
	In	153	14	25	302	80	474	288	186	1048	288	760
	Out	77	70	119	301	55	516	286	230	1138	286	852

Discounts for Mixed Use Development

Period & Direction		Residential	Existing Office	New Office	Bank	Restaurant	Retail			Project Totals		
							Total	Pass By	Net	Total	Pass By	Net
AM Peak Hour	Total	10	4	8	9	6	107		107	144	0	144
	In	1	4	6	4	3	65		65	83	0	83
	Out	9	0	2	5	3	42	0	42	61	0	61
PM Peak Hour	Total	12	4	8	31	7	347	201	146	409	201	208
	In	7	1	1	15	3	165	102	63	192	102	90
	Out	5	3	7	16	4	182	99	83	217	99	118

Total Trips Generated By Project - Adjusted for Mixed Use Development

Period & Direction		Residential	Existing Office	New Office	Bank	Restaurant	Retail			Project Totals		
							Total	Pass By	Net	Total	Pass By	Net
AM Peak Hour	Total	184	84	141	154	109	161	0	161	833	0	833
	In	32	73	126	87	57	98	0	98	473	0	473
	Out	152	11	15	67	52	63	0	63	360	0	360
PM Peak Hour	Total	218	80	136	572	128	643	373	270	1777	373	1404
	In	146	13	24	287	77	309	188	121	856	188	668
	Out	72	67	112	285	51	334	185	149	921	185	736

Trip Distribution and Assignments

The project-related trips were distributed along the anticipated approach routes to and departure routes from the project site based on the directional distribution of existing peak hour traffic and adjacent land uses. The project trip assignments are shown on Figures 8 and 9. The pass by trip assignments are shown on Figure 10.

2012 Background Plus Project Projections

Background plus project traffic conditions are defined as 2012 background traffic conditions plus project related traffic. These projections were estimated by subtracting traffic generated by existing development and then superimposing the peak hourly traffic generated by the proposed project onto the net 2012 background peak hour traffic volumes. Traffic generated by the existing on-site development was subtracted from the background traffic stream manually. This calculation is shown in the traffic projection worksheets that are presented as Appendix D.

The resulting peak hour traffic projections for 2012 background plus project conditions are shown on Figures 11 and 12.

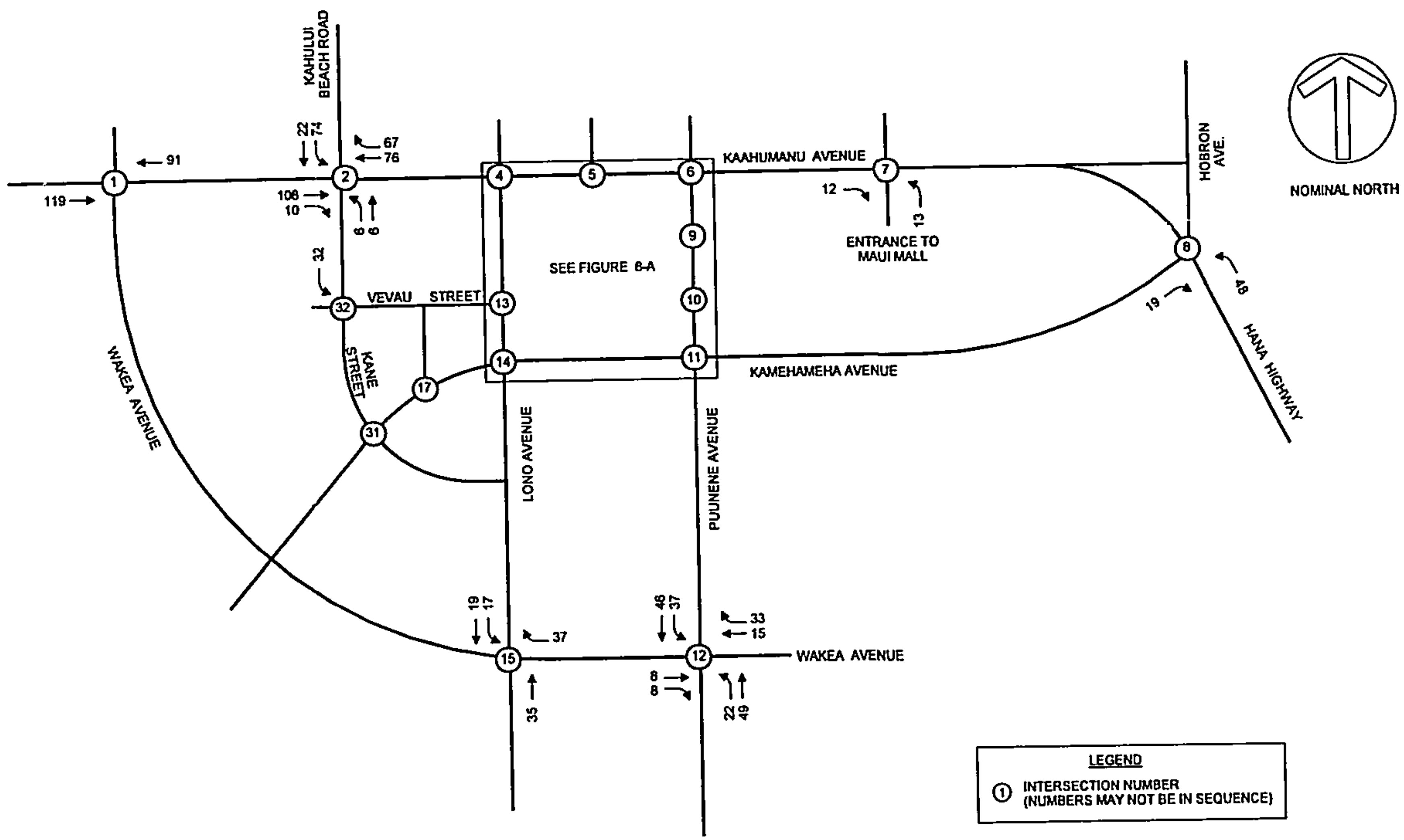

Figure 8
AM PROJECT TRIP ASSIGNMENTS

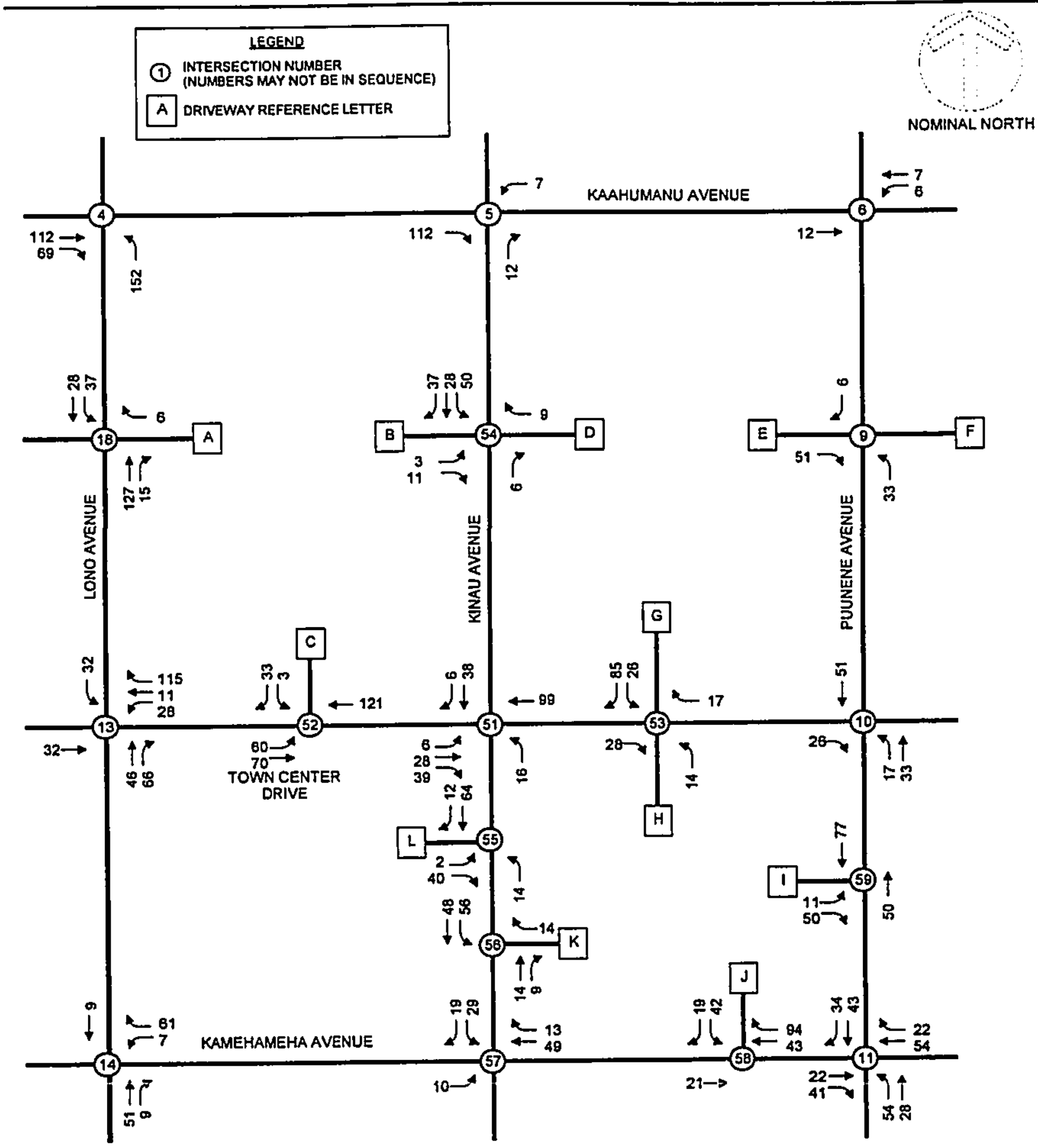

Figure 8A
AM PROJECT TRIP ASSIGNMENTS INSET

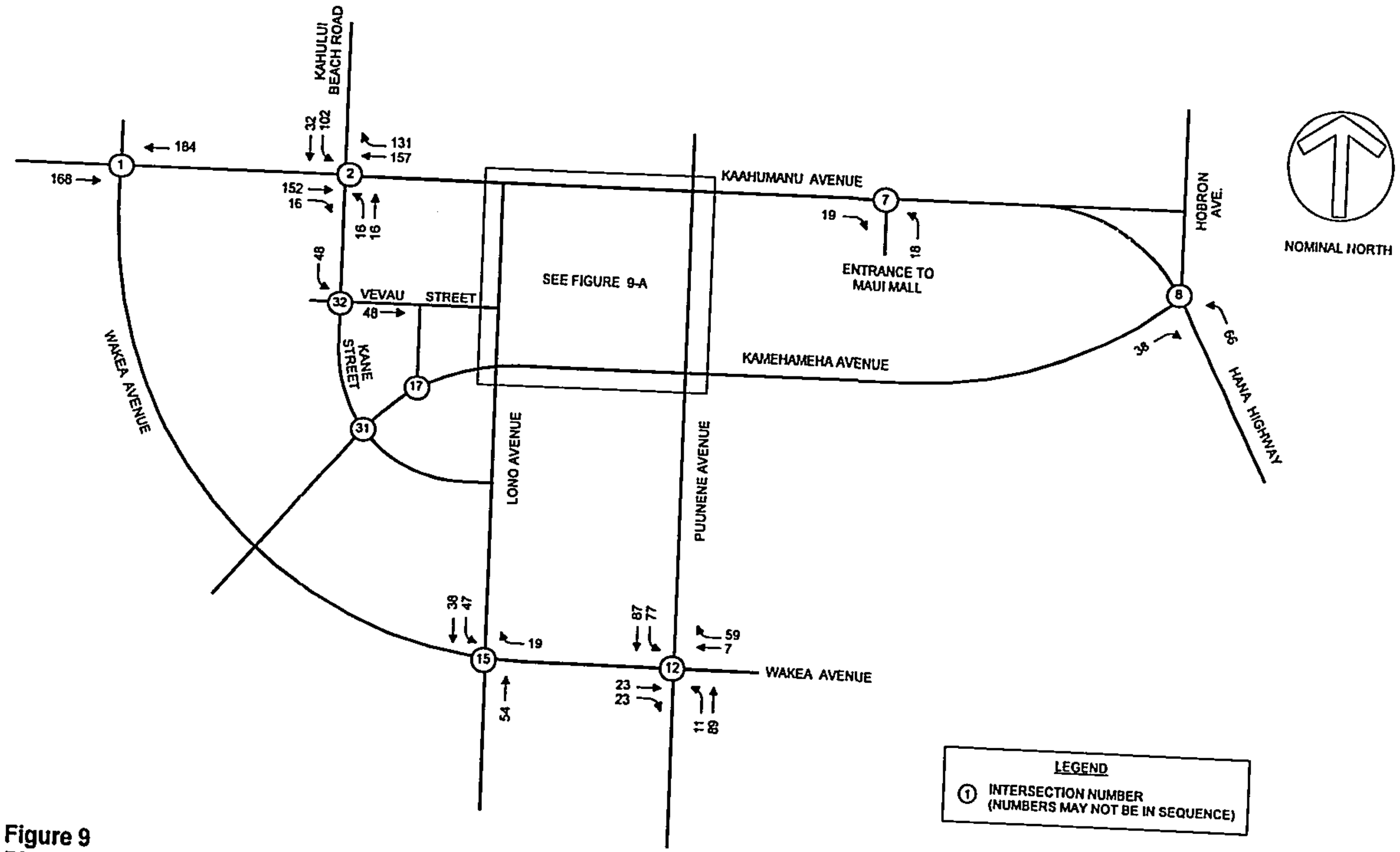

Figure 9
PM PROJECT TRIP ASSIGNMENTS

Phillip Rowell and Associates

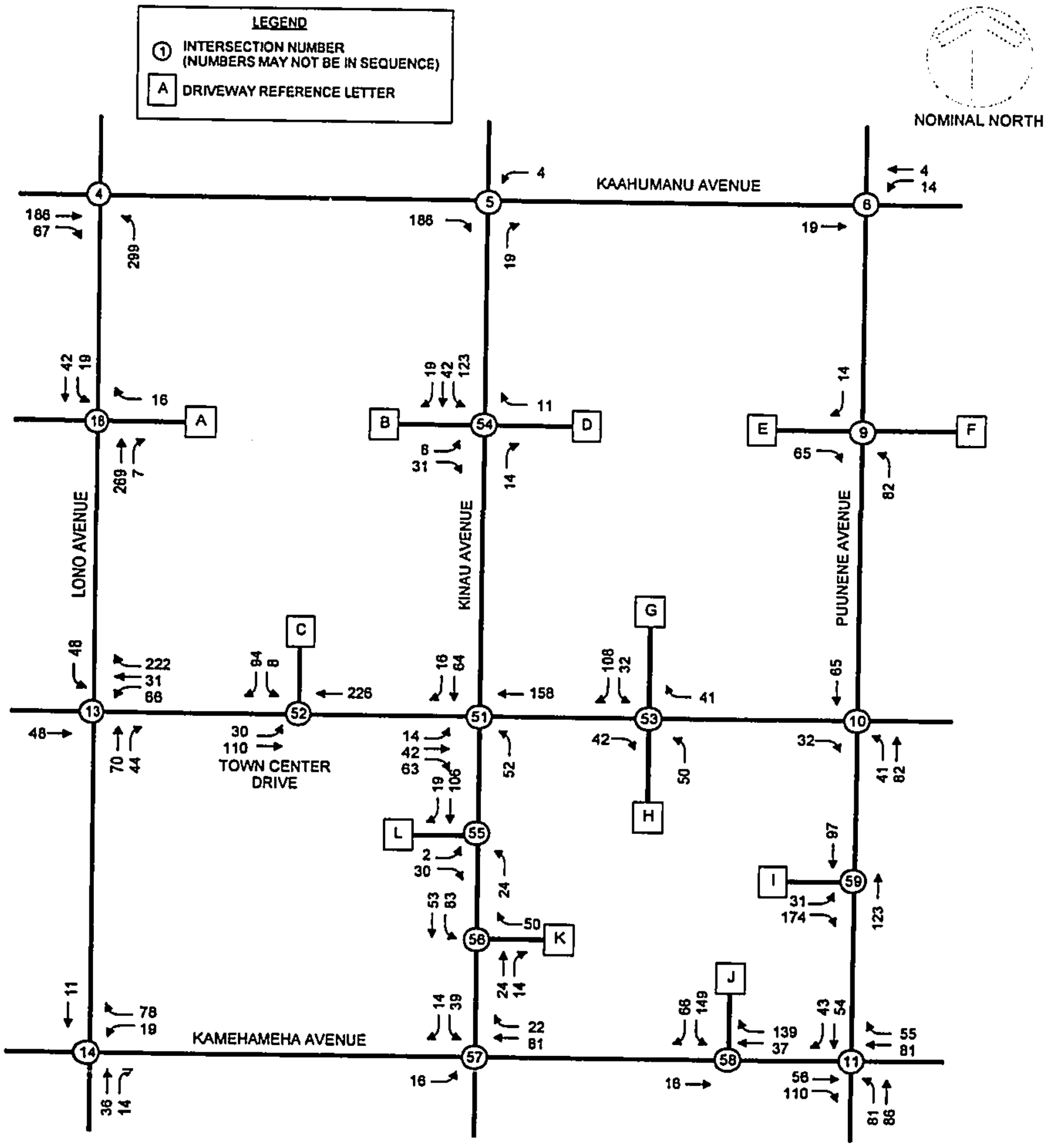

Figure 9A
PM PROJECT TRIP ASSIGNMENTS INSET

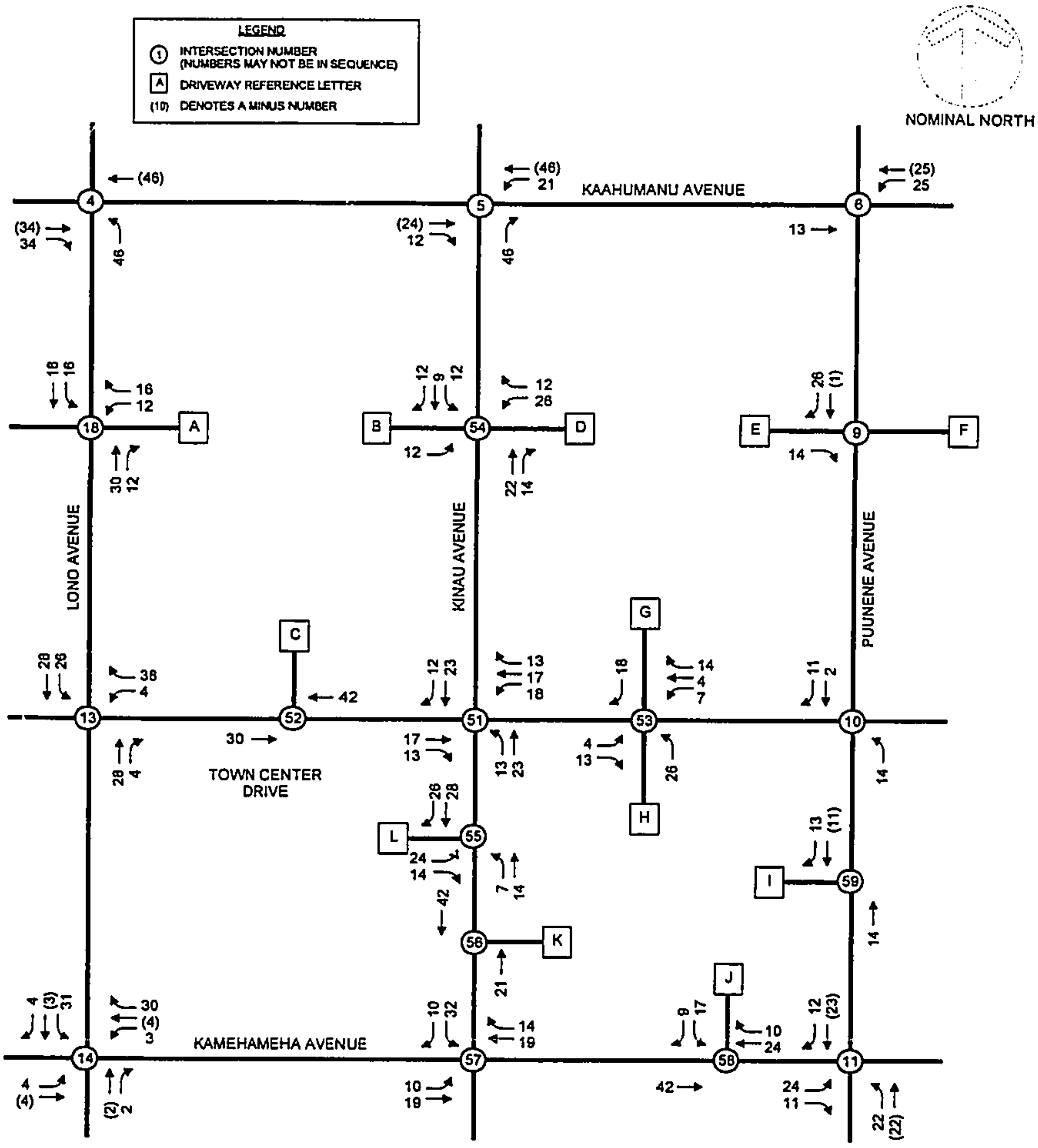

Figure 10
PASS BY TRIP ASSIGNMENTS
(PM PEAK HOUR ONLY)

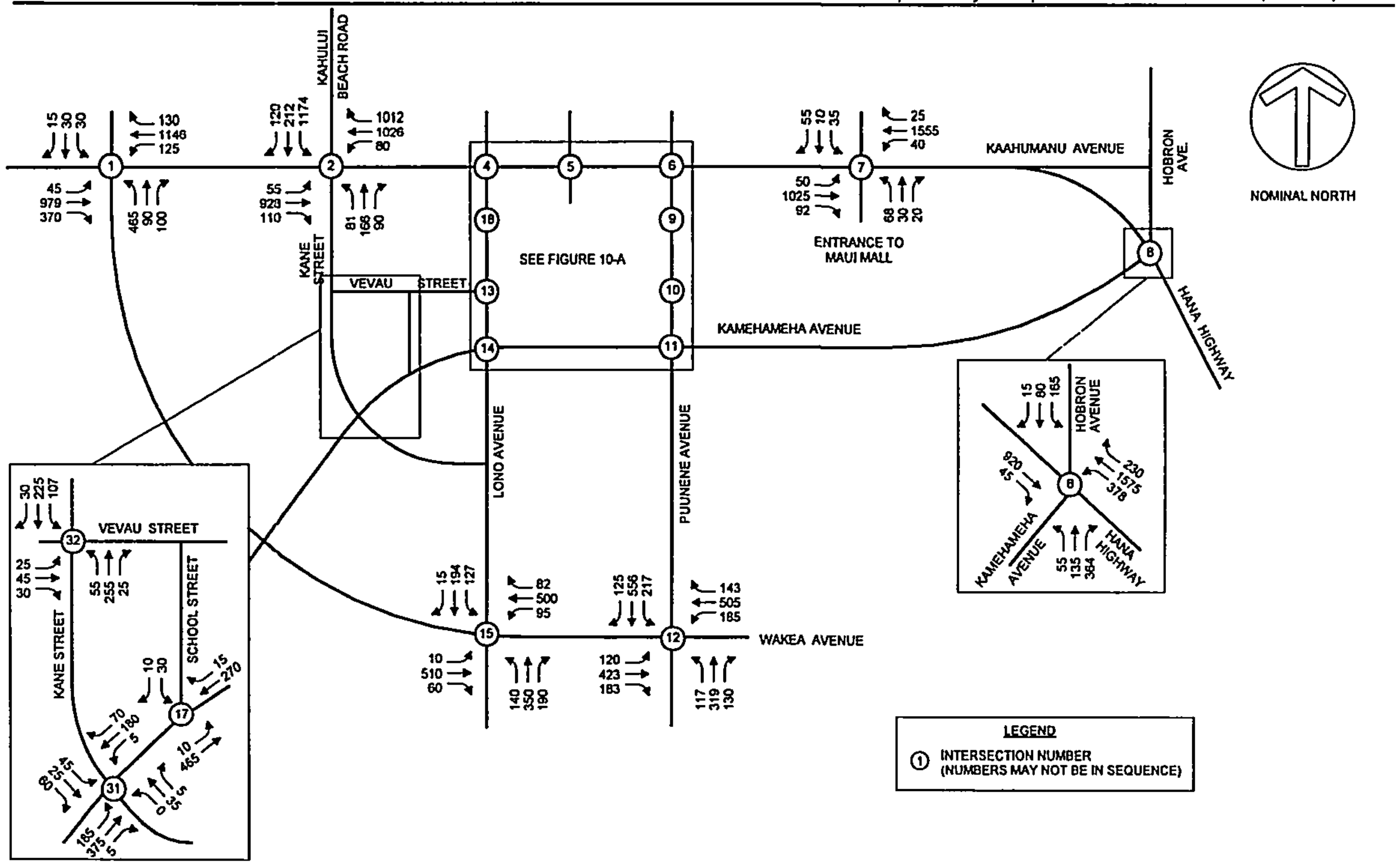

Figure 11
BACKGROUND (2012) PLUS PROJECT AM PEAK HOUR TRAFFIC PROJECTIONS

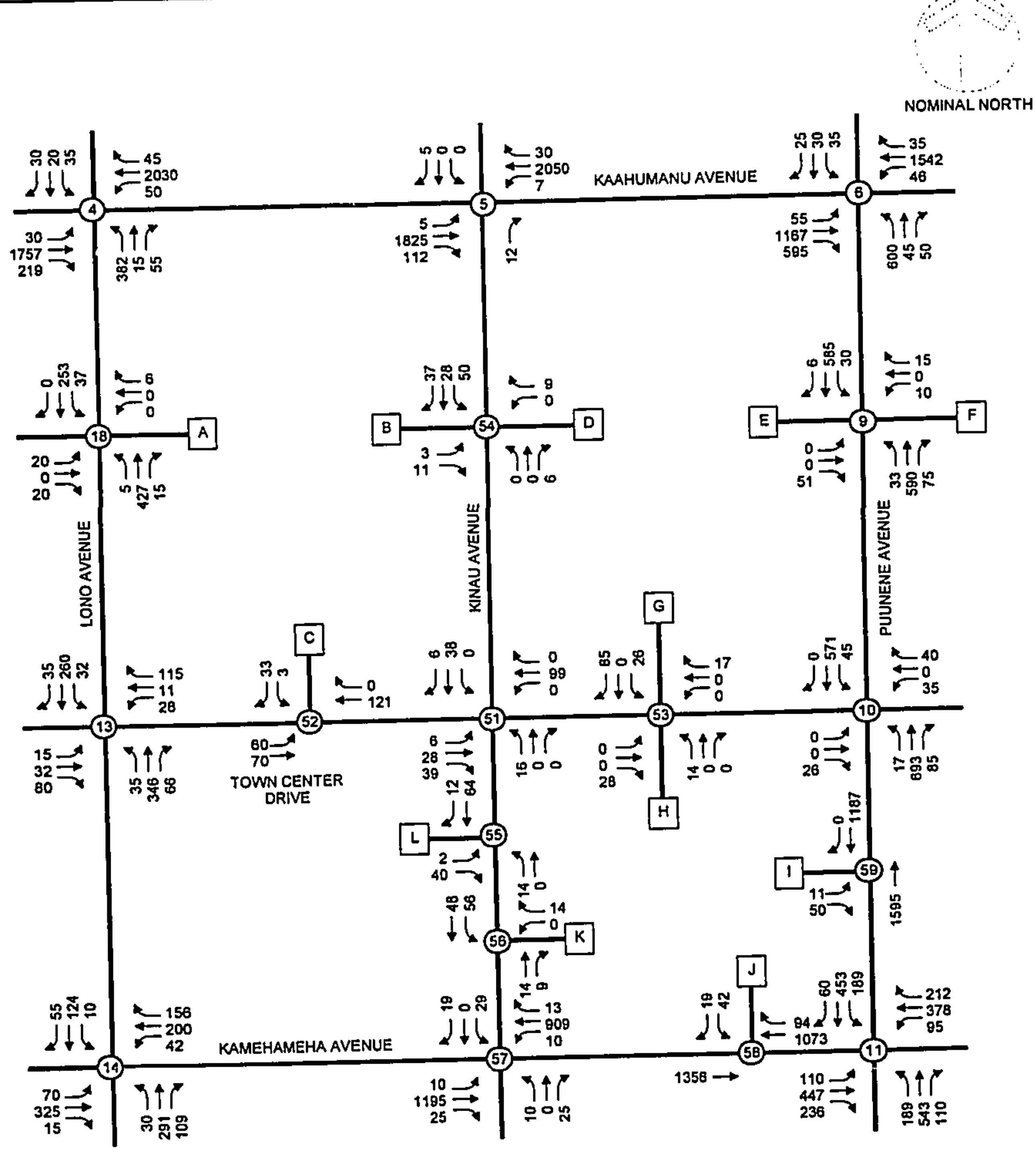

Figure 11A
BACKGROUND (2012) PLUS PROJECT AM PEAK HOUR TRAFFIC PROJECTIONS INSET

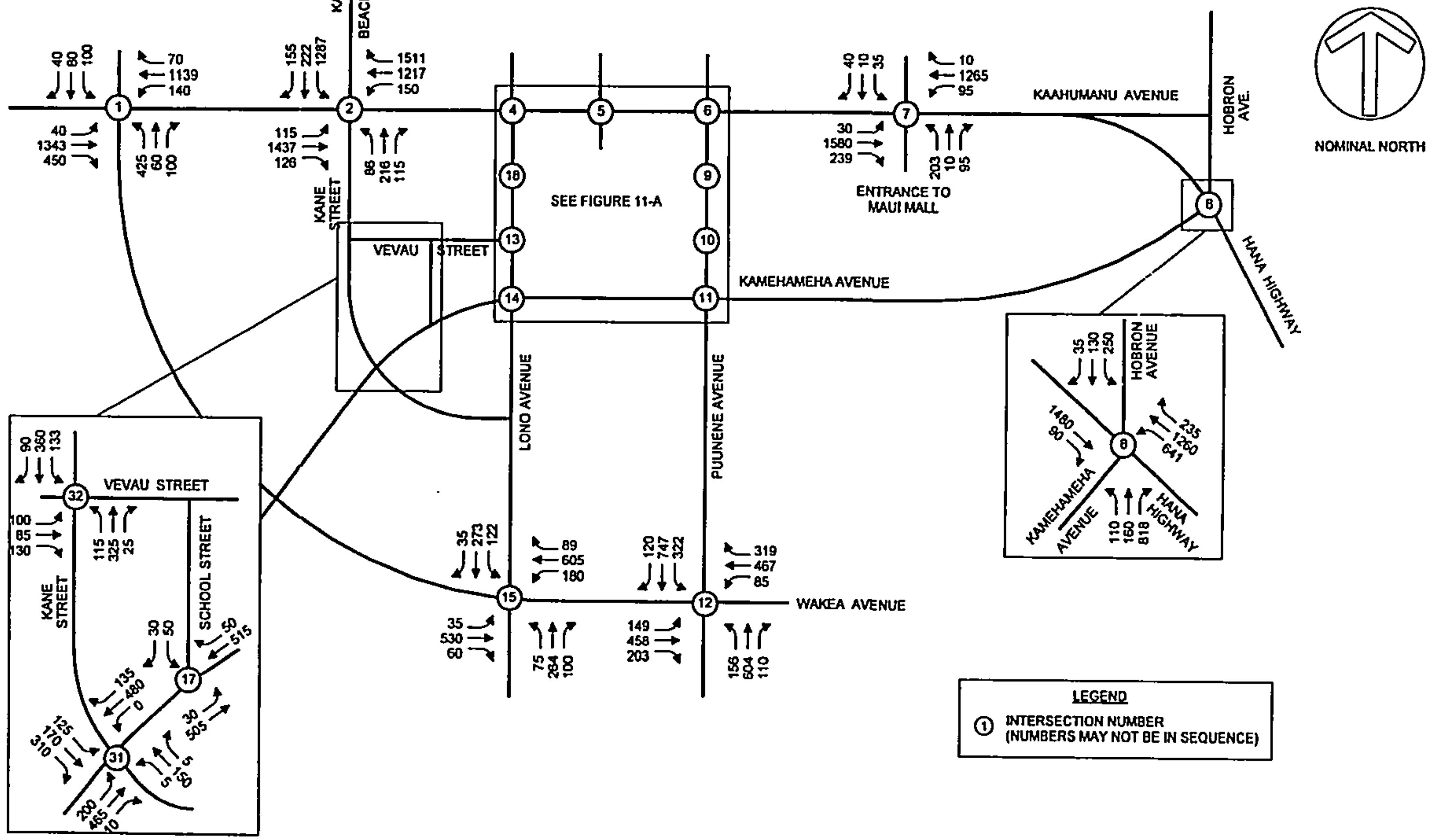

Figure 12
BACKGROUND (2012) PLUS PROJECT PM PEAK HOUR TRAFFIC PROJECTIONS

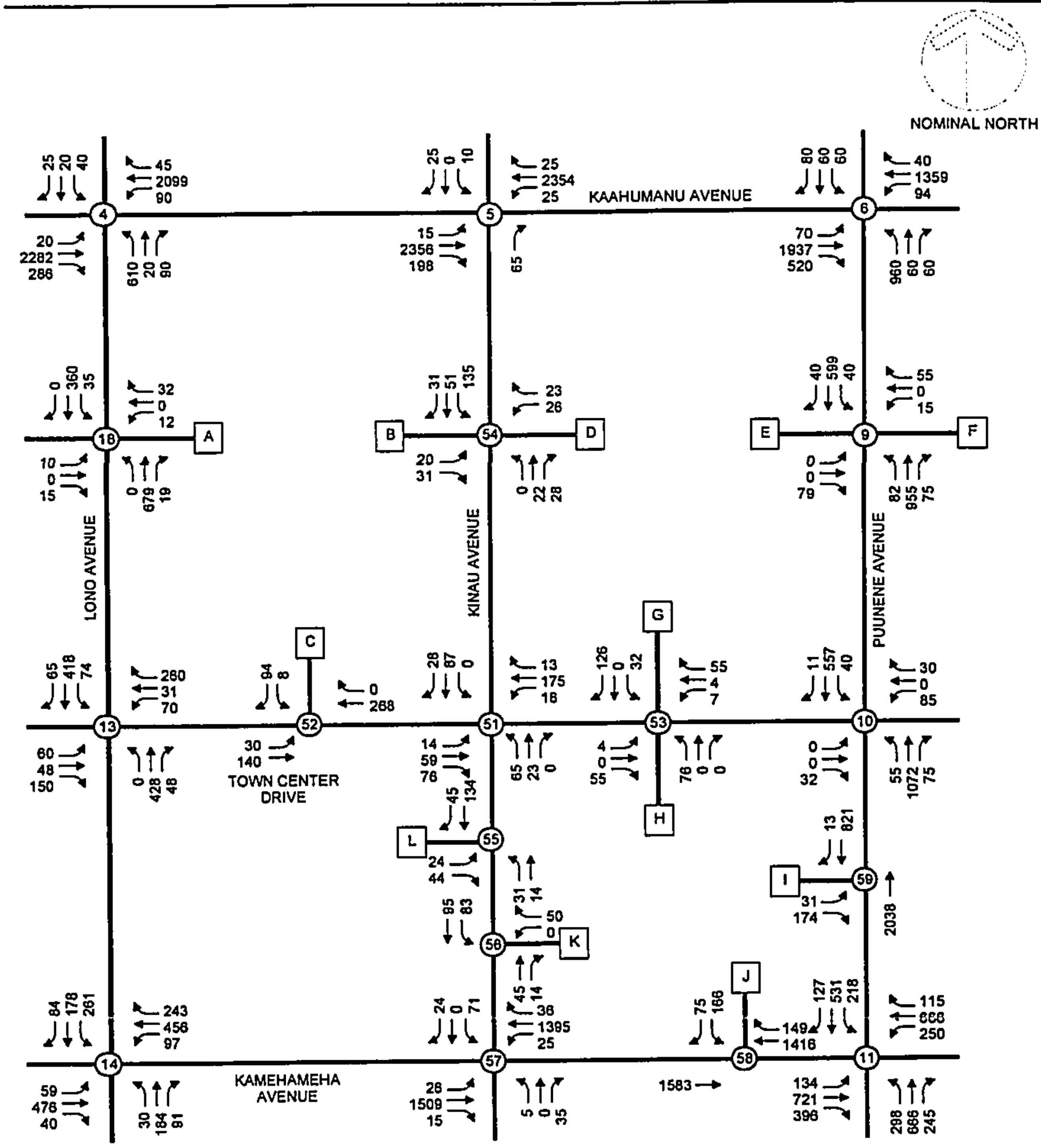

Figure 12A
BACKGROUND (2012) PLUS PROJECT PM PEAK HOUR TRAFFIC PROJECTIONS INSET

5. TRAFFIC IMPACT ANALYSIS

The purpose of this chapter is to summarize the results of the level-of-service analysis, which identifies the project-related impacts. In addition, any mitigation measures necessary and feasible are identified and other access, egress and circulation issues are discussed.

The impact of the project was assessed by analyzing the changes in traffic volumes and levels-of-service at the study intersections. Mitigation measures are described in the following chapter.

Changes In Total Intersection Volumes

An analysis of the project's share of 2012 background plus project intersection approach volumes at the study intersections is summarized in Table 12. The table summarizes the project's share of total 2012 peak hour approach volumes at each intersection. Also shown are the percentage of 2012 background plus project traffic that is the result of background growth and traffic generated by related projects.

An analysis of the project's pro rata share of the increase of traffic volumes between 2005 and 2012 summarized in Table 13. This table summarizes the growth between 2005 and 2012 and indicates the percentage of growth resulting from background growth and related projects and the percentage growth resulting from project generated traffic.

Table 12 Analysis of Project's Share of Total Intersection Approach Volumes (1)

Intersection	Period	Existing	2012 Background	2012 Background Plus Project	Background Growth Trips	Background Growth Percent of Total Traffic (2)	Project Traffic Trips	Project Traffic Percent of Total Traffic (3)
Wakea Av at Kaahumanu Av	AM	2850	3360	3525	510	14.5%	165	4.7%
	PM	3130	3690	3987	560	14.0%	297	7.4%
Kahului Beach Rd at Kaahumanu Av	AM	3865	4780	5054	915	18.1%	274	5.4%
	PM	4780	6125	6637	1345	20.3%	512	7.7%
Lono St at Kaahumanu Av	AM	3670	4430	4668	760	16.3%	238	5.1%
	PM	4300	5195	5637	895	15.9%	442	7.8%
Center St at Kaahumanu Av	AM	3445	4110	4046	665	16.4%	-64	-1.6%
	PM	4245	5070	5073	825	16.3%	3	0.1%
Puunene Av at Kaahumanu Av	AM	3520	4195	4170	675	16.2%	-25	-0.6%
	PM	4475	5335	5315	860	16.2%	-20	-0.4%
Maui Mall at Kaahumanu Av	AM	2445	2980	3005	535	17.8%	25	0.8%
	PM	2935	3575	3612	640	17.7%	37	1.0%
Hana Hwy at Kaahumanu Av	AM	3055	3835	3902	780	20.0%	67	1.7%
	PM	3990	5105	5209	1115	21.4%	104	2.0%
Puunene Av at Maui Mall North	AM	1240	1415	1395	175	12.5%	-20	-1.4%
	PM	1740	2015	1940	275	14.2%	-75	-3.9%
Puunene Av at Maui Mall South	AM	1345	1535	1512	190	12.6%	-23	-1.5%
	PM	1745	2035	1957	290	14.8%	-78	-4.0%
Puunene Av at Kamehameha Av	AM	2390	2880	3023	490	16.2%	143	4.7%
	PM	3285	4115	4367	830	19.0%	252	5.8%
Puunene Av at Wakea Av	AM	2420	2805	3023	385	12.7%	218	7.2%
	PM	2785	3355	3731	570	15.3%	376	10.1%
Lono Av at Vevau St	AM	710	815	1055	105	-1.0% (3)	240	22.7%
	PM	990	1185	1702	195	-3.5% (3)	517	30.4%
Lono St at Kamehameha Av	AM	1145	1315	1427	170	11.9%	112	7.8%
	PM	1615	2055	2199	440	20.0%	144	6.5%
Lono Av at Wakea Av	AM	1905	2190	2273	285	12.5%	83	3.7%
	PM	1965	2285	2368	320	13.5%	83	3.5%
School St at Kamehameha Av	AM	610	800	800	190	23.8%	0	0.0%
	PM	885	1180	1180	295	25.0%	0	0.0%
Kane St at Kamehameha Av	AM	785	990	990	205	20.7%	0	0.0%
	PM	1430	1995	1995	565	28.3%	0	0.0%
Kane St at Vevau St	AM	675	775	868	100	11.5%	93	10.7%
	PM	1030	1165	1534	135	8.8%	369	24.1%

Notes:
(1) Volumes shown are total intersection approach volumes or projections.
(2) Percentage of total 2012 background plus project traffic.
(3) Background traffic projections are less than existing traffic volumes because traffic is redistributed as a result of converting Vevau Street from two-way to one-way between Kane Street and Vevau Street. This redistribution of traffic results in negative percentages for background growth. This anomaly distorts the calculations to overestimate percentages of project generated traffic.

Table 13 Analysis of Project's Share of Total Intersection Approach Volumes Growth [1]

Intersection	Period	Existing	2012 Background	Background Plus Project	Background Growth [2] Volume	Background Growth [2] % of 2005 to 2012 Growth	Project Trips [3] Volume [4]	Project Trips [3] % of 2005 to 2012 Growth
Wakea Av at Kaahumanu Av	AM	2850	3360	3525	510	75.6%	165	24.4%
	PM	3130	3690	3987	560	65.3%	297	34.7%
Kahului Beach Rd at Kaahumanu Av	AM	3865	4780	5054	915	77.0%	274	23.0%
	PM	4780	6125	6637	1345	72.4%	512	27.6%
Lono St at Kaahumanu Av	AM	3670	4430	4668	760	76.2%	238	23.8%
	PM	4300	5195	5637	895	66.9%	442	33.1%
Center St at Kaahumanu Av	AM	3445	4110	4046	665	110.6%	-64	-10.6%
	PM	4245	5070	5073	825	99.6%	3	0.4%
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	PM	2935	3575	3612	640	94.5%	37	5.5%
Hana Hwy at Kaahumanu Av	AM	3055	3835	3902	780	92.1%	67	7.9%
	PM	3990	5105	5209	1115	91.5%	104	8.5%
Puunene Av at Maui Mall North	AM	1240	1415	1395	175	112.9%	-20	-12.9%
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Puunene Av at Kamehameha Av	AM	2390	2880	3023	490	77.4%	143	22.6%
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Puunene Av at Wakea Av	AM	2420	2805	3023	385	63.8%	218	36.2%
	PM	2785	3355	3731	570	60.3%	376	39.7%
Lono Av at Vevau St	AM	710	815	1055	105	30.4%	240	103.1% (5)
	PM	990	1185	1702	195	27.4%	517	109.1% (5)
Lono St at Kamehameha Av	AM	1145	1315	1427	170	60.3%	112	39.7%
	PM	1615	2055	2199	440	75.3%	144	24.7%
Lono Av at Wakea Av	AM	1905	2190	2273	285	77.4%	83	22.6%
	PM	1965	2285	2368	320	79.4%	83	20.6%
School St at Kamehameha Av	AM	610	800	800	190	100.0%	0	0.0%
	PM	885	1180	1180	295	100.0%	0	0.0%
Kane St at Kamehameha Av	AM	785	990	990	205	100.0%	0	0.0%
	PM	1430	1995	1995	565	100.0%	0	0.0%
Kane St at Vevau St	AM	675	775	868	100	51.8%	93	48.2%
	PM	1030	1165	1534	135	26.8%	369	73.2%

Notes:
(1) Volumes shown are total intersection approach volumes or projections.
(2) Background versus existing.
(3) Background plus project versus background.
(4) Project generated traffic
(5) Background traffic projections are less than existing traffic volumes because traffic is redistributed as a result of converting Vevau Street from two-way to one-way between Kane Street and Vevau Street. This redistribution of traffic results in negative percentages for growth between existing and 2012 background. This anomaly distorts the calculations to indicate that the growth as a result of project generated traffic is greater than 100%.

Methodology for Level-of-Service Analysis

1. As previously noted, State Department of Transportation (Honolulu) has requested the Synchro software package be used to performed level-of-service analyses. Accordingly, Synchro 6 was used to calculate the traffic signal timings. The timings were then downloaded into the Highway Capacity Software to calculate the levels-of-service of the signalized intersections. Both software packages are based on the *Highway Capacity Manual.*

2. Only the overall intersection levels-of-service are shown in the following level-of-service tables. This is a departure from past presentations where the results for the overall intersection and each controlled lane group was shown. Detailed results indicating the results of the level-of-service analysis for each movement is presented in the appendices.

3. Neither Synchro nor the Highway Capacity Software results report a volume-to-capacity ratio for unsignalized intersections or results for the overall intersection. Shown in the following tables are the delay and level-of-service of the worse movement of the unsignalized intersection. This is consistent with the *Highway Capacity Manual* methodology for unsignalized intersections.

4. In the past, the LA Department of Transportation standard was used to determine the significance of the impacts of project generated traffic. SDOT has consistently responded that they prefer to use the engineering judgement and discretion of their staff to assess the traffic impacts of a project and the effectiveness of possible mitigation measures, along with the standards of the Institute of Transportation Engineers . Accordingly, we have used the Institute of Transportation Engineers standard that a Level-of-Service D is the minimum acceptable level-of-service and that the criteria is applicable to the overall intersection rather than each controlled lane group. If project generated traffic causes the level-of-service to drop below Level-of-Service D, then mitigation should be provided to improve the level-of-service to Level-of-Service C or better. If the Level-of-Service is E or F without project generated traffic and project generated traffic causes the delay of increase, then mitigation should be provided to improve the delay to be equal to or less than the delay for background without project conditions.

5. As the *Highway Capacity Manual* defines level-of-service by delay, we have used the same definitions.

Results of Level-of-Service Analysis

The results of the level-of-service analysis are summarized in Table 14. For the signalized intersections, the volume-to-capacity ratio, control delay and level-of-service for the overall intersection is shown for each intersection. For the unsignalized intersections, the control delay and the level-of-service of the movement with the lowest level-of-service is shown. The results of the level-of-service analysis is discussed separately for each movement.

Table 14 2012 Levels-of-Service

		AM Peak Hour								PM Peak Hour							
		2012 Without Project			2012 With Project			Changes		2012 Without Project			2012 With Project			Changes	
	Intersection	V/C(1)	Delay(2)	LOS(3)	V/C	Delay	LOS	V/C	Delay	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
1	Kaahumanu Av. at Wakea Av.	0.62	24.8	C	0.65	25.5	C	0.03	0.7	0.81	25.4	C	0.84	30.8	C	0.03	5.4
2	Kaahumanu Av. at Kahului Beach Rd.	0.89	326.8	F	0.92	338.6	F	0.03	11.8	1.08	89.2	F	1.13	108.7	F	0.05	19.5
4	Kaahumanu Av. at Lono Av.	0.74	26.7	C	0.89	33.5	C	0.15	6.8	0.91	28.2	C	1.28	91.9	F	0.37	63.7
5	Kaahumanu Av at Kinau Avenue		(5)	F		22.4	C		NC		42.2	E		49.0	E		6.8
6	Kaahumanu Av. at Puunene Av.	0.75	30.1	C	0.75	30.1	C	0.00	0.0	1.19	95.0	F	1.19	98.7	F	0.00	3.7
7	Kaahumanu Av. at Maui Mall	0.44	16.4	B	0.45	16.5	B	0.01	0.1	0.74	20.9	C	0.76	21.1	C	0.02	0.2
8	Hana Highway at Kamehameha Av.	0.69	36.6	D	0.69	37.5	D	0.00	0.9	1.17	105.7	F	1.20	119.4	F	0.03	13.7
9	Puunene Av at Drives E & F		25.3	D		19.9	C		-5.4		159.5	F		43.0	E		-116.5
10	Puunene Av at Town Center Drive		55.2	F		32.9	D		-22.3		818.1	F		549.2	F		-268.9
11	Kamehameha Av. at Puunene Av.	0.62	20.8	C	0.64	21.8	C	0.02	1.0	0.92	30.0	D	0.88	73.4	E	-0.04	43.4
12	Puunene Av. at Wakea Av.	0.77	53.0	D	0.82	54.2	D	0.05	1.2	0.87	46.8	D	0.94	53.5	D	0.07	6.7
13	Lono Av. at Town Center Drive		15.8	C		26.5	D		10.7		76.4	F			F		
14	Kamehameha Av. at Lono Av.	0.38	9.3	A	0.40	9.4	A	0.02	0.1	0.54	12.1	B	0.57	12.2	B	0.03	0.1
15	Lono Av. at Wakea Av.	0.53	17.6	B	0.55	18.1	B	0.02	0.5	0.56	16.6	B	0.58	17.3	B	0.02	0.7
17	Kamehameha Av. at School St.		17.4	C		17.4	C		0.0		36.6	E		36.6	E		0.0
31	Kamehameha Av. at Kane St.		55.6	F		55.6	F		0.0			F			F		NC
31	Kane St. at Vevau St.		26.7	D		36.5	E		9.8		111.5	F		760.4	F		648.9
51	Town Center Drive at Kinau Avenue				0.10		A						0.22		A		
52	Town Center Drive at Drive C					9.2	A							10.80	B		
53	Town Center Drive at Drives G & H					9.3	A							10.8	B		
54	Kinau Avenue at Drives B & D					8.8	A							11.0	B		
55	Kinau Avenue at Drive L					8.8	A							9.8	A		
56	Kinau Avenue at Drive K					8.4	A							8.7	A		
57	Kinau Avenue at Kamehameha Av					126.7	F							>999.9	F		
58	Kamehameha Avenue at Drive J					150.5	F							>999.9	F		
59	Puunene Avenue at Drive I					40.0	B								F		

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. NC denotes "Not Calculated." The calculated delay is greater than 999.9 seconds per vehicle.
5. Calculated delay is greater than 999.9 seconds per vehicle.
6. NC = Not Calculated

1. Kaahumanu Avenue at Wakea Avenue

During the morning peak hour, the intersection will operate at Level-of-Service C without and with project traffic. During the afternoon peak hour, the intersection will operate at Level-of-Service C without the project and with the project. As the intersection will operate at Level-of-Service C or better during both peak periods, no mitigation is recommended.

2. Kaahumanu Avenue at Kahului Beach Road and Kane Street

This intersection will operate at Level-of-Service F during both peak periods, without and with project related traffic. It should be noted that the intersection currently operates at Level-of-Service F during the morning peak hour and Level-of-Service D during the afternoon peak hour as indicated in Chapter 2. Improvement of this intersection has been recommended as part of the MCC Student Housing and Kane Street Mixed Use Projects. The recommended improvements were reassessed in response to comments from SDOT. The recommended improvements are described in the following chapter.

4. Kaahumanu Avenue at Lono Avenue

This intersection will operate at Level-of-Service C during the morning peak hour, but will operate at Level-of-Service F during the afternoon peak hour, without and with project generated traffic. During the afternoon peak hour, the control delay will increase from 28.2 seconds per vehicle to 91.9 seconds per vehicle. It is recommended that the northbound approach be modified to provide one northbound to westbound left turn lane and a optional left, through and right turn lane.

5. Kaahumanu Avenue at Kinau Avenue

This intersection is a stop sign controlled intersection. Therefore, the delays and levels-of-service shown are for the movement with the lowest level-of-service. As part of the pre-consultation with SDOT at the start of this project, it was decided that signalization of this intersection was not a viable option. It was decided that left turns from the Kahului Town Center would be prohibited in the interest of safety and maintaining an acceptable level-of-service. Therefore, it is the southbound approach that will operate at Level-of-Service F and not traffic exiting the project. Traffic exiting the project will operate a Level-of-Service C during both peak periods and traffic turning left into the project will operate at Level-of-Service C during both peak periods. It was determined that restricting traffic movements of the southbound approach to right turns only was not viable at this time but should be considered in the future if an opportunity arises.

6. Kaahumanu Avenue at Puunene Avenue

During the morning peak hour, this intersection will operate at Level-of-Service C, without and with the project. During the afternoon peak hour, the intersection will operate at Level-of-Service F, without and with the project. It is recommended that the northbound approach be modified to provide an additional northbound to westbound left turn lane. The northbound approach will have two left turn only lanes plus an optional through and right turn lane.

7. Kaahumanu Avenue at Maui Mall

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service C during the afternoon peak hour. No mitigation is recommended.

8. Hana Highway at Kamehameha Avenue and Hobron Avenue

This intersection will operate at Level-of-Service D during the morning peak hour, without and with the project, and Level-of-Service F during the afternoon peak hour. It is recommended that the northbound approach of Kamehameha Avenue be modified to provide an additional northbound to eastbound right turn lane.

9. Puunene Avenue at Maui Mall North and Drive E

This intersection is unsignalized. The delays and levels-of-service shown are the delays and levels-of-service of the movement with the highest delay and lowest level-of-service, which is the westbound approach. During pre-consultation meetings, it was determined that left turns out of the project should be prohibited in the interest of pedestrian safety. Traffic exiting the project is restricted to right turns only and will operate at Level-of-Service B during both peak periods. Traffic turning left into the project from Puunene Avenue will operate at level-of-service A during both peak periods. When possible, traffic using the east lag of this intersection should be restricted to right turns in and out. The levels-of-service would then be comparable to those of traffic entering and exiting the project site.

10. Puunene Avenue at Town Center Drive

This intersection is also unsignalized. The delays and levels-of-service shown are the delays and levels-of-service of the movement with the highest delay and lowest level-of-service, which is the westbound approach, which will operate at Level-of-Service F, without and with. Traffic entering and exiting the project will operate at Level-of-Service C, or better during both peak periods. When possible, traffic using the east lag of this intersection should be restricted to right turns in and out. The levels-of-service would then be comparable to those of traffic entering and exiting the project site.

11. Puunene Avenue at Kamehameha Avenue

This intersection will operate at Level-of-Service C during the morning peak hour, without and with project traffic. During the afternoon peak hour, the level-of-service will decrease from Level-of-Service D without project traffic to Level-of-Service E with project traffic. It recommended that the westbound approach be modified to provide an additional westbound to southbound left turn, that the left turn storage lane be lengthened and that the existing right turn only lane be modified to allow an optional through movement or right turn.

12. Puunene Avenue at Wakea Avenue

During the morning and afternoon peak periods, this intersection will operate at Level-of-Service D without and with the project traffic during both peak periods. No mitigation is recommended.

13. Lono Avenue at Town Center Drive and Vevau Street

This intersection will operate at Level-of-Service D during the morning peak hour. During the afternoon peak hour, the intersection will operate at Level-of-Service F without and with project traffic. It is recommended that the intersection be converted to a four-way stop sign controlled intersection. As a four-way stop sign controlled intersection, the level-of-service will still be Level-of-Service F, but the control delay will decrease. Not only will this improvement significantly reduce to control delay, but it will facilitate pedestrian crossings between the Kahului Town Center and MCC Student Housing projects and enhance pedestrian safety.

14. Lono Avenue at Kamehameha Avenue

This intersection will operate at Level-of-Service A during the morning peak hour, without and with project traffic, and Level-of-Service B during the afternoon peak hour, without and with project traffic. No mitigation is recommended.

15. Lono Avenue at Wakea Avenue

This intersection will operate at Level-of-Service B during both peak hours, without and with project traffic. No mitigation is recommended.

17. Kamehameha Avenue at School Street

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service E during the afternoon peak hour. There is no change in the delay or level-of-service because the project does not contribute any traffic to this intersection. As the project adds no traffic to this intersection, there is no impact as a result of project generated traffic and no mitigation is recommended.

18. Lono Avenue at Project Drive A

All movements at this intersection will operate at Level-of-Service B or better during the morning peak hour and Level-of-Service C or better during the afternoon peak hour.

31. Kamehameha Avenue at Kane Street

This intersection will operate at Level-of-Service F during the morning peak hour and Level-of-Service F during the afternoon peak hour. There is no change in the delay or level-of-service because the project does not contribute any traffic to this intersection. As the project adds no traffic to this intersection, there is no impact as a result of project generated traffic and no mitigation is recommended. It was concluded in the traffic study for the MCC Student Housing and Kane Street Mixed Use project that traffic signals are warranted at this intersection for background without project conditions.

32. Kane Street at Vevau Street

This intersection will operate at Level-of-Service E during the morning and Level-of-Service F during the afternoon peak hour. The peak hour warrant for a traffic signal is satisfied for 2012 background without project conditions. The approach that triggers the warrant is the eastbound approach exiting Kaahumanu Shopping Center.

51. Town Center Drive at Kinau Avenue

This intersection is planned to be a roundabout. The Highway Capacity Manual methodology calculates only the volume-to-capacity ratio of each approach. Shown in the level-of-service table (Table 15) is the volume-to-capacity ratio and level-of-service of the approach with the lowest level-of-service. All four approaches will operate at Level-of-Service A, or better.

52. Town Center Drive at Drive C

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service B during the afternoon peak hour.

53. Town Center Drive at Drives G & H

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service B during the afternoon peak hour.

54. Town Center Drive at Drives B & D

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service B during the afternoon peak hour.

55. Town Center Drive at Drive L

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service A during the afternoon peak hour.

56. Town Center Drive at Drive K

This intersection will operate at Level-of-Service A during the morning peak hour and Level-of-Service A during the afternoon peak hour.

57. Kinau Avenue at Kamehameha Avenue

As currently proposed, this intersection will operate at Level-of-Service C during the morning peak hour and Level-of-Service F during the afternoon peak hour. The southbound to eastbound left turn is the controlling movement in both cases. In addition, the redistribution of left turn traffic from Drive J will aggravate the poor level-of-service during the afternoon peak hour. With the additional traffic from Drive J, improvement of the intersection will be required. There are two possible mitigation measures: provide a left turn refuge lane or install traffic signals.

Installation of a left turn refuge lane would be difficult to install because of the south leg of the intersection. With a separate left turn refuge lane, the intersection would operate at Level-of-Service C during the morning and Level-of-Service D during the afternoon.

The afternoon peak hour volumes satisfy the peak hour warrant for a traffic signal. As a signalized intersection, all movements will operate at Level-of-Service C, or better, and the overall intersection will operate at Level-of-Service C.

58. Kamehameha Avenue at Drive J

This intersection is the driveway along the north side of Kamehameha Avenue and west of Puunene Avenue. All movements are expected to operate at an acceptable level-of-service except the southbound to eastbound left turn, which will operate at Level-of-Service F. The estimated left turns from Drive J is 42 vehicles per hour during the morning peak hour and 166 vehicles per hour during the afternoon peak hour. This large number of vehicles will have to turn out and cross the eastbound left turn storage lane approaching Puunene Avenue. As this will be a difficult move for this number of vehicles, it is recommended that left turns from this driveway be prohibited and redirected to use Kinau Avenue to exit the project onto Kamehameha Avenue. With this mitigation, the driveway will operate at Level-of-Service A during the morning and afternoon peak hours.

59. Puunene Avenue at Drive I

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service D during the afternoon peak hour. An impact of this driveway that is not assessed in the level-of-service analysis is the limited distance between the driveway and Kamehameha Avenue. Drivers exiting this driveway that want to turn left at Kamehameha Avenue will block the southbound through lanes alone Puunene Avenue. A detail of the proposed configuration of this intersection that will address this issue is presented in the following chapter. Left turns from the driveway should also be prohibited.

6. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the level-of-service analysis, mitigation is required at the following intersections:

A. Kaahumanu Avenue at Kahului Beach Road & Kane Street
B. Kaahumanu Avenue at Lono Street
C. Kaahumanu Avenue at Puunene Avenue
D. Hana Highway at Kamehameha Avenue & Hobron Avenue
E. Kamehameha Avenue at Puunene Avenue
F. Lono Avenue at Town Center Drive
G. Kinau Avenue at Kamehameha Avenue
H. Puunene Avenue at Drive I
I. Kamehameha Avenue at Lono Avenue[5]

[5] This intersection was added to this list of intersections needing mitigation response to the comment letter from the County of Maui Department of Public Works and Environmental Management. The letter noted that there are backups along the southbound left turn lane during the afternoon peak hour.

A. Kaahumanu Avenue at Kahului Beach Road and Kane Street

This intersection will operate at Level-of-Service F during both peak periods, without and with project related traffic. It should be noted that the intersection currently operates at Level-of-Service F during the morning peak hour and Level-of-Service D during the afternoon peak hour as indicated in Chapter 2. Improvement of this intersection has been recommended as part of the MCC Student Housing and Kane Street Mixed Use Projects. The recommended improvements are shown on Figure 13.

B. Kaahumanu Avenue at Lono Avenue

This intersection will operate at Level-of-Service C during the morning peak hour, but will operate at Level-of-Service F during the afternoon peak hour, without and with project generated traffic. It is recommended that the northbound approach be modified to provide one northbound to westbound left turn lane and a optional left, through and right turn lane. See Figure 14

C. Kaahumanu Avenue at Puunene Avenue

During the morning peak hour, this intersection will operate at Level-of-Service C, without and with the project. During the afternoon peak hour, the intersection will operate at Level-of-Service F, without and with the project. It is recommended that the northbound approach be modified to provide an additional northbound to westbound left turn lane. The northbound approach will have two left turn only lanes plus an optional through and right turn lane. A schematic drawing is shown in the discussion on pedestrians.

D. Hana Highway at Kamehameha Avenue and Hobron Avenue

This intersection will operate at Level-of-Service D during the morning peak hour, without and with the project, and Level-of-Service F during the afternoon peak hour. It is recommended that the northbound approach of Kamehameha Avenue be modified to provide an additional northbound to eastbound right turn lane. See Figure 15.

E. Puunene Avenue at Kamehameha Avenue

This intersection will operate at Level-of-Service C during the morning peak hour, without and with project traffic. During the afternoon peak hour, the level-of-service will decrease from Level-of-Service D without project traffic to Level-of-Service E with project traffic. It recommended that the westbound approach be modified to provide an additional westbound to southbound left turn, that the left turn storage lane be lengthened and that the existing right turn only lane be modified to allow an optional through movement or right turn.

12. Puunene Avenue at Wakea Avenue

During the morning and afternoon peak periods, this intersection will operate at Level-of-Service D without and with the project traffic during both peak periods. No mitigation is recommended.

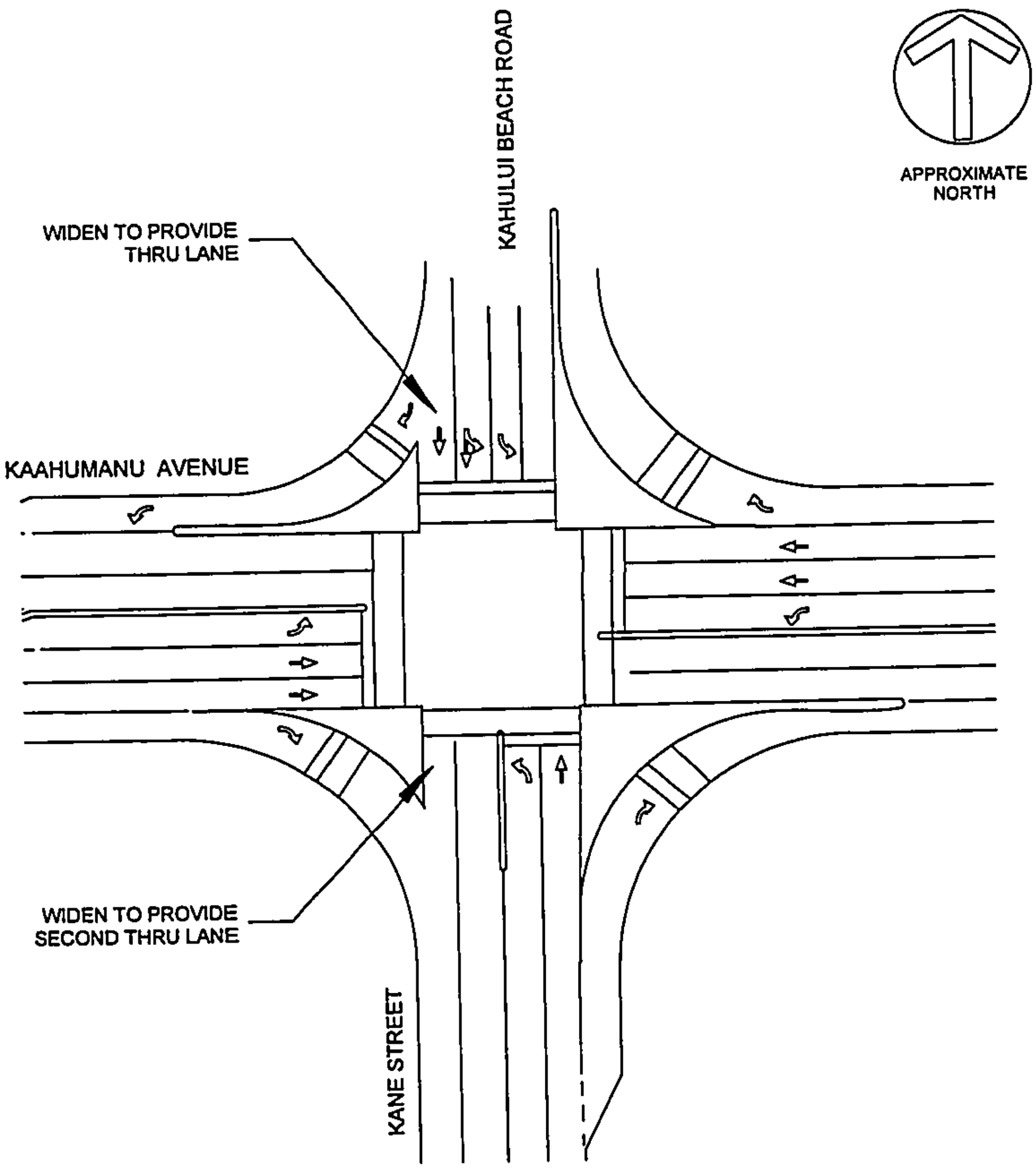

Figure 13
SCHEMATIC DIAGRAM OF PROPOSED IMPROVEMENTS
KAAHUMANU AVENUE AT KAHULUI BEACH ROAD & KANE STREET
(INTERSECTION NO. 2)

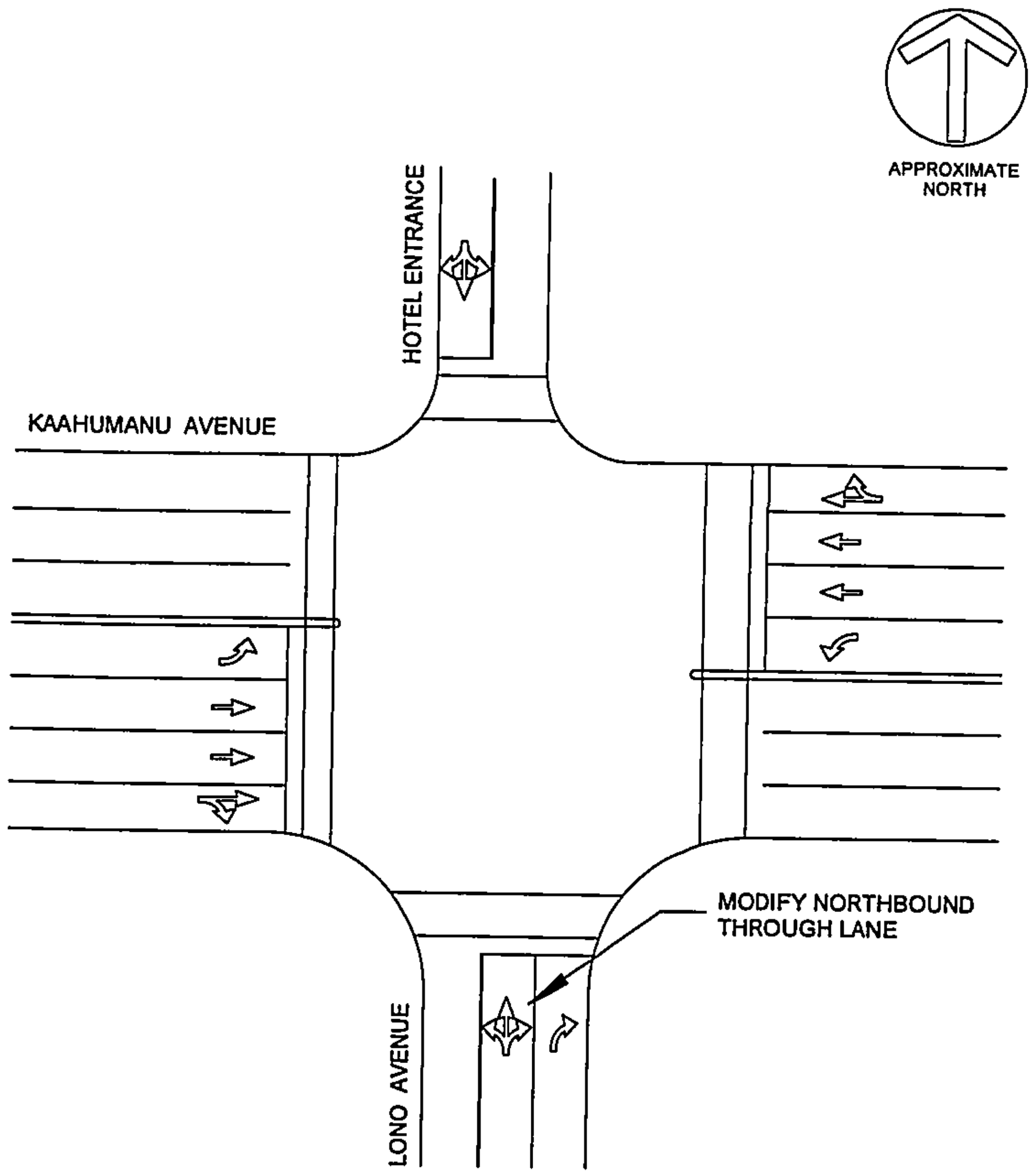

Figure 14
SCHEMATIC DIAGRAM OF PROPOSED IMPROVEMENTS
KAAHUMANU AVENUE AT LONO AVENUE
(INTERSECTION NO. 4)

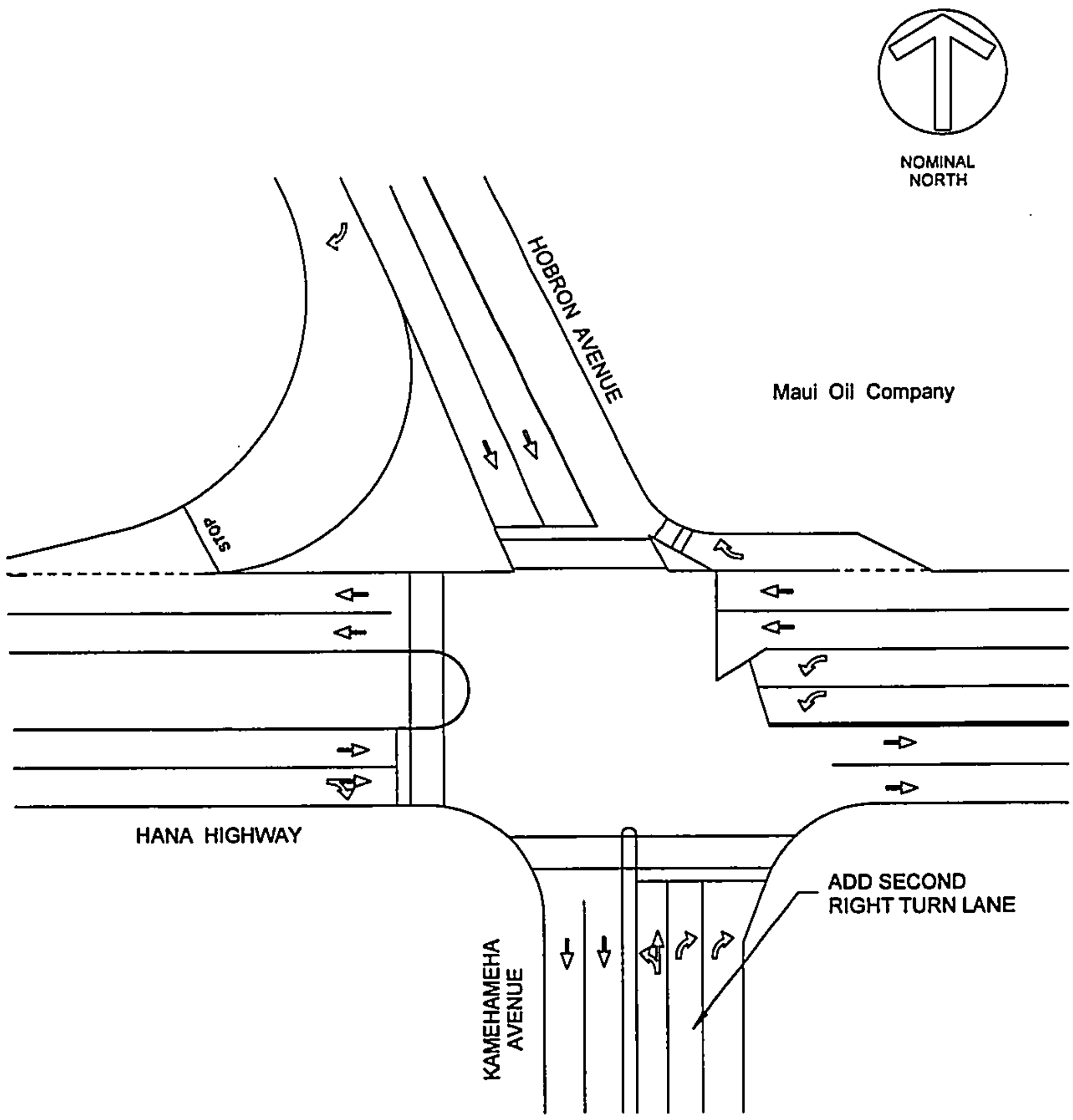

Figure 15
SCHEMATIC DIAGRAM OF PROPOSED IMPROVEMENTS
HANA HIGHWAY AT KAMEHAMEHA AVENUE & HOBRON AVENUE
(INTERSECTION NO. 8)

F. Lono Avenue at Town Center Drive and Vevau Street

This intersection will operate at Level-of-Service D during the morning peak hour. During the afternoon peak hour, the intersection will operate at Level-of-Service F without and with project traffic. It is recommended that the intersection be converted to a four-way stop sign controlled intersection. As a four-way stop sign controlled intersection, the level-of-service will still be Level-of-Service F, but the control delay will decrease. Not only will this improvement significantly reduce to control delay, but it will facilitate pedestrian crossings between the Kahului Town Center and MCC Student Housing projects and enhance pedestrian safety.

G. Kinau Avenue at Kamehameha Avenue

As currently proposed, this intersection will operate at Level-of-Service C during the morning peak hour and Level-of-Service F during the afternoon peak hour. The southbound to eastbound left turn is the controlling movement in both cases. In addition, the redistribution of left turn traffic from Drive J will aggravate the poor level-of-service during the afternoon peak hour. With the additional traffic from Drive J, improvement of the intersection will be required. There are two possible mitigation measures: provide a left turn refuge lane or install traffic signals.

Installation of a left turn refuge lane would be difficult to install because of the south leg of the intersection. With a separate left turn refuge lane, the intersection would operate at Level-of-Service C during the morning and Level-of-Service D during the afternoon.

The afternoon peak hour volumes satisfy the peak hour warrant for a traffic signal. As a signalized intersection, all movements will operate at Level-of-Service C, or better, and the overall intersection will operate at Level-of-Service C.

H. Puunene Avenue at Drive I

This intersection will operate at Level-of-Service B during the morning peak hour and Level-of-Service D during the afternoon peak hour. An impact of this driveway that is not assessed in the level-of-service analysis is the limited distance between the driveway and Kamehameha Avenue. Drivers exiting this driveway that want to turn left at Kamehameha Avenue will block the southbound through lanes alone Puunene Avenue. A detail of the proposed configuration of this intersection that will address this issue is presented as Figure 16.

I. Kamehameha Avenue at Lono Avenue

To mitigate existing backups along the southbound left turn, the left turn storage lane should be extended to comply with AASHTO guidelines. The required length is approximately 325 feet.

Summary of Mitigation Measures

Table 15 is a summary of the results of the level-of-service analysis and the recommended mitigation measures for each intersection.

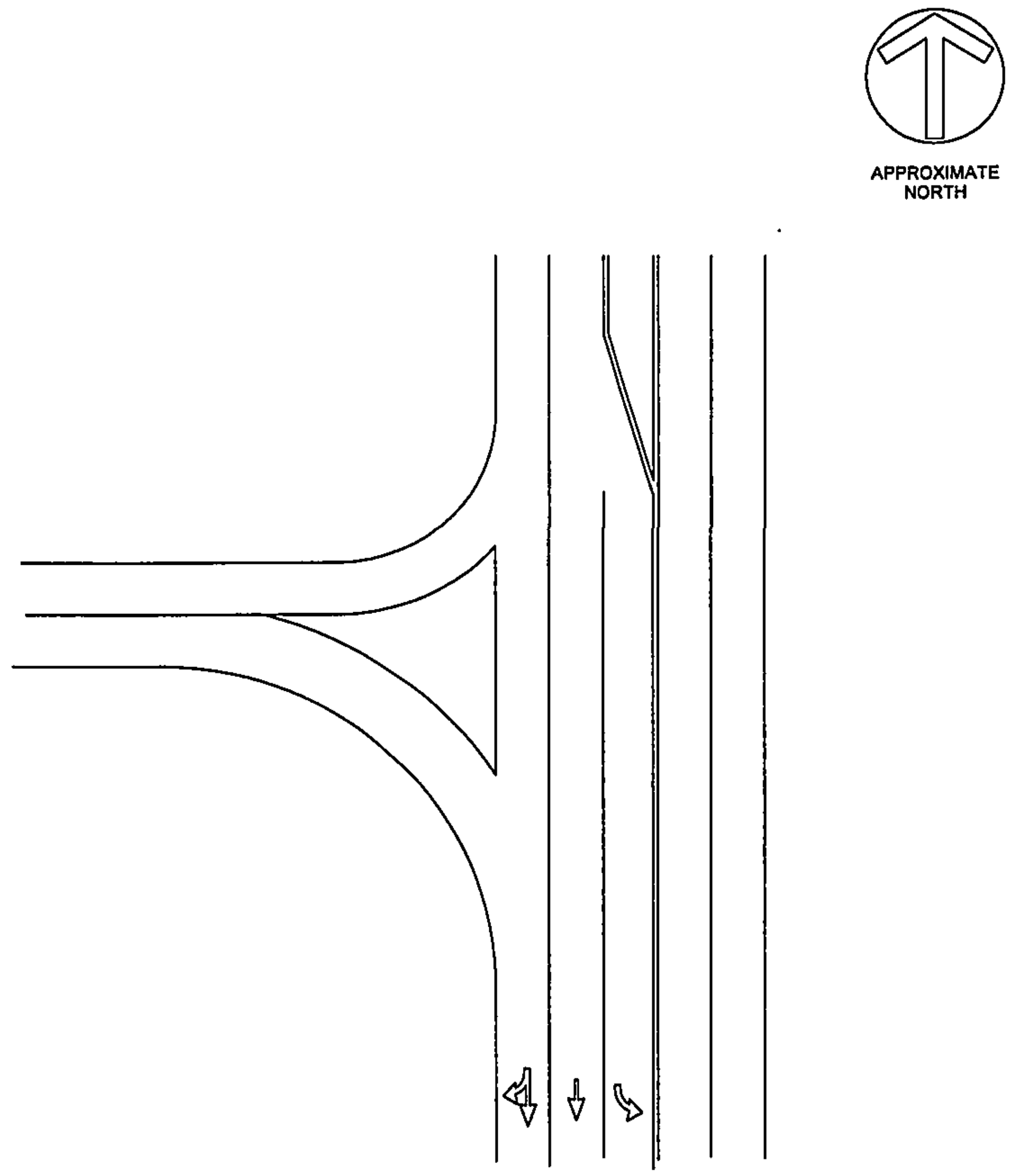

Figure 16
SCHEMATIC DIAGRAM OF PROPOSED IMPROVEMENTs
KAMEHAMEHA AVENUE AT DRIVE I

Table 15 Summary of Mitigation Measures

	Intersection	Recommended Mitigation
1	Kaahumanu Av. at Wakea Av.	No mitigation required.
2	Kaahumanu Av. at Kahului Beach Rd.	Mitigation recommended as part of MCC and Kane Street Projects.
4	Kaahumanu Av. at Lono Av.	Modify northbound approach to provide optional left, through and right plus left turn only lane.
5	Kaahumanu Av at Kinau Avenue	Prohibit northbound to westbound left turns and northbound through movements.
6	Kaahumanu Av. at Puunene Av.	Widen northbound approach to provide second left turn lane.
7	Kaahumanu Av. at Maui Mall	No mitigation required.
8	Hana Highway at Kamehameha Av.	Modify Kamehameha Avenue approach to provide second right turn only lane.
9	Puunene Av at Drives E & F	Prohibit left turns from eastbound and west bound approaches.
10	Puunene Av at Town Center Drive	Prohibit left turns from eastbound and westbound approaches.
11	Kamehameha Av. at Puunene Av.	Add second westbound to southbound left turn lane, lengthen left turn storage lanes and modify right turn lane to allow through movement or right turn.
12	Puunene Av. at Wakea Av.	No mitigation required.
13	Lono Av. at Town Center Drive	Convert to a four-way stop sign controlled intersection.
14	Kamehameha Av. at Lono Av.	No mitigation required for project traffic. Left turn storage lane should be extended to mitigate existing backups.
15	Lono Av. at Wakea Av.	No mitigation required.
17	Kamehameha Av. at School St.	No mitigation required.
31	Kamehameha Av. at Kane St.	Traffic signals recommended for MCC and Kane Street projects.
32	Kane St. at Vevau St.	No mitigation for project traffic. Traffic signals are warranted for Kaahumanu Shopping Center approach.
51	Town Center Drive at Kinau Avenue	Designed as a roundabout. No additional mitigation required.
52	Town Center Drive at Drive C	No mitigation required.
53	Town Center Drive at Drives G & H	No mitigation required.
54	Kinau Avenue at Drives B & D	No mitigation required.
55	Kinau Avenue at Drive L	No mitigation required.
56	Kinau Avenue at Drive K	No mitigation required.
57	Kinau Avenue at Kamehameha Av	Install traffic signals.
58	Kamehameha Avenue at Drive J	Restrict to right turns only.
59	Puunene Avenue at Drive I	See Figure 16.

Other Transportation Issues

Pedestrians Crossing Lono Street

It is anticipated that there will be a significant number of pedestrian crossing Lono Street at Town Center Drive since this crossing is aligned with Vevau Street, which will also be a pedestrian oriented street. Accordingly, any potential measures available to enhance pedestrian safety, as well as encourage pedestrian flows, should be implemented.

There are no estimates available of the number of pedestrian crossing expected. There are no pedestrian generation data available.

As previously discussed, a four-way stop sign controlled intersection has been recommended at this intersection of mitigate the poor level-of-service of the intersection. This four-way stop will slow traffic down along Lono Street and require all vehicles approaching the intersection to stop. Therefore any pedestrians crossing the intersection will have the right-of-way.

Pedestrians Crossing Puunene Avenue

During pre-consultation meetings, the safety of pedestrians wanting to cross Puunene Avenue was an issue discussed.

There is a pedestrian warrant for traffic signals but this warrant was not examined as there are no pedestrian related data for any of the pedestrian crosswalks. As there are no pedestrian trip generation data available, it is not possible to estimate the number of pedestrians that will use these crosswalks in order to assess this warrant. The minium number of pedestrian crossings required to trigger this warrant is "100 or more for each of any four (4) hours or 190 or more during any one (1) hour." The warrant also states that a signalized pedestrian crosswalk should not be provided within 300 feet of a signalized intersection unless it can be verified that the signal will not adversely impact the operation of the existing signalized intersection.[6] As both crosswalks along Puunene Avenue are approximately 300 feet from the nearest signalized intersection, installing a pedestrian signal to the crosswalks to not comply with this criterion.

Lastly, is was also concluded that coordination of four traffic signals within 1000 feet of roadway would be difficult. The result would be constrained flow along Puunene Avenue as queues would back up through the upstream signals.

In order to provide safer crosswalks across Puunene Avenue, it was determined that the safest and most viable alternative would be to provide a pedestrian refuge median along Puunene Avenue in the vicinity of Town Center Drive. This can be accomplished as left turns from the project have been prohibited and left turns from the Maui Mall side of Puunene Avenue should be prohibited when possible. Not only will the prohibition of left turns enhance the safety of pedestrians crossing Puunene Avenue, but traffic movements that adversely affect safety and level-of-service will be eliminated.

A schematic drawing of the proposed layout along Puunene Avenue is presented as Figure 17.

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[6] US Department of Transportation, Federal Highway Administration, *Manual of Uniform Traffic Control Devices*, Washington, D.C., 2003, page 4C-10.

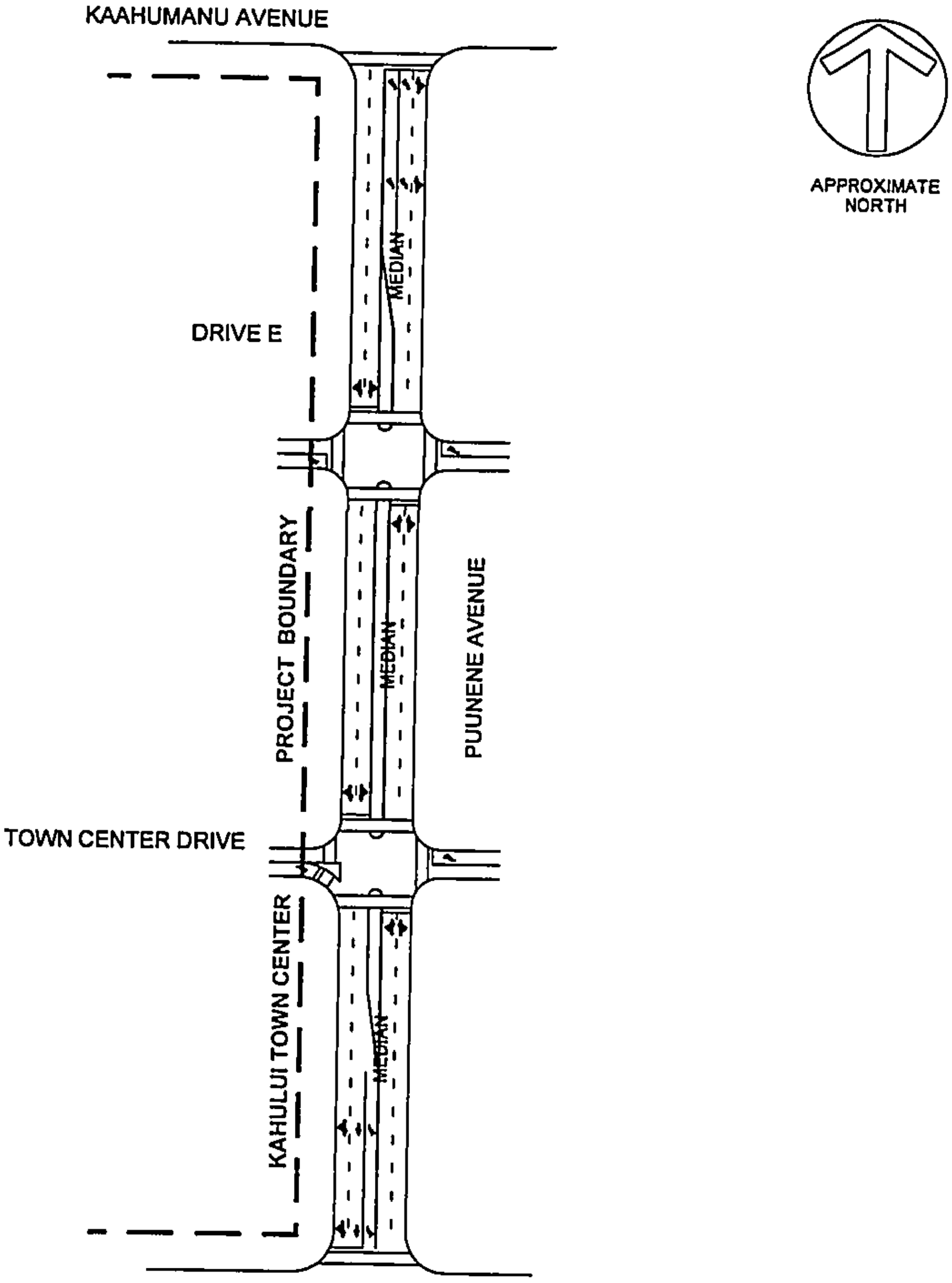


Figure 17
SCHEMATIC DIAGRAM OF PROPOSED LAYOUT ALONG PUUNENE AVENUE

Internal Circulation

During the pre-consultation meetings, it was requested that the viability of closing the internal street system to through traffic and restricting the central area, in the vicinity of the roundabout at the intersection of Town Center Drive at Kinau Avenue, to pedestrians only. It was decided that a subjective assessment should be provided rather than a detailed analysis as presented for the preferred concept.

After reviewing the concept, it is obvious that closure on the central area of the project site will result in traffic having to take circuitous routes around the project. This means more traffic at the intersections around the perimeter of the project. One of the major objectives of the access and egress concept as shown in the plan is to minimize adverse circulation by providing the most direct routes possible to the parking facility locations within the project in order to minimize the traffic impacts of the project on the adjacent roadway network. Blocking the central area to traffic would put this traffic back into the adjacent roadway network.

Lastly, while this concept may encourage more pedestrian circulation within the project, it would also offset some of the advantage of the multi-use concept since traffic could not move between all the quadrants without getting back onto the public roadway system and therefore would affect the traffic discounts used for a multi-use development. This will have a particularly adverse impact of traffic circulation of service vehicles, which would have to make numerous entrances and exits to serve the project.

An alternative to closing the central area to vehicular traffic is to convert Town Center Drive and Kinau Avenue from two-way to one-way operation. The same arguments as against the closure of the central area are applicable to the one-way concept but possibly not to the same degree.

APPENDIX A
SCHEMATIC DRAWINGS OF EXISTING LANE CONFIGURATIONS

Appendix A
Schematic Drawings of Existing Lane Configurations

Figure No.	Intersection	Intersection No.
A-1	Kaahumanu Avenue at Wakea Avenue & Maui Community College	1
A-2	Kaahumanu Avenue at Kahului Beach Road & Kane Street	2
A-3	Kaahumanu Avenue at Lono Avenue	4
A-4	Kaahumanu Avenue at Kahului Shopping Center	5
A-5	Kaahumanu Avenue at Puunene Avenue	6
A-6	Kaahumanu Avenue at Maui Mall	7
A-7	Hana Highway at Kamehameha Avenue & Hobron Avenue	8
A-8	Puunene Avenue at Kahului SC North	9
A-9	Puunene Avenue at Kahului SC South	10
A-10	Puunene Avenue at Kamehameha Avenue	11
A-11	Puunene Avenue at Wakea Avenue	12
A-12	Lono Avenue at Vevau Street	13
A-13	Lono Avenue at Kamehameha Avenue	14
A-14	Lono Avenue at Wakea Avenue	15
A-15	Kamehameha Avenue at School Street	17
A-16	Kane Street at Kamehameha Avenue	31
A-17	Kane Street at Vevau Street	32
A-18	Kamehameha Avenue at Kaulawahine Street	57

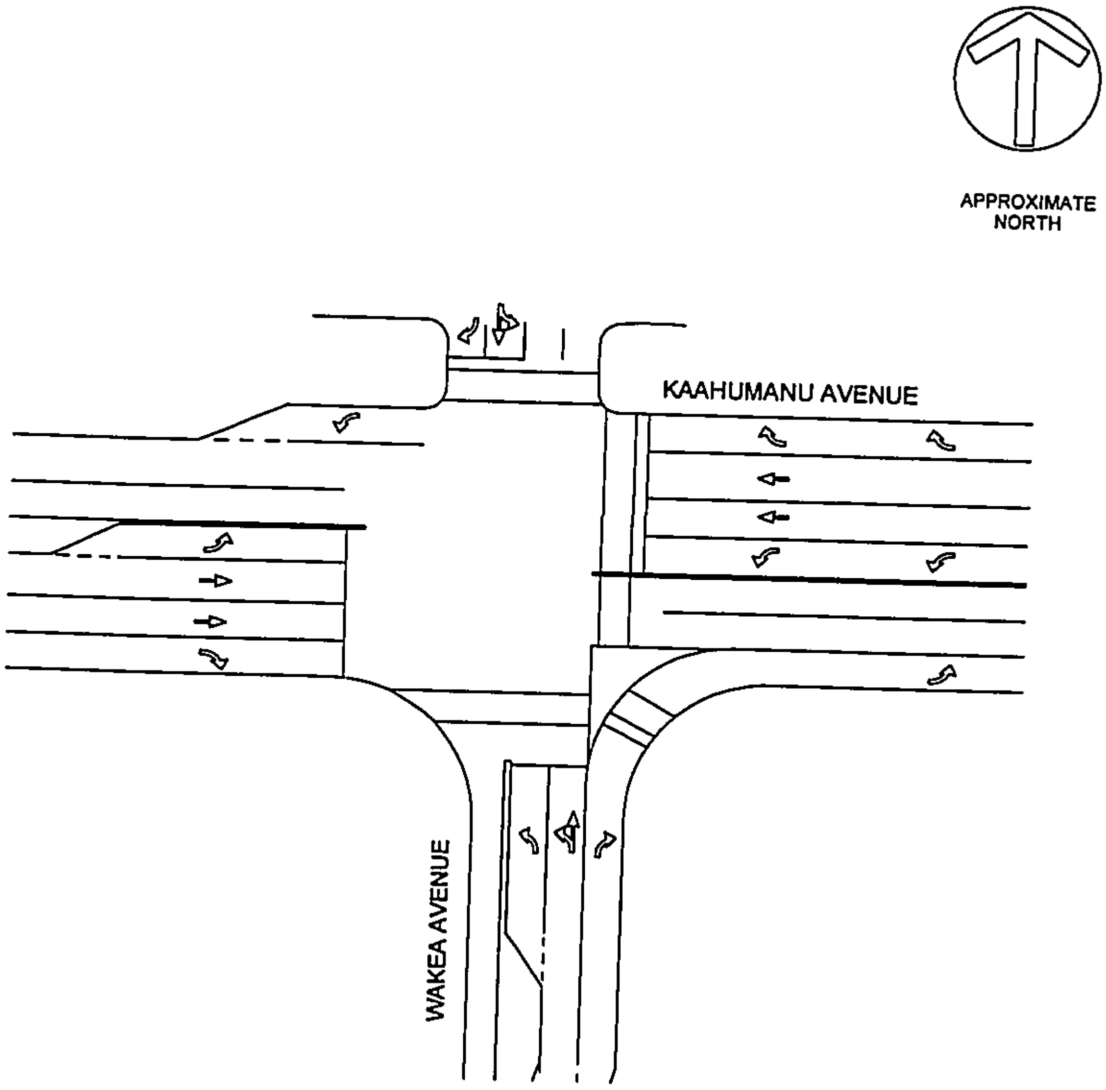


Figure A-1
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
KAAHUMANU AVENUE AT WAKEA AVENUE & MAUI COMMUNITY COLLEGE
(INTERSECTION NO. 1)

Phillip Rowell and Associates

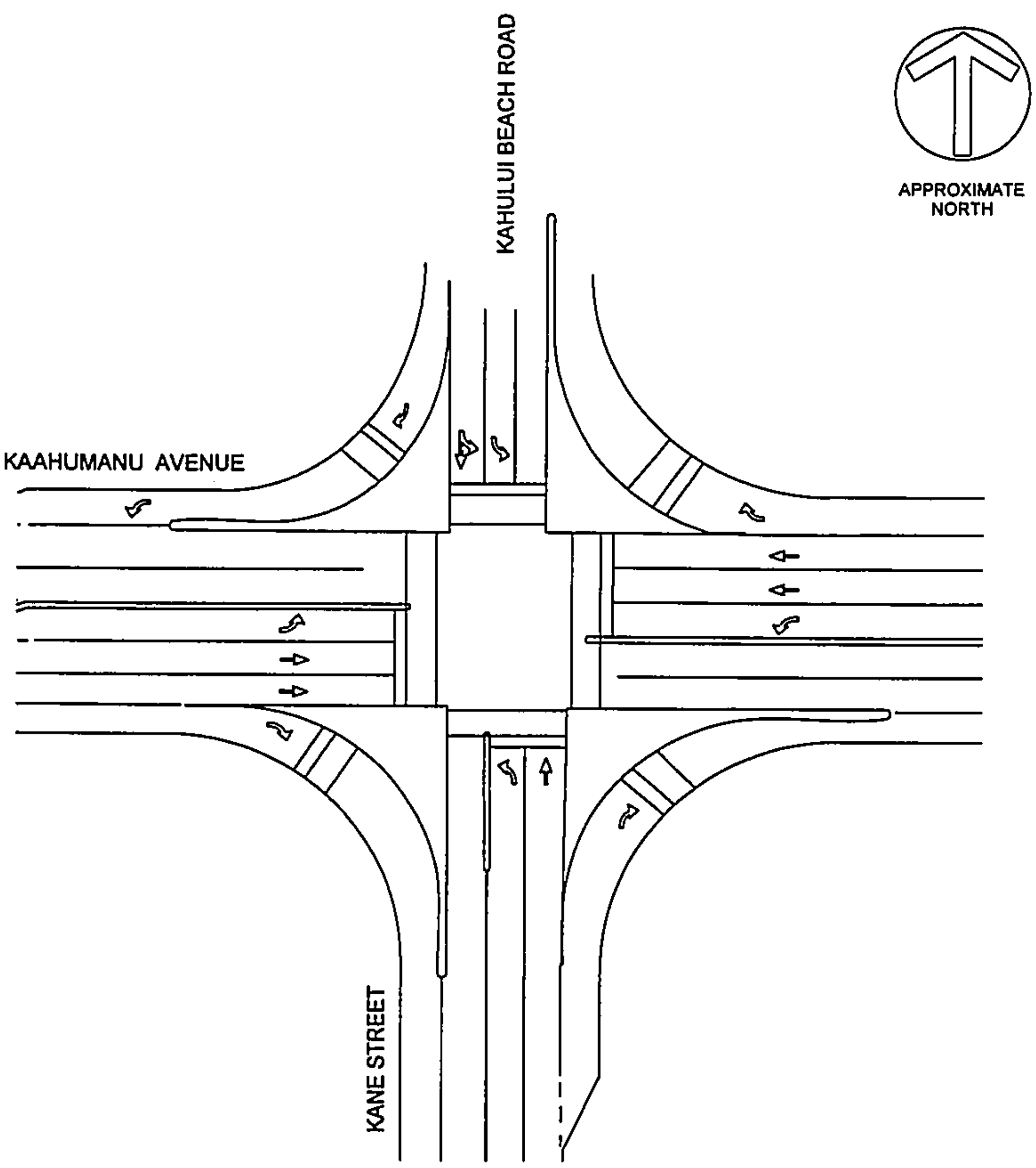


Figure A-2
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
KAAHUMANU AVENUE AT KAHULUI BEACH ROAD & KANE STREET
(INTERSECTION NO. 2)

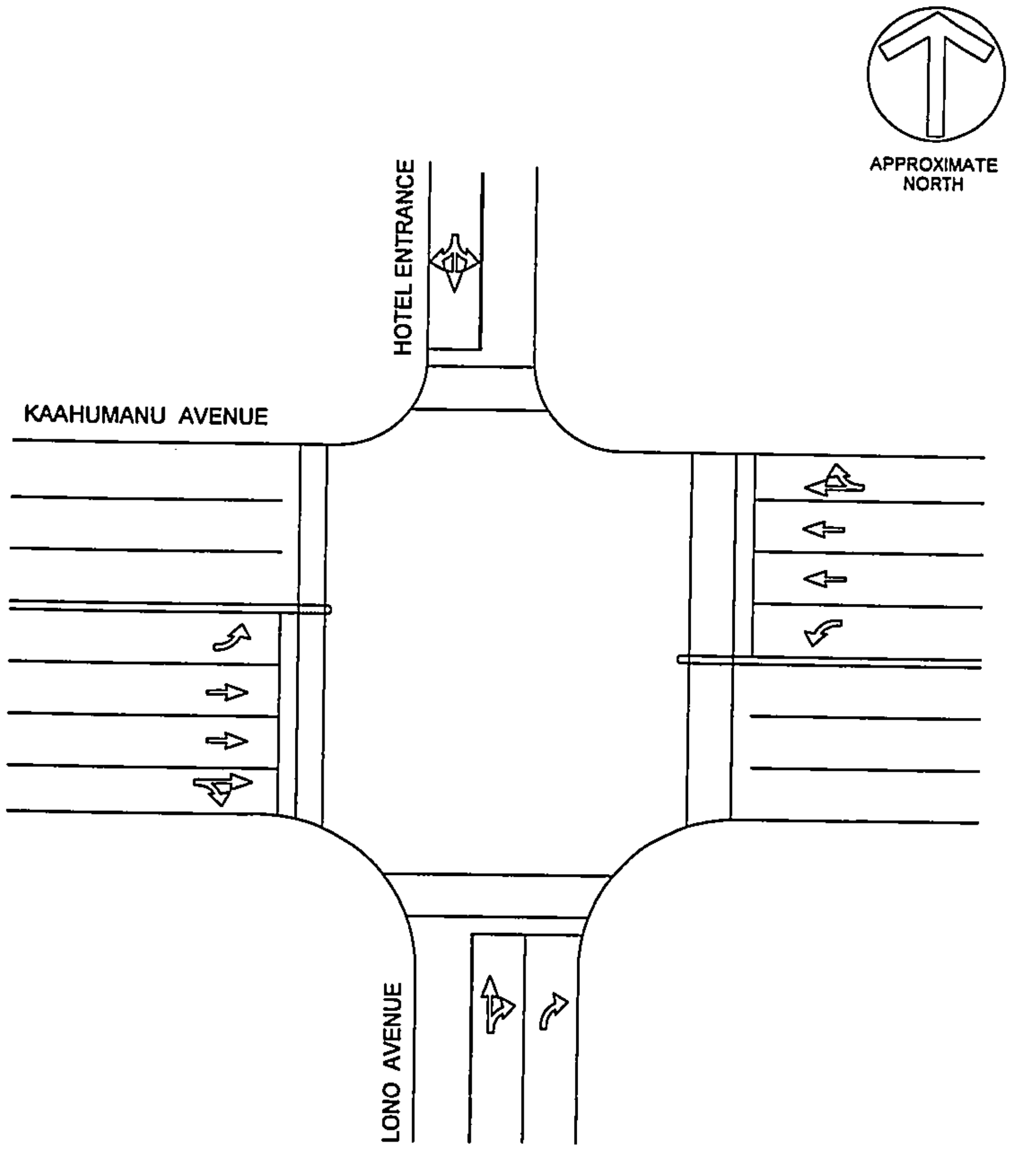


Figure A-3
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
KAAHUMANU AVENUE AT LONO AVENUE
(INTERSECTION NO. 4)

Phillip Rowell and Associates

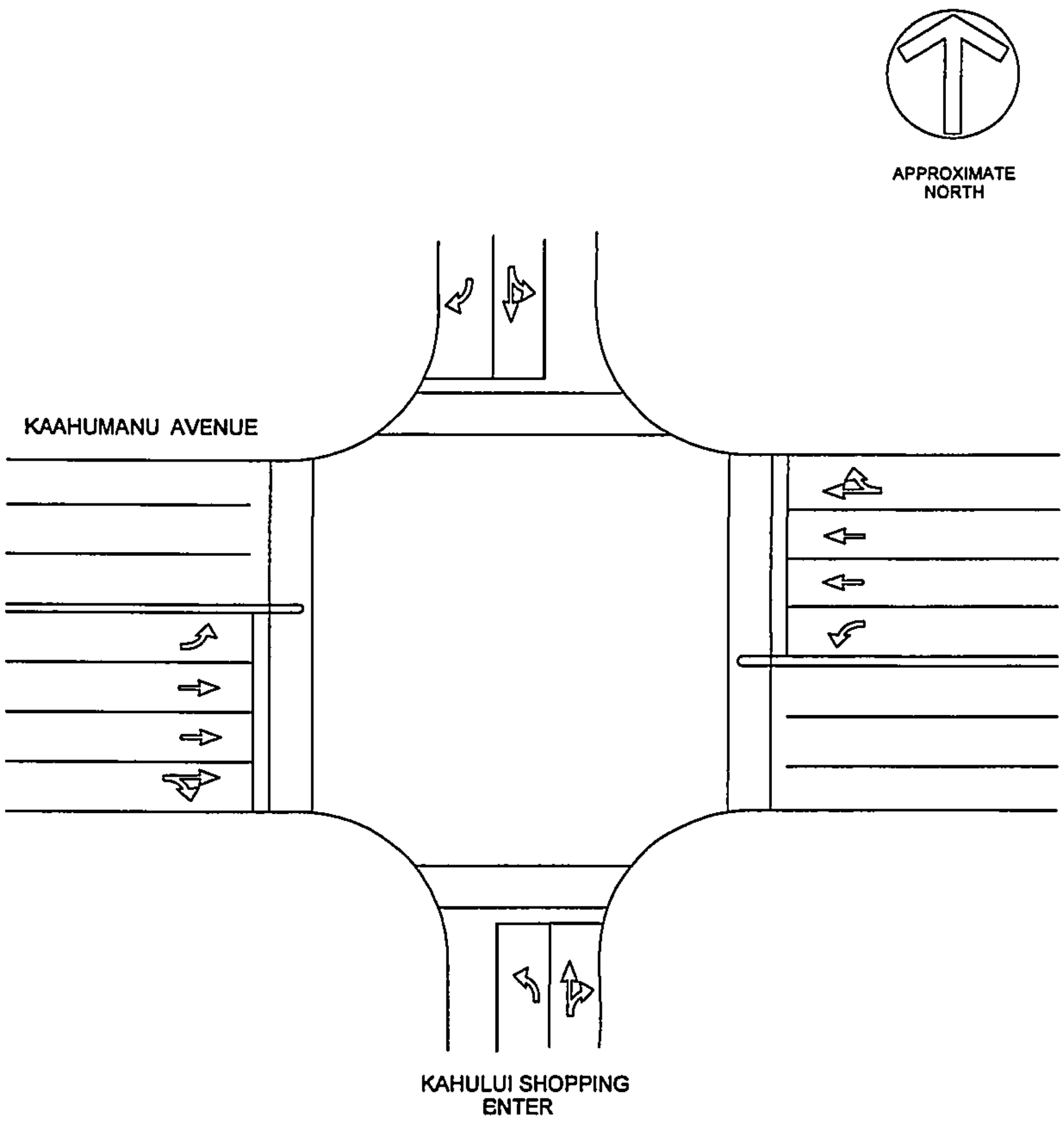


Figure A-4
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
KAAHUMNAU AVENUE AT KAHULUI SHOPPING CENTER
(INTERSECTION NO. 5)

Phillip Rowell and Associates

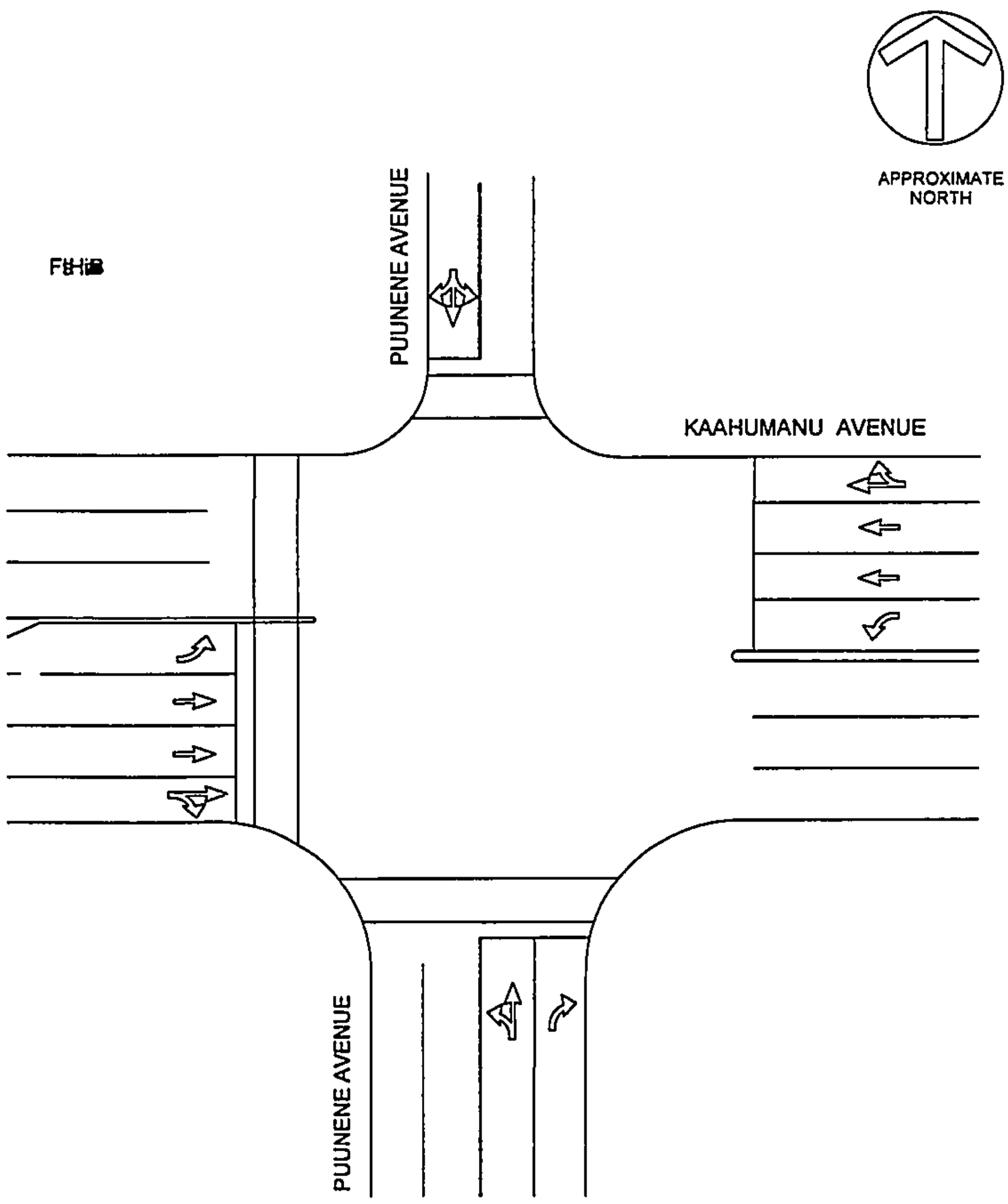


Figure A-5
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION OF KAAHUMANU AVENUE AT PUUNENE AVENUE (INTERSECTION NO. 6)

Phillip Rowell and Associates

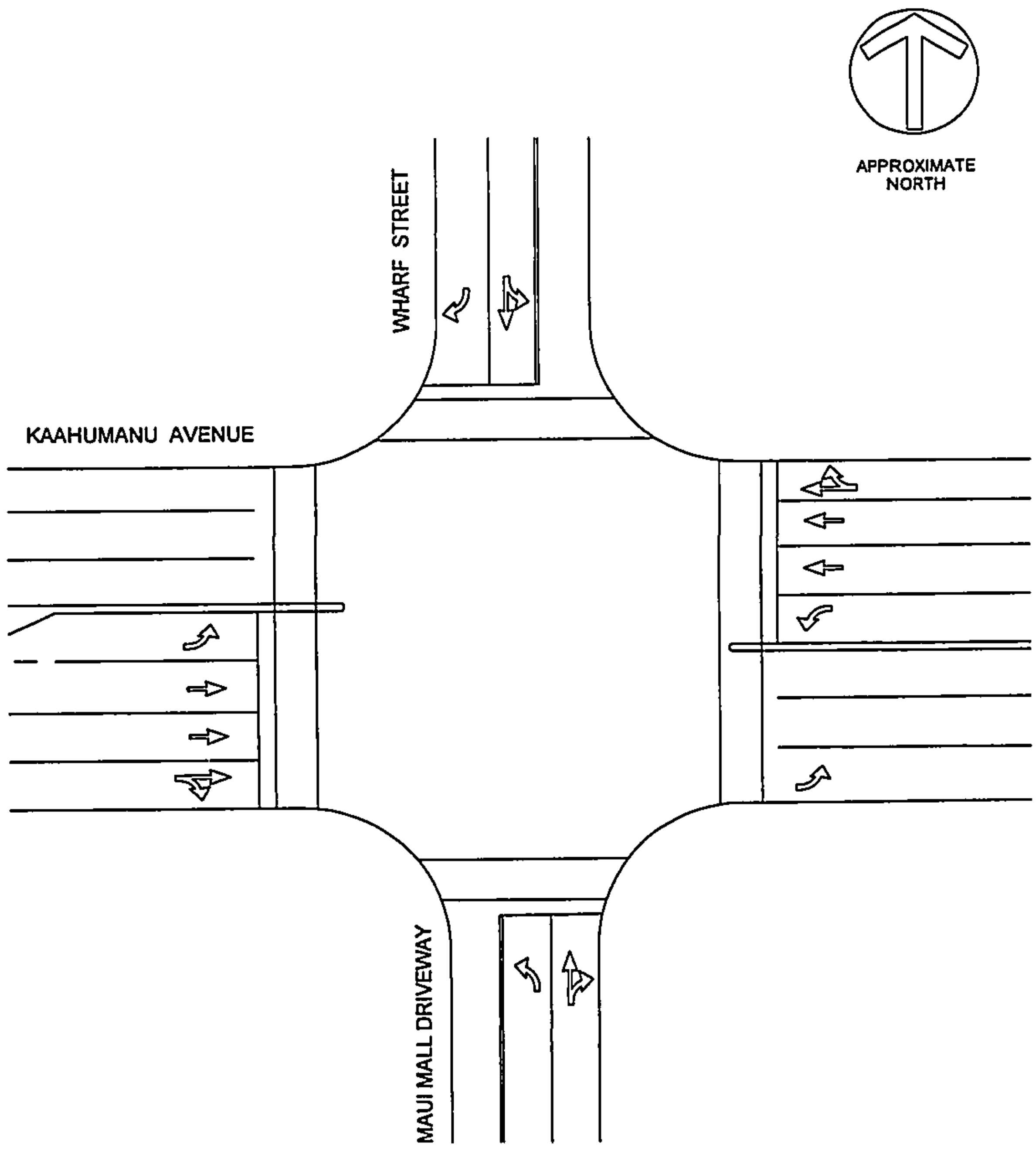


Figure A-6
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
KAAHUMANU AVENUE AT MAUI MALL
(INTERSECTION NO. 7)

Phillip Rowell and Associates

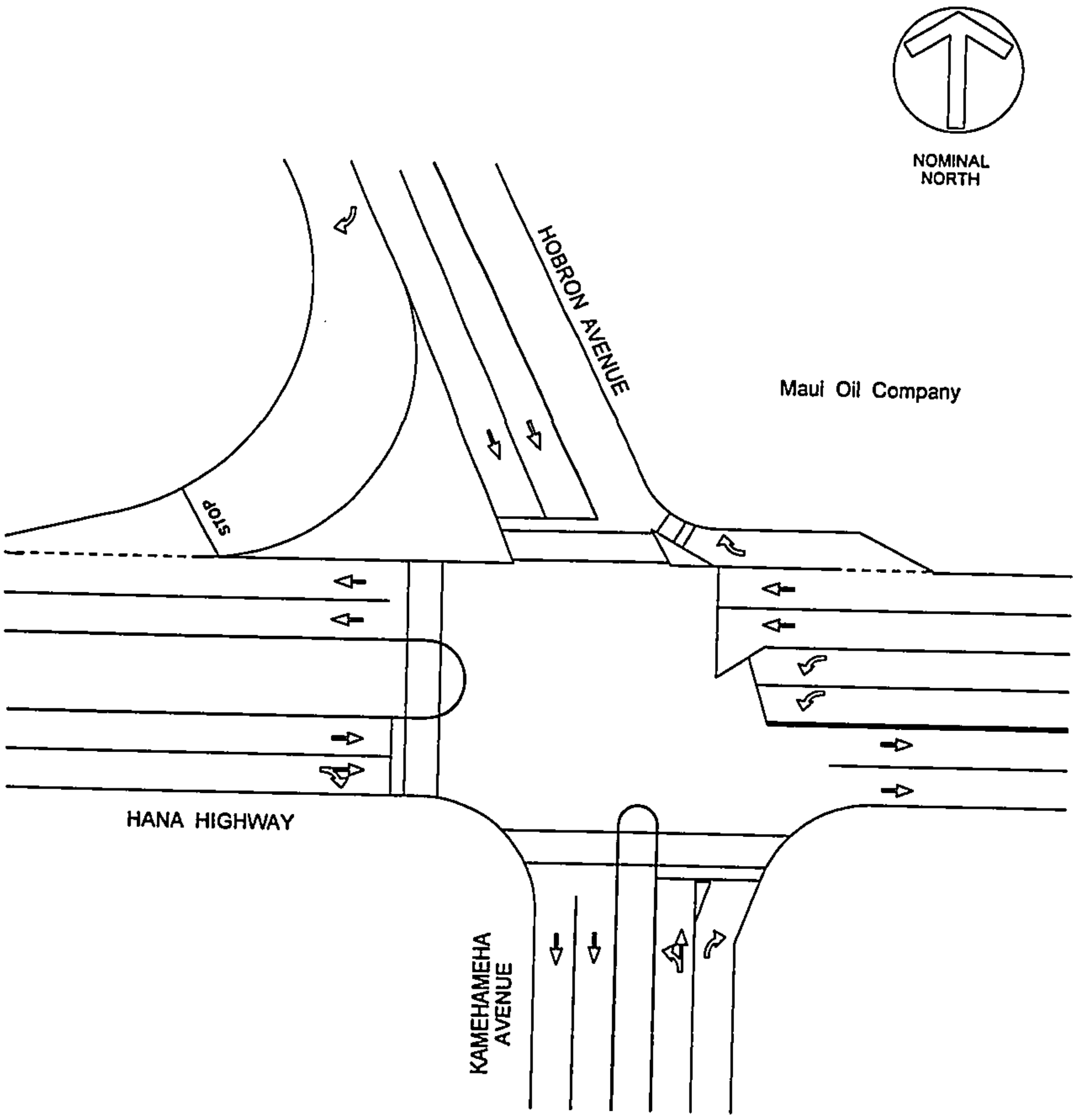


Figure A-7
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION HANA HIGHWAY AT KAMEHAMEHA AVENUE & HOBRON AVENUE (INTERSECTION NO. 8)

Phillip Rowell and Associates

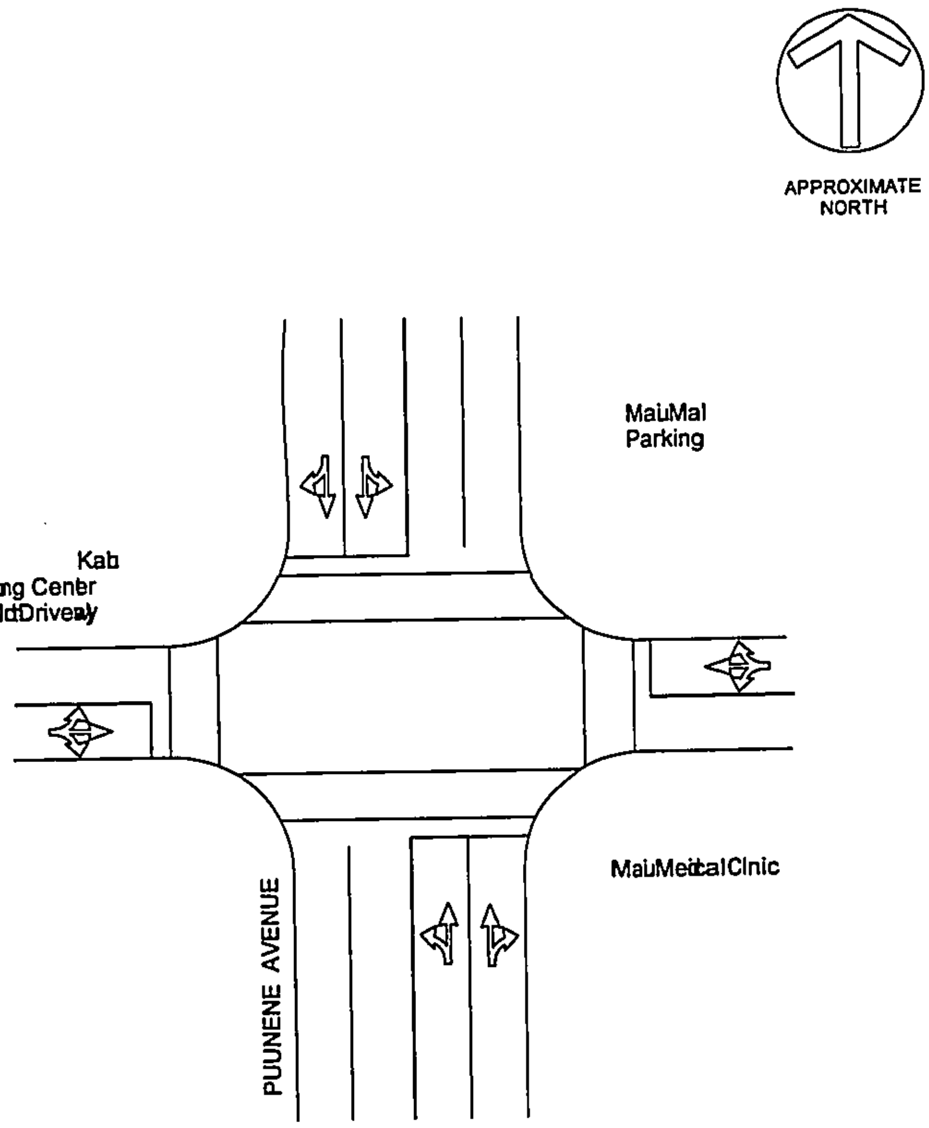


Figure A-8
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
PUUNENE AVENUE AT KAHULUI SHOPPING CENTER NORTH
(INTERSCTION NO. 9)

Phillip Rowell and Associates

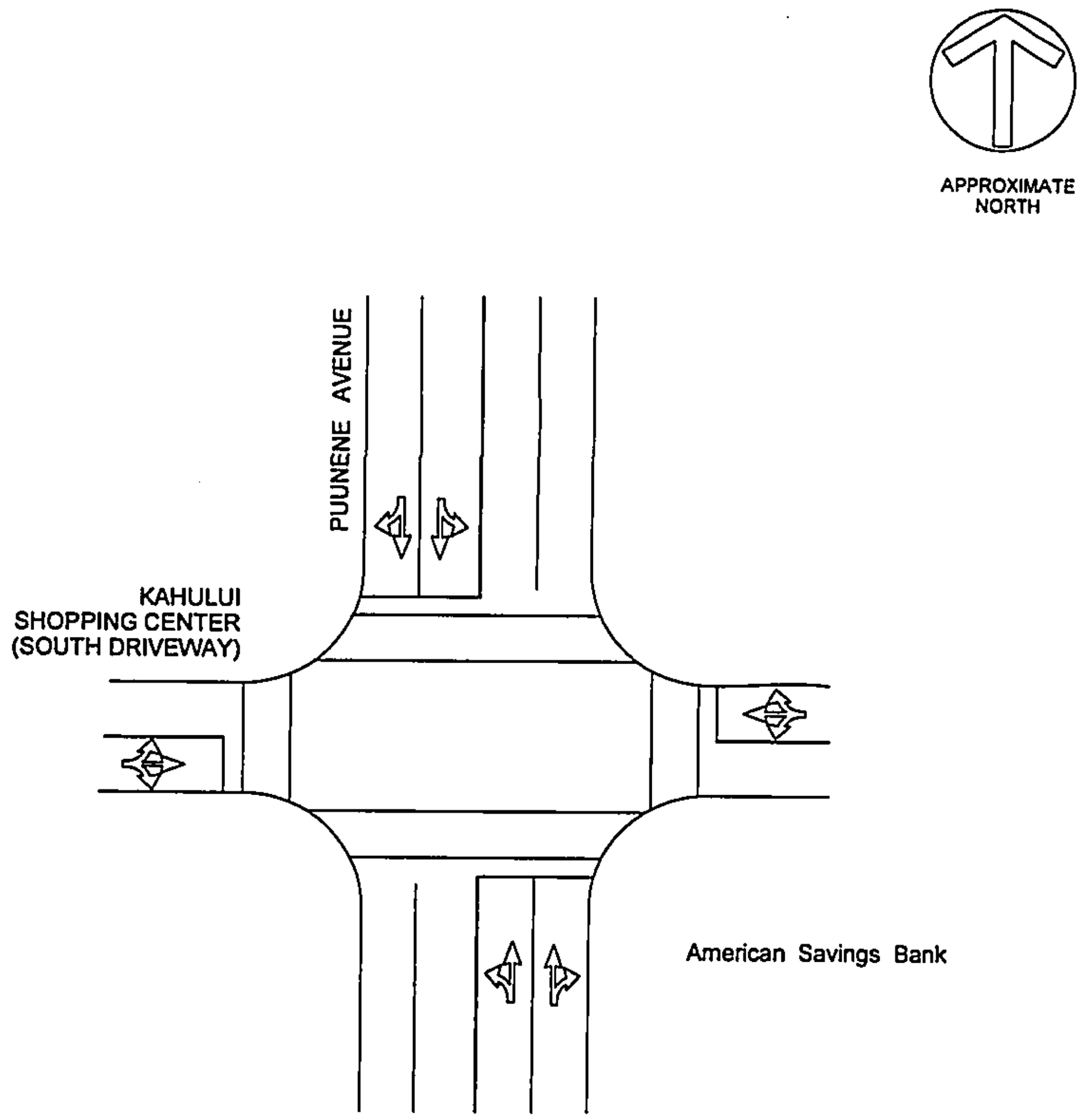


Figure A-9
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
PUUNENE AVENUE AT KAHULUI SHOPPING CENTER SOUTH
(INTERSECTION N0. 10)

Phillip Rowell and Associates

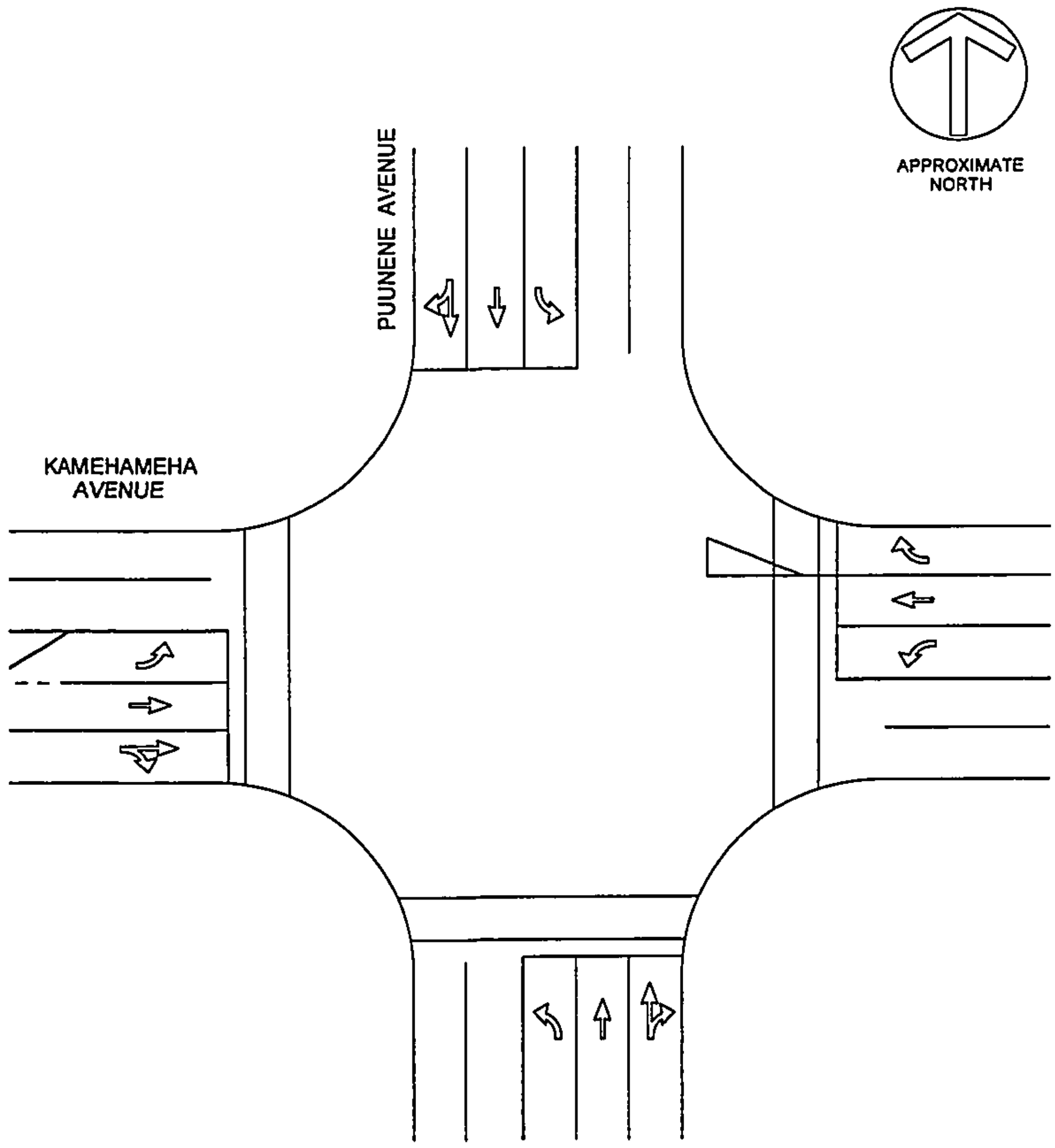


Figure A-10
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
PUUNENE AVENUE AT KAMEHAMEHA AVENUE
(INTERSECTION NO. 11)

Phillip Rowell and Associates

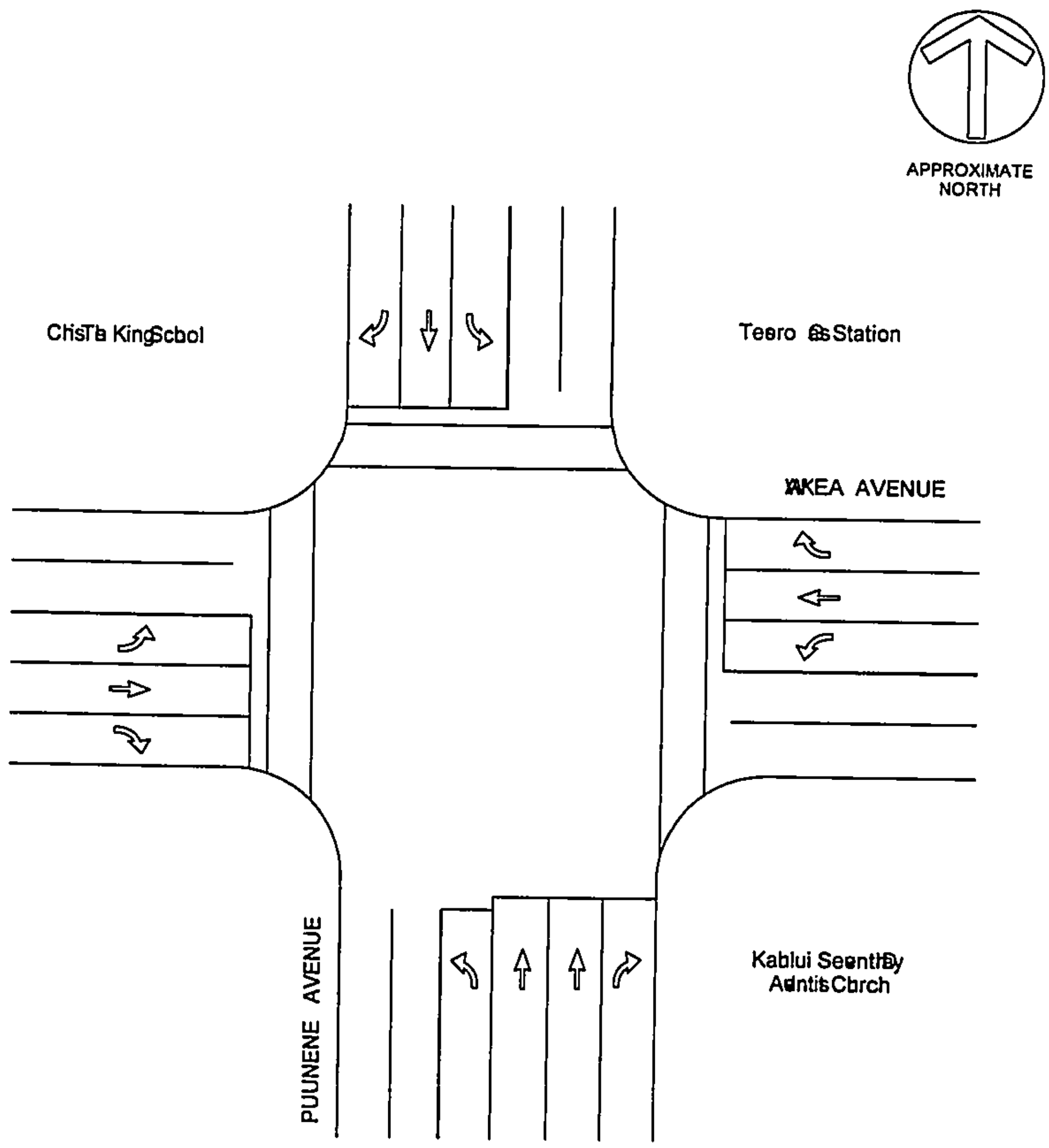


Figure A-11
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
PUUNENE AVENUE AT WAKEA AVENUE
(INTERSECTION NO. 12)

Phillip Rowell and Associates

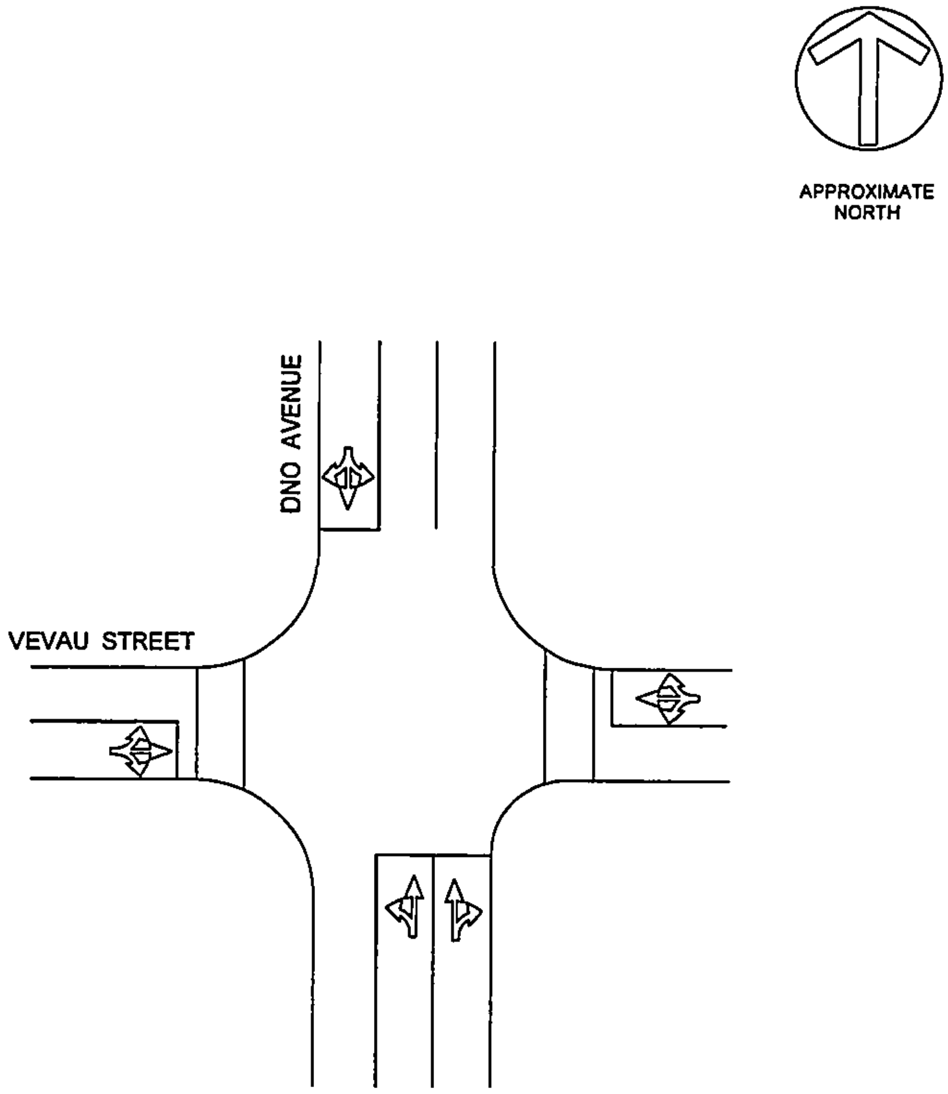


Figure A-12
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
LONO AVENUE AT VEVAU STREET
(INTERSECTION NO. 13)

Phillip Rowell and Associates

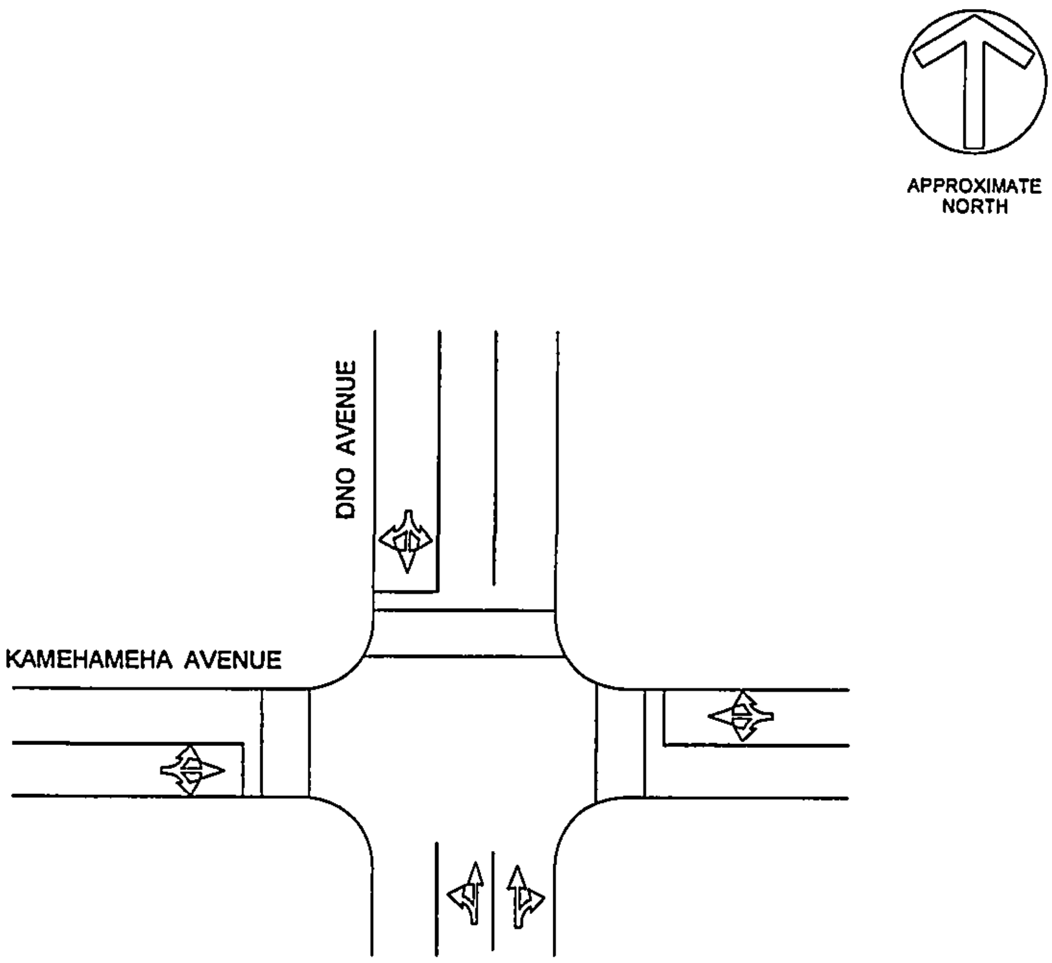


Figure A-13
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
LONO AVENUE AT KAMEHAMEHA AVENUE
(INTERSECTION NO. 14)

Phillip Rowell and Associates

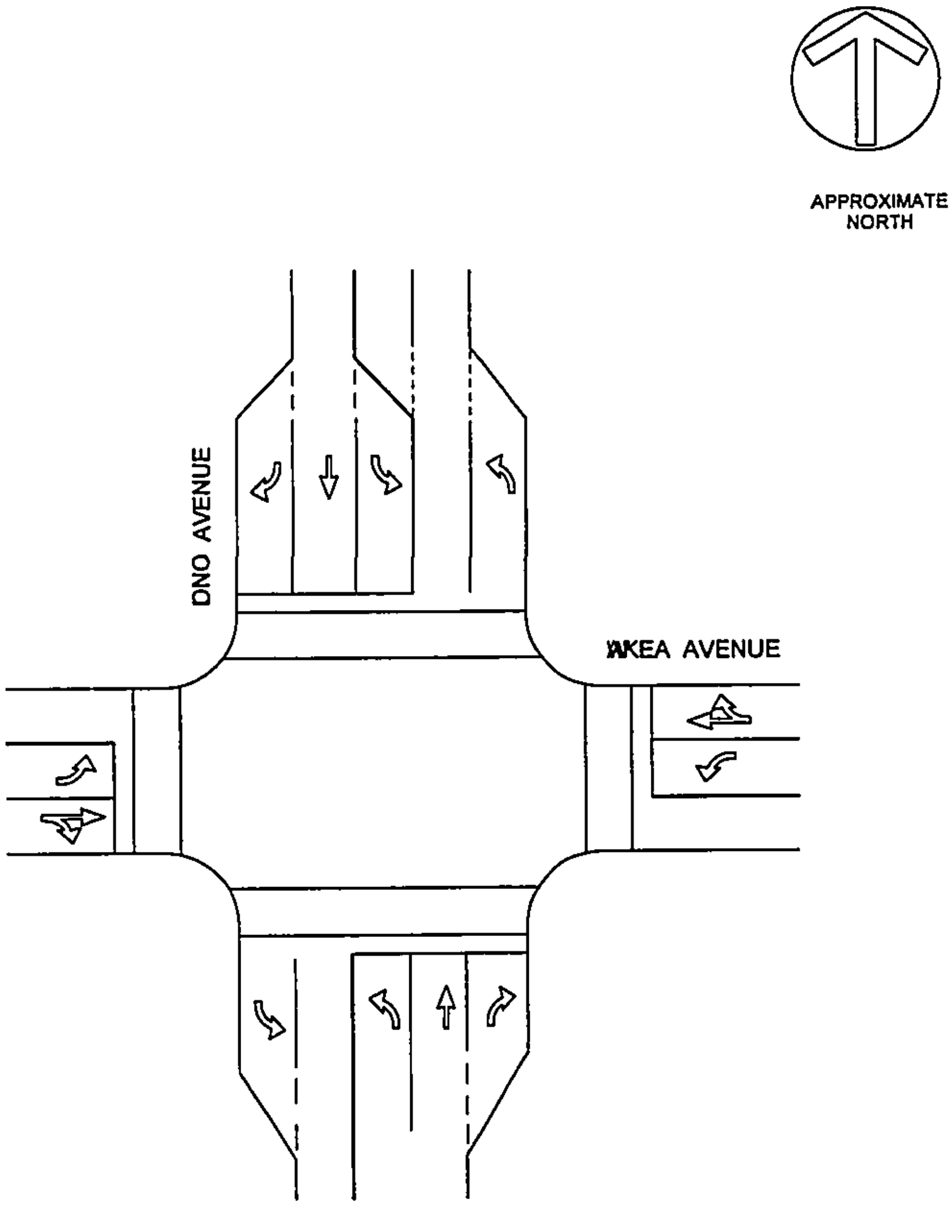


Figure A-14
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
LONO AVENUE AT WAKEA AVENUE
(INTERSECTION NO. 15)

Phillip Rowell and Associates

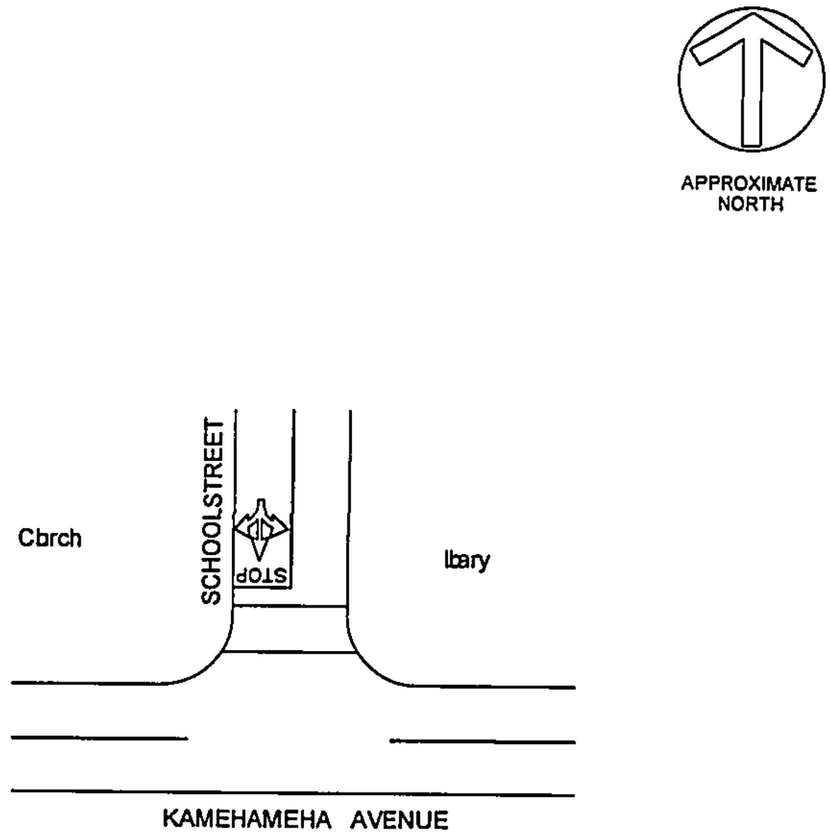


Figure A-15
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
SCHOOL STREET AT KAMEHAMEHA AVENUE
(INTERSECTION NO. 17)

Phillip Rowell and Associates

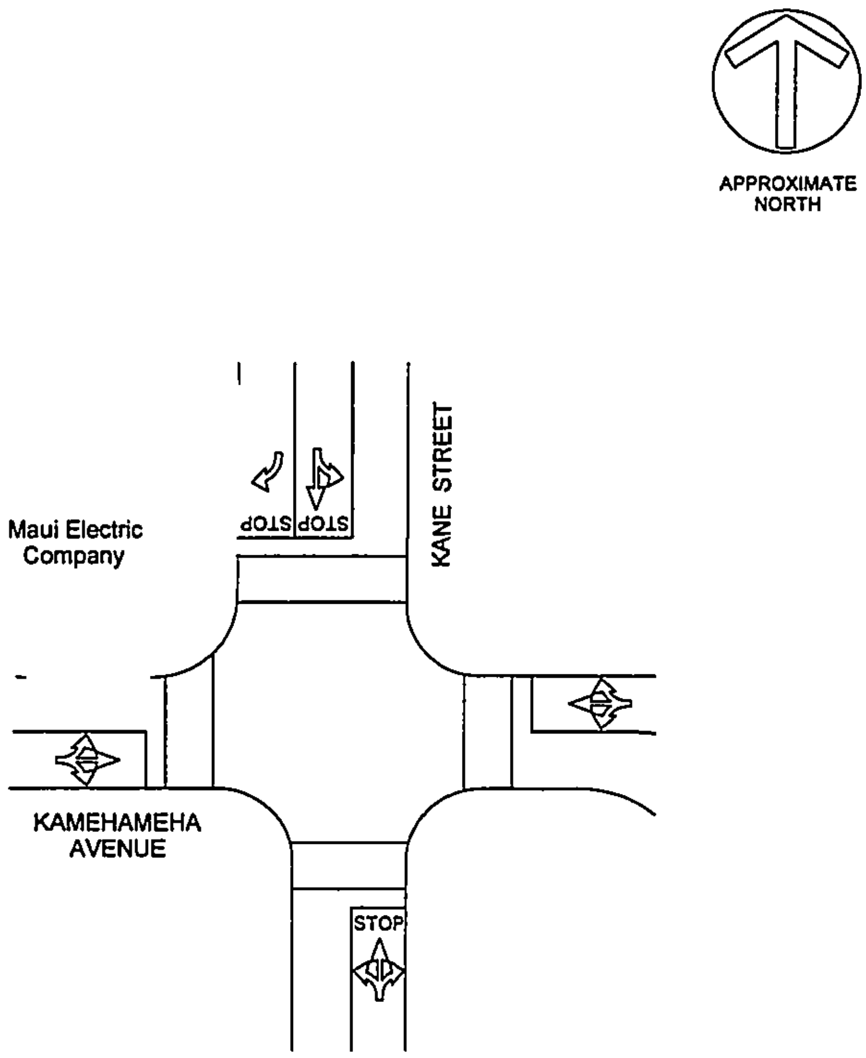


Figure A-16
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
WEST KAMEHAMEHA AVENUE AT KANE STREET
(INTERSECTION NO. 31)

Phillip Rowell and Associates

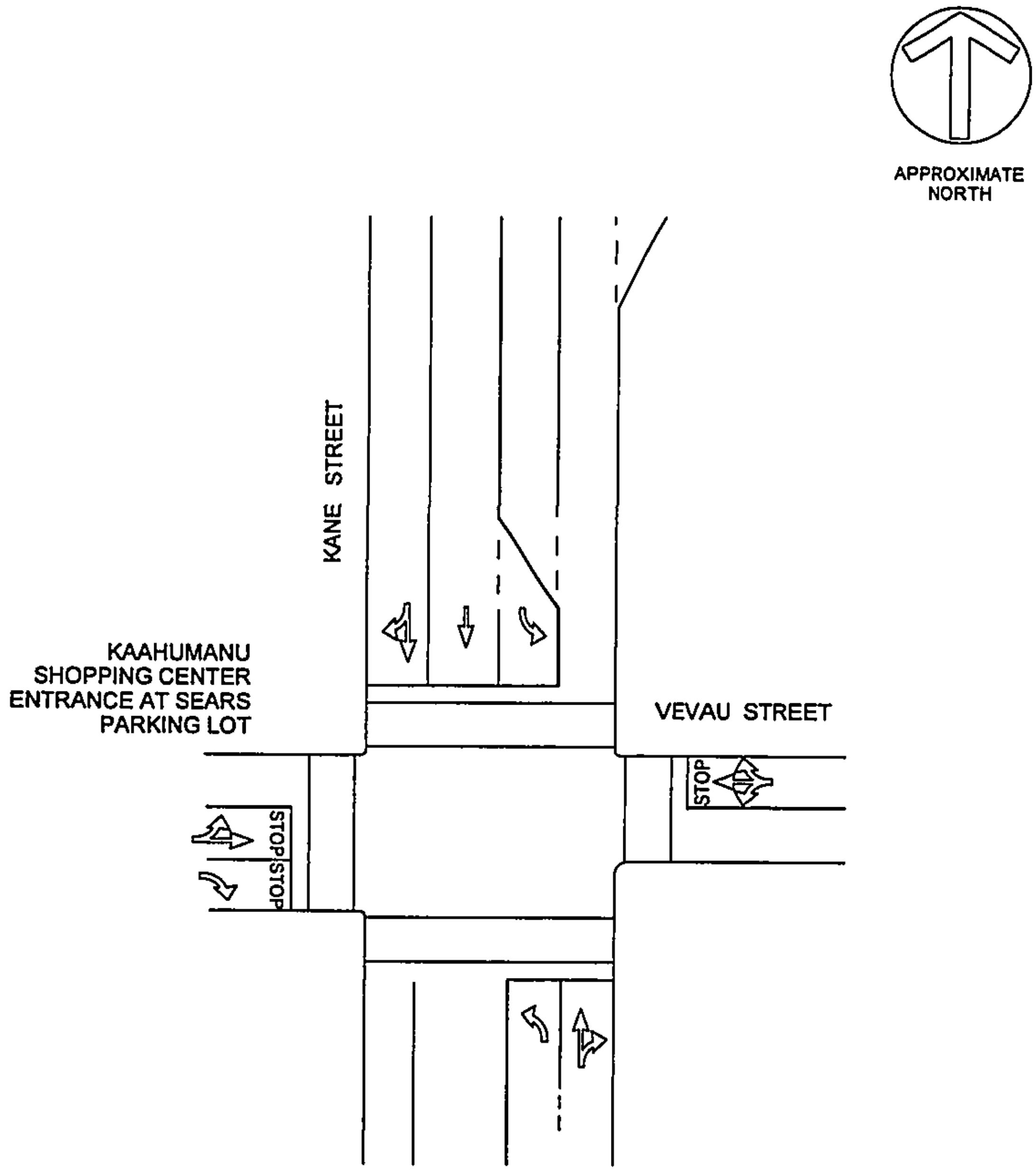


Figure A-17
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
KANE AVENUE AT VEVAU STREET
(INTERSECTION NO. 32)

Phillip Rowell and Associates

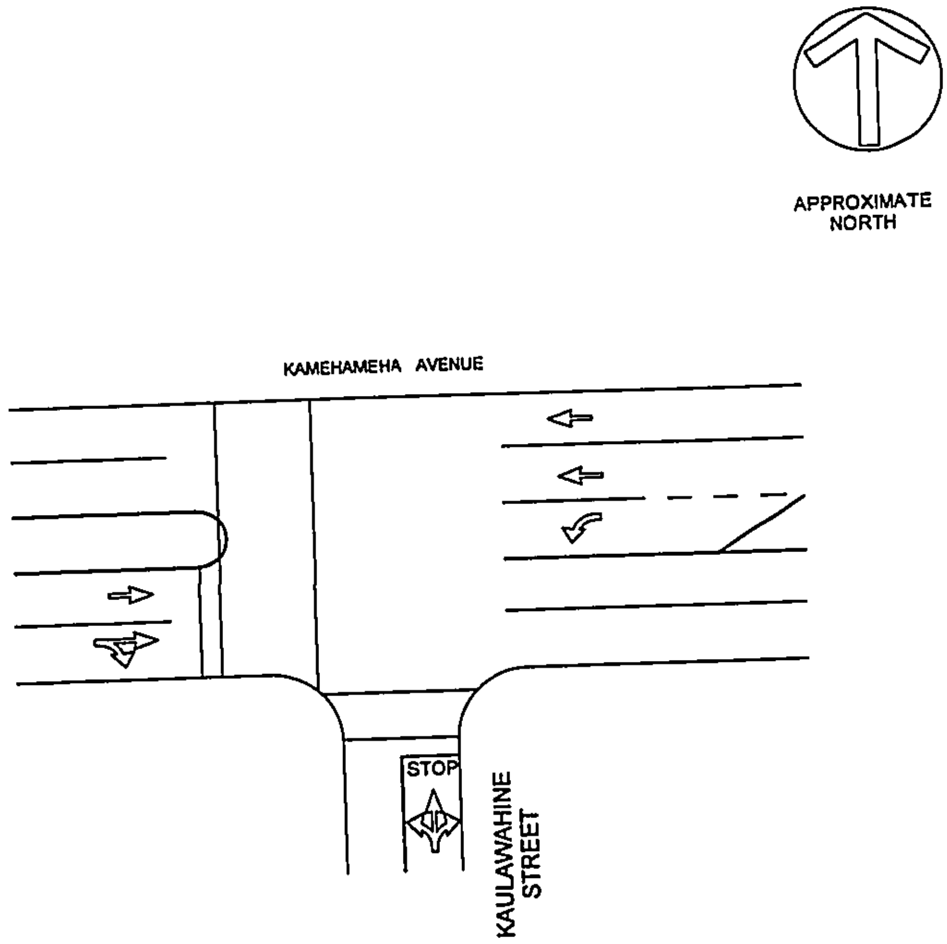


Figure A-18
SCHEMATIC DIAGRAM OF EXISTING LANE CONFIGURATION
KAMEHAMEHA AVENUE AT KULA WAHINE STREET
(INTERSECTION NO. 57)

Phillip Rowell and Associates

APPENDIX B
DETAILED RESULTS OF LEVEL-OF-SERVICE ANALYSIS

Table B-1
Detailed Results of Level-of-Service Analysis for Kaahumanu Avenue at Wakea Avenue

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***	***0.52***	***22.9***	***C***	***0.62***	***24.8***	***C***	***0.65***	***25.5***	***C***	***0.03***	***0.7***
	Eastbound Left	0.21	40.8	D	0.24	41.4	D	0.24	41.4	D	0.00	0.0
	Eastbound Thru	0.51	20.7	C	0.62	22.7	C	0.67	23.9	C	0.05	1.2
	Eastbound Right	0.27	18.1	B	0.34	19.1	B	0.34	19.1	B	0.00	0.0
	Westbound Left	0.43	41.3	D	0.48	42.8	D	0.48	42.8	D	0.00	0.0
	Westbound Thru	0.55	19.0	B	0.66	21.1	C	0.72	22.5	C	0.06	1.4
	Westbound Right	0.09	13.9	B	0.11	14.1	B	0.11	14.1	B	0.00	0.0
	Northbound Left	0.59	31.4	C	0.69	35.6	D	0.69	35.6	D	0.00	0.0
	Northbound Left & Thru	0.54	29.7	C	0.64	33.2	C	0.64	33.2	C	0.00	0.0
	Northbound Right	0.08	21.5	C	0.10	21.7	C	0.10	21.7	C	0.00	0.0
	Southbound Left & Thru	0.10	21.8	C	0.13	22.1	C	0.13	22.1	C	0.00	0.0
	Southbound Right	0.00	20.7	C	0.00	20.7	C	0.00	20.7	C	0.00	0.0
PM Peak Hour	***Overall Intersection***	***0.68***	***25.4***	***C***	***0.81***	***29.2***	***C***	***0.84***	***30.8***	***C***	***0.03***	***1.6***
	Eastbound Left	0.18	40.4	D	0.22	41.1	D	0.22	41.1	D	0.00	0.0
	Eastbound Thru	0.70	24.6	C	0.83	27.9	C	0.91	33.0	C	0.08	5.1
	Eastbound Right	0.38	19.7	B	0.45	20.1	C	0.45	20.1	C	0.00	0.0
	Westbound Left	0.48	42.8	D	0.57	45.5	D	0.57	45.5	D	0.00	0.0
	Westbound Thru	0.49	18.0	B	0.59	18.6	B	0.70	21.0	C	0.11	2.4
	Westbound Right	0.01	13.1	B	0.03	12.5	B	0.03	12.5	B	0.00	0.0
	Northbound Left	0.74	41.6	D	0.89	59.4	E	0.87	56.4	E	-0.02	-3.0
	Northbound Left & Thru	0.62	34.0	C	0.83	49.7	D	0.81	48.0	D	-0.02	-1.7
	Northbound Right	0.08	21.5	C	0.10	21.5	C	0.10	21.5	C	0.00	0.0
	Southbound Left & Thru	0.40	26.8	C	0.52	29.8	C	0.51	29.6	C	-0.01	-0.2
	Southbound Right	0.04	21.1	C	0.03	20.7	C	0.03	20.7	C	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-2
Detailed Results of Level-of-Service Analysis for
Kaahumanu Avenue at Kahului Beach Road & Kane Street

		Existing			2012 Without Project			2012 With Project			Changes	
	Approach and Movement	V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***	***0.71***	***219.7***	***F***	***0.89***	***326.8***	***F***	***0.92***	***338.6***	***F***	***0.03***	***11.8***
	Eastbound Left	0.32	41.3	D	0.35	42.3	D	0.35	42.3	D	0.00	0.0
	Eastbound Thru	0.70	31.2	C	0.88	39.4	D	0.94	46.5	D	0.06	7.1
	Eastbound Right	0.00	21.6	C	0.04	22.1	C	0.07	22.4	C	0.03	0.3
	Westbound Left	0.26	39.9	D	0.51	47.6	D	0.51	47.6	D	0.00	0.0
	Westbound Thru	0.79	34.2	C	0.96	50.4	D	1.04	69.2	E	0.08	18.8
	Westbound Right	1.07	75.4	E	0.20	13.6	B	0.29	14.7	B	0.09	1.1
	Northbound Left	0.06	15.1	B	0.11	15.5	B	0.11	15.6	B	0.00	0.1
	Northbound Thru	0.17	17.3	B	0.23	18.0	B	0.24	18.1	B	0.01	0.1
	Northbound Right	0.41	40.4	D	0.46	42.1	D	0.46	42.1	D	0.00	0.0
	Southbound Left	2.21	592.2	F	2.69	806.7	F	2.74	831.4	F	0.05	24.7
	Southbound Left & Thru	2.41	686.1	F	2.94	922.1	F	3.09	988.9	F	0.15	66.8
	Southbound Right	0.23	36.3	D	0.33	38.4	D	0.33	38.4	D	0.00	0.0
PM Peak Hour	***Overall Intersection***	***0.85***	***54.7***	***D***	***1.08***	***89.2***	***F***	***1.13***	***108.7***	***F***	***0.05***	***19.5***
	Eastbound Left	0.65	86.5	F	0.75	95.4	F	0.75	95.4	F	0.00	0.0
	Eastbound Thru	0.93	62.4	E	1.16	130.6	F	1.24	165.7	F	0.08	35.1
	Eastbound Right	0.02	33.9	C	0.06	34.4	C	0.09	34.9	C	0.03	0.5
	Westbound Left	0.45	75.7	E	0.98	136.2	F	0.98	136.2	F	0.00	0.0
	Westbound Thru	0.68	46.7	D	0.91	60.7	E	1.05	90.6	F	0.14	29.9
	Westbound Right	0.23	6.1	A	0.51	9.0	A	0.62	11.1	B	0.11	2.1
	Northbound Left	0.23	61.1	E	0.29	62.3	E	0.36	63.9	E	0.07	1.6
	Northbound Thru	0.68	77.7	E	0.83	90.7	F	0.89	100.4	F	0.06	9.7
	Northbound Right	0.12	60.1	E	0.20	61.5	E	0.20	61.5	E	0.00	0.0
	Southbound Left	0.88	58.4	E	1.11	116.6	F	1.16	132.7	F	0.05	16.1
	Southbound Left & Thru	0.83	53.5	D	1.03	88.7	F	1.10	112.9	F	0.07	24.2
	Southbound Right	0.39	66.3	E	0.48	69.5	E	0.48	69.5	E	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-4
Detailed Results of Level-of-Service Analysis for Kaahumanu Avenue at Lono Avenue

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***	***0.60***	***22.2***	***C***	***0.74***	***26.7***	***C***	***0.89***	***33.5***	***C***	***0.15***	***6.8***
	Eastbound Left	0.09	41.3	D	0.18	42.9	D	0.18	42.9	D	0.00	0.0
	Eastbound Thru & Right	0.67	20.4	C	0.81	24.0	C	0.85	25.7	C	0.04	1.7
	Westbound Left	0.21	43.5	D	0.30	45.4	D	0.30	45.4	D	0.00	0.0
	Westbound Thru & Right	0.75	22.1	C	0.88	27.2	C	0.88	27.2	C	0.00	0.0
	Northbound Left & Thru	0.50	31.9	C	0.67	38.1	D	1.09	105.1	F	0.42	67.0
	Northbound Right	0.03	23.7	C	0.05	23.9	C	0.05	23.9	C	0.00	0.0
	Southbound Left, Thru & Right	0.10	24.5	C	0.21	26.1	C	0.28	27.7	C	0.07	1.6
PM Peak Hour	***Overall Intersection***	***0.74***	***19.5***	***B***	***0.91***	***28.2***	***C***	***1.28***	***91.9***	***F***	***0.37***	***63.7***
	Eastbound Left	0.06	34.3	C	0.11	35.1	D	0.11	35.1	D	0.00	0.0
	Eastbound Thru & Right	0.81	18.7	B	0.96	29.3	C	1.03	43.7	D	0.07	14.4
	Westbound Left	0.37	40.2	D	0.51	44.6	D	0.51	44.6	D	0.00	0.0
	Westbound Thru & Right	0.72	16.3	B	0.86	20.5	C	0.84	19.8	B	-0.02	-0.7
	Northbound Left & Thru	0.76	43.6	D	0.96	71.2	E	2.14	555.1	F	1.18	483.9
	Northbound Right	0.07	24.3	C	0.12	25.0	C	0.12	25.0	C	0.00	0.0
	Southbound Left, Thru & Right	0.14	25.3	C	0.38	30.5	C	0.53	38.0	D	0.15	7.5

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-5
Detailed Results of Level-of-Service Analysis for Kaahumanu Avenue at Kahului Shopping Center

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Eastbound Left		16.0	C		19.9	C		19.9	C	0.00	0.0
	Westbound Left		15.2	C		19.8	C		18.1	C	0.00	-1.7
	Northbound Left & Thru			F			F				0.00	0.0
	Northbound Right		17.5	C		22.1	C		20.9	C	0.00	-1.2
	Southbound Left, Thru & Right			F			F		22.4	C	0.00	22.4
PM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Eastbound Left		19.7	C		27.2	D		26.2	D	0.00	-1.0
	Westbound Left		21.9	C		32.6	D		31.8	D	0.00	-0.8
	Northbound Left & Thru			F							0.00	0.0
	Northbound Right		27.6	D		42.2	E		59.0	E	0.00	16.8
	Southbound Left, Thru & Right			C			F			F	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-6
Detailed Results of Level-of-Service Analysis for Kaahumanu Avenue at Puunene Avenue

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	*Overall Intersection*	*0.63*	*26.0*	*C*	*0.75*	*30.1*	*C*	*0.75*	*30.1*	*C*	*0.00*	*0.0*
	Eastbound Left	0.32	46.1	D	0.35	46.9	D	0.35	46.9	D	0.00	0.0
	Eastbound Thru & Right	0.71	25.9	C	0.87	31.4	C	0.87	31.7	C	0.00	0.3
	Westbound Left	0.25	44.5	D	0.22	43.8	D	0.26	44.6	D	0.04	0.8
	Westbound Thru & Right	0.67	24.8	C	0.79	28.0	C	0.78	27.5	C	-0.01	-0.5
	Northbound Left	0.61	28.2	C	0.73	33.0	C	0.73	33.0	C	0.00	0.0
	Northbound Left, Thru & Right	0.55	26.1	C	0.64	29.3	C	0.64	29.3	C	0.00	0.0
	Southbound Left & Thru	0.10	18.3	B	0.12	18.6	B	0.12	18.6	B	0.00	0.0
	Southbound Right	0.01	17.4	B	0.02	17.5	B	0.02	17.5	B	0.00	0.0
PM Peak Hour	*Overall Intersection*	*1.00*	*51.5*	*D*	*1.19*	*95.0*	*F*	*1.19*	*98.7*	*F*	*0.00*	*3.7*
	Eastbound Left	0.45	67.0	E	0.53	70.8	E	0.53	70.8	E	0.00	0.0
	Eastbound Thru & Right	0.97	49.3	D	1.16	114.3	F	1.18	120.7	F	0.02	6.4
	Westbound Left	0.60	75.1	E	0.68	81.3	F	0.71	84.0	F	0.03	2.7
	Westbound Thru & Right	0.55	28.1	C	0.68	31.0	C	0.65	30.4	C	-0.03	-0.6
	Northbound Left	1.10	107.1	F	1.31	189.8	F	1.31	189.8	F	0.00	0.0
	Northbound Left, Thru & Right	0.94	64.3	E	1.11	112.1	F	1.11	112.1	F	0.00	0.0
	Southbound Left & Thru	0.29	26.5	C	0.39	29.2	C	0.39	29.2	C	0.00	0.0
	Southbound Right	0.09	22.9	C	0.10	23.1	C	0.10	23.1	C	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-7
Detailed Results of Level-of-Service Analysis for Kaahumanu Avenue at Maui Mall

	Approach and Movement	Existing V/C[1]	Existing Delay[2]	Existing LOS[3]	2012 Without Project V/C	2012 Without Project Delay	2012 Without Project LOS	2012 With Project V/C	2012 With Project Delay	2012 With Project LOS	Changes V/C	Changes Delay
AM Peak Hour	***Overall Intersection***	*0.37*	*15.2*	*B*	*0.44*	*16.4*	*B*	*0.45*	*16.5*	*B*	*0.01*	*0.1*
	Eastbound Left	0.26	44.0	D	0.29	44.6	D	0.29	44.6	D	0.00	0.0
	Eastbound Thru	0.42	13.0	B	0.54	14.5	B	0.54	14.5	B	0.00	0.0
	Eastbound Right	0.08	10.1	B	0.09	10.2	B	0.11	10.3	B	0.02	0.1
	Westbound Left	0.15	41.8	D	0.20	42.8	D	0.23	43.4	D	0.03	0.6
	Westbound Thru & Right	0.48	13.5	B	0.58	14.8	B	0.58	14.8	B	0.00	0.0
	Northbound Left	0.16	30.2	C	0.19	30.6	C	0.23	31.2	C	0.04	0.6
	Northbound Thru & Right	0.10	29.1	C	0.12	29.4	C	0.12	29.4	C	0.00	0.0
	Southbound Left & Thru	0.11	29.3	C	0.13	29.5	C	0.13	29.5	C	0.00	0.0
	Southbound Right	0.09	29.1	C	0.11	29.3	C	0.11	29.3	C	0.00	0.0
PM Peak Hour	***Overall Intersection***	*0.61*	*18.2*	*B*	*0.74*	*20.9*	*C*	*0.76*	*21.1*	*C*	*0.02*	*0.2*
	Eastbound Left	0.15	41.8	D	0.17	42.3	D	0.17	42.3	D	0.00	0.0
	Eastbound Thru	0.68	17.1	B	0.83	21.8	C	0.83	21.8	C	0.00	0.0
	Eastbound Right	0.05	9.8	A	0.08	10.1	B	0.10	10.3	B	0.02	0.2
	Westbound Left	0.46	49.6	D	0.55	53.1	D	0.55	53.1	D	0.00	0.0
	Westbound Thru & Right	0.37	12.3	B	0.46	13.3	B	0.46	13.3	B	0.00	0.0
	Northbound Left	0.53	38.1	D	0.62	41.8	D	0.68	44.8	D	0.06	3.0
	Northbound Thru & Right	0.17	30.1	C	0.21	30.6	C	0.21	30.6	C	0.00	0.0
	Southbound Left & Thru	0.11	29.3	C	0.13	29.6	C	0.13	29.6	C	0.00	0.0
	Southbound Right	0.05	28.6	C	0.07	28.7	C	0.07	28.7	C	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-8

Detailed Results of Level-of-Service Analysis for Kaahumanu Avenue at Hana Highway

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***	***0.58***	***31.8***	***C***	***0.69***	***36.6***	***D***	***0.69***	***37.5***	***D***	***0.00***	***0.9***
	Eastbound Thru &Right	0.48	28.5	C	0.59	31.1	C	0.59	31.1	C	0.00	0.0
	Westbound Left	0.50	54.6	E	0.64	68.3	E	0.73	72.0	E	0.09	3.7
	Westbound Thru	0.60	17.8	B	0.70	20.2	C	0.70	20.2	C	0.00	0.0
	Westbound Right	0.17	11.9	B	0.24	12.6	B	0.24	12.6	B	0.00	0.0
	Northbound Left & Thru	0.68	78.4	E	0.80	89.0	F	0.78	87.0	F	-0.02	-2.0
	Northbound Right	0.39	44.8	D	0.72	57.0	E	0.76	59.5	E	0.04	2.5
	Southbound Left	0.41	63.9	E	0.60	70.3	E	0.60	70.3	E	0.00	0.0
	Southbound Thru	0.22	59.4	E	0.27	60.4	E	0.27	60.4	E	0.00	0.0
	Southbound Right	0.02	55.9	E	0.06	56.6	E	0.06	56.6	E	0.00	0.0
PM Peak Hour	***Overall Intersection***	***0.88***	***52.7***	***D***	***1.17***	***105.7***	***F***	***1.20***	***119.4***	***F***	***0.03***	***13.7***
	Eastbound Thru &Right	0.81	38.9	D	0.96	54.2	D	0.96	54.2	D	0.00	0.0
	Westbound Left	0.73	72.2	E	1.11	139.4	F	1.24	188.9	F	0.13	49.5
	Westbound Thru	0.48	15.5	B	0.58	17.3	B	0.58	17.3	B	0.00	0.0
	Westbound Right	0.18	11.9	B	0.24	12.6	B	0.24	12.6	B	0.00	0.0
	Northbound Left & Thru	0.95	112.4	F	1.11	158.1	F	1.11	158.1	F	0.00	0.0
	Northbound Right	1.10	124.7	F	1.63	348.6	F	1.71	383.5	F	0.08	34.9
	Southbound Left	0.68	74.8	E	0.90	97.6	F	0.90	97.6	F	0.00	0.0
	Southbound Thru	0.38	62.7	E	0.44	64.5	E	0.44	64.5	E	0.00	0.0
	Southbound Right	0.08	56.9	E	0.14	58.0	E	0.14	58.0	E	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-9
Detailed Results of Level-of-Service Analysis for
Puunene Avenue at Kahului Shopping Center North

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left & Thru		8.7	A		8.9	A		8.9	A	0.00	0.0
	Southbound Left & Thru		8.8	A		9.2	A		9.2	A	0.00	0.0
	Westbound Left, Thru & Right		19.8	C		25.3	D		19.9	C	0.00	-5.4
	Eastbound Left, Thru & Right		18.6	C		21.9	C		10.8	B	0.00	-11.1
PM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left & Thru		9.0	A		9.6	A		9.4	A	0.00	-0.2
	Southbound Left & Thru		10.3	B		11.1	B		11.1	B	0.00	0.0
	Westbound Left, Thru & Right		49.6	E		159.5	F		43.0	E	0.00	-116.5
	Eastbound Left, Thru & Right		26.9	D		54.4	F		11.3	B	0.00	-43.1

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-10
Detailed Results of Level-of-Service Analysis for
Puunene Avenue at Kahului Shopping Center South

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left & Thru		8.6	A		8.9	A		8.8	A	0.00	-0.1
	Southbound Left & Thru		9.2	A		9.6	A		9.8	A	0.00	0.2
	Westbound Left, Thru & Right		32.3	D		55.2	F		32.9	D	0.00	-22.3
	Eastbound Left, Thru & Right		17.0	C		19.7	C		10.5	B	0.00	-9.2
PM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left & Thru		9.0	A		9.9	A		8.9	A	0.00	-1.0
	Southbound Left & Thru		10.3	B		11.3	B		11.9	B	0.00	0.6
	Westbound Left, Thru & Right		257.3	F		818.1	F		549.2	F	0.00	-268.9
	Eastbound Left, Thru & Right		102.5	F		427.3	F		10.5	B	0.00	-416.8

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. *LOS denotes Level-of-Service calculated using the operations method described in Highway Capacity Manual.* LOS is based on delay.

Table B-11

Detailed Results of Level-of-Service Analysis for Puunene Avenue at Kamehameha Avenue

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***	***0.52***	***18.7***	***B***	***0.62***	***20.8***	***C***	***0.64***	***21.8***	***C***	***0.02***	***1.0***
	Eastbound Left	0.23	13.0	B	0.31	14.4	B	0.35	15.6	B	0.04	1.2
	Eastbound Thru & Right	0.48	21.8	C	0.66	25.0	C	0.73	26.9	C	0.07	1.9
	Westbound Left	0.20	12.5	B	0.30	14.5	B	0.32	15.1	B	0.02	0.6
	Westbound Thru	0.51	23.8	C	0.63	26.7	C	0.73	30.4	C	0.10	3.7
	Westbound Right	0.21	19.5	B	0.29	20.6	C	0.30	20.7	C	0.01	0.1
	Northbound Left	0.28	11.0	B	0.33	11.8	B	0.46	13.6	B	0.13	1.8
	Northbound Thru & Right	0.51	19.3	B	0.60	20.7	C	0.57	20.2	C	-0.03	-0.5
	Southbound Left	0.41	13.2	B	0.52	16.0	B	0.54	16.1	B	0.02	0.1
	Southbound Thru & Right	0.40	18.0	B	0.45	18.6	B	0.44	18.5	B	-0.01	-0.1
PM Peak Hour	***Overall Intersection***	***0.88***	***30.0***	***C***	***0.92***	***44.3***	***D***	***0.88***	***73.4***	***E***	***-0.04***	***29.1***
	Eastbound Left	0.32	16.3	B	0.37	17.2	B	0.45	18.7	B	0.08	1.5
	Eastbound Thru & Right	0.78	28.5	C	1.00	53.0	D	1.20	123.8	F	0.20	70.8
	Westbound Left	0.63	23.0	C	0.83	37.2	D	0.83	37.2	D	0.00	0.0
	Westbound Thru	0.90	43.6	D	1.13	103.5	F	1.29	166.8	F	0.16	63.3
	Westbound Right	0.00	17.4	B	0.08	18.1	B	0.08	18.1	B	0.00	0.0
	Northbound Left	0.44	13.8	B	0.57	17.4	B	0.85	32.7	C	0.28	15.3
	Northbound Thru & Right	0.94	37.3	D	0.91	33.1	C	0.80	26.2	C	-0.11	-6.9
	Southbound Left	0.58	21.2	C	0.67	24.0	C	0.73	26.4	C	0.06	2.4
	Southbound Thru & Right	0.52	19.5	B	0.59	20.6	C	0.57	20.3	C	-0.02	-0.3

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-12
Detailed Results of Level-of-Service Analysis for Puunene Avenue at Wakea Avenue

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***	*0.69*	*45.9*	*D*	*0.80*	*55.9*	*E*	*0.85*	*57.4*	*E*	*0.05*	*1.5*
	Eastbound Left	0.69	67.9	E	0.88	92.3	F	0.88	92.3	F	0.00	0.0
	Eastbound Thru	0.70	39.3	D	0.82	46.4	D	0.84	47.8	D	0.02	1.4
	Eastbound Right	0.30	29.5	C	0.35	30.4	C	0.37	30.7	C	0.02	0.3
	Westbound Left	1.21	185.7	F	1.35	241.0	F	1.35	241.0	F	0.00	0.0
	Westbound Thru	0.84	48.2	D	0.97	67.2	E	1.00	74.3	E	0.03	7.1
	Westbound Right	0.14	27.1	C	0.18	27.6	C	0.25	28.7	C	0.07	1.1
	Northbound Left	0.58	59.7	E	0.69	67.9	E	0.85	87.6	F	0.16	19.7
	Northbound Thru	0.20	22.6	C	0.22	22.9	C	0.27	23.3	C	0.05	0.4
	Northbound Right	0.19	22.9	C	0.21	23.2	C	0.21	23.2	C	0.00	0.0
	Southbound Left	0.48	40.2	D	0.55	42.4	D	0.67	46.9	D	0.12	4.5
	Southbound Thru	0.52	20.8	C	0.61	23.1	C	0.67	24.6	C	0.06	1.5
	Southbound Right	0.18	22.7	C	0.20	23.1	C	0.20	23.1	C	0.00	0.0
PM Peak Hour	***Overall Intersection***	*0.73*	*38.7*	*D*	*0.87*	*46.8*	*D*	*0.94*	*53.5*	*D*	*0.07*	*6.7*
	Eastbound Left	0.88	92.3	F	1.02	125.5	F	1.02	125.5	F	0.00	0.0
	Eastbound Thru	0.74	41.2	D	0.86	50.2	D	0.91	55.8	E	0.05	5.6
	Eastbound Right	0.32	29.8	C	0.36	30.6	C	0.41	31.6	C	0.05	1.0
	Westbound Left	0.55	57.7	E	0.62	62.0	E	0.62	62.0	E	0.00	0.0
	Westbound Thru	0.77	42.9	D	0.91	56.3	E	0.93	58.7	E	0.02	2.4
	Westbound Right	0.45	32.4	C	0.52	34.1	C	0.66	38.6	D	0.14	4.5
	Northbound Left	0.88	92.3	F	1.05	135.3	F	1.14	161.5	F	0.09	26.2
	Northbound Thru	0.30	23.8	C	0.43	25.4	C	0.50	26.6	C	0.07	1.2
	Northbound Right	0.15	22.4	C	0.18	22.7	C	0.18	22.7	C	0.00	0.0
	Southbound Left	0.64	45.8	D	0.75	52.0	D	0.99	86.2	F	0.24	34.2
	Southbound Thru	0.65	24.0	C	0.80	29.8	C	0.90	38.4	D	0.10	8.6
	Southbound Right	0.17	22.6	C	0.20	23.0	C	0.20	23.0	C	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-13

Detailed Results of Level-of-Service Analysis for Lono Avenue at Vevau Street

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left, Thru & Right		8.0	A		8.1	A		8.1	A	0.00	0.0
	Southbound Left, Thru & Right		8.0	A		8.2	A		8.5	A	0.00	0.3
	Westbound Left, Thru & Right		13.9	B		15.8	C		26.5	D	0.00	10.7
	Eastbound Left, Thru & Right		14.0	B		15.7	C		24.0	C	0.00	8.3
PM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left, Thru & Right		8.5	A		8.8	A		8.9	A	0.00	0.1
	Southbound Left, Thru & Right		8.0	A		8.3	A		9.0	A	0.00	0.7
	Westbound Left, Thru & Right		33.3	D		73.5	F			F	0.00	-73.5
	Eastbound Left, Thru & Right		28.9	D		76.4	F			F	0.00	-76.4

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-14
Detailed Results of Level-of-Service Analysis for Lono Avenue at Kamehameha Avenue

	Approach and Movement	Existing V/C[1]	Existing Delay[2]	Existing LOS[3]	2012 Without Project V/C	2012 Without Project Delay	2012 Without Project LOS	2012 With Project V/C	2012 With Project Delay	2012 With Project LOS	Changes V/C	Changes Delay
AM Peak Hour	*Overall Intersection*	*0.33*	*9.0*	*A*	*0.38*	*9.3*	*A*	*0.40*	*9.4*	*A*	*0.02*	*0.1*
	Eastbound Left	0.12	8.2	A	0.15	8.5	A	0.15	8.5	A	0.00	0.0
	Eastbound Thru	0.36	9.9	A	0.42	10.5	B	0.42	10.5	B	0.00	0.0
	Eastbound Right	0.00	7.3	A	0.00	7.3	A	0.00	7.3	A	0.00	0.0
	Westbound Left	0.08	7.9	A	0.10	8.2	A	0.12	8.4	A	0.02	0.2
	Westbound Thru	0.22	8.7	A	0.26	9.0	A	0.26	9.0	A	0.00	0.0
	Westbound Right	0.03	7.5	A	0.05	7.6	A	0.14	8.2	A	0.09	0.6
	Northbound Left	0.05	7.7	A	0.06	7.7	A	0.06	7.7	A	0.00	0.0
	Northbound Thru	0.30	9.4	A	0.34	9.8	A	0.38	10.1	B	0.04	0.3
	Northbound Right	0.08	7.9	A	0.10	8.0	A	0.11	8.1	A	0.01	0.1
	Southbound Left	0.02	7.5	A	0.03	7.5	A	0.03	7.6	A	0.00	0.1
	Southbound Thru & Right	0.14	8.2	A	0.17	8.4	A	0.18	8.5	A	0.01	0.1
PM Peak Hour	*Overall Intersection*	*0.43*	*10.6*	*B*	*0.54*	*12.1*	*B*	*0.57*	*12.2*	*B*	*0.03*	*0.1*
	Eastbound Left	0.13	8.9	A	0.21	10.2	B	0.22	10.3	B	0.01	0.1
	Eastbound Thru	0.40	10.8	B	0.60	13.6	B	0.59	13.5	B	-0.01	-0.1
	Eastbound Right	0.02	7.8	A	0.04	7.9	A	0.04	7.9	A	0.00	0.0
	Westbound Left	0.17	9.3	A	0.30	11.8	B	0.38	13.4	B	0.08	1.6
	Westbound Thru	0.45	11.4	B	0.57	13.1	B	0.57	13.0	B	0.00	-0.1
	Westbound Right	0.06	8.1	A	0.10	8.3	A	0.26	9.6	A	0.16	1.3
	Northbound Left	0.05	8.7	A	0.07	8.8	A	0.07	8.8	A	0.00	0.0
	Northbound Thru	0.20	9.6	A	0.24	9.9	A	0.24	9.9	A	0.00	0.0
	Northbound Right	0.05	8.5	A	0.06	8.6	A	0.09	8.8	A	0.03	0.2
	Southbound Left	0.40	12.2	B	0.48	13.7	B	0.55	15.0	B	0.07	1.3
	Southbound Thru & Right	0.27	10.1	B	0.33	10.7	B	0.30	10.4	B	-0.03	-0.3

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-15

Detailed Results of Level-of-Service Analysis for Lono Avenue at Wakea Avenue

	Approach and Movement	Existing V/C[1]	Existing Delay[2]	Existing LOS[3]	2012 Without Project V/C	2012 Without Project Delay	2012 Without Project LOS	2012 With Project V/C	2012 With Project Delay	2012 With Project LOS	Changes V/C	Changes Delay
AM Peak Hour	*Overall Intersection*	*0.46*	*16.3*	*B*	*0.53*	*17.6*	*B*	*0.55*	*18.1*	*B*	*0.02*	*0.5*
	Eastbound Left	0.03	10.1	B	0.04	10.2	B	0.04	10.3	B	0.00	0.1
	Eastbound Thru & Right	0.50	15.1	B	0.58	16.6	B	0.58	16.6	B	0.00	0.0
	Westbound Left	0.26	13.1	B	0.35	15.4	B	0.35	15.4	B	0.00	0.0
	Westbound Thru & Right	0.47	14.6	B	0.55	16.0	B	0.60	16.9	B	0.05	0.9
	Northbound Left	0.28	18.5	B	0.33	19.4	B	0.34	19.7	B	0.01	0.3
	Northbound Thru	0.41	19.7	B	0.47	20.7	C	0.48	20.9	C	0.01	0.2
	Northbound Right	0.12	16.3	B	0.16	16.7	B	0.16	16.7	B	0.00	0.0
	Southbound Left	0.29	19.4	B	0.39	21.6	C	0.46	23.6	C	0.07	2.0
	Southbound Thru	0.21	17.1	B	0.24	17.5	B	0.27	17.8	B	0.03	0.3
	Southbound Right	0.01	15.2	B	0.01	15.2	B	0.01	15.2	B	0.00	0.0
PM Peak Hour	*Overall Intersection*	*0.47*	*15.0*	*B*	*0.56*	*16.6*	*B*	*0.58*	*17.3*	*B*	*0.02*	*0.7*
	Eastbound Left	0.08	7.5	A	0.12	8.1	A	0.13	8.2	A	0.01	0.1
	Eastbound Thru & Right	0.46	10.6	B	0.52	11.5	B	0.52	11.5	B	0.00	0.0
	Westbound Left	0.40	11.6	B	0.51	14.8	B	0.51	14.8	B	0.00	0.0
	Westbound Thru & Right	0.51	11.4	B	0.60	13.0	B	0.62	13.4	B	0.02	0.4
	Northbound Left	0.24	23.1	C	0.32	25.1	C	0.31	24.9	C	-0.01	-0.2
	Northbound Thru	0.35	23.7	C	0.42	24.8	C	0.45	25.3	C	0.03	0.5
	Northbound Right	0.00	19.6	B	0.02	19.8	B	0.02	19.8	B	0.00	0.0
	Southbound Left	0.19	22.1	C	0.29	24.1	C	0.49	29.8	C	0.20	5.7
	Southbound Thru	0.40	24.3	C	0.47	25.7	C	0.47	25.6	C	0.00	-0.1
	Southbound Right	0.04	20.0-	B	0.05	20.1	C	0.05	20.1	C	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-17

Detailed Results of Level-of-Service Analysis for School Street at Kamehameha Avenue

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Eastbound Left & Thru		7.8	A		8.0	A		8.0	A	0.00	0.0
	Southbound Left & Right		13.0	B		17.4	C		17.4	C	0.00	0.0
PM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Eastbound Left & Thru		8.6	A		9.1	A		9.1	A	0.00	0.0
	Southbound Left & Right		18.0	C		36.6	E		36.6	E	0.00	0.0

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-31

Detailed Results of Level-of-Service Analysis for Kane Street at Kamehameha Avenue

		Existing			2012 Without Project			2012 With Project			Changes	
	Approach and Movement	V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Eastbound Left, Thru & Right		8.1	A		8.3	A		8.3	A	0.00	0.0
	Westbound Left, Thru & Right		7.9	A		8.1	A		8.1	A	0.00	0.0
	Northbound Left, Thru & Right		21.2	C		31.0	D		31.0	D	0.00	0.0
	Southbound Left & Thru		30.5	D		55.6	F		55.6	F	0.00	0.0
	Southbound Right		9.7	A		9.9	A		9.9	A	0.00	0.0
PM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Eastbound Left, Thru & Right		9.1	A		9.5	A		9.5	A	0.00	0.0
	Westbound Left, Thru & Right		8.0	A		8.4	A		8.3	A	0.00	-0.1
	Northbound Left, Thru & Right		43.6	E			F			F	0.00	0.0
	Southbound Left & Thru		151.2	F			F			F	0.00	0.0
	Southbound Right		16.0	C		19.7	C		19.7	C	0.00	0.0

NOTES:

1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-32
Detailed Results of Level-of-Service Analysis for Kane Street at Vevau Street

	Approach and Movement	Existing			2012 Without Project			2012 With Project			Changes	
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left		7.8	A		8.1	A		8.0	A	0.00	-0.1
	Southbound Left		7.9	A		8.0	A		8.2	A	0.00	0.2
	Westbound Left, Thru & Right		16.1	C		19.6	C		21.4	C	0.00	1.8
	Eastbound Left & Thru		20.8	C		26.7	D		36.5	E	0.00	9.8
	Eastbound Right		9.5	A		9.7	A		9.9	A	0.00	0.2
PM Peak Hour	***Overall Intersection***										***0.00***	***0.0***
	Northbound Left		8.0	A		8.2	A		8.7	A	0.00	0.5
	Southbound Left		7.7	A		7.8	A		8.4	A	0.00	0.6
	Westbound Left, Thru & Right		20.3	C		26.5	D		132.8	F	0.00	106.3
	Eastbound Left & Thru		47.4	E		111.5	F		760.4	F	0.00	648.9
	Eastbound Right		9.9	A		10.2	B		11.7	B	0.00	1.5

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-51
Detailed Results of Level-of-Service Analysis for Center Street at Vevau Street

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	V/C[1]	LOS[3]	V/C[1]	LOS[3]
Eastbound	0.07	A	0.16	A
Westbound	0.10	A	0.22	A
Northbound	0.02	A	0.09	A
Southbound	0.05	A	0.14	A

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-52
Detailed Results of Level-of-Service Analysis for Vevau Street at Drive C

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay[2]	LOS[3]	Delay[2]	LOS[3]
Eastbound Left & Thru	7.6	A	7.9	A
Southbound Left & Right	9.2	A	10.8	B

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-53
Detailed Results of Level-of-Service Analysis for Vevau Street at Drive G & Drive H

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay[2]	LOS[3]	Delay[2]	LOS[3]
Eastbound Left, Thru & Right	7.2	A	7.3	A
Westbound Left, Thru & Right	7.3	A	7.3	A
Northbound Left, Thru & Right	9.3	A	10.8	B
Southbound Left. Thru & Right	8.8	A	9.3	A

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-54
Detailed Results of Level-of-Service Analysis for Center Street at Drive B & Drive D

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay[2]	LOS[3]	Delay[2]	LOS[3]
Northbound Left, Thru & Right	7.3	A	7.4	A
Southbound Left. Thru & Right	7.3	A	7.5	A
Westbound Left & Right	8.3	A	11.0	B
Eastbound Left & Right	8.8	A	10.4	B

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-55
Detailed Results of Level-of-Service Analysis for Center Street at Drive L

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay(2)	LOS(3)	Delay(2)	LOS(3)
Northbound Left & Thru	7.4	A	7.6	A
Eastbound Left & Right	8.8	A	9.8	A

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-56
Detailed Results of Level-of-Service Analysis for Center Street at Drive K

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay(2)	LOS(3)	Delay(2)	LOS(3)
Southbound Left & Thru	7.3	A	7.5	A
Westbound Left & Right	8.4	A	8.7	A

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-57
Detailed Results of Level-of-Service Analysis for Kamehameha Avenue at Center Street/Kaulawahine Street

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay(2)	LOS(3)	Delay(2)	LOS(3)
Eastbound Left	10.2	B	13.8	B
Westbound Left	11.9	B	14.8	B
Northbound Left, Thru & Right	45.0	E	84.5	F
Southbound Left	126.7	F		F
Southbound Thru & Right	12.2	B	16.2	C

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-58
Detailed Results of Level-of-Service Analysis for Kamehameha Avenue at Drive J

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay(2)	LOS(3)	Delay(2)	LOS(3)
Eastbound Left	11.5	B	14.7	B
Southbound Left & Right	150.5	F		F

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table B-59
Detailed Results of Level-of-Service Analysis for Puunene Avenue at Drive I

Approach and Movement	2012 With Project			
	AM PEAK HOUR		PM PEAK HOUR	
Overall Intersection	Delay[2]	LOS[3]	Delay[2]	LOS[3]
Eastbound Left & Right	40.0	E		F

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

APPENDIX C
DETAILED TRIP GENERATION CALCULATIONS

Part 1

Trip Generation Analysis

Kahului Town Center
March 2006

Use	Units	Quad 1	Quad 2	Quad 3	Quad 4	Totals
Residential	Units	0	80	295	67	442
Ex. Office	SF	0	0	0	56,653	56,653
New Office	SF	61,574	0	0	34,596	96,170
Bank	SF	9,000	0	4,180	0	13,180
Restaurant	SF	4,484	1,258	6,593	0	12,335
Retail (GSF)	SF	36,234	12,163	40,732	29,414	118,543
Retail (LSF)	SF	30,800	10,350	34,600	25,000	100,750

Adjustment Factors for Mixed Use Development

	AM	PM
Residential	5%	5%
Ex. Office	5%	5%
New Office	5%	5%
Bank	5%	5%
Restaurant	5%	5%
Retail	40%	35%

Part 2

Trip Generation Summary (Unadjusted)

Kahului Town Center

Phase 1 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	0	0	678	2218	584	3159				6639		
AM Total	0	0	95	111	42	77		0	77	325	0	325
AM In	0	0	84	62	22	47		0	47	215	0	215
AM Out	0	0	11	49	20	30		0	30	110	0	110
PM Total	0	0	92	412	49	288	54.8%	158	130	841	158	683
PM In	0	0	16	206	29	138		79	59	389	79	310
PM Out	0	0	76	206	20	150		79	71	452	79	373

Phase 2 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	469	0	0	0	164	1555				2188		
AM Total	35	0	0	0	12	40		0	40	87	0	87
AM In	6	0	0	0	6	24		0	24	36	0	36
AM Out	29	0	0	0	6	16		0	16	51	0	51
PM Total	42	0	0	0	14	140	75.3%	105	35	196	105	91
PM In	27	0	0	0	8	67		53	14	102	53	49
PM Out	15	0	0	0	6	73		52	21	94	52	42

Phase 3 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	1729	0	0	1030	859	3407				7025		
AM Total	130	0	0	52	61	83		0	83	326	0	326
AM In	22	0	0	29	32	51		0	51	134	0	134
AM Out	108	0	0	23	29	32		0	32	192	0	192
PM Total	153	0	0	191	72	311	53.0%	165	146	727	165	562
PM In	103	0	0	96	43	149		83	66	391	83	308
PM Out	50	0	0	95	29	162		82	80	336	82	254

Phase 4 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	393	624	381	0	0	2758				4156		
AM Total	29	88	54	0	0	68		0	68	239	0	239
AM In	5	77	48	0	0	41		0	41	171	0	171
AM Out	24	11	6	0	0	27		0	27	68	0	68
PM Total	35	84	52	0	0	251	58.2%	146	105	422	146	276
PM In	23	14	9	0	0	120		73	47	166	73	93
PM Out	12	70	43	0	0	131		73	58	256	73	183

Total Project Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	2591	624	1059	3248	1607	10679		0	0	20008	0	0
AM Total	194	88	149	163	115	268		0	268	977	0	977
AM In	33	77	132	91	60	163		0	163	556	0	556
AM Out	161	11	17	72	55	105		0	105	421	0	421
PM Total	230	84	144	603	135	990	0.0%	574	416	2186	574	1612
PM In	153	14	25	302	80	474		288	186	1048	288	760
PM Out	77	70	119	301	55	516		286	230	1138	286	852

Part 3

Adjustments for Mixed Use Development

Kahului Town Center

Phase 1 Trips	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	0	0	34	111	29	1264				1438		
AM Total	0	0	5	6	2	31		0	31	44	0	44
AM In	0	0	4	3	1	19		0	19	27	0	27
AM Out	0	0	1	3	1	12		0	12	17	0	17
PM Total	0	0	5	21	2	101	54.8%	55	46	129	55	74
PM In	0	0	1	10	1	48		28	20	60	28	32
PM Out	0	0	4	11	1	53		27	26	69	27	42

Phase 2 Trips	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	23	0	0	0	8	622				653		
AM Total	2	0	0	0	1	16		0	16	19	0	19
AM In	0	0	0	0	0	10		0	10	10	0	10
AM Out	2	0	0	0	1	6		0	6	9	0	9
PM Total	2	0	0	0	1	49	75.3%	37	12	52	37	15
PM In	1	0	0	0	0	23		19	4	24	19	5
PM Out	1	0	0	0	1	26		18	8	28	18	10

Phase 3 Trips	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	86	0	0	52	43	1363				1544		
AM Total	7	0	0	3	3	33		0	33	46	0	46
AM In	1	0	0	1	2	20		0	20	24	0	24
AM Out	6	0	0	2	1	13		0	13	22	0	22
PM Total	8	0	0	10	4	109	53.0%	58	51	131	58	73
PM In	5	0	0	5	2	52		29	23	64	29	35
PM Out	3	0	0	5	2	57		29	28	67	29	38

Phase 4 Trips	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	20	31	19	0	0	1103				1173		
AM Total	1	4	3	0	0	27		0	27	35	0	35
AM In	0	4	2	0	0	16		0	16	22	0	22
AM Out	1	0	1	0	0	11		0	11	13	0	13
PM Total	2	4	3	0	0	88	58.2%	51	37	97	51	46
PM In	1	1	0	0	0	42		26	16	44	26	18
PM Out	1	3	3	0	0	46		25	21	53	25	28

Total Project Trips	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	129	31	53	163	80	4352		0	0	4808	0	0
AM Total	10	4	8	9	6	107		0	107	144	0	144
AM In	1	4	6	4	3	65		0	65	83	0	83
AM Out	9	0	2	5	3	42		0	42	61	0	61
PM Total	12	4	8	31	7	347	0.0%	201	146	409	201	208
PM In	7	1	1	15	3	165		102	63	192	102	90
PM Out	5	3	7	16	4	182		99	83	217	99	118

Part 4

Adjusted Trip Generation Summary

Kahului Town Center

Phase 1 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	0	0	644	2107	555	1695				5201		
AM Total	0	0	90	105	40	46		0	46	281	0	281
AM In	0	0	80	59	21	28		0	28	188	0	188
AM Out	0	0	10	46	19	18		0	18	93	0	93
PM Total	0	0	87	391	47	187	54.8%	102	85	712	102	610
PM In	0	0	15	196	28	90		51	39	329	51	278
PM Out	0	0	72	195	19	97		51	46	383	51	332

Phase 2 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	446	0	0	0	156	933				1535		
AM Total	33	0	0	0	11	24		0	24	68	0	68
AM In	6	0	0	0	6	14		0	14	26	0	26
AM Out	27	0	0	0	5	10		0	10	42	0	42
PM Total	40	0	0	0	13	91	75.3%	69	22	144	69	75
PM In	26	0	0	0	8	44		35	9	78	35	43
PM Out	14	0	0	0	5	47		34	13	66	34	32

Phase 3 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	1643	0	0	978	816	2044				5481		
AM Total	123	0	0	49	58	50		0	50	280	0	280
AM In	21	0	0	28	30	31		0	31	110	0	110
AM Out	102	0	0	21	28	19		0	19	170	0	170
PM Total	145	0	0	181	68	202	53.0%	107	95	596	107	489
PM In	98	0	0	91	41	97		54	43	327	54	273
PM Out	47	0	0	90	27	105		53	52	269	53	216

Phase 4 Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	373	593	362	0	0	1655				2983		
AM Total	28	84	51	0	0	41		0	41	204	0	204
AM In	5	73	46	0	0	25		0	25	149	0	149
AM Out	23	11	5	0	0	16		0	16	55	0	55
PM Total	33	80	49	0	0	163	58.2%	95	68	325	95	230
PM In	22	13	9	0	0	78		48	30	122	48	74
PM Out	11	67	40	0	0	85		47	38	203	47	156

Total Project Trips

	Residential	Existing Office	New Office	Bank	Restaurant	Total Retail	Pass By Percent	Pass By Trips	Net Retail	Total Trips	Total Pass By	New Trips
Weekday Total	2462	593	1006	3085	1527	6527		0	0	15200	0	0
AM Total	184	84	141	154	109	161		0	161	833	0	833
AM In	32	73	126	87	57	98		0	98	473	0	473
AM Out	152	11	15	67	52	63		0	63	360	0	360
PM Total	218	80	136	572	126	643	0.0%	373	270	1777	373	1404
PM In	146	13	24	287	77	309		188	121	856	188	668
PM Out	72	67	112	285	51	334		185	149	921	185	736

APPENDIX D
TRAFFIC PROJECTION WORKSHEETS

Part 2.1

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 1
INTERSECTION OF Wakea Avenue at Kaahumanu Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2012 Background AM	2012 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	2010 Cum + Proj w/ Superferry AM	2010 Cum + Proj w/ Superferry PM
1	N- RT	15	35	0	5			15	40			0	0				15	40			15	40
2	TH	25	70	5	10			30	80			0	0				30	80			30	80
3	LT	25	90	5	10			30	100			0	0				30	100			30	100
4	E- RT	115	60	15	10			130	70			0	0				130	70			130	70
5	TH	880	780	120	105	55	70	1055	955			91	184				1146	1139		82	1146	1221
6	LT	110	125	15	15			125	140			0	0				125	140			125	140
7	S- RT	90	90	10	10			100	100			0	0				100	100			100	100
8	TH	80	55	10	5			90	60			0	0				90	60			90	60
9	LT	410	375	55	50			465	425			0	0				465	425			465	425
10	W- RT	325	395	45	55			370	450			0	0				370	450			370	450
11	TH	735	1020	100	140	70	70	905	1230	-45	-55	119	168				979	1343		89	979	1432
12	LT	40	35	5	5			45	40			0	0				45	40			45	40
TOTAL		2850	3130	385	420	125	140	3360	3690	-45	-55	210	352				3525	3987			3525	4158
Approach Totals																						
From North		65	195	10	25	0	0	75	220	0	0	0	0				75	220				
From East		1105	965	150	130	55	70	1310	1165	0	0	91	184				1401	1349				
From South		580	520	75	65	0	0	655	585	0	0	0	0				655	585				
From West		1100	1450	150	200	70	70	1320	1720	-45	-55	119	168				1394	1833				
Total		2850	3130	385	420	125	140	3360	3690	-45	-55	210	352				3525	3987				
Departure Totals																						
To North		235	150	30	20	0	0	265	170	0	0	0	0				265	170				
To East		850	1200	115	160	70	70	1035	1430	-45	-55	119	168				1109	1543				
To South		460	590	65	80	0	0	525	670	0	0	0	0				525	670				
To West		1305	1190	175	160	55	70	1535	1420	0	0	91	184				1626	1604				
Total		2850	3130	385	420	125	140	3360	3690	-45	-55	210	352				3525	3987				
Leg Totals																						
North		300	345	40	45	0	0	340	390	0	0	0	0				340	390				
East		1955	2165	265	290	125	140	2345	2595	-45	-55	210	352				2510	2892				
South		1040	1110	140	145	0	0	1180	1255	0	0	0	0				1180	1255				
West		2405	2640	325	360	125	140	2855	3140	-45	-55	210	352				3020	3437				
Total		5700	6260	770	840	250	280	6720	7380	-90	-110	420	704				7050	7974				

Part 2.2

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 2
INTERSECTION OF Kahului Beach Road/Kane Street at Kaahumanu Avenue

No	Approach & Mvt	Existing		Background Growth		Related Projects Trips		2010 Background		Adjustment For Existing Site Traffic		Total New Project Trips		Adjustment For Pass By Trips			2010 Cum + Proj				2010 Cum + Proj w/ Superferry	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	%	AM	PM	AM	PM	AM	PM	AM	PM
1 N-	RT	100	135	15	20	5	1	120	155			0	0				120	155			120	155
2	TH	155	160	20	20	14	10	190	190			22	32				212	222			212	222
3	LT	945	980	130	135	73	124	1150	1240	-50	-55	74	102				1174	1287			1174	1287
4 E-	RT	775	1065	105	145	66	172	945	1380			67	131				1012	1511		93	1012	1604
5	TH	780	785	105	105	63	169	950	1060			76	157				1026	1217		82	1026	1299
6	LT	40	70	5	10	33	69	80	150			0	0				80	150			80	150
7 S-	RT	80	100	10	15	1	0	90	115			0	0				90	115			90	115
8	TH	120	165	15	20	23	17	160	200			6	16				166	216			166	216
9	LT	45	55	5	5	24	10	75	70			6	16				81	86			81	86
10 W-	RT	80	90	10	10	11	11	100	110			10	16				110	126			110	126
11	TH	695	1075	95	145	77	122	865	1340	-45	-55	108	152				928	1437		89	928	1526
12	LT	50	100	5	15	0	0	55	115			0	0				55	115			55	115
TOTAL		3865	4780	520	645	390	705	4780	6125	-95	-110	369	622				5054	6637			5054	6901

	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
Approach Totals														
From North	1200	1275	165	175	92	135	1460	1585	-50	-55	96	134	1506	1664
From East	1595	1920	215	260	162	410	1975	2590	0	0	143	288	2118	2878
From South	245	320	30	40	48	27	325	385	0	0	12	32	337	417
From West	825	1265	110	170	88	133	1020	1565	-45	-55	118	168	1093	1678
Total	3865	4780	520	645	390	705	4780	6125	-95	-110	369	622	5054	6637
Departure Totals														
To North	945	1330	125	180	89	189	1160	1695	0	0	73	147	1233	1842
To East	1720	2155	235	295	151	246	2105	2695	-95	-110	182	254	2192	2839
To South	275	320	35	40	58	90	370	450	0	0	32	48	402	498
To West	925	975	125	130	92	180	1145	1285	0	0	82	173	1227	1458
Total	3865	4780	520	645	390	705	4780	6125	-95	-110	369	622	5054	6637
Leg Totals														
North	2145	2605	290	355	181	324	2620	3280	-50	-55	169	281	2739	3506
East	3315	4075	450	555	313	656	4080	5285	-95	-110	325	542	4310	5717
South	520	640	65	80	106	117	695	835	0	0	44	80	739	915
West	1750	2240	235	300	180	313	2165	2850	-45	-55	200	341	2320	3136
Total	7730	9560	1040	1290	780	1410	9560	12250	-190	-220	738	1244	10108	13274

Part 2.4

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 4
INTERSECTION OF Lono Avenue at Kaahumanu Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	20 Cum w/ Supp AM
1	N- RT	15	10	0	0	15	15	30	25			0	0	0				30	25			30
2	TH	10	15	0	0	10	5	20	20			0	0	0				20	20			20
3	LT	20	20	5	5	10	15	35	40			0	0	0				35	40			35
4	E- RT	20	20	5	5	20	20	45	45			0	0	0				45	45			45
5	TH	1745	1805	235	245	50	95	2030	2145			0	0	0			-46	2030	2099		174	2030
6	LT	35	65	5	10	10	15	50	90			0	0	0				50	90			50
7	S- RT	45	70	5	10	5	10	55	90			0	0	0				55	90			55
8	TH	10	10	0	0	5	10	15	20			0	0	0				15	20			15
9	LT	185	225	25	30	20	10	230	265			39	152	299			46	382	610			382
10	W- RT	125	160	15	20	10	15	150	195			19	69	67			34	219	296			219
11	TH	1445	1890	195	255	100	95	1740	2240	-95	-110	15	112	186			-34	1757	2282		167	1757
12	LT	15	10	0	0	15	10	30	20			0	0	0				30	20			30
TOTAL		3670	4300	490	580	270	315	4430	5195	-95	-110		333	552				4668	5637			4668
Approach Totals																						
From North		45	45	5	5	35	35	85	85	0	0		0	0				85	85			
From East		1800	1890	245	260	80	130	2125	2280	0	0		0	0				2125	2234			
From South		240	305	30	40	30	30	300	375	0	0		152	299				452	720			
From West		1585	2060	210	275	125	120	1920	2455	-95	-110		181	253				2006	2598			
Total		3670	4300	490	580	270	315	4430	5195	-95	-110		333	552				4668	5637			
Departure Totals																						
To North		45	40	5	5	40	40	90	85	0	0		0	0				90	85			
To East		1510	1980	205	270	115	120	1830	2370	-95	-110		112	186				1847	2412			
To South		170	240	20	30	30	35	220	305	0	0		69	67				289	406			
To West		1945	2040	260	275	85	120	2290	2435	0	0		152	299				2442	2734			
Total		3670	4300	490	580	270	315	4430	5195	-95	-110		333	552				4668	5637			
Leg Totals																						
North		90	85	10	10	75	75	175	170	0	0		0	0				175	170			
East		3310	3870	450	530	195	250	3955	4650	-95	-110		112	186				3972	4646			
South		410	545	50	70	60	65	520	680	0	0		221	366				741	1126			
West		3530	4100	470	550	210	240	4210	4890	-95	-110		333	552				4448	5332			
Total		7340	8600	980	1160	540	630	8860	10390	-190	-220		666	1104				9336	11274			

Part 2.5

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 5
INTERSECTION OF Kahului Shopping Center at Kaahumanu Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	2010 Cum + Proj w/ Superferry AM	2010 Cum + Proj w/ Superferry PM
1 N-	RT	5	20	0	5			5	25			0	0				5	25			5	25
2	TH	0	0	0	0			0	0			0	0				0	0			0	0
3	LT	0	10	0	0			0	10			0	0				0	10			0	10
4 E-	RT	25	20	5	5			30	25			0	0				30	25			30	25
5	TH	1735	2000	235	270	80	130	2050	2400			0	0			-46	2050	2354		174	2050	2528
6	LT	35	30	5	5			40	35	-40	-35	7	4			21	7	25			7	25
7 S-	RT	25	50	5	5			30	55	-30	-55	12	19			46	12	65			12	65
8	TH	5	0	0	0			5	0	-5		0	0				0	0			0	0
9	LT	20	15	5	0			25	15	-25	-15	0	0				0	0			0	0
10 W-	RT	85	95	10	15			95	110	-95	-110	112	186			12	112	198			112	198
11	TH	1505	1990	205	270	115	120	1825	2380			0	0			-24	1825	2356		167	1825	2523
12	LT	5	15	0	0			5	15			0	0				5	15			5	15
TOTAL		3445	4245	470	575	195	250	4110	5070	-195	-215	131	209				4046	5073			4046	5414
Approach Totals																						
From North		5	30	0	5	0	0	5	35	0	0	0	0				5	35				
From East		1795	2050	245	280	80	130	2120	2460	-40	-35	7	4				2087	2404				
From South		50	65	10	5	0	0	60	70	-60	-70	12	19				12	65				
From West		1595	2100	215	285	115	120	1925	2505	-95	-110	112	186				1942	2569				
Total		3445	4245	470	575	195	250	4110	5070	-195	-215	131	209				4048	5073				
Departure Totals																						
To North		35	35	5	5	0	0	40	40	-5	0	0	0				35	40				
To East		1530	2050	210	275	115	120	1855	2445	-30	-55	12	19				1837	2431				
To South		120	125	15	20	0	0	135	145	-135	-145	119	190				119	223				
To West		1760	2035	240	275	80	130	2080	2440	-25	-15	0	0				2055	2379				
Total		3445	4245	470	575	195	250	4110	5070	-195	-215	131	209				4046	5073				
Leg Totals																						
North		40	65	5	10	0	0	45	75	-5	0	0	0				40	75				
East		3325	4100	455	555	195	250	3975	4905	-70	-90	19	23				3924	4835				
South		170	190	25	25	0	0	195	215	-195	-215	131	209				131	288				
West		3355	4135	455	560	195	250	4005	4945	-120	-125	112	186				3997	4948				
Total		6890	8490	940	1150	390	500	8220	10140	-390	-430	262	418				8092	10146				

Part 2.6

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 6
INTERSECTION OF Puunene Avenue at Kaahumanu Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	2010 Background AM	2010 Background PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM
1 N-	RT	20	70	5	10			25	80			25	80	0	0				25	80		
2	TH	25	65	5	10			30	75			30	75	0	0				30	75		62
3	LT	30	55	5	5			35	60			35	60	0	0				35	60		
4 E-	RT	30	35	5	5			35	40			35	40	0	0				35	40		98
5	TH	1325	1135	180	155	70	125	1575	1415	-40	-35	1535	1380	7	4			-25	1542	1359		36
6	LT	40	80	5	10	0		45	90	-10	-35	35	55	6	14			25	41	94		13
7 S-	RT	45	55	5	5			50	60			50	60	0	0				50	60		93
8	TH	40	55	5	5			45	60			45	60	0	0				45	60		51
9	LT	520	835	70	115	10	10	600	960			600	960	0	0				600	960		138
10 W-	RT	480	455	65	60		5	545	520			545	520	0	0				545	520		
11	TH	915	1575	125	215	115	115	1155	1905			1155	1905	12	19			13	1167	1937		167
12	LT	50	60	5	10			55	70			55	70	0	0				55	70		
TOTAL		3520	4475	480	605	195	255	4195	5335	-50	-70	4145	5265	25	37				4170	5315		
Approach Totals																						
From North		75	190	15	25	0	0	90	215	0	0	90	215	0	0				90	215		
From East		1395	1250	190	170	70	125	1655	1545	-50	-70	1605	1475	13	18				1618	1493		
From South		605	945	80	125	10	10	695	1080	0	0	695	1080	0	0				695	1080		
From West		1445	2090	195	285	115	120	1755	2495	0	0	1755	2495	12	19				1767	2527		
Total		3520	4475	480	605	195	255	4195	5335	-50	-70	4145	5265	25	37				4170	5315		
Departure Totals																						
To North		120	150	15	20	0	0	135	170	0	0	135	170	0	0				135	170		
To East		990	1685	135	225	115	115	1240	2025	0	0	1240	2025	12	19				1252	2057		
To South		545	600	75	80	0	5	620	685	-10	-35	610	650	6	14				616	689		
To West		1865	2040	255	280	80	135	2200	2455	-40	-35	2160	2420	7	4				2167	2399		
Total		3520	4475	480	605	195	255	4195	5335	-50	-70	4145	5265	25	37				4170	5315		
Leg Totals																						
North		195	340	30	45	0	0	225	385	0	0	225	385	0	0				225	385		
East		2385	2935	325	395	185	240	2895	3570	-50	-70	2845	3500	25	37				2870	3550		
South		1150	1545	155	205	10	15	1315	1765	-10	-35	1305	1730	6	14				1311	1769		
West		3310	4130	450	565	195	255	3955	4950	-40	-35	3915	4915	19	23				3934	4926		
Total		7040	8950	960	1210	390	510	8390	10670	-100	-140	8290	10530	50	74				8340	10630		

Part 2.7

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 7
INTERSECTION OF Maui Mall at Kaahumanu Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	2010 Cum + Proj w/ Superferry AM	2010 Cum + Proj w/ Superferry PM
1	N- RT	50	35	5	5			55	40			0	0				55	40			55	40
2	TH	10	10	0	0			10	10			0	0				10	10			10	10
3	LT	30	30	5	5			35	35			0	0				35	35			35	35
4	E- RT	20	10	5	0			25	10			0	0				25	10			25	10
5	TH	1305	1010	175	135	75	120	1555	1265			0	0				1555	1265		93	1555	1358
6	LT	25	80	5	10	10	5	40	95			0	0				40	95			40	95
7	S- RT	15	80	0	10	5	5	20	95			0	0				20	95		24	20	119
8	TH	25	10	5	0			30	10			0	0				30	10			30	10
9	LT	50	160	5	20		5	55	185			13	18				68	203		50	68	253
10	W- RT	70	190	10	25		5	80	220			12	19				92	239			92	239
11	TH	800	1295	110	175	115	110	1025	1580			0	0				1025	1580		98	1025	1678
12	LT	45	25	5	5			50	30			0	0				50	30			50	30
TOTAL		2445	2935	330	390	205	250	2980	3575	0	0	25	37				3005	3612			3005	3877
Approach Totals																						
From North		90	75	10	10	0	0	100	85	0	0	0	0				100	85				
From East		1350	1100	185	145	85	125	1620	1370	0	0	0	0				1620	1370				
From South		90	250	10	30	5	10	105	290	0	0	13	18				118	308				
From West		915	1510	125	205	115	115	1155	1830	0	0	12	19				1167	1849				
Total		2445	2935	330	390	205	250	2980	3575	0	0	25	37				3005	3612				
Departure Totals																						
To North		90	45	15	5	0	0	105	50	0	0	0	0				105	50				
To East		845	1405	115	190	120	115	1080	1710	0	0	0	0				1080	1710				
To South		105	280	15	35	10	10	130	325	0	0	12	19				142	344				
To West		1405	1205	185	160	75	125	1665	1490	0	0	13	18				1678	1508				
Total		2445	2935	330	390	205	250	2980	3575	0	0	25	37				3005	3612				
Leg Totals																						
North		180	120	25	15	0	0	205	135	0	0	0	0				205	135				
East		2195	2505	300	335	205	240	2700	3080	0	0	0	0				2700	3080				
South		195	530	25	65	15	20	235	615	0	0	25	37				260	652				
West		2320	2715	310	365	190	240	2820	3320	0	0	25	37				2845	3357				
Total		4890	5870	660	780	410	500	5960	7150	0	0	50	74				6010	7224				

Part 2.8

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 8
INTERSECTION OF Hana Highway at Kaahumanu Avenue

No	Approach	& Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	2010 Cum + Proj w/ Superferry AM	2010 Cum + Proj w/ Superferry PM
1	N-	RT	5	20	0	5	10	10	15	35			0	0				15	35			15	35
2		TH	65	110	10	15	5	5	80	130			0	0				80	130		98	80	228
3		LT	115	190	15	25	35	35	165	250			0	0				165	250			165	250
4	E-	RT	170	175	25	25	35	35	230	235			0	0				230	235			230	235
5		TH	1305	1045	175	140	35	75	1515	1260			0	0				1515	1260			1515	1260
6		LT	260	380	35	50	35	145	330	575			48	66				378	641			378	641
7	S-	RT	185	525	25	70	135	185	345	780			19	38				364	818			364	818
8		TH	115	135	15	20	5	5	135	160			0	0				135	160		118	135	278
9		LT	50	95	5	15	0		55	110			0	0				55	110			55	110
10	W-	RT	40	80	5	10			45	90			0	0				45	90			45	90
11		TH	745	1235	100	165	75	80	920	1480			0	0				920	1480			920	1480
12		LT	0	0	0	0			0	0			0	0				0	0			0	0
TOTAL			3055	3990	410	540	370	575	3835	5105	0	0	67	104				3902	5209			3902	5425
Approach Totals																							
From North			185	320	25	45	50	50	260	415	0	0	0	0				260	415				
From East			1735	1600	235	215	105	255	2075	2070	0	0	48	66				2123	2136				
From South			350	755	45	105	140	190	535	1050	0	0	19	38				554	1088				
From West			785	1315	105	175	75	80	965	1570	0	0	0	0				965	1570				
Total			3055	3990	410	540	370	575	3835	5105	0	0	67	104				3902	5209				
Departure Totals																							
To North			285	310	40	45	40	40	365	395	0	0	0	0				365	395				
To East			1045	1950	140	260	245	300	1430	2510	0	0	19	38				1449	2548				
To South			365	570	50	75	40	150	455	795	0	0	48	66				503	861				
To West			1360	1160	180	160	45	85	1585	1405	0	0	0	0				1585	1405				
Total			3055	3990	410	540	370	575	3835	5105	0	0	67	104				3902	5209				
Leg Totals																							
North			470	630	65	90	90	90	625	810	0	0	0	0				625	810				
East			2780	3550	375	475	350	555	3505	4580	0	0	67	104				3572	4684				
South			715	1325	95	180	180	340	990	1845	0	0	67	104				1057	1949				
West			2145	2475	285	335	120	165	2550	2975	0	0	0	0				2550	2975				
Total			6110	7980	820	1080	740	1150	7670	10210	0	0	134	208				7804	10418				

Part 2.9

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 9
INTERSECTION OF Puunene Avenue at Kahului Shopping Center North

			Existing		Background Growth		Related Projects Trips		2010 Background		Adjustment For Existing Site Traffic		Total New Project Trips		Adjustment For Pass By Trips			2010 Cum + Proj	
No	Approach	& Mvt	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	%	AM	PM	AM	PM
1	N-	RT	10	25	0	5		5	10	35	-10	-35	6	14			26	6	40
2		TH	515	530	70	70			585	600			0	0			-1	585	599
3		LT	25	35	5	5			30	40			0	0				30	40
4	E-	RT	15	50	0	5			15	55			0	0				15	55
5		TH	5	10	0	0			5	10	-5	-10	0	0				0	0
6		LT	10	15	0	0			10	15			0	0				10	15
7	S-	RT	65	65	10	10			75	75			0	0				75	75
8		TH	515	835	70	115	5	5	590	955			0	0				590	955
9		LT	25	70	5	10	5	35	35	115	-35	-115	33	82				33	82
10	W-	RT	35	85	5	10			40	95	-40	-95	51	65			14	51	79
11		TH	15	15	0	0			15	15	-15	-15	0	0				0	0
12		LT	5	5	0	0	0	0	5	5	-5	-5	0	0				0	0
TOTAL			1240	1740	165	230	10	45	1415	2015	-110	-275	90	161				1395	1940
Approach Totals																			
From North			550	590	75	80	0	5	625	675	-10	-35	6	14				621	679
From East			30	75	0	5	0	0	30	80	-5	-10	0	0				25	70
From South			605	970	85	135	10	40	700	1145	-35	-115	33	82				698	1112
From West			55	105	5	10	0	0	60	115	-60	-115	51	65				51	79
Total			1240	1740	165	230	10	45	1415	2015	-110	-275	90	161				1395	1940
Departure Totals																			
To North			535	890	70	120	5	5	610	1015	-5	-5	0	0				605	1010
To East			105	115	15	15	0	0	120	130	-15	-15	0	0				105	115
To South			560	630	75	80	0	0	635	710	-40	-95	51	65				646	693
To West			40	105	5	15	5	40	50	160	-50	-160	39	96				39	122
Total			1240	1740	165	230	10	45	1415	2015	-110	-275	90	161				1395	1940
Leg Totals																			
North			1085	1480	145	200	5	10	1235	1690	-15	-40	6	14				1226	1689
East			135	190	15	20	0	0	150	210	-20	-25	0	0				130	185
South			1165	1600	160	215	10	40	1335	1855	-75	-210	84	147				1344	1805
West			95	210	10	25	5	40	110	275	-110	-275	90	161				90	201
Total			2480	3480	330	460	20	90	2830	4030	-220	-550	180	322				2790	3880

Part 2.10

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 10
INTERSECTION OF Puunene Avenue at Kahului Shopping Center South

No	Approach	& Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	2010 Cum + Proj w/ Superferry AM	2010 Cum + Proj w/ Superferry PM
1	N-	RT	5	25	0	5	0	0	5	30	-5	-30	0	0			11	0	11			0	1
2		TH	495	515	65	70			560	585	-40	-95	51	65			2	571	557			571	55
3		LT	40	35	5	5			45	40			0	0				45	40			45	4
4	E-	RT	35	25	5	5			40	30			0	0				40	30			40	3
5		TH	15	5	0	0			15	5	-15	-5	0	0				0	0			0	[illegible]
6		LT	30	75	5	10			35	85			0	0				35	85			35	8
7	S-	RT	75	65	10	10			85	75			0	0				85	75			85	7
8		TH	575	840	80	115	5	35	660	990			33	82				693	1072			693	107
9		LT	40	85	5	10	5	17	50	110	-50	-110	17	41			14	17	55			17	5
10	W-	RT	25	10	5	0			30	10	-30	-10	26	32				26	32			26	3
11		TH	5	5	0	0			5	5	-5	-5	0	0				0	0			0	[illegible]
12		LT	5	60	0	10	0	0	5	70	-5	-70	0	0				0	0			0	[illegible]
TOTAL			1345	1745	180	240	10	52	1535	2035	-150	-325	127	220				1512	1957			1512	195

Approach Totals

	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
From North	540	575	70	80	0	0	610	655	-45	-125	51	65	616	608
From East	80	105	10	15	0	0	90	120	-15	-5	0	0	75	115
From South	690	990	95	135	10	52	795	1175	-50	-110	50	123	795	1202
From West	35	75	5	10	0	0	40	85	-40	-85	26	32	26	32
Total	1345	1745	180	240	10	52	1535	2035	-150	-325	127	220	1512	1957
Departure Totals														
To North	615	925	85	133	5	35	705	1090	-5	-70	33	82	733	1102
To East	120	105	15	15	0	0	135	120	-5	-5	0	0	130	115
To South	550	600	75	80	0	0	625	680	-70	-105	77	97	632	674
To West	60	115	5	15	5	17	70	145	-70	-145	17	41	17	66
Total	1345	1745	180	240	10	52	1535	2035	-150	-325	127	220	1512	1957
Leg Totals														
North	1155	1500	155	210	5	35	1315	1745	-50	-195	84	147	1349	1710
East	200	210	25	30	0	0	225	240	-20	-10	0	0	205	230
South	1240	1590	170	215	10	52	1420	1855	-120	-215	127	220	1427	1876
West	95	190	10	25	5	17	110	230	-110	-230	43	73	43	98
Total	2690	3490	360	480	20	104	3070	4070	-300	-650	254	440	3024	3914

Part 2.11
Traffic Projection Worksheet
Kahului Town Center
March 2006

INTERSECTION NO 11
INTERSECTION OF Puunene Avenue at Kamehameha Avenue

No	Approach & Mvt		Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	2010 Cum + Proj w/ Superferry AM	2010 Cum + Proj w/ Superferry Pl
1	N-	RT	55	100	5	15			60	115			0	0			12	60	127			60	12
2		TH	405	500	55	70			460	570	-50	-70	43	54			-23	453	531		62	453	59
3		LT	155	175	20	25			175	200	-20	-25	34	43				189	218			189	21
4	E-	RT	170	40	25	5	15	70	210	115	-20	-55	22	55				212	115			212	11
5		TH	265	465	35	65	25	55	325	585			54	81				379	666			379	66
6		LT	75	190	10	25	10	35	95	250			0	0				95	250			95	25
7	S-	RT	95	130	15	20	0	95	110	245			0	0				110	245			110	24
8		TH	510	695	70	95			580	790	-65	-170	28	68			-22	543	668		64	543	73
9		LT	120	165	15	20	0	10	135	195			54	81			22	189	298			189	29
10	W-	RT	160	235	20	30	15	10	195	275			41	110			11	236	396			236	33
11		TH	285	495	40	65	100	105	425	665			22	56				447	721			447	72
12		LT	95	95	15	15			110	110			0	0			24	110	134			110	13
TOTAL			2390	3285	325	450	165	380	2880	4115	-155	-320	298	548				3023	4367			3023	449
Approach Totals																							
From North			615	775	80	110	0	0	695	885	-70	-95	77	97				702	878				
From East			510	695	70	95	50	160	630	950	-20	-55	78	136				688	1031				
From South			725	990	100	135	0	105	825	1230	-65	-170	82	149				842	1209				
From West			540	825	75	110	115	115	730	1050	0	0	63	166				793	1251				
Total			2390	3285	325	450	165	380	2880	4115	-155	-320	298	548				3023	4367				
Departure Totals																							
To North			775	830	110	115	15	70	900	1015	-85	-225	50	123				865	915				
To East			535	800	75	110	100	200	710	1110	-20	-25	56	99				746	1184				
To South			640	925	85	125	25	45	750	1095	-50	-70	84	164				784	1177				
To West			440	730	55	100	25	65	520	895	0	0	108	162				628	1091				
Total			2390	3285	325	450	165	380	2880	4115	-155	-320	298	548				3023	4367				
Leg Totals																							
North			1390	1605	190	225	15	70	1595	1900	-155	-320	127	220				1567	1791				
East			1045	1495	145	205	150	360	1340	2060	-40	-80	132	235				1432	2215				
South			1365	1915	185	260	25	150	1575	2325	-115	-240	166	313				1626	2386				
West			980	1555	130	210	140	180	1250	1945	0	0	171	328				1421	2342				
Total			4780	6570	650	900	330	760	5760	8230	-310	-640	596	1096				6046	8734				

Part 2.50

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 12
INTERSECTION OF Puunene Avenue at Wakea Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM	AM	PM	2010 Cum + Proj w/ Superferry AM	2010 Cum + Proj w/ Superferry PM
1 N-	RT	110	105	15	15			125	120			0	0				125	120			125	12
2	TH	430	540	60	75	20	45	510	660			46	87				556	747		62	556	80
3	LT	155	210	20	30	5	5	180	245			37	77				217	322			217	32
4 E-	RT	95	230	15	30		0	110	260			33	59				143	319			143	31
5	TH	425	390	60	55	5	15	490	460			15	7				505	467			505	45
6	LT	165	75	20	10			185	85			0	0				185	85			185	8
7 S-	RT	115	95	15	15			130	110			0	0				130	110			130	11
8	TH	240	365	30	50		100	270	515			49	89				319	604		64	319	66
9	LT	80	120	10	15	5	10	95	145			22	11				117	156			117	15
10 W-	RT	155	160	20	20			175	180			8	23				183	203			183	20
11	TH	355	375	50	50	10	10	415	435			8	23				423	458			423	45
12	LT	95	120	15	15	10	5	120	140			0	0				120	140			120	14
TOTAL		2420	2785	330	380	55	190	2805	3355	0	0	218	376				3023	3731			3023	385
Approach Totals																						
From North		695	855	95	120	25	50	815	1025	0	0	83	164				898	1189				
From East		685	695	95	95	5	15	785	805	0	0	48	66				833	871				
From South		435	580	55	80	5	110	495	770	0	0	71	100				566	870				
From West		605	655	85	85	20	15	710	755	0	0	16	46				726	801				
Total		2420	2785	330	380	55	190	2805	3355	0	0	218	376				3023	3731				
Departure Totals																						
To North		430	715	60	95	10	105	500	915	0	0	82	148				582	1063				
To East		625	680	85	95	15	15	725	790	0	0	45	100				770	890				
To South		750	775	100	105	20	45	870	925	0	0	54	110				924	1035				
To West		615	615	85	85	10	25	710	725	0	0	37	18				747	743				
Total		2420	2785	330	380	55	190	2805	3355	0	0	218	376				3023	3731				
Leg Totals																						
North		1125	1570	155	215	35	155	1315	1940	0	0	165	312				1480	2252				
East		1310	1375	180	190	20	30	1510	1595	0	0	93	166				1603	1761				
South		1185	1355	155	185	25	155	1365	1695	0	0	125	210				1490	1905				
West		1220	1270	170	170	30	40	1420	1480	0	0	53	84				1473	1544				
Total		4840	5570	660	760	110	380	5610	6710	0	0	436	752				6046	7462				

Part 2.13

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 13
INTERSECTION OF Lono Avenue at Vevau Street

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1 N-	RT	30	55	4	5	0	5	35	65			0	0				35	65
2	TH	225	325	30	45	5	20	260	390			0	0			28	260	418
3	LT	20	10	3	0	0		25	10	-25	-10	32	48			26	32	74
4 E-	RT	15	20	2	5	0		15	25	-15	-25	115	222			38	115	260
5	TH	5	15	1	0	0		5	15	-5	-15	11	31				11	31
6	LT	5	35	1	5	0		5	40	-5	-40	28	66			4	28	70
7 S-	RT	20	30	3	5	0		25	35	-25	-35	66	44			4	66	48
8	TH	260	260	35	35	5	35	300	330			46	70			28	346	428
9	LT	30	45	4	5	0		35	50			0	0				35	50
10 W-	RT	70	130	9	20	0		80	150			0	0				80	150
11	TH	15	15	2	0	0		15	15	-15	-15	32	48				32	48
12	LT	15	50	2	5	0	5	15	60			0	0				15	60
TOTAL		710	990	96	130	10	65	815	1185	-90	-140	330	529				1055	1702
Approach Totals																		
From North		275	390	37	50	5	25	320	465	-25	-10	32	48				327	557
From East		25	70	4	10	0	0	25	80	-25	-80	154	319				154	361
From South		310	335	42	45	5	35	360	415	-25	-35	112	114				447	526
From West		100	195	13	25	0	5	110	225	-15	-15	32	48				127	258
Total		710	990	96	130	10	65	815	1185	-90	-140	330	529				1055	1702
Departure Totals																		
To North		290	330	39	45	5	40	330	415	-15	-25	161	292				476	748
To East		55	55	8	5	0	0	65	60	-65	-60	130	140				130	170
To South		300	490	40	70	5	20	345	580	-5	-40	28	66				368	638
To West		65	115	9	10	0	5	75	130	-5	-15	11	31				81	146
Total		710	990	96	130	10	65	815	1185	-90	-140	330	529				1055	1702
Leg Totals																		
North		565	720	76	95	10	65	650	880	-40	-35	193	340				803	1305
East		80	125	12	15	0	0	90	140	-90	-140	284	459				284	531
South		610	825	82	115	10	55	705	995	-30	-75	140	180				815	1164
West		165	310	22	35	0	10	185	355	-20	-30	43	79				208	404
Total		1420	1980	192	260	20	130	1630	2370	-180	-280	660	1058				2110	3404

Part 2.14

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 14
INTERSECTION OF Lono Avenue at Kamehameha Avenue

No	Approach	& Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N-	RT	50	70	7	10	0	0	55	80			0	0			4	55	84
2		TH	100	170	14	25	0	15	115	210		-40	9	11			-3	124	178
3		LT	10	200	1	25	0	5	10	230			0	0			31	10	261
4	E-	RT	85	105	12	15	0	15	95	135			61	78			30	156	243
5		TH	170	365	23	50	5	45	200	460			0	0			-4	200	456
6		LT	30	65	4	10	0	0	35	75			7	19			3	42	97
7	S-	RT	90	65	12	10	0		100	75			9	14			2	109	91
8		TH	230	155	31	20	5	10	265	185	-25	-35	51	36			-2	291	184
9		LT	25	25	3	5	0		30	30			0	0				30	30
10	W-	RT	15	25	2	5	0	10	15	40			0	0				15	40
11		TH	280	325	38	45	5	110	325	480			0	0			-4	325	476
12		LT	60	45	8	5	0	5	70	55			0	0			4	70	59
TOTAL			1145	1615	155	225	15	215	1315	2055	-25	-75	137	158				1427	2199
Approach Totals																			
From North			160	440	22	60	0	20	180	520	0	-40	9	11				189	523
From East			285	535	39	75	5	60	330	670	0	0	68	97				398	796
From South			345	245	46	35	5	10	395	290	-25	-35	60	50				430	305
From West			355	395	48	55	5	125	410	575	0	0	0	0				410	575
Total			1145	1615	155	225	15	215	1315	2055	-25	-75	137	158				1427	2199
Departure Totals																			
To North			375	305	51	40	5	30	430	375	-25	-35	112	114				517	486
To East			380	590	51	80	5	115	435	785	0	0	9	14				444	828
To South			145	260	20	40	0	25	165	325	0	-40	16	30				181	315
To West			245	460	33	65	5	45	285	570	0	0	0	0				285	570
Total			1145	1615	155	225	15	215	1315	2055	-25	-75	137	158				1427	2199
Leg Totals																			
North			535	745	73	100	5	50	610	895	-25	-75	121	125				706	1009
East			665	1125	90	155	10	175	765	1455	0	0	77	111				842	1624
South			490	505	66	75	5	35	560	615	-25	-75	76	80				611	620
West			600	855	81	120	10	170	695	1145	0	0	0	0				695	1145
Total			2290	3230	310	450	30	430	2630	4110	-50	-150	274	316				2854	4398

Part 2.15

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 15
INTERSECTION OF Lono Avenue at Wakea Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1 N-	RT	15	30	2	5	0		15	35			0	0				15	35
2	TH	150	230	20	30	5	15	175	275		-40	19	38				194	273
3	LT	95	55	13	5	0	15	110	75			17	47				127	122
4 E-	RT	40	45	5	5	0	20	45	70			37	19				82	89
5	TH	430	535	58	70	10		500	605			0	0				500	605
6	LT	85	160	12	20	0		95	180			0	0				95	180
7 S-	RT	165	90	22	10	5		190	100			0	0				190	100
8	TH	295	205	40	30	5	10	340	245	-25	-35	35	54				350	264
9	LT	125	65	17	10	0		140	75			0	0				140	75
10 W-	RT	55	55	7	5	0		60	60			0	0				60	60
11	TH	440	465	60	65	10		510	530			0	0				510	530
12	LT	10	30	1	5	0		10	35			0	0				10	35
TOTAL		1905	1965	257	260	35	60	2190	2285	-25	-75	108	158				2273	2368
Approach Totals																		
From North		260	315	35	40	5	30	300	385	0	-40	38	85				336	430
From East		555	740	75	95	10	20	640	855	0	0	37	19				677	874
From South		585	360	79	50	10	10	670	420	-25	-35	35	54				680	439
From West		505	550	68	75	10	0	580	625	0	0	0	0				580	625
Total		1905	1965	257	260	35	60	2190	2285	-25	-75	108	158				2273	2368
Departure Totals																		
To North		345	280	48	40	5	30	395	350	-25	-35	72	73				442	388
To East		700	610	95	80	15	15	810	705	0	0	17	47				827	752
To South		290	445	39	55	5	15	330	515	0	-40	19	38				349	513
To West		570	630	77	85	10	0	655	715	0	0	0	0				655	715
Total		1905	1965	257	260	35	60	2190	2285	-25	-75	108	158				2273	2368
Leg Totals																		
North		605	595	81	80	10	60	695	735	-25	-75	108	158				778	818
East		1255	1350	170	175	25	35	1450	1560	0	0	54	66				1504	1626
South		875	805	118	105	15	25	1000	935	-25	-75	54	92				1029	952
West		1075	1180	145	160	20	0	1235	1340	0	0	0	0				1235	1340
Total		3810	3930	514	520	70	120	4380	4570	-50	-150	216	316				4546	4736

Part 2.17

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 17
INTERSECTION OF School Street at Kamehameha Avenue

No	Approach & Mvt		Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N-	RT	10	25	0	5		0	10	30			0	0				10	30
2		TH	0	0	0	0			0	0			0	0				0	0
3		LT	15	25	0	5	15	20	30	50			0	0				30	50
4	E-	RT	5	30	0	5	10	15	15	50			0	0				15	50
5		TH	230	420	30	55	10	40	270	515			0	0				270	515
6		LT	0	0	0	0			0	0			0	0				0	0
7	S-	RT	0	0	0	0			0	0			0	0				0	0
8		TH	0	0	0	0			0	0			0	0				0	0
9		LT	0	0	0	0			0	0			0	0				0	0
10	W-	RT	0	0	0	0			0	0			0	0				0	0
11		TH	340	360	45	50	80	94	465	505			0	0				465	505
12		LT	10	25	0	5			10	30			0	0				10	30
TOTAL			610	685	75	125	115	169	800	1180	0	0	0	0				800	1180
Approach Totals																			
From North			25	50	0	10	15	20	40	80	0	0	0	0				40	80
From East			235	450	30	60	20	55	285	565	0	0	0	0				285	565
From South			0	0	0	0	0	0	0	0	0	0	0	0				0	0
From West			350	385	45	55	80	94	475	535	0	0	0	0				475	535
Total			610	885	75	125	115	169	800	1180	0	0	0	0				800	1180
Departure Totals																			
To North			15	55	0	10	10	15	25	80	0	0	0	0				25	80
To East			355	385	45	55	95	114	495	555	0	0	0	0				495	555
To South			0	0	0	0	0	0	0	0	0	0	0	0				0	0
To West			240	445	30	60	10	40	280	545	0	0	0	0				280	545
Total			610	885	75	125	115	169	800	1180	0	0	0	0				800	1180
Leg Totals																			
North			40	105	0	20	25	35	65	160	0	0	0	0				65	160
East			590	835	75	115	115	169	780	1120	0	0	0	0				780	1120
South			0	0	0	0	0	0	0	0	0	0	0	0				0	0
West			590	830	75	115	90	134	755	1080	0	0	0	0				755	1080
Total			1220	1770	150	250	230	338	1600	2360	0	0	0	0				1600	2360

Part 2.18

Traffic Projection Worksheet

Kahului Town Center
March 2006

INTERSECTION NO 18
INTERSECTION OF Drive A at Lono Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1 N-	RT	0	0	0	0			0	0			0	0				0	0
2	TH	170	240	25	30	30	30	225	300			28	42			18	253	360
3	LT	0	0	0	0			0	0			37	19			16	37	35
4 E-	RT	0	0	0	0			0	0			6	16			16	6	32
5	TH	0	0	0	0			0	0			0	0				0	0
6	LT	0	0	0	0			0	0			0	0			12	0	12
7 S-	RT	0	0	0	0			0	0			15	7			12	15	19
8	TH	240	310	30	40	30	30	300	380			127	269			30	427	679
9	LT	0	0	0	0			0	0			0	0				0	0
10 W-	RT	0	0	0	0			0	0			0	0				0	0
11	TH	0	0	0	0			0	0			0	0				0	0
12	LT	0	0	0	0			0	0			0	0				0	0
TOTAL		410	550	55	70	60	60	525	680	0	0	213	353				738	1137
Approach Totals																		
From North		170	240	25	30	30	30	225	300	0	0	65	61				290	395
From East		0	0	0	0	0	0	0	0	0	0	6	18				6	44
From South		240	310	30	40	30	30	300	380	0	0	142	276				442	698
From West		0	0	0	0	0	0	0	0	0	0	0	0				0	0
Total		410	550	55	70	60	60	525	680	0	0	213	353				738	1137
Departure Totals																		
To North		240	310	30	40	30	30	300	380	0	0	133	285				433	711
To East		0	0	0	0	0	0	0	0	0	0	52	26				52	54
To South		170	240	25	30	30	30	225	300	0	0	28	42				253	372
To West		0	0	0	0	0	0	0	0	0	0	0	0				0	0
Total		410	550	55	70	60	60	525	680	0	0	213	353				738	1137
Leg Totals																		
North		410	550	55	70	60	60	525	680	0	0	198	346				723	1106
East		0	0	0	0	0	0	0	0	0	0	58	42				58	98
South		410	550	55	70	60	60	525	680	0	0	170	318				695	1070
West		0	0	0	0	0	0	0	0	0	0	0	0				0	0
Total		820	1100	110	140	120	120	1050	1360	0	0	426	706				1476	2274

Part 2.31
Traffic Projection Worksheet
Kahului Town Center
Intersection

INTERSECTION NO 31
INTERSECTION OF Kane Street at Kamehameha Avenue

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1 N-	RT	55	275	5	35			60	310			0	0				60	310
2	TH	20	25	5	5		140	25	170			0	0				25	170
3	LT	40	110	5	15			45	125			0	0				45	125
4 E-	RT	60	120	10	15			70	135			0	0				70	135
5	TH	150	370	20	50	10		180	420			0	0				180	420
6	LT	5	0	0	0			5	0			0	0				5	0
7 S-	RT	5	5	0	0			5	5			0	0				5	5
8	TH	20	10	5	0	10	140	35	150			0	0				35	150
9	LT	0	5	0	0			0	5			0	0				0	5
10 W-	RT	5	10	0	0			5	10			0	0				5	10
11	TH	260	325	35	45	80	95	375	465			0	0				375	465
12	LT	165	175	20	25			185	200			0	0				185	200
TOTAL		785	1430	105	190	100	375	990	1995	0	0	0	0				990	1995
Approach Totals																		
From North		115	410	15	55	0	140	130	605	0	0	0	0				130	605
From East		215	490	30	65	10	0	255	555	0	0	0	0				255	555
From South		25	20	5	0	10	140	40	160	0	0	0	0				40	160
From West		430	510	55	70	80	95	565	675	0	0	0	0				565	675
Total		785	1430	105	190	100	375	990	1995	0	0	0	0				990	1995
Departure Totals																		
To North		245	305	35	40	10	140	290	485	0	0	0	0				290	485
To East		305	440	40	60	80	95	425	595	0	0	0	0				425	595
To South		30	35	5	5	0	140	35	180	0	0	0	0				35	180
To West		205	650	25	85	10	0	240	735	0	0	0	0				240	735
Total		785	1430	105	190	100	375	990	1995	0	0	0	0				990	1995
Leg Totals																		
North		360	715	50	95	10	280	420	1090	0	0	0	0				420	1090
East		520	930	70	125	90	95	680	1150	0	0	0	0				680	1150
South		55	55	10	5	10	280	75	340	0	0	0	0				75	340
West		635	1160	80	155	90	95	805	1410	0	0	0	0				805	1410
Total		1570	2860	210	380	200	750	1980	3990	0	0	0	0				1980	3990

Part 2.32

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 32
INTERSECTION OF Kane Street at Vevau Street

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N- RT	25	80	5	10			30	90			0	0				30	90
2	TH	180	185	25	25			205	210	20	150	0	0				225	360
3	LT	65	75	10	10			75	85			32	48				107	133
4	E- RT	20	60	5	10			25	70			11	31				36	101
5	TH	20	50	5	5			25	55			0	0				25	55
6	LT	10	15	0	0			10	15			0	0				10	15
7	S- RT	20	20	5	5			25	25			0	0				25	25
8	TH	200	165	25	20			225	185	30	140	0	0				255	325
9	LT	50	100	5	15			55	115			0	0				55	115
10	W- RT	25	115	5	15			30	130			0	0				30	130
11	TH	40	75	5	10			45	85			0	0				45	85
12	LT	20	90	5	10			25	100			0	0				25	100
TOTAL		675	1030	100	135	0	0	775	1165	50	290	43	79				868	1534
Approach Totals																		
From North		270	340	40	45	0	0	310	385	20	150	32	48				362	583
From East		50	125	10	15	0	0	60	140	0	0	11	31				71	171
From South		270	285	35	40	0	0	305	325	30	140	0	0				335	465
From West		85	280	15	35	0	0	100	315	0	0	0	0				100	315
Total		675	1030	100	135	0	0	775	1165	50	290	43	79				868	1534
Departure Totals																		
To North		240	315	35	40	0	0	275	355	30	140	11	31				316	526
To East		125	170	20	25	0	0	145	195	0	0	32	48				177	243
To South		215	315	30	40	0	0	245	355	20	150	0	0				265	505
To West		95	230	15	30	0	0	110	260	0	0	0	0				110	260
Total		675	1030	100	135	0	0	775	1165	50	290	43	79				868	1534
Leg Totals																		
North		510	655	75	85	0	0	585	740	50	290	43	79				678	1109
East		175	295	30	40	0	0	205	335	0	0	43	79				248	414
South		485	600	65	80	0	0	550	680	50	290	0	0				600	970
West		180	510	30	65	0	0	210	575	0	0	0	0				210	575
Total		1350	2060	200	270	0	0	1550	2330	100	580	86	158				1736	3068

Part 2.51

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 51
INTERSECTION OF Center Street at Vevau Street

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N- RT			0	0			0	0			6	16			12	6	28
2	TH			0	0			0	0			38	64			23	38	87
3	LT			0	0			0	0			0	0				0	0
4	E- RT			0	0			0	0			0	0			13	0	13
5	TH			0	0			0	0			99	158			17	99	175
6	LT			0	0			0	0			0	0			18	0	18
7	S- RT			0	0			0	0			0	0				0	0
8	TH			0	0			0	0			0	0			23	0	23
9	LT			0	0			0	0			16	52			13	16	65
10	W- RT			0	0			0	0			39	63			13	39	76
11	TH			0	0			0	0			28	42			17	28	59
12	LT			0	0			0	0			6	14				6	14
TOTAL		0	0	0	0	0	0	0	0	0	0	232	409				232	558
Approach Totals																		
From North		0	0	0	0	0	0	0	0	0	0	44	80				44	115
From East		0	0	0	0	0	0	0	0	0	0	99	158				99	206
From South		0	0	0	0	0	0	0	0	0	0	16	52				16	88
From West		0	0	0	0	0	0	0	0	0	0	73	119				73	149
Total		0	0	0	0	0	0	0	0	0	0	232	409				232	558
Departure Totals																		
To North		0	0	0	0	0	0	0	0	0	0	6	14				6	50
To East		0	0	0	0	0	0	0	0	0	0	28	42				28	59
To South		0	0	0	0	0	0	0	0	0	0	77	127				77	181
To West		0	0	0	0	0	0	0	0	0	0	121	226				121	268
Total		0	0	0	0	0	0	0	0	0	0	232	409				232	558
Leg Totals																		
North		0	0	0	0	0	0	0	0	0	0	50	94				50	165
East		0	0	0	0	0	0	0	0	0	0	127	200				127	265
South		0	0	0	0	0	0	0	0	0	0	93	179				93	269
West		0	0	0	0	0	0	0	0	0	0	194	345				194	417
Total		0	0	0	0	0	0	0	0	0	0	464	818				464	1116

Part 2.52

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 52
INTERSECTION OF Vevau Street at Drive C

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1 N-	RT			0	0			0	0			33	94				33	94
2	TH			0	0			0	0			0	0				0	0
3	LT			0	0			0	0			3	8				3	8
4 E-	RT			0	0			0	0			0	0				0	0
5	TH			0	0			0	0			121	226			42	121	268
6	LT			0	0			0	0			0	0				0	0
7 S-	RT			0	0			0	0			0	0				0	0
8	TH			0	0			0	0			0	0				0	0
9	LT			0	0			0	0			0	0				0	0
10 W-	RT			0	0			0	0			0	0				0	0
11	TH			0	0			0	0			70	110			30	70	140
12	LT			0	0			0	0			60	30				60	30
TOTAL		0	0	0	0	0	0	0	0	0	0	287	468				287	540
Approach Totals																		
From North		0	0	0	0	0	0	0	0	0	0	36	102				36	102
From East		0	0	0	0	0	0	0	0	0	0	121	226				121	268
From South		0	0	0	0	0	0	0	0	0	0	0	0				0	0
From West		0	0	0	0	0	0	0	0	0	0	130	140				130	170
Total		0	0	0	0	0	0	0	0	0	0	287	468				287	540
Departure Totals																		
To North		0	0	0	0	0	0	0	0	0	0	60	30				60	30
To East		0	0	0	0	0	0	0	0	0	0	73	118				73	148
To South		0	0	0	0	0	0	0	0	0	0	0	0				0	0
To West		0	0	0	0	0	0	0	0	0	0	154	320				154	362
Total		0	0	0	0	0	0	0	0	0	0	287	468				287	540
Leg Totals																		
North		0	0	0	0	0	0	0	0	0	0	96	132				96	132
East		0	0	0	0	0	0	0	0	0	0	194	344				194	416
South		0	0	0	0	0	0	0	0	0	0	0	0				0	0
West		0	0	0	0	0	0	0	0	0	0	284	460				284	532
Total		0	0	0	0	0	0	0	0	0	0	574	936				574	1080

Part 2.53

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 53
INTERSECTION OF Vevau Street at Drive G & Drive H

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1 N-	RT			0	0			0	0			85	108			18	85	126
2	TH			0	0			0	0			0	0				0	0
3	LT			0	0			0	0			26	32				26	32
4 E-	RT			0	0			0	0			17	41			14	17	55
5	TH			0	0			0	0			0	0			4	0	4
6	LT			0	0			0	0			0	0			7	0	7
7 S-	RT			0	0			0	0			0	0				0	0
8	TH			0	0			0	0			0	0				0	0
9	LT			0	0			0	0			14	50			26	14	76
10 W-	RT			0	0			0	0			28	42			13	28	55
11	TH			0	0			0	0			0	0				0	0
12	LT			0	0			0	0			0	0			4	0	4
TOTAL		0	0	0	0	0	0	0	0	0	0	170	273				170	359
Approach Totals																		
From North		0	0	0	0	0	0	0	0	0	0	111	140				111	158
From East		0	0	0	0	0	0	0	0	0	0	17	41				17	66
From South		0	0	0	0	0	0	0	0	0	0	14	50				14	76
From West		0	0	0	0	0	0	0	0	0	0	28	42				28	59
Total		0	0	0	0	0	0	0	0	0	0	170	273				170	359
Departure Totals																		
To North		0	0	0	0	0	0	0	0	0	0	17	41				17	59
To East		0	0	0	0	0	0	0	0	0	0	26	32				26	32
To South		0	0	0	0	0	0	0	0	0	0	28	42				28	62
To West		0	0	0	0	0	0	0	0	0	0	99	158				99	206
Total		0	0	0	0	0	0	0	0	0	0	170	273				170	359
Leg Totals																		
North		0	0	0	0	0	0	0	0	0	0	128	181				128	217
East		0	0	0	0	0	0	0	0	0	0	43	73				43	98
South		0	0	0	0	0	0	0	0	0	0	42	92				42	138
West		0	0	0	0	0	0	0	0	0	0	127	200				127	265
Total		0	0	0	0	0	0	0	0	0	0	340	546				340	718

Part 2.54

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 54
INTERSECTION OF Center Street at Drive B & Drive D

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1 N-	RT			0	0			0	0			37	19			12	37	31
2	TH			0	0			0	0			28	42			9	28	51
3	LT			0	0			0	0			50	123			12	50	135
4 E-	RT			0	0			0	0			9	11			12	9	23
5	TH			0	0			0	0			0	0				0	0
6	LT			0	0			0	0			0	0			26	0	26
7 S-	RT			0	0			0	0			6	14			14	6	28
8	TH			0	0			0	0			0	0			22	0	22
9	LT			0	0			0	0			0	0				0	0
10 W-	RT			0	0			0	0			11	31				11	31
11	TH			0	0			0	0			0	0				0	0
12	LT			0	0	0	0	0	0			3	8			12	3	20
TOTAL		0	0	0	0	0	0	0	0	0	0	144	248				144	367
Approach Totals																		
From North		0	0	0	0	0	0	0	0	0	0	115	184				115	217
From East		0	0	0	0	0	0	0	0	0	0	9	11				9	49
From South		0	0	0	0	0	0	0	0	0	0	6	14				6	50
From West		0	0	0	0	0	0	0	0	0	0	14	39				14	51
Total		0	0	0	0	0	0	0	0	0	0	144	248				144	367
Departure Totals																		
To North		0	0	0	0	0	0	0	0	0	0	12	19				12	65
To East		0	0	0	0	0	0	0	0	0	0	56	137				56	163
To South		0	0	0	0	0	0	0	0	0	0	39	73				39	108
To West		0	0	0	0	0	0	0	0	0	0	37	19				37	31
Total		0	0	0	0	0	0	0	0	0	0	144	248				144	367
Leg Totals																		
North		0	0	0	0	0	0	0	0	0	0	127	203				127	282
East		0	0	0	0	0	0	0	0	0	0	65	148				65	212
South		0	0	0	0	0	0	0	0	0	0	45	87				45	158
West		0	0	0	0	0	0	0	0	0	0	51	58				51	82
Total		0	0	0	0	0	0	0	0	0	0	288	496				288	734

Part 2.55

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 55
INTERSECTION OF Center Street at Drive L

No	Approach & Mvt		Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N-	RT			0	0			0	0			12	19			26	12	45
2		TH			0	0			0	0			64	106			28	64	134
3		LT			0	0			0	0			0	0				0	0
4	E-	RT			0	0			0	0			0	0				0	0
5		TH			0	0			0	0			0	0				0	0
6		LT			0	0			0	0			0	0				0	0
7	S-	RT			0	0			0	0			0	0				0	0
8		TH			0	0			0	0			0	0				0	0
9		LT			0	0			0	0			0	0			14	0	14
10	W-	RT			0	0			0	0			14	24			7	14	31
11		TH			0	0			0	0			40	30			14	40	44
12		LT			0	0			0	0			0	0				0	0
													2	2			22	2	24
TOTAL			0	0	0	0	0	0	0	0	0	0	132	181				132	292

Approach Totals

	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adj. Existing Site AM	Adj. Existing Site PM	Total New Project Trips AM	Total New Project Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
From North	0	0	0	0	0	0	0	0	0	0	78	125	78	179
From East	0	0	0	0	0	0	0	0	0	0	0	0	0	0
From South	0	0	0	0	0	0	0	0	0	0	14	24	14	45
From West	0	0	0	0	0	0	0	0	0	0	42	32	42	68
Total	0	0	0	0	0	0	0	0	0	0	132	181	132	292
Departure Totals														
To North	0	0	0	0	0	0	0	0	0	0	2	2	2	38
To East	0	0	0	0	0	0	0	0	0	0	0	0	0	0
To South	0	0	0	0	0	0	0	0	0	0	104	136	104	178
To West	0	0	0	0	0	0	0	0	0	0	26	43	26	76
Total	0	0	0	0	0	0	0	0	0	0	132	181	132	292
Leg Totals														
North	0	0	0	0	0	0	0	0	0	0	78	127	78	217
East	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South	0	0	0	0	0	0	0	0	0	0	118	160	118	223
West	0	0	0	0	0	0	0	0	0	0	68	75	68	144
Total	0	0	0	0	0	0	0	0	0	0	264	362	264	584

Part 2.56
Traffic Projection Worksheet
Kahului Town Center
Intersection

INTERSECTION NO 56
INTERSECTION OF Center Street at Drive K

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N- RT			0	0			0	0			0	0				0	0
2	TH			0	0			0	0			48	53			42	48	95
3	LT			0	0			0	0			56	83				56	83
4	E- RT			0	0			0	0			14	50				14	50
5	TH			0	0			0	0			0	0				0	0
6	LT			0	0			0	0			0	0				0	0
7	S- RT			0	0			0	0			9	14				9	14
8	TH			0	0			0	0			14	24			21	14	45
9	LT			0	0			0	0			0	0				0	0
10	W- RT			0	0			0	0			0	0				0	0
11	TH			0	0			0	0			0	0				0	0
12	LT			0	0			0	0			0	0				0	0
TOTAL		0	0	0	0	0	0	0	0	0	0	141	224				141	287
Approach Totals																		
From North		0	0	0	0	0	0	0	0	0	0	104	136				104	178
From East		0	0	0	0	0	0	0	0	0	0	14	50				14	50
From South		0	0	0	0	0	0	0	0	0	0	23	38				23	59
From West		0	0	0	0	0	0	0	0	0	0	0	0				0	0
Total		0	0	0	0	0	0	0	0	0	0	141	224				141	287
Departure Totals																		
To North		0	0	0	0	0	0	0	0	0	0	28	74				28	95
To East		0	0	0	0	0	0	0	0	0	0	65	97				65	97
To South		0	0	0	0	0	0	0	0	0	0	48	53				48	95
To West		0	0	0	0	0	0	0	0	0	0	0	0				0	0
Total		0	0	0	0	0	0	0	0	0	0	141	224				141	287
Leg Totals																		
North		0	0	0	0	0	0	0	0	0	0	132	210				132	273
East		0	0	0	0	0	0	0	0	0	0	79	147				79	147
South		0	0	0	0	0	0	0	0	0	0	71	91				71	154
West		0	0	0	0	0	0	0	0	0	0	0	0				0	0
Total		0	0	0	0	0	0	0	0	0	0	282	448				282	574

Part 2.57

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 57
INTERSECTION OF Kamehameha Avenue at Center Street/Kaulawahine Street

No	Approach & Mvt		Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N-	RT			0	0			0	0			19	14			10	19	24
2		TH			0	0			0	0			0	0				0	0
3		LT			0	0			0	0			29	39			32	29	71
4	E-	RT			0	0			0	0			13	22			14	13	36
5		TH	340	575	45	80	25	65	410	720	450	575	49	81			19	909	1395
6		LT	10	20	0	5			10	25			0	0				10	25
7	S-	RT	20	30	5	5			25	35			0	0				25	35
8		TH			0	0			0	0			0	0				0	0
9		LT	10	5	0	0			10	5			0	0				10	5
10	W-	RT	20	15	5	0			25	15			0	0				25	15
11		TH	520	660	70	90	115	115	705	865	490	625	0	0			19	1195	1509
12		LT			0	0			0	0			10	16			10	10	26
TOTAL			920	1305	125	180	140	180	1185	1665	940	1200	120	172				2245	3141
Approach Totals																			
From North			0	0	0	0	0	0	0	0	0	0	48	53				48	95
From East			350	595	45	85	25	65	420	745	450	575	62	103				932	1456
From South			30	35	5	5	0	0	35	40	0	0	0	0				35	40
From West			540	675	75	90	115	115	730	880	490	625	10	16				1230	1550
Total			920	1305	125	180	140	180	1185	1665	940	1200	120	172				2245	3141
Departure Totals																			
To North			0	0	0	0	0	0	0	0	0	0	23	38				23	62
To East			540	690	75	95	115	115	730	900	490	625	29	39				1249	1615
To South			30	35	5	5	0	0	35	40	0	0	0	0				35	40
To West			350	580	45	80	25	65	420	725	450	575	68	95				938	1424
Total			920	1305	125	180	140	180	1185	1665	940	1200	120	172				2245	3141
Leg Totals																			
North			0	0	0	0	0	0	0	0	0	0	71	91				71	157
East			890	1285	120	180	140	180	1150	1645	940	1200	91	142				2181	3071
South			60	70	10	10	0	0	70	80	0	0	0	0				70	80
West			890	1255	120	170	140	180	1150	1605	940	1200	78	111				2168	2974
Total			1840	2610	250	360	280	360	2370	3330	1880	2400	240	344				4490	6282

Part 2.58

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 58
INTERSECTION OF Kamehameha Avenue at Drive J

No	Approach	& Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N-	RT			0	0			0	0			19	66			9	19	75
2		TH			0	0			0	0			0	0				0	0
3		LT			0	0			0	0			42	149			17	42	166
4	E-	RT			0	0			0	0			94	139			10	94	149
5		TH	345	595	45	80	25	.65	415	740	615	615	43	37			24	1073	1416
6		LT			0	0			0	0			0	0				0	0
7	S-	RT			0	0			0	0			0	0				0	0
8		TH			0	0			0	0			0	0				0	0
9		LT			0	0			0	0			0	0				0	0
10	W-	RT			0	0			0	0			0	0				0	0
11		TH	540	665	75	90	115	115	730	870	605	655	21	16			42	1556	1583
12		LT			0	0			0	0			0	0			9	0	9
TOTAL			885	1260	120	170	140	180	1145	1610	1220	1270	219	407				2584	3398
Approach Totals																			
From North			0	0	0	0	0	0	0	0	0	0	61	215				61	241
From East			345	595	45	80	25	65	415	740	615	615	137	176				1167	1565
From South			0	0	0	0	0	0	0	0	0	0	0	0				0	0
From West			540	665	75	90	115	115	730	870	605	655	21	16				1356	1592
Total			885	1260	120	170	140	180	1145	1610	1220	1270	219	407				2584	3398
Departure Totals																			
To North			0	0	0	0	0	0	0	0	0	0	94	139				94	158
To East			540	665	75	90	115	115	730	870	605	655	63	165				1398	1749
To South			0	0	0	0	0	0	0	0	0	0	0	0				0	0
To West			345	595	45	80	25	65	415	740	615	615	62	103				1092	1491
Total			885	1260	120	170	140	180	1145	1610	1220	1270	219	407				2584	3398
Leg Totals																			
North			0	0	0	0	0	0	0	0	0	0	155	354				155	399
East			885	1260	120	170	140	180	1145	1610	1220	1270	200	341				2565	3314
South			0	0	0	0	0	0	0	0	0	0	0	0				0	0
West			885	1260	120	170	140	180	1145	1610	1220	1270	83	119				2448	3083
Total			1770	2520	240	340	280	360	2290	3220	2440	2540	438	814				5168	6798

Part 2.59

Traffic Projection Worksheet

Kahului Town Center
Intersection

INTERSECTION NO 59
INTERSECTION OF Puunene Avenue at Drive I

No	Approach & Mvt	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	Adjustment For Pass By Trips %	Adjustment For Pass By Trips AM	Adjustment For Pass By Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
1	N- RT			0	0			0	0			0	0			13	0	13
2	TH	515	775	70	105			585	880	525	855	77	97			-11	1187	1821
3	LT			0	0			0	0			0	0				0	0
4	E- RT			0	0			0	0			0	0				0	0
5	TH			0	0			0	0			0	0				0	0
6	LT			0	0			0	0			0	0				0	0
7	S- RT			0	0			0	0			0	0				0	0
8	TH	775	830	105	110	15	70	895	1010	650	905	50	123				1595	2038
9	LT			0	0			0	0			0	0				0	0
10	W- RT			0	0			0	0			50	174				50	174
11	TH			0	0			0	0			0	0				0	0
12	LT			0	0			0	0			11	31				11	31
TOTAL		1290	1605	175	215	15	70	1480	1890	1175	1760	188	425				2843	4077

Approach Totals

	Existing AM	Existing PM	Background Growth AM	Background Growth PM	Related Projects Trips AM	Related Projects Trips PM	2010 Background AM	2010 Background PM	Adjustment For Existing Site Traffic AM	Adjustment For Existing Site Traffic PM	Total New Project Trips AM	Total New Project Trips PM	2010 Cum + Proj AM	2010 Cum + Proj PM
From North	515	775	70	105	0	0	585	880	525	855	77	97	1187	1834
From East	0	0	0	0	0	0	0	0	0	0	0	0	0	0
From South	775	830	105	110	15	70	895	1010	650	905	50	123	1595	2038
From West	0	0	0	0	0	0	0	0	0	0	61	205	61	205
Total	1290	1605	175	215	15	70	1480	1890	1175	1760	188	425	2843	4077
Departure Totals														
To North	775	830	105	110	15	70	895	1010	650	905	61	154	1606	2069
To East	0	0	0	0	0	0	0	0	0	0	0	0	0	0
To South	515	775	70	105	0	0	585	880	525	855	127	271	1237	1995
To West	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Total	1290	1605	175	215	15	70	1480	1890	1175	1760	188	425	2843	4077
Leg Totals														
North	1290	1605	175	215	15	70	1480	1890	1175	1760	138	251	2793	3903
East	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South	1290	1605	175	215	15	70	1480	1890	1175	1760	177	394	2832	4033
West	0	0	0	0	0	0	0	0	0	0	61	205	61	218
Total	2580	3210	350	430	30	140	2960	3780	2350	3520	376	850	5686	8154

Appendix E
Analysis of Weekday Variation of Traffic Volumes

Purpose

The purpose of this analysis is to confirm that Monday and Friday peak hour traffic counts represent typical weekday peak hour volumes.

Background

In past studies, traffic counts were performed on Mondays, Tuesdays, Thursdays and Fridays. In the comments received, Maui County DPW&EM asked for confirmation that Monday and Friday counts were typical. During a subsequent meeting, it was agreed that we would do a continuous mechanical traffic counts along a County road in the study area to determine if Monday and Friday counts are typical and therefore useable in a traffic analysis. It was further agreed that we would perform these counts with and without schools in session.

Methodology

A mechanical traffic counts was placed along Kane Street between Kaahumanu Avenue and Vevau Street. Continuous counts were taken for one week in February (schools in session) and July (schools not in session). The morning and afternoon peak hours were then tabulated and analyzed.

Survey Results

The results of the surveys are summarized in Tables E1 and E2.

Conclusions

1. The weekday peak hour traffic volumes varied by only 8% of the average peak hourly volume. The greatest variation was 8%, which was during the Tuesday morning peak hour with no school traffic. The traffic was higher than average.

2. Traffic counts performed during Monday morning peak hours will be within 4% of the average weekday morning peak hour and that counts performed during Monday afternoon peak hours will be within 2% of the average weekday afternoon peak hour volume.

3. Traffic counts performed during Friday morning peak hours will be within 6% of the average weekday morning peak hour and that counts performed during Friday afternoon peak hours will be within 5% of the average weekday afternoon peak hour volume.

Table E-1
TRAFFIC VOLUME SURVEY RESULTS

Project: MCC Mixed Use Project
Station No: 1
Station Location: Kane Street between Kaahumanu Ave and Vevau Street
Start Time: 12 00 AM, Monday, 13 February 2006
End Time: 12 00 AM, Saturday, 18 February 2006

Interval	Start Time	Monday 13 Februa SB	NB	7 Total	Tuesday 14 February 2006 SB	NB	Total	Wednesday 15 February 2006 SB	NB	Total	Thursday 16 February 2006 SB	NB	Total	Friday 17 February 2006 SB	NB	Total	
1	12.00 AM	27	15	42	15	12	27	15	7	22	24	11	35	31	15	46	
2	01.00 AM	16	3	19	16	7	23	19	11	30	20	12	32	17	11	28	
3	02.00 AM	12	9	21	8	2	10	11	4	15	15	7	22	15	3	18	
4	03 00 AM	15	4	19	10	4	14	6	9	15	4	10	14	7	4	11	
5	04.00 AM	17	11	28	13	17	30	12	15	27	24	14	38	16	22	38	
6	05 00 AM	41	29	70	57	27	84	58	29	87	51	40	91	58	31	89	
7	06.00 AM	156	92	248	155	97	252	169	104	273	173	90	263	159	96	255	
8	07.00 AM	216	186	402	238	204	442	226	194	420	210	197	407	200	184	384	AM Peak Commute Per
9	08 00 AM	204	165	369	239	170	409	215	177	392	220	167	387	193	184	377	
10	09.00 AM	257	177	434	241	166	407	235	198	433	244	165	409	268	151	419	
11	10 00 AM	262	186	448	237	231	468	256	233	489	246	222	468	259	221	480	
12	11.00 AM	292	208	500	308	241	549	271	209	480	257	259	516	315	270	585	
13	12.00 PM	288	252	540	296	259	555	288	228	516	280	201	481	318	241	559	
14	01.00 PM	279	234	513	282	255	537	298	234	532	274	236	510	238	201	439	
15	02 00 PM	289	287	576	319	246	565	277	249	526	266	264	530	203	260	463	
16	03 00 PM	249	243	492	280	280	560	292	215	507	280	228	508	237	219	456	
17	04.00 PM	249	234	483	292	234	526	276	274	550	253	228	481	266	245	511	PM Peak Commute Per
18	05 00 PM	277	245	522	252	250	502	215	253	468	288	246	534	210	231	441	
19	06.00 PM	252	253	505	230	219	449	306	232	538	269	240	509	255	206	461	
20	07.00 PM	201	194	395	168	170	338	207	197	404	185	207	392	221	241	462	
21	08.00 PM	125	144	269	146	128	274	132	142	274	147	156	303	182	160	342	
22	09 00 PM	83	125	208	126	107	233	98	122	220	132	126	258	152	173	325	
23	10.00 PM	55	50	105	52	44	96	63	54	117	89	55	144	99	87	186	
24	11.00 PM	33	37	70	29	33	62	37	28	65	26	31	57	47	52	99	
	Daily Total	3895	3383	7278	4009	3403	7412	3982	3418	7400	3977	3412	7389	3966	3508	7474	
	Directional %	53.5%	46.5%	100.0%	54.1%	45.9%	100.0%	53.8%	46.2%	100.0%	53.8%	46.2%	100.0%	53.1%	46.9%	100.0%	
	AM Maximum	216	186	402	239	204	442	226	194	420	220	197	407	200	184	384	
	PM Maximum	277	245	522	292	280	560	292	274	550	288	246	534	266	245	511	
	Daily Maximum	292	287	576	319	280	565	306	274	550	288	264	534	318	270	585	

DAILY VARIATION ANALYSIS

Day	AM PEAK HOUR		PM PEAK HOUR			AM	PM
M	402	0.978	522	0.976	Mon	402	522
T	442	1.075	560	1.047	Tue	442	560
W	420	1.022	550	1.028	Wed	420	550
T	407	0.990	534	0.998	Thur	407	534
F	384	0.934	511	0.955	Fri	384	511
TOTAL	2055		2677				
AVG	411		535				

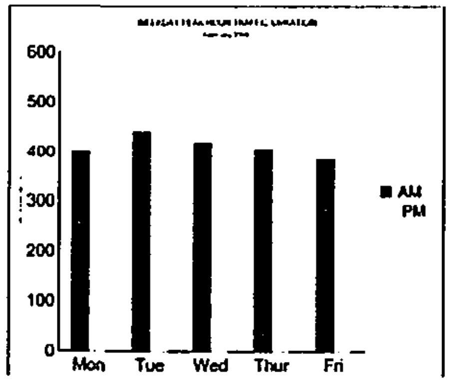


Table E-2
TRAFFIC VOLUME SURVEY RESULTS

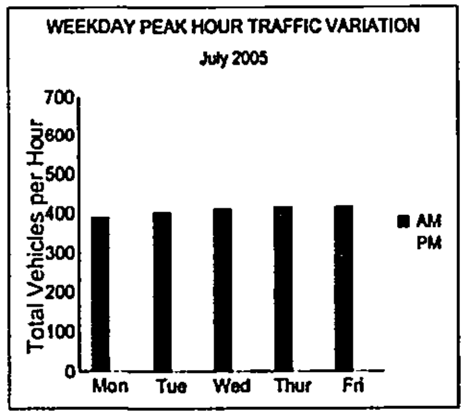
Project: MCC Mixed Use Project
Station No: 1
Station Location: Kane Street between Kaahumanu Ave and Vevau Street
Start Time: 12.00 AM, Monday, 25 July 2005
End Time: 12.00 AM, Saturday, July 30, 2005

NO SCHOOL

	Start	Monday 25 July 2005			Tuesday 26 July 2005			Wednesday 27 July 2005			Thursday 28 July 2005			Friday 29 July 2005			
Interval	Time	SB	NB	Total	SB	NB	Total	SB	NB	Total	SB	NB	Total	SB	NB	Total	
1	12.00 AM	38	15	53	25	31	56	31	20	51	39	23	62	28	19	47	
2	01:00 AM	15	16	31	21	18	39	19	12	31	23	11	34	19	6	25	
3	02.00 AM	16	10	26	10	9	19	15	4	19	14	10	24	20	10	30	
4	03.00 AM	11	10	21	6	3	9	11	9	20	6	11	17	12	9	21	
5	04:00 AM	21	7	28	15	9	24	8	7	15	9	11	20	15	13	28	
6	05 00 AM	42	16	58	46	19	65	47	20	67	34	26	60	40	21	61	
7	06.00 AM	122	55	177	112	64	176	110	66	176	113	67	180	103	64	167	
8	07.00 AM	214	163	377	198	188	386	208	154	362	218	155	373	216	165	381	AM Peak Commute
9	08.00 AM	215	175	390	220	182	402	220	191	411	214	202	416	223	193	416	
10	09.00 AM	236	178	414	224	168	392	250	165	415	219	179	398	240	170	410	
11	10.00 AM	243	195	438	270	218	488	245	216	461	276	196	472	285	207	492	
12	11:00 AM	315	235	550	293	257	550	268	258	526	267	215	482	264	237	501	
13	12.00 PM	308	224	532	300	275	575	253	253	506	305	207	512	283	272	555	
14	01:00 PM	271	273	544	287	299	586	294	255	549	293	246	539	308	234	542	
15	02 00 PM	261	218	479	276	249	525	302	200	502	278	246	524	313	306	619	
16	03.00 PM	316	262	578	296	251	547	286	259	545	326	236	562	300	291	591	
17	04.00 PM	311	288	599	316	317	633	341	284	625	336	299	635	356	321	677	PM Peak Commute
18	05 00 PM	332	315	647	324	285	609	292	341	633	318	328	646	316	336	652	
19	06.00 PM	257	261	518	299	228	527	292	248	540	286	250	536	307	282	589	
20	07.00 PM	204	219	423	234	198	432	240	176	416	207	223	430	249	252	501	
21	08.00 PM	165	148	313	157	167	324	157	151	308	153	163	316	204	195	399	
22	09.00 PM	153	140	293	113	125	238	132	151	283	137	154	291	146	194	340	
23	10.00 PM	89	82	171	76	81	157	86	75	161	68	75	143	122	105	227	
24	11.00 PM	53	33	86	48	51	99	49	52	101	45	53	98	65	72	157	
	Daily Total	4208	3538	7746	4166	3692	7858	4156	3567	7723	4184	3586	7770	4454	3974	8428	
	Directional %	54.3%	45.7%	100.0%	53.0%	47.0%	100.0%	53.8%	46.2%	100.0%	53.8%	46.2%	100.0%	52.6%	47.2%	100.0%	
	AM Maximum	215	175	390	220	188	402	220	191	411	218	202	416	223	193	416	
	PM Maximum	332	315	647	324	317	633	341	341	633	336	328	646	356	336	677	
	Daily Maximum	332	315	647	324	317	633	341	341	633	336	328	646	356	336	677	

DAILY VARIATION ANALYSIS

Day	AM PEAK HOUR		PM PEAK HOUR				
M	390	0.958	647	1.000	Mon	390	647
T	402	0.988	633	0.978	Tue	402	633
W	411	1.010	633	0.978	Wed	411	633
T	416	1.022	646	0.998	Thur	416	646
F	416	1.022	677	1.046	Fri	416	677
TOTAL	2035		3236				
AVG	407		647				



Philip Rowell and Associates

Appendix F
Preliminary Analysis of Superferry Traffic

Background

During the comment period for Kahului Town Center TIAR, comments were received from Maui County Planning Department, Maui Planning County Planning Commission and State Department of Transportation relative to the traffic impacts of the Superferry. While the Superferry is not part of the proposed project, the task of identifying the impacts of the Superferry was put upon the Kahului Town Center TIAR. A copy of the draft EIS for the Superferry was obtained and reviewed. The EIS for the Superferry was consistent with discussions with the Consultant preparing the EIS and with SDOT-Harbors. The EIS implied that there would be no impacts on peak hour traffic conditions in the study area. This conclusion was cited in the draft TIAR.

Subsequent discussions were held with the reviewing agencies. It was concluded that traffic projections presented in the draft TIAR for the Superferry and the afternoon peak hour traffic projections presented in the Kahului Town Center would be used to assess a worse case scenario: the Superferry arriving in Kahului during the afternoon peak hour.

It was also understood that this is an unlikely scenario. Therefore, it was decided that the analysis would be presented as an appendix to avoid any confusion relative to the impacts of the Kahului Town Center project versus the proposed Superferry. Mitigation of both projects should be assessed separately and required to mitigate the impacts of the respective project.

Methodology

The peak hour traffic assignments for the Superferry were superimposed on the afternoon peak hour traffic projections for the Kahului Town Center. The resulting projections represent 2012 afternoon peak hour volume estimates including Kahului Town Center, the Superferry and all the related projects used in estimating 2012 background traffic projections in the Kahului Town Center TIAR.

A level-of-service analysis was performed for the resulting projections and compared to level-of-service analysis results for 2012 conditions with only the Kahului Town Center. The resulting changes in volume-to-capacity ratio, delay and level-of-service were then identified.

Results of Level-of-Service Analysis

The results of the level-of-service analysis are summarized in Table F-1. Shown are the volume-to-capacity ratios, delays and levels-of-service for 2012 conditions with and without the Superferry. Also shown are the changes in volume-to-capacity ratios, delays and levels-of-service. Only the results for peak hour conditions are shown, as there are no morning peak hour traffic assignments associated with the Superferry.

As shown in the table, the level-of-service of three intersections will decrease. The level-of-service of the intersections Kaahumanu Avenue at Kinau Avenue and Puunene Avenue at Town Center Drive will decrease from Level-of-Service E to Level-of-Service F. The level-of-service of the intersection of Puunene Avenue at Wakea Avenue will decrease from D to E.

The most significant increase is at the intersection of Kaahumanu Avenue at Puunene Avenue. The level-of-service is Level-of-Service F without and with the Superferry, but the delay increases 56.8 seconds per vehicle. The represents an increase of 57.5%. The volume-to-capacity ratio increases 0.18, or 15%.

Table F-1 2012 Levels-of-Service With Kahului Town Center and With Superferry Traffic

	Intersection	PM Peak Hour								
		2012 With Kahului Town Center Without Superferry			2012 With Kahului Town Center With Superferry			Changes		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Kaahumanu Av. at Wakea Av.	0.84	30.8	C	0.84	32.3	C	0.00	1.5	
2	Kaahumanu Av. at Kahului Beach Rd.	1.13	108.7	F	1.16	121.7	F	0.03	13.0	
4	Kaahumanu Av. at Lono Av.	1.28	91.9	F	1.28	91.9	F	0.00	0.0	
5	Kaahumanu Av at Kinau Avenue	[illegible]	49.0	E	[illegible]	62.9	F	[illegible]	13.9	E to F
6	Kaahumanu Av. at Puunene Av.	1.19	98.7	F	1.37	155.5	F	0.18	56.8	
7	Kaahumanu Av. at Maui Mall	0.76	21.1	C	0.82	23.2	C	0.06	2.1	
8	Hana Highway at Kamehameha Av.	1.20	119.4	F	1.20	133.9	F	0.00	14.5	
9	Puunene Av at Drives E & F	[illegible]	43.0	E	[illegible]	51.4	F	[illegible]	8.4	E to F
10	Puunene Av at Town Center Drive	[illegible]	549.2	F	[illegible]	549.2	F	[illegible]	0.0	
11	Kamehameha Av. at Puunene Av.	0.88	73.4	E	0.95	73.4	E	0.07	0.0	
12	Puunene Av. at Wakea Av.	0.94	53.5	D	0.98	55.6	E	0.04	2.1	D to E

NOTES:
1. V/C denotes ratio of volume to capacity.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. NC denotes "Not Calculated." The calculated delay is greater than 999.9 seconds per vehicle.
5. Calculated delay is greater then 999.9 seconds per vehicle.
6. NC = Not Calculated

Appendix J

Letters of Response to Agency Comments

Index of Agency Comment Letters

FEDERAL

Department of the Army, Corps of Engineers

Natural Resources Conservation Service (NRCS)

STATE

Department of Health

Department of Health, Maui District Office

Department of Land and Natural Resources, State Historic Preservation Division (SHPD)

Department of Transportation

Department of Accounting and General Services, Survey Division

Department of Education

COUNTY

Department of Planning

Department of Public Works and Environmental Management

Fire Department

Police Department

Department of Housing and Human Concerns

Department of Parks and Recreaition

Department of Water Supply

OTHER

Maui Electric Company

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

August 22, 2006

RECEIVED
AUG 24 2006
CHRIS HART & PARTNERS
Landscape Architecture & Planning
cc: Milu 05/173

Regulatory Branch

Director
Department of Planning
250 South High Street
Wailuku, Maui 96793

Administrator
A&B Properties, Inc.
822 Bishop Street
Honolulu, Hawaii 96813

Gentlemen:

This responds to the request for comments regarding the draft Environmental Assessment and the Special Management Area permit application for the proposed Kahului Town Center (TMKs (2) 3-7-07: 5, 8, 9 ,10, 27 & 50) at Kahului, Maui Island. Based on the information provided, I have determined that this activity and location is on 19.9 acreas of upland area, and outside the limit of our jurisdiction under the authority of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Therefore a Department of Army (DA) permit will not be required for construction activities associated with this development.

File Number POH-2006-329 has been assigned to this project. Please feel free to contact Mr. Farley Watanabe of my staff at 438-7701, if you have additional questions.

Sincerely,

GEORGE P. YOUNG, P.E.
Chief, Regulatory Branch

Copy furnished:
Mr. Christopher L. Hart, ASLA, Chris Hart & Partners, Inc., 1955 Main Street, Suite 200, Wailuku, HI 96793

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. George P. Young, P.E., Chief
Regulatory Branch
U.S. Army Engineer District, Honolulu
CEPOH-EC-R
Building 230
Fort Shafter, HI 96858-5440

Dear Mr. Young:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your August 22, 2006 letter, which states that a DA permit is not required for the project.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 · WAILUKU, MAUI, HAWAII 96793-1706 · PHONE: 808-242-1955 · FAX: 808-242-1956

United States Department of Agriculture

NRCS Natural Resources Conservation Service

USDA

Our People...Our Islands...In Harmony

210 Imi Kala Street, Suite #209, Wailuku, HI 96793-2100

August 14, 2006

Ms Kivette Caigoy, Staff Planner
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

'06 AUG 16 P1:59
DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

Dear Ms Caigoy,

SUBJECT: EA 2004/0008; SM1 2006/0010
TMK: (2) 3-7-007:005
PROJECT NAME: Kahului Town Center
APPLICANT: A&B Properties Inc.

We have no comments or recommendations at this time.

Thank you for the opportunity to comment.

Sincerely,

Ranae Ganske-Cerizo
District Conservationist

CHRIS HART & PARTNERS, INC.

November 16, 2006

Ms. Ranae Ganske-Cerizo, District Conservationist
Natural Resources Conservation Service
210 Imi Kala Street, Suite 209
Wailuku, HI 96793

Dear Ms. Ganske-Cerizo:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your August 14, 2006 letter, which states that NRCS does not have any comments on the Kahului Town Center project at this time.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

uc

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
EPO-06-145

September 21, 2006

'06 SEP 27 AM 1 57
DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

Mr. Michael W. Foley, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

SUBJECT: Draft Environmental Assessment and Special Management Area Permit Application for the Proposed Kahului Town Center at Kahului, Maui, Hawaii
TMK: (2) 3-7-007: 005, 008, 009, 010, 027 and 050

Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have the following Clean Water Branch, Clean Air Branch and Noise, Radiation & Indoor Air Quality Branch, and Environmental Planning Office comments.

Clean Water Branch

The Department of Health (DOH), Clean Water Branch (CWB) has reviewed the limited information contained in the subject document and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 for this project. Pursuant to Federal Water Pollution Control Act (commonly known as the "Clean Water Act" (CWA) Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40, Code of Federal Regulations (CFR), Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

2. In accordance with HAR, Sections 11-55-04 and 11-55-34.05, the Director of Health may require the submittal of an individual permit application or a Notice of Intent (NOI) for general permit coverage authorized under the National Pollutant Discharge Elimination System (NPDES).

a. An application for an NPDES individual permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

b. An NOI to be covered by an NPDES general permit is to be submitted at least 30 days before the commencement of the respective activity. A separate NOI is needed for coverage under each NPDES general permit. The NOI forms may be picked up at our office or downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

  i. Storm water associated with industrial activities, as defined in Title 40, CFR, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi). [HAR, Chapter 11-55, Appendix B]

  ii. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. **An NPDES permit is required before the commencement of the construction activities.** [HAR, Chapter 11-55, Appendix C]

  iii. Discharges of treated effluent from leaking underground storage tank remedial activities. [HAR, Chapter 11-55, Appendix D]

  iv. Discharges of once through cooling water less than one (1) million gallons per day. [HAR, Chapter 11-55, Appendix E]

  v. Discharges of hydrotesting water. [HAR, Chapter 11-55, Appendix F]

  vi. Discharges of construction dewatering effluent. [HAR, Chapter 11-55, Appendix G]

  vii. Discharges of treated effluent from petroleum bulk stations and terminals. [HAR, Chapter 11-55, Appendix H]

  viii. Discharges of treated effluent from well drilling activities. [HAR, Chapter 11-55, Appendix I]

  ix. Discharges of treated effluent from recycled water distribution systems. [HAR, Chapter 11-55, Appendix J]

x. Discharges of storm water from a small municipal separate storm sewer system. [HAR, Chapter 11-55, Appendix K]

xi. Discharges of circulation water from decorative ponds or tanks. [HAR, Chapter 11-55, Appendix L]

3. In accordance with HAR, Section 11-55-38, the applicant for an NPDES permit is required to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. If applicable, please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

4. Any discharges related to project construction or operation activities, with or without a Section 401 WQC or NPDES permit coverage, shall comply with the applicable State Water Quality Standards as specified in HAR, Chapter 11-54.

The Hawaii Revised Statutes, Subsection 342D-50(a), requires that "[n]o person, including any public body, shall discharge any water pollutants into state waters, or cause or allow any water pollutant to enter state waters except in compliance with this chapter, rules adopted pursuant to this Chapter, or a permit or variance issued by the director."

If you have any questions, please contact Mr. Alec Wong, Supervisor of the Engineering Section, CWB, at (808) 586-4309.

<u>Clean Air Branch</u>

Control of Fugitive Dust

A significant potential for fugitive dust emissions exists during all phases of construction and operations. Proposed activities that occur in proximity to existing residences, businesses, public areas or thoroughfares, exacerbate potential dust problems. It is recommended that a dust control management plan be developed which identifies and addresses all activities that have a potential to generate fugitive dust. The plan, which doses not require the Department of Health (DOH) approval, would help with recognizing and minimizing the dust problems from the proposed project.

Activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance problems.

The contractor should provide adequate measures to control the fugitive dust from the road areas and during the various phases of construction. Examples of measures that can be implemented to control dust include, but are not limited to, the following:

a) Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Providing an adequate water resource at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing dust from shoulders and access roads;
e) Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling dust from debris being hauled away from the project site.

If you have any questions, please contact the Clean Air Branch at 586-4200

Noise, Radiation & Indoor Air Quality Branch

The project activities should comply with the Administrative Rules of the Department of Health:

- Chapter 11-41, Lead Substances
- Chapter 11-46, Community Noise Control
- Chapter 11-501, Asbestos Requirements
- Chapter 11-503, Fees for Asbestos Removal and Certification
- Chapter 11-504, Asbestos Abatement Certification Program

Should you have any questions, please contact Russell S. Takata of Noise, Radiation & Indoor Air Quality Branch at (808) 586-4701

Environmental Planning Office

Please note that some of the following issues may not apply to your particular proposed project or requested action. Should you have any questions about the applicability of the listed concerns or the particular environmental programs administered by our office, please feel free to contact us.

To facilitate Total Maximum Daily Load (TMDL) development and implementation, and to assist with our assessment of the potential impact of proposed actions upon water quality, pollutant loading, and biological resources in receiving waters, we suggest that environmental review documents, permit applications, and related submittals include the following standard information and analyses. Please note that these comments are also listed on our website: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html. We suggest that you also review other Standard Comments on this website.

Waterbody type and class

1. Identify the waterbody type and class, as defined in Hawaii Administrative Rules Chapter 11-54 (http://www.state.hi.us/health/about/rules/11-54.pdf), of all potentially affected water bodies. Potentially affected water bodies means those in which proposed project activities would take place and any others that could receive water discharged by the proposed project activity or water flowing down from the proposed site. These waterbodies can be presented as a chain of receiving waters whose top link is the project site upslope and whose bottom link is in Pacific Ocean "oceanic waters," with all receiving waters named according to conventions established by Chapter 11-54 and the *List of Impaired Waters in Hawaii Prepared under Clean Water Act § 303(d).* For example, a recent project proposed for Nuhelewai Stream, Oahu (a tributary of Kapalama Canal) might potentially affect Nuhelewai Stream, Kapalama Canal, Honolulu Harbor and Shore Areas, and the Pacific Ocean.

Existing water quality management actions

2. Identify any existing National Pollutant Discharge Elimination System (NPDES) permits and related connection permits (issued by permittees) that will govern the management of water that runs off or is discharged from the proposed project site or facility. Please include NPDES and other permit numbers; names of permittees, permitted facilities, and receiving waters (including waterbody type and class as in 1. above); diagrams showing drainage/discharge pathways and outfall locations; and note any permit conditions that may specifically apply to the proposed project.

3. Identify any planning documents, groups, and projects that include specific prescriptions for water quality management at the proposed project site and in the potentially affected waterbodies. Please note those prescriptions that may specifically apply to the proposed project.

Pending water quality management actions

4. Identify all potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)* including the listed waterbody, geographic scope of listing, and pollutant(s) (See Table 5 at http://www.hawaii.gov/health/environmental/env-planning/wqm/303dpcfinal.pdf).

5. If the proposed project involves potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)*, identify and quantify expected changes in the following site and watershed conditions and characteristics
   - surface permeability
   - hydrologic response of surface (timing, magnitude, and pathways)
   - receiving water hydrology
   - runoff and discharge constituents
   - pollutant concentrations and loads in receiving waters
   - aquatic habitat quality and the integrity of aquatic biota

Where TMDLs are already established they include pollutant load allocations for the surrounding lands and point source discharges. In these cases, we suggest that the submittal specify how the proposed project would contribute to achieving the applicable load reductions.

Where TMDLs are yet to be established and implemented, a first step in achieving TMDL objectives is to prevent any project-related increases in pollutant loads. This is generally accomplished through the proper application of suitable best management practices in all phases of the project and adherence to any applicable ordinances, standards, and permit conditions. In these cases we suggest that the submittal specify how the proposed project would contribute to reducing the polluted discharge and runoff entering the receiving waters, including plans for additional pollutant load reduction practices in future management of the surrounding lands and drainage/discharge systems.

Proposed Action and Alternatives Considered

We suggest that each submittal identify and analyze potential project impacts at a watershed scale by considering the potential contribution of the proposed project to cumulative, multi-project watershed effects on hydrology, water quality, and aquatic and riparian ecosystems.

We also suggest that each submittal broadly evaluate project alternatives by identifying more than one engineering solution for proposed projects. In particular, we suggest the consideration of "alternative," "soft," and "green" engineering solutions for channel modifications that would provide a more environmentally friendly and aesthetically pleasing channel environment and minimize the destruction of natural landscapes.

We strongly recommend that you review all of the Standard Comments on our website: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

If there are any questions about these comments please contact Jiacai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
CWB
CAB
NRIAQ
EH-Maui

CHRIS HART
& PARTNERS, INC.

November 16, 2006

Mr. Kelvin H. Sunada
Manager, Environmental Planning Office
State of Hawaii
Department of Health
PO Box 3378
Honolulu, Hawaii 96801-3378

Dear Mr. Sunada:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated September 21, 2006, regarding the above-referenced project. We are pleased to address your comments as follows:

1. The Army Corps of Engineers has been contacted regarding the project, and has responded with a letter stating, "this activity and location is ... outside the limit of our jurisdiction under the authority of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Therefore a Department of Army (DOA) permit will not be required for construction activities associated with this development."

2. We understand from your letter that the Director of Health may require submittal of an individual permit application or notice of intent (NOI) for general NPDES permit coverage. The Clean Water Branch will be contacted regarding the NPDES coverage. We note the timing and conditions associated with the NOI and permit application as detailed in your letter.

3. The subject project is being reviewed by SHPD. Attached is SHPD's comment letter dated October 28, 2006, which requests archaeological monitoring during construction.

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 · WAILUKU, MAUI, HAWAII 96793-1706 · PHONE: 808-242-1955 · FAX: 808-242-1956

4. Discharges. Discharges related to project construction shall comply with applicable State water quality standards.

5. Dust. A dust control management plan will be implemented prior to site work. Section III.A.5 of the Draft EA documents some of the dust control measures that will be implemented as part of a dust control management plan. The Applicant also understands that construction activities must comply with the provisions of HAR, Chapter 11-60.

6. Noise. Activities associated with the construction phase of the project, will comply with the Department of Health's Administrative Rules, Chapter 11-46, "Community Noise Control." We note that a noise permit may be required prior to commencement of work. In addition, the applicant understands that HAR, Chapter 11-46 sets maximum allowable sound levels from stationary equipment such as compressors and HVAC equipment. The location and placement of this type of equipment will be considered during the planning, design, and construction of the project.

   In addition, the applicant understands that compliance is required with the following chapters of the Administrative Rules of the Department of Health:

   - Chapter 11-41, Lead Substances;
   - Chapter 11-501, Asbestos Requirements;
   - Chapter 11-503, Fees for Asbestos Removal and Certification; and
   - Chapter 11-504, Asbestos Abatement Certification Program.

7. Waterbody type and class: The only water body potentially affected by the project is Kahului Harbor, classified by Hawaii Administrative Rules Chapter 11-54 as Marine, Class A

8. Existing water quality management actions: The project will require application for a NPDES permit.

9. Planning documents including specific prescriptions for water quality management at the project site: The project must comply with Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui.

10. Impaired waterways: Water bodies potentially affected by the proposed project are Kahului Harbor and the Pacific Ocean. Of these two, only Kahului Harbor is listed as impaired under the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act 303(d).*

11. Expected changes in site and watershed conditions: As detailed in the preliminary drainage report for the project, development of the proposed

project will produce an increase in storm runoff of 21.55 cfs over current conditions. The project's drainage system is projected to be able to retain approximately 54 cfs when the system is completed. County standards require the project to retain all proposed runoff that exceeds the existing runoff quantity. To meet the County standard the project would be required to retain 21.55 cfs. The project will retain approximately 54 cfs - double the County standard. Compared to existing conditions, the project will decrease the runoff by approximately 32.45 cfs through retention.

The drainage system will consist of retention swales, drain inlets, underground retention piping and catch basins located within paved and landscaped areas. Mechanical filtering devices will also be analyzed during the design process, to be incorporated into the drainage system. Also, during that phase of design other methods to reduce runoff will be investigated, including landscaped swales and permeable pavement.

With the retention and filtration of runoff on site, it is unlikely that development of the proposed project will impact any of the criteria listed in the September 21, 2006 letter from DOH, including: surface permeability; hydrologic response of surface; receiving water hydrology; runoff and discharge constituents; pollutant concentrations and loads in receiving waters; aquatic habitat quality, and integrity of aquatic biota.

In addition, by reducing the overall volume of runoff currently generated on site, the cumulative effects of the project at a watershed level are nonexistent.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

FROM : FAX NO. : Sep. 11 2006 09:39AM P4

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M. D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M. D., M. P. H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

'06 AUG 30 A9 :42

DEPT OF PLANNING
COUNTY OF MAUI
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August 29, 2006

Mr. Michael W. Foley
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawai'i 96793

Attention: Kivette Caigoy

Dear Mr. Foley:

Subject: **Kahului Town Center**
TMK: (2) 3-7-007: 005
EA 2006/0008, SM1 2006/0010

Thank you for the opportunity to comment on the proposed Kahului Town Center project. The following comments are offered:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage is required for this project. The Clean Water Branch should be contacted at 808 586-4309.

2. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work.

Should you have any questions, please call me at 808 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. Herbert S. Matsubayashi
District Environmental Health Program Chief
State of Hawaii
Maui District Health Office
54 High Street
Wailuku, Hawaii 96793

Dear Mr. Matsubayashi:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your August 29, 2006 letter. We are pleased to address your comments as follows:

1. **National Pollutant Discharge Elimination System (NPDES) Permit.** The applicant is aware that a NPDES permit is required for this project. The Clean Water Branch will be contacted regarding the NPDES coverage.

2. **Noise.** Activities associated with the construction phase of the project will comply with the Department of Health's Administrative Rules, Chapter 11-46, "Community Noise Control." We note that a noise permit may be required prior to commencement of work. In addition, the applicant understands that HAR, Chapter 11-46 sets maximum allowable sound levels from stationary equipment such as compressors and HVAC equipment. The location and placement of this type of equipment will be considered during the planning, design, and construction of the project.

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Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

FROM : FAX NO. :8082701775 Nov. 01 2006 04:48PM P4

DOCUMENT CAPTURED AS RECEIVED

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

'06 OCT 30 P2:07

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

October 28, 2006

LOG NO: 2006.3552
DOC NO: 0610MK28
Archaeology

Michael Foley
Director, Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

SUBJECT: **Chapter 6E-42 Historic Preservation Review [County/Planning] - Special Management Area Assessment Application, Draft Environmental Assessment for the Kahului Town Center**
Wailuku Ahupuaa, Wailuku District, Island of Maui
TMK: (2) 3-7-007: 005, 008, 009, 010, 027, and 050

Thank you for the opportunity to review and comment on the above application. Our review is based on reports, maps, and aerial photographs maintained at the State Historic Preservation Division (SHPD). We have previously reviewed and accepted an archaeological assessment that was conducted on the subject parcel (Johnson and Dega 2006, *An Archaeological Assessment of the Kahului Shopping Center Project, Wailuku Ahupuaa, Kahului, Island of Maui, Hawaii [TMK 3-7-7:5, 8-10, 27 and 50]*).

We concurred with the mitigation recommendations in the above report that, although no intact historic properties were identified during the testing phase of the survey, precautionary archaeological monitoring is warranted given the presence of historic artifacts. We believe there is a possibility that intact historic deposits may yet be encountered during demolition of existing structures, removal of existing pavement, and installation of any proposed infrastructure.

Based on the submitted plans, we understand the proposed undertaking consists of the the installation of all improvements associated with the proposed Kahului Town Center Development.

Ground altering activities associated with the proposed undertaking may have an effect on historic site which may be present. We believe that any adverse effect may be mitigated through precautionary monitoring. Therefore, we recommend the following condition be attached to the subject permit, should it be approved.

1) A qualified archaeological monitor or monitors shall be present during all ground-altering activities conducted in the project area in order to document any historic properties which may be encountered during the proposed undertaking and to provide mitigation measures as necessary. An archaeological monitoring plan will need to be

submitted to the State Historic Preservation Division for review and acceptance, prior to the commencement of any ground-altering activities. An archaeological monitoring plan must contain the following nine specifications: (1) The kinds of remains that are anticipated and where in the construction area the remains are likely to be found; (2) How the remains and deposits will be documented; (3) How the expected types of remains will be treated; (4) The archaeologist(s) conducting the monitoring has/have the authority to halt the construction in the immediate area of the find in order to carry out the plan; (5) A coordination meeting between the archaeologist and construction crew is scheduled, so that the construction team is aware of the plan; (6) What laboratory work will be done on remains that are collected; (7) A schedule of report preparation; (8) Details concerning the archiving of any collections that are made; and (9) An acceptable report documenting the findings of the monitoring activities shall be submitted to the State Historic Preservation Division for review upon 180 days following the completion of the proposed undertaking.

2) Please notify our Maui and Oahu offices, via facsimile, at onset and completion of the project and monitoring program.

If you have any questions, please call Dr. Melissa A. Kirkendall at (808) 243-5169.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

MK:kf:gvf

o: Bert Ratte, DSA, County of Maui FAX (808) 270-7972
Maui Cultural Resources Commission, Dept. of Planning, 205 S. High Street, Wailuku 96793

CHRIS HART & PARTNERS, INC.

November 16, 2006

Ms. Melanie A. Chinen
Administrator
State Historic Preservation Division
State of Hawaii
Department of Land and Natural Resources
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Ms. Chinen:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated October 28, 2006 regarding the above-referenced project. Pursuant to your letter, the applicant understands that you have previously received and accepted an Archaeological Assessment Report conducted on the subject property, and that in accordance with the prior report, although no intact historical resources were identified during the testing phase, there is a possibility that intact historical resources may be uncovered during construction activities and therefore precautionary archaeological monitoring is warranted.

The project archaeologist has submitted an archaeological monitoring plan, which addresses each of the nine specifications outlined in the comment letter, to the State Historic Preservation Division's Maui office for review and acceptance.

Pursuant to your letter, the SHPD Maui and Oahu offices will be notified via facsimile at the onset and completion of the project and monitoring program.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

ac

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
FRANCIS PAUL KEENO
BARRY FUKUNAGA
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.2282

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

September 26, 2006

'06 SEP 27 A11 :58

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

Mr. Michael W. Foley
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

Subject: Kahului Town Center
Draft Environmental Assessment (EA 2006/0008) and
Special Management Area Use Permit (SM1 2006/0010)
TMK: 3-7-007: 005

We have the following comments on the subject project:

1. The project will have a traffic impact on our highway facilities of Kaahumanu Avenue and Puunene Avenue.

2. Our Highways Division will not allow a new project driveway to Puunene Avenue.

3. We have concerns on the project's TIAR recommendations for modification of traffic signal phasing at the Puunene Avenue/Wakea Avenue intersection. We recommend the applicant discuss the concerns from our Highways Traffic staff by arranging a meeting through our Highways Maui District Office. The TIAR should be revised to reflect an acceptable mitigation measure.

4. Further study is needed on the alternatives to improve crosswalks on Puunene Avenue. The applicant should be required to monitor pedestrian traffic and provide findings and recommend pedestrian improvements. The applicant should also be required to construct improvements as determined and accepted by our Highways Maui District Office, at no cost to the State.

5. The applicant has indicated that they would be agreeable to fair sharing contributions for mitigation measures and improvements on Kaahumanu Avenue and Puunene Avenue. Developers of other projects in the same area have committed to do certain mitigation

measures and improvements. We would prefer that the County require the applicant to, similarly, provide specific mitigation measures and improvements by an agreement with our Highways Division through the Highways Maui District Office, at no cost to the State. Coordination of each set of measures and improvements by the respective developers will be necessary so that the collective sum of improvements by all the developers can produce the desired improvements in traffic conditions.

6. Plans for any construction work within or abutting our highway right-of-ways must be submitted to the Highways Division through our Highways Maui District Office for review and approval.

We appreciate the opportunity to provide our comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

CHRIS HART & PARTNERS, INC.

November 16, 2006

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

Dear Mr. Haraga:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated October 23, 2006, regarding the above-referenced project. We are pleased to address your comments as follows:

1. We understand from your letter that the project will have an impact on the highway facilities of Kaahumanu Avenue and Puunene Avenue.

2. Regarding the driveway along Puunene Avenue, we will provide an alternative in the final report.

3. Regarding the intersection of Puunene Avenue at Wakea Avenue, we will provide alternative mitigation and, if possible, we will discuss with the Maui District Office.

4. The issue of pedestrians crossing Puunene Avenue was discussed at two meetings attended by the traffic engineer. We are developing alternatives to include in the final report.

5. We are refining the mitigation projects in the area in response to comments from DOT and other agencies and several additional development projects that have been made public since the draft TIAR was prepared. We will discuss these mitigation measures with the

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appropriate agencies and the developer and determine which mitigation measures will be the responsibility of the developer.

6. We understand from your letter that plans for construction work within or abutting highway rights-of-way must be submitted to the Highways Division for review and approval.

Thank you for your consideration of the application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Maui County Department of Planning
Mr. Darren Lake, A&B Properties
Project File

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
Comptroller

KATHERINE H. THOMASON
Deputy Comptroller

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING
AND GENERAL SERVICES
SURVEY DIVISION
P.O. BOX 119
HONOLULU, HAWAII 96810-0119

Response Refer to:
MA-342(06)

August 15, 2006

'06 AUG 17 A9:44
DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

MEMORANDUM

TO: Michael W. Foley, Planning Director
Maui County Planning Department

ATTN.: Kivette Caigoy, Environmental Planner

FROM: Reid K. Siarot, State Land Surveyor
DAGS, Survey Division

SUBJECT: I.D.: EA 2006/0008; SM1 2006/0010
TMK: 3-7-07: 05
Project Name: Kahului Town Center
Applicant: A&B Properties Inc.

We have reviewed the Application for Special Management Area Permit for the above subject.

Please be advised that our records indicate that Survey Benchmark (K-5) and Tidal Survey Benchmark (161-5680 TIDAL 12) are possibly located within the improvement area on the proposed Kahului Town Center site [see attached National Geodetic Survey (NGS) Data Sheets].

Please be further advised that if there is a possibility the Benchmark(s) will be disturbed or destroyed, the Benchmark(s) must be referenced and eventually replaced. Copies of field notes, descriptions and new values of the replaced Benchmark(s) should be sent to our office.

Should you have any questions, please call me at 586-0390.

Enclosures

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.37
1        National Geodetic Survey,   Retrieval Date = AUGUST 14, 2006
 TU0856 ***********************************************************************
 TU0856  TIDAL BM     -  This is a Tidal Bench Mark.
 TU0856  DESIGNATION -  161 5680 TIDAL 12
 TU0856  PID         -  TU0856
 TU0856  STATE/COUNTY-  HI/MAUI
 TU0856  USGS QUAD   -  WAILUKU (1997)
 TU0856
 TU0856                          *CURRENT SURVEY CONTROL
 TU0856  ___________________________________________________________________
 TU0856* NAD 83(1986)-  20 53 20.     (N)    156 28 00.      (W)     SCALED
 TU0856* LOCAL TIDAL -        1.365  (meters)        4.48    (feet)  ADJUSTED
 TU0856  ___________________________________________________________________
 TU0856  GEOID HEIGHT-         15.88  (meters)                        GEOID03
 TU0856
 TU0856  VERT ORDER  -  FIRST     CLASS I
 TU0856
 TU0856.The horizontal coordinates were scaled from a topographic map and have
 TU0856.an estimated accuracy of +/- 6 seconds.
 TU0856
 TU0856.The orthometric height was determined by differential leveling
 TU0856.and adjusted by the National Geodetic Survey in December 2003..
 TU0856
 TU0856.This Tidal Bench Mark is designated as VM 12699
 TU0856.by the Center for Operational Oceanographic Products and Services.
 TU0856
 TU0856.The geoid height was determined by GEOID03.
 TU0856
 TU0856;                    North         East     Units  Estimated Accuracy
 TU0856;SPC HI 2     -    61,520.      520,810.      MT   (+/- 180 meters Scaled)
 TU0856
 TU0856                          SUPERSEDED SURVEY CONTROL
 TU0856
 TU0856.No superseded survey control is available for this station.
 TU0856
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 TU0856_MARKER: DJ = TIDAL STATION DISK
 TU0856_SETTING: 30 = SET IN A LIGHT STRUCTURE
 TU0856_SP_SET: CONCRETE DRAIN FRAME
 TU0856_STAMPING: NO 12 1971
 TU0856_MARK LOGO: NONE
 TU0856_MAGNETIC: N = NO MAGNETIC MATERIAL
 TU0856_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
 TU0856
 TU0856  HISTORY      - Date      Condition         Report By
 TU0856  HISTORY      - 1971      MONUMENTED        NOS
 TU0856  HISTORY      - 19790605 GOOD               NGS
 TU0856
 TU0856                          STATION DESCRIPTION
 TU0856
 TU0856'DESCRIBED BY NATIONAL GEODETIC SURVEY 1979 (WVM)
 TU0856'IN KAHULUI.
 TU0856'FROM TIDAL DESCRIPTIONS DATED 3 FEB 1975.
 TU0856'BENCH MARK 12 1971 IS A STANDARD DISK, STAMPED NO 12 1971, SET IN THE
 TU0856'CENTER OF THE SOUTHWEST SIDE OF THE TOP OF A 4 X 4 FOOT CONCRETE FRAME
```

TU0856'FOR AN IRON STORM DRAIN GRATING. IT IS 40 FEET SOUTHWEST OF
TU0856'CENTERLINE OF SOUTH PUUENE AVENUE AND 22 FEET SOUTHEAST OF CENTERLINE
TU0856'OF ENTRANCE/EXIT WAY TO KAHULUI SHOPPING CENTER ACROSS THE STREET FROM
TU0856'MAUI SAVINGS AND LOAN ASSOCIATION.

*** retrieval complete.
Elapsed Time = 00:00:00

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

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DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.37
1        National Geodetic Survey,   Retrieval Date = AUGUST 14, 2006
 TU0178 ***********************************************************************
 TU0178  DESIGNATION -  K 5
 TU0178  PID         -  TU0178
 TU0178  STATE/COUNTY-  HI/MAUI
 TU0178  USGS QUAD   -  WAILUKU (1997)
 TU0178
 TU0178                         *CURRENT SURVEY CONTROL
 TU0178  ___________________________________________________________________
 TU0178* NAD 83(1986)-  20 53 27.     (N)    156 28 01.     (W)     SCALED
 TU0178* LOCAL TIDAL -          2.160  (meters)        7.09  (feet)  ADJ UNCH
 TU0178  ___________________________________________________________________
 TU0178  GEOID HEIGHT-          15.87  (meters)                      GEOID03
 TU0178
 TU0178  VERT ORDER  -  FIRST     CLASS I
 TU0178
 TU0178.The horizontal coordinates were scaled from a topographic map and have
 TU0178.an estimated accuracy of +/- 6 seconds.
 TU0178
 TU0178.The orthometric height was key entered from printed documents
 TU0178.and not key verified.
 TU0178
 TU0178.The geoid height was determined by GEOID03.
 TU0178
 TU0178;                    North        East     Units  Estimated Accuracy
 TU0178;SPC HI 2      -    61,730.      520,780.     MT  (+/- 180 meters Scaled)
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 TU0178
 TU0178.No superseded survey control is available for this station.
 TU0178
 TU0178_U.S. NATIONAL GRID SPATIAL ADDRESS: 4QGJ635121(NAD 83)
 TU0178_MARKER: DB = BENCH MARK DISK
 TU0178_SETTING: 30 = SET IN A LIGHT STRUCTURE
 TU0178_SP_SET: WALL
 TU0178_STAMPING: K 5 1950
 TU0178_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
 TU0178
 TU0178  HISTORY      - Date     Condition        Report By
 TU0178  HISTORY      - 1950     MONUMENTED       CGS
 TU0178  HISTORY      - 1968     GOOD             CGS
 TU0178  HISTORY      - 1979     GOOD             NGS
 TU0178
 TU0178                        STATION DESCRIPTION
 TU0178
 TU0178'DESCRIBED BY COAST AND GEODETIC SURVEY 1968
 TU0178'IN KAHULUI.
 TU0178'AT NORTHWEST END OF THE FIRST NATIONAL BANK BUILDING, ACROSS PUUNENE
 TU0178'AVE. FROM THE KAHULUI SHOPPING CENTER, IN MIDDLE OF SHRUBBERY STRIP.
 TU0178'132 FEET NORTHEAST OF THE CENTER OF PUUNENE AVE., 38.0 FEET SOUTHEAST
 TU0178'OF CURB OF STATE HIGHWAY 32, 34 FEET SOUTHEAST OF THE CENTER OF A
 TU0178'STORM-DRAIN MANHOLE COVER, 35.5 FEET SOUTHWEST OF NORTHEAST CORNER OF
 TU0178'BUILDING, 22 FEET NORTHEAST OF NORTHWEST CORNER OF BUILDING, 3.5 FEET
 TU0178'OUT FROM BASE OF WALL AND BELOW THE K IN FIRST NATIONAL BANK, 4.6 FEET
 TU0178'NORTHEAST OF THE CORNER OF A JOG IN THE WALL, 4 FEET IN FROM LAWN
```

TU0178'EDGE, 3 FEET SOUTHWEST OF OUTLINE OF OLD NORTHWEST ENTRANCE DOOR (NOW
TU0178'SEALED UP), UNDER SOUTHWEST SPREAD OF A CLUMP OF SMALL PALMS, AND 2
TU0178'INCHES BELOW GROUND SURFACE.
TU0178
TU0178 STATION RECOVERY (1979)
TU0178
TU0178'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1979 (WVM)
TU0178'RECOVERED AS DESCRIBED WITH THE EXCEPTION THAT THE FIRST NATIONAL
TU0178'BANK IS NOW THE FIRST BANK OF HAWAII.

*** retrieval complete.
Elapsed Time = 00:00:00

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. Reid K. Siarot
Acting State Land Surveyor
State of Hawaii
Department of Accounting
and General Services
Survey Division
P.O. Box 119
Honolulu, Hawaii 96810-0119

Dear Mr. Siarot:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated August 15, 2006, which states that Survey Benchmark (K-5) and Tidal Survey Benchmark (161-5680 TIDAL 12) are possibly located within the improvement area on the above referenced project.

The applicant will coordinate replacement of any survey benchmarks, if necessary, with DAGS at the appropriate time prior to construction of each phase. The tidal bench marks will be replaced once construction is completed.

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 · WAILUKU, MAUI, HAWAII 96793-1706 · PHONE: 808-242-1955 · FAX: 808-242-1956

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Maui County Department of Planning
Mr. Darren Lake, A&B Properties
Project File

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF BUSINESS SERVICES

September 19, 2006

Mr. Michael W. Foley, Planning Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawai`i 96793

Attn: Ms. Kivette Caigoy:

Dear Mr. Foley:

SUBJECT: Draft Environmental Assessment for the Kahului Town Center (EA 2006/0008) and (SM1 2006/0010)

The Department of Education (DOE) has no comment on the proposed plans to build 121timeshare units. The DOE does not request a school fair-share contribution on projects that are only seeking Special Management Area Permits. The DOE estimates that eventually the project would house a total of 111 public school students, including 71 in elementary school, 22 in middle school and 18 in high school.

The DOE has no other comment on the application but appreciates the opportunity to review the plans. Should you have any questions, please call Heidi Meeker of the Facilities Development Branch at 733-4862.

Sincerely yours,

Duane Y. Kashiwai
Public Works Manager
Facilities Development Branch

DYK:jmb

c: Randolph Moore, Acting Assistant Superintendent, OBS
Ken Nomura, CAS, Baldwin/Kekaulike/Maui Complex Areas

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. Duane Y. Kashiwai, Public Works Manager
Facilities Development Branch
State of Hawai'i Department of Education
P.O. Box 2360
Honolulu, HI 96804

Dear Mr. Kashiwai:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your September 19, 2006 comment letter. Per our conversation of September 27, 2006 with Heidi Meeker, we acknowledge that the reference to 121 timeshare units is an error, but not the conclusion of the letter, which states that the DOE does not request a school fair-share contribution for projects that are only seeking Special Management Area (SMA) permits.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

DON COUCH
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

September 19, 2006

Mr. Christopher L. Hart, ASLA
Chris Hart & Partners, Inc.
1955 Main Street, Suite 200
Wailuku, Hawaii 96793

Dear Mr. Hart:

RE: Comments on the Draft Environmental Assessment for the Proposed Kahului Town Center Redevelopment Located at TMK: 3-7-007: 005, 008, 009, 010, 027, and 050, Kahului, Island of Maui, Hawaii (EA 2006/0008)

At the regular meeting of September 12, 2006, the Maui Planning Commission (Commission) reviewed the above-referenced document and provided the following comments:

1. Discuss whether the existing utility lines along Kaahumanu Avenue, Puunene Avenue, Kamehameha Avenue, and Lono Avenue will be placed underground.

2. Discuss designing the drainage system to manage more stormwater runoff than presently required by the County. Provide a detailed analysis.

3. Given the proximity of the proposed action to the Kahului Harbor, provide an analysis of the worst case traffic scenario should the Superferry dock during peak traffic hours.

   a. The analysis should also account for traffic from the increase in cruise ship activities and reconfigured cargo operations of the harbor.

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SEP 25 2006

cc: Mike. 05172

Mr. Christopher L. Hart, ASLA
September 19, 2006
Page 2

b. Discuss how the proposed action will accommodate pedestrian safety across Kaahumanu Avenue with the Superferry activity at Kahului Harbor.

4. Discuss whether the traffic signals along Kaahumanu Avenue are synchronized and the next generation of synchronization. Provide updates to traffic signal synchronization along Dairy Road and Hana Highway.

5. As represented, an objective of the proposed project is to create a core destination for Kahului Town. As such, consider and discuss providing mass transit drop-off points within the project.

6. Discuss whether the proposed project has an affordable housing component.

7. How many office and retail businesses can the proposed project accommodate? Discuss the types of businesses that the project will likely accommodate.

8. Clarify whether a well will be constructed for irrigation purposes.

9. Provide additional discussion for proposed energy conservation measures. The Commission encourages seeking the basic LEED Certification. Include the LEED certification checklist in the Final EA for informational purposes.

10. Discuss potential impacts of powerline emissions to occupants of the proposed project, specifically the residential component.

11. Summarize and include as an appendix any response from the community received to date from any previously held public meetings.

Further, the Department notes that photos and plans were presented in the powerpoint presentation that were not included in the Draft EA. Please include a copy of the slides as an appendix in the Final EA.

Upon completion of the foregoing, please submit two (2) copies to the Department for review.

Should you require further clarification, please contact Ms. Ann Cua, Staff Planner, by email at ann.cua@co.maui.hi.us, or by phone at 270-7521.

Sincerely,

Don Couch

for MICHAEL W. FOLEY
Planning Director

MWF:KAC:ATC:lar
c: Don Couch, Deputy Planning Director
Ann T. Cua, Staff Planner
EA Project File
General File
K:\WP_DOCS\PLANNING\EA\2006\0008_KahuluiTownCenter\MPC_DEAComments.wpd

CHRIS HART
& PARTNERS, INC.

November 16, 2006

Mr. Michael Foley
Director
Department of Planning
250 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Foley:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated September 19, 2006, regarding the above-referenced project. We are pleased to address your comments as follows:

1. Fronting the project, there are utility lines along Kamehameha Avenue and Puunene Avenue. As part of the road widening improvement to Puunene Avenue, the utility lines are proposed to be placed underground.

2. The project's drainage system is projected to be able to retain approximately 54 cfs when the system is completed. County standards require the project to retain all proposed runoff that exceeds the existing runoff quantity. To meet the County standard the project would be required to retain 21.55 cfs. The project will retain approximately 54 cfs - double the County standard. Compared to existing conditions, the project will decrease the runoff by approximately 32.45 cfs through retention.

   The final drainage system and retention quantities will be determined during the construction document phase of the project. Also, during that phase of design other methods to reduce runoff will be investigated, including landscaped swales and permeable pavement.

   Existing runoff: 82.82 cfs
   Proposed runoff: 104.37 cfs
   Proposed retention capacity: 54 cfs

Quadrant 1
The runoff generated from Quadrant 1 will be piped into the County drainage system. The drainage system is located in Quadrant 1 and presently serves that area. The area has a runoff quantity of 26 cfs.

Quadrant 2
The runoff generated from Quadrant 2 will be retained, probably in the parking area. The area has runoff quantity of 26 cfs.

Quadrants 3 & 4
The runoff that needs to be retained for these quadrants will be retained under the proposed park. The area can accommodate 28-60" diameter perforated pipe at 125 feet in length. This retention area will be able to accommodate a runoff of approximately 38 cfs. The total runoff from Quadrant 3 and 4 is approximately 52 cfs.

3. a). The traffic consultant has obtained the traffic studies for the Kahului Harbor Master Plan and the Hawaii Superferry, and has revised the traffic projections to account for the traffic generated by these projects. The impact of these projects is being documented in an additional chapter that has been added to the enclosed Traffic Impact Analysis Report (TIAR), which accounts for the increase in traffic from the Superferry operations.

   b). DOT has requested an assessment of alternatives to address the issue of pedestrians crossing both Puunene and Kaahumanu Avenues. Maui Police Department has submitted a similar a suggestion regarding pedestrian safety. Accordingly, there are several options to be assessed and discussed in the final draft. However, it should be pointed out that all of these options are across State highways, which means there may or may not be a consensus among the County, State and developer. We can only make a recommendation.

   Another issue to be addressed is what share of any improvements to accommodate superferry activity should be borne by the developer of Kahului Town Center. The developer of Kahului Town Center can and should bear their fare share responsibility, but it also appears reasonable that the Superferry bears its fair share responsibility.

4. The traffic consultant has discussed the viability of upgrading the traffic signal coordination plan along Kaahumanu Avenue with a traffic signal designer involved in the design of the ATSAC system used on Los Angeles. The ATSAC system requires constant oversight by a trained traffic signal technician or engineer. Such a system was not considered viable for any of the major roadways in Maui because of the difficulty in finding and retaining

traffic signal technicians with adequate experience to maintain the system. Regarding the traffic signals along Dairy Road, the new equipment has been installed and the system should be activated shortly. The only remaining issue is whether a midday timing plan should be developed in addition to the morning and afternoon peak hours. The above discussion can be included in the final report.

5. A mass transit/ bus drop-off point has been accommodated and provided on the site plan at the Kinau entrance to the project from Kaahumanu Avenue.

6. The project will have an affordable housing component. The developer is currently working with Housing & Human Concerns to prepare an affordable housing agreement for the project.

7. The exact number and sizes of the commercial office and retail spaces will be determined as the project is marketed. The project could potentially range up to 200 or more businesses. Examples of retail categories that may be accommodated within the project include restaurants & eateries, houseware & furniture, grocery, entertainment, financial institutions, apparel, technology & electronics, specialty and health & fitness. Office users will include the typical mix of office tenants, with examples including financial institutions, real estate firms, medical and dental offices.

8. A well will be constructed for irrigation purposes.

9. The developer will continue to investigate the feasibility of both incorporating individual green building technologies into the project and individual building design. Additionally, the developer is investigating the feasibility of obtaining LEED certification. The U.S. Green Building Council (USGBC) is currently reviewing two new certifications that could potentially be applicable to this project: LEED- Neighborhood Development certification and LEED-Multifamily certification. Although these certification programs have not been implemented by the USGBC, they are expected to be available as the project is built-out. The USGBC has released draft standards for the LEED-Neighborhood Development certification. A table has been attached in the appendix section which outlines these standards (based on the 9/6/2005 draft obtained from the USGBC website) and includes comments indicating whether each standard is potentially applicable to this project. The table should only be used as an indicator of whether a standard is applicable to the project and therefore potentially feasible. The feasibility of meeting these standards will continue to be evaluated. For individual buildings, the developer will continue to review the feasibility of seeking LEED- NC and/or LEED for multi-family certification.

10. Discussions conducted with MECO officials have indicated that the proposed buildings are an acceptable distance from the power lines, and as such there would be no adverse impacts from power line emissions to occupants of the proposed project.

11. Community meetings appendix:

Group	Key Comments
Community Open House (1/21/06)	• Make site well-shaded with monkey pods • Pedestrian safety concern over vehicle access • Higher density is OK • Want Ah Fook's to be a tenant within the project
Residential Broker Focus Groups (July 2005)	• Town center concept is something that is needed in downtown Kahului • Encouraged design consistency across the commercial and residential components • The conveniences of the retail on the ground floor would be an amenity to residential buyers
Rotary Club of Wailuku	

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Darren Lake, A&B Properties
Project File

FROM : FAX NO. : Oct. 26 2006 08:44AM P2

ALAN M. ARAKAWA
Mayor

MILTON M. ARAKAWA, A.I.C.P.
Director

MICHAEL M. MIYAMOTO
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

DAVID TAYLOR, P.E.
Wastewater Reclamation Division

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

TRACY TAKAMINE, P.E.
Solid Waste Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL MANAGEMENT
200 SOUTH HIGH STREET, ROOM 322
WAILUKU, MAUI, HAWAII 96793

'06 OCT 24 A8:28
DEPT OF PLANNING
COUNTY OF MAUI
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RECEIVED
OCT 26 2006
CHRIS HART & PARTNERS
Landscape Architecture & Planning

October 23, 2006

MEMO TO: MICHAEL W. FOLEY, PLANNING DIRECTOR

FROM: MILTON M. ARAKAWA, A.I.C.P., DIRECTOR OF PUBLIC WORKS AND ENVIRONMENTAL MANAGEMENT

SUBJECT: APPLICATION FOR SPECIAL MANAGEMENT AREA AND HAWAII REVISED STATUTES, CHAPTER 343 AND DRAFT ENVIRONMENTAL ASSESSMENT FOR KAHULUI TOWN CENTER
TMK: (2) 3-7-007:005
EA 2006/0008
SM1 2006/0010

We reviewed the subject application and have the following comments:

1. Although wastewater system capacity is currently available as of August 28, 2006, the developer should be informed that wastewater system capacity cannot be ensured until the issuance of the building permit.

2. Provide discussion and calculations (sewer impact study) to substantiate that the existing wastewater system is adequate to serve this project.

3. Wastewater contribution calculations are required before building permit is issued.

4. Developer shall pay assessment fees for treatment plant expansion costs in accordance with ordinance setting forth such fees.

5. Developer is required to fund any necessary off-site improvements to collection system and wastewater pump stations.

6. Plans should show the installation of a single service lateral and an advance riser for each lot.

7. Non-contact cooling water, condensate, etc. should not drain to the wastewater system.

8. Indicate on the plans the ownership of each easement (in favor of which party). Note: County will not accept sewer easements that traverse private property.

9. Commercial kitchen facilities within the proposed project shall comply with pre-treatment requirements (including grease interceptors, sample boxes, screens etc.).

10. The plans submitted for this project do not adequately show sufficient detail to determine whether the project is compliant with building codes. We will review the project for building code requirements during the building permit application process.

11. Submit justification for the assumed 5 percent (5%) discount in the Traffic Impact Assessment Report (TIAR).

12. Add separate figures showing pass by trips and assumptions for clarity.

13. Clarify why the discussion does not correspond to Table 14 with regards to level-of-service.

14. Clarify when "should" intersections be restricted to right in/right out.

15. Evaluate other alternatives aside from four (4) way stop control.

16. At the intersection of Lono and Kamehameha Avenues, during the afternoon, the southbound left turns do not always clear in one cycle. Address this existing condition in the discussion.

If you have any questions regarding this memorandum, please call Michael Miyamoto at 270-7845.

MMA:MMM:da
S:\LUCA\CZM\kah_twn_cntr_ea_sm1_37007005_da.wpd

CHRIS HART
& PARTNERS, INC.

November 16, 2006

Mr. Milton W. Arakawa, A.I.C.P.
Director
Department of Public Works
and Environmental Management
200 South High Street, Room 322
Wailuku, Maui, Hawaii 96793

Dear Mr. Arakawa:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated October 23, 2006, regarding the above-referenced project. We are pleased to address your comments as follows:

1. Wastewater system capacity. The applicant understands that wastewater system capacity cannot be ensured until the issuance of the building permit.

2. Sewer Impact Study. A study has been completed by Brown & Caldwell that provides discussion and calculations substantiating that the existing wastewater system is adequate to serve this project. The study will be included as an appendix in the Draft EA.

3. Wastewater calculations. The applicant acknowledges that wastewater contribution calculations are required before the building permit is issued. This issue will be addressed during the building permit process.

4. Assessment fees for treatment plant expansion. The applicant understands that assessment fees for treatment plant expansion will be required in accordance with the ordinance setting forth such fees. This issue will be addressed during the building permit process.

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 • WAILUKU, MAUI, HAWAII 96793-1705 • PHONE: 808-242-1955 • FAX: 808-242-1956

5. Off-site improvements. The applicant understands that the developer is required to fund any necessary off-site improvement costs to the collection system and wastewater pump stations. This issue will be addressed during the building permit process.

6. Installation of Single-Service Lateral. Final construction plans will show the installation of a service lateral and an advanced riser for each lot.

7. Non-contact cooling water. The applicant acknowledges that non-contact cooling water, condensate, etc. should not drain to the wastewater system.

8. Sewer Easements. The applicant understands that the County will not accept sewer easements that traverse private property. Final construction plans will identify all easements that affect the subject property.

9. Kitchen facilities. The applicant acknowledges that any future kitchen facilities must comply with pretreatment requirements including grease interceptors, sample boxes, screens, etc. This issue will be addressed during the building permit process.

10. Building codes. The applicant understands that review of the project for building code compliance will occur during the building permit process.

11. Trip Generation Discount. The 5% discount was applied only to the residential, office, bank and restaurant uses. A discount of 35% and 40% was applied to the retail uses. The discount of 5% is considered conservative. Comparable mixed-use projects in Southern California have used a discount of 10% to 15%. It was decided that the lower discount of 5% is more appropriate because of the higher discount applied to the retail. The discount for the retail is based on trip generation calculations for the individual quadrants compared to trip generation calculations for the total development.

12. Pass by Trips. The traffic consultant will provide an appendix including trip assignment figures for each quadrant as well as the pass-by trips in the final draft TIAR.

13. Table 14, TIAR. The discrepancies have been edited in the final draft TIAR.

14. Intersection Restrictions. The comment is unclear as to which intersection is being questioned. The report recommended that several intersections be restricted to right turn in and right turn out only. The intersections along Puunene Avenue are restricted in order to enhance pedestrian safety. The recommendation for the driveway along Puunene Avenue immediately north of Kamehameha Avenue is restricted because of the driveway's proximity to the signalized intersection. Left turns from this intersection would have to

cross the left turn storage lane, which is undesirable. An alternative will be provided in the final report with a solution to this issue.

15. Four-way Stop Controls. Assuming that this comment relates to the intersection of Lono Avenue at Town Center Drive, the options are limited. The traffic consultant will, however, discuss alternatives in the final draft TIAR.

16. Left turns at Lono and Kamehameha Avenue. The traffic consultant will address the backups at the intersection of Lono Avenue at Kamehameha Avenue, in the final draft TIAR and identify mitigation.

Thank you for your consideration of the application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Maui County Department of Planning
Mr. Darren Lake, A&B Properties
Project File

ALAN M. ARAKAWA
MAYOR

CARL M. KAUPALOLO
CHIEF

NEAL A. BAL
DEPUTY CHIEF

COUNTY OF MAUI
DEPARTMENT OF FIRE AND PUBLIC SAFETY

200 DAIRY ROAD
KAHULUI, MAUI, HAWAII 96732
(808) 270-7561
FAX (808) 270-7919

'06 OCT 26 A11:46
DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

October 26, 2006

Ann T. Cua, Staff Planner
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

Subject: EA 2006/0008; SM1 2006/0010, Kahului Town Center, TMK (2)3-7-007:005

Dear Ms. Cua,

I have had an opportunity to review the project description. We will be looking at the roadway widths of the project as well as water for fire protection. It is apparent that the project will be built over a 6-10 year span and that many items will be addressed separately over this time. It is difficult to address all fire dept issues with the project now.

Water

All water for fire protection will come from the County water system. If the entire project remains private, than all fire hydrants and associated equipment will be inspected by our department after the double detector check valve. If the intent is to turn over the street and roadways to the County in the future, than the Department of Water Supply will handle all fire hydrant related inspections.

The details of the required locations for fire protection will be reviewed during the building permit application process.

Roadways

In general, a clearance of 20 feet is required for roadway widths to allow access for emergency vehicles. It is noted that the roadways in the project will allow parking on both sides. Will the 20 foot clearance requirement be met even when vehicles are parked? Will the radius of the round-a-bout be adequate to allow a fire truck to complete a turn?

Subject: EA 2006/0008; SM1 2006/0010, Kahului Town Center, TMK (2)3-7-007:005
October 26, 2006
continue:

All details concerning roadway widths, water for fire protection and turning radius will be looked at closely during the building permit process. Please contact Lt. Scott English at 270-7122 if there are any questions or concerns.

Sincerely,

Valeriano F. Martin
Captain
Fire Prevention Bureau

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. Valeriano F. Martin
Captain
Fire Prevention Bureau
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Maui, Hawaii 96732

Dear Mr. Martin:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated October 26, 2006 regarding the above-referenced project.

Based upon your letter, we understand that your office will be looking at the roadway widths of the project as well as water for fire protection, and that many specific issues will be addressed separately on an ongoing basis due to the 6-10 year time frame for project build-out. We also understand that the details of the required locations for fire protection will be reviewed during the building permit application process.

In response to your comment regarding fire and emergency vehicle access, the proposed roadway widths will provide for 20 feet of clearance after factoring in street parking, as generally required for emergency vehicle access. The round-about will be designed with a fire truck turning radius in mind.

We further understand that all details concerning roadway widths, water for fire protection and turning radius will be analyzed during the building permit process.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

COPY

POLICE DEPARTMENT

COUNTY OF MAUI

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE
YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

GARY A. YABUTA
DEPUTY CHIEF OF POLICE

September 27, 2006

MEMORANDUM

TO	:	MICHAEL W. FOLEY, PLANNING DIRECTOR
FROM	:	THOMAS M. PHILLIPS, CHIEF OF POLICE
SUBJECT	:	I.D. : EA 2006/0008; SM1 2006/0010 TMK : 3-7-007:005 Project Name : Kahului Town Center Applicant : A & B Properties, Inc.

___ No recommendation or comment to offer.

_x_ Refer to enclosed comments and/or recommendations.

Thank you for giving us the opportunity to comment on this project.

AC Wayne T. Ribao

Assistant Chief Wayne T. Ribao
For: THOMAS M. PHILLIPS
Chief of Police

Enclosure

TO : THOMAS M. PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI

VIA : CHANNELS

FROM : SCOTT Y. MIGITA, ADMINISTRATIVE SERGEANT, WAILUKU PATROL

SUBJECT : APPLICATION FOR SPECIAL MANAGEMENT AREA AND HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT-KAHULUI TOWN CENTER (TMK: (2) 3-7-007: 005, 008, 009, 010, 027, and 050) KAHULUI, MAUI, HAWAII

Sir, this transmittal is being submitted regarding an Application For Special Management Area and HRS Chapter 343 Draft Environmental Assessment on the Kahului Town Center (TMK: (2) 3-7-007: 005, 008, 009, 010, 027, and 050) prepared for A & B Properties, Inc. by Chris Hart & Partners, Inc. This project proposes the redevelopment of an existing shopping center to a mixed use commercial/residential development, including retail, office, and other commercial spaces, 442 apartment residential units and related off site and on site improvements. The project will require a consolidation and/or consolidation/resubdivision of lots. The redevelopment project will be implemented in phases over a six to ten year period.

Addressing the issue of traffic and safety from a police standpoint, one option would be to place a traffic signal for increased safety at the intersection of Puunene Avenue and Town Center Drive, which runs parallel between Kaahumanu Avenue and Kamehameha Avenue. This would create a safer crossing for pedestrians and vehicles in this vicinity and across the busy Puunene Avenue. If this option is not warranted, a right turn in and right turn out configuration from Town Center Drive onto Puunene Avenue might be a possibility or allowing for pedestrian traffic only on Town Center Drive, between Puunene Avenue and Kinau Avenue.

Another area of concern is the issue of adequate security, lighting, and parking. It may be advantageous to provide round the clock security since this proposed project consists of both commercial and residential development. In regards to parking, there should be enough parking spaces for anticipated business employees and customers as well as residential and guest parking in order to avoid vehicles from parking along the surrounding streets and thus perhaps causing a traffic hazard with poor visibility to other vehicles exiting the premises. The issue of noise coming from the commercial area of the town center which may adversely affect the residential area should also be considered and addressed.

Submitted for your information and perusal.

Respectfully submitted,

SC [illegible] 1122

Scott Y. MIGITA, E-1122
Administrative Sergeant, Wailuku Patrol
09/21/06 at 1805 hours

WITH THE HEAVY TRAFFIC ON PUUNENE AVE., WHICH WILL STEADILY INCREASE, PEDESTRIAN SAFETY IS A CONCERN.

CPT [illegible]
09/22/06

I AGREE WITH SGT. MIGITA & CAPT. MATSUOKA. THE SAFETY OF THE PUBLIC SHOULD BE TAKEN INTO CONSIDERATION.

AC [illegible]
9/26/06

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. Thomas M. Phillips
Chief of Police
Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawaii 96793

Dear. Mr. Phillips:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated September 27, 2006, regarding the above-referenced project.

In response to your letter, we offer the following comments:

1. The viability of installing traffic signals at the intersection of Puunene Avenue at Town Center Drive was discussed with DOT. Based on this discussion, it was concluded that a traffic signal at this location would not operate well with the adjacent signalized intersection because the intersections are too close to provide adequate queue space and the queues would backup through the adjacent intersection. In order to address your concerns regarding pedestrians crossing Puunene Avenue, it was determined that the safest alternative would be to construct a pedestrian refuge median along Puunene Avenue in the vicinity of Town Center Drive. This can be accomplished as left turns from the project have been prohibited and left turns from the Maui Mall side of Puunene Avenue should also be prohibited when possible.

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 · WAILUKU, MAUI, HAWAII 96793-1706 · PHONE: 808-242-1955 · FAX: 808-242-1956

2. <u>Security and parking</u>: To discourage criminal activity and alleviate the potential impact on police services, the applicant will incorporate strategies into the project to facilitate natural surveillance. Such strategies would include parking lot and sidewalk lighting; limiting the number of access ways into the site to Town Center Drive, Kinau Avenue, and the other proposed driveways; providing visibility to various public and private spaces within the project site from adjacent roadways and uses; providing visibility to common areas from residential areas of the project; and incorporating benches and outside seating areas into the project design to facilitate observation of common areas. The applicant is also considering providing round-the-clock security, which would most likely take the form of a roving patrol shared with the adjacent Maui Mall. The project also complies with the County's parking requirements.

3. <u>Noise</u>: Activities associated with the construction phase of the project will comply with the Department of Health's Administrative Rules, Chapter 11-46, "Community Noise Control." The issue of noise from the commercial area of the town center that may have adverse effects on the residential area during the project's operating phase will be addressed through use of appropriate building materials and design.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

ALAN M. ARAKAWA
Mayor
ALICE L. LEE
Director
HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

RECEIVED
AUG 15 2006

August 10, 2006

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED
AUG 14 A8:10

TO: KIVETTE CAIGOY, Environmental Planner
Department of Planning

FROM: ALICE L. LEE, Director
Department of Housing and Human Concerns

SUBJECT: I.D.: EA 2006/0008 & SM1 2006/0010
TMK: 3-7-007:005
PROJECT NAME: KAHULUI TOWN CENTER
APPLICANT: A & B PROPERTIES, INC.

We have reviewed the Draft Environmental Assessment and SMA permit application for the subject project and would like to offer the following comments:

1. The 442 multi-family residential units that are proposed for development in the project should be required to comply with the affordable housing requirements that are specified in the bill for an ordinance entitled A BILL FOR AN ORDINANCE ESTABLISHING A RESIDENTIAL WORKFORCE HOUSING POLICY. If the bill for an ordinance is adopted by the County of Maui prior to the development of the project, the applicant should be required to comply with the provisions of the adopted ordinance.

2. The applicant should be required to undertake a housing need assessment for the approximately 144,000 s.f. of retail commercial space and the approximately 96,000 s.f. of new office space that is proposed for development. The assessment should also specify how the applicant proposes to satisfy the housing need that may be generated by the development of the retail commercial space and new office space.

Thank you for the opportunity to comment.

ETO:hs
c: Housing Administrator

CHRIS HART & PARTNERS, INC.

November 16, 2006

Ms. Alice L. Lee
Director
Department of Housing and Human Concerns
200 South High Street
Wailuku, HI 96793

Dear Ms. Lee:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated August 10, 2006, regarding the above-referenced project. We are pleased to address your comments as follows:

1. Affordable Housing. The applicant is aware that the project will be required to comply with the recently adopted Residential Workforce Housing Policy.

2. Housing Needs Assessment. Please note that the net increase in retail space generated by the project is roughly 30,000 square feet over the original 110,000 square feet of retail space within the Kahului Shopping Center block. The project will increase the total office space on the property by approximately 96,000 square feet. The retail and commercial component of the project will be phased over multiple years. Because the proposed project is a mixed-use development incorporating residential, commercial, and retail space within a compact neighborhood setting, the proposed 442 multi-family residential units will more than offset any demand for residential housing generated by the proposed project.

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 · WAILUKU, MAUI, HAWAII 96793-1706 · PHONE: 808-242-1955 · FAX: 808-242-1956

Thank you for your consideration of the application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

FROM : FAX NO. : Sep. 27 2006 04:19PM P1

AC

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION
700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

MEMORANDUM

'06 SEP 21 P2:39
DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

September 15, 2006

MEMO TO: Michael W. Foley, Planning Director

FROM: Glenn T. Correa, Director

SUBJECT: Kahului Town Center
EA 2006/0008
SM1 2006/0010
TMK: (2) 3-7-007:005, 008, 009, 010, 027, and 050

Thank you for the opportunity to review and comment on the Application for Special Management Area Permit and HRS Chapter 343 Draft Environmental Assessment prepared in support of the Kahului Town Center by Chris Hart & Partners, Inc.

Our Department met with the developer and their consultants, Wednesday, September 6, 2006, to discuss the Kahului Town Center project's potential built-out impact on the Kahului and Wailuku area parks. The Department informed the developer that it would be requesting they provide one improved parcel of land, suitable in shape, location, and topography for active ballfields (approx. 5 acres), within the Community Plan area to satisfy Maui County Code 18.16.320 requirements pertaining to Parks and playgrounds.

The Department also informed the developer that it would not be in support of accepting the approximately one-half acre "Town Square Park" toward fulfillment of the Code requirements.

Should you have any questions or need of additional information, please call me or Patrick Matsui, Chief of Parks Planning & Development, at 270-7387.

c: Pat Rocco, Central Maui Parks District Supervisor

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. Glenn T. Correa
Director
Department of Parks & Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawaii 96793

Dear Mr. Correa:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated September 15, 2006, stating that the Parks Department will be requesting that the developer provide one improved parcel of land, suitable in shape, location and topography for active ballfields, of approximately five (5) acres; and indicating that the Department would not support accepting the one-half-acre "Town Square Park" toward fulfillment of park dedication requirements.

The applicant will work with the Department of Parks and Recreation to come to a mutually satisfactory agreement on the provision of park land related to development of the proposed project.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

RECEIVED
OCT 20 2006
CHRIS HART & PARTNERS
Landscape Architecture and Planning

COMike
25173

'06 OCT 19 A10:01

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

ALAN M. ARAKAWA
Mayor

GEORGE Y. TENGAN
Director

ERIC H. YAMASHIGE, P.E., L.S.
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2155
www.mauiwater.org

September 29, 2006

Mr. Michael W. Foley, Planning Director
Department of Planning
County of Maui
250 South High Street
Wailuku HI 96793

Re: I.D.: SM1 2006/0008, EA 2006/0008
TMK: 3-7-07:005
Project Name: Kahului Town Center

Dear Mr. Foley:

Thank you for the opportunity to comment on this application.

Source Availability and Consumption
The project area is served by the Central Maui System. The main sources of water for this system are the designated Iao aquifer, the Waihee aquifer, the Iao tunnel and the Iao-Waikapu Ditch. New source development projects include a water treatment facility at Waiale. The Department will not issue reservations for future meters or temporary construction meters for Central Maui projects. Water for new projects may not be available until new sources are online. Reclaimed water for construction demand is available at the Kahului Wastewater Treatment Plant from the Department of Public Works and Environmental Management Wastewater Division. Domestic demand for 227,048 square feet commercial use would be 31,787 gallons per day (gpd). Daily demand for 442 multifamily units would be 247,520 gallons, for a total domestic demand of 279,307 gpd based on system standards. The applicant estimates irrigation demand to 7,500 gpd. The applicant may be required to develop or provide source to meet demand of the proposed project, depending on the phasing of the project.

System Infrastructure
The subject property is served by 12-inch waterlines and fire hydrants along all perimeters as well as an on-site private fire system. The applicant will be required to provide for water service and fire protection in accordance with system standards. Fire flow and domestic calculations will be reviewed in detail in the building permit process.

Conservation
Since 97 percent of the demand for this project is for indoor use, we recommend that the applicant specifically include and implement indoor conservation measures in project design and construction.
Utilize Low-Flow Fixtures and Devices: Maui County Code Subsection 16.20A.680 requires the use of low-flow water fixtures and devices in faucets, showerheads, urinals, water closets and hose bibs. Ultra low flush toilets, conserving washing machines can significantly reduce water use.
Eliminate Single-Pass Cooling: Single-pass, water-cooled systems should be eliminated per Maui County Code Subsection 14.21.20. Although prohibited by code, single-pass water cooling is still manufactured into some models of air conditioners, freezers, and commercial refrigerators.
Maintain Fixtures to Prevent Leaks: A simple, regular program of repair and maintenance can prevent the loss of hundreds or even thousands of gallons a day. The applicant should establish a regular maintenance program.
Use Non-potable Water: Use brackish or reclaimed water for landscaping of common areas and other non-potable purposes when available. Reclaimed water, available for trucking from the Kahului Sewage Treatment Plant, or brackish water should be used for dust control during construction.
Use Climate-adapted Plants: We recommend the applicant to increase the use of climate-adapted plants in landscaping plan. The project is located in the "Maui County Planting Plan" - Plant Zones 3 and 5. Native plants adapted to the area conserve water and protect the watershed from degradation due to invasive alien species.
Prevent Over-Watering By Automated Systems: Provide rain-sensors on all automated irrigation controllers. Check and reset controllers at least once a month to reflect the monthly changes in evapo-transpiration rates at the site. As an alternative, provide the more automated, soil-moisture sensors on controllers.

Pollution Prevention
The project overlies the Kahului aquifer. In order to protect ground and surface water sources in the area, we encourage the applicant to utilize Best Management Practices (BMPs) designed to minimize infiltration and runoff from construction. Mitigation measures are enumerated below and should be implemented during construction.

- Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the water
- Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work
- Retain ground cover until the last possible date
- Stabilize denuded areas by sodding or planting as soon as possible. Replanting should include soil l amendments, fertilizers and temporary irrigation. Use high seeding rates to ensure rapid

stand establishment

- Avoid fertilizers and biocides, or apply only during periods of low rainfall to minimize chemical run-off.
- Keep run-off on site
- Construct drainage control features, such as berms
- Maintain drainage structures, detention, silting and debris basins
- Control dust by proper stockpiling and use non-potable water for dust control
- Cover open vehicles carrying soils, gravel or other particulate matter.

Should you have any questions, please contact our Water Resources and Planning Division at 244-8550.

Sincerely,

George Y. Tengan, Director

cmb

c:
engineering
applicant, w/attachments:

Ordinance No. 2108 - A Bill for an Ordinance Amending Chapter 16.20 of the Maui County Code, Pertaining to the Plumbing Code
A Checklist of Water Conservation Ideas for Condominiums
A Checklist of Water Conservation Ideas for Commercial Buildings
Saving Water in the Yard-What and How to Plant in your Area

C:\WPdocs\Permcomm\Kahului Town Center EA SM1.wpd

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. George Y. Tengan
Director
Department of Water Supply
County of Maui
P.O. Box 1109
Wailuku, Hawaii 96793-6109

Dear Mr. Tengan:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated September 29, 2006, regarding the above-referenced project.

In response to your letter, we offer the following comments:

1. Source Availability and Consumption. The Applicant acknowledges that the Water Department will not issue reservations for future meters or temporary construction meters for Central Maui projects. The Applicant also notes from your letter that they may be required to develop or provide source to meet demand of the proposed project, depending on the phasing of the project. The Applicant will meet with the Water Department at a later date depending on project phasing.

2. System Infrastructure. The Applicant understands that the subject property is served by 12-inch waterlines and fire hydrants along all perimeters, as well as an on-site private fire system. The applicant will provide for water service and fire protection in accordance with system standards. Fire flow calculations will be provided during the building permit process.

LANDSCAPE ARCHITECTURE AND PLANNING
1955 MAIN STREET, SUITE 200 · WAILUKU, MAUI, HAWAII 96793-1706 · PHONE: 808-242-1955 · FAX: 808-242-1956

3. Conservation Measures. The Applicant proposes to implement the following water conservation measures into the project:

   - Installing water conserving, low flow fixtures.
   - Incorporating water efficient landscaping (xeriscaping) into the landscape design.
   - Eliminate single-pass cooling.
   - Maintaining fixtures to prevent leaks.
   - Utilizing properly planned and efficient irrigation systems, including using drip-irrigation instead of above-ground spray heads, where appropriate, and using rain sensor technology that shuts off the automatic irrigation system during rain events, preventing over-watering by automated systems.
   - Using non-invasive, climate-appropriate plants and climate-appropriate native plants, so as to reduce the amount of water required to maintain plant health.

4. Pollution Prevention. The project will implement Best Management Practices (BMPs) to eliminate pollutants from runoff and infiltration, as will be required by the grading permit. The issue of pollution prevention will be further addressed during the construction document phase of the project.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

'06 SEP 26 A11 :54

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

September 26, 2006

Ms. Kivette Caigoy, Environmental Planner
County of Maui – Department of Planning
250 South High Street
Wailuku, Maui, Hawaii, 96793

Dear Ms. Caigoy,

Subject: Kahului Town Center
Application for Special Management Area and HRS Chapter 343 Draft Environmental Assessment
Kahului, Maui, Hawaii
TMK: (2) 3-7-007: 005, 008, 009, 010, 027, and 050

Thank you for allowing us to comment on the Draft Environmental Assessment (EA) for the subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) will be requiring access and electrical easements for our facilities to serve the subject project site. We highly encourage the customer's electrical consultant to submit electrical drawings and a project time schedule as soon as practical so that service can be provided on a timely basis.

A project of this magnitude will have a substantial impact to our system and its capacity. MECO will need to perform a load study pending the receipt of the customer's demand load requirements which may include the need for facility upgrades and/or a new substation site.

In addition, we suggest that the developer and/or their consultant make contact with Joanne Ide of our Demand Side Management (DSM) group at 871-2397 to review potential energy conservation and efficiency opportunities for their project.

Should you have any other questions or concerns, please call Ray Okazaki at 871-2340.

Sincerely,

Neal Shinyama
Manager, Engineering

NS/ro:lk

cc: Joanne Ide – MECO DSM

CHRIS HART & PARTNERS, INC.

November 16, 2006

Mr. Neal Shinyama
Manager, Engineering
Maui Electric Company, Ltd.
210 West Kamehameha Avenue
P.O Box 398
Kahului, Hawaii 96733-6898

Dear Mr. Shinyama:

RE: Draft Environmental Assessment (EA) and Special Management Area (SMA) Permit for the Kahului Town Center project, located on property bounded by Kaahumanu Ave., Lono Ave., Puunene Ave., and Kamehameha Ave., Kahului, Maui, Hawaii; TMK Parcel Nos. (2) 3-7-007:005, 008, 009, 010, 027, and 050.

Thank you for your letter dated September 26, 2006 which states that MECO may require access and electrical easements for its facilities along the project site. Per your request, we will have the project's electrical consultant meet with your office as soon as is practical in order to verify the project's electrical demand and indicate the desired service location.

Thank you for your consideration of this application. Should you have any questions, please contact myself, or Mr. Jason Medema, Staff Planner, at 242-1955.

Sincerely yours,

Michael J. Summers

Michael J. Summers
Senior Planner

cc. Mr. Michael Foley, Director, Department of Planning
Mr. Darren Lake, A&B Properties
Project File

Appendix K

Sewer Impact Study

Kahului Town Center
Sewer Study

Technical Memorandum

August 2006

A&B Properties Inc.

Prepared by:

BROWN AND CALDWELL
119 Merchant Street
Suite 200
Honolulu, Hawaii 96813
(808) 523-8499

THOMAS TADASHI MYERS
LICENSED PROFESSIONAL ENGINEER
No. 9758-C
HAWAII, U.S.A.

This work was prepared by me
or under my supervision.

Thomas T. Myers

Thomas T. Myers, P. E.
Brown and Caldwell

BROWN AND CALDWELL

Technical Memorandum
Kahului Town Center Sewer Study

Prepared For: A&B Properties, Inc.
Prepared By: Brown and Caldwell
August 2006

1.0 INTRODUCTION

A&B Properties, Inc. (A&B) is proposing to expand the Kahului Town Center (KTC) with more retail, office, restaurant and residential spaces. Prior to development, the County of Maui Department of Public Works and Environmental Management, Wastewater Reclamation Division (County) requires a wastewater collection system hydraulic modeling study to ensure the existing system can accommodate the flows generated by the new development. A&B has contracted Brown and Caldwell to perform this study to investigate the impacts of the proposed KTC development on the wastewater collection system.

The KTC is located mauka of Kaahumanu Avenue, between Puunene Avenue and Lono Avenue, and consists of approximately 99,000 sq ft of retail space. In 2005, the KTC was damaged by fire. A&B plans to redevelop the area to include 118,543 sq ft of retail space, 152,823 sq ft of office space, 13,180 sq ft of space for banks, 12,335 sq ft of restaurant space and 442 residential units.

A hydraulic model representing the project area wastewater collection system was developed using XP Software's Stormwater and Wastewater Management Model (XP-SWMM) to simulate the impact the new development will have on the system capacity. This study has determined that the existing collection system infrastructure, from the project site to the Wailuku-Kahului Wastewater Reclamation Facility (WKWRF), has ample capacity to accommodate the additional flow expected to be generated from all four phases of the proposed KTC development.

2.0 HYDRAULIC MODEL

The goal of this modeling study was to determine if the existing wastewater collection system has the capacity to accept the increased flow expected from the future KTC development without causing surcharging or spills. To accomplish this, the following four model scenarios were developed:

- Current development condition, dry weather
- Current development condition, wet weather
- Future development condition, dry weather
- Future development condition, wet weather

The current development conditions were modeled to establish a baseline and to calibrate the model. During rainfall events a portion of the total rainfall can be expected to find its way into the wastewater collection system; therefore, the model was developed to simulate increased flow that is proportional to the amount and duration of rainfall. The current development condition dry and wet weather model output was compared to actual flow and rainfall data and, where necessary, the model input variables were adjusted until the simulation provided an output that was sufficiently close to the actual flow data.

The future development conditions are projections based on the increased flow from the new development during dry and wet weather conditions. Ideally, the wastewater collection system should be able to accommodate the worst case scenario, which is the future development, wet weather condition.

Flow scenarios were modeled using XP-SWMM, a dynamic hydraulic modeling software program. The hydraulic model was developed using existing information available at the time of the study. Available information included:

- County wastewater flow standards
- County land usage parcel map
- County field investigations
- County Geographical Information Systems (GIS) Sewer Data
- County A&B Pump Station Facility Capacity Evaluation (2003)
- County flow monitoring data (2006)
- Future development ultimate flow estimate provided by Sato & Associates, Inc. (145,000 gpd)

The model represents the 18- and 24-inch sewer main that runs along Vevau Street from the KTC site (near the upstream end) downstream to the Kahului Pump Station (PS). The modeled area includes 2 pump stations, 18 manholes and 20 sewer pipe segments. County GIS data was used to confirm the location, size and inverts of the sewer pipes and manholes depicted in the model. In the event of missing data, assumptions based on general design criteria of collections systems were used to fill in gaps. Field investigations performed by the County identified which lines shown in the County GIS database are currently in use or have been abandoned. See Appendix A for collection system maps.

The Kahului PS receives wastewater flows via the 24-inch sewer main, which collects flow from the KTC and surrounding areas including a combination of business, commercial, industrial and residential areas. The model's average dry weather flows were calculated using the County wastewater flow standards in conjunction with the County land use map (see Appendix B). The following tables summarize the County wastewater flow standards that were used in this analysis.

Type of Use	Unit	Contribution (gal/unit/day)
Commercial - Office	Employee	20
Commercial - Retail	Employee	15
Hotel, average with laundry	Room	300
Industry	Employee	25
Quasi-Public	Person	25
Residential	Home	350

Type	Population
Office Employees	1 per 200 square feet of floor area
Retail/Warehouse Employees	1 per 350 square feet of floor area
Storage/Industry Employees	1 per 500 square feet of floor area

There was limited detailed information available about the specifics of each individual parcel, therefore average flows were applied based on area and land use classification with the following assumptions:

- Single Family Areas: Each parcel has one home
- Multifamily Areas: Each acre has 3 homes
- Commercial, Industrial, Quasi Public Areas: Assume floor area is equal to 1/3 of total parcel area
- Commercial Areas: Composed of half office and half retail space
- Quasi Public Areas: Use Industrial flow generation estimates

The following table lists the total estimated dry weather flow for each input manhole (see Appendix C for calculations).

Input Manhole	Average Flow (GPD)
KA01XCO100	266,800
KAO100O800	109,800
KAO100O710	80,300
KAO100O610	8,600
KAO100O510	43,400
KAO1XBO100	80,400
KAO10AO100	36,900
A&B WWPS	220,000
KAO100O130	14,400
KAO1XAO100	24,900
KAO100O110	14,800

Actual wastewater flow rates are not constant throughout the day, but generally exhibit a relatively repetitive diurnal characteristic. To simulate these daily changes in flow rate, input hydrographs (time vs. flow graphs) were developed based on standard residential and industrial unit hydrographs. The calculated average daily flows were integrated into hydrographs to depict a time series flow which was used as input data for the model. See Appendix D for individual input hydrographs.

3.0 HYDRAULIC ANALYSIS

Flow and rainfall data collected by Fukunaga and Associates for the County was used to calibrate the model. The data was collected from February 2005 to June 2005, September 2005 and January 2006 for flow monitor KA-3. Data was recorded from flow monitor KA-1 during January 2005, March 2005 and September to December 2005. Flow monitors were located at MH#KA01OO0400 (Monitor KA-3) and MH#KA01OO0000 (KA-1) and rain gage data from the Maui Zoological and Botanical Garden rain gage. The largest storm event captured during the flow monitoring was approximately an 8-hour 4-inch rainfall event (0.50 inches/hour). Using the 1962 Rainfall Frequency Atlas of the Hawaiian Islands, this correlates relatively closely with a historical 2-year 6-hour storm event (0.40 inches/hour). See Appendix E for flow monitoring and rainfall data.

Based on the County standard unit flows, the model's current condition dry weather results were slightly higher than actual measured flows and therefore considered adequate for the study. Where the hydraulic model estimated that 0.8 mgd passes through the 24-inch sewer during peak dry weather flows, the flow monitoring results showed approximately 0.6 mgd passes through the pipe during peak dry weather flows.

For wet weather flow estimation, the County standards suggest using the Babbitt method to estimate peak flow. This method resulted in an estimated peaking factor between 3.0 to 5.0, depending upon the dry weather flow. On the other hand, flow monitoring data showed there is little if any change in flow due to infiltration or inflow generated by rainfall events. Based on available flow monitoring data, the peaking factor is estimated to be between 1 and approximately 1.2. Therefore, the County peaking method was not used to simulate increased wet weather flow. Instead a more realistic, but still conservative peaking factor of 2.0 was used to simulate wet weather impact on the modeled flow.

The estimated ultimate flow generated by the KTC upgrades was provided by Sato & Associates, Inc. Upon completion of all four phases of the project the average daily flow was expected to be 145,000 gpd. This estimate was compared to the expected flow of 133,800 gpd based on the County standard unit flows and the proposed areas and type of use. The Sato & Associates Inc. estimate of 145,000 gpd was more conservative and therefore used in the model.

3.1 Capacity of Collection System

The collection system capacity assessment assumes that all of the flow from the KTC will be discharged to the most upstream manhole in the project area (KA01OO0700). While this may not be the final design, it is probably the most conservative because the manhole is located on the 18-inch gravity sewer, two pipe reaches upstream of the transition to the 24-inch gravity sewer.

Assuming that the maximum capacity of the gravity collection system is defined as the flow rate at which any pipe flows 100% full (depth of water in pipe is equal to pipe diameter), the model shows the limiting point would be the downstream end of the 18-inch pipe at the transition to the 24-inch pipe (manhole KA01OO0500) as this is where the flow is the deepest relative to the pipe diameter.

Under existing conditions the hydraulic model shows the downstream end of the 18-inch gravity sewer manhole (KA01OO0500) flows at a depth of approximately 44% of the total pipe diameter during peak dry weather flow periods and 58% of the total pipe diameter during peak wet weather periods. The downstream end of the 24-inch gravity sewer (manhole KA01OO0000) is predicted to flow at approximately 26% of the total pipe diameter during peak dry weather flow periods and 31% of the total pipe diameter during peak wet weather periods.

The hydraulic model predicts that even under the worst case scenario, development of all four phases of the KTC (which adds an estimated 145,000 gpd average flow) and wet weather conditions, the 18-inch gravity sewer would flow at only about 64% of the total pipe diameter. See Appendix F for a figure showing the hydraulic model results including the future condition peak wet weather flow maximum hydraulic grade line and the full XP-SWMM results report.

3.2 Capacity of Kahului Pumping Station

The Kahului PS is the terminal downstream point in the model. This pump station transmits the flow from the modeled 18- and 24-inch gravity sewer directly to the WKWRF for treatment and disposal. The percentage of the available pump station capacity usage for both measured and modeled scenarios is summarized below. In all cases the pump station has ample capacity to transmit all flow to the WKWRF.

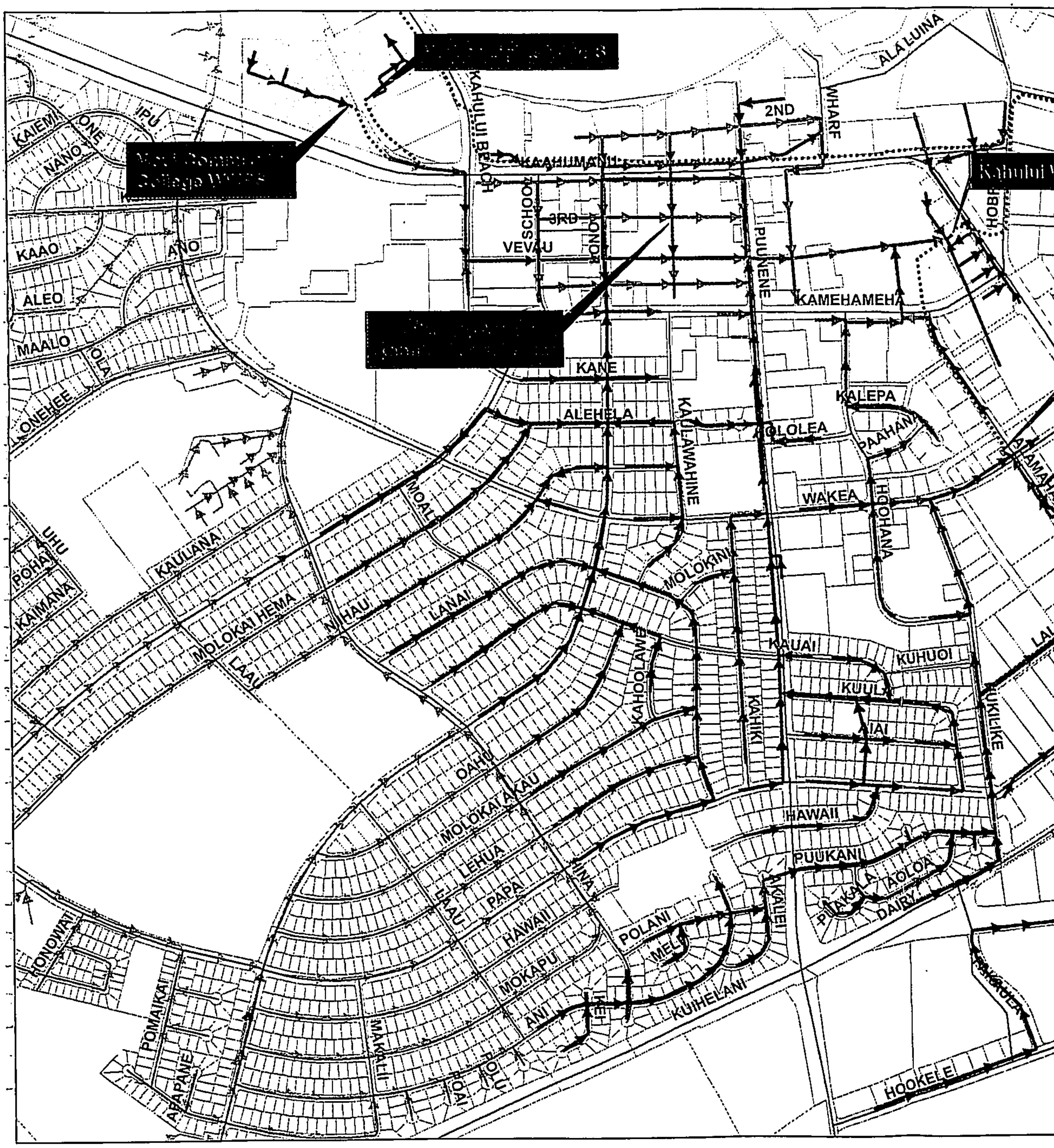
Design Capacity of existing Kahului PS – 6.0 mgd

Measured (Existing Conditions) Average Dry Weather Flow – 0.8 mgd
Measured (Existing Conditions) Peak Wet Weather Flow – 1.7 mgd
Measured (Existing Conditions) Percent of Capacity Used – 28 %

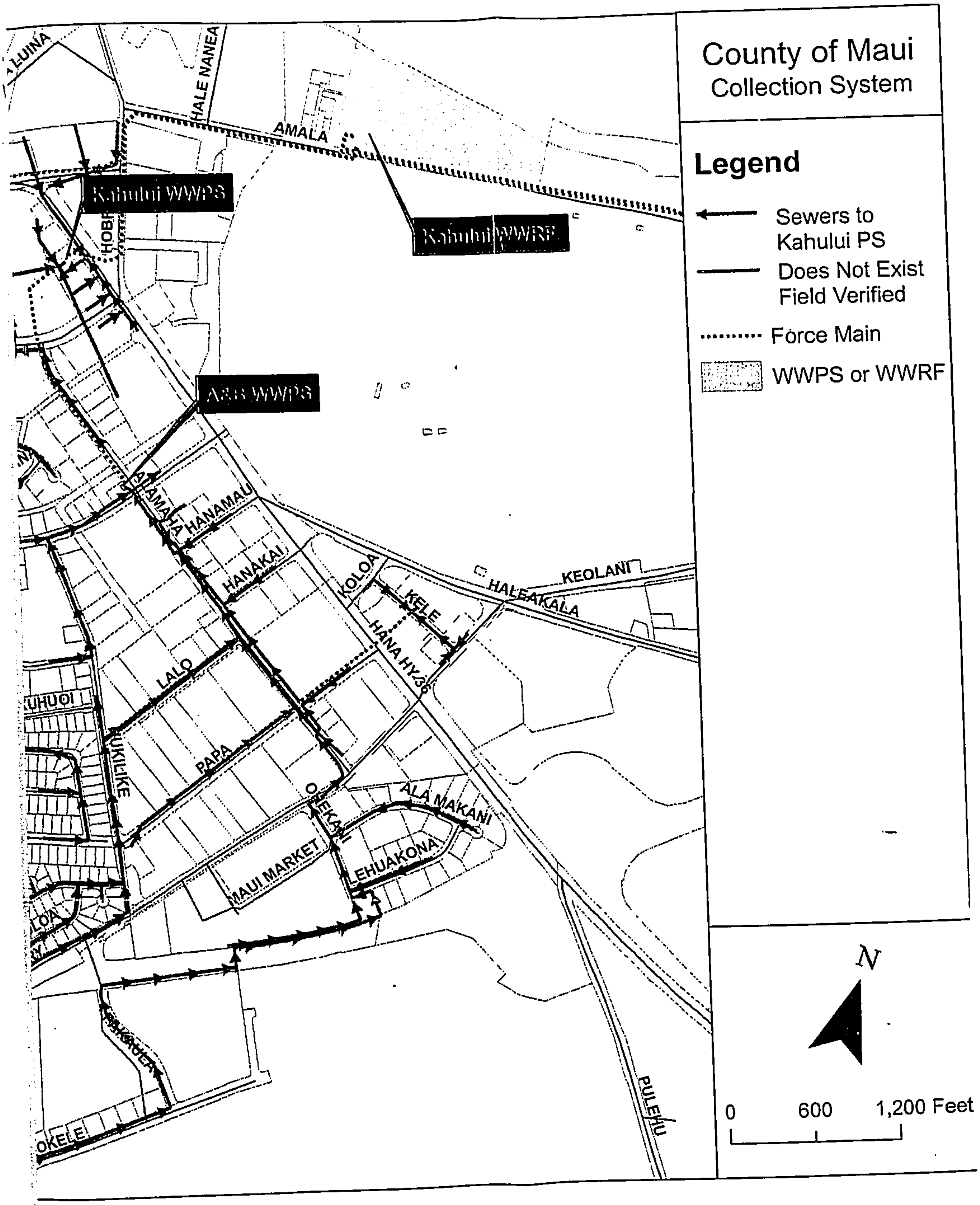
Modeled (Existing Conditions) Average Dry Weather Flow – 0.9 mgd
Modeled (Existing Conditions) Peak Wet Weather Flow – 2.3 mgd
Modeled (Existing Conditions) % of Capacity Used – 38%

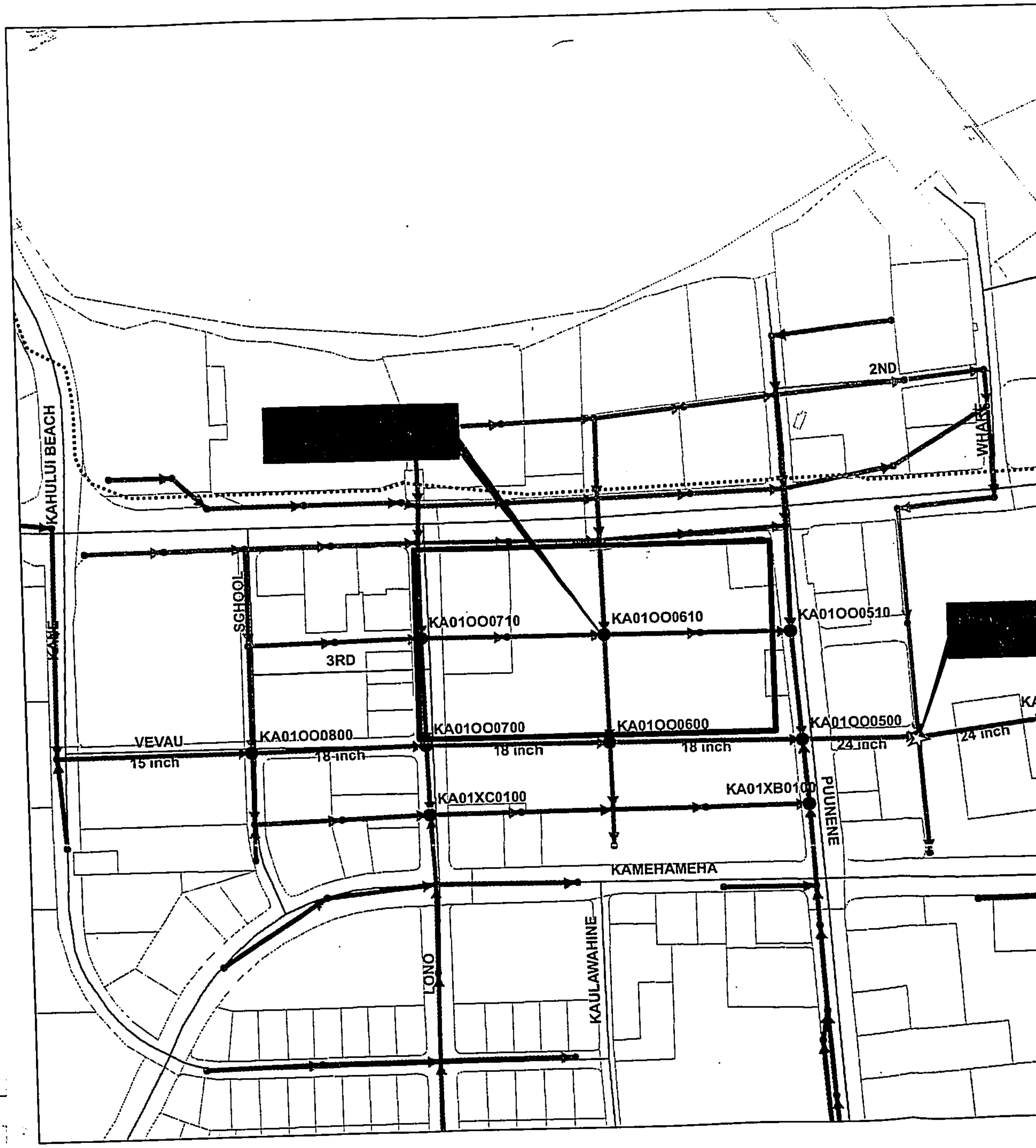
Modeled (Future Conditions) Average Dry Weather Flow – 0.95 mgd
Modeled (Future Conditions) Peak Wet Weather Flow – 2.8 mgd
Modeled (Future Conditions) % of Capacity Used – 47%

Appendix A
Collection System Maps

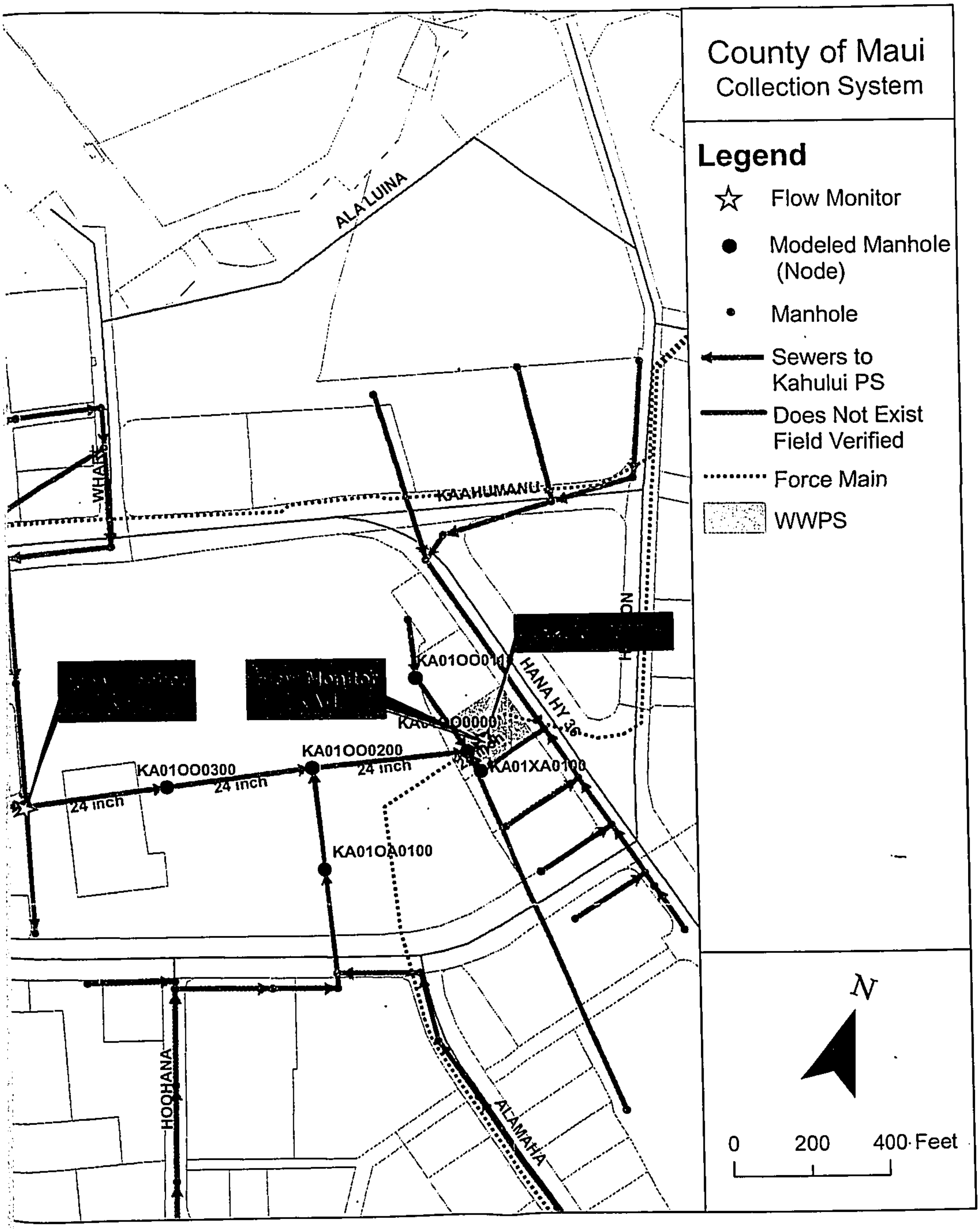


Kahului W
ALA LUINA
2ND
WHARF
KAHULUI BEACH
KAAHUMANU
SCHOOL
3RD
VEVAU
ONO
PUUNENE
KAMEHAMEHA
KAIEMI
ONE
IPU
NANO
KAAO
ANO
ALEO
MAALO
OLA
ONEHEE
KANE
ALEHELA
KAULAWAHINE
KALEPA
OLOLEA
PAAHANA
WAKEA
HOOHANA
MOALI
KAULIANA
UHU
POHA
KAIMANA
MOLOKAI HEMA
NIIHAU
LANAI
LAAU
MOLOKINI
KAUAI
KUHUOI
KAHOOLAWE
KAHIKI
KUULA
OAHU
MOLOKAI A KAU
HAWAII
LEHUA
PAPA
HINA
PUUKANI
AOLOA
DAIRY
KALEI
POLANI
MELE
HAWAII
MOKAPU
ANI
KUIHELANI
POMAIKAI
APAPANE
MAKALII
POLU
OAI
HOOKELE


County of Maui
Collection System
Legend
Sewers to Kahului PS
Does Not Exist Field Verified
Force Main
WWPS or WWRF
N
0
600
1,200 Feet
Kahului WWPS
Kahului WWRF
A&B WWPS
LUINA
HALE NANEA
AMALA
HOBR
AMAHA
HANAMAU
HANAKAI
KOLOA
KELE
KEOLANI
HALEAKALA
HANA HY 36
LALO
PAPA
UKILIKE
KUHUOI
OHEKANI
ALA MAKANI
LEHUAKONA
MAUI MARKET
PULEHU
OKELE



2ND
WHARF
KAHULUI BEACH
SCHOOL
KANE
3RD
KA01OO0710
KA01OO0610
KA01OO0510
VEVAU
15 inch
KA01OO0800
18 inch
KA01OO0700
18 inch
KA01OO0600
18 inch
KA01OO0500
24 inch
24 inch
KA01XC0100
KA01XB0100
PUUNENE
KAMEHAMEHA
LONO
KAULAWAHINE


County of Maui
Collection System
Legend
Flow Monitor
Modeled Manhole (Node)
Manhole
Sewers to Kahului PS
Does Not Exist Field Verified
Force Main
WWPS
N
0
200
400 Feet
ALA LUINA
WHARF
KAAHUMANU
HANA HY 36
ALAMAHA
HOOHANA
[redacted]
[redacted]
[redacted]
KA01OO0300
KA01OO0200
KA01XA0100
KA01OA0100
24 inch
24 inch
24 inch

Appendix B
COM Wastewater Flow Standards and Land Use Map

County of Maui
Wastewater Reclamation Division

2200 Main Street Suite 610 • Wailuku, HI 96793 • (808) 270-7417 • 270-7425 fax

Wastewater Flow Standards

The following wastewater flow contributions are to be utilized for projecting wastewater flows for the following types of uses, unless other supporting data is provided to show differently.

Type of use	Unit	Contribution (Gal/Unit/Day)
Apartment/Condo	Unit	255
Bar	Seat	15
Church, large	Seat	6
Church, small	Seat	4
Cottage or Ohana (600 S.F. max)	Unit	180
Day-care Center	Child	10
Factory	Employee	30
Golf Clubhouse	Golf Rounds	25
Hotel, resort with laundry	Room	350
Hotel, average with laundry	Room	300
Hotel, average without laundry	Room	250
Hospital	Bed	200
Industrial Shop	Employee	25
Laundry (coin operated)	Machine	300
Office	Employee	20
Residence, subdivision	Home	350
Restaurant, average	Seat	80
Restaurant, fast food	Seat	100
Rest Home	Patient	100
Retail Store	Employee	15
School, elementary	Student	15
School, high	Student	25
Storage, w/ offices	Employee	15
Storage w/ offices and showers	Employee	30
Store Customer bathroom usage	Use	5
Theater	Seat	5

The following standards will be used as necessary to compute the number of units required to make wastewater calculations:

Residential Occupancy	4 persons per unit
Apartment/Condo Occupancy	2.5 persons per unit
Hotel Occupancy	2.25 persons per unit
Hotel Employees	1 per hotel room
Office Employees	1 per 200 square feet of floor area
Retail Warehouse Employees	1 per 350 square feet of floor area
Storage/ Industrial Employees	1 per 500 square feet of floor area

Wastewater Flow Standards
County of Maui

Average Wastewater Flow: The average wastewater flow is the sum of the applicable wastewater flows listed above.

Maximum Wastewater Flow: The maximum wastewater flow is obtained by multiplying the average flow by a flow factor. The flow factor shall be obtained utilizing the Babbit formula or other rationale method.

Dry Weather Infiltration/Inflow: The following rates shall be used in the design of wastewater transmission lines:

a. 35 gpcd* - Wastewater lines laid below the normal ground water table.

b. 5 gpcd - Wastewater lines laid above the normal ground water table.

* gpcd = Gallons per Capita Day

Wet Weather Infiltration/Inflow: The following rates shall be used in the design of wastewater transmission lines:

a 2,750 gad* - Wastewater lines laid below the normal ground water table.

b. 1,250 gad - Wastewater lines laid above the normal ground water table.

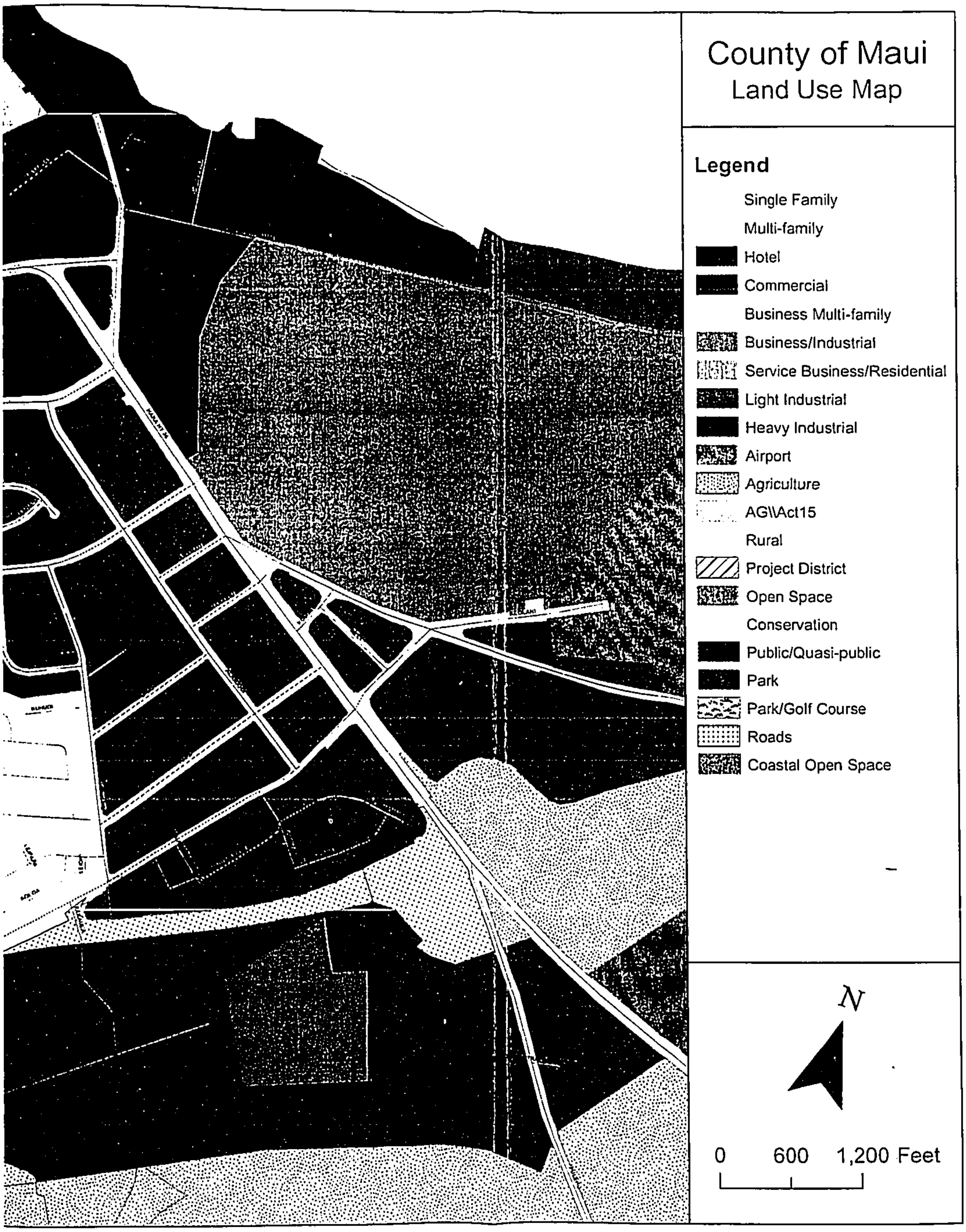
* gad + Gallons per Acre per Day

Design Average Flow: The design average flow is the sum of the average wastewater flow and the applicable dry weather infiltration/inflow rate.

Design Maximum Flow: The design maximum flow is the sum of the maximum flow and the applicable dry weather infiltration/inflow rate.

Design Peak Flow: The design peak flow of wastewater is the sum of design maximum flow and the wet weather infiltration/inflow


KAAHUMANU

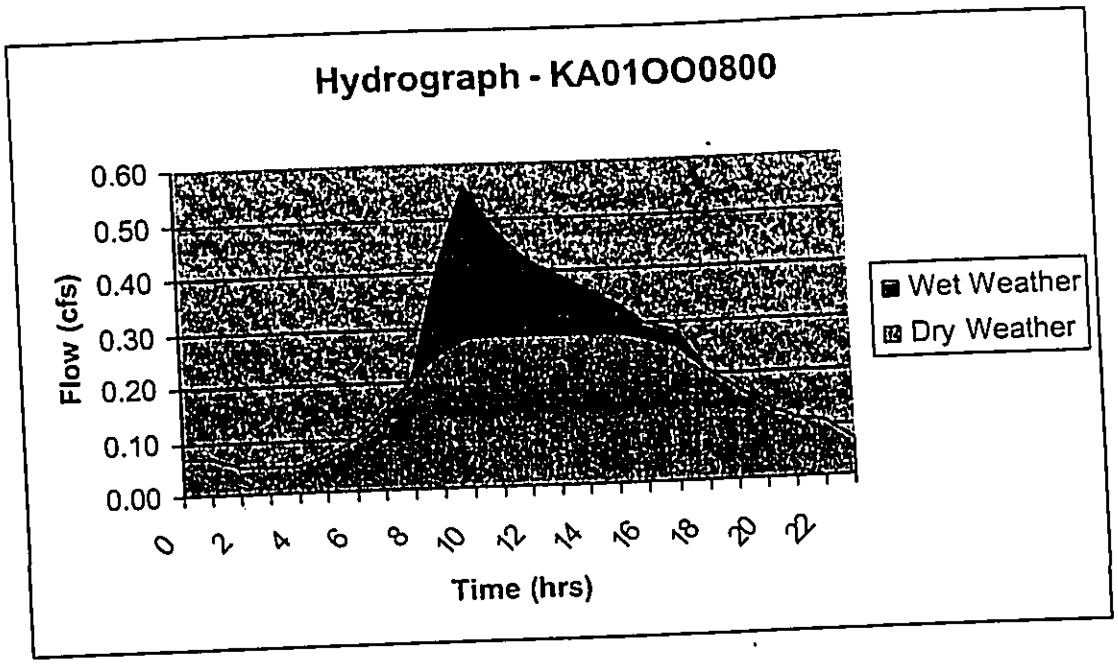

County of Maui
Land Use Map
Legend
Single Family
Multi-family
Hotel
Commercial
Business Multi-family
Business/Industrial
Service Business/Residential
Light Industrial
Heavy Industrial
Airport
Agriculture
AG\\Act15
Rural
Project District
Open Space
Conservation
Public/Quasi-public
Park
Park/Golf Course
Roads
Coastal Open Space
N
0 600 1,200 Feet

Appendix C
Flow Calculations

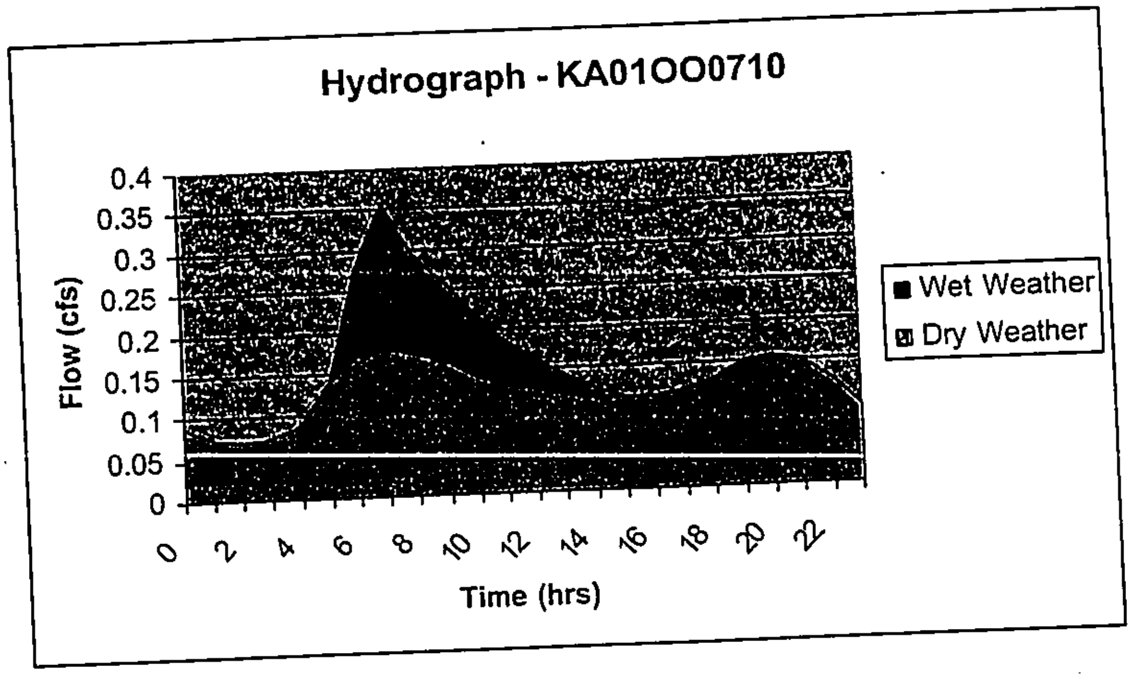
	Flows to SMH	Acreage of Property Type		COM (GPD)	COM 1 acre = 15 people Dry I/I 525 gad for below normal GWT	Average Flow (GPD)	Sum Flow (GPD)	Average (CFS)
KAO100O700								
	KA01XCO100							
		SF Homes - 350 homes	132	184100	69300	253400		0.3921
		Commercial	3	3111	1575	4686		0.0073
		Quasi-Public	7	5082	3675	8757		0.0136
							266843	0.4129
	KAO100O800							
		SF Homes - 1 home	1	350	525	875		0.0014
		MF Homes-assume 25 homes	7.5	8750	3938	12688		0.0196
		Commercial	30	31114	15750	46864		0.0725
		Quasi-Public	17	12342	8925	21267		0.0329
		Heavy Industry	22.5	16335	11813	28148		0.0436
							109841	0.1700
	KAO100O710							
		Commercial	6	6223	3150	9373		0.0145
		Hotels (Not Labeled) - 200 Rms	9	60000	4725	64725		0.1002
		Commercial (Not Labeled)	4	4149	2100	6249		0.0097
							80346	0.1243
KAO100O600								
	KAO100O610							
		Commercial (Not Labeled)	5.5	5704	2888	8592	8592	0.0133
KAO100O500								
	KAO100O510							
		Commercial	15	15557	7875	23432		0.0363
		Industrial (Not Labeled)	16	11616	8400	20016		0.0310
							43448	0.0672
	KAO1XBO100	SF Homes - 254 homes	55	13970	28875	42845		0.0663
		Commercial	6	6223	3150	9373		0.0145
		Light Industry	3	2178	1575	3753		0.0058
		Quasi-Public	17	12342	8925	21267		0.0329
		Park	6	0	3150	3150		0.0049
							80388	0.1244
KAO100O400								
KAO100O300								
KAO100O200								
	KAO10AO100	Commercial	16	16594	8400	24994		0.0387
		Light Industry	9.5	6897	4988	11885		0.0184
							36879	0.0571
KAO100O100								
	A&B WWPS							
		Known Flows	319.5	220000	factored	220000	220000	0.3404
	KAO100O130							
		Light Industry	11.5	8349	6038	14387	14387	0.0223
	KAO1XAO100							
		Light Industry	4	2904	2100	5004		0.0077

		Industrial (not labeled)	14	10164	7350	17514		0.0271
		Commercial	1.5	1556	788	2343		0.0036
							24861	0.0385
	KAO100O110							
		Commercial	9.5	9853	4988	14840	14840	0.0230
Kahului PS								
		Total Area	1067.5					
		Total Flow to Kahului PS					900426	1.39

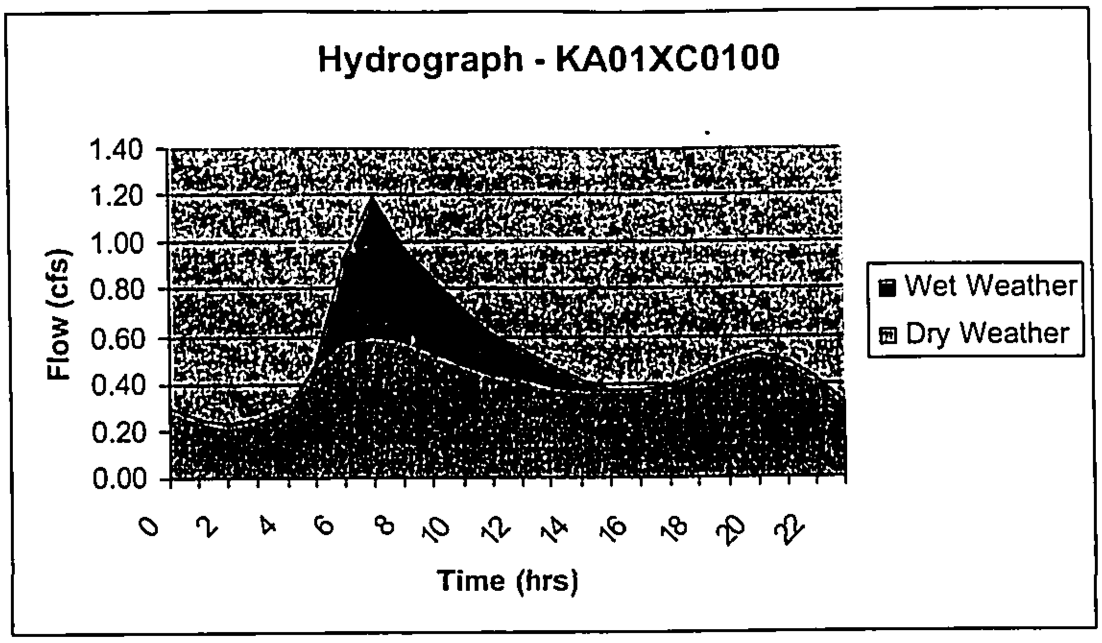
Appendix D
Input Hydrographs

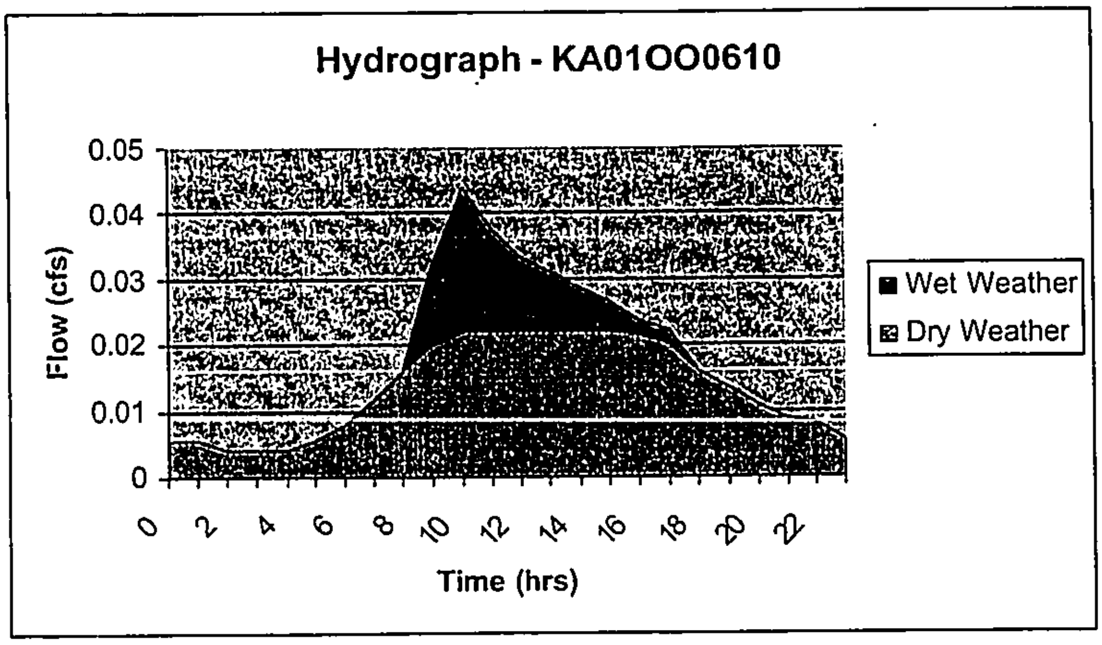


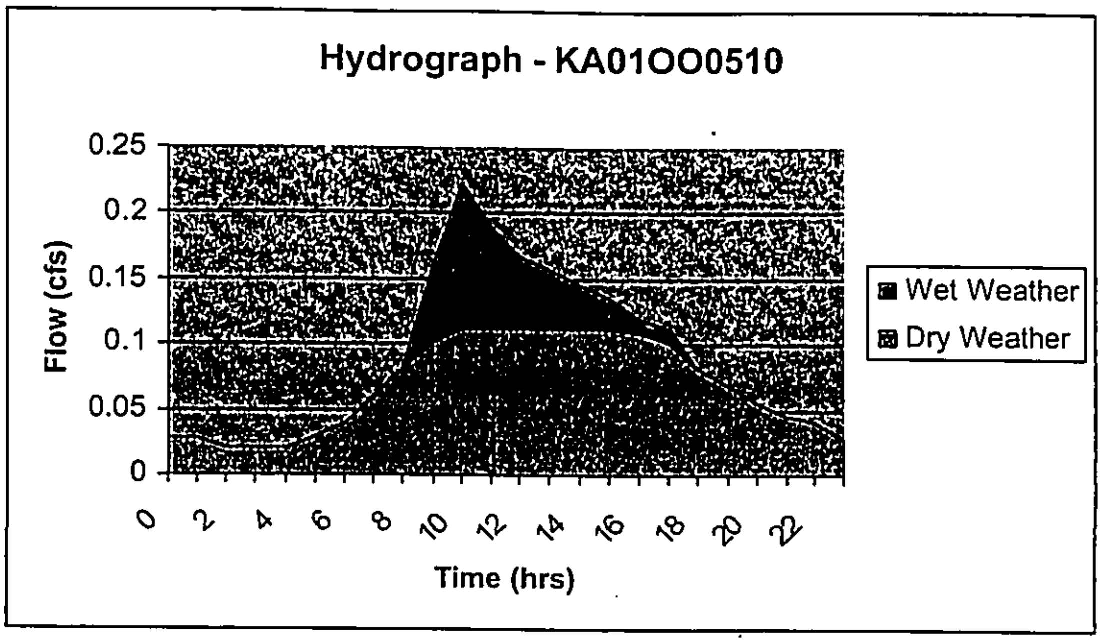
Hydrograph - KA01OO0800
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)
Wet Weather
Dry Weather



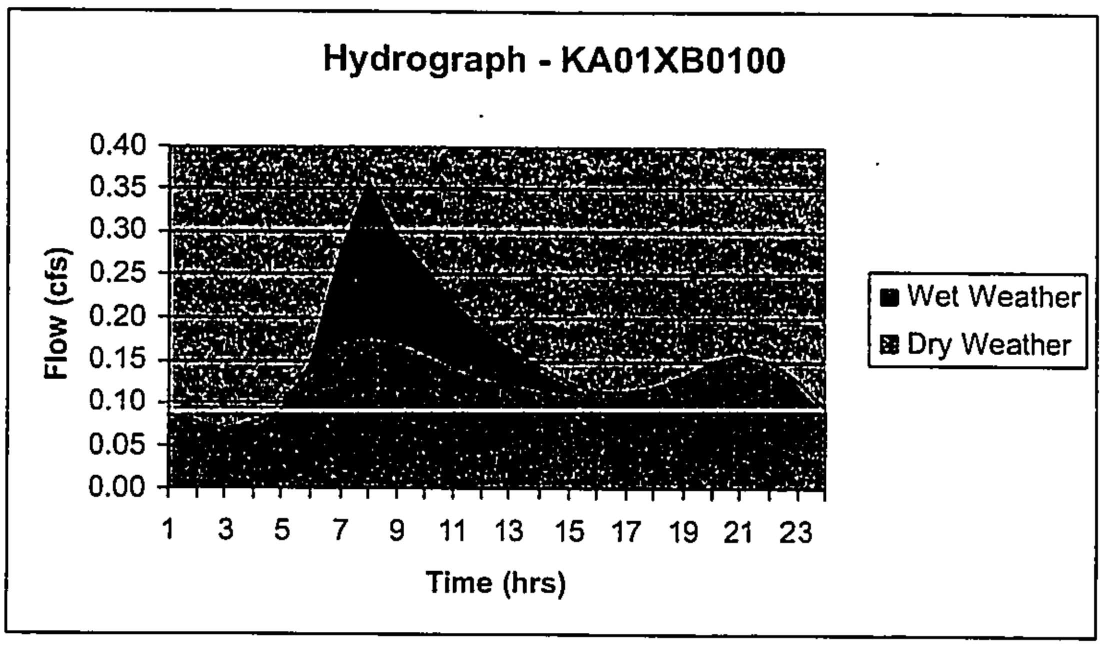
Hydrograph - KA01OO0710
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)
Wet Weather
Dry Weather


Hydrograph - KA01XC0100
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)
Wet Weather
Dry Weather

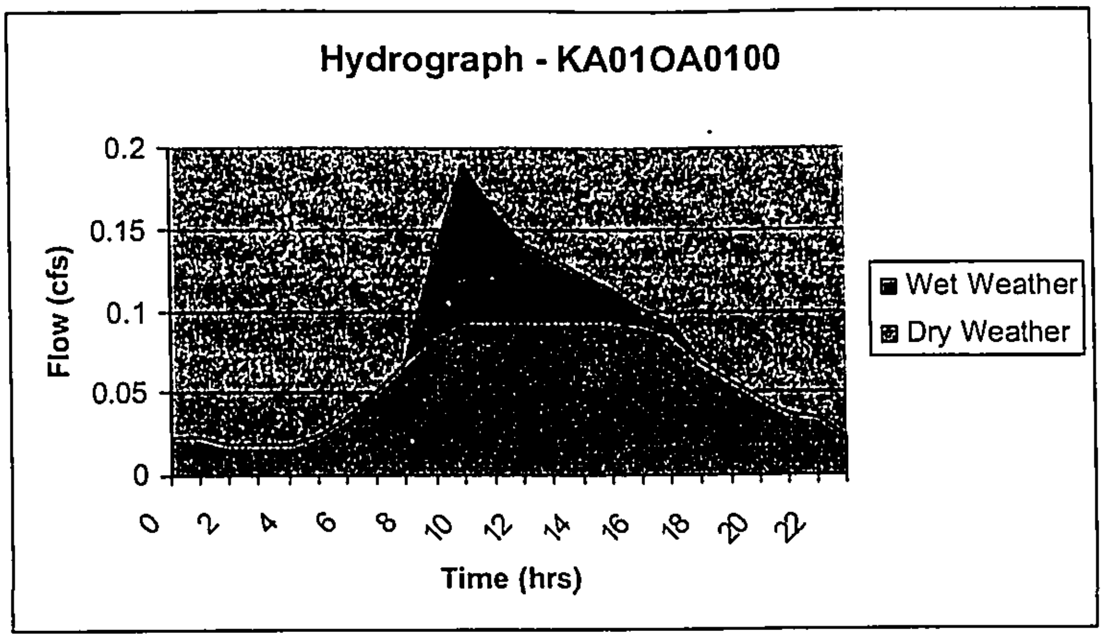

Hydrograph - KA01OO0610
0.05
0.04
0.03
0.02
0.01
0
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)
Wet Weather
Dry Weather



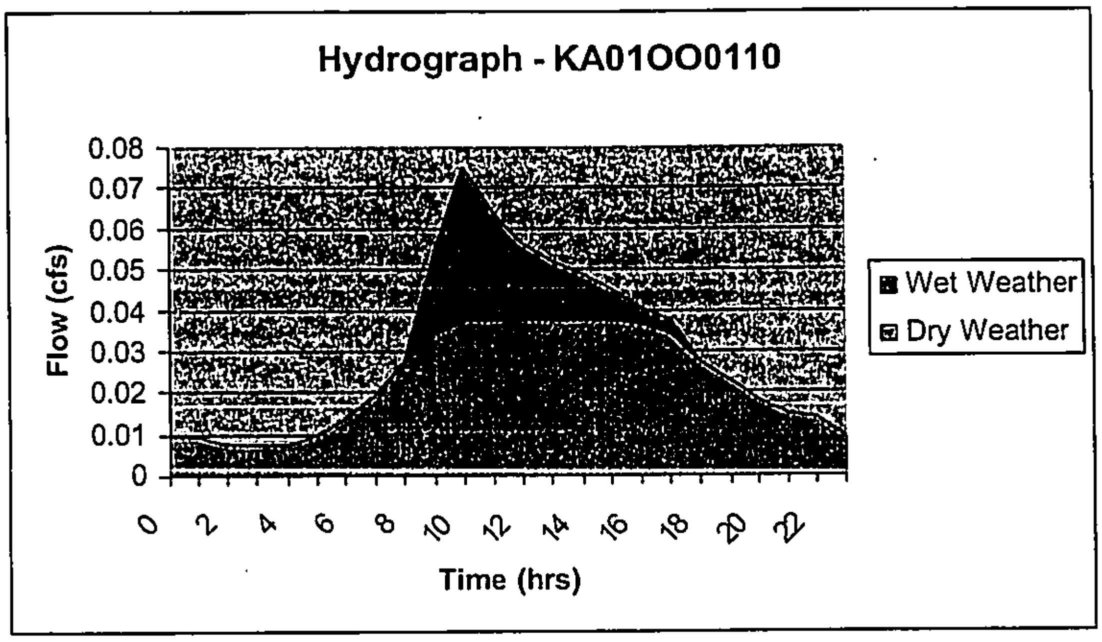
Hydrograph - KA01OO0510
0.25
0.2
0.15
0.1
0.05
0
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)
Wet Weather
Dry Weather



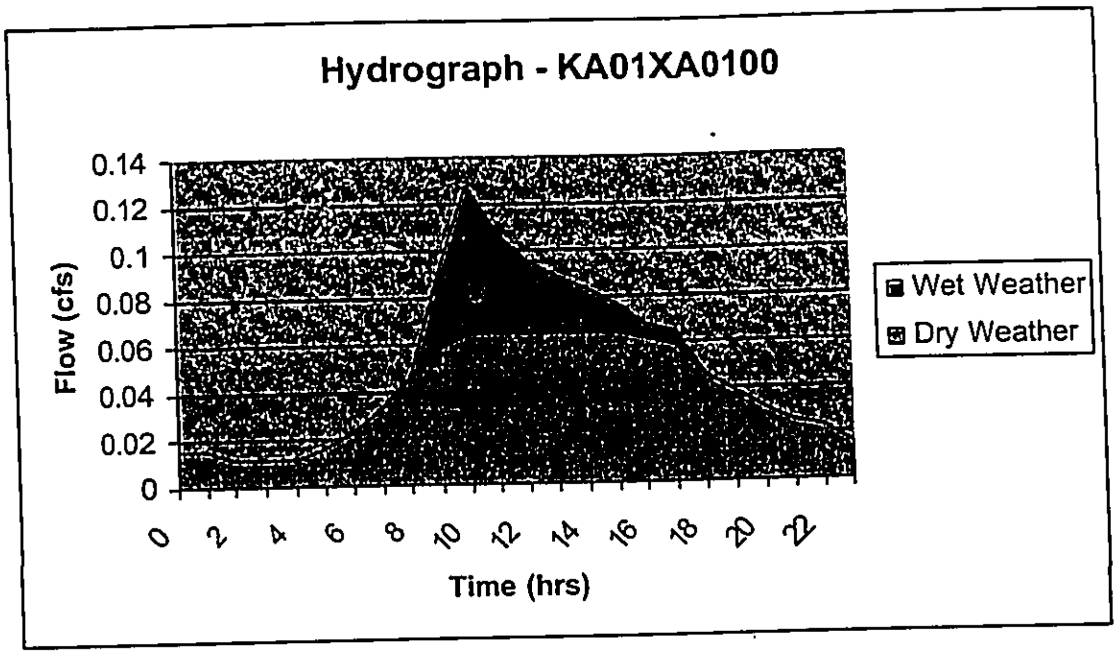
Hydrograph - KA01XB0100
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Flow (cfs)
1
3
5
7
9
11
13
15
17
19
21
23
Time (hrs)
Wet Weather
Dry Weather



Hydrograph - KA01OA0100
0.2
0.15
0.1
0.05
0
Flow (cfs)
Wet Weather
Dry Weather
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)



Hydrograph - KA01OO0110
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Flow (cfs)
Wet Weather
Dry Weather
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)



Hydrograph - KA01XA0100
Flow (cfs)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
2
4
6
8
10
12
14
16
18
20
22
Time (hrs)
Wet Weather
Dry Weather

Appendix E
Flow Monitoring and Rainfall Data

Appendix A Flow Monitor Location

No.	Monitor ID	SMH[1]	Pipe Size[2] (in)	Elevation[2] (ft)	Depth[2] (ft)	Acreage	Approximate Location	Note
1	KI-4	KI13XB0400	27	-3.440	11	549	South Kihei Rd near Kaonoulu St	Upstream KI13XB0500
2	KI-3	KI12XA0100	21	-4.560	10	926	South Kihei Rd near Kauhaa St	Upstream KI12XA0200
3	KI-2	KI10OO0000	36	-6.540	13	3134	South Kihei Rd near Halelani Pl	In front of Kihei 6 WWPS wetwell at influent line
4	KI-5	KI20OO0000	30	-1.250	15	1500	South Kihei Rd near Kealii Ala Nui Pl	In front of Kihei 7 WWPS wetwell at influent line
5	KI-6	KI21OO0000	30	0.000	18	1042	South Kihei Rd near Kamala Pl	In front of Kihei 8 WWPS wetwell at influent line
6	KI-1	KI23OO0120	21	-2.320	15	71	Grand Wailea Hotel near firepit	Installed at outgoing line
7	LA-5	LA03OO0200	30	-4.350	11	1118	Lahaina 3 WWPS	In front of WWPS and installed at influent line
8	LA-2	LA23OO0100	24	-6.000	15	458	Napili 3 WWPS	In front of WWPS and installed at influent line
9	LA-1	LA21OO0000	30	-6.850	13	857	Napili 1 WWPS	In front of WWPS wetwell at influent line
10	LA-4	LA01OO0200	36	4.890	14	1595	Honoapiilani Hwy and Halawai Dr	Near Lahaina 1 WWPS
11	LA-8	LA02OO0120A	12	12.000	5	133	By Lahaina 2 WWPS	Installed in the line between LA02OO0120 and 0130
12	LA-6	LA03XB1500	21	11.300	8	381	Honoapiilani Hwy near Kenui St	Upstream LA03XB1600
13	LA-7	LA04OO0200	18	-3.830	11	484	Ala Moana St near Front St	In front of Lahaina 4 WWPS at influent line
14	LA-3	LA05OO0200	10	-3.400	8	151	Lahaina 5 WWPS	In front of WWPS and installed at outgoing line
15	KA-2	KA31XA0200	18	-5.240	12	374	Alakapa Pl & Laulea Pl	Upstream KA31XA0300
16	KA-1	KA01OO0000	24	-7.820	13	1025	Kahului WWPS	In front of WWPS wetwell at influent line
17	KA-3	KA01OO0400	24	-6.000	12	503	Maui Mall	Upstream KA01OO0500
18	KA-9	KA20XA3600	18	28.120	6	568	Hina Av and Keulana St	Upstream KA20XA3700
~~19~~	~~KA-5~~	~~KA20XA2100~~	~~30~~	~~10.710~~	~~7~~	~~996~~	~~S. Wakea Av and Kaahumanu Av near MCC~~	~~Upstream KA20XA2200~~
20	KA-4	KA20XA0700	30	3.690	5	1511	Near Kanaloa Av and Kahului Beach Rd	Upstream KA20XA0800
21	KA-10	KA21XB0100	12	29.000	6	128	Kalakaua St near Kuhio Pl	Upstream KA21XB0200
22	KA-6	KA20OO0100	21	-4.430	13	1709	Wailuku WWPS	Upstream KA20OO0200
23	KA-7	KA20XG2100	12	145.000	5	827	Lower Main St and Ainahou Pl	Upstream KA20XG2200
24	KA-8	KA20XG4300	18	223.860	11	443	Waiale Rd near prison	Upstream KA20XG4400
25	LA-8A	LA11OO0200	21	-1.39	9	133.00	Kaanapali Pkwy near Kekaa Dr	21" line from the south by Kaanapali WWPS
26	KI-6A	KI21XA0200	30	0.60	10	934.00	S Kihei Rd and Kilihana Rd	in the outgoing line
27	KI-6B	KI21XA0500	30	6.16	20	788.00	S Kihei Rd btwn Waika St and Okolani Dr	In the outgoing line
30	KI-1A	KI23OO0110	24	-2.56	23	396.00	Near Kihei 10 WWPS	Installed at outgoing line
31	KI-1B	KI23XC0100	18	8.50	22	325.00	Four Seasons Resort	Upstream KI23XC0200
32	KA-14	KA21XA0200	12	19.60	6	310.00	Waiehu Beach Road turning into Hawaiian H	Upstream KA21XA0300
33	LA-3A	LA04XB0300	18	-2.24	9	349.00	1113 Front Street near Kenui Street	Upstream LA04XB0400
28	Kahului-RG1						Maui Nui Botanical Gardens	on roof of equipment shed
29	Kihei-RG1						Kihei Wastewater Reclamation Facility	
30	Lahaina-RG1						Lahaina Wastewater Reclamation Facility	on roof of blower bldg

[1] Refer to the County GIS maps for manhole location
[2] Field verify

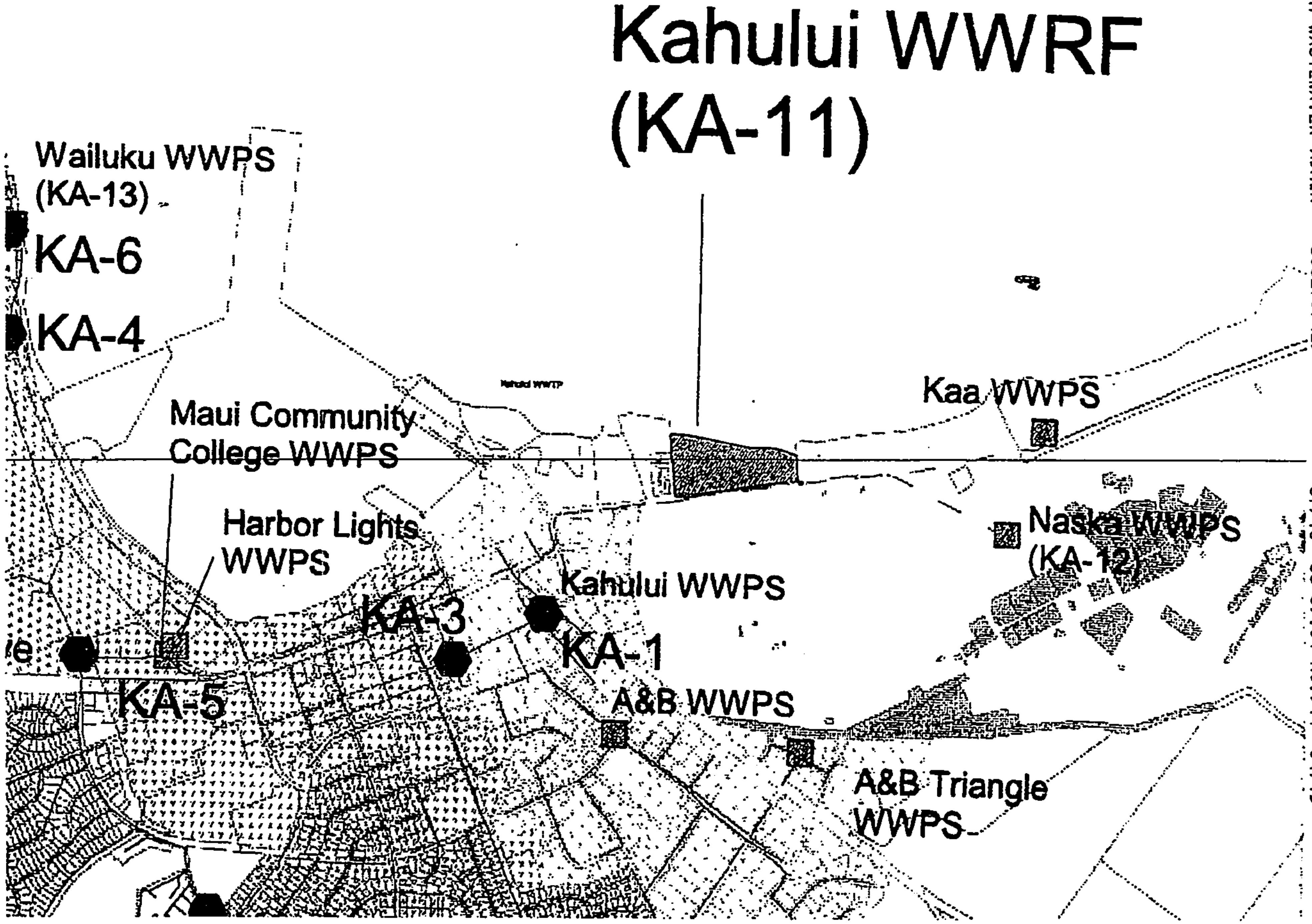

Hobron Ave.
Kahului WWPS
KA01OO0000
Alenaha Pl.
Kaahumanu Ave.
Wharf St.
West Kamehameha Ave.
KA01OO0400
KA01OO0500
KA01OO0600
KA01OO0700
24
18
Ho'ohana St.
Pl.
Kalipa
Paahana
St.
Holo Lea St.
Puunene Ave.
South
St.
Lono
Ave.
School Ave.
Kane St.
Kaha
West

MAN HOLE #5

COM WASTEWATER ADMIN 8082707425 07/10 '06 09:04 NO.914 04/15

DOCUMENT CAPTURED AS RECEIVED

Flow monitor locations



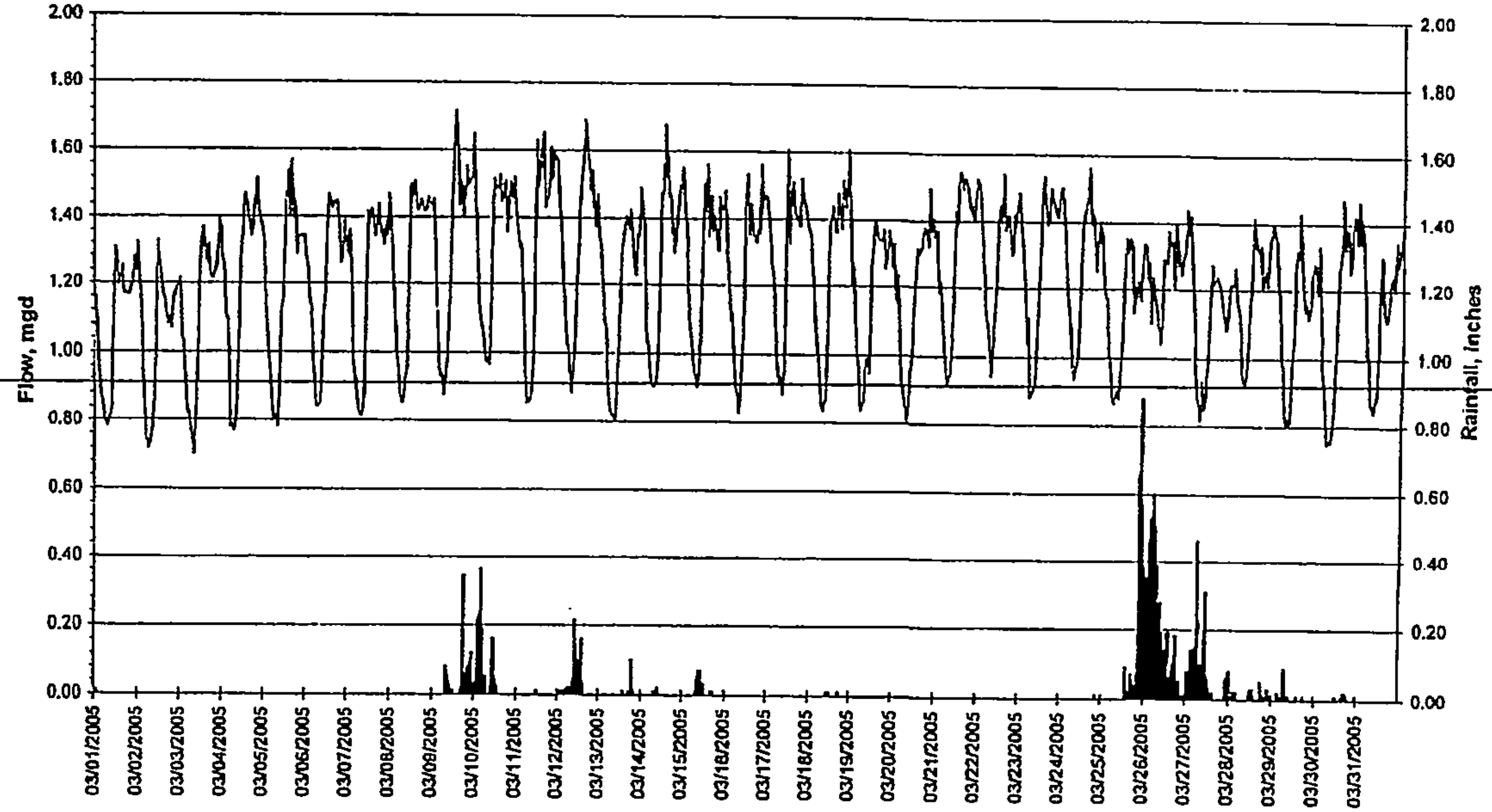
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for March 2005
Flow Monitor: KA-1; MH ID: KA01OO0000; Location: Kahului WWPS
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 13.59 in
Measured Qavgmin = 0.8471 mgd
Measured Qavgmax = 1.5057 mgd

Measured Qmin = 0.702 mgd
Measured Qavg = 1.2211 mgd
Measured Qmax = 1.717 mgd

Measured Dmin = 5.691 in (24% full)
Measured Davg = 7.807 in (33% full)
Measured Dmax = 10.077 in (42% full)

Design Qcap = 23.53 mgd
Pipe Size = 24 in
Tributary Area = 1025 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-1_Mar05.xls 7/10/2006

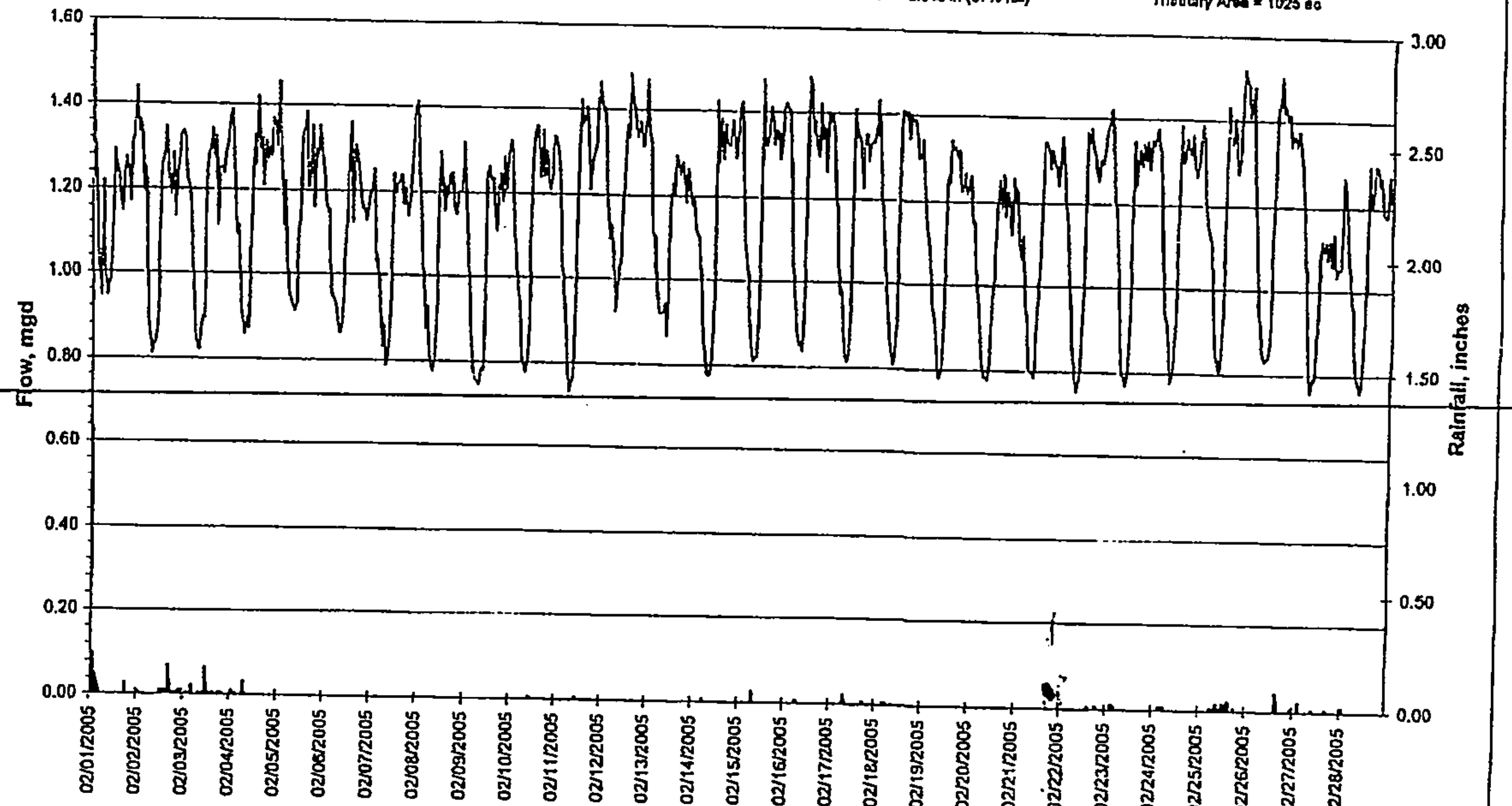
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for February 2005
Flow Monitor: KA-1; MH ID: KA01OO0000; Location: Kahului WWPS
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 2.9 in
Measured Qavgmin = 0.8055 mgd
Measured Qavgmax = 1.3995 mgd

Measured Qmin = 0.731 mgd
Measured Qavg = 1.1535 mgd
Measured Qmax = 1.522 mgd

Measured Dmin = 8.077 in (25% full)
Measured Davg = 8.358 in (35% full)
Measured Dmax = 8.843 in (37% full)

Design Qcap = 23.53 mgd
Pipe Size = 24 in
Tributary Area = 1025 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-1_Feb05.xls 7/10/2006

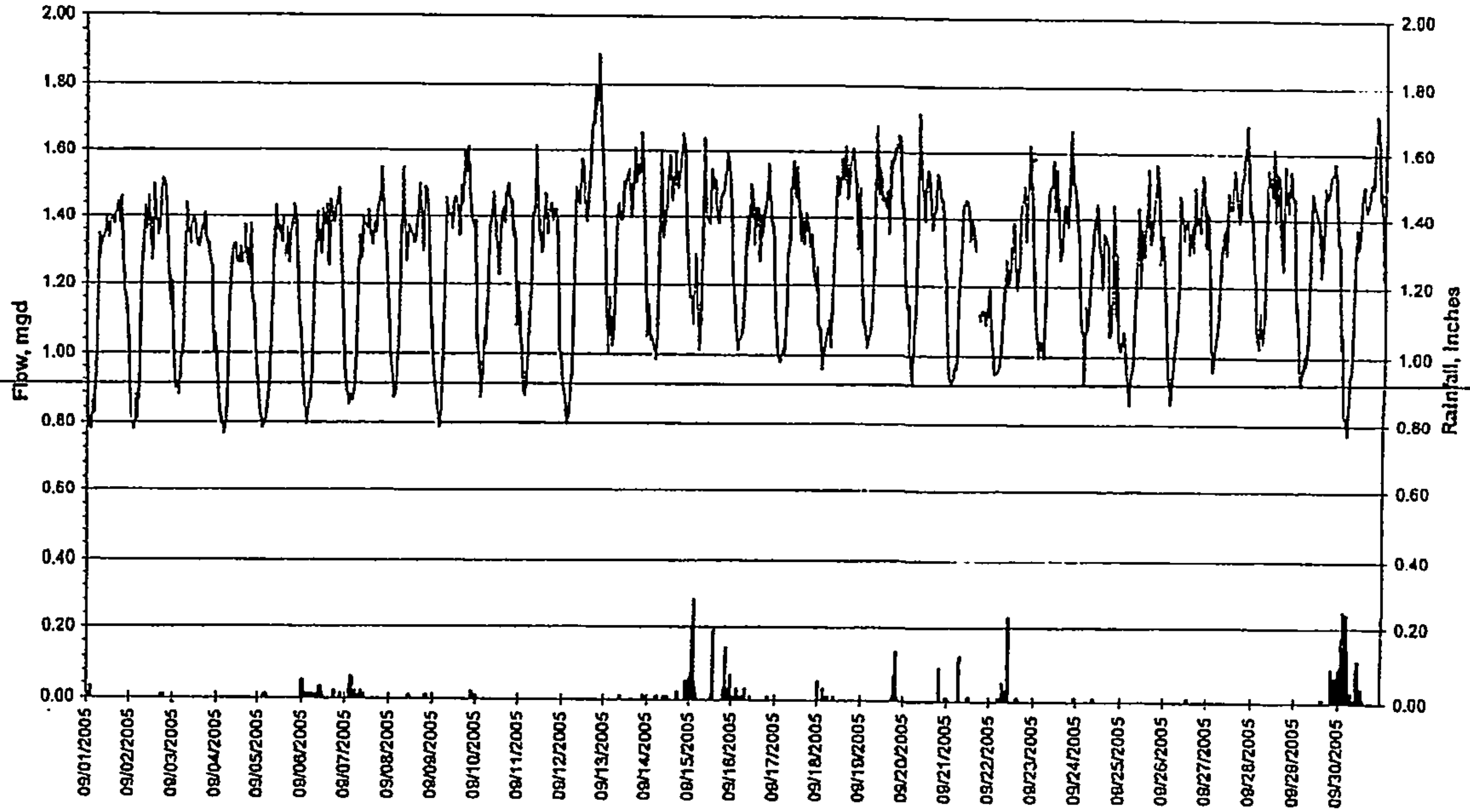
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for September 2005
Flow Monitor: KA-1; MH ID: KA01OO0000; Location: Kahului WWPS
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 4.15 in
Measured Qavgmin = 0.8036 mgd
Measured Qavgmax = 1.5755 mgd

Measured Qmin = 0.762 mgd
Measured Qavg = 1.2803 mgd
Measured Qmax = 1.886 mgd

Measured Dmin = 6.725 in (28% full)
Measured Davg = 7.64 in (32% full)
Measured Dmax = 9.192 in (38% full)

Design Qcap = 23.53 mgd
Pipe Size = 24 in
Tributary Area = 1025 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-1_Sep05.xls 7/10/2006

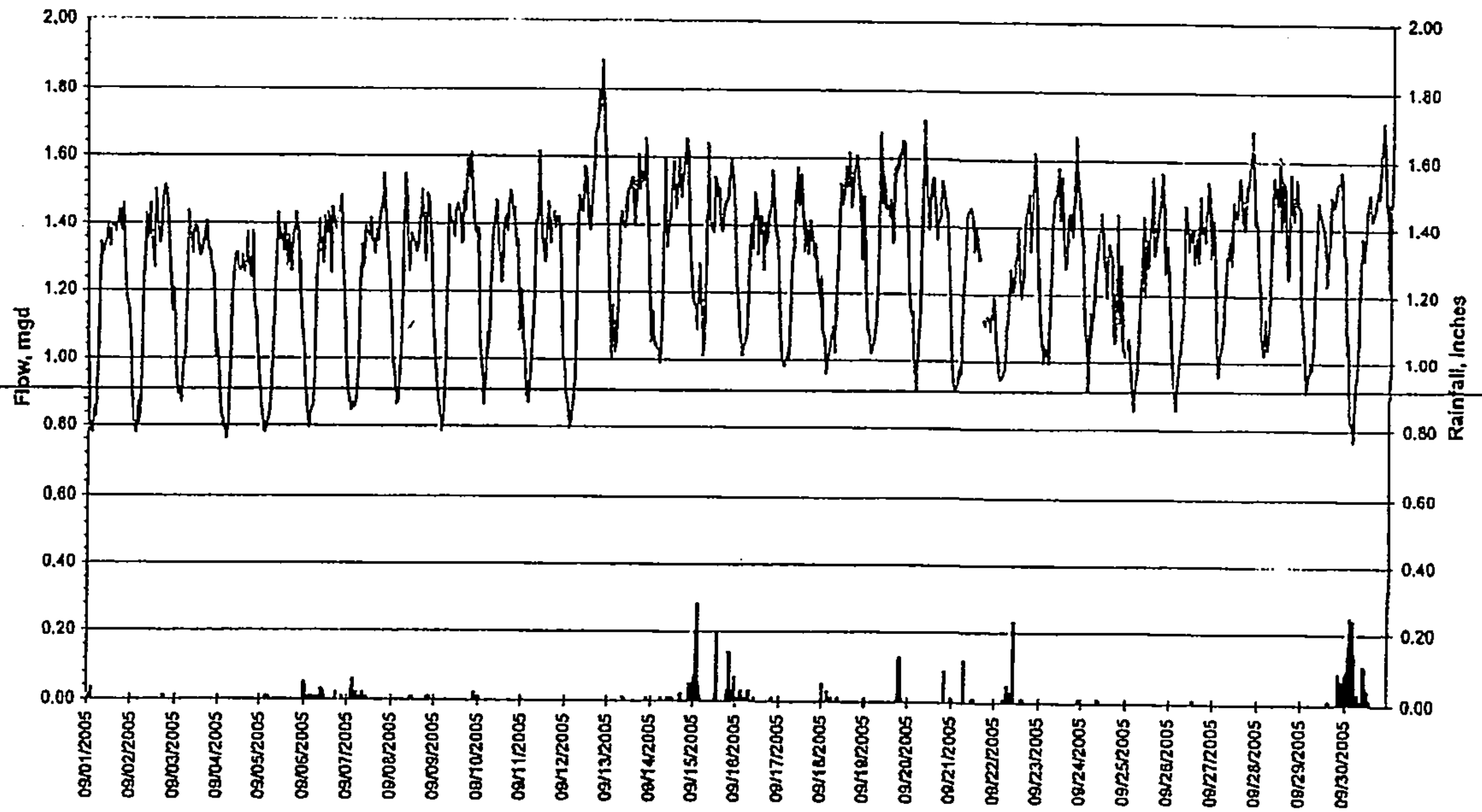
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for September 2005
Flow Monitor: KA-1; MH ID: KA01OO0000; Location: Kahului WWPS
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 4.15 in
Measured Qavgmin = 0.8836 mgd
Measured Qavgmax = 1.5755 mgd

Measured Qmin = 0.762 mgd
Measured Qavg = 1.2803 mgd
Measured Qmax = 1.888 mgd

Measured Dmin = 6.225 in (26% full)
Measured Davg = 7.64 in (32% full)
Measured Dmax = 9.102 in (38% full)

Design Qcap = 23.53 mgd
Pipe Size = 24 in
Tributary Area = 1025 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-1_Sep05.xls 7/10/2006

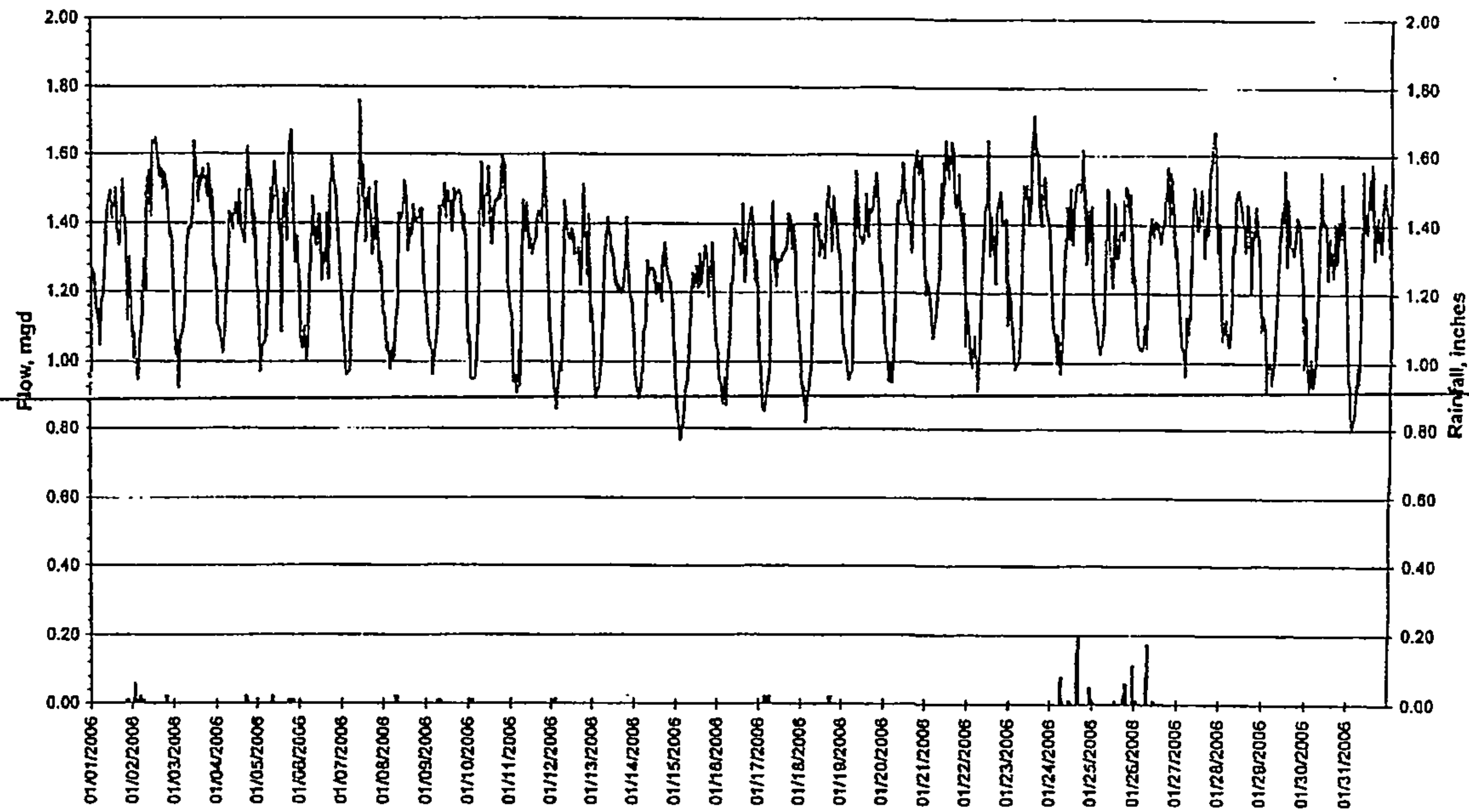
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for January 2006
Flow Monitor: KA-1; MH ID: KA01OO0000; Location: Kahului WWPS
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 1.25 in
Measured Qavgmin = 0.9583 mgd
Measured Qavgmax = 1.563 mgd

Measured Qmin = 0.768 mgd
Measured Qavg = 1.282 mgd
Measured Qmax = 1.78 mgd

Measured Dmin = 8.248 in (20% full)
Measured Davg = 8.433 in (35% full)
Measured Dmax = 10.215 in (43% full)

Design Qcap = 23.53 mgd
Pipe Size = 24 in
Tributary Area = 1025 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-1_Jan06.xls 7/10/2006

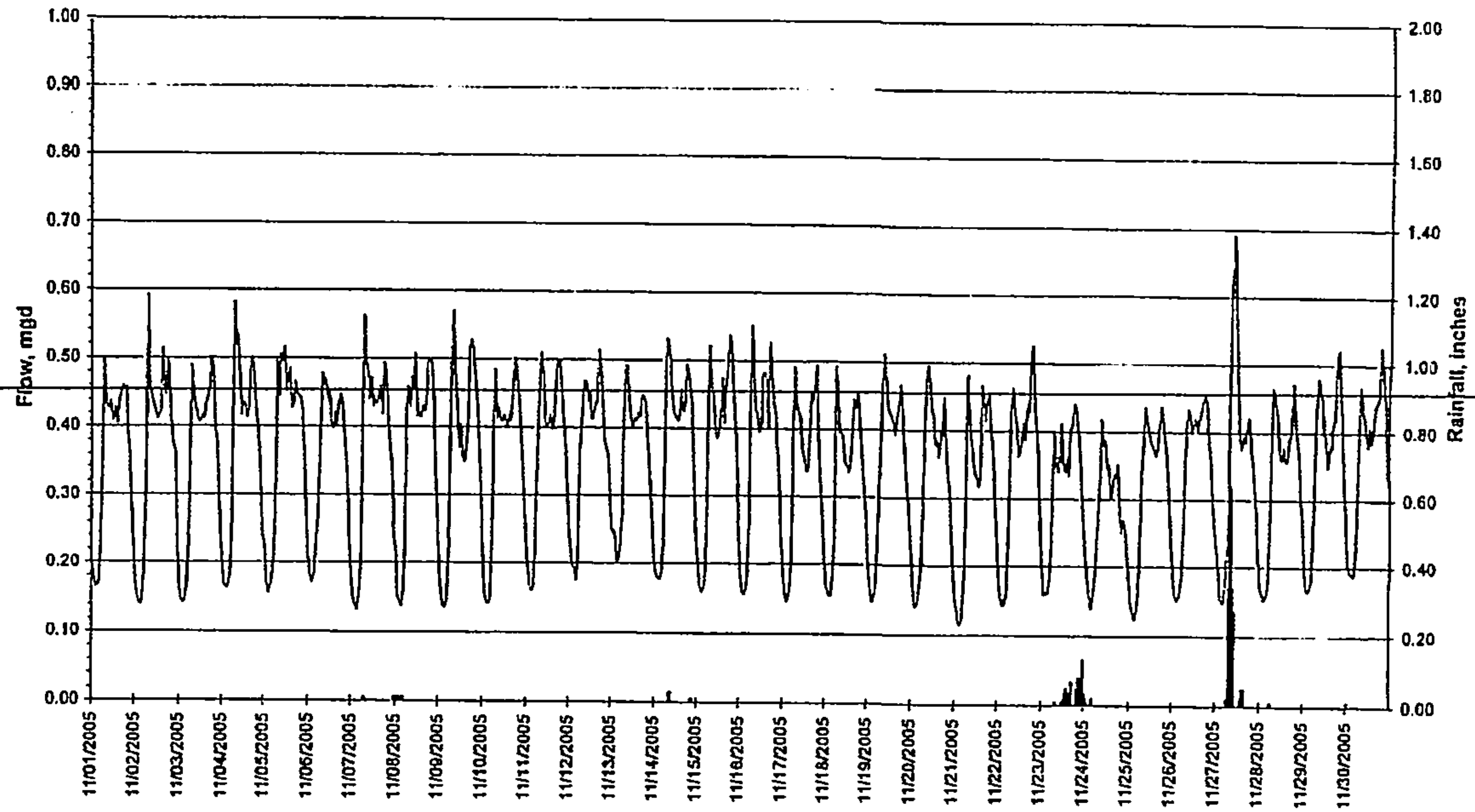
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for November 2005
Flow Monitor: KA-3; MH ID: KA01OO0400; Location: Maui Mall
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 2.41 in
Measured Qavgmin = 0.1524 mgd
Measured Qavgmax = 0.5102 mgd

Measured Qmin = 0.115 mgd
Measured Qavg = 0.3480 mgd
Measured Qmax = 0.693 mgd

Measured Dmin = 2.553 in (11% full)
Measured Davg = 3.839 in (16% full)
Measured Dmax = 5.186 in (22% full)

Design Qcap = 7.10 mgd
Pipe Size = 24 in
Tributary Area = 503 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-3_Nov05.xls 7/10/2006

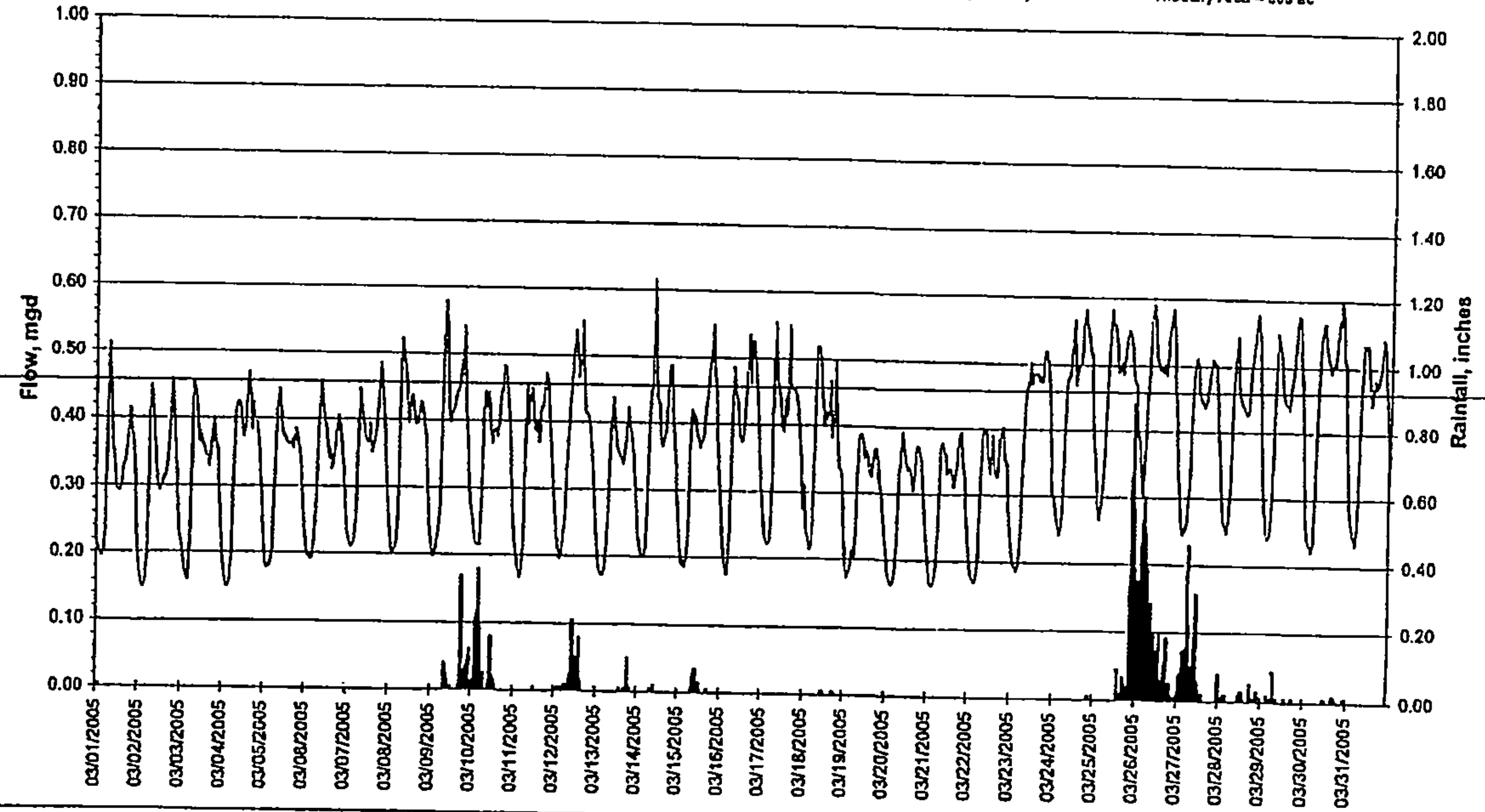
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for March 2005
Flow Monitor: KA-3; MH ID: KA01OO0400; Location: Maui Mall
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 13.59 in
Measured Qavgmin = 0.1893 mgd
Measured Qavgmax = 0.5088 mgd

Measured Qmin = 0.149 mgd
Measured Qavg = 0.3673 mgd
Measured Qmax = 0.616 mgd

Measured Dmin = 2.284 in (10% full)
Measured Davg = 3.815 in (16% full)
Measured Dmax = 4.717 in (20% full)

Design Qcap = 7.19 mgd
Pipe Size = 24 in
Tributary Area = 503 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-3_Mar05.xls 7/10/2006

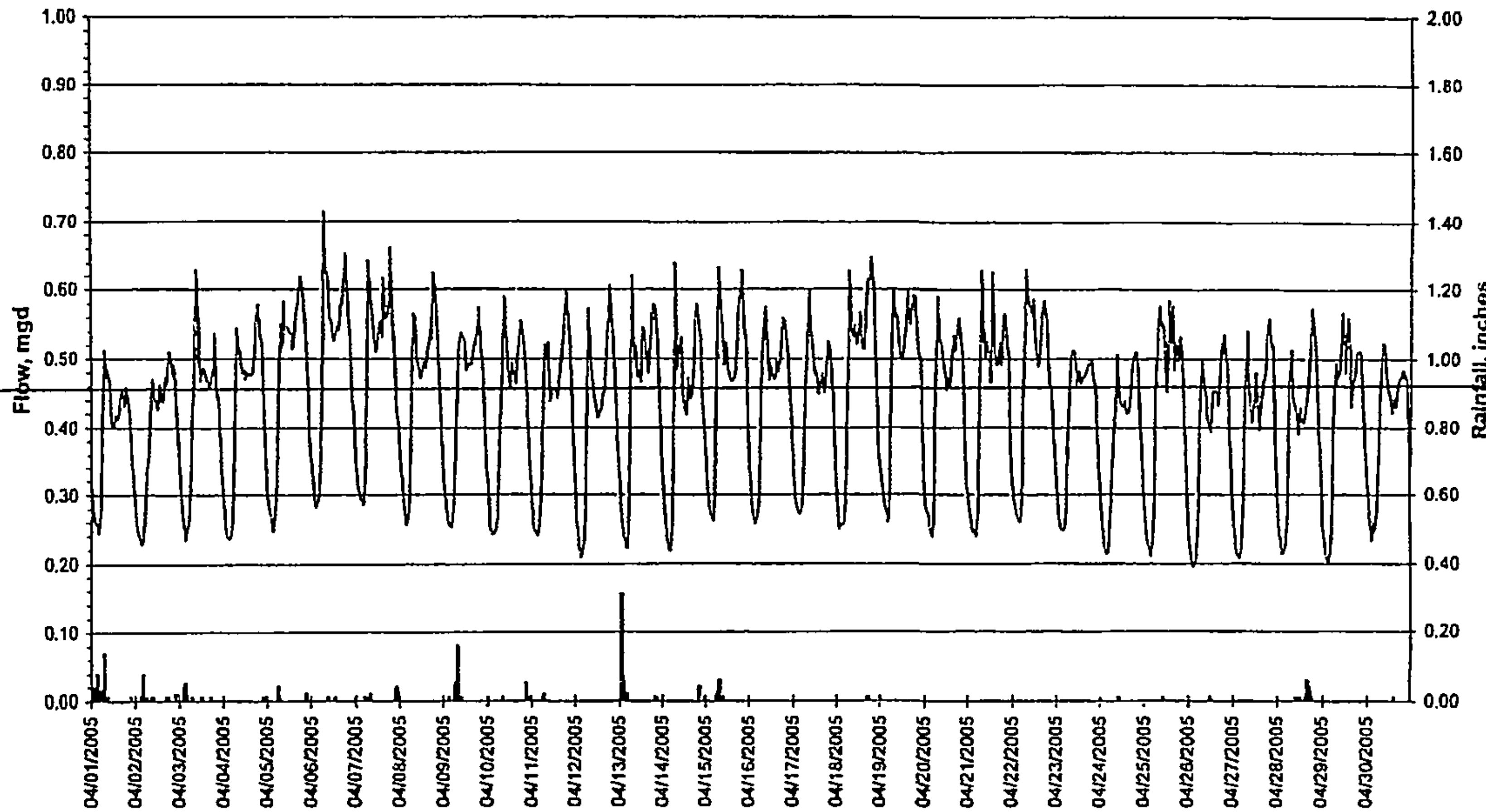
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for April 2005
Flow Monitor: KA-3; MH ID: KA01OO0400; Location: Maui Mall
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 2.01 in
Measured Qavgmin = 0.233 mgd
Measured Qavgmax = 0.5503 mgd

Measured Qmin = 0.196 mgd
Measured Qavg = 0.4335 mgd
Measured Qmax = 0.716 mgd

Measured Dmin = 2.493 in (10% full)
Measured Davg = 3.891 in (15% full)
Measured Dmax = 5.098 in (21% full)

Design Qcap = 7.19 mgd
Pipe Size = 24 in
Tributary Area = 503 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-3_Apr05.xls 7/10/2006

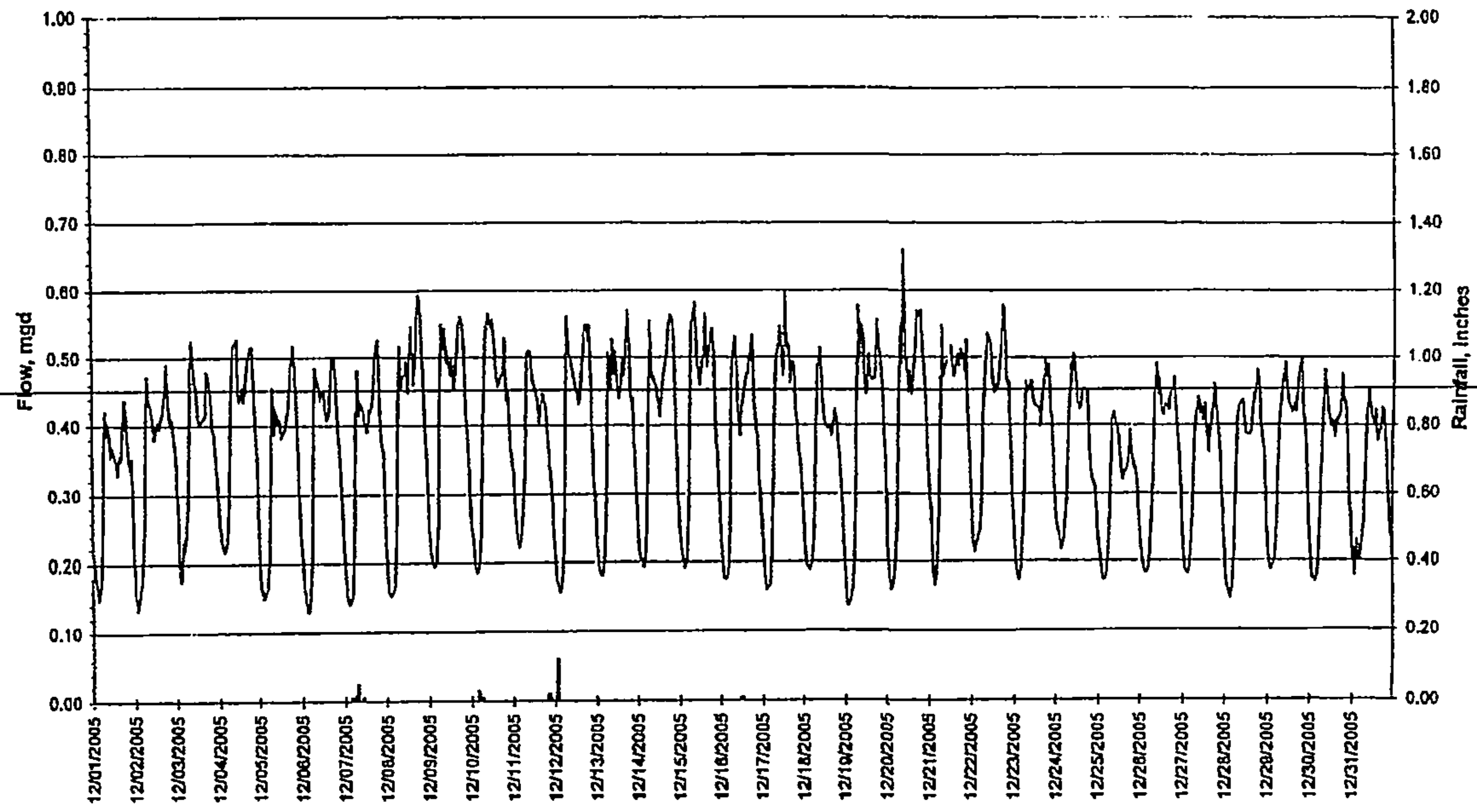
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for December 2005
Flow Monitor: KA-3; MH ID: KA01O00400; Location: Maui Mall
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 0.3 in
Measured Qavgmin = 0.1738 mgd
Measured Qavgmax = 0.5253 mgd

Measured Qmin = 0.131 mgd
Measured Qavg = 0.374 mgd
Measured Qmax = 0.662 mgd

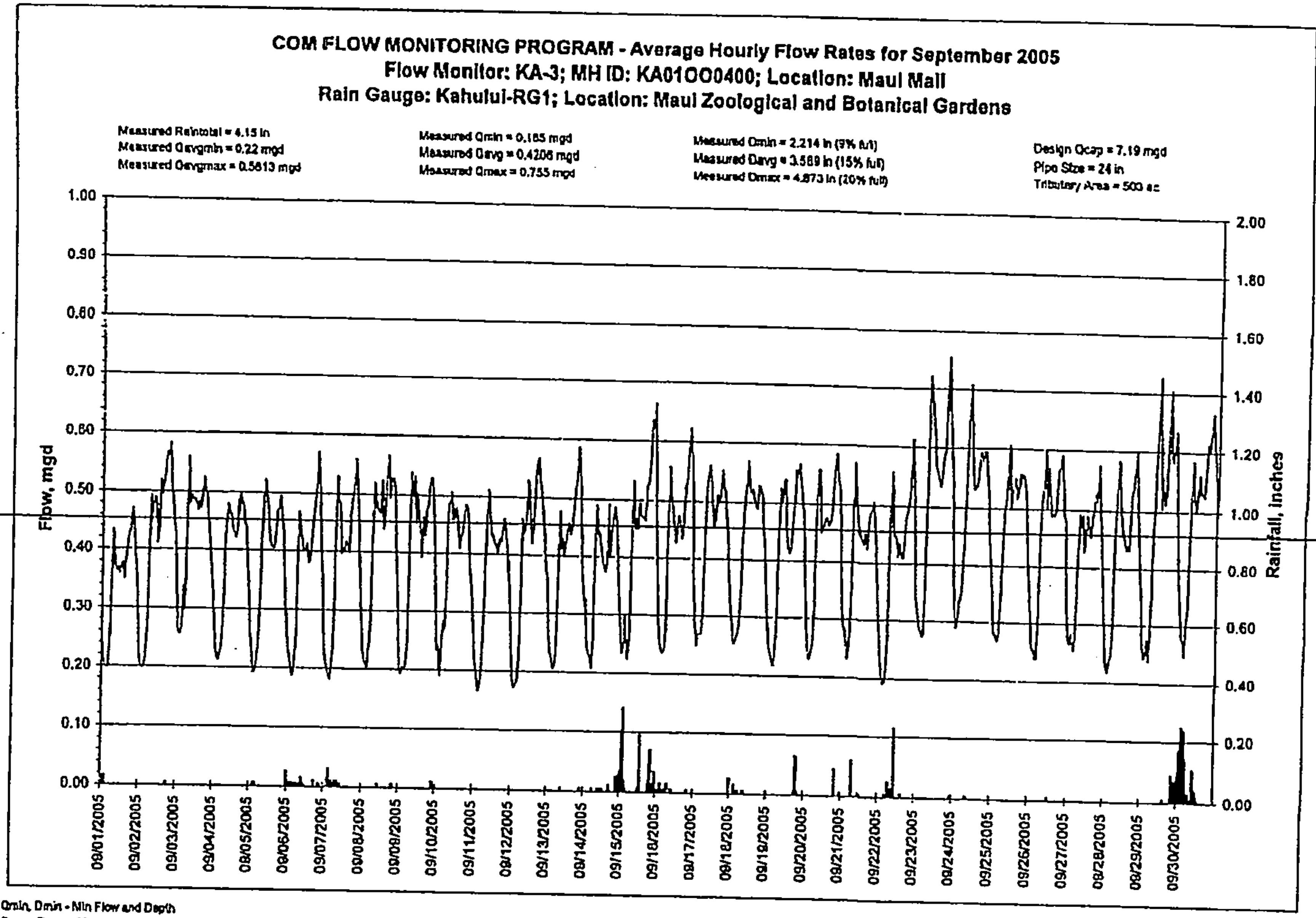
Measured Dmin = 2.653 in (11% full)
Measured Davg = 3.957 in (16% full)
Measured Dmax = 5.151 in (21% full)

Design Qcap = 7.19 mgd
Pipe Size = 24 in
Tributary Area = 500 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-3_Dec05.xls 7/10/2006



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-3_Sep05.xls 7/10/2006

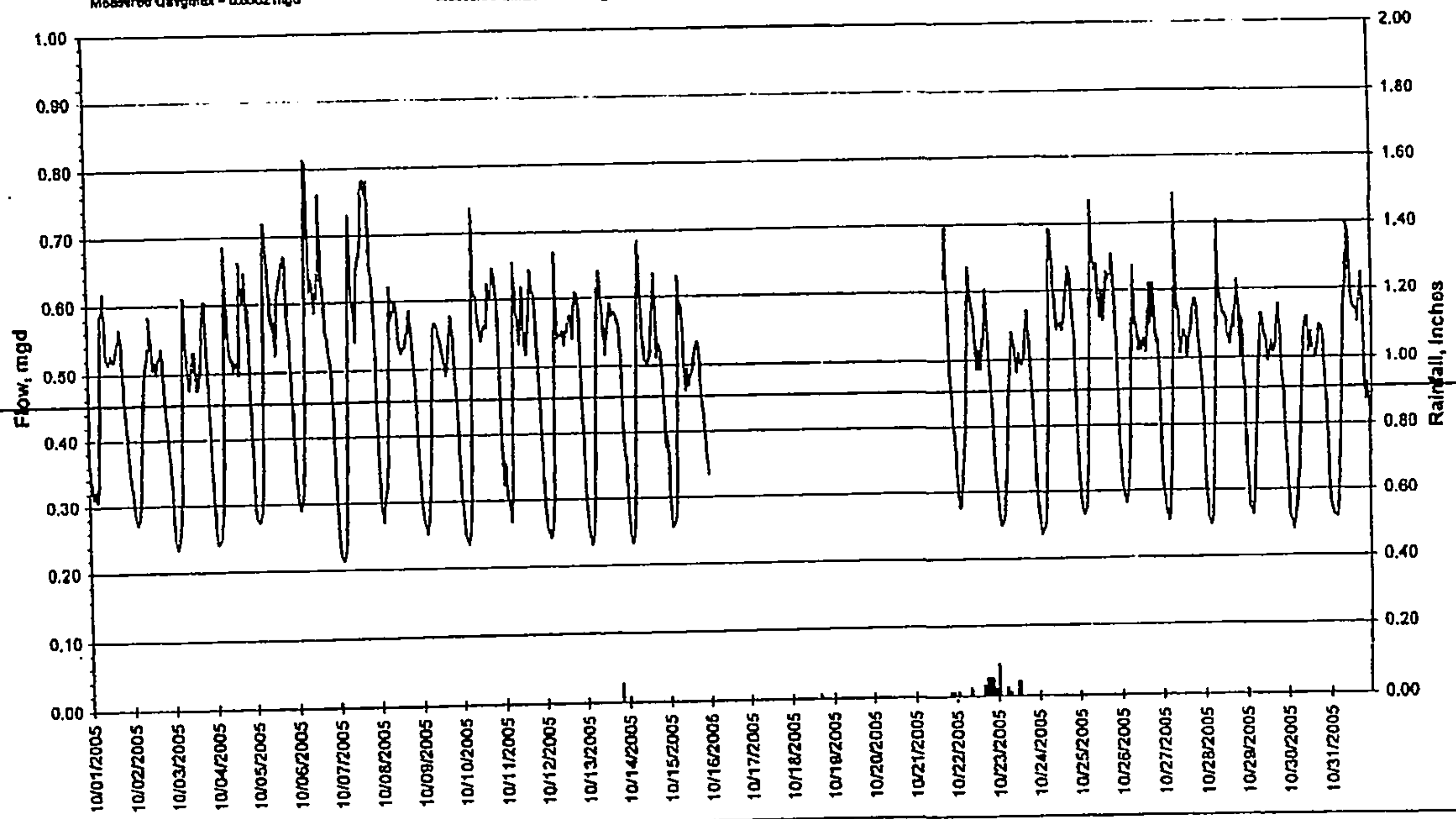
COM FLOW MONITORING PROGRAM - Average Hourly Flow Rates for October 2005
Flow Monitor: KA-3; MH ID: KA01OO0400; Location: Maui Mall
Rain Gauge: Kahului-RG1; Location: Maui Zoological and Botanical Gardens

Measured Raintotal = 0.54 in
Measured Qavgmin = 0.2589 mgd
Measured Qavgmax = 0.6582 mgd

Measured Qmin = 0.214 mgd
Measured Qavg = 0.476 mgd
Measured Qmax = 0.814 mgd

Measured Dmin = 2.53 in (11% full)
Measured Davg = 3.827 in (16% full)
Measured Dmax = 5.07 in (21% full)

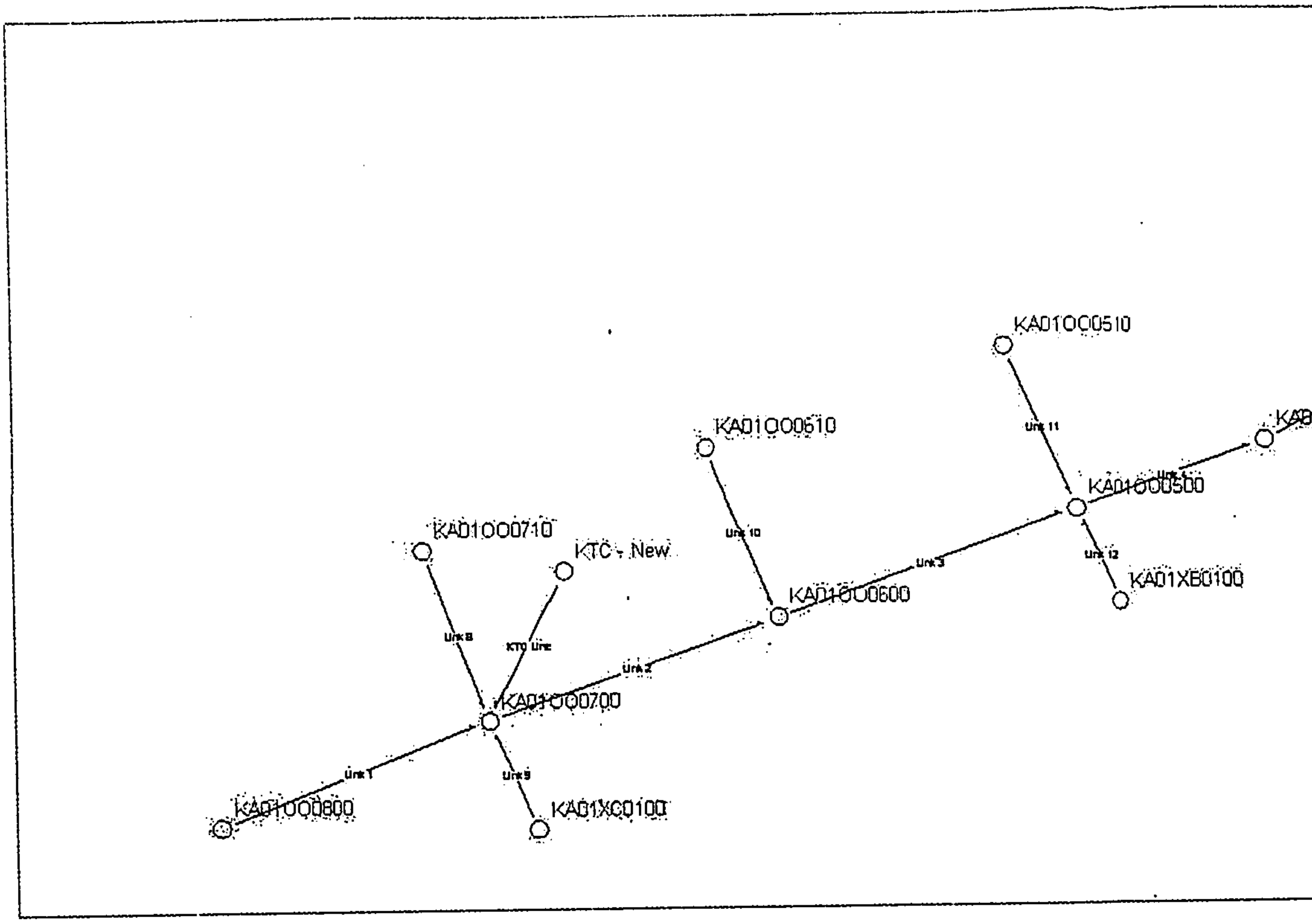
Design Qcap = 7.19 mgd
Pipe Size = 24 in
Tributary Area = 503 ac



Qmin, Dmin - Min Flow and Depth
Qmax, Dmax - Max Flow and Depth
Qavgmin - Ave of Daily Min Flow
Qavgmax - Ave of Daily Max Flow
Qavg, Davg - Daily Ave Flow and Depth
Tributary Area, Pipe Size, Capacity based on the GIS Data

KA-3_Oct05.xls 7/10/2006

Appendix F
Hydraulic Model Results

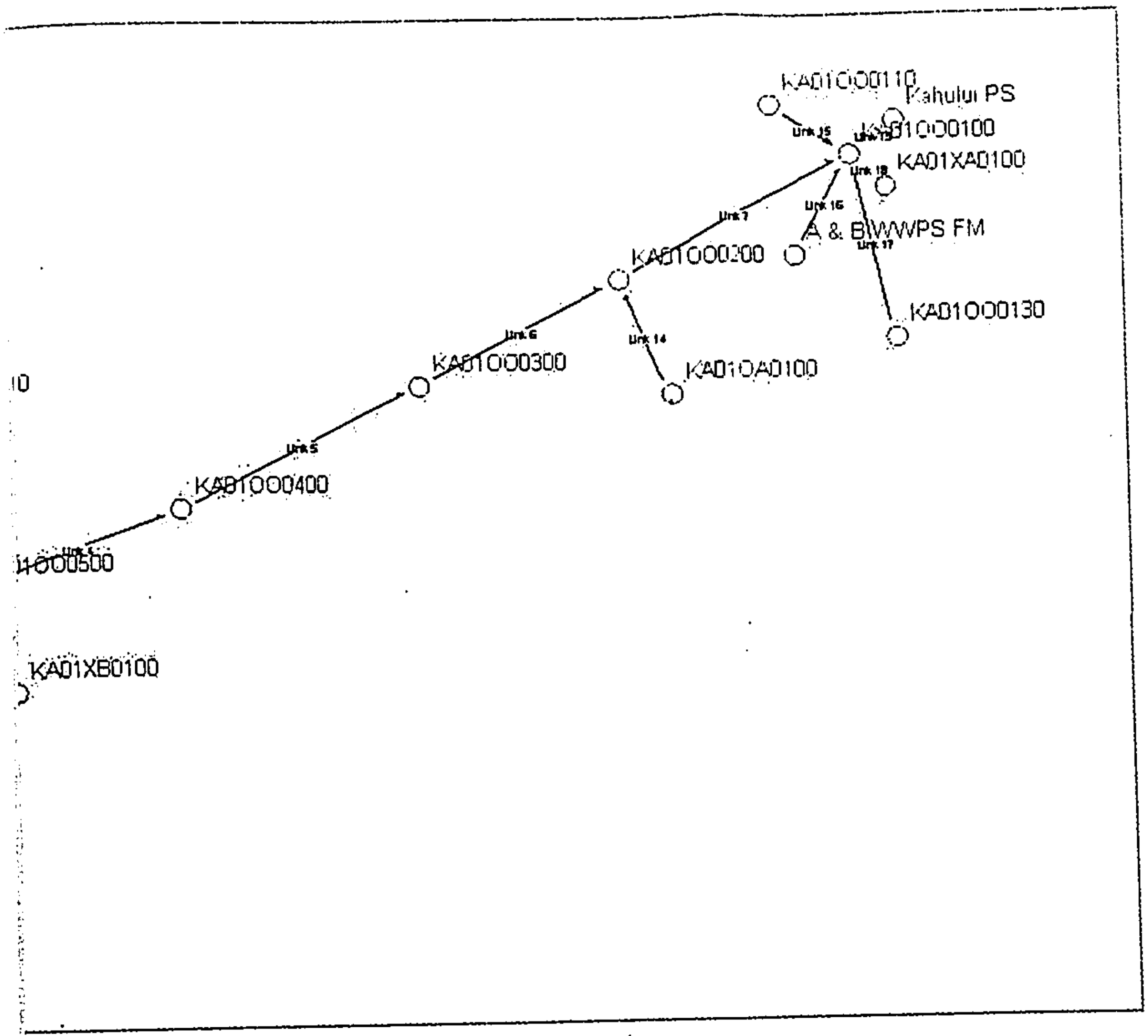


SWMM

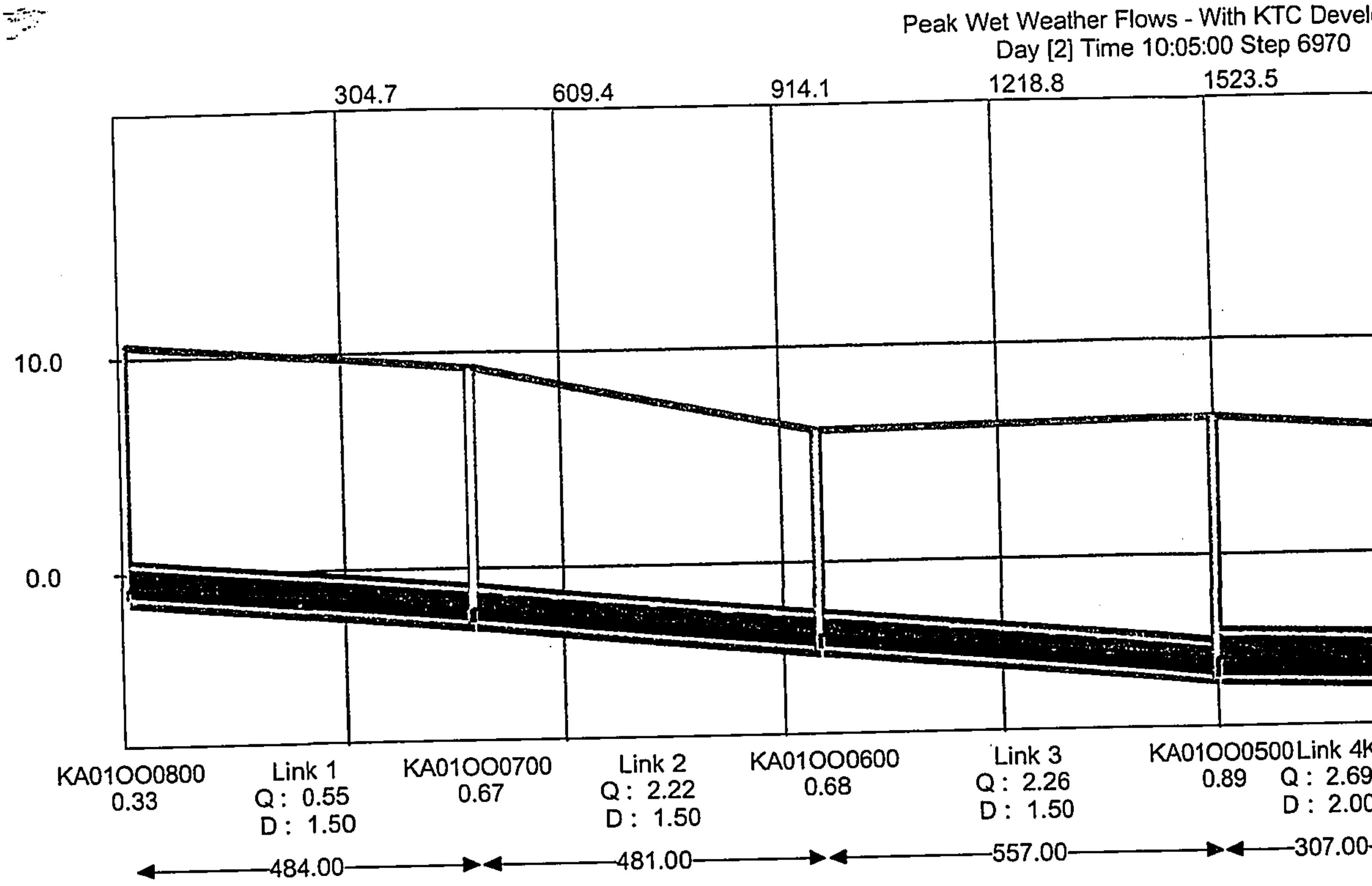
Version 10.00

Kahului Shopping Center Study

Licenced To: Brown & Caldwell [42-1000-2119]

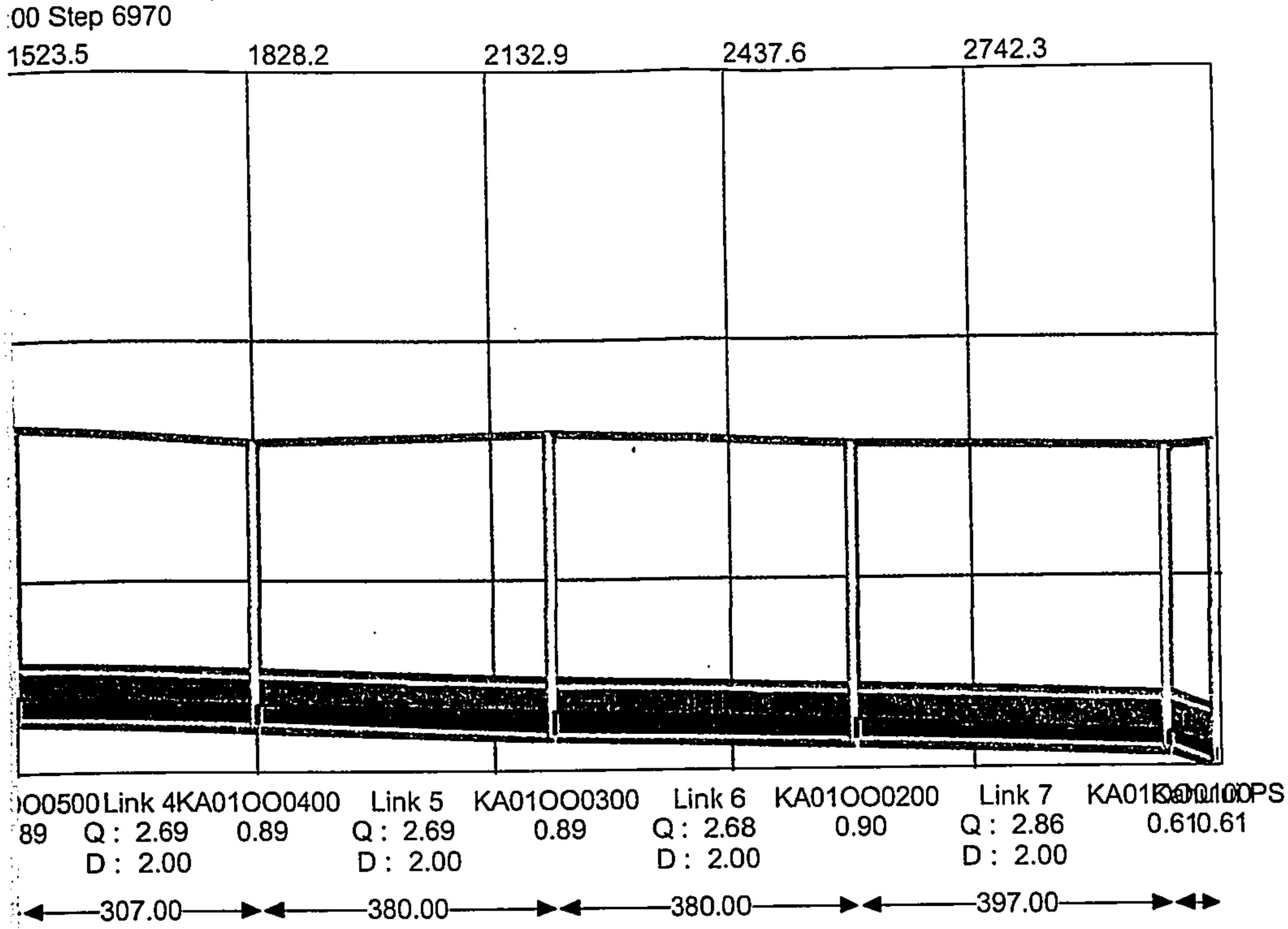

KA01OO0110
Kahului PS
KA01OO0100
KA01XA0100
A & B WWPS FM
KA01OO0200
KA01OO0130
KA01OO0300
KA01OA0100
KA01OO0400
KA01XB0100

07/14/06



Peak Wet Weather Flows - With KTC Devel
Day [2] Time 10:05:00 Step 6970
304.7
609.4
914.1
1218.8
1523.5
10.0
0.0
KA01OO0800
0.33
Link 1
Q : 0.55
D : 1.50
KA01OO0700
0.67
Link 2
Q : 2.22
D : 1.50
KA01OO0600
0.68
Link 3
Q : 2.26
D : 1.50
KA01OO0500
0.89
Q : 2.69
D : 2.00
484.00
481.00
557.00
307.00

/Vith KTC Development
:00 Step 6970



```
            Kahului Shopping Center - COM Standards_SC200.txt
 Current Directory:   C:\XPS\XPSWMM\WORK\KAHULUI SHOPPING CENTER - COM
STANDARD
 Engine Name: C:\XPS\xpswmm\SWMMEN~1.EXE



 Input File : Center - COM standards\Kahului Shopping Center - COM
Standards.XP
          *=============================================*
          |                   xpswmm                    |
          |    Storm and Wastewater Management Model    |
          |         Interface Version: 10.0             |
          |            Engine Version: 10.03            |
          |=============================================|
          |                                             |
          |                Developed by                 |
          |                                             |
          |                XP Software                  |
          |                                             |
          |=============================================|
          |      XP Software       February, 2006       |
          |       Data File Version --->    11.7        |
          |       Serial Number: 42-xxx-0000            |
          |          XP Software (Evaluation)           |
          *=============================================*

Engine Name: C:\XPS\xpswmm\SWMMEN~1.EXE



*================================================*
|       Input and Output file names by Layer      |
*================================================*

 Input File  to Layer #     1 JOT.US


 Output File to Layer #     1 JOT.US


*=======================================================*
|   Special command line arguments in XP-SWMM2000. This |
|   now includes program defaults. $Keywords are the program|
|   defaults.  Other Keywords are from the SWMMCOM.CFG file.|
|   or the command line or any cfg file on the command line.|
|   Examples include these in the file xpswm.bat under the |
|   section :solve or in the windows version XPSWMM32 in the|
|   file solve.bat                                      |
|                                                       |
|   Note: the cfg file should be in the subdirectory swmxp |
|         or defined by the set variable in the xpswm.bat |
|         file.  Some examples of the command lines possible|
|         are shown below:                              |
|                                                       |
|   swmmd swmmcom.cfg                                   |
|   swmmd my.cfg                                        |
|   swmmd nokeys nconv5 perv extranwq                   |
*=======================================================*

 $powerstation                       0.0000         1          2
 $perv                               0.0000         0          4
```

$oldegg	0.0000	0	7
$as	0.0000	0	11
$noflat	0.0000	0	21
$oldomega	0.0000	0	24
$oldvol	0.0000	1	28
$implicit	0.0000	1	29
$oldhot	0.0000	1	31
$oldscs	0.0000	0	33
$flood	0.0000	1	40
$nokeys	0.0000	0	42
$pzero	0.0000	0	55
$oldvol2	0.0000	2	59
$storage2	0.0000	3	62
$oldhot1	0.0000	1	63
$pumpwt	0.0000	1	70
$ecloss	0.0000	1	77
$exout	0.0000	0	97
$spatial = 0.90	0.9000	5	124
$djref = -1.0	-0.1000	3	143
$weirlen = 50	50.0000	1	153
$oldbnd	0.0000	1	154
$nogrelev	0.0000	1	161
$ncmid	0.0000	0	164
$new_nl_97	0.0000	2	290
$best97	0.0000	1	294
$newbound	0.0000	1	295
$q_tol = 0.01	0.0001	1	316
$new_storage	0.0000	1	322
$old_iteration	0.0000	1	333
$minlen=30.0	30.0000	1	346
$review_elevation	0.0000	1	383
$use_half_volume	0.0000	1	385
$min_ts = 0.5	0.5000	1	407
$design_restart = on	0.0000	1	412
$zero_value=1.e-05	0.0000	1	415
$relax_depth = on	0.0000	1	427
$saveallpts = on	0.0000	1	434

```
*=====================================================*
| Parameter Values on the Tapes Common Block.These are the |
| values read from the data file and dynamically allocated |
| by the model for this simulation.                        |
*=====================================================*
```

Number of Subcatchments in the Runoff Block (NW)....	0
Number of Channel/Pipes in the Runoff Block (NG)....	0
Runoff Water quality constituents (NRQ)............	0
Runoff Land Uses per Subcatchment (NLU)............	0
Number of Elements in the Transport Block (NET).....	0
Number of Storage Junctions in Transport (NTSE).....	0
Number of Input Hydrographs in Transport (NTH)......	0
Number of Elements in the Extran Block (NEE)........	20
Number of Groundwater Subcatchments in Runoff (NGW).	0
Number of Interface locations for all Blocks (NIE)..	20
Number of Pumps in Extran (NEP)....................	0
Number of Orifices in Extran (NEO).................	0
Number of Tide Gates/Free Outfalls in Extran (NTG)..	1
Number of Extran Weirs (NEW).......................	0
Number of SCS hydrograph points....................	1
Number of Extran printout locations (NPO)..........	0
Number of Tide elements in Extran (NTE)............	1
Number of Natural channels (NNC)...................	0
Number of Storage junctions in Extran (NVSE)........	0
Number of Time history data points in Extran(NTVAL).	0
Number of Variable storage elements in Extran (NVST)	0
Number of Input Hydrographs in Extran (NEH).........	12
Number of Particle sizes in Transport Block (NPS)...	0
Number of User defined conduits (NHW)..............	20

```
                 Kahului Shopping Center - COM Standards_SC200.txt
 Number of Connecting conduits in Extran (NECC)......    20
 Number of Upstream elements in Transport (NTCC).....    10
 Number of Storage/treatment plants (NSTU)...........     1
 Number of Values for R1 lines in Transport (NR1)....     0
 Number of Nodes to be allowed for (NNOD)............    20
 Number of Plugs in a Storage Treatment Unit.........     1

########################################################
#    Entry made to the HYDRAULIC Layer(Block) of SWMM #
#    Last Updated June,2005 by XP Software            #

    Kahului Shopping Center Study



*=====================================================*
|       HYDRAULICS TABLES IN THE OUTPUT FILE          |
|  These are the more important tables in the output file.
|  You can use your editor to find the table numbers, |
|  for example: search for Table E20 to check continuity.
|  This output file can be imported into a Word Processor
|  and printed on US letter or A4 paper using portrait|
|  mode, courier font, a size of 8 pt. and margins of 0.75
|                                                     |
|  Table E1    - Basic Conduit Data                   |
|  Table E2    - Conduit Factor Data                  |
|  Table E3a   - Junction Data                        |
|  Table E3b   - Junction Data                        |
|  Table E4    - Conduit Connectivity Data            |
|  Table E4a   - Dry Weather Flow Data                |
|  Table E4b   - Real Time Control Data               |
|  Table E5    - Junction Time Step Limitation Summary|
|  Table E5a   - Conduit Explicit Condition Summary   |
|  Table E6    - Final Model Condition                |
|  Table E7    - Iteration Summary                    |
|  Table E8    - Junction Time Step Limitation Summary|
|  Table E9    - Junction  Summary  Statistics        |
|  Table E10   - Conduit   Summary  Statistics        |
|  Table E11   - Area assumptions used in the analysis|
|  Table E12   - Mean conduit information             |
|  Table E13   - Channel losses(H) and culvert info   |
|  Table E13a  - Culvert Analysis Classification      |
|  Table E14   - Natural Channel Overbank Flow Information
|  Table E14a  - Natural Channel Encroachment Information
|  Table E14b  - Floodplain Mapping                   |
|  Table E15   - Spreadsheet Info List                |
|  Table E15a  - Spreadsheet Reach List               |
|  Table E16   - New Conduit Output Section           |
|  Table E17   - Pump Operation                       |
|  Table E18   - Junction Continuity Error            |
|  Table E19   - Junction Inflow & Outflow Listing    |
|  Table E20   - Junction Flooding and Volume List    |
|  Table E21   - Continuity balance at simulation end |
|  Table E22   - Model Judgement Section              |
*=====================================================*

Time Control from Hydraulics Job Control
Year.........    2006 Month.......     7
Day..........       2 Hour........     0
Minute.......       0 Second......     0


Control information for simulation
----------------------------------
```

```
Integration cycles.................     14400
Length of integration step is......     30.00 seconds
Simulation length..................    120.00 hours
Do not create equiv. pipes(NEQUAL).         0
Use U.S. customary units for I/O...         0
Printing starts in cycle...........         1
Intermediate printout intervals of.       500 cycles
Intermediate printout intervals of.    250.00 minutes
Summary printout intervals of......       500 cycles
Summary printout time interval of..    250.00 minutes
Hot start file parameter (REDO)....         0
Initial time.......................      0.00 hours

Iteration variables: Flow Tolerance.    0.00010
                     Head Tolerance.    0.00050
    Minimum depth (m or ft).........    0.00001
    Underrelaxation parameter.......    0.85000
    Time weighting parameter........    0.85000
    Conduit roughness factor........    1.00000
    Flow adjustment factor..........    1.00000
    Initial Condition Smoothing.....          0
    Courant Time Step Factor........    1.00000
    Default Expansion/Contraction K.    0.00000
    Default Entrance/Exit K.........    0.00000
    Routing Method..................    Dynamic Wave

Default surface area of junctions...      12.57 square feet.
Minimum Junction/Conduit Depth......    0.00001 feet.
Ponding Area Coefficient............    5000.00
Ponding Area Exponent...............     1.0000
Minimum Orifice Length..............    1000.00 feet.
NJSW input hydrograph junctions.....      12
     or user defined hydrographs....
```

===
| Table E1 - Conduit Data |
===

Inp Num	Conduit Name	Length (ft)	Conduit Class	Area (ft^2)	Manning Coef.	Max Width (ft)	Depth (ft)	Trapezoid Side Slopes
1	Link 1	484.0000	Circular	1.7671	0.0140	1.5000	1.5000	
2	Link 2	481.0000	Circular	1.7671	0.0140	1.5000	1.5000	
3	Link 3	557.0000	Circular	1.7671	0.0140	1.5000	1.5000	
4	Link 4	307.0000	Circular	3.1416	0.0140	2.0000	2.0000	
5	Link 7	397.0000	Circular	3.1416	0.0140	2.0000	2.0000	
6	Link 5	380.0000	Circular	3.1416	0.0140	2.0000	2.0000	
7	Link 6	380.0000	Circular	3.1416	0.0140	2.0000	2.0000	
8	Link 8	301.0000	Circular	0.3491	0.0140	0.6667	0.6667	
9	Link 9	197.0000	Circular	0.7854	0.0140	1.0000	1.0000	
10	Link 10	306.0000	Circular	0.3491	0.0140	0.6667	0.6667	
11	Link 11	313.0000	Circular	0.3491	0.0140	0.6667	0.6667	

```
 12          Link 12   194.0000   Circular    0.5454     0.0140     0.8333
0.8333
 13          Link 14   163.0000   Circular    0.7854     0.0140     1.0000
1.0000
 14          Link 15   233.4600   Circular    0.3491     0.0140     0.6667
0.6667
 15          Link 18    61.4100   Circular    0.5454     0.0140     0.8333
0.8333
 16          Link 16   564.6000   Circular    0.3491     0.0140     0.6667
0.6667
 17          Link 17  1030.0000   Circular    0.3491     0.0140     0.6667
0.6667
 18          Link 19    61.0000   Circular    3.1416     0.0140     2.0000
2.0000
 19         KTC Line   150.0000   Circular    0.3491     0.0140     0.6667
0.6667
Total length of all conduits ....      6560.4700 feet

*===================================================*
| If there are messages about (sqrt(g*d)*dt/dx), or |
| the sqrt(wave celerity)*time step/conduit length  |
| in the output file all it means is that the       |
| program will lower the internal time step to      |
| satisfy this condition (explicit condition).      |
| You control the actual internal time step by      |
| using the minimum courant time step factor in the |
| HYDRAULICS job control.  The message put in words |
| states that the smallest conduit with the fastest |
| velocity will control the time step selection.    |
| You have further control by using the modify      |
| conduit option in the HYDRAULICS Job Control.     |
*===================================================*

        Conduit     Courant
           Name       Ratio
 ---------------  ---------
         Link 1        0.43
         Link 2        0.43
         Link 3        0.37
         Link 4        0.78
         Link 7        0.61
         Link 5        0.63
         Link 6        0.63
         Link 8        0.46
         Link 9        0.86
        Link 10        0.45
        Link 11        0.44
        Link 12        0.80
        Link 14        1.04   ===> Warning ! (sqrt(wave celerity)*time
step/conduit length)
        Link 15        0.60
        Link 18        2.53   ===> Warning ! (sqrt(wave celerity)*time
step/conduit length)
        Link 16        0.25
        Link 17        0.13
        Link 19        3.95   ===> Warning ! (sqrt(wave celerity)*time
step/conduit length)
       KTC Line        0.93

*=================*
|  Conduit Volume  |
*=================*

Full pipe or full open conduit volume
Input full depth volume............    8.9142E+03 cubic feet
```

Table E3a - Junction Data

Inp Num	Junction Name	Ground Elevation	Crown Elevation	Invert Elevation	Qinst cfs	Initial Depth-ft	Interface Flow (%)
1	KA01000800	10.5000	0.4200	-1.0800	0.0000	0.0000	100.0000
2	KA01000700	9.2500	5.5067	-2.5500	0.0000	0.0000	100.0000
3	KA01000600	6.0000	-2.5100	-4.0100	0.0000	0.0000	100.0000
4	KA01000500	6.4000	-3.6900	-5.6900	0.0000	0.0000	100.0000
5	KA01000400	5.7000	-4.0000	-6.0000	0.0000	0.0000	100.0000
6	KA01000200	5.6000	-2.5000	-6.7600	0.0000	0.0000	100.0000
7	KA01000100	5.4300	2.2267	-7.1600	0.0000	0.0000	100.0000
8	KA01000300	6.0000	-4.3800	-6.3800	0.0000	0.0000	100.0000
9	KA01000710	12.0000	0.4167	-0.2500	0.0000	0.0000	100.0000
10	KA01XC0100	8.6400	-0.2900	-1.2900	0.0000	0.0000	100.0000
11	KA01000610	10.0000	-0.7133	-1.3800	0.0000	0.0000	100.0000
12	KA01000510	6.5000	-2.4233	-3.0900	0.0000	0.0000	100.0000
13	KA01XB0100	6.8000	-3.0467	-3.8800	0.0000	0.0000	100.0000
14	KA010A0100	7.7500	-1.8000	-2.8000	0.0000	0.0000	100.0000
15	KA01000110	6.5000	3.3967	2.7300	0.0000	0.0000	100.0000
16	KA01XA0100	6.0000	-5.6167	-6.4500	0.0000	0.0000	100.0000
17	A & B WWPS	6.3000	-2.1933	-2.8600	0.0000	0.0000	100.0000
18	KA01000130	6.0000	-1.2533	-1.9200	0.0000	0.0000	100.0000
19	Kahului PS	5.5000	-5.8200	-7.8200	0.0000	0.0000	100.0000
20	KTC - New	9.0000	6.1667	5.5000	0.0000	0.0000	100.0000

Table E3b - Junction Data

Inp Num	Junction Name	X Coord.	Y Coord.	Type of Manhole	Type of Inlet	Maximum Capacity	Pavement Shape	Slope
1	KA01000800	520371.6020	61434.5700	No Ponding	Normal		0	0.0000
2	KA01000700	520509.0910	61488.5850	No Ponding	Normal		0	0.0000
3	KA01000600	520656.4010	61540.1400	No Ponding	Normal		0	0.0000

4	KA01000500 0 0.0000	520808.6205	61594.1550	No Ponding	Normal
5	KA01000400 0 0.0000	520906.1475	61628.5400	No Ponding	Normal
6	KA01000200 0 0.0000	521107.0810	61730.2600	No Ponding	Normal
7	KA01000100 0 0.0000	521213.7210	61785.6600	No Ponding	Normal
8	KA01000300 0 0.0000	521016.0090	61683.3900	No Ponding	Normal
9	KA01000710 0 0.0000	520476.4405	61576.3550	No Ponding	Normal
10	KA01XC0100 0 0.0000	520533.4190	61432.1300	No Ponding	Normal
11	KA01000610 0 0.0000	520620.6620	61627.9900	No Ponding	Normal
12	KA01000510 0 0.0000	520772.0100	61677.8450	No Ponding	Normal
13	KA01XB0100 0 0.0000	520830.7690	61546.0850	No Ponding	Normal
14	KA010A0100 0 0.0000	521129.8990	61677.8450	No Ponding	Normal
15	KA01000110 0 0.0000	521177.9715	61807.8250	No Ponding	Normal
16	KA01XA0100 0 0.0000	521229.6090	61770.4300	No Ponding	Normal
17	A & B WWPS 0 0.0000	521187.9375	61739.6650	No Ponding	Normal
18	KA01000130 0 0.0000	521233.1790	61702.5550	No Ponding	Normal
19	Kahului PS 0 0.0000	521233.8305	61800.6100	No Ponding	Normal
20	KTC - New 0 0.0000	520548.2665	61565.2300	No Ponding	Normal

==
| Table E4 - Conduit Connectivity |
==

Input Number	Conduit Name	Upstream Node	Downstream Node	Upstream Elevation	Downstream Elevation	
1	Link 1	KA01000800	KA01000700	-1.0800	-2.5500	No Design
2	Link 2	KA01000700	KA01000600	-2.5500	-4.0100	No Design
3	Link 3	KA01000600	KA01000500	-4.0100	-5.6900	No Design
4	Link 4	KA01000500	KA01000400	-5.6900	-6.0000	No Design
5	Link 7	KA01000200	KA01000100	-6.7600	-7.1600	No Design
6	Link 5	KA01000400	KA01000300	-6.0000	-6.3800	No Design
7	Link 6	KA01000300	KA01000200	-6.3800	-6.7600	No Design
8	Link 8	KA01000710	KA01000700	-0.2500	-1.7600	No Design
9	Link 9	KA01XC0100	KA01000700	-1.2900	-1.7600	No Design
10	Link 10	KA01000610	KA01000600	-1.3800	-3.2200	No Design
11	Link 11	KA01000510	KA01000500	-3.0900	-4.6500	No Design

```
   12           Link 12       KA01XB0100       KA01000500      -3.8800
-4.6500 No Design
   13           Link 14       KA010A0100       KA01000200      -2.8000
-3.5000 No Design
   14           Link 15       KA01000110       KA01000100       2.7300
1.5600 No Design
   15           Link 18       KA01XA0100       KA01000100      -6.4500
-7.1600 No Design
   16           Link 16       A & B WWPS       KA01000100      -2.8600
-6.4500 No Design
   17           Link 17       KA01000130       KA01000100      -1.9200
-6.4500 No Design
   18           Link 19       KA01000100       Kahului PS      -7.1600
-7.8200 No Design
   19           KTC Line       KTC - New       KA01000700       5.5000
4.8400 No Design
```

```
*=============================================*
|         FREE OUTFALL DATA (DATA GROUP I1)   |
|       BOUNDARY CONDITION ON DATA GROUP J1   |
*=============================================*
```

Outfall at Junction....Kahului PS has boundary condition number...
1

```
*=============================================*
|     INTERNAL CONNECTIVITY INFORMATION       |
*=============================================*
```

CONDUIT	JUNCTION	JUNCTION
FREE # 1	Kahului PS	BOUNDARY

```
*================================================*
|        Boundary Condition Information          |
|               Data Groups J1-J4                |
*================================================*
```

BC NUMBER.. 1 has no control water surface.

```
*================================================*
|             XP Note Field Summary              |
*================================================*
```

```
*==============================*
|   Conduit Convergence Criteria |
*==============================*
```

Conduit Name	Full Flow	Conduit Slope
Link 1	5.3755	0.0030
Link 2	5.3739	0.0030
Link 3	5.3569	0.0030
Link 4	6.6752	0.0010
Link 7	6.6679	0.0010
Link 5	6.6428	0.0010

```
      Link 6        6.6428        0.0010
      Link 8        0.7948        0.0050
      Link 9        1.6159        0.0024
     Link 10        0.8701        0.0060
     Link 11        0.7922        0.0050
     Link 12        1.2817        0.0040
     Link 14        2.1680        0.0043
     Link 15        0.7944        0.0050
     Link 18        2.1876        0.0116
     Link 16        0.8949        0.0064
     Link 17        0.7442        0.0044
     Link 19       21.8505        0.0108
    KTC Line        0.7444        0.0044

 *=================================*
 |    Initial Model Condition      |
 | Initial Time =      0.01 hours  |
 *=================================*

      Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
     KA01000800/   0.00 /     -1.08        KA01000700/   0.00 /     -2.55
KA01000600/   0.00 /     -4.01
     KA01000500/   0.00 /     -5.69        KA01000400/   0.00 /     -6.00
KA01000200/   0.00 /     -6.76
     KA01000100/   0.00 /     -7.16        KA01000300/   0.00 /     -6.38
KA01000710/   0.00 /     -0.25
     KA01XC0100/   0.00 /     -1.29        KA01000610/   0.00 /     -1.38
KA01000510/   0.00 /     -3.09
     KA01XB0100/   0.00 /     -3.88        KA010A0100/   0.00 /     -2.80
KA01000110/   0.00 /      2.73
     KA01XA0100/   0.00 /     -6.45        A & B WWPS/   0.00 /     -2.86
KA01000130/   0.00 /     -1.92
     Kahului PS/   0.00 /     -7.82        KTC - New/   0.00 /       5.50

      Conduit/       FLOW    ===> "*" Conduit uses the normal flow option.
       Link 1/       0.00               Link 2/      0.00            Link 3/
  0.00
       Link 4/       0.00               Link 7/      0.00            Link 5/
  0.00
       Link 6/       0.00               Link 8/      0.00            Link 9/
  0.00
      Link 10/       0.00              Link 11/      0.00           Link 12/
  0.00
      Link 14/       0.00              Link 15/      0.00           Link 18/
  0.00
      Link 16/       0.00              Link 17/      0.00           Link 19/
  0.00
     KTC Line/       0.00             FREE # 1/      0.00

      Conduit/   Velocity
       Link 1/       0.00               Link 2/      0.00            Link 3/
  0.00
       Link 4/       0.00               Link 7/      0.00            Link 5/
  0.00
```

```
     Link 6/        0.00        Link 8/        0.00        Link 9/
0.00
     Link 10/       0.00        Link 11/       0.00        Link 12/
0.00
     Link 14/       0.00        Link 15/       0.00        Link 18/
0.00
     Link 16/       0.00        Link 17/       0.00        Link 19/
0.00
     KTC Line/      0.00

     Conduit/ Cross Sectional Area
     Link 1/        0.00        Link 2/        0.00        Link 3/
0.00
     Link 4/        0.00        Link 7/        0.00        Link 5/
0.00
     Link 6/        0.00        Link 8/        0.00        Link 9/
0.00
     Link 10/       0.00        Link 11/       0.00        Link 12/
0.00
     Link 14/       0.00        Link 15/       0.00        Link 18/
0.00
     Link 16/       0.00        Link 17/       0.00        Link 19/
0.00
     KTC Line/      0.00

     Conduit/ Hydraulic Radius
     Link 1/        0.00        Link 2/        0.00        Link 3/
0.00
     Link 4/        0.00        Link 7/        0.00        Link 5/
0.00
     Link 6/        0.00        Link 8/        0.00        Link 9/
0.00
     Link 10/       0.00        Link 11/       0.00        Link 12/
0.00
     Link 14/       0.00        Link 15/       0.00        Link 18/
0.00
     Link 16/       0.00        Link 17/       0.00        Link 19/
0.00
     KTC Line/      0.00

     Conduit/ Upstream/ Downstream Elevation
     Link 1/    -2.55/    -2.55         Link 2/     -4.01/    -4.01
Link 3/     -5.69/    -5.69
     Link 4/    -6.00/    -6.00         Link 7/     -7.16/    -7.16
Link 5/     -6.38/    -6.38
     Link 6/    -6.76/    -6.76         Link 8/     -2.55/    -2.55
Link 9/     -2.55/    -2.55
     Link 10/   -4.01/    -4.01         Link 11/    -5.69/    -5.69
Link 12/    -5.69/    -5.69
     Link 14/   -6.76/    -6.76         Link 15/    -7.16/    -7.16
Link 18/    -7.16/    -7.16
     Link 16/   -7.16/    -7.16         Link 17/    -7.16/    -7.16
Link 19/    -7.82/    -7.82
     KTC Line/  -2.55/    -2.55

######## Important Information ########
Start time of user hydrographs was...      0.000000000000000E+000
Start time of the simulation was.....      0.000000000000000E+000
Found a match between user hydrograph and simulation start time.

=====================================================================
==
===> System inflows (data group K3) at     0.00 hours ( Junction / Inflow,cfs
)

KA01000800/ 6.78E-02 KA01000710/ 8.70E-02 KA01XC0100/ 2.89E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 8.70E-02
```

```
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     0.01 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     1.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 6.83E-02 KA01XC0100/ 2.27E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 6.83E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     2.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     3.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 8.82E-02 KA01XC0100/ 2.93E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 8.82E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     4.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 7.12E-02 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
5.60E-03 KA01000510/ 2.84E-02 KA01XB0100/ 1.43E-01
 KA010A0100/ 2.40E-02 KA01000110/ 9.54E-03 KA01XA0100/ 1.62E-02 A & B WWPS/
1.43E-01 KA01000130/ 9.33E-03 KTC - New / 9.44E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        500      Time          4 Hrs - 10.00 Min

      Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
     KA01000800/   0.10 /     -0.98        KA01000700/   0.32 /     -2.23
KA01000600/   0.31 /     -3.70
     KA01000500/   0.41 /     -5.28        KA01000400/   0.41 /     -5.59
KA01000200/   0.43 /     -6.33
     KA01000100/   0.25 /     -6.91        KA01000300/   0.41 /     -5.97
KA01000710/   0.16 /     -0.09
     KA01XC0100/   0.32 /     -0.97        KA01000610/   0.03 /     -1.35
```

```
KA01000510/   0.08 /    -3.01
     KA01XB0100/   0.16 /    -3.72        KA010A0100/   0.07 /    -2.73
KA01000110/   0.05 /     2.78
     KA01XA0100/   0.04 /    -6.41        A & B WWPS/   0.16 /    -2.70
KA01000130/   0.05 /    -1.87
     Kahului PS/   0.25 /    -7.57        KTC - New/   0.15 /     5.65

        Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
         Link 1/        0.05*            Link 2/        0.52            Link 3/
  0.52*         Link 4/         0.62
         Link 7/        0.62             Link 5/        0.61            Link 6/
  0.60          Link 8/         0.09
         Link 9/        0.32            Link 10/        0.00           Link 11/
  0.02         Link 12/         0.10
        Link 14/        0.02            Link 15/        0.01           Link 18/
  0.01*        Link 16/         0.11
        Link 17/        0.01            Link 19/        0.75           KTC Line/
  0.07          FREE # 1/       0.75
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     5.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.00E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
7.87E-03 KA01000510/ 3.99E-02 KA01XB0100/ 1.73E-01
 KA010A0100/ 3.37E-02 KA01000110/ 1.34E-02 KA01XA0100/ 2.27E-02 A & B WWPS/
2.01E-01 KA01000130/ 1.31E-02 KTC - New / 1.33E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     6.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.47E-01 KA01000710/ 1.79E-01 KA01XC0100/ 5.95E-01 KA01000610/
1.16E-02 KA01000510/ 5.88E-02 KA01XB0100/ 1.79E-01
 KA010A0100/ 4.97E-02 KA01000110/ 1.98E-02 KA01XA0100/ 3.35E-02 A & B WWPS/
2.97E-01 KA01000130/ 1.93E-02 KTC - New / 1.96E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     7.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.03E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 1.73E-01
 KA010A0100/ 6.86E-02 KA01000110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     8.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.54E-01 KA01000710/ 1.60E-01 KA01XC0100/ 5.33E-01 KA01000610/
2.00E-02 KA01000510/ 1.01E-01 KA01XB0100/ 1.60E-01
 KA010A0100/ 8.57E-02 KA01000110/ 3.41E-02 KA01XA0100/ 5.77E-02 A & B WWPS/
5.12E-01 KA01000130/ 3.33E-02 KTC - New / 3.37E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        1000        Time            8 Hrs - 20.00 Min

      Junction / Depth  / Elevation     ===>  "*" Junction is Surcharged.
     KA01000800/   0.21 /    -0.87        KA01000700/   0.49 /    -2.06
KA01000600/   0.49 /    -3.52
```

```
       KA01000500/   0.65 /    -5.04         KA01000400/    0.65 /     -5.35
KA01000200/    0.67 /     -6.09
       KA01000100/   0.42 /    -6.74         KA01000300/    0.65 /     -5.73
KA01000710/    0.22 /     -0.03
       KA01XC0100/   0.43 /    -0.86         KA01000610/    0.07 /     -1.31
KA01000510/    0.16 /     -2.93
       KA01XB0100/   0.22 /    -3.66         KA010A0100/    0.13 /     -2.67
KA01000110/    0.09 /      2.82
       KA01XA0100/   0.09 /    -6.36         A & B WWPS/    0.34 /     -2.52
KA01000130/    0.09 /     -1.83
       Kahului PS/   0.42 /    -7.40         KTC - New/     0.30 /      5.80

         Conduit/          FLOW      ===> "*" Conduit uses the normal flow option.
          Link 1/          0.22*          Link 2/        1.24*          Link 3/
 1.25*            Link 4/          1.50
          Link 7/          1.56           Link 5/        1.50           Link 6/
 1.49             Link 8/          0.17
          Link 9/          0.56           Link 10/       0.02           Link 11/
 0.09             Link 12/         0.17
          Link 14/         0.07           Link 15/       0.03           Link 18/
 0.05*            Link 16/         0.44
          Link 17/         0.03           Link 19/       2.10           KTC Line/
 0.29             FREE # 1/        2.10
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     9.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.43E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    10.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.30E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    11.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.24E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    12.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.18E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
```

Kahului Shopping Center - COM Standards_SC200.txt
Cycle 1500 Time 12 Hrs - 30.00 Min

Junction / Depth / Elevation ===> "*" Junction is Surcharged.
KA01000800/ 0.23 / -0.85 KA01000700/ 0.48 / -2.07
KA01000600/ 0.48 / -3.53
KA01000500/ 0.63 / -5.06 KA01000400/ 0.63 / -5.37
KA01000200/ 0.66 / -6.10
KA01000100/ 0.43 / -6.73 KA01000300/ 0.64 / -5.74
KA01000710/ 0.18 / -0.07
KA01XC0100/ 0.36 / -0.93 KA01000610/ 0.08 / -1.30
KA01000510/ 0.18 / -2.91
KA01XB0100/ 0.18 / -3.70 KA010A0100/ 0.15 / -2.65
KA01000110/ 0.10 / 2.83
KA01XA0100/ 0.10 / -6.35 A & B WWPS/ 0.40 / -2.46
KA01000130/ 0.11 / -1.81
Kahului PS/ 0.43 / -7.39 KTC - New/ 0.35 / 5.85

Conduit/ FLOW ===> "*" Conduit uses the normal flow option.
Link 1/ 0.28* Link 2/ 1.18* Link 3/
1.20* Link 4/ 1.43
Link 7/ 1.53 Link 5/ 1.44 Link 6/
1.44 Link 8/ 0.12
Link 9/ 0.40 Link 10/ 0.02 Link 11/
0.11 Link 12/ 0.12
Link 14/ 0.09 Link 15/ 0.04 Link 18/
0.06* Link 16/ 0.56
Link 17/ 0.04 Link 19/ 2.23 KTC Line/
0.37 FREE # 1/ 2.23
# #
===> System inflows (data group K3) at 13.00 hours (Junction / Inflow,cfs)

KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.12E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
# #
===> System inflows (data group K3) at 14.00 hours (Junction / Inflow,cfs)

KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.12E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
# #
===> System inflows (data group K3) at 15.00 hours (Junction / Inflow,cfs)

KA01000800/ 2.71E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.13E-02 KA01000510/ 1.08E-01 KA01XB0100/ 1.12E-01
KA010A0100/ 9.14E-02 KA01000110/ 3.64E-02 KA01XA0100/ 6.15E-02 A & B WWPS/
5.46E-01 KA01000130/ 3.56E-02 KTC - New / 3.60E-01
# #
# #
===> System inflows (data group K3) at 16.00 hours (Junction / Inflow,cfs)

KA01000800/ 2.54E-01 KA01000710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01000610/
2.00E-02 KA01000510/ 1.01E-01 KA01XB0100/ 1.18E-01

KA010A0100/ 8.57E-02 KA01000110/ 3.41E-02 KA01XA0100/ 5.77E-02 A & B WWPS/
5.12E-01 KA01000130/ 3.33E-02 KTC - New / 3.37E-01
# #
#

Cycle 2000 Time 16 Hrs - 40.00 Min

Junction / Depth / Elevation ===> "*" Junction is Surcharged.
KA01000800/ 0.22 / -0.86 KA01000700/ 0.46 / -2.09
KA01000600/ 0.47 / -3.54
KA01000500/ 0.61 / -5.08 KA01000400/ 0.61 / -5.39
KA01000200/ 0.64 / -6.12
KA01000100/ 0.42 / -6.74 KA01000300/ 0.62 / -5.76
KA01000710/ 0.18 / -0.07
KA01XC0100/ 0.35 / -0.94 KA01000610/ 0.07 / -1.31
KA01000510/ 0.17 / -2.92
KA01XB0100/ 0.18 / -3.70 KA010A0100/ 0.14 / -2.66
KA01000110/ 0.10 / 2.83
KA01XA0100/ 0.09 / -6.36 A & B WWPS/ 0.38 / -2.48
KA01000130/ 0.10 / -1.82
Kahului PS/ 0.42 / -7.40 KTC - New/ 0.33 / 5.83

Conduit/ FLOW ===> "*" Conduit uses the normal flow option.
Link 1/ 0.26* Link 2/ 1.11* Link 3/
1.13* Link 4/ 1.35 Link 5/ 1.35 Link 6/
1.35 Link 7/ 1.44 Link 8/ 0.12 Link 10/ 0.02 Link 11/
0.10 Link 9/ 0.39 Link 12/ 0.12 Link 15/ 0.03 Link 18/
0.06* Link 14/ 0.09 Link 16/ 0.53 Link 19/ 2.09 KTC Line/
0.35 Link 17/ 0.03 FREE # 1/ 2.09
# #
#
===> System inflows (data group K3) at 17.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.03E-01 KA01000710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 1.30E-01
KA010A0100/ 6.86E-02 KA01000110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
# #
#
# #
#
===> System inflows (data group K3) at 18.00 hours (Junction / Inflow,cfs
)

KA01000800/ 1.69E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
1.33E-02 KA01000510/ 6.76E-02 KA01XB0100/ 1.49E-01
KA010A0100/ 5.71E-02 KA01000110/ 2.27E-02 KA01XA0100/ 3.85E-02 A & B WWPS/
3.41E-01 KA01000130/ 2.22E-02 KTC - New / 2.25E-01
# #
#
# #
#
===> System inflows (data group K3) at 19.00 hours (Junction / Inflow,cfs
)

KA01000800/ 1.36E-01 KA01000710/ 1.55E-01 KA01XC0100/ 5.17E-01 KA01000610/
1.07E-02 KA01000510/ 5.41E-02 KA01XB0100/ 1.55E-01
KA010A0100/ 4.57E-02 KA01000110/ 1.82E-02 KA01XA0100/ 3.08E-02 A & B WWPS/
2.73E-01 KA01000130/ 1.78E-02 KTC - New / 1.80E-01
# #
#
# #
#

```
 ===> System inflows (data group K3) at    20.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.10E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
8.67E-03 KA01000510/ 4.39E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 3.71E-02 KA01000110/ 1.48E-02 KA01XA0100/ 2.50E-02 A & B WWPS/
2.22E-01 KA01000130/ 1.44E-02 KTC - New / 1.46E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        2500        Time            20 Hrs - 50.00 Min

       Junction / Depth  / Elevation     ===>  "*" Junction is Surcharged.
      KA01000800/   0.15 /    -0.93       KA01000700/   0.42 /     -2.13
KA01000600/   0.42 /    -3.59
      KA01000500/   0.56 /    -5.13       KA01000400/   0.56 /     -5.44
KA01000200/   0.59 /    -6.17
      KA01000100/   0.35 /    -6.81       KA01000300/   0.57 /     -5.81
KA01000710/   0.21 /    -0.04
      KA01XC0100/   0.40 /    -0.89       KA01000610/   0.05 /     -1.33
KA01000510/   0.12 /    -2.97
      KA01XB0100/   0.20 /    -3.68       KA010A0100/   0.10 /     -2.70
KA01000110/   0.07 /     2.80
      KA01XA0100/   0.06 /    -6.39       A & B WWPS/   0.24 /     -2.62
KA01000130/   0.07 /    -1.85
      Kahului PS/   0.35 /    -7.47        KTC - New/   0.22 /      5.72

         Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
          Link 1/        0.12*             Link 2/        0.92*         Link 3/
  0.94*          Link 4/        1.14
          Link 7/        1.19              Link 5/        1.14          Link 6/
  1.15           Link 8/        0.15
          Link 9/        0.50             Link 10/        0.01         Link 11/
  0.05          Link 12/        0.15
         Link 14/        0.04             Link 15/        0.02         Link 18/
  0.03*         Link 16/        0.23
         Link 17/        0.02             Link 19/        1.49        KTC Line/
  0.15          FREE # 1/       1.49
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    21.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.02E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
8.00E-03 KA01000510/ 4.05E-02 KA01XB0100/ 1.24E-01
 KA010A0100/ 3.43E-02 KA01000110/ 1.36E-02 KA01XA0100/ 2.31E-02 A & B WWPS/
2.05E-01 KA01000130/ 1.33E-02 KTC - New / 1.35E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    22.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 9.32E-02 KA01XC0100/ 3.10E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 9.32E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    23.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 8.70E-02 KA01XC0100/ 2.89E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 8.70E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
```

1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
# #
# #
===> System inflows (data group K3) at 24.00 hours (Junction / Inflow,cfs)

KA01000800/ 6.78E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 7.45E-02
KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
# #
# #
===> System inflows (data group K3) at 25.00 hours (Junction / Inflow,cfs)

KA01000800/ 5.08E-02 KA01000710/ 6.83E-02 KA01XC0100/ 2.27E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 6.83E-02
KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
# #

Cycle 3000 Time 25 Hrs - 0.00 Min

Junction / Depth / Elevation ===> "*" Junction is Surcharged.

Junction	Depth	Elevation	Junction	Depth	Elevation
KA01000800/	0.12 /	-0.96	KA01000700/	0.30 /	-2.25
KA01000600/	0.31 /	-3.70			
KA01000500/	0.41 /	-5.28	KA01000400/	0.41 /	-5.59
KA01000200/	0.44 /	-6.32			
KA01000100/	0.26 /	-6.90	KA01000300/	0.41 /	-5.97
KA01000710/	0.15 /	-0.10			
KA01XC0100/	0.28 /	-1.01	KA01000610/	0.04 /	-1.34
KA01000510/	0.09 /	-3.00			
KA01XB0100/	0.15 /	-3.73	KA010A0100/	0.08 /	-2.72
KA01000110/	0.05 /	2.78			
KA01XA0100/	0.05 /	-6.40	A & B WWPS/	0.18 /	-2.68
KA01000130/	0.06 /	-1.86			
Kahului PS/	0.26 /	-7.56	KTC - New/	0.16 /	5.66

Conduit/ FLOW ===> "*" Conduit uses the normal flow option.

Conduit	Flow	Conduit	Flow	Conduit	Flow	Conduit	Flow
Link 1/	0.07*	Link 2/	0.49*	Link 3/	0.49*	Link 4/	0.60
Link 5/	0.60	Link 6/	0.61	Link 7/	0.63	Link 8/	0.08
Link 9/	0.25	Link 10/	0.01	Link 11/	0.03	Link 12/	0.08
Link 14/	0.02	Link 15/	0.01	Link 18/	0.02*	Link 16/	0.14
Link 17/	0.01	Link 19/	0.81	KTC Line/	0.09	FREE # 1/	0.81

# #
===> System inflows (data group K3) at 26.00 hours (Junction / Inflow,cfs)

KA01000800/ 5.08E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 7.45E-02
KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
# #
# #
===> System inflows (data group K3) at 27.00 hours (Junction / Inflow,cfs

)
KA01000800/ 5.08E-02 KA01000710/ 8.82E-02 KA01XC0100/ 2.93E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 8.82E-02
KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
# #
#
# #
#
===> System inflows (data group K3) at 28.00 hours (Junction / Inflow,cfs
)
KA01000800/ 7.12E-02 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
5.60E-03 KA01000510/ 2.84E-02 KA01XB0100/ 1.43E-01
KA010A0100/ 2.40E-02 KA01000110/ 9.54E-03 KA01XA0100/ 1.62E-02 A & B WWPS/
1.43E-01 KA01000130/ 9.33E-03 KTC - New / 9.44E-02
# #
#
# #
#
===> System inflows (data group K3) at 29.00 hours (Junction / Inflow,cfs
)
KA01000800/ 1.00E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
7.87E-03 KA01000510/ 3.99E-02 KA01XB0100/ 1.73E-01
KA010A0100/ 3.37E-02 KA01000110/ 1.34E-02 KA01XA0100/ 2.27E-02 A & B WWPS/
2.01E-01 KA01000130/ 1.31E-02 KTC - New / 1.33E-01
# #
#

Cycle 3500 Time 29 Hrs - 10.00 Min

Junction / Depth / Elevation ===> "*" Junction is Surcharged.
KA01000800/ 0.12 / -0.96 KA01000700/ 0.39 / -2.16
KA01000600/ 0.39 / -3.62
KA01000500/ 0.51 / -5.18 KA01000400/ 0.51 / -5.49
KA01000200/ 0.52 / -6.24
KA01000100/ 0.31 / -6.85 KA01000300/ 0.51 / -5.87
KA01000710/ 0.20 / -0.05
KA01XC0100/ 0.40 / -0.89 KA01000610/ 0.04 / -1.34
KA01000510/ 0.09 / -3.00
KA01XB0100/ 0.20 / -3.68 KA010A0100/ 0.08 / -2.72
KA01000110/ 0.06 / 2.79
KA01XA0100/ 0.05 / -6.40 A & B WWPS/ 0.19 / -2.67
KA01000130/ 0.06 / -1.86
Kahului PS/ 0.30 / -7.52 KTC - New/ 0.17 / 5.67

Conduit/ FLOW ===> "*" Conduit uses the normal flow option.
Link 1/ 0.07* Link 2/ 0.80 Link 3/
0.79* Link 4/ 0.96
Link 7/ 0.93 Link 5/ 0.94 Link 6/
0.92 Link 8/ 0.15
Link 9/ 0.49 Link 10/ 0.01 Link 11/
0.03 Link 12/ 0.15
Link 14/ 0.03 Link 15/ 0.01 Link 18/
0.02* Link 16/ 0.15
Link 17/ 0.01 Link 19/ 1.11 KTC Line/
0.10 FREE # 1/ 1.11
# #
#
===> System inflows (data group K3) at 30.00 hours (Junction / Inflow,cfs
)
KA01000800/ 1.47E-01 KA01000710/ 1.79E-01 KA01XC0100/ 5.95E-01 KA01000610/
1.16E-02 KA01000510/ 5.88E-02 KA01XB0100/ 1.79E-01
KA010A0100/ 4.97E-02 KA01000110/ 1.98E-02 KA01XA0100/ 3.35E-02 A & B WWPS/
2.97E-01 KA01000130/ 1.93E-02 KTC - New / 1.96E-01

```
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    31.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.03E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 1.73E-01
 KA010A0100/ 6.86E-02 KA01000110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    32.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.54E-01 KA01000710/ 1.60E-01 KA01XC0100/ 5.33E-01 KA01000610/
2.00E-02 KA01000510/ 1.01E-01 KA01XB0100/ 1.60E-01
 KA010A0100/ 8.57E-02 KA01000110/ 3.41E-02 KA01XA0100/ 5.77E-02 A & B WWPS/
5.12E-01 KA01000130/ 3.33E-02 KTC - New / 3.37E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    33.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.43E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #

 Cycle        4000       Time          33 Hrs - 20.00 Min

        Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
       KA01000800/  0.22 /    -0.86       KA01000700/   0.50 /     -2.05
KA01000600/   0.50 /    -3.51
       KA01000500/  0.66 /    -5.03       KA01000400/   0.66 /     -5.34
KA01000200/   0.68 /    -6.08
       KA01000100/  0.44 /    -6.72       KA01000300/   0.67 /     -5.71
KA01000710/   0.21 /    -0.04
       KA01XC0100/  0.41 /    -0.88       KA01000610/   0.07 /     -1.31
KA01000510/   0.17 /    -2.92
       KA01XB0100/  0.21 /    -3.67       KA010A0100/   0.14 /     -2.66
KA01000110/   0.10 /     2.83
       KA01XA0100/  0.09 /    -6.36       A & B WWPS/   0.38 /     -2.48
KA01000130/   0.10 /    -1.82
       Kahului PS/  0.44 /    -7.38       KTC - New/    0.34 /      5.84

        Conduit/         FLOW    ===> "*" Conduit uses the normal flow option.
         Link 1/         0.26*          Link 2/       1.28*          Link 3/
  1.30*         Link 4/         1.56
         Link 7/         1.65           Link 5/       1.56           Link 6/
  1.56          Link 8/         0.16
         Link 9/         0.52           Link 10/      0.02           Link 11/
  0.10          Link 12/        0.16
        Link 14/         0.09           Link 15/      0.04           Link 18/
  0.06*         Link 16/        0.53
        Link 17/         0.03           Link 19/      2.30           KTC Line/
  0.35          FREE # 1/       2.30
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    34.00 hours ( Junction / Inflow,cfs
)
```

KA01000800/ 2.80E-01 KA01000710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.30E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
#
# #
#
===> System inflows (data group K3) at 35.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.80E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.24E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
#
# #
#
===> System inflows (data group K3) at 36.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.80E-01 KA01000710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.18E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
#
# #
#
===> System inflows (data group K3) at 37.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.12E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
#

Cycle 4500 Time 37 Hrs - 30.00 Min

Junction / Depth / Elevation ===> "*" Junction is Surcharged.
KA01000800/ 0.23 / -0.85 KA01000700/ 0.47 / -2.08
KA01000600/ 0.48 / -3.53
KA01000500/ 0.62 / -5.07 KA01000400/ 0.63 / -5.37
KA01000200/ 0.65 / -6.11
KA01000100/ 0.43 / -6.73 KA01000300/ 0.63 / -5.75
KA01000710/ 0.18 / -0.07
KA01XC0100/ 0.35 / -0.94 KA01000610/ 0.08 / -1.30
KA01000510/ 0.18 / -2.91
KA01XB0100/ 0.18 / -3.70 KA010A0100/ 0.15 / -2.65
KA01000110/ 0.10 / 2.83
KA01XA0100/ 0.10 / -6.35 A & B WWPS/ 0.40 / -2.46
KA01000130/ 0.11 / -1.81
Kahului PS/ 0.43 / -7.39 KTC - New/ 0.35 / 5.85

Conduit/ FLOW ===> "*" Conduit uses the normal flow option.
Link 1/ 0.28* Link 2/ 1.15* Link 3/
1.17* Link 4/ 1.40
Link 7/ 1.50 Link 5/ 1.40 Link 6/
1.40 Link 8/ 0.12
Link 9/ 0.38 Link 10/ 0.02 Link 11/
0.11 Link 12/ 0.12
Link 14/ 0.09 Link 15/ 0.04 Link 18/
0.06* Link 16/ 0.56
Link 17/ 0.04 Link 19/ 2.20 KTC Line/

```
   0.37          FREE # 1/         2.20
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    38.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    39.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.71E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.13E-02 KA01000510/ 1.08E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.14E-02 KA01000110/ 3.64E-02 KA01XA0100/ 6.15E-02 A & B WWPS/
5.46E-01 KA01000130/ 3.56E-02 KTC - New / 3.60E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    40.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.54E-01 KA01000710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01000610/
2.00E-02 KA01000510/ 1.01E-01 KA01XB0100/ 1.18E-01
 KA010A0100/ 8.57E-02 KA01000110/ 3.41E-02 KA01XA0100/ 5.77E-02 A & B WWPS/
5.12E-01 KA01000130/ 3.33E-02 KTC - New / 3.37E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    41.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.03E-01 KA01000710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 1.30E-01
 KA010A0100/ 6.86E-02 KA01000110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        5000       Time          41 Hrs - 40.00 Min

       Junction / Depth  / Elevation     ===>   "*" Junction is Surcharged.
      KA01000800/   0.21 /     -0.87        KA01000700/   0.45 /     -2.10
KA01000600/   0.46 /     -3.55
      KA01000500/   0.60 /     -5.09        KA01000400/   0.60 /     -5.40
KA01000200/   0.63 /     -6.13
      KA01000100/   0.40 /     -6.76        KA01000300/   0.61 /     -5.77
KA01000710/   0.19 /     -0.06
      KA01XC0100/   0.37 /     -0.92        KA01000610/   0.07 /     -1.31
KA01000510/   0.16 /     -2.93
      KA01XB0100/   0.19 /     -3.69        KA010A0100/   0.13 /     -2.67
KA01000110/   0.09 /      2.82
      KA01XA0100/   0.09 /     -6.36        A & B WWPS/   0.34 /     -2.52
KA01000130/   0.10 /     -1.82
     Kahului PS/    0.40 /     -7.42         KTC - New/   0.30 /      5.80

        Conduit/          FLOW     ===> "*" Conduit uses the normal flow option.
          Link 1/          0.22*             Link 2/         1.06*         Link 3/
  1.08*          Link 4/          1.30
          Link 7/          1.39              Link 5/         1.31          Link 6/
  1.31           Link 8/          0.13
```

```
        Link 9/          0.42               Link 10/          0.02              Link 11/
0.09              Link 12/          0.13
        Link 14/          0.07               Link 15/          0.03              Link 18/
0.05*             Link 16/          0.45
        Link 17/          0.03               Link 19/          1.95              KTC Line/
0.29              FREE # 1/         1.95
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     42.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.69E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
1.33E-02 KA01000510/ 6.76E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 5.71E-02 KA01000110/ 2.27E-02 KA01XA0100/ 3.85E-02 A & B WWPS/
3.41E-01 KA01000130/ 2.22E-02 KTC - New / 2.25E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     43.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.36E-01 KA01000710/ 1.55E-01 KA01XC0100/ 5.17E-01 KA01000610/
1.07E-02 KA01000510/ 5.41E-02 KA01XB0100/ 1.55E-01
 KA010A0100/ 4.57E-02 KA01000110/ 1.82E-02 KA01XA0100/ 3.08E-02 A & B WWPS/
2.73E-01 KA01000130/ 1.78E-02 KTC - New / 1.80E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     44.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.10E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
8.67E-03 KA01000510/ 4.39E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 3.71E-02 KA01000110/ 1.48E-02 KA01XA0100/ 2.50E-02 A & B WWPS/
2.22E-01 KA01000130/ 1.44E-02 KTC - New / 1.46E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     45.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.02E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
8.00E-03 KA01000510/ 4.05E-02 KA01XB0100/ 1.24E-01
 KA010A0100/ 3.43E-02 KA01000110/ 1.36E-02 KA01XA0100/ 2.31E-02 A & B WWPS/
2.05E-01 KA01000130/ 1.33E-02 KTC - New / 1.35E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

Cycle        5500       Time          45 Hrs - 50.00 Min

      Junction / Depth  / Elevation     ===>  "*" Junction is Surcharged.
      KA01000800/   0.14 /    -0.94       KA01000700/   0.39 /    -2.16
KA01000600/   0.40 /   -3.61
      KA01000500/   0.52 /    -5.17       KA01000400/   0.53 /    -5.47
KA01000200/   0.56 /   -6.20
      KA01000100/   0.33 /    -6.83       KA01000300/   0.53 /    -5.85
KA01000710/   0.19 /   -0.06
      KA01XC0100/   0.37 /    -0.92       KA01000610/   0.05 /    -1.33
KA01000510/   0.11 /   -2.98
      KA01XB0100/   0.19 /    -3.69       KA010A0100/   0.09 /    -2.71
KA01000110/   0.06 /    2.79
      KA01XA0100/   0.06 /    -6.39       A & B WWPS/   0.22 /    -2.64
KA01000130/   0.07 /   -1.85
      Kahului PS/   0.33 /    -7.49        KTC - New/   0.20 /     5.70
```

```
            Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
             Link 1/        0.10*         Link 2/        0.80*        Link 3/
  0.82*          Link 4/           1.00
             Link 7/         1.06         Link 5/        1.01         Link 6/
  1.01           Link 8/           0.13
             Link 9/         0.43        Link 10/        0.01        Link 11/
  0.04          Link 12/           0.13
            Link 14/         0.03        Link 15/        0.01        Link 18/
  0.02*         Link 16/           0.21
            Link 17/         0.01        Link 19/        1.32       KTC Line/
  0.14         FREE # 1/           1.32
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    46.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 9.32E-02 KA01XC0100/ 3.10E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 9.32E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    47.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 8.70E-02 KA01XC0100/ 2.89E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 8.70E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    48.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    49.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 6.83E-02 KA01XC0100/ 2.27E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 6.83E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    50.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        6000       Time          50 Hrs -   0.00 Min
```

```
   Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
       KA01000800/   0.10 /    -0.98      KA01000700/   0.28 /     -2.27
KA01000600/   0.29 /    -3.72
       KA01000500/   0.38 /    -5.31      KA01000400/   0.38 /     -5.62
KA01000200/   0.41 /    -6.35
       KA01000100/   0.24 /    -6.92      KA01000300/   0.39 /     -5.99
KA01000710/   0.14 /    -0.11
       KA01XC0100/   0.27 /    -1.02      KA01000610/   0.04 /     -1.34
KA01000510/   0.08 /    -3.01
       KA01XB0100/   0.14 /    -3.74      KA010A0100/   0.07 /     -2.73
KA01000110/   0.05 /     2.78
       KA01XA0100/   0.04 /    -6.41      A & B WWPS/   0.16 /     -2.70
KA01000130/   0.05 /    -1.87
       Kahului PS/   0.24 /    -7.58      KTC - New/    0.14 /      5.64

        Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
          Link 1/       0.05*         Link 2/       0.42*        Link 3/
  0.43*          Link 4/         0.52
          Link 7/       0.56          Link 5/       0.53         Link 6/
  0.53           Link 8/         0.07
          Link 9/       0.23          Link 10/      0.00         Link 11/
  0.02          Link 12/         0.07
         Link 14/       0.02          Link 15/      0.01         Link 18/
  0.01*         Link 16/         0.11
         Link 17/       0.01          Link 19/      0.69         KTC Line/
  0.07          FREE # 1/        0.69
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     51.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 8.82E-02 KA01XC0100/ 2.93E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 8.82E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     52.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 7.12E-02 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
5.60E-03 KA01000510/ 2.84E-02 KA01XB0100/ 1.43E-01
 KA010A0100/ 2.40E-02 KA01000110/ 9.54E-03 KA01XA0100/ 1.62E-02 A & B WWPS/
1.43E-01 KA01000130/ 9.33E-03 KTC - New / 9.44E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     53.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.00E-01 KA01000710/ 2.76E-01 KA01XC0100/ 9.19E-01 KA01000610/
7.87E-03 KA01000510/ 3.99E-02 KA01XB0100/ 2.76E-01
 KA010A0100/ 3.37E-02 KA01000110/ 1.34E-02 KA01XA0100/ 2.27E-02 A & B WWPS/
2.01E-01 KA01000130/ 1.31E-02 KTC - New / 1.33E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     54.00 hours ( Junction / Inflcw,cfs
)

 KA01000800/ 1.47E-01 KA01000710/ 3.58E-01 KA01XC0100/ 1.19E+00 KA01000610/
1.16E-02 KA01000510/ 5.88E-02 KA01XB0100/ 3.58E-01
 KA010A0100/ 4.97E-02 KA01000110/ 1.98E-02 KA01XA0100/ 3.35E-02 A & B WWPS/
```

2.97E-01 KA01000130/ 1.93E-02 KTC - New / 1.96E-01
# #

Cycle 6500 Time 54 Hrs - 10.00 Min

Junction / Depth / Elevation ===> "*" Junction is Surcharged.
KA01000800/ 0.14 / -0.94 KA01000700/ 0.54 / -2.01
KA01000600/ 0.54 / -3.47
KA01000500/ 0.70 / -4.99 KA01000400/ 0.70 / -5.30
KA01000200/ 0.70 / -6.06
KA01000100/ 0.40 / -6.76 KA01000300/ 0.69 / -5.69
KA01000710/ 0.29 / 0.04
KA01XC0100/ 0.57 / -0.72 KA01000610/ 0.05 / -1.33
KA01000510/ 0.11 / -2.98
KA01XB0100/ 0.28 / -3.60 KA010A0100/ 0.09 / -2.71
KA01000110/ 0.07 / 2.80
KA01XA0100/ 0.06 / -6.39 A & B WWPS/ 0.23 / -2.63
KA01000130/ 0.07 / -1.85
Kahului PS/ 0.40 / -7.42 KTC - New/ 0.21 / 5.71

Conduit/ FLOW ===> "*" Conduit uses the normal flow option.
Link 1/ 0.11* Link 2/ 1.48 Link 3/
1.46* Link 4/ 1.76
Link 7/ 1.71 Link 5/ 1.74 Link 6/
1.70 Link 8/ 0.29
Link 9/ 0.96 Link 10/ 0.01 Link 11/
0.04 Link 12/ 0.29
Link 14/ 0.04 Link 15/ 0.01 Link 18/
0.02* Link 16/ 0.21
Link 17/ 0.01 Link 19/ 1.96 KTC Line/
0.14 FREE # 1/ 1.96
# #
===> System inflows (data group K3) at 55.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.03E-01 KA01000710/ 2.94E-01 KA01XC0100/ 9.76E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 2.94E-01
KA010A0100/ 6.86E-02 KA01000110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
1.20E+00 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
# #
# #
===> System inflows (data group K3) at 56.00 hours (Junction / Inflow,cfs
)

KA01000800/ 4.07E-01 KA01000710/ 2.56E-01 KA01XC0100/ 8.53E-01 KA01000610/
3.20E-02 KA01000510/ 1.62E-01 KA01XB0100/ 2.56E-01
KA010A0100/ 1.37E-01 KA01000110/ 5.45E-02 KA01XA0100/ 1.62E-01 A & B WWPS/
1.20E+00 KA01000130/ 5.33E-02 KTC - New / 5.39E-01
# #
# #
===> System inflows (data group K3) at 57.00 hours (Junction / Inflow,cfs
)

KA01000800/ 5.59E-01 KA01000710/ 2.14E-01 KA01XC0100/ 7.13E-01 KA01000610/
4.40E-02 KA01000510/ 2.23E-01 KA01XB0100/ 2.14E-01
KA010A0100/ 1.89E-01 KA01000110/ 7.50E-02 KA01XA0100/ 1.90E-01 A & B WWPS/
1.20E+00 KA01000130/ 7.33E-02 KTC - New / 7.42E-01
# #
# #
===> System inflows (data group K3) at 58.00 hours (Junction / Inflow,cfs

```
KA01000800/ 4.75E-01 KA01000710/ 1.83E-01 KA01XC0100/ 6.07E-01 KA01000610/
3.74E-02 KA01000510/ 1.90E-01 KA01XB0100/ 1.83E-01
 KA010A0100/ 1.60E-01 KA01000110/ 6.38E-02 KA01XA0100/ 1.78E-01 A & B WWPS/
1.20E+00 KA01000130/ 6.23E-02 KTC - New / 6.30E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        7000        Time           58 Hrs - 20.00 Min

      Junction / Depth   / Elevation     ===>  "*" Junction is Surcharged.
     KA01000800/   0.32 /      -0.76        KA01000700/   0.66 /     -1.89
KA01000600/   0.67 /     -3.34
     KA01000500/   0.87 /     -4.82         KA01000400/   0.88 /     -5.12
KA01000200/   0.89 /     -5.87
     KA01000100/   0.61 /     -6.55         KA01000300/   0.88 /     -5.50
KA01000710/   0.24 /     -0.01
     KA01XC0100/   0.47 /     -0.82         KA01000610/   0.10 /     -1.28
KA01000510/   0.25 /     -2.84
     KA01XB0100/   0.24 /     -3.64         KA010A0100/   0.20 /     -2.60
KA01000110/   0.14 /      2.87
     KA01XA0100/   0.16 /     -6.29         A & B WWPS/   3.15*/      0.29
KA01000130/   0.15 /     -1.77
     Kahului PS/   0.61 /     -7.21         KTC - New/    0.54 /      6.04

       Conduit/          FLOW    ===> "*" Conduit uses the normal flow option.
        Link 1/          0.53*          Link 2/         2.14*          Link 3/
 2.19*          Link 4/          2.63
        Link 7/          2.85           Link 5/         2.64           Link 6/
 2.65           Link 8/          0.21
        Link 9/          0.68           Link 10/        0.04           Link 11/
 0.21          Link 12/          0.20
       Link 14/          0.18           Link 15/        0.07           Link 18/
 0.19*         Link 16/          1.20
       Link 17/          0.07           Link 19/        4.38           KTC Line/
 0.71          FREE # 1/         4.38
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     59.00 hours ( Junction / Inflow,cfs
)

KA01000800/ 4.19E-01 KA01000710/ 1.61E-01 KA01XC0100/ 5.37E-01 KA01000610/
3.30E-02 KA01000510/ 1.67E-01 KA01XB0100/ 1.61E-01
 KA010A0100/ 1.41E-01 KA01000110/ 5.63E-02 KA01XA0100/ 1.65E-01 A & B WWPS/
1.20E+00 KA01000130/ 5.50E-02 KTC - New / 5.56E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     60.00 hours ( Junction / Inflow,cfs
)

KA01000800/ 3.92E-01 KA01000710/ 1.42E-01 KA01XC0100/ 4.71E-01 KA01000610/
3.08E-02 KA01000510/ 1.56E-01 KA01XB0100/ 1.42E-01
 KA010A0100/ 1.32E-01 KA01000110/ 5.25E-02 KA01XA0100/ 1.52E-01 A & B WWPS/
1.20E+00 KA01000130/ 5.13E-02 KTC - New / 5.19E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     61.00 hours ( Junction / Inflow,cfs
)

KA01000800/ 3.64E-01 KA01000710/ 1.23E-01 KA01XC0100/ 4.09E-01 KA01000610/
2.86E-02 KA01000510/ 1.45E-01 KA01XB0100/ 1.23E-01
 KA010A0100/ 1.23E-01 KA01000110/ 4.88E-02 KA01XA0100/ 1.40E-01 A & B WWPS/
1.20E+00 KA01000130/ 4.77E-02 KTC - New / 4.82E-01
```

```
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    62.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 3.36E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.64E-02 KA01000510/ 1.34E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 1.13E-01 KA01000110/ 4.50E-02 KA01XA0100/ 1.27E-01 A & B WWPS/
1.20E+00 KA01000130/ 4.40E-02 KTC - New / 4.45E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #

 Cycle        7500       Time           62 Hrs - 30.00 Min

       Junction / Depth   / Elevation    ===>  "*" Junction is Surcharged.
      KA01000800/   0.26 /     -0.82      KA01000700/   0.51 /     -2.04
KA01000600/   0.52 /     -3.49
      KA01000500/   0.67 /     -5.02      KA01000400/   0.68 /     -5.32
KA01000200/   0.70 /     -6.06
      KA01000100/   0.52 /     -6.64      KA01000300/   0.68 /     -5.70
KA01000710/   0.18 /     -0.07
      KA01XC0100/   0.35 /     -0.94      KA01000610/   0.08 /     -1.30
KA01000510/   0.20 /     -2.89
      KA01XB0100/   0.18 /     -3.70      KA010A0100/   0.17 /     -2.63
KA01000110/   0.12 /      2.85
      KA01XA0100/   0.14 /     -6.31      A & B WWPS/   3.15*/      0.29
KA01000130/   0.12 /     -1.80
      Kahului PS/   0.52 /     -7.30      KTC - New/    0.40 /      5.90

       Conduit/          FLOW    ===> "*" Conduit uses the normal flow option.
        Link 1/          0.35*          Link 2/        1.33*         Link 3/
 1.36*          Link 4/          1.63
        Link 7/          1.76           Link 5/        1.63          Link 6/
 1.64           Link 8/          0.12
        Link 9/          0.39           Link 10/       0.03          Link 11/
 0.14         Link 12/           0.12
       Link 14/          0.12           Link 15/       0.05          Link 18/
 0.13*        Link 16/           1.20
       Link 17/          0.05           Link 19/       3.19          KTC Line/
 0.46         FREE # 1/          3.19
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    63.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.98E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.35E-02 KA01000510/ 1.19E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 1.01E-01 KA01000110/ 4.00E-02 KA01XA0100/ 1.17E-01 A & B WWPS/
1.20E+00 KA01000130/ 3.91E-02 KTC - New / 3.96E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    64.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.18E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 1.04E-01 A & B WWPS/
1.20E+00 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
 ===> System inflows (data group K3) at    65.00 hours ( Junction / Inflow,cfs
)
```

```
 KA01000800/ 2.03E-01 KA01000710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 1.30E-01
 KA010A0100/ 8.79E-02 KA01000110/ 2.73E-02 KA01XA0100/ 8.77E-02 A & B WWPS/
1.20E+00 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    66.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.69E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
1.33E-02 KA01000510/ 6.76E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 7.33E-02 KA01000110/ 2.27E-02 KA01XA0100/ 7.31E-02 A & B WWPS/
1.20E+00 KA01000130/ 2.22E-02 KTC - New / 2.25E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        8000       Time          66 Hrs - 40.00 Min

       Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
      KA01000800/   0.19 /    -0.89        KA01000700/  0.45 /    -2.10
KA01000600/   0.45 /     -3.56
      KA01000500/   0.59 /    -5.10        KA01000400/  0.59 /    -5.41
KA01000200/   0.62 /     -6.14
      KA01000100/   0.47 /    -6.69        KA01000300/  0.60 /    -5.78
KA01000710/   0.20 /     -0.05
      KA01XC0100/   0.39 /    -0.90        KA01000610/  0.06 /    -1.32
KA01000510/   0.14 /     -2.95
      KA01XB0100/   0.20 /    -3.68        KA010A0100/  0.14 /    -2.66
KA01000110/   0.09 /      2.82
      KA01XA0100/   0.11 /    -6.34        A & B WWPS/  3.15*/     0.29
KA01000130/   0.09 /     -1.83
      Kahului PS/   0.47 /    -7.35        KTC - New/   0.27 /     5.77

         Conduit/         FLOW    ===> "*" Conduit uses the normal flow option.
          Link 1/         0.18*           Link 2/         1.04*          Link 3/
  1.05*          Link 4/          1.27
          Link 7/         1.35            Link 5/         1.27           Link 6/
  1.27           Link 8/          0.14
          Link 9/         0.47           Link 10/         0.01          Link 11/
  0.07          Link 12/          0.14
         Link 14/         0.08           Link 15/         0.02          Link 18/
  0.08*         Link 16/          1.20
         Link 17/         0.02           Link 19/         2.67          KTC Line/
  0.24          FREE # 1/         2.67
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    67.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.36E-01 KA01000710/ 1.55E-01 KA01XC0100/ 5.17E-01 KA01000610/
1.07E-02 KA01000510/ 5.41E-02 KA01XB0100/ 1.55E-01
 KA010A0100/ 5.86E-02 KA01000110/ 1.82E-02 KA01XA0100/ 5.85E-02 A & B WWPS/
1.20E+00 KA01000130/ 1.78E-02 KTC - New / 1.80E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    68.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.10E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
8.67E-03 KA01000510/ 4.39E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 4.76E-02 KA01000110/ 1.48E-02 KA01XA0100/ 4.75E-02 A & B WWPS/
1.20E+00 KA01000130/ 1.44E-02 KTC - New / 1.46E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
```

```
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    69.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.02E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
8.00E-03 KA01000510/ 4.05E-02 KA01XB0100/ 1.24E-01
 KA010A0100/ 4.40E-02 KA01000110/ 1.36E-02 KA01XA0100/ 3.92E-02 A & B WWPS/
1.20E+00 KA01000130/ 1.33E-02 KTC - New / 1.35E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    70.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 9.32E-02 KA01XC0100/ 3.10E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 9.32E-02
 KA010A0100/ 2.93E-02 KA01000110/ 9.09E-03 KA01XA0100/ 2.00E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        8500      Time          70 Hrs - 50.00 Min

       Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
      KA01000800/   0.12 /     -0.96        KA01000700/   0.34 /     -2.21
KA01000600/   0.35 /    -3.66
      KA01000500/   0.46 /     -5.23        KA01000400/   0.47 /     -5.53
KA01000200/   0.50 /    -6.26
      KA01000100/   0.33 /     -6.83        KA01000300/   0.47 /     -5.91
KA01000710/   0.17 /    -0.08
      KA01XC0100/   0.32 /     -0.97        KA01000610/   0.04 /     -1.34
KA01000510/   0.09 /    -3.00
      KA01XB0100/   0.17 /     -3.71        KA010A0100/   0.09 /     -2.71
KA01000110/   0.06 /     2.79
      KA01XA0100/   0.06 /     -6.39        A & B WWPS/   0.31 /     -2.55
KA01000130/   0.06 /    -1.86
      Kahului PS/   0.33 /     -7.49         KTC - New/   0.17 /      5.67

         Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
          Link 1/        0.08*          Link 2/       0.61*          Link 3/
  0.63*          Link 4/         0.78
          Link 7/        0.85           Link 5/       0.79           Link 6/
  0.80           Link 8/         0.10
          Link 9/        0.33          Link 10/       0.01          Link 11/
  0.03          Link 12/         0.10
         Link 14/        0.03          Link 15/       0.01          Link 18/
  0.02*         Link 16/         0.37
         Link 17/        0.01          Link 19/       1.28          KTC Line/
  0.10          FREE # 1/        1.28
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    71.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 8.70E-02 KA01XC0100/ 2.89E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 8.70E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    72.00 hours ( Junction / Inflow,cfs
)
```

```
 KA01000800/ 6.78E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    73.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 6.83E-02 KA01XC0100/ 2.27E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 6.83E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    74.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    75.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 8.82E-02 KA01XC0100/ 2.93E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 8.82E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle      9000      Time          75 Hrs -  0.00 Min

       Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
      KA01000800/  0.10 /    -0.98      KA01000700/  0.29 /    -2.26
KA01000600/  0.29 /    -3.72
      KA01000500/  0.38 /    -5.31      KA01000400/  0.38 /    -5.62
KA01000200/  0.41 /    -6.35
      KA01000100/  0.24 /    -6.92      KA01000300/  0.38 /    -6.00
KA01000710/  0.14 /    -0.11
      KA01XC0100/  0.28 /    -1.01      KA01000610/  0.03 /    -1.35
KA01000510/  0.08 /    -3.01
      KA01XB0100/  0.14 /    -3.74      KA010A0100/  0.07 /    -2.73
KA01000110/  0.05 /     2.78
      KA01XA0100/  0.04 /    -6.41      A & B WWPS/  0.16 /    -2.70
KA01000130/  0.05 /    -1.87
      Kahului PS/  0.24 /    -7.58       KTC - New/  0.14 /     5.64

        Conduit/       FLOW   ===> "*" Conduit uses the normal flow option.
         Link 1/       0.05*        Link 2/       0.44*       Link 3/
  0.44*         Link 4/       0.53
         Link 7/       0.54         Link 5/       0.53        Link 6/
  0.53          Link 8/       0.07
         Link 9/       0.25        Link 10/       0.00       Link 11/
  0.02         Link 12/       0.07
        Link 14/       0.02        Link 15/       0.01       Link 18/
  0.01*        Link 16/       0.10
        Link 17/       0.01        Link 19/       0.67       KTC Line/
  0.07        FREE # 1/       0.67
```

```
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    76.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 7.12E-02 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
5.60E-03 KA01000510/ 2.84E-02 KA01XB0100/ 1.43E-01
 KA010A0100/ 2.40E-02 KA01000110/ 9.54E-03 KA01XA0100/ 1.62E-02 A & B WWPS/
1.43E-01 KA01000130/ 9.33E-03 KTC - New / 9.44E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    77.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.00E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
7.87E-03 KA01000510/ 3.99E-02 KA01XB0100/ 1.73E-01
 KA010A0100/ 3.37E-02 KA01000110/ 1.34E-02 KA01XA0100/ 2.27E-02 A & B WWPS/
2.01E-01 KA01000130/ 1.31E-02 KTC - New / 1.33E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    78.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.47E-01 KA01000710/ 1.79E-01 KA01XC0100/ 5.95E-01 KA01000610/
1.16E-02 KA01000510/ 5.88E-02 KA01XB0100/ 1.79E-01
 KA010A0100/ 4.97E-02 KA01000110/ 1.98E-02 KA01XA0100/ 3.35E-02 A & B WWPS/
2.97E-01 KA01000130/ 1.93E-02 KTC - New / 1.96E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    79.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.03E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 1.73E-01
 KA010A0100/ 6.86E-02 KA01000110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle        9500       Time          79 Hrs - 10.00 Min

        Junction / Depth  / Elevation     ===>  "*" Junction is Surcharged.
      KA01000800/   0.17 /     -0.91         KA01000700/   0.47 /     -2.08
KA01000600/   0.47 /     -3.54
      KA01000500/   0.61 /     -5.08         KA01000400/   0.61 /     -5.39
KA01000200/   0.63 /     -6.13
      KA01000100/   0.39 /     -6.77         KA01000300/   0.62 /     -5.76
KA01000710/   0.22 /     -0.03
      KA01XC0100/   0.44 /     -0.85         KA01000610/   0.06 /     -1.32
KA01000510/   0.13 /     -2.96
      KA01XB0100/   0.22 /     -3.66         KA010A0100/   0.11 /     -2.69
KA01000110/   0.08 /      2.81
      KA01XA0100/   0.07 /     -6.38         A & B WWPS/   0.28 /     -2.58
KA01000130/   0.08 /     -1.84
      Kahului PS/   0.38 /     -7.44          KTC - New/   0.25 /      5.75

         Conduit/        FLOW     ===> "*" Conduit uses the normal flow option.
          Link 1/        0.15*           Link 2/        1.13           Link 3/
  1.13*          Link 4/          1.36
          Link 7/        1.39            Link 5/        1.36           Link 6/
  1.35           Link 8/          0.18
          Link 9/        0.59           Link 10/        0.01          Link 11/
```

```
 0.06         Link 12/          0.18
       Link 14/          0.05          Link 15/        0.02          Link 18/
 0.04*        Link 16/          0.31
       Link 17/          0.02          Link 19/        1.77          KTC Line/
 0.21         FREE # 1/         1.77
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     80.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.54E-01 KA01000710/ 1.60E-01 KA01XC0100/ 5.33E-01 KA01000610/
2.00E-02 KA01000510/ 1.01E-01 KA01XB0100/ 1.60E-01
 KA010A0100/ 8.57E-02 KA01000110/ 3.41E-02 KA01XA0100/ 9.23E-02 A & B WWPS/
5.12E-01 KA01000130/ 3.33E-02 KTC - New / 3.37E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     81.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.43E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 1.27E-01 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     82.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.30E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 1.08E-01 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     83.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.24E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 9.52E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle      10000       Time            83 Hrs - 20.00 Min

      Junction / Depth  / Elevation     ===>  "*" Junction is Surcharged.
     KA01000800/   0.23 /    -0.85       KA01000700/   0.48 /    -2.07
KA01000600/   0.49 /    -3.52
     KA01000500/   0.64 /    -5.05       KA01000400/   0.64 /    -5.36
KA01000200/   0.67 /    -6.09
     KA01000100/   0.44 /    -6.72       KA01000300/   0.65 /    -5.73
KA01000710/   0.19 /    -0.06
     KA01XC0100/   0.37 /    -0.92       KA01000610/   0.08 /    -1.30
KA01000510/   0.18 /    -2.91
     KA01XB0100/   0.19 /    -3.69       KA010A0100/   0.15 /    -2.65
KA01000110/   0.10 /     2.83
     KA01XA0100/   0.12 /    -6.33       A & B WWPS/   0.40 /    -2.46
KA01000130/   0.11 /    -1.81
     Kahului PS/   0.44 /    -7.38        KTC - New/   0.35 /     5.85

       Conduit/        FLOW     ===> "*" Conduit uses the normal flow option.
```

```
            Link 1/          0.28*              Link 2/         1.21*              Link 3/
  1.23*           Link 4/           1.47
            Link 7/          1.57               Link 5/         1.47               Link 6/
  1.48            Link 8/           0.13
            Link 9/          0.43               Link 10/        0.02               Link 11/
  0.11           Link 12/           0.13
           Link 14/          0.09               Link 15/        0.04               Link 18/
  0.10*          Link 16/           0.56
           Link 17/          0.04               Link 19/        2.32               KTC Line/
  0.37          FREE # 1/           2.32
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     84.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.18E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 8.88E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     85.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 8.25E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     86.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 7.62E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     87.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 2.71E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.13E-02 KA01000510/ 1.08E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.14E-02 KA01000110/ 3.64E-02 KA01XA0100/ 6.77E-02 A & B WWPS/
5.46E-01 KA01000130/ 3.56E-02 KTC - New / 3.60E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle      10500       Time          87 Hrs - 30.00 Min

      Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
         KA01000800/   0.23 /    -0.85       KA01000700/   0.47 /     -2.08
KA01000600/   0.47 /     -3.54
         KA01000500/   0.62 /    -5.07       KA01000400/   0.62 /     -5.38
KA01000200/   0.65 /     -6.11
         KA01000100/   0.43 /    -6.73       KA01000300/   0.62 /     -5.76
KA01000710/   0.18 /     -0.07
         KA01XC0100/   0.34 /    -0.95       KA01000610/   0.08 /     -1.30
KA01000510/   0.18 /     -2.91
         KA01XB0100/   0.18 /    -3.70       KA010A0100/   0.15 /     -2.65
KA01000110/   0.10 /      2.83
```

```
        KA01XA0100/   0.10 /     -6.35        A & B WWPS/   0.40 /     -2.46
KA01OO0130/   0.11 /     -1.81
        Kahului PS/   0.42 /     -7.40        KTC - New/    0.35 /      5.85

      Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
      Link 1/         0.28*              Link 2/         1.13*          Link 3/
1.15*         Link 4/          1.37
      Link 7/         1.47               Link 5/         1.37           Link 6/
1.37          Link 8/          0.11
      Link 9/         0.37               Link 10/        0.02           Link 11/
0.11          Link 12/         0.11
      Link 14/        0.09               Link 15/        0.04           Link 18/
0.07*         Link 16/         0.56
      Link 17/        0.04               Link 19/        2.17           KTC Line/
0.37          FREE # 1/        2.17
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
===> System inflows (data group K3) at    88.00 hours ( Junction / Inflow,cfs
)

KA01OO0800/ 2.54E-01 KA01OO0710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01OO0610/
2.00E-02 KA01OO0510/ 1.01E-01 KA01XB0100/ 1.18E-01
KA01OA0100/ 8.57E-02 KA01OO0110/ 3.41E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.12E-01 KA01OO0130/ 3.33E-02 KTC - New / 3.37E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
===> System inflows (data group K3) at    89.00 hours ( Junction / Inflow,cfs
)

KA01OO0800/ 2.03E-01 KA01OO0710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01OO0610/
1.60E-02 KA01OO0510/ 8.11E-02 KA01XB0100/ 1.30E-01
KA01OA0100/ 6.86E-02 KA01OO0110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01OO0130/ 2.67E-02 KTC - New / 2.70E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
===> System inflows (data group K3) at    90.00 hours ( Junction / Inflow,cfs
)

KA01OO0800/ 1.69E-01 KA01OO0710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01OO0610/
1.33E-02 KA01OO0510/ 6.76E-02 KA01XB0100/ 1.49E-01
KA01OA0100/ 5.71E-02 KA01OO0110/ 2.27E-02 KA01XA0100/ 3.85E-02 A & B WWPS/
3.41E-01 KA01OO0130/ 2.22E-02 KTC - New / 2.25E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
===> System inflows (data group K3) at    91.00 hours ( Junction / Inflow,cfs
)

KA01OO0800/ 1.36E-01 KA01OO0710/ 1.55E-01 KA01XC0100/ 5.17E-01 KA01OO0610/
1.07E-02 KA01OO0510/ 5.41E-02 KA01XB0100/ 1.55E-01
KA01OA0100/ 4.57E-02 KA01OO0110/ 1.82E-02 KA01XA0100/ 3.08E-02 A & B WWPS/
2.73E-01 KA01OO0130/ 1.78E-02 KTC - New / 1.80E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

Cycle      11000      Time          91 Hrs - 40.00 Min

      Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
      KA01OO0800/   0.17 /    -0.91       KA01OO0700/   0.44 /     -2.11
KA01OO0600/   0.44 /     -3.57
      KA01OO0500/   0.58 /    -5.11       KA01OO0400/   0.59 /     -5.41
KA01OO0200/   0.61 /     -6.15
      KA01OO0100/   0.37 /    -6.79       KA01OO0300/   0.59 /     -5.79
```

```
KA01000710/   0.21 /    -0.04
     KA01XC0100/   0.40 /     -0.89        KA01000610/   0.06 /     -1.32
KA01000510/   0.13 /    -2.96
     KA01XB0100/   0.21 /     -3.67        KA010A0100/   0.11 /     -2.69
KA01000110/   0.08 /     2.81
     KA01XA0100/   0.07 /     -6.38        A & B WWPS/   0.27 /     -2.59
KA01000130/   0.08 /    -1.84
     Kahului PS/   0.37 /     -7.45         KTC - New/   0.24 /      5.74

       Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
        Link 1/        0.15*               Link 2/      1.01*        Link 3/
  1.02*        Link 4/          1.24
        Link 7/        1.30                Link 5/      1.24         Link 6/
  1.25         Link 8/          0.15
        Link 9/        0.51               Link 10/      0.01         Link 11/
  0.06        Link 12/          0.15
       Link 14/        0.05               Link 15/      0.02         Link 18/
  0.03*       Link 16/          0.30
       Link 17/        0.02               Link 19/      1.67         KTC Line/
  0.20        FREE # 1/         1.67
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    92.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.10E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
8.67E-03 KA01000510/ 4.39E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 3.71E-02 KA01000110/ 1.48E-02 KA01XA0100/ 2.50E-02 A & B WWPS/
2.22E-01 KA01000130/ 1.44E-02 KTC - New / 1.46E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    93.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.02E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
8.00E-03 KA01000510/ 4.05E-02 KA01XB0100/ 1.24E-01
 KA010A0100/ 3.43E-02 KA01000110/ 1.36E-02 KA01XA0100/ 2.31E-02 A & B WWPS/
2.05E-01 KA01000130/ 1.33E-02 KTC - New / 1.35E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    94.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 9.32E-02 KA01XC0100/ 3.10E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 9.32E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    95.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 8.70E-02 KA01XC0100/ 2.89E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 8.70E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle      11500      Time         95 Hrs - 50.00 Min

      Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
```

```
       KA01000800/   0.12 /      -0.96        KA01000700/   0.32 /     -2.23
KA01000600/    0.32 /      -3.69
       KA01000500/   0.43 /      -5.26        KA01000400/   0.43 /     -5.57
KA01000200/    0.46 /      -6.30
       KA01000100/   0.27 /      -6.89        KA01000300/   0.43 /     -5.95
KA01000710/    0.16 /      -0.09
       KA01XC0100/   0.31 /      -0.98        KA01000610/   0.04 /     -1.34
KA01000510/    0.09 /      -3.00
       KA01XB0100/   0.16 /      -3.72        KA010A0100/   0.08 /     -2.72
KA01000110/    0.05 /       2.78
       KA01XA0100/   0.05 /      -6.40        A & B WWPS/   0.18 /     -2.68
KA01000130/    0.06 /      -1.86
       Kahului PS/   0.27 /      -7.55        KTC - New/    0.16 /      5.66

        Conduit/        FLOW     ===> "*" Conduit uses the normal flow option.
         Link 1/        0.07*             Link 2/      0.54*           Link 3/
  0.55*         Link 4/          0.67
         Link 7/        0.69              Link 5/      0.67            Link 6/
  0.67          Link 8/          0.09
         Link 9/        0.29             Link 10/      0.01           Link 11/
  0.03          Link 12/         0.09
        Link 14/        0.02             Link 15/      0.01           Link 18/
  0.02*         Link 16/         0.14
        Link 17/        0.01             Link 19/      0.87          KTC Line/
  0.09          FREE # 1/        0.87
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     96.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 6.78E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
5.33E-03 KA01000510/ 2.70E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 2.29E-02 KA01000110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01000130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     97.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 6.83E-02 KA01XC0100/ 2.27E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 6.83E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     98.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 7.45E-02 KA01XC0100/ 2.48E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 7.45E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at     99.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 5.08E-02 KA01000710/ 8.82E-02 KA01XC0100/ 2.93E-01 KA01000610/
4.00E-03 KA01000510/ 2.03E-02 KA01XB0100/ 8.82E-02
 KA010A0100/ 1.71E-02 KA01000110/ 6.82E-03 KA01XA0100/ 1.15E-02 A & B WWPS/
1.02E-01 KA01000130/ 6.67E-03 KTC - New / 6.74E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
```

```
#
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at   100.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 7.12E-02 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
5.60E-03 KA01000510/ 2.84E-02 KA01XB0100/ 1.43E-01
 KA010A0100/ 2.40E-02 KA01000110/ 9.54E-03 KA01XA0100/ 1.62E-02 A & B WWPS/
1.43E-01 KA01000130/ 9.33E-03 KTC - New / 9.44E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle      12000      Time       100 Hrs -  0.00 Min

       Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
      KA01000800/   0.10 /    -0.98       KA01000700/   0.31 /    -2.24
KA01000600/   0.31 /    -3.70
      KA01000500/   0.40 /    -5.29       KA01000400/   0.40 /    -5.60
KA01000200/   0.43 /    -6.33
      KA01000100/   0.25 /    -6.91       KA01000300/   0.41 /    -5.97
KA01000710/   0.16 /    -0.09
      KA01XC0100/   0.31 /    -0.98       KA01000610/   0.03 /    -1.35
KA01000510/   0.08 /    -3.01
      KA01XB0100/   0.16 /    -3.72       KA010A0100/   0.07 /    -2.73
KA01000110/   0.05 /     2.78
      KA01XA0100/   0.04 /    -6.41       A & B WWPS/   0.16 /    -2.70
KA01000130/   0.05 /    -1.87
      Kahului PS/   0.25 /    -7.57        KTC - New/   0.14 /     5.64

         Conduit/        FLOW   ===> "*" Conduit uses the normal flow option.
          Link 1/        0.05*          Link 2/        0.49          Link 3/
  0.50*          Link 4/          0.60
          Link 7/        0.60           Link 5/        0.59          Link 6/
  0.59           Link 8/          0.09
          Link 9/        0.29           Link 10/       0.00          Link 11/
  0.02          Link 12/          0.09
         Link 14/        0.02           Link 15/       0.01          Link 18/
  0.01*         Link 16/          0.10
         Link 17/        0.01           Link 19/       0.73          KTC Line/
  0.07           FREE # 1/        0.73
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at   101.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.00E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
7.87E-03 KA01000510/ 3.99E-02 KA01XB0100/ 1.73E-01
 KA010A0100/ 3.37E-02 KA01000110/ 1.34E-02 KA01XA0100/ 2.27E-02 A & B WWPS/
2.01E-01 KA01000130/ 1.31E-02 KTC - New / 1.33E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at   102.00 hours ( Junction / Inflow,cfs
)

 KA01000800/ 1.47E-01 KA01000710/ 1.79E-01 KA01XC0100/ 5.95E-01 KA01000610/
1.16E-02 KA01000510/ 5.88E-02 KA01XB0100/ 1.79E-01
 KA010A0100/ 4.97E-02 KA01000110/ 1.98E-02 KA01XA0100/ 3.35E-02 A & B WWPS/
2.97E-01 KA01000130/ 1.93E-02 KTC - New / 1.96E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at   103.00 hours ( Junction / Inflow,cfs
)
```

KA01000800/ 2.03E-01 KA01000710/ 1.73E-01 KA01XC0100/ 5.74E-01 KA01000610/
1.60E-02 KA01000510/ 8.11E-02 KA01XB0100/ 1.73E-01
KA010A0100/ 6.86E-02 KA01000110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01000130/ 2.67E-02 KTC - New / 2.70E-01
# #
#
# #
#
===> System inflows (data group K3) at 104.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.54E-01 KA01000710/ 1.60E-01 KA01XC0100/ 5.33E-01 KA01000610/
2.00E-02 KA01000510/ 1.01E-01 KA01XB0100/ 1.60E-01
KA010A0100/ 8.57E-02 KA01000110/ 3.41E-02 KA01XA0100/ 5.77E-02 A & B WWPS/
5.12E-01 KA01000130/ 3.33E-02 KTC - New / 3.37E-01
# #
#

Cycle 12500 Time 104 Hrs - 10.00 Min

Junction / Depth / Elevation ===> "*" Junction is Surcharged.
KA01000800/ 0.20 / -0.88 KA01000700/ 0.49 / -2.06
KA01000600/ 0.49 / -3.52
KA01000500/ 0.64 / -5.05 KA01000400/ 0.64 / -5.36
KA01000200/ 0.66 / -6.10
KA01000100/ 0.42 / -6.74 KA01000300/ 0.65 / -5.73
KA01000710/ 0.22 / -0.03
KA01XC0100/ 0.43 / -0.86 KA01000610/ 0.07 / -1.31
KA01000510/ 0.15 / -2.94
KA01XB0100/ 0.22 / -3.66 KA010A0100/ 0.13 / -2.67
KA01000110/ 0.09 / 2.82
KA01XA0100/ 0.08 / -6.37 A & B WWPS/ 0.33 / -2.53
KA01000130/ 0.09 / -1.83
Kahului PS/ 0.41 / -7.41 KTC - New/ 0.30 / 5.80

Conduit/ FLOW ===> "*" Conduit uses the normal flow option.
Link 1/ 0.21* Link 2/ 1.23* Link 3/
1.24* Link 4/ 1.49
Link 7/ 1.54 Link 5/ 1.48 Link 6/
1.48 Link 8/ 0.17
Link 9/ 0.57 Link 10/ 0.02 Link 11/
0.08 Link 12/ 0.17
Link 14/ 0.07 Link 15/ 0.03 Link 18/
0.05* Link 16/ 0.42
Link 17/ 0.03 Link 19/ 2.06 KTC Line/
0.28 FREE # 1/ 2.06
# #
#
===> System inflows (data group K3) at 105.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.80E-01 KA01000710/ 1.43E-01 KA01XC0100/ 4.75E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.43E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
#
# #
#
===> System inflows (data group K3) at 106.00 hours (Junction / Inflow,cfs
)

KA01000800/ 2.80E-01 KA01000710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.30E-01
KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# #
#

```
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
)===> System inflows (data group K3) at   107.00 hours ( Junction / Inflow,cfs

 KA01000800/ 2.80E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.24E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
)===> System inflows (data group K3) at   108.00 hours ( Junction / Inflow,cfs

 KA01000800/ 2.80E-01 KA01000710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.18E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #

 Cycle      13000      Time       108 Hrs - 20.00 Min

      Junction / Depth  / Elevation     ===>  "*" Junction is Surcharged.
       KA01000800/   0.23 /   -0.85       KA01000700/   0.48 /    -2.07
 KA01000600/   0.48 /   -3.53
       KA01000500/   0.63 /   -5.06       KA01000400/   0.63 /    -5.37
 KA01000200/   0.66 /   -6.10
       KA01000100/   0.43 /   -6.73       KA01000300/   0.64 /    -5.74
 KA01000710/   0.19 /   -0.06
       KA01XC0100/   0.36 /   -0.93       KA01000610/   0.08 /    -1.30
 KA01000510/   0.18 /   -2.91
       KA01XB0100/   0.18 /   -3.70       KA010A0100/   0.15 /    -2.65
 KA01000110/   0.10 /    2.83
       KA01XA0100/   0.10 /   -6.35       A & B WWPS/   0.40 /    -2.46
 KA01000130/   0.11 /   -1.81
       Kahului PS/   0.43 /   -7.39       KTC - New/    0.35 /     5.85

        Conduit/        FLOW    ===> "*" Conduit uses the normal flow option.
         Link 1/        0.28*        Link 2/        1.18*        Link 3/
 1.20*         Link 4/        1.44
         Link 7/        1.54         Link 5/        1.44         Link 6/
 1.44          Link 8/        0.12
         Link 9/        0.41         Link 10/       0.02         Link 11/
 0.11          Link 12/       0.12
        Link 14/        0.09         Link 15/       0.04         Link 18/
 0.06*         Link 16/       0.56
        Link 17/        0.04         Link 19/       2.24         KTC Line/
 0.37          FREE # 1/      2.24
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
)===> System inflows (data group K3) at   109.00 hours ( Junction / Inflow,cfs

 KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
2.20E-02 KA01000510/ 1.11E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.43E-02 KA01000110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01000130/ 3.67E-02 KTC - New / 3.71E-01
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
# # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
)===> System inflows (data group K3) at   110.00 hours ( Junction / Inflow,cfs

KA01000800/ 2.80E-01 KA01000710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01000610/
```

```
2.20E-02 KA01O00510/ 1.11E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.43E-02 KA01O00110/ 3.75E-02 KA01XA0100/ 6.35E-02 A & B WWPS/
5.63E-01 KA01O00130/ 3.67E-02 KTC - New / 3.71E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at   111.00 hours ( Junction / Inflow,cfs
)

 KA01O00800/ 2.71E-01 KA01O00710/ 1.12E-01 KA01XC0100/ 3.72E-01 KA01O00610/
2.13E-02 KA01O00510/ 1.08E-01 KA01XB0100/ 1.12E-01
 KA010A0100/ 9.14E-02 KA01O00110/ 3.64E-02 KA01XA0100/ 6.15E-02 A & B WWPS/
5.46E-01 KA01O00130/ 3.56E-02 KTC - New / 3.60E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at   112.00 hours ( Junction / Inflow,cfs
)

 KA01O00800/ 2.54E-01 KA01O00710/ 1.18E-01 KA01XC0100/ 3.93E-01 KA01O00610/
2.00E-02 KA01O00510/ 1.01E-01 KA01XB0100/ 1.18E-01
 KA010A0100/ 8.57E-02 KA01O00110/ 3.41E-02 KA01XA0100/ 5.77E-02 A & B WWPS/
5.12E-01 KA01O00130/ 3.33E-02 KTC - New / 3.37E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle      13500      Time         112 Hrs - 30.00 Min

       Junction / Depth  / Elevation    ===>  "*" Junction is Surcharged.
      KA01O00800/   0.23 /     -0.85       KA01O00700/   0.46 /     -2.09
KA01O00600/   0.47 /     -3.54
      KA01O00500/   0.61 /     -5.08       KA01O00400/   0.61 /     -5.39
KA01O00200/   0.64 /     -6.12
      KA01O00100/   0.42 /     -6.74       KA01O00300/   0.62 /     -5.76
KA01O00710/   0.18 /     -0.07
      KA01XC0100/   0.35 /     -0.94       KA01O00610/   0.07 /     -1.31
KA01O00510/   0.17 /     -2.92
      KA01XB0100/   0.18 /     -3.70       KA010A0100/   0.15 /     -2.65
KA01O00110/   0.10 /      2.83
      KA01XA0100/   0.09 /     -6.36       A & B WWPS/   0.38 /     -2.48
KA01O00130/   0.11 /     -1.81
      Kahului PS/   0.42 /     -7.40        KTC - New/   0.34 /      5.84

         Conduit/       FLOW     ===> "*" Conduit uses the normal flow option.
          Link 1/        0.26*          Link 2/       1.11*         Link 3/
   1.13*         Link 4/         1.35
          Link 7/        1.44           Link 5/       1.35          Link 6/
   1.35          Link 8/         0.11
          Link 9/        0.38          Link 10/       0.02         Link 11/
   0.11         Link 12/         0.11
         Link 14/        0.09          Link 15/       0.04         Link 18/
   0.06*        Link 16/         0.53
         Link 17/        0.03          Link 19/       2.10         KTC Line/
   0.35         FREE # 1/        2.10
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at   113.00 hours ( Junction / Inflow,cfs
)

 KA01O00800/ 2.03E-01 KA01O00710/ 1.30E-01 KA01XC0100/ 4.34E-01 KA01O00610/
1.60E-02 KA01O00510/ 8.11E-02 KA01XB0100/ 1.30E-01
 KA010A0100/ 6.86E-02 KA01O00110/ 2.73E-02 KA01XA0100/ 4.62E-02 A & B WWPS/
4.10E-01 KA01O00130/ 2.67E-02 KTC - New / 2.70E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
```

```
#
)===> System inflows (data group K3) at   114.00 hours ( Junction / Inflow,cfs

 KA01000800/ 1.69E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
1.33E-02 KA01000510/ 6.76E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 5.71E-02 KA01000110/ 2.27E-02 KA01XA0100/ 3.85E-02 A & B WWPS/
3.41E-01 KA01000130/ 2.22E-02 KTC - New / 2.25E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
)===> System inflows (data group K3) at   115.00 hours ( Junction / Inflow,cfs

 KA01000800/ 1.36E-01 KA01000710/ 1.55E-01 KA01XC0100/ 5.17E-01 KA01000610/
1.07E-02 KA01000510/ 5.41E-02 KA01XB0100/ 1.55E-01
 KA010A0100/ 4.57E-02 KA01000110/ 1.82E-02 KA01XA0100/ 3.08E-02 A & B WWPS/
2.73E-01 KA01000130/ 1.78E-02 KTC - New / 1.80E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
)===> System inflows (data group K3) at   116.00 hours ( Junction / Inflow,cfs

 KA01000800/ 1.10E-01 KA01000710/ 1.49E-01 KA01XC0100/ 4.96E-01 KA01000610/
8.67E-03 KA01000510/ 4.39E-02 KA01XB0100/ 1.49E-01
 KA010A0100/ 3.71E-02 KA01000110/ 1.48E-02 KA01XA0100/ 2.50E-02 A & B WWPS/
2.22E-01 KA01000130/ 1.44E-02 KTC - New / 1.46E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#

 Cycle      14000       Time        116 Hrs - 40.00 Min

        Junction / Depth   / Elevation    ===>  "*" Junction is Surcharged.
       KA01000800/    0.15 /      -0.93       KA01000700/   0.42 /     -2.13
KA01000600/    0.43 /      -3.58
       KA01000500/    0.56 /      -5.13       KA01000400/   0.57 /     -5.43
KA01000200/    0.59 /      -6.17
       KA01000100/    0.36 /      -6.80       KA01000300/   0.57 /     -5.81
KA01000710/    0.21 /      -0.04
       KA01XC0100/    0.40 /      -0.89       KA01000610/   0.05 /     -1.33
KA01000510/    0.12 /      -2.97
       KA01XB0100/    0.20 /      -3.68       KA010A0100/   0.10 /     -2.70
KA01000110/    0.07 /       2.80
       KA01XA0100/    0.06 /      -6.39       A & B WWPS/   0.24 /     -2.62
KA01000130/    0.07 /      -1.85
       Kahului PS/    0.35 /      -7.47       KTC - New/    0.22 /      5.72
         Conduit/            FLOW      ===> "*" Conduit uses the normal flow option.
          Link 1/            0.12*          Link 2/      0.94*         Link 3/
  0.95*          Link 4/             1.16
          Link 7/            1.21           Link 5/      1.16          Link 6/
  1.17           Link 8/             0.15
          Link 9/            0.50           Link 10/     0.01          Link 11/
  0.05           Link 12/            0.15
          Link 14/           0.04           Link 15/     0.02          Link 18/
  0.03*          Link 16/            0.24
          Link 17/           0.02           Link 19/     1.52          KTC Line/
  0.16           FREE # 1/           1.52
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
)===> System inflows (data group K3) at   117.00 hours ( Junction / Inflow,cfs

 KA01000800/ 1.02E-01 KA01000710/ 1.24E-01 KA01XC0100/ 4.13E-01 KA01000610/
8.00E-03 KA01000510/ 4.05E-02 KA01XB0100/ 1.24E-01
```

```
 KA01OA0100/ 3.43E-02 KA01OO0110/ 1.36E-02 KA01XA0100/ 2.31E-02 A & B WWPS/
2.05E-01 KA01OO0130/ 1.33E-02 KTC - New / 1.35E-01
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    118.00 hours ( Junction / Inflow,cfs
)

 KA01OO0800/ 6.78E-02 KA01OO0710/ 9.32E-02 KA01XC0100/ 3.10E-01 KA01OO0610/
5.33E-03 KA01OO0510/ 2.70E-02 KA01XB0100/ 9.32E-02
 KA01OA0100/ 2.29E-02 KA01OO0110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01OO0130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#
 ===> System inflows (data group K3) at    119.00 hours ( Junction / Inflow,cfs
)

 KA01OO0800/ 6.78E-02 KA01OO0710/ 9.32E-02 KA01XC0100/ 3.10E-01 KA01OO0610/
5.33E-03 KA01OO0510/ 2.70E-02 KA01XB0100/ 9.32E-02
 KA01OA0100/ 2.29E-02 KA01OO0110/ 9.09E-03 KA01XA0100/ 1.54E-02 A & B WWPS/
1.37E-01 KA01OO0130/ 8.89E-03 KTC - New / 8.99E-02
 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
#


 *=================================================*
 | Table E5 - Junction Time Limitation Summary     |
 |           (0.10 or 0.25)* Depth * Area          |
 | Time step = ----------------------------        |
 |                   Sum of Flow                   |
 *=================================================*
 |  The time this junction was the limiting junction |
 |            is listed in the third column.       |
 *=================================================*
```

Junction	Time(.10)	Time(.25)	Time(sec)
KA01OO0800	231.6305	300.0000	201240.000
KA01OO0700	168.1440	300.0000	0.0000
KA01OO0600	300.0000	300.0000	0.0000
KA01OO0500	300.0000	300.0000	0.0000
KA01OO0400	300.0000	300.0000	0.0000
KA01OO0200	197.5091	300.0000	0.0000
KA01OO0100	300.0000	300.0000	0.0000
KA01OO0300	169.9582	300.0000	0.0000
KA01OO0710	192.8958	300.0000	0.0000
KA01XC0100	60.7456	151.8639	0.0000
KA01OO0610	300.0000	300.0000	0.0000
KA01OO0510	300.0000	300.0000	0.0000
KA01XB0100	129.8010	300.0000	0.0000
KA01OA0100	300.0000	300.0000	0.0000

KA01OO0110	300.0000	300.0000	0.0000
KA01XA0100	169.6675	300.0000	0.0000
A & B WWPS	10.0615	25.1538	230760.000
KA01OO0130	300.0000	300.0000	0.0000
Kahului PS	300.0000	300.0000	0.0000
KTC - New	105.2182	263.0456	0.0000

The junction requiring the smallest time step was...A & B WWPS

```
*=====================================================*
| Table E5a - Conduit Explicit Condition Summary       |
| Courant   =         Conduit Length                   |
| Time step = -------------------------------          |
|              Velocity + sqrt(g*depth)                |
|                                                      |
|            Conduit Implicit Condition Summary        |
| Courant   =         Conduit Length                   |
| Time step = -------------------------------          |
|                      Velocity                         |
*=====================================================*
| The 3rd column is the Explicit time step times the   |
|     minimum courant time step factor                 |
|                                                      |
| Minimum Conduit Time Step in seconds in the 4th column|
| in the list. Maximum possible is 10 * maximum time step|
|                                                      |
| The 5th column is the maximum change at any time step|
| during the simulation. The 6th column is the wobble  |
| value which is an indicator of the flow stability.   |
|                                                      |
| You should use this section to find those conduits that|
| are slowing your model down.  Use modify conduits to |
| alter the length of the slow conduits to make your   |
| simulation faster, or change the conduit name to     |
| "CHME?????" where ????? are any characters, this will|
| lengthen the conduit based on the model time step,   |
| not the value listed in modify conduits.             |
*=====================================================*
```

Wobble	Conduit Type of Soln	Time(exp)	Expl*Cmin	Time(imp)	Time(min)	Max Qchange
0.5414	Link 1 Normal Soln	76.4558	76.4558	288.5457	2.0000	0.0050
2.1125	Link 2 Normal Soln	63.5188	63.5188	166.3322	0.0000	0.0152
2.1417	Link 3 Normal Soln	68.5010	68.5010	199.4300	0.0000	0.0146
2.0488	Link 4 Normal Soln	41.7607	41.7607	152.9195	0.0000	0.0137
2.1662	Link 7 Normal Soln	52.4629	52.4629	181.2818	0.0000	0.0089
2.0549	Link 5 Normal Soln	51.6943	51.6943	190.0523	0.0000	0.0141
2.0496	Link 6 Normal Soln	51.5907	51.5907	191.0993	0.0000	0.0095
2.4713	Link 8 Normal Soln	56.0219	56.0219	141.9087	0.0000	0.0125
4.0549	Link 9 Normal Soln	28.7503	28.7503	86.0398	0.0000	0.0403

```
        Link 10    99.0090    99.0090   245.1430     0.0000      0.0002
0.2630  Normal Soln
        Link 11    66.3966    66.3966   168.0148     0.0000      0.0026
1.4635  Normal Soln
        Link 12    37.9235    37.9235   100.6495     0.0000      0.0120
1.5355  Normal Soln
        Link 14    38.7325    38.7325   100.6467     0.0000      0.0035
0.4528  Normal Soln
        Link 15    66.3607    66.3607   171.7911     0.0000      0.0005
0.4910  Normal Soln
        Link 18    10.0365    10.0365    36.1732     2.0000      0.0064
0.4207  Normal Soln
        Link 16    41.8484    41.8484   165.0317     0.0000      0.0143
6.9548  Normal Soln
        Link 17   298.9806   298.9806   300.0000     0.0000      0.0001
0.5057  Normal Soln
        Link 19     6.1825     6.1825    11.2173  7196.0000      0.0101
1.0042  Normal Soln
        KTC Line   22.4580    22.4580    61.7175     0.0000      0.0155
5.1868  Normal Soln
The conduit with the smallest time step limitation was..Link 19

The conduit with the largest wobble was................Link 16

The conduit with the largest flow change in any

consecutive time step..................................Link 9

*==============================================*
| Table E6. Final Model Condition              |
|           This table is used for steady state|
|           flow comparison and is the information|
|           saved to the hot-restart file.     |
|           Final Time =   120.008 hours       |
*==============================================*

Junction / Depth  / Elevation   ===>   "*" Junction is Surcharged.
      KA01000800/   0.12 /     -0.96/      KA01000700/   0.33 /    -2.22/
KA01000600/   0.33 /     -3.68/
      KA01000500/   0.43 /     -5.26/      KA01000400/   0.43 /    -5.57/
KA01000200/   0.46 /     -6.30/
      KA01000100/   0.27 /     -6.89/      KA01000300/   0.44 /    -5.94/
KA01000710/   0.16 /     -0.09/
      KA01XC0100/   0.31 /     -0.98/      KA01000610/   0.04 /    -1.34/
KA01000510/   0.09 /     -3.00/
      KA01XB0100/   0.16 /     -3.72/      KA010A0100/   0.08 /    -2.72/
KA01000110/   0.05 /      2.78/
      KA01XA0100/   0.05 /     -6.40/      A & B WWPS/   0.18 /    -2.68/
KA01000130/   0.06 /     -1.86/
      Kahului PS/   0.27 /     -7.55/      KTC - New/    0.16 /     5.66/

   Conduit/       Flow    ===> "*" Conduit uses the normal flow option.
        Link 1/        0.07*/        Link 2/      0.56*/        Link 3/
   0.57*/
        Link 4/        0.69 /        Link 7/      0.71 /        Link 5/
   0.69 /
        Link 6/        0.69 /        Link 8/      0.09 /        Link 9/
   0.31 /
        Link 10/       0.01 /        Link 11/     0.03 /        Link 12/
   0.09 /
        Link 14/       0.02 /        Link 15/     0.01 /        Link 18/
   0.02*/
        Link 16/       0.14 /        Link 17/     0.01 /        Link 19/
   0.88 /
        KTC Line/      0.09 /        FREE # 1/    0.88 /

        Conduit/   Velocity
```

Link 1/ 0.78 / Link 2/ 1.97 / Link 3/
1.88 /
Link 4/ 1.37 / Link 7/ 1.37 / Link 5/
1.36 /
Link 6/ 1.34 / Link 8/ 1.45 / Link 9/
1.52 /
Link 10/ 0.63 / Link 11/ 0.99 / Link 12/
1.29 /
Link 14/ 0.83 / Link 15/ 0.70 / Link 18/
0.55 /
Link 16/ 1.81 / Link 17/ 0.66 / Link 19/
3.38 /
KTC Line/ 1.37 /

Conduit/ Width
Link 1/ 0.85 / Link 2/ 1.24 / Link 3/
1.25 /
Link 4/ 1.65 / Link 7/ 1.65 / Link 5/
1.65 /
Link 6/ 1.65 / Link 8/ 0.57 / Link 9/
0.92 /
Link 10/ 0.31 / Link 11/ 0.45 / Link 12/
0.65 /
Link 14/ 0.53 / Link 15/ 0.36 / Link 18/
0.43 /
Link 16/ 0.59 / Link 17/ 0.36 / Link 19/
1.37 /
KTC Line/ 0.57 /

Junction/ EGL
KA01000800/ 0.12 / KA01000700/ 7.56 / KA01000600/
0.83 /
KA01000500/ 1.20 / KA01000400/ 0.46 / KA01000200/
3.33 /
KA01000100/ 8.77 / KA01000300/ 0.47 / KA01000710/
0.16 /
KA01XC0100/ 0.31 / KA01000610/ 0.04 / KA01000510/
0.09 /
KA01XB0100/ 0.16 / KA010A0100/ 0.08 / KA01000110/
0.05 /
KA01XA0100/ 0.05 / A & B WWPS/ 0.18 / KA01000130/
0.06 /
Kahului PS/ 0.45 / KTC - New/ 0.16 /

Junction/ Freeboard
KA01000800/ 11.46 / KA01000700/ 11.47 / KA01000600/
9.68 /
KA01000500/ 11.66 / KA01000400/ 11.27 / KA01000200/
11.90 /
KA01000100/ 12.32 / KA01000300/ 11.94 / KA01000710/
12.09 /
KA01XC0100/ 9.62 / KA01000610/ 11.34 / KA01000510/
9.50 /
KA01XB0100/ 10.52 / KA010A0100/ 10.47 / KA01000110/
3.72 /
KA01XA0100/ 12.40 / A & B WWPS/ 8.98 / KA01000130/
7.86 /
Kahului PS/ 13.05 / KTC - New/ 3.34 /

Junction/ Max Volume
KA01000800/ 4.09 / KA01000700/ 8.45 / KA01000600/
8.55 /
KA01000500/ 11.12 / KA01000400/ 11.15 / KA01000200/
11.28 /
KA01000100/ 7.65 / KA01000300/ 11.18 / KA01000710/
4.13 /
KA01XC0100/ 8.12 / KA01000610/ 1.32 / KA01000510/
3.17 /

KA01XB0100/ 3.97 / KA01OA0100/ 2.62 / KA01O00110/
1.82 /
KA01XA0100/ 2.09 / A & B WWPS/ 39.58 / KA01O00130/
1.86 /
Kahului PS/ 7.64 / KTC - New/ 7.05 /

Junction/Total Fldng
KA01O00800/ 0.00 / KA01O00700/ 0.00 / KA01O00600/
0.00 /
KA01O00500/ 0.00 / KA01O00400/ 0.00 / KA01O00200/
0.00 /
KA01O00100/ 0.00 / KA01O00300/ 0.00 / KA01O00710/
0.00 /
KA01XC0100/ 0.00 / KA01O00610/ 0.00 / KA01O00510/
0.00 /
KA01XB0100/ 0.00 / KA01OA0100/ 0.00 / KA01O00110/
0.00 /
KA01XA0100/ 0.00 / A & B WWPS/ 0.00 / KA01O00130/
0.00 /
Kahului PS/ 0.00 / KTC - New/ 0.00 /

Conduit/ Cross Sectional Area
Link 1/ 0.09 / Link 2/ 0.29 / Link 3/
0.30 /
Link 4/ 0.50 / Link 7/ 0.52 / Link 5/
0.50 /
Link 6/ 0.51 / Link 8/ 0.06 / Link 9/
0.20 /
Link 10/ 0.01 / Link 11/ 0.03 / Link 12/
0.07 /
Link 14/ 0.03 / Link 15/ 0.01 / Link 18/
0.03 /
Link 16/ 0.08 / Link 17/ 0.01 / Link 19/
0.26 /
KTC Line/ 0.07 /

Conduit/ Final Volume
Link 1/ 42.00 / Link 2/ 137.24 / Link 3/
167.75 /
Link 4/ 154.14 / Link 7/ 205.96 / Link 5/
191.69 /
Link 6/ 194.90 / Link 8/ 19.28 / Link 9/
40.22 /
Link 10/ 2.58 / Link 11/ 8.56 / Link 12/
14.01 /
Link 14/ 4.49 / Link 15/ 3.03 / Link 18/
1.70 /
Link 16/ 42.56 / Link 17/ 14.04 / Link 19/
15.87 /
KTC Line/ 9.85 /

Conduit/ Hydraulic Radius
Link 1/ 0.09 / Link 2/ 0.20 / Link 3/
0.20 /
Link 4/ 0.26 / Link 7/ 0.26 / Link 5/
0.26 /
Link 6/ 0.26 / Link 8/ 0.09 / Link 9/
0.17 /
Link 10/ 0.02 / Link 11/ 0.05 / Link 12/
0.10 /
Link 14/ 0.05 / Link 15/ 0.03 / Link 18/
0.04 /
Link 16/ 0.10 / Link 17/ 0.03 / Link 19/
0.17 /
KTC Line/ 0.10 /

Conduit/ Upstream/ Downstream Elevation
Link 1/ -0.96/ -2.22 Link 2/ -2.22/ -3.68

```
Link 3/    -3.68/   -5.26/
      Link 4/   -5.26/   -5.57        Link 7/    -6.30/    -6.89
Link 5/    -5.57/   -5.94/
      Link 6/   -5.94/   -6.30        Link 8/    -0.09/    -1.62
Link 9/    -0.98/   -1.53/
     Link 10/   -1.34/   -3.19        Link 11/   -3.00/    -4.58
Link 12/   -3.72/   -4.52/
     Link 14/   -2.72/   -3.44        Link 15/    2.78/     1.60
Link 18/   -6.40/   -6.89/
     Link 16/   -2.68/   -6.28        Link 17/   -1.86/    -6.41
Link 19/   -6.89/   -7.55/
   KTC Line/    5.66/    4.98
```

===
| Table E7 - Iteration Summary |
===

Total number of time steps simulated...........	14400
Total number of passes in the simulation........	60978
Total number of time steps during simulation....	60958
Ratio of actual # of time steps / NTCYC.........	4.233
Average number of iterations per time step......	1.000
Average time step size(seconds)................	7.087
Smallest time step size(seconds)...............	6.000
Largest time step size(seconds)................	30.000
Average minimum Conduit Courant time step (sec).	8.264
Average minimum implicit time step (sec)........	8.100
Average minimum junction time step (sec)........	8.100
Average Courant Factor Tf.......................	8.100
Number of times omega reduced...................	0

===
| Table E8 - Junction Time Step Limitation Summary |
===
| Not Convr = Number of times this junction did not converge during the simulation. |
| Avg Convr = Average junction iterations. |
| Conv err = Mean convergence error. |
| Omega Cng = Change of omega during iterations |
| Max Itern = Maximum number of iterations |
===

Junction	Not Convr	Avg Convr	Total Itt	Omega Cng	Max Itern	Ittrn >10	Ittrn >25	Ittrn >40
KA01000800	0	1.02	62299	0	10	1	0	0
KA01000700	0	1.44	87581	0	14	2	0	0
KA01000600	0	1.59	96710	0	6	0	0	0
KA01000500	0	1.51	91964	0	7	0	0	0
KA01000400	0	1.76	107169	0	6	0	0	0
KA01000200	0	1.62	98828	0	6	0	0	0
KA01000100	0	1.65	100308	0	14	1	0	0
KA01000300	0	1.65	100601	0	5	0	0	0
KA01000710	0	1.02	62141	0	5	0	0	0
KA01XC0100	0	1.23	74970	0	15	1	0	0
KA01000610	0	1.00	60983	0	3	0		

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0 0						
KA01000510	0	1.00	61203	0	7	0
0 0						
KA01XB0100	0	1.02	62218	0	12	1
0 0						
KA010A0100	0	1.00	61052	0	6	0
0 0						
KA01000110	0	1.00	61031	0	4	0
0 0						
KA01XA0100	0	1.01	61583	0	9	0
0 0						
A & B WWPS	0	1.20	72846	0	17	1
0 0						
KA01000130	0	1.00	60992	0	3	0
0 0						
Kahului PS	0	1.81	110150	0	7	0
0 0						
KTC - New	0	1.11	67674	0	6	0
0 0						

Total number of iterations for all junctions.. 1562303

Minimum number of possible iterations......... 1219160

Efficiency of the simulation................. 1.28

Good Efficiency

```
*=================================================*
| Extran Efficiency is an indicator of the efficiency of |
| the simulation.  Ideal efficiency is one iteration per |
| time step.  Altering the underrelaxation parameter,    |
| lowering the time step, increasing the flow and head   |
| tolerance are good ways of improving the efficiency,   |
| another is lowering the internal time step. The lower the |
| efficiency generally the faster your model will run.   |
| If your efficiency is less than 1.5 then you may try   |
| increasing your time step so that your overall simulation |
| is faster.  Ideal efficiency would be around 2.0       |
|                                                        |
| Good Efficiency      < 1.5           mean iterations   |
| Excellent Efficiency < 2.5 and > 1.5 mean iterations   |
| Good      Efficiency < 4.0 and > 2.5 mean iterations   |
| Fair      Efficiency < 7.5 and > 4.0 mean iterations   |
| Poor Efficiency      > 7.5           mean iterations   |
*=================================================*
```

```
*==================================================*
|        Table E9 - JUNCTION SUMMARY STATISTICS     |
| The Maximum area is only the area of the node, it |
| does not include the area of the surrounding conduits|
*==================================================*
```

Junction Name	Ground Elevation feet	Uppermost PipeCrown Elevation feet	Maximum Junction Elevation feet	Time of Occurence Hr.	Min.	Feet of Surcharge at Max Elevation	Maximum Freeboard of node feet	Maximum Junction Area ft^2	Maximum Gutter Depth feet	Maximum Gutter Width feet	Maximum Gutter Velocity ft/s
KA01000800	10.5000	0.4200	-0.7542	58	1	0.0000	11.2542	12.5660	0.0000	0.0000	0.0000
KA01000700	9.2500	5.5067	-1.8776	58	2	0.0000	11.1276	12.5660	0.0000	0.0000	0.0000
KA01000600	6.0000	-2.5100	-3.3294	58	4	0.0000	9.3294	12.5660	0.0000	0.0000	0.0000
KA01000500	6.4000	-3.6900	-4.8048	58	6	0.0000	11.2048	12.5660	0.0000	0.0000	0.0000
KA01000400	5.7000	-4.0000	-5.1128	58	7	0.0000	10.8128	12.5660	0.0000	0.0000	0.0000
KA01000200	5.6000	-2.5000	-5.8620	58	11	0.0000	11.4620	12.5660	0.0000	0.0000	0.0000
KA01000100	5.4300	2.2267	-6.5509	58	11	0.0000	11.9809	12.5660	0.0000	0.0000	0.0000
KA01000300	6.0000	-4.3800	-5.4904	58	9	0.0000	11.4904	12.5660	0.0000	0.0000	0.0000
KA01000710	12.0000	0.4167	0.0784	55	1	0.0000	11.9216	12.5660	0.0000	0.0000	0.0000
KA01XC0100	8.6400	-0.2900	-0.6435	55	0	0.0000	9.2835	12.5660	0.0000	0.0000	0.0000
KA01000610	10.0000	-0.7133	-1.2746	58	3	0.0000	11.2746	12.5660	0.0000	0.0000	0.0000
KA01000510	6.5000	-2.4233	-2.8375	58	2	0.0000	9.3375	12.5660	0.0000	0.0000	0.0000
KA01XB0100	6.8000	-3.0467	-3.5643	55	1	0.0000	10.3643	12.5660	0.0000	0.0000	0.0000
KA01OA0100	7.7500	-1.8000	-2.5919	58	1	0.0000	10.3419	12.5660	0.0000	0.0000	0.0000
KA01000110	6.5000	3.3967	2.8748	58	2	0.0000	3.6252	12.5660	0.0000	0.0000	0.0000
KA01XA0100	6.0000	-5.6167	-6.2838	58	0	0.0000	12.2838	12.5660	0.0000	0.0000	0.0000
A & B WWPS	6.3000	-2.1933	0.2895	59	37	2.4828	6.0105	12.5660	0.0000	0.0000	0.0000
KA01000130	6.0000	-1.2533	-1.7716	58	11	0.0000	7.7716	12.5660	0.0000	0.0000	0.0000
Kahului PS	5.5000	-5.8200	-7.2119	58	11	0.0000	12.7119	12.5660	0.0000	0.0000	0.0000
KTC - New	9.0000	6.1667	6.0607	58	1	0.0000	2.9393	12.5660	0.0000	0.0000	0.0000

```
*==================================================*
|        Table E10 - CONDUIT SUMMARY STATISTICS      |
| Note: The peak flow may be less than the design flow |
| and the conduit may still surcharge because of the |
| downstream boundary conditions.                    |
|                                                    |
| * denotes an open conduit that has been overtopped |
|   this is a potential source of severe errors      |
*==================================================*
```

Conduit Maximum Maximum Time Maximum

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Conduit Design Name	Design Flow (cfs)	Design Velocity (ft/s)	Vertical Depth (in)	Maximum Computed Flow (cfs)	Time of Occurence Hr.	Time of Occurence Min.	Maximum Computed Velocity (ft/s)	Time of Occurence Hr.	Time of Occurence Min.	Ratio of Max. to Design Flow	Maximum Water Elev at Pipe Ends Upstream (ft)	Maximum Water Elev at Pipe Ends Dwnstrm (ft)	Ratio d/D US	Ratio d/D DS
Link 1	5.3755	3.0419	18.0000	0.5568	58	1	1.6774	58	1	0.1036	-0.7542	-1.8776	0.217	0.448
Link 2	5.3739	3.0410	18.0000	2.2222	58	2	2.8918	58	2	0.4135	-1.8776	-3.3294	0.448	0.454
Link 3	5.3569	3.0314	18.0000	2.2625	58	4	2.7930	58	4	0.4224	-3.3294	-4.8048	0.454	0.590
Link 4	6.6752	2.1248	24.0000	2.6934	58	5	2.0076	58	4	0.4035	-4.8048	-5.1128	0.443	0.444
Link 7	6.6679	2.1225	24.0000	2.8717	58	11	2.1900	58	12	0.4307	-5.8620	-6.5509	0.449	0.305
Link 5	6.6428	2.1145	24.0000	2.6907	58	7	1.9995	58	6	0.4051	-5.1128	-5.4904	0.444	0.445
Link 6	6.6428	2.1145	24.0000	2.6884	58	9	1.9885	58	9	0.4047	-5.4904	-5.8620	0.445	0.449
Link 8	0.7948	2.2768	8.0000	0.3560	55	1	2.1211	55	2	0.4479	0.0784	-1.4831	0.493	0.415
Link 9	1.6159	2.0575	12.0000	1.1869	55	1	2.2896	55	1	0.7345	-0.6435	-1.3011	0.647	0.459
Link 10	0.8701	2.4927	8.0000	0.0436	58	3	1.2483	58	4	0.0501	-1.2746	-3.1266	0.158	0.140
Link 11	0.7922	2.2694	8.0000	0.2216	58	2	1.8630	58	3	0.2797	-2.8375	-4.4335	0.379	0.325
Link 12	1.2817	2.3500	10.0000	0.3566	55	1	1.9275	55	1	0.2782	-3.5643	-4.3907	0.379	0.311
Link 14	2.1680	2.7604	12.0000	0.1879	58	1	1.6196	58	1	0.0867	-2.5919	-3.3234	0.208	0.177
Link 15	0.7944	2.2757	8.0000	0.0745	58	2	1.3590	58	2	0.0938	2.8748	1.6833	0.217	0.185
Link 18	2.1876	4.0109	10.0000	0.1903	58	0	1.6978	58	0	0.0870	-6.2838	-6.5509	0.199	0.731
Link 16	0.8949	2.5634	8.0004	1.2000	59	37	3.4212	59	37	1.3410	0.2895	-5.9315	4.724	0.778
Link 17	0.7442	2.1318	8.0000	0.0711	58	12	1.2590	58	12	0.0956	-1.7716	-6.3297	0.223	0.180
Link 19	21.8505	6.9552	24.0000	4.4041	58	11	5.4380	58	12	0.2016	-6.5509	-7.2119	0.305	0.304
KTC Line	0.7444	2.1324	8.0004	0.7395	58	1	2.4305	58	1	0.9933	6.0607	5.2461	0.841	0.609
FREE # 1	Undefnd	Undefnd	Undefn	4.4041	58	11								

```
*==========================================*
| Table E11.  Area assumptions used in the analysis|
| Subcritical and Critical flow assumptions from   |
|    Subroutine Head.  See Figure 17-1 in the      |
|        manual for further information.           |
*==========================================*
```

Maximum Conduit Name	Duration of Dry Flow(min)	Duration of Sub-Critical Flow(min)	Durat. of Upstream Critical Flow(min)	Durat. of Downstream Critical Flow(min)	Maximum Hydraulic Radius-m	Maximum X-Sect Area(ft^2)	Maximum Vel*D (ft^2/s)
Link 1	0.1250	7199.8750	0.0000	0.0000	0.2099	0.3320	0.8372

Link 2	0.0000	7200.0000	0.0000	0.0000	0.3487	0.7685	1.9558
Link 3	0.1250	7199.8750	0.0000	0.0000	0.3574	0.8101	2.1863
Link 4	0.0000	7200.0000	0.0000	0.0000	0.4607	1.3418	1.7785
Link 7	0.0000	7200.0000	0.0000	0.0000	0.4532	1.3113	1.6502
Link 5	0.1250	7199.8750	0.0000	0.0000	0.4614	1.3458	1.7759
Link 6	6.2500	7193.7500	0.0000	0.0000	0.4625	1.3520	1.7773
Link 8	0.0000	0.0000	0.0000	7200.0000	0.1631	0.1678	0.6419
Link 9	0.0000	0.0000	0.0000	7200.0000	0.2821	0.5184	1.2654
Link 10	0.0000	0.0000	0.0000	7200.0000	0.0643	0.0349	0.1241
Link 11	0.0000	0.0000	0.0000	7200.0000	0.1354	0.1189	0.4368
Link 12	0.0000	0.0000	0.0000	7200.0000	0.1688	0.1850	0.5541
Link 14	0.0000	0.0000	0.0000	7200.0000	0.1232	0.1160	0.3115
Link 15	0.0000	0.0000	0.0000	7200.0000	0.0853	0.0548	0.1821
Link 18	0.0000	7200.0000	0.0000	0.0000	0.1151	0.1121	0.6563
Link 16	0.0000	0.0000	0.0000	7200.0000	0.2016	0.3548	6.2744
Link 17	0.0000	0.0000	0.0000	7200.0000	0.0868	0.0565	0.1691
Link 19	0.0000	7200.0000	0.0000	0.0000	0.3457	0.8099	3.3094
KTC Line	0.0000	0.0000	0.0000	7200.0000	0.2009	0.3043	1.1747

```
*========================================*
| Table E12. Mean Conduit Flow Information |
*========================================*
```

Conduit Name	Mean Flow (cfs)	Total Flow (ft^3)	Mean Percent Change	Low Flow Weightng	Mean Froude Number	Mean Hydraulic Radius	Mean Cross Area	Mean Conduit Roughness
Link 1	0.1779	76841.445	0.0001	1.0000	0.4502	0.1285	0.1589	0.0140
Link 2	0.9776	422319.39	0.0002	1.0000	0.6162	0.2485	0.4314	0.0140
Link 3	0.9913	428236.82	0.0002	1.0000	0.5884	0.2560	0.4556	0.0140
Link 4	1.1921	514994.95	0.0002	1.0000	0.3729	0.3289	0.7575	0.0140
Link 7	1.2516	540696.66	0.0002	1.0000	0.4704	0.3301	0.7667	0.0140

Link 5	1.1918	514853.93	0.0002	1.0000	0.3707	0.3297	0.7610	0.0140
Link 6	1.1914	514694.38	0.0002	0.9996	0.3634	0.3323	0.7709	0.0140
Link 8	0.1304	56320.582	0.0000	1.0000	0.6961	0.1080	0.0817	0.0140
Link 9	0.4337	187362.13	0.0001	1.0000	0.5683	0.1973	0.2587	0.0140
Link 10	0.0140	6042.9431	0.0000	1.0000	0.6669	0.0382	0.0163	0.0140
Link 11	0.0709	30633.930	0.0000	1.0000	0.6725	0.0822	0.0539	0.0140
Link 12	0.1304	56323.101	0.0000	1.0000	0.6398	0.1104	0.0917	0.0140
Link 14	0.0606	26179.112	0.0000	1.0000	0.6332	0.0739	0.0539	0.0140
Link 15	0.0238	10302.784	0.0000	1.0000	0.6379	0.0510	0.0253	0.0140
Link 18	0.0481	20766.567	0.0000	1.0000	0.5375	0.0666	0.0516	0.0140
Link 16	0.4335	187271.07	0.0001	1.0000	0.7885	0.1495	0.1755	0.0140
Link 17	0.0233	10060.558	0.0000	1.0000	0.6006	0.0524	0.0264	0.0140
Link 19	1.7802	769039.02	0.0003	1.0000	1.1834	0.2330	0.4341	0.0140
KTC Line	0.2359	101904.42	0.0000	1.0000	0.6706	0.1384	0.1324	0.0140
FREE # 1	1.7802	769042.41						

```
*=========================================================*
| Table E13. Channel losses(H), headwater depth (HW), tailwater |
| depth (TW), critical and normal depth (Yc and Yn).      |
| Use this section for culvert comparisons                |
*=========================================================*
```

Conduit Maximum Head Friction Critical Normal HW

Name	Flow	Loss	Loss	Depth	Depth	Elevat	TW Elevat	
Link 1	0.5568	0.0000	0.9692	0.2750	0.3248	-0.7542	-1.8776	Max Flow
Link 2	2.2221	0.0000	1.4546	0.5624	0.6722	-1.8776	-3.3300	Max Flow
Link 3	2.2624	0.0000	1.5205	0.5676	0.6802	-3.3294	-4.8052	Max Flow
Link 4	2.6934	0.0000	0.3086	0.5711	0.8841	-4.8048	-5.1131	Max Flow
Link 7	2.8716	0.0000	0.4855	0.5897	0.9170	-5.8620	-6.5509	Max Flow
Link 5	2.6907	0.0000	0.3782	0.5708	0.8860	-5.1128	-5.4906	Max Flow
Link 6	2.6884	0.0000	0.3729	0.5706	0.8856	-5.4904	-5.8621	Max Flow
Link 8	0.3560	0.0000	1.3489	0.2769	0.3126	0.0784	-1.4831	Max Flow
Link 9	1.1869	0.0000	0.4954	0.4589	0.6372	-0.6435	-1.3011	Max Flow
Link 10	0.0436	0.0000	1.6425	0.0934	0.1008	-1.2746	-3.1266	Max Flow
Link 11	0.2216	0.0000	1.3864	0.2165	0.2410	-2.8375	-4.4335	Max Flow
Link 12	0.3566	0.0000	0.6856	0.2593	0.3005	-3.5643	-4.3907	Max Flow
Link 14	0.1879	0.0000	0.6194	0.1766	0.1989	-2.5919	-3.3234	Max Flow
Link 15	0.0745	0.0000	1.0200	0.1233	0.1377	2.8748	1.6833	Max Flow
Link 18	0.1902	0.0000	0.2804	0.1874	0.1661	-6.2839	-6.5532	Max Flow
Link 16	1.2000	0.0000	6.2173	0.5185	0.6667	0.2895	-5.9315	Max Flow
Link 17	0.0711	0.0000	3.7702	0.1203	0.1389	-1.7716	-6.3297	Max Flow
Link 19	4.4041	0.0000	0.6599	0.7365	0.6081	-6.5509	-7.2119	Max Flow
KTC Line	0.7394	0.0000	0.6685	0.4060	0.5430	6.0607	5.2460	Max Flow

Table E13a. CULVERT ANALYSIS CLASSIFICATION, and the time the culvert was in a particular classification during the simulation. The time is in minutes. The Dynamic Wave Equation is used for all conduit analysis but the culvert flow classification condition is based on the HW and TW depths.

Conduit Name	Mild Slope Critical D Outlet Control	Mild Slope TW Control Outlet Control	Steep Slope TW Insignf Entrance Control	Slug Flow Outlet/ Entrance Control	Mild Slope TW > D Outlet Control	Mild Slope TW <= D Outlet Control	Outlet Control	Inlet Control	Inlet Configuration
Link 1	0.0000	7200.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	None
Link 2	13.0000	7187.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	None
Link 3	0.0000	7200.0000	0.0000	0.0000	0.0000	0.0000			

```
0.0000      0.0000 None
           Link 4    15.0000 7185.0000    0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
           Link 7 4457.0000 2743.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
           Link 5    21.0000 7179.0000    0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
           Link 6     6.0000 7188.0000    6.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
           Link 8 3621.0000 3579.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
           Link 9 3640.0000 3560.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 10 3993.0000 3207.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 11 2862.0000 4338.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 12 3788.0000 3412.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 14 2887.0000 4313.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 15 3187.0000 4013.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 18    0.0000    0.0000 7200.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 16 2704.0000 3629.0000     0.0000    0.0000    0.0000    0.0000
867.0000     0.0000 None
          Link 17 3433.0000 3767.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
          Link 19    0.0000    0.0000 7200.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None
         KTC Line 1984.0000 5216.0000     0.0000    0.0000    0.0000    0.0000
0.0000      0.0000 None

   *====================================*
   |   Kinematic Wave Approximations     |
   |  Time in Minutes for Each Condition |
   *====================================*

          Conduit Duration of     Slope    Super-       Roll
             Name Normal Flow  Criteria  Critical      Waves
 --------------- ----------- --------- --------- ---------
           Link 1   7199.0000 7199.5000    0.0000    0.0000
           Link 2   5928.3333 6548.3667    4.7500    0.0000
           Link 3   7191.8750 7193.3750    0.0000    0.0000
           Link 4      0.0000 6095.3333    5.2500    0.0000
           Link 7     21.6667   23.1667    0.0000    0.0000
           Link 5      0.6667 6630.1333    6.7500    0.0000
           Link 6      9.7500 7162.0167    0.5000    0.0000
           Link 8      0.0000    0.0000    0.0000    0.0000
           Link 9      0.0000    0.0000    0.0000    0.0000
          Link 10      0.0000    1.0000    1.0000    0.0000
          Link 11      0.0000    0.0000    0.0000    0.0000
          Link 12      0.0000    0.0000    0.0000    0.0000
          Link 14      0.0000    0.0000    0.0000    0.0000
          Link 15      0.0000    0.0000    0.0000    0.0000
          Link 18   7196.7500 7196.7500    1.8750    0.0000
          Link 16      0.0000    0.0000    0.0000    0.0000
          Link 17      0.0000    0.0000    0.0000    0.0000
          Link 19     15.1417   15.1417 7194.3750    0.0000
         KTC Line      0.0000    0.0000    0.0000    0.0000

*=====================================================*
|     Table E15 - SPREADSHEET INFO LIST                |
| Conduit Flow and Junction Depth Information for use in |
| spreadsheets.  The maximum values in this table are the |
| true maximum values because they sample every time step.|
| The values in the review results may only be the       |
```

| maximum of a subset of all the time steps in the run. |
| Note: These flows are only the flows in a single barrel.|
===

Conduit Name	Maximum Flow (cfs)	Total Flow (ft^3)	Maximum Velocity (ft/s)	Maximum Volume (ft^3)	##	Junction Name	Invert Elevation (ft)	Maximum Elevation (ft)
Link 1	0.5568	76841.4445	1.6774	111.9722	##	KA01000800	-1.0800	-0.7542
Link 2	2.2222	422319.3919	2.8918	173.3429	##	KA01000700	-2.5500	-1.8776
Link 3	2.2625	428236.8240	2.7930	272.3336	##	KA01000600	-4.0100	-3.3294
Link 4	2.6934	514994.9508	2.0076	412.3745	##	KA01000500	-5.6900	-4.8048
Link 7	2.8717	540696.6604	2.1900	427.3571	##	KA01000400	-6.0000	-5.1128
Link 5	2.6907	514853.9269	1.9995	512.1215	##	KA01000200	-6.7600	-5.8620
Link 6	2.6884	514694.3804	1.9885	516.2666	##	KA01000100	-7.1600	-6.5509
Link 8	0.3560	56320.5822	2.1211	8.4921	##	KA01000300	-6.3800	-5.4904
Link 9	1.1869	187362.1254	2.2896	84.8312	##	KA01000710	-0.2500	0.0784
Link 10	0.0436	6042.9431	1.2483	0.5072	##	KA01XC0100	-1.2900	-0.6435
Link 11	0.2216	30633.9295	1.8630	4.7594	##	KA01000610	-1.3800	-1.2746
Link 12	0.3566	56323.1006	1.9275	10.8858	##	KA01000510	-3.0900	-2.8375
Link 14	0.1879	26179.1117	1.6196	4.3556	##	KA01XB0100	-3.8800	-3.5643
Link 15	0.0745	10302.7839	1.3590	1.2336	##	KA01OA0100	-2.8000	-2.5919

```
      Link 18       0.1903  20766.5669        1.6978        12.0231    ##
KA01000110    2.7300        2.8748


      Link 16       1.2000 187271.0655        3.4212        26.3982    ##
KA01XA0100   -6.4500       -6.2838


      Link 17       0.0711  10060.5578        1.2590         1.3764    ##
A & B WWPS   -2.8600        0.2895


      Link 19       4.4041 769039.0163        5.4380        45.4738    ##
KA01000130   -1.9200       -1.7716


     KTC Line       0.7395 101904.4174        2.4305        24.6088    ##
Kahului PS   -7.8200       -7.2119


     FREE # 1       4.4041 769042.4092        0.0000         0.0000    ##
 KTC - New    5.5000        6.0607
```

```
*===============================================*
|   Table E15a - SPREADSHEET REACH LIST          |
| Peak flow and Total Flow listed by Reach or those |
|     conduits or diversions having the same     |
|     upstream and downstream nodes.             |
*===============================================*
```

Upstream Node	Downstream Node	Maximum Flow (cfs)	Total Flow (ft^3)
KA01000800	KA01000700	0.5568	76841.4445
KA01000700	KA01000600	2.2222	422319.392
KA01000600	KA01000500	2.2625	428236.824
KA01000500	KA01000400	2.6934	514994.951
KA01000200	KA01000100	2.8717	540696.660
KA01000400	KA01000300	2.6907	514853.927
KA01000300	KA01000200	2.6884	514694.380
KA01000710	KA01000700	0.3560	56320.5822

KA01XC0100	KA01000700	1.1869	187362.125
KA01000610	KA01000600	0.0436	6042.9431
KA01000510	KA01000500	0.2216	30633.9295
KA01XB0100	KA01000500	0.3566	56323.1006
KA010A0100	KA01000200	0.1879	26179.1117
KA01000110	KA01000100	0.0745	10302.7839
KA01XA0100	KA01000100	0.1903	20766.5669
A & B WWPS	KA01000100	1.2000	187271.065
KA01000130	KA01000100	0.0711	10060.5578
KA01000100	Kahului PS	4.4041	769039.016
KTC - New	KA01000700	0.7395	101904.417

```
############################################################
# Table E16. New Conduit Information Section               #
#            Conduit Invert (IE) Elevation and Conduit     #
#            Maximum Water Surface (WS) Elevations         #
############################################################
```

Conduit Name	Upstream Node	Downstream Node	IE Up	IE Dn	WS Up	WS Dn	Conduit Type
Link 1	KA01000800	KA01000700	-1.0800	-2.5500	-0.7542	-1.8776	Circular
Link 2	KA01000700	KA01000600	-2.5500	-4.0100	-1.8776	-3.3294	Circular
Link 3	KA01000600	KA01000500	-4.0100	-5.6900	-3.3294	-4.8048	Circular
Link 4	KA01000500	KA01000400	-5.6900	-6.0000			

```
-4.8048    -5.1128 Circular

           Link 7        KA01000200       KA01000100    -6.7600    -7.1600
-5.8620    -6.5509 Circular

           Link 5        KA01000400       KA01000300    -6.0000    -6.3800
-5.1128    -5.4904 Circular

           Link 6        KA01000300       KA01000200    -6.3800    -6.7600
-5.4904    -5.8620 Circular

           Link 8        KA01000710       KA01000700    -0.2500    -1.7600
0.0784    -1.4831 Circular

           Link 9        KA01XC0100       KA01000700    -1.2900    -1.7600
-0.6435    -1.3011 Circular

          Link 10        KA01000610       KA01000600    -1.3800    -3.2200
-1.2746    -3.1266 Circular

          Link 11        KA01000510       KA01000500    -3.0900    -4.6500
-2.8375    -4.4335 Circular

          Link 12        KA01XB0100       KA01000500    -3.8800    -4.6500
-3.5643    -4.3907 Circular

          Link 14        KA010A0100       KA01000200    -2.8000    -3.5000
-2.5919    -3.3234 Circular

          Link 15        KA01000110       KA01000100     2.7300     1.5600
2.8748     1.6833 Circular

          Link 18        KA01XA0100       KA01000100    -6.4500    -7.1600
-6.2838    -6.5509 Circular

          Link 16        A & B WWPS       KA01000100    -2.8600    -6.4500
0.2895    -5.9315 Circular

          Link 17        KA01000130       KA01000100    -1.9200    -6.4500
-1.7716    -6.3297 Circular

          Link 19        KA01000100       Kahului PS    -7.1600    -7.8200
-6.5509    -7.2119 Circular

         KTC Line        KTC - New        KA01000700     5.5000     4.8400
6.0607     5.2461 Circular


*=========================================================================
*
|    Table E18 - Junction Continuity Error.   Division by Volume added 11/96
```

Kahului Shopping Center - COM Standards_SC200.txt

| Continuity Error = Net Flow + Beginning Volume - Ending Volume
| ---
| Total Flow + (Beginning Volume + Ending Volume)/2
|
| Net Flow   = Node Inflow - Node Outflow
| Total Flow = absolute (Inflow + Outflow)
| Intermediate column is a judgement on the node continuity error.
|
| Excellent < 1 percent   Great 1 to 2 percent   Good 2 to 5 percent
| Fair 5 to 10 percent   Poor 10 to 25 percent   Bad 25 to 50 percent
| Terrible > 50 percent

*===
*

Junction Name	Net Flow Thru Node	Total Flow Thru Node	Volume Failed to Converge		% of Node	% of Inflow	Remaining Volume	Beginning Volume
KA01000800	-16.9867	23.6738	153707.2385	0	-0.0110	0.0022	40.6605	0.0000
KA01000700	-43.9861	98.4175	844747.9614	0	-0.0052	0.0057	142.4036	0.0000
KA01000600	-48.8838	123.6027	856599.1590	0	-0.0057	0.0063	172.4865	0.0000
KA01000500	-12.8358	178.2050	1030188.805	0	-0.0012	0.0017	191.0408	0.0000
KA01000400	-45.0843	133.8053	1029848.878	0	-0.0044	0.0059	178.8895	0.0000
KA01000200	-22.4197	164.0956	1081570.153	0	-0.0021	0.0029	186.5153	0.0000
KA01000100	-68.8198	50.8914	1538136.651	0	-0.0045	0.0089	119.7112	0.0000
KA01000300	-54.8530	147.2257	1029548.307	0	-0.0053	0.0071	202.0787	0.0000
KA01000710	2.9022				0.0026	0.0004	10.8828	0.0000

```
13.7850 112655.7116          0

     KA01XC0100       9.3999        0.0025        0.0012       20.9209        0.0000
30.3207 374758.3784          0

     KA01OO0610       2.2405        0.0185        0.0003        1.6225        0.0000
 3.8630  12089.6653          0

     KA01OO0510       3.2910        0.0054        0.0004        4.9478        0.0000
 8.2387  61276.2800          0

     KA01XB0100       2.9558        0.0026        0.0004        8.2461        0.0000
11.2020 112658.2299          0

     KA010A0100       2.2885        0.0044        0.0003        2.9066        0.0000
 5.1951  52363.5045          0

     KA01OO0110       2.1099        0.0102        0.0003        1.9877        0.0000
 4.0976  20609.6270          0

     KA01XA0100      -2.0477       -0.0049        0.0003        2.8213        0.0000
 0.7736  41534.1623          0

      A & B WWPS      2.0908        0.0006        0.0003       22.7750        0.0000
24.8658 374568.2650          0

     KA01OO0130      10.6374        0.0528        0.0014        6.6094        0.0000
17.2468  20138.3009          0

     Kahului PS     -19.7738       -0.0013        0.0026       11.2894        0.0000
-8.4844 1538081.426          0

      KTC - New      -0.8137       -0.0004        0.0001        6.5034        0.0000
 5.6897 203816.3646          0

The total continuity error was   -298.59      cubic feet
The remaining total volume was    1335.3      cubic feet
Your mean node continuity error was   Excellent

Your worst node continuity error was  Excellent


*===============================================*
| Table E19 - Junction Inflow & Outflow Listing  |
|             Units are either ft^3 or m^3       |
|             depending on the units in your model.|
*===============================================*

                    Constant        User        Interface       DWF
Inflow   RNF Layer                                 Inflow
       Junction     Inflow      Inflow       Inflow        Inlow
through    Inflow      Outflow    Evaporation     from
          Name    to Node      to Node       to Node      to Node
Outfall    to Node     from Node    from Node     2D Layer
---------------- ----------- ----------- ----------- -----------
----------- ----------- ----------- ----------- -----------
```

KA01OO0800	0.0000	76865.9292	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01OO0710	0.0000	56334.7310	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01XC0100	0.0000	187394.9277	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01OO0610	0.0000	6046.7328	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01OO0510	0.0000	30642.4044	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01XB0100	0.0000	56334.7310	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01OA0100	0.0000	26184.4452	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01OO0110	0.0000	10306.8612	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01XA0100	0.0000	20767.6296	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
A & B WWPS	0.0000	187298.1000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
KA01OO0130	0.0000	10077.7608	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		
Kahului PS	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	769042.4092	0.0000	0.0000		
KTC - New	0.0000	101912.1264	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000		

```
*==============================================*
| Table E20 - Junction Flooding and Volume Listing.  |
|             The maximum volume is the total volume |
|             in the node including the volume in the |
|             flooded storage area. This is the max  |
|             volume at any time. The volume in the  |
|             flooded storage area is the total volume|
|             above the ground elevation, where the  |
|             flooded pond storage area starts.      |
| The fourth column is instantaneous, the fifth is the|
| sum of the flooded volume over the entire simulation|
| Units are either ft^3 or m^3 depending on the units.|
*==============================================*
```

Out of Passed to

Junction Name	Surcharged Time (min)	Flooded Time(min)	1D-System (Flooded Volume)	Maximum Volume	2D cell OR Volume Stored in 1D-System allowed Flood Pond of
KA01000800	0.0000	0.0000	0.0000	4.0946	0.0000
KA01000700	0.0000	0.0000	0.0000	8.4494	0.0000
KA01000600	0.0000	0.0000	0.0000	8.5524	0.0000
KA01000500	0.0000	0.0000	0.0000	11.1232	0.0000
KA01000400	0.0000	0.0000	0.0000	11.1480	0.0000
KA01000200	0.0000	0.0000	0.0000	11.2843	0.0000
KA01000100	0.0000	0.0000	0.0000	7.6538	0.0000
KA01000300	0.0000	0.0000	0.0000	11.1792	0.0000
KA01000710	0.0000	0.0000	0.0000	4.1268	0.0000
KA01XC0100	0.0000	0.0000	0.0000	8.1243	0.0000
KA01000610	0.0000	0.0000	0.0000	1.3247	0.0000
KA01000510	0.0000	0.0000	0.0000	3.1725	0.0000
KA01XB0100	0.0000	0.0000	0.0000	3.9669	0.0000
KA010A0100	0.0000	0.0000	0.0000	2.6155	0.0000
KA01000110	0.0000	0.0000	0.0000	1.8192	0.0000

KA01XA0100	0.0000	0.0000	0.0000	0.0000	2.0880
A & B WWPS	0.0000	878.5750	0.0000	0.0000	39.5761
KA01O00130	0.0000	0.0000	0.0000	0.0000	1.8649
Kahului PS	0.0000	0.0000	0.0000	0.0000	7.6410
KTC - New	0.0000	0.0000	0.0000	0.0000	7.0456

```
*================================*
| Simulation Specific Information |
*================================*
 Number of Input Conduits..........       19 Number of Simulated
Conduits......        20
 Number of Natural Channels........        0 Number of
Junctions..............       20
 Number of Storage Junctions.......        0 Number of
Weirs..................    0
 Number of Orifices................        0 Number of
Pumps...................   0
 Number of Free Outfalls...........        1 Number of Tide Gate
Outfalls......        0

*==================================================*
| Average % Change in Junction or Conduit is defined as: |
| Conduit  % Change ==> 100.0 ( Q(n+1) - Q(n) ) / Qfull  |
| Junction % Change ==> 100.0 ( Y(n+1) - Y(n) ) / Yfull  |
*==================================================*
```

The Conduit with the largest average change was..FREE # 1 with 0.000
percent
The Junction with the largest average change was.A & B WWPS with 0.013
percent
The Conduit with the largest sinuosity was.......Link 16 with 6.955

```
*==========================================================*
| Table E21. Continuity balance at the end of the simulation |
|            Junction Inflow, Outflow or Street Flooding      |
| Error = Inflow  + Initial Volume - Outflow - Final  Volume  |
*==========================================================*
```

Inflow Junction	Inflow Volume,ft^3	Average Inflow, cfs
KA01O00800	76865.7940	0.1779
KA01O00710	56335.1294	0.1304
KA01XC0100	187396.2530	0.4338

KA01O00610	6046.7222	0.0140
KA01O00510	30642.3505	0.0709
KA01XB0100	56335.1294	0.1304
KA01OA0100	26184.3927	0.0606
KA01O00110	10306.8431	0.0239
KA01XA0100	20767.5954	0.0481
A & B WWPS	187297.1995	0.4336
KA01O00130	10077.7431	0.0233
KTC - New	101911.9472	0.2359
Kahului PS	-769042.4092	-1.7802

Outflow Junction	Outflow Volume,ft^3	Average Outflow, cfs
Kahului PS	769042.4092	1.7802

==

| Initial system volume = 0.0000 Cu Ft |

| Total system inflow volume = 770166.3792 Cu Ft |

| Inflow + Initial volume = 770166.3792 Cu Ft |

```
*=====================================================*

| Total system outflow        =    769042.4092 Cu Ft |

| Volume left in system       =      1335.2988 Cu Ft |

| Evaporation                 =         0.0000 Cu Ft |

| Outflow + Final Volume      =    770377.7080 Cu Ft |

*=====================================================*


*=============================================*
| Total Model Continuity Error                |
| Error in Continuity, Percent =      -0.0274 |
| Error in Continuity, ft^3    =     -211.329 |
| + Error means a continuity loss, - a gain   |
*=============================================*

######################################################
# Table E22. Numerical Model judgement section       #
######################################################
Your overall error was                                          -0.0274 percent

Worst nodal error was in node KA01000100       with             -0.0045 percent

Of the total inflow this loss was                                0.0089 percent

Your overall continuity error was                   Excellent

                                                    Excellent Efficiency
```

Efficiency of the simulation 1.28

Most Number of Non Convergences at one Node 0.

Total Number Non Convergences at all Nodes 0.

Total Number of Nodes with Non Convergences 0.

===> Hydraulic model simulation ended normally.
===> XP-SWMM Simulation ended normally.

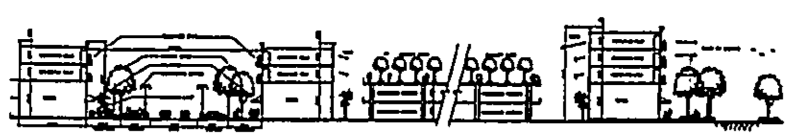
===> Your input file was named : C:\XPS\xpswmm\Work\Kahului Shopping Center - COM standards\Kahului Shopping Center - COM Standards_SC200.DAT

===> Your output file was named : C:\XPS\xpswmm\Work\Kahului Shopping Center - COM standards\Kahului Shopping Center - COM Standards_SC200.out

```
*=========================================================*
|            SWMM Simulation Date and Time Summary         |
*=========================================================*
| Starting Date... July     13, 2006  Time...  13:45:47:47 |
|   Ending Date... July     13, 2006  Time...  13:46:30:50 |
|  Elapsed Time...   0.71717 minutes or    43.03000 seconds |
*=========================================================*
```

Appendix L

LEED for Neighborhood Developments
Rating System



LEED for Neighborhood Developments
Rating System- Preliminary Draft
Draft Version 9/6/2005
(Obtlained from U.S. Green Building Council Website)

Location Efficiency			
Prerequisite:	Transportation Efficiency	-	Yes
Prerequisite:	Water and Stormwater Infrastructure Efficiency	-	Yes
Credit:	Contanimated Brownfields Redevelopment	4	No
Credit:	High Cost Contanimated Brownfields Redevelopment	1	No
Credit:	Adjacent, Infill, or Redevelopment Site	3 to 10	Yes
Credit:	Reduced Automobile Dependence	2 to 6	Partial
Credit:	Contribution to Jobs-Housing Balance	4	Yes
Credit:	School Proximity	1	No
Credit:	Access to Public Space	2	Yes
Environmental Preservation			
Prerequisite:	Imperiled Species and Ecological Communities	-	Yes
Prerequisite:	Parkland Preservation	-	Yes
Prerequisite:	Wetland & Water Body Protection	-	Yes
Prerequisite:	Farmland Preservation	-	Yes
Prerequisite:	Erosion & Sedmintation Control	-	Yes
Credit:	Support Off-Site Land Conservation	2	Investigate
Credit:	Site Design for Habitat or Wetlands Conservation	1	Yes
Credit:	Restoration of Habitat or Wetlands	1	Not Applicable
Credit:	Conservation Management of Habitat or Wetlands	1	Not Applicable
Credit:	Steep Slope Preservation	1	Yes
Credit:	Minimize Site Disturbance During Construction	1	Yes
Credit:	Minimize Site Disturbance Through Site Design	1	Yes
Credit:	Maintain Stormwater Runoff Rates	1	Yes
Credit:	Reduce Stormwater Runoff Rates	1	Yes
Credit:	Stormwater Treatment	2	Investigate
Credit:	Outdoor Hazardous Waste Pollution Prevention	1	Yes
Compact, Complete & Connected Neighborhoods			
Prerequisite:	Open Community	-	Yes
Prerequisite:	Compact Development	-	Yes
Prerequisite:	Diversity of Uses	-	Yes
Credit:	Compact Development	1 to 5	Partial
Credit:	Transit-Oriented Compactness	1	Investigate
Credit:	Diversity of Uses	1 to 3	Yes
Credit:	Housing Diversity	4	Partial
Credit:	Affordable Rental Housing	1 to 2	No
Credit:	Affordable For-Sale Housing	1 to 2	Partial
Credit:	Reduced Parking Footprint	2	Yes
Credit:	Community Outreach and Involvement	1	Yes
Credit:	Block Perimiter	1 to 4	Yes
Credit:	Locating Buildings to Shape Walkable Streets	1	Yes
Credit:	Designing Building Access to Shape Walkable Streets	1	Investigate
Credit:	Designing Buildings to Shape Walkable Streets	1	Yes
Credit:	Comprehensively Designed Walkable Streets	2	Investigate
Credit:	Street Network	1	Investigate
Credit:	Pedestrian Network	1	Yes
Credit:	Maximize Pedestrian Experience	1	Yes

Credit:	Superior Pedestrian Experience	1 to 2	Partial
Credit:	Applying Regional Precedents in Urbanism and Architecture	1	Investigate
Credit:	Transit Subsidy	3	No
Credit:	Transit Amenities	1	Investigate
Credit:	Access to Nearby Communities	1	Yes
Credit:	Adaptive Reuse of Historic Buildings	1 to 2	Not Applicable
Resource Efficiency			
Credit:	Certified Green Building	1 to 5	Investigate
Credit:	Energy Efficiency in Buildings	1 to 3	Investigate
Credit:	Water Efficiency in Buildings	1 to 2	Investigate
Credit:	Heat Island Reduction	1	Investigate
Credit:	Infrastructure Energy Efficiency	1	Investigate
Credit:	On-Site Power Generation	1	Investigate
Credit:	On-Site Renewable Energy Sources	1	Investigate
Credit:	Efficient Irrigation	1	Yes
Credit:	Greywater & Stormwater Reuse	2	No
Credit:	Waterwater Management	1	No
Credit:	Reuse of Materials	1	Investigate
Credit:	Recycled Content	1	Investigate
Credit:	Regionally Provided Materials	1	No
Credit:	Construction Waste Management	1	Investigate
Credit:	Comprehensive Waste Management	1	Investigate
Credit:	Light Pollution Reduction	1	Investigate
Credit:	Contanimant Reduction in Brownfields Remediation	1	Not Applicable
Other			
Anticipated Accredited Professional Innovation Credit		1 to 2	
Anticipated Innovation Credit(s)		1 to 4	
TOTAL POINTS POSSIBLE		114	

Anticipated Certification Levels

Certified: 46-56 points
Silver: 57-67 points
Gold: 68-90 points
Platinum: 91-114 points

Appendix M

Draft EA Powerpoint Presentation
to Maui County Planning Commission
September 2006

A&B PROPERTIES, INC.

Kahului Town Center

DRAFT- ENVIRONMENTAL ASSESSMENT
September 12, 2006

1

A&B PROPERTIES, INC.

Kahului Town Center

OVERVIEW

Mike Summers
Chris Hart & Partners

2

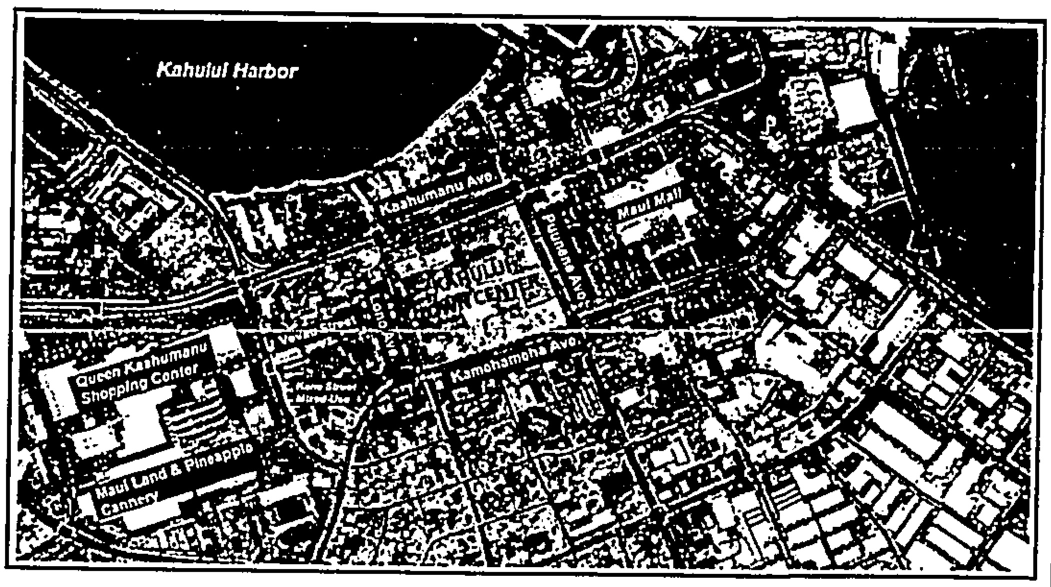
A&B PROPERTIES, INC

Project Team

▪ A&B Properties, Inc.	Applicant / Developer
▪ Chris Hart & Partners	Development Permitting, Landscape Architecture
▪ MC Architects NGA Hawaii Leslie Lippich & Assoc.	Architecture
▪ Sato & Associates	Preliminary Engineering Drainage
▪ Phillip Rowell and Assoc.	Traffic Engineering
▪ SCS, Inc.	Archaeology

3

A&B PROPERTIES, INC



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A&B PROPERTIES, INC

Project Profile

- Mixed-use, town center
- Commercial, Retail, and Residential
  - 144,000 square feet of retail commercial space
  - 96,000 square feet of new office space
  - 57,000 square feet of existing office space
  - 442 multi-family residential units
- Project Area - 19.9 acres
- Required Permits – SMA Permit, NPDES Permit, Grading Permit, Flood Development Permit

A&B PROPERTIES, INC

Project Objectives

- Develop a ***pedestrian-oriented downtown*** for Kahului where residents can live, work and play.
- ***Revive the Kahului core*** by creating exciting urban retail and residential housing opportunities for local residents.
- ***Unify existing and planned neighboring developments.***
- Build upon the tradition of the Kahului Shopping Center as a ***gathering place for Maui residents.***
- ***Enhance the entry experience to Maui.***

A&B PROPERTIES, INC.

Smart Growth Principles

- Redeveloping an ***existing underdeveloped in-fill property*** to accommodate local needs.
- Providing a ***variety of housing choices within walking distance of daily needs.***
- Creating ***pedestrian-oriented streets.***
- Placing ***off-street parking within the interior of the lot.***
- Providing ***multi-family housing above ground floor retail.***
- Incorporating a ***place-based or traditional architectural styles*** into the design of the project.

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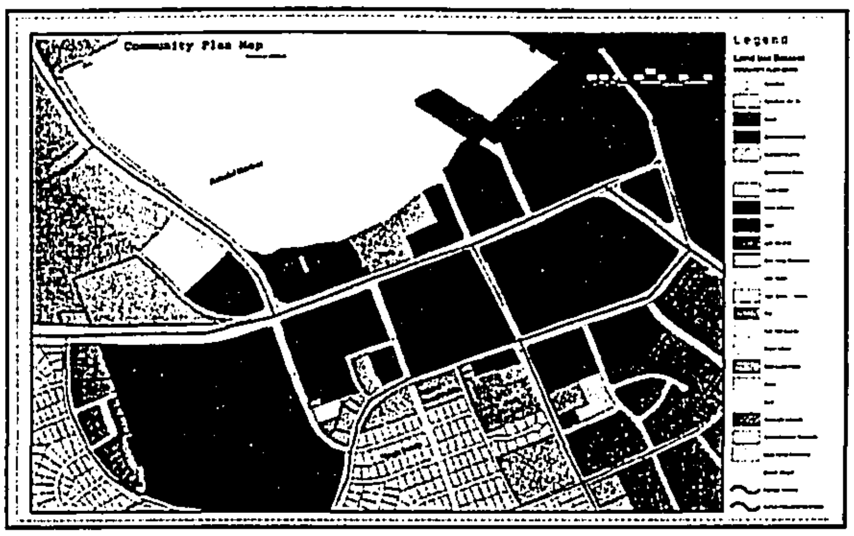
A&B PROPERTIES, INC.

Land Use Designations

8

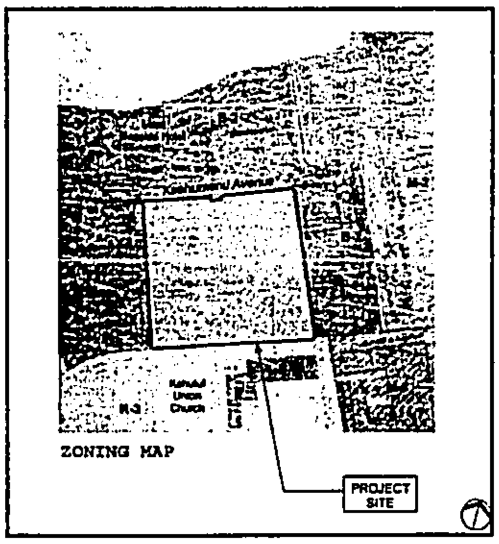
A&B PROPERTIES, INC.

Community Plan Map



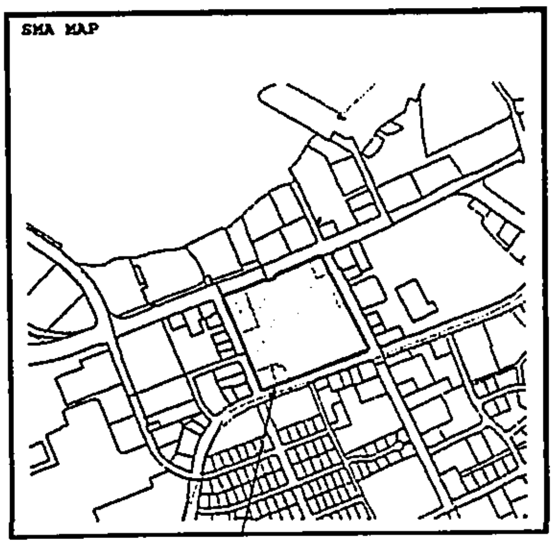
A&B PROPERTIES, INC.

Zoning Map



A&B PROPERTIES, INC.

SMA Map



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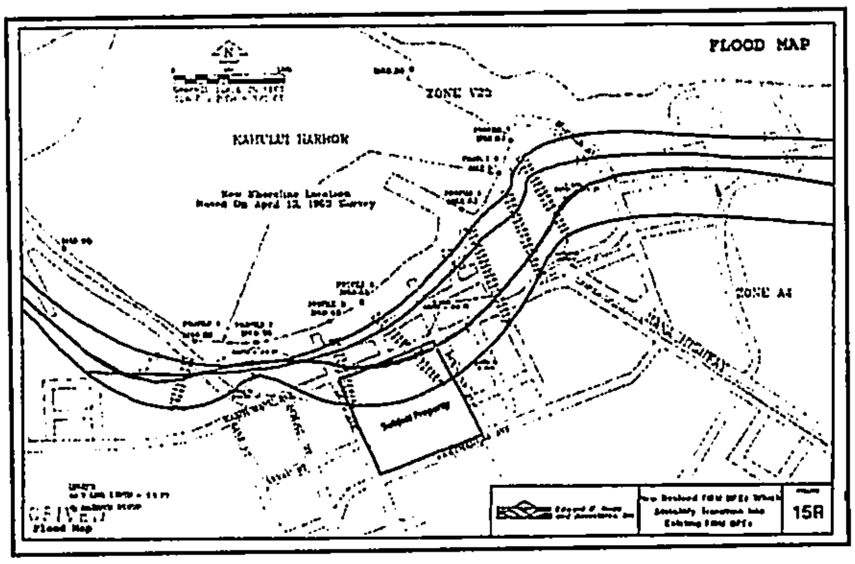
A&B PROPERTIES, INC.

FIRM Map



12

A&B PROPERTIES, INC.

Draft Environmental Assessment

- **Documents project impacts and identifies mitigation measures:**
  - **Physical Environment**
  - **Socio-Economic Environment**
  - **Infrastructure**
  - **Public Facilities**

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A&B PROPERTIES, INC.

Kahului Town Center

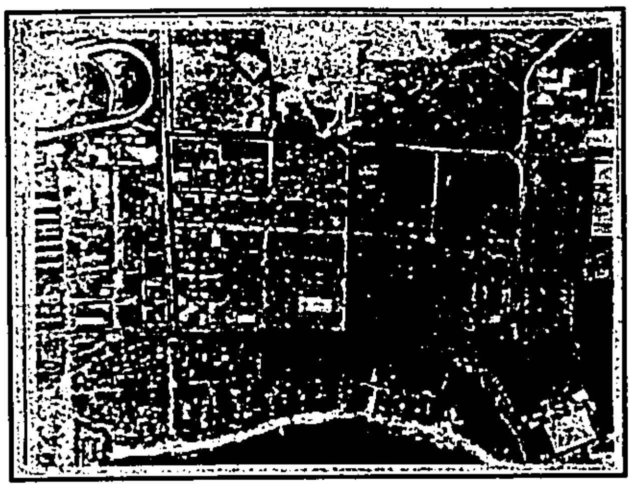
SITE HISTORY
PROPOSED ACTION

Grant Chun
A&B Properties, Inc.

14

A&B PROPERTIES, INC.

Pre-Shopping Center (Circa 1940's)



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A&B PROPERTIES, INC.

Pre-Shopping Center (Circa 1950's)

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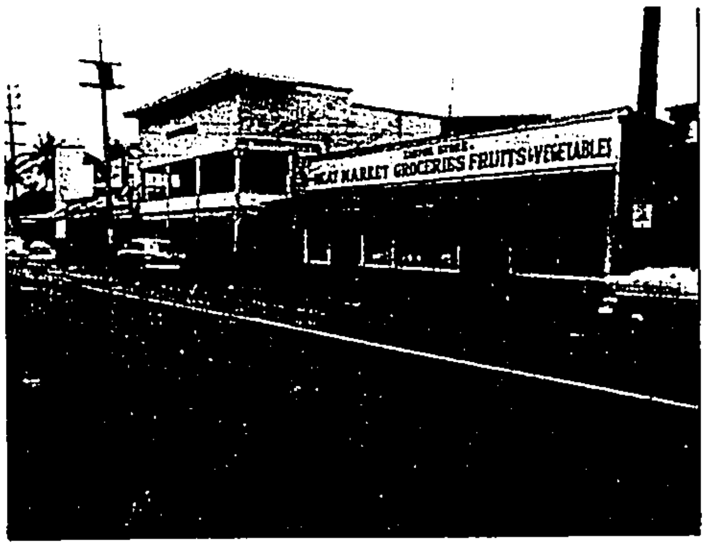
A&B PROPERTIES, INC.

Kaahumanu Avenue Streetscape (Circa 1950's)



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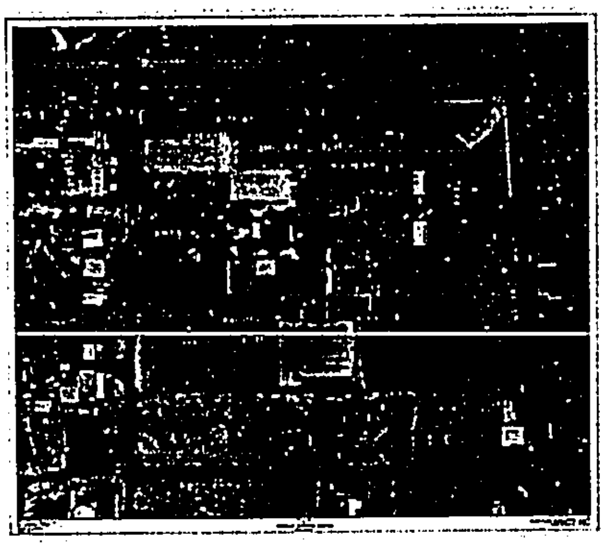
1962



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A&B PROPERTIES, INC

Before Fire

19

A&B PROPERTIES, INC

After Fire

20

A&B PROPERTIES, INC.

Design Alternatives

- Pedestrian Mall
  - Fort Street Mall in Honolulu
  - Initial A&B 1990 master plan
  - History of poor performance

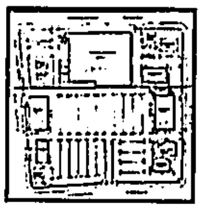
- Regional Mall
  - Kaahumanu Shopping Center
  - Vehicle oriented, with large surface parking lots
  - Doesn't define a downtown core

21

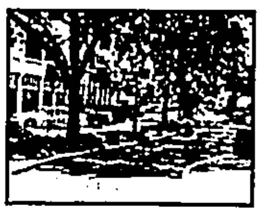
A&B PROPERTIES, INC.

Design Alternatives, Cont.

- Single-Use Commercial
  - Office park or big box retail
  - Lack of definition, "sense of place"



- Pedestrian-Oriented Main Street
  - Mixed-Use
  - Strong performance
  - Provides definition or "sense of place"
  - Pedestrian-oriented; meets design objectives



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A&B PROPERTIES, INC.

Master Plan Concept Development

- Contracted MC Architects/ NGA Hawaii to develop draft plan
- Conducted workshops with Central Maui residential brokers
- Hosted community open house to receive feedback
- Conducted pre-consultation with government agencies and community organizations
- Refined the plan to meet community sentiments

23

A&B PROPERTIES, INC.

Pre-consultation

- County of Maui
  - Department of Planning
  - Department of Public Works and Environmental Management
  - Department of Parks and Recreation
  - Department of Housing & Human Concerns
  - Planning Commission
  - Urban Design Review Board
  - Arborist Committee
  - Members of the Maui County Council
  - Mayor
- State of Hawaii
  - Department of Transportation
  - Department of Education
- Public Outreach
  - Community Open House (1/21/06)
  - Central Maui residential broker open house
  - Presentation to Rotary Club of Wailuku

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Community Input

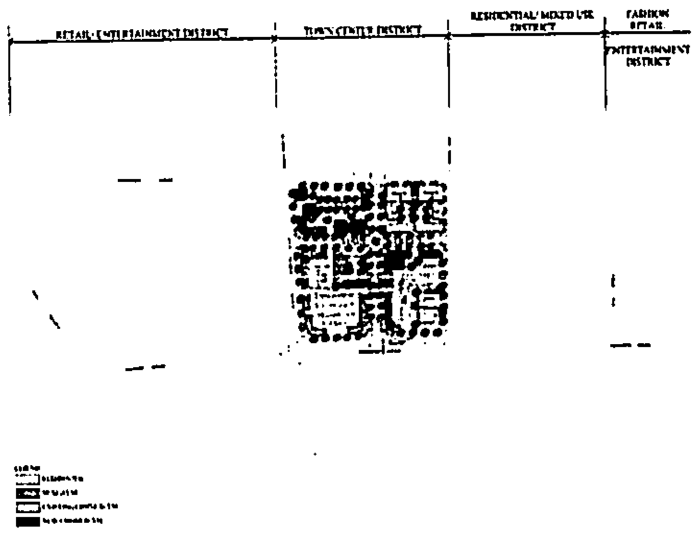
- Lots of Shade – desire to keep Monkey Pods
- Pedestrian friendly – traffic calming
- Ah Fooks – Maui identify
- Positive market response to mixed-use – initial Kane Street project sales

The Maui News

A&B town center plan 'great start'

Nearly 300 vie for Kahului condos

Strategic Vision



A&B PROPERTIES, INC.

Conceptual Rendering

(Looking west along Town Center Drive)

27

A&B PROPERTIES, INC.

Housing Goals

- Provide a ***mix of unit types***: 1-, 2- and 3-bedroom units and townhomes
- Target ***Maui County residents***
- Provide a ***full range of pricing*** to capture a broad demographic
- Working with the Director of Housing & Human Concerns to provide ***affordably priced units.***
- Design units to be of ***high quality workmanship, attractive, and energy and water efficient***

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A&B PROPERTIES, INC.

Commercial Space

- ***Provide a mix of retail and office space*** to attract a diverse tenant mix
- ***Accommodate long-term demand*** for commercial space on Maui
- ***Create a synergy*** between residential, retail, restaurant and office uses

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A&B PROPERTIES, INC.

Kahului Town Center

ARCHITECTURE

Steve Marlette
MC Architects

30

A&B PROPERTIES, INC. AB

Design Objectives

- Utilize Maui inspired architecture
- Provide a human scale environment
- Create pedestrian-friendly streets
- Allow for the interaction of mixed-uses
- Create a gathering place for Maui residents

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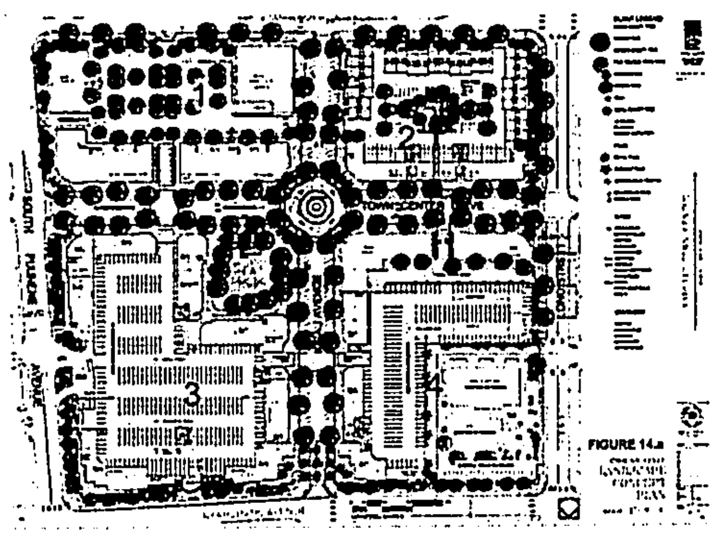
A&B PROPERTIES, INC. AB

Site Plan



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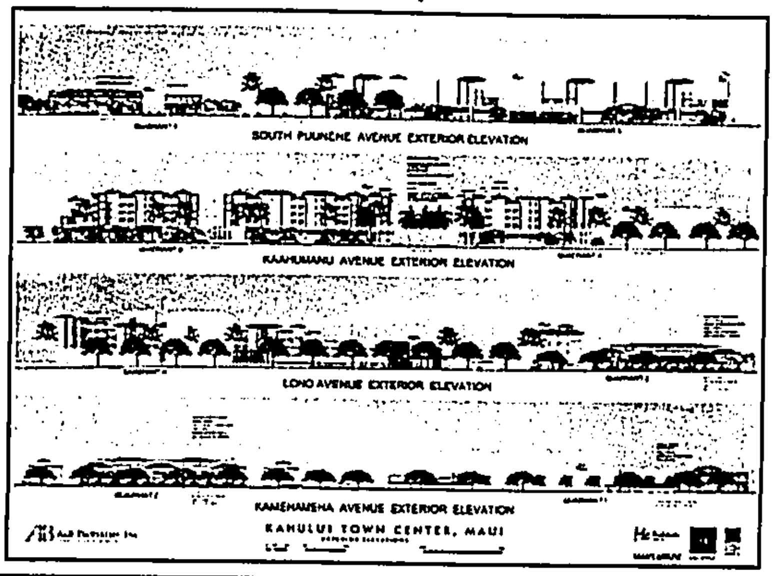
A&B PROPERTIES, INC.

Exterior Elevation (Exterior Streets)



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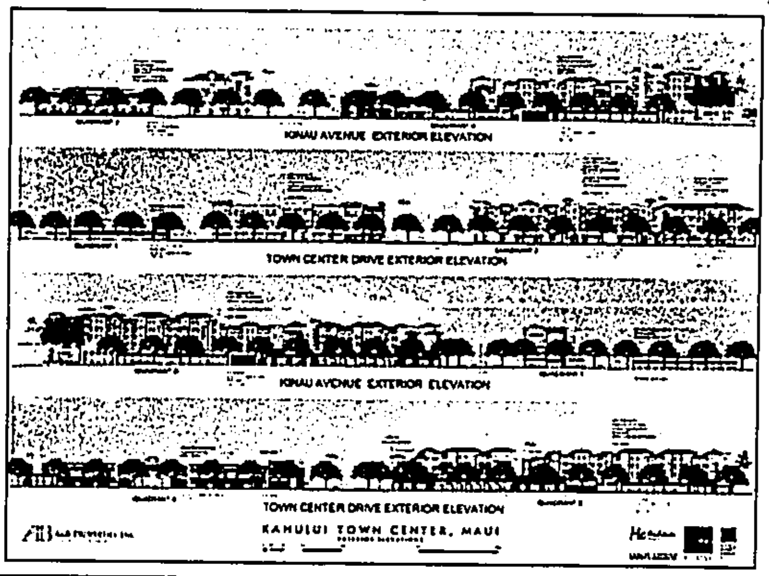
A&B PROPERTIES, INC.

Exterior Elevation (Interior Streets)



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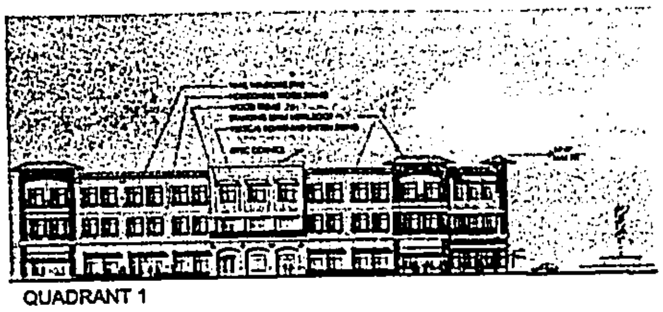
A&B PROPERTIES, INC.

Quadrant 1 – Town Center Drive

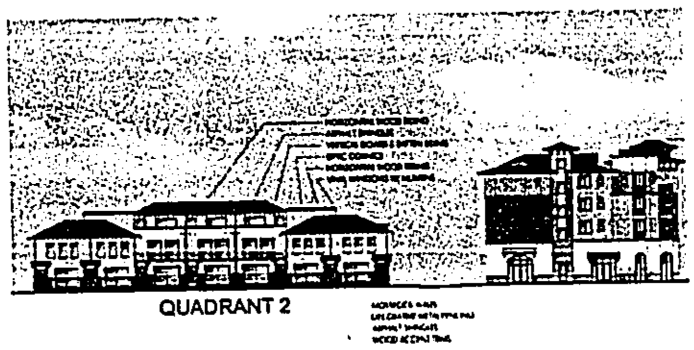


TOWN CENTER DRIVE

35

A&B PROPERTIES, INC.

Quadrant 2 – Kinau Avenue

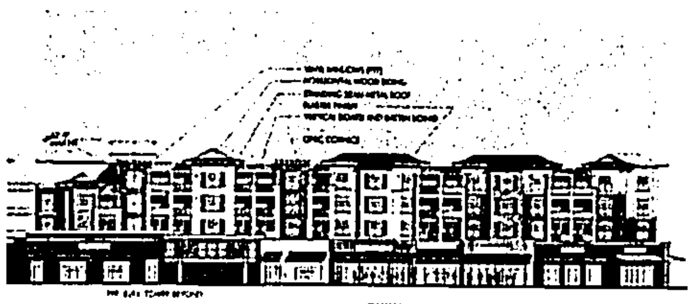


KINAU AVENUE

36

A&B PROPERTIES, INC.

Quadrant 3 – Town Center Drive



QUADRANT 3

TOWN CENTER DRIVE

37

A&B PROPERTIES, INC.

Quadrant 4 – Town Center Drive

QUADRANT 4

TOWN CENTER DRIVE

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A&B PROPERTIES, INC.

Quadrant 4 – Kinau Avenue (mauka side)

QUADRANT 4

KINAU AVENUE

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Puunene Ave at Kamehameha Ave

40

A&B PROPERTIES, INC.

Lono Ave at Kamehameha Ave

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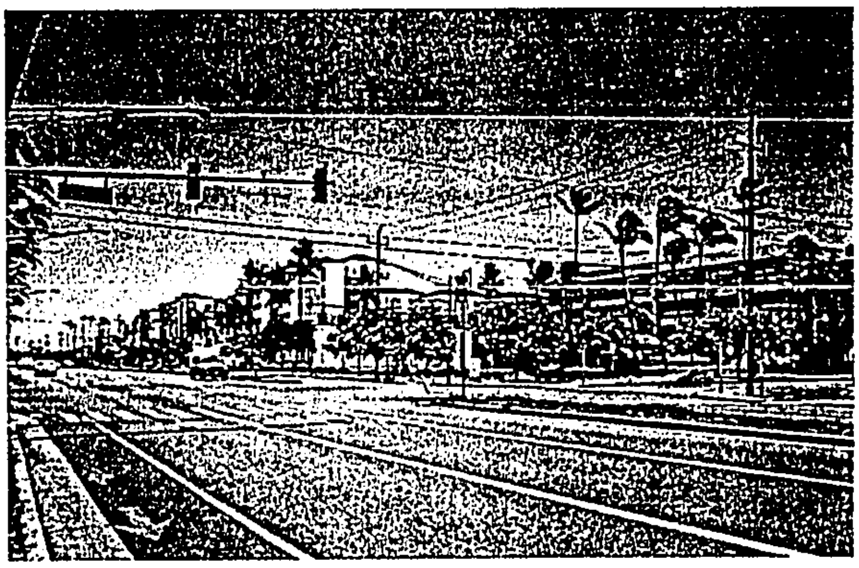
A&B PROPERTIES, INC.

Kaahumanu Ave at Lono Ave



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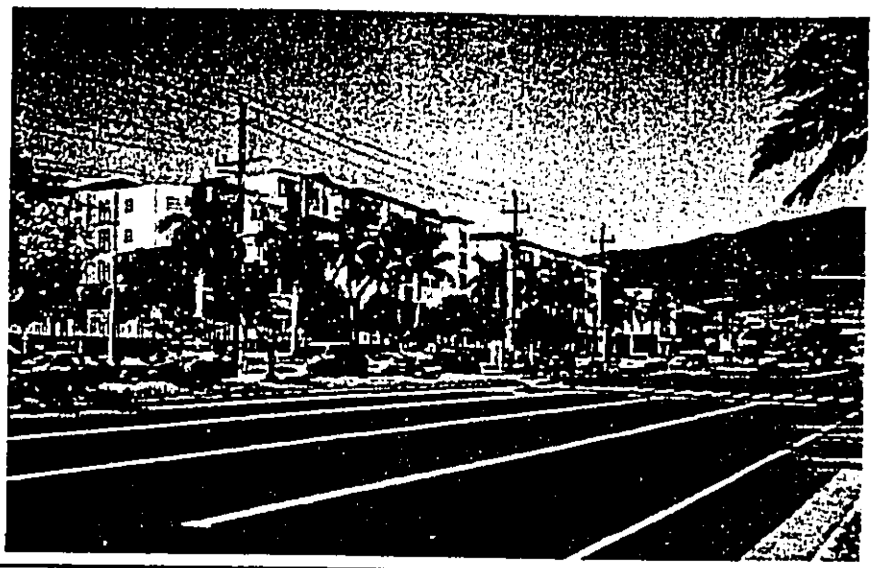
A&B PROPERTIES, INC

Kaahumanu Ave Looking West



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A&B PROPERTIES, INC

Kahului Town Center

Preliminary Engineering & Drainage

Miko Ishikawa, PE
Sato & Associates

44

A&B PROPERTIES, INC.

Drainage

- Net increase of 21.55 cfs of runoff.
- Grated catch basins to capture and retention basins to hold net increase.
- Incorporation of *pervious surfaces* and *retention swales* to further filter runoff prior to entering the undergound retention piping.
- *Mechanical filtering devices* will be analyzed to further filter sediments and oils from runoff.

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A&B PROPERTIES, INC.

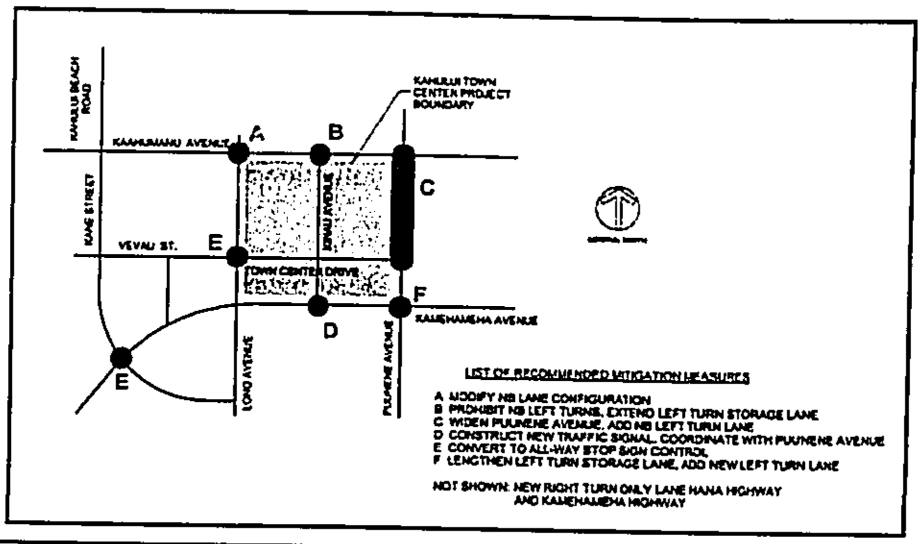
ROADWAYS & TRAFFIC

Phillip Rowell
Phillip Rowell & Associates

46

A&B PROPERTIES, INC.

Summary of Mitigation



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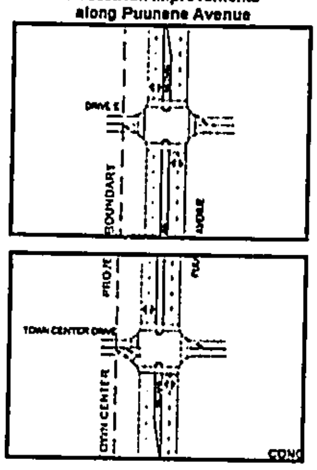
A&B PROPERTIES, INC.

Pedestrian Crossings

- **Prohibit left turns from northbound Kinau Avenue to westbound Kaahumanu Avenue**
- **Provide pedestrian refuge islands at the mid-block driveways**
- **Provide a four-way stop along Lono Avenue at Town Center Drive**
- **Provide a roundabout and raised pedestrian crosswalks on-site to calm traffic and discourage through traffic.**

Pedestrian Improvements along Puunene Avenue



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A&B PROPERTIES, INC.

Kahului Town Center

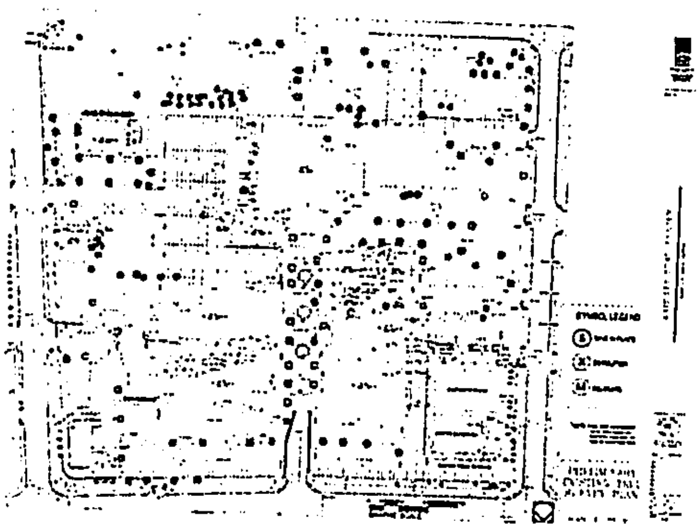
LANDSCAPE ARCHITECTURE

Bill Mitchell
Chris Hart & Partners

49

A&B PROPERTIES, INC.

Existing Tree Survey Plan



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A&B PROPERTIES, INC.

Hawaii BuiltGreen Standards

- 1-21: Amend disturbed soil to min. depth of 4" to restore soil functions.
- 1-24: Mulch used in landscape to min. evaporation
- 1-26: Drought-resistant, native plants used for 50% of the landscaped area.
- 1-27: Irrigation system has water-saving features.
- 2-4: Landscape elements (trees) shade buildings and paved areas.
- 2-8: Generous areas of planting and groundcover to reduce site temperature.

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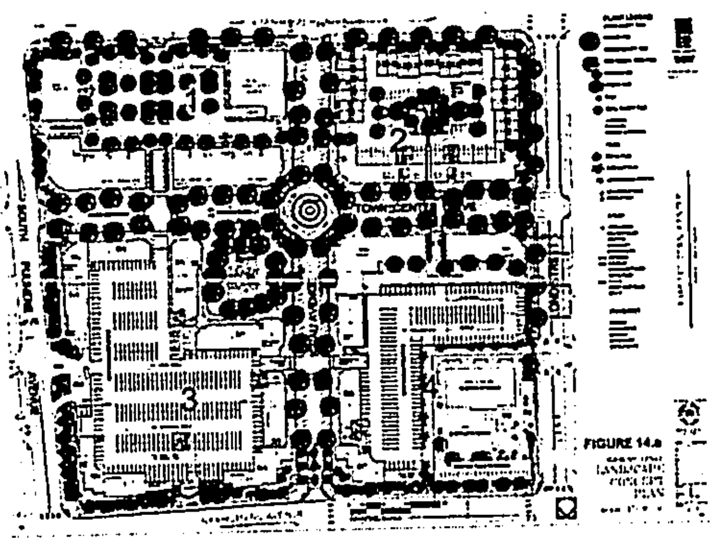
A&B PROPERTIES, INC.

Site Landscape Plan



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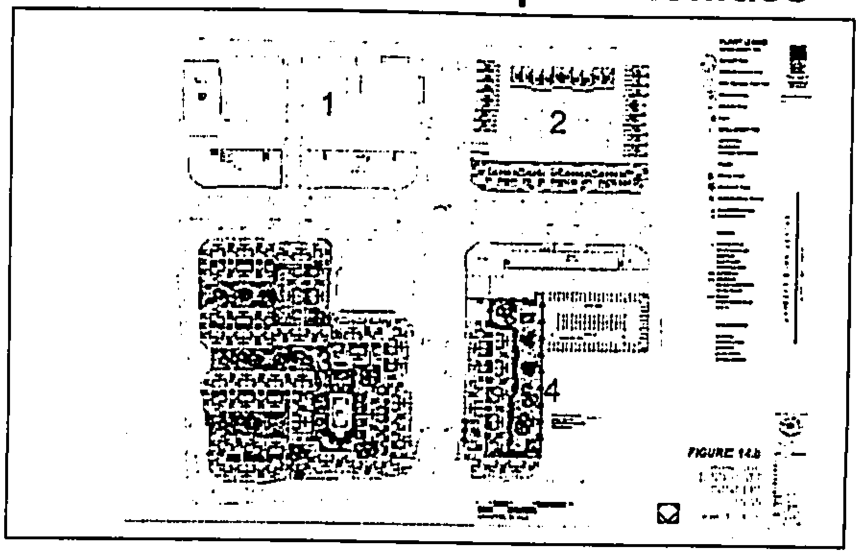
A&B PROPERTIES, INC.

Roof Deck Landscape Amenities



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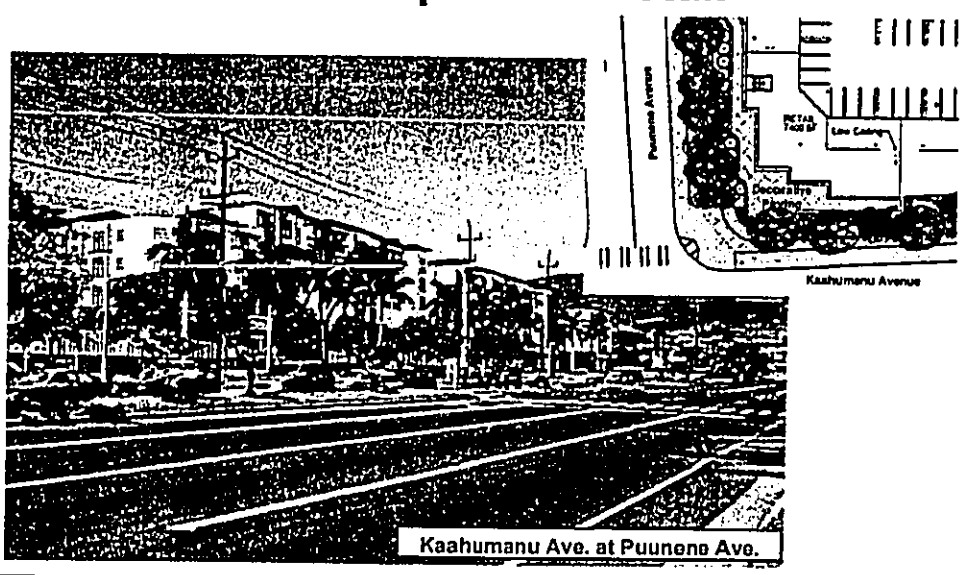
A&B PROPERTIES, INC.

Landscape Plan Detail



Kaahumanu Ave. at Puunene Ave.

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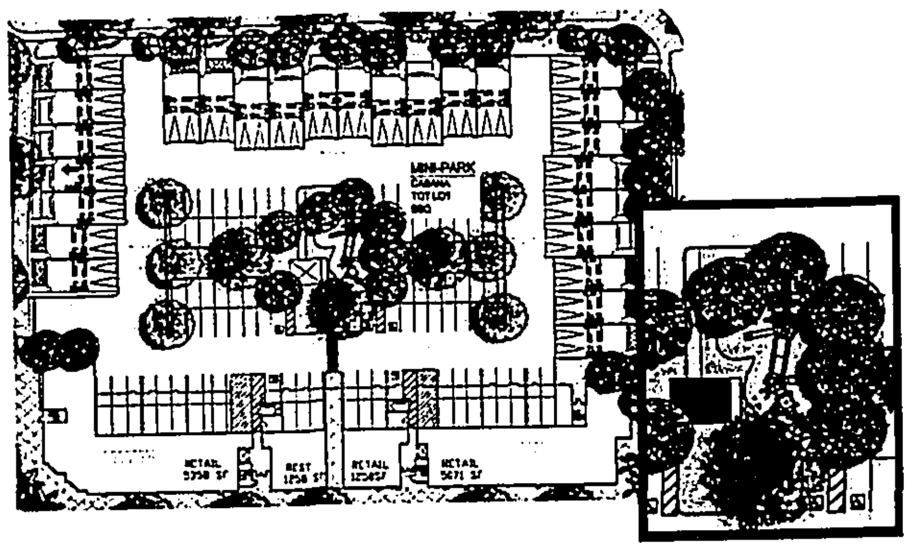
A&B PROPERTIES, INC.

Mini-Park (Quadrant 2)



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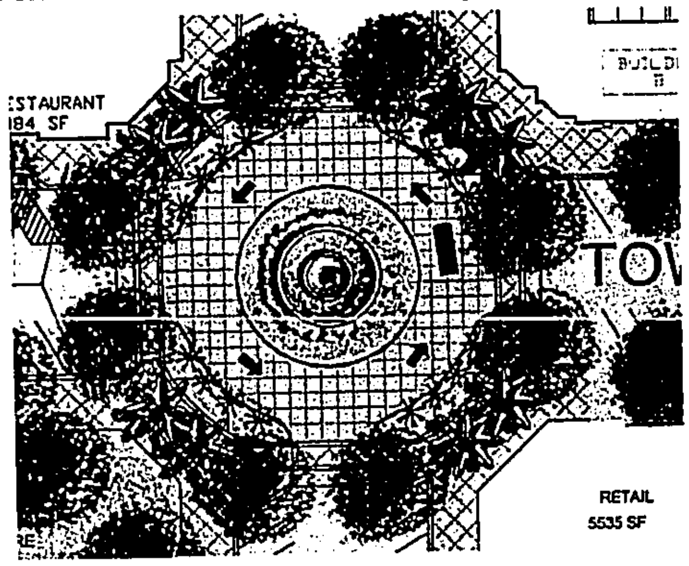
A&B PROPERTIES, INC.

Traffic Circle Landscape Features



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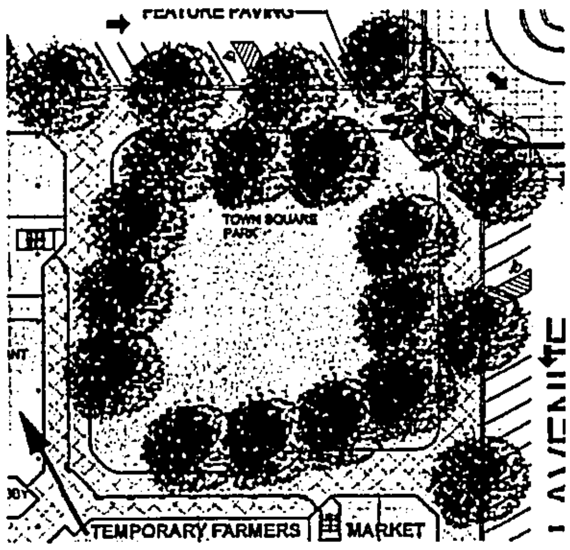
A&B PROPERTIES, INC.

Town Square



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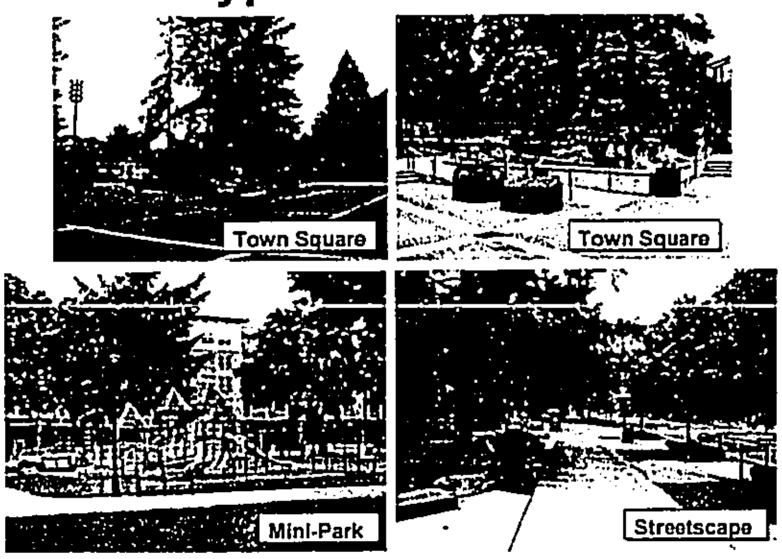
A&B PROPERTIES, INC.

Typical Amenities



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A&B PROPERTIES, INC.

Typical Amenities

PROJECT AMENITIES

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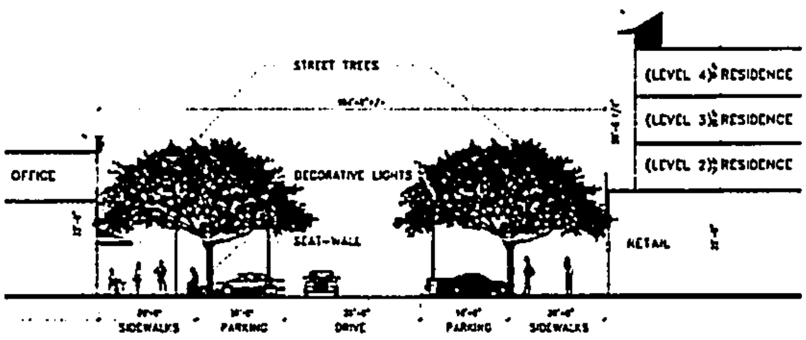
A&B PROPERTIES, INC.

Interior Street Section

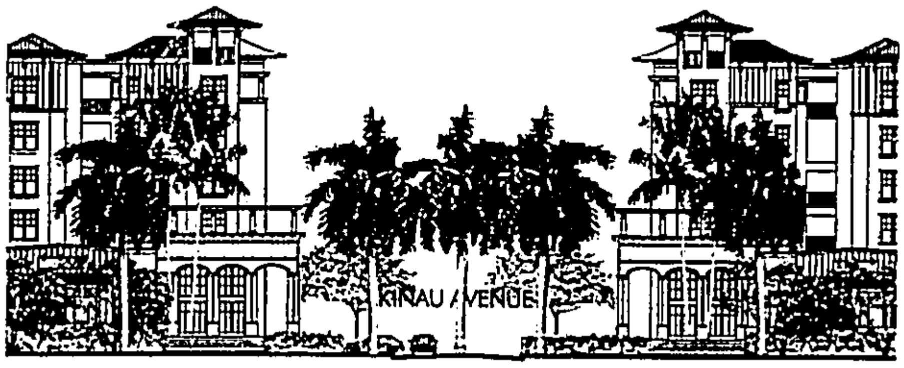


TOWN CENTER DRIVE

60

A&B PROPERTIES, INC.

Kaahumanu Ave. Entrance



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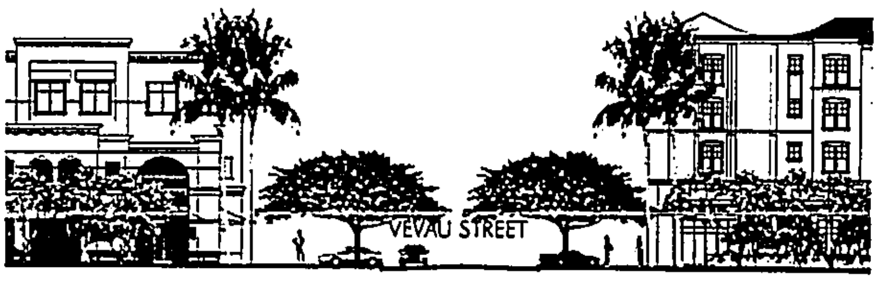
A&B PROPERTIES, INC.

South Puunene Ave. Entrance



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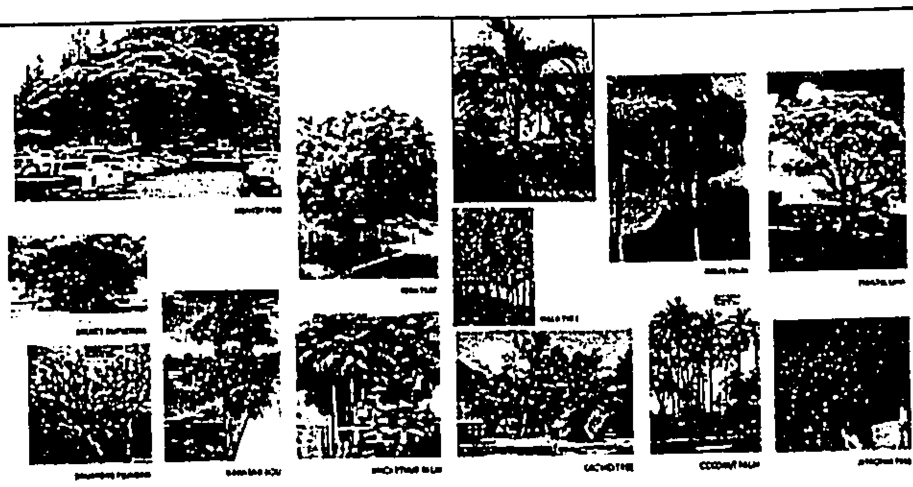
A&B PROPERTIES, INC.



KAHULUI TOWN CENTER

LANDSCAPE PLANT MATERIAL

FIGURE 14.c

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A&B PROPERTIES, INC.

Thank you

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