

DRAFT ENVIRONMENTAL ASSESSMENT

**B.T. KUWAHARA PRIVATE COMMERCIAL DEVELOPMENT
AND RELATED USE OF STATE LAND**

TMKs (3rd): 1-5-007:006, 055, 069 & 070
Pāhoa, Puna District, County of Hawai‘i, State of Hawai‘i

March 2013

Prepared for:
B.T. Kuwahara LLC
P.O. Box 421
Pāhoa, Hawai‘i 96778

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APPLICANT:

B.T. Kuwahara LLC
P.O. Box 421
Pāhoa, Hawai‘i 96778

APPROVING AGENCY:

County of Hawai‘i
Planning Department
101 Pauahi Street
Hilo, Hawai‘i 96720

CONSULTANT:

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CLASS OF ACTION:

Use of State Land

This document is prepared pursuant to:

The Hawai‘i Environmental Policy Act
Chapter 343, Hawai‘i Revised Statutes, and
Title 11, Chapter 200 Hawai‘i Department of Health Administrative Rules.

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SUMMARY OF THE PROPOSED ACTION, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

B.T. Kuwahara LLC, the applicant, plans to develop a commercial center at 15-2714 Pāhoa Village Road in the community of Pāhoa Village, Island of Hawai‘i. The project site is located along Pāhoa Village Road and adjacent to the Kahakai Boulevard-Pāhoa Village Road intersection. The commercial center would consist of 104,143 square feet of leasable space, and is likely to include a super market (40,000 square feet), garden center (10,000 square feet), family medical clinic (11,250 square feet), a quality restaurant (5,000 square feet), a post office (2,000 square feet), a medical/dental clinic (5,040 square feet), a specialty retail store (8,000 square feet), a paint/hardware store (10,000 square feet), a second specialty retail store (10,000 square feet, or two stores of equivalent total area), and a full service restaurant (2,853 square feet). The project would utilize three privately-owned parcels totaling 9.93-acres with Tax Map Key numbers of (3rd) 1-5-007:006, 069 & 070 and a 50-foot-wide by 829.60-foot-long State of Hawai‘i property, the Kahakai Boulevard extension, with a Tax Map Key number (3rd) 1-5-007:055.

No public funds would be used for the proposed project, including roadway improvements. Total project construction costs are roughly estimated at \$20 million. Construction would commence in 2013 upon completion of permitting and design; construction may be completed as soon as 2014.

The proposed project would extend Kahakai Boulevard approximately 829.60 feet toward the west (i.e., mauka direction). Primary access to the project site would be via this Kahakai Boulevard extension and two access driveways along Pāhoa Village Road. Additional roadway improvements include widening of the portion of Pāhoa Village Road fronting the project site to allow for turning lanes and sidewalks, and construction of a traffic light at the Kahakai Boulevard-Pāhoa Village Road intersection.

The proposed project would have significant positive economic and social impacts by providing both short-term and long-term employment and by providing access to services, including health care in an area with a distinct lack of such services. Traffic impacts would occur, and would be mitigated by signalization of the Kahakai Boulevard-Pāhoa Village Road intersection, as well as by the addition of turning lanes. Other minor, short-term construction-phase impacts including noise, air, and water quality are mitigable. No other significant impacts are expected to occur to cultural and historic sites, archaeological resources, and flora and fauna, or they are negligible.

PART 1: PROJECT DESCRIPTION, BACKGROUND AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Project Description, Location, and Property Ownership

B.T. Kuwahara LLC, the applicant, plans to develop a commercial center at 15-2714 Pāhoa Village Road in the community of Pāhoa Village, Island of Hawai‘i. The project site is located along Pāhoa Village Road and adjacent to the Kahakai Boulevard-Pāhoa Village Road intersection (See Figures 1 & 2). The commercial center would consist of 104,143 square feet of leasable space, and is likely to include a super market (40,000 square feet), garden center (10,000 square feet), family medical clinic (11,250 square feet), a quality restaurant (5,000 square feet), a post office (2,000 square feet), a medical/dental clinic (5,040 square feet), a specialty retail store (8,000 square feet), a paint/hardware store (10,000 square feet), a second specialty retail store (10,000 square feet, or two stores of equivalent total area), and a full service restaurant (2,853 square feet). Design of the site is in progress and input has been solicited from the community regarding the overall design and appearance. Figure 3 shows a preliminary site plan, although it must be emphasized that the layout and site access are in flux. Additional amenities that would be constructed include an outside stage performance area and covered bicycle racks.

No public funds would be used for the proposed project, including roadway improvements. Total project construction costs are roughly estimated at \$20 million. Construction would commence in 2013 upon completion of permitting and design; construction may be completed as soon as 2014.

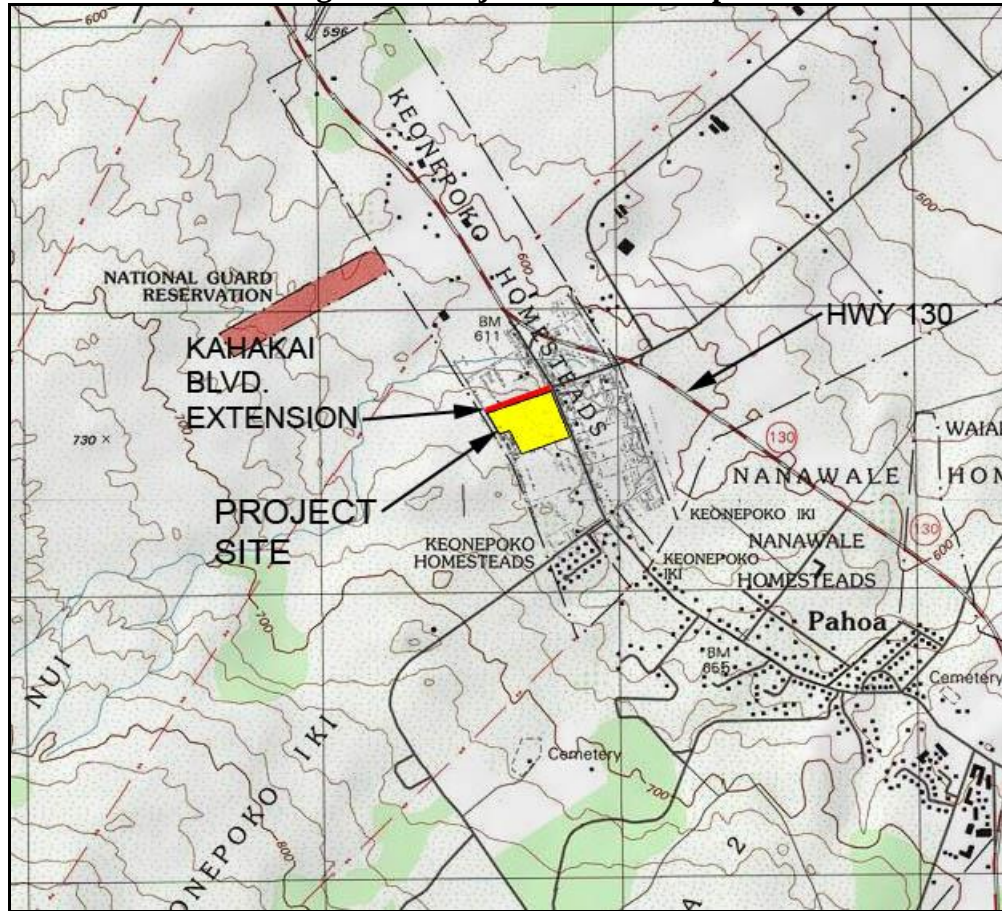
The project site is currently the base yard for Bryson’s Cinders, Inc., providing construction material including soil, sand, cinders, and rock mixtures for construction, agriculture, and landscaping projects. The project site currently contains an office, warehouse, and two residences.

The project would utilize three privately-owned parcels totaling 9.93-acres with Tax Map Key (TMK) numbers of (3rd) 1-5-007:006, 069 & 070 and the 50-foot-wide by 829.60 foot-long State-owned Kahakai Boulevard extension property with a TMK number of (3rd) 1-5-007:055. Primary access to the project site would be via and two driveways along Pāhoa Village Road and the unimproved Kahakai Boulevard parcel, that would be extended 829.60 feet toward the west. Additional roadway improvements include widening a 600-foot portion Pāhoa Village Road fronting the project site to allow for turning lanes and sidewalks, and construction of a traffic light at the Kahakai Boulevard-Pāhoa Village Road intersection. A covered bus stop with turnout would also be constructed along Pāhoa Village Road (i.e., the west side of Pāhoa Village Road).

The business provides material including soil, sand, cinders, and rock mixtures for construction, agriculture, and landscaping projects. The project site also currently contains two residences. The Kahakai Boulevard extension parcel is currently owned by

the State of Hawai‘i, managed by the Department of Land and Natural Resources Land Division, and conveyance of this property to the County of Hawai‘i is in progress.

Figure 1 - Project Location Map

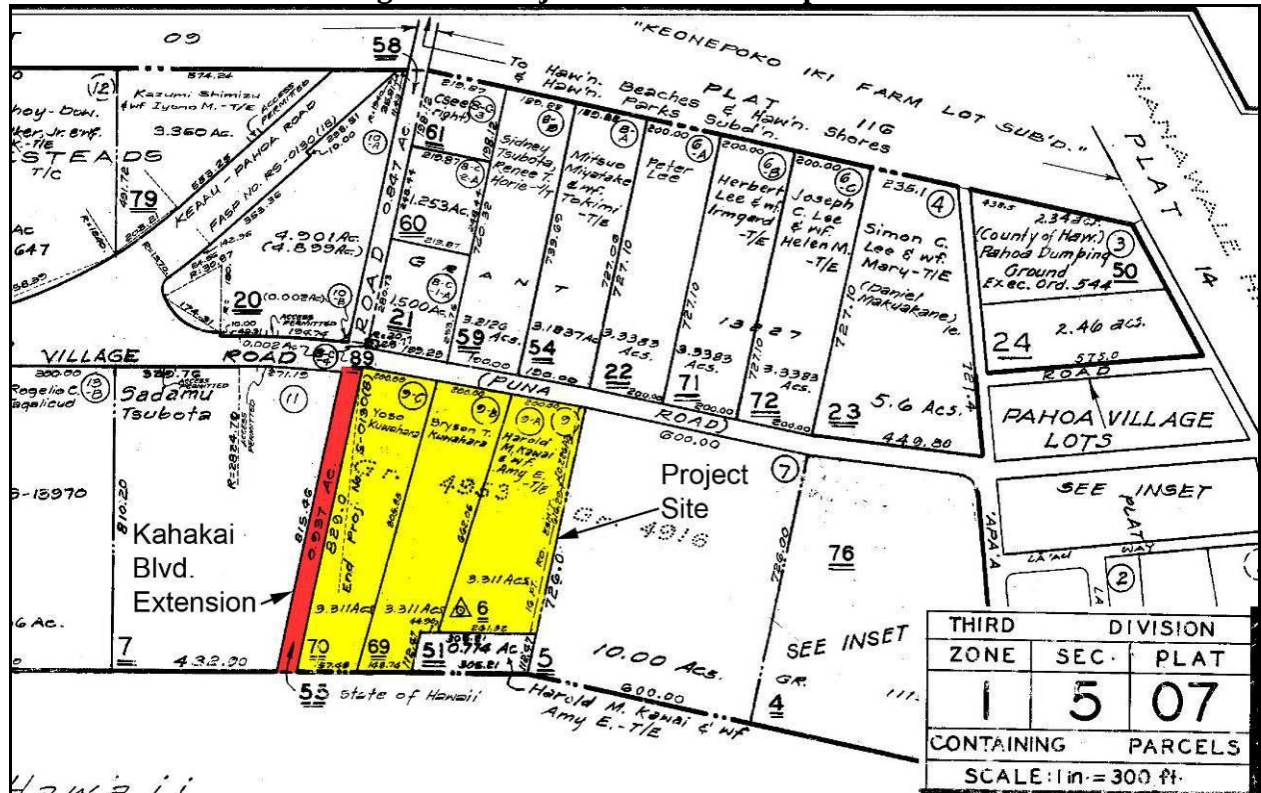


1.2 Summary of Regulatory Requirements

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200 of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact assessment process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the anticipated finding that no significant impacts are expected to occur; Part 5 lists each criterion and presents the preliminary conclusions for each made by the County of Hawai‘i Planning Department, the approving agency. If, after considering comments to the Draft EA, the Planning Department concludes that, as anticipated, no significant impacts would be expected to occur, then the Planning

Department will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) will be prepared.

Figure 2 - Project Area TMK Map



1.3 Public Involvement and Agency Coordination

The following agencies and organizations were consulted in development of this environmental assessment.

Federal:

U.S. Fish and Wildlife Service

State:

Department of Business, Economic Development and Tourism
 Department of Civil Defense
 Department of Education
 Department of Health, Environmental Planning Office
 Department of Land and Natural Resources, Historic Preservation Division
 Department of Land and Natural Resources, Engineering Division
 Department of Land and Natural Resources, Land Division
 Department of Transportation

State Legislators

County:

Department of Water Supply
County Council
Fire Department
Mass Transit Agency
Mayor
Planning Department
Police Department
Public Works Department

Private:

Malama O Puna
Main Street Pāhoa Association
Friends of Puna's Future
Adjacent Property Owners
Puna Community Development Plan Action Committee
Hawai'i Cave Conservancy

Copies of communications received during preconsultation are contained in Appendix 1.

1.5 Property Ownership

Parcels TMK (3rd) 1-5-007: 006, 069 & 070 are owned by B.T. Kuwahara LLC. The 50-foot wide portion of Kahakai Boulevard, TMK (3rd) 1-5-007:055, is currently property of the State of Hawai'i under management by the Department of Land and Natural Resources Land Division, and conveyance of this property to the County of Hawai'i and management by the Department of Public Works is in progress.

PART 2: ALTERNATIVES

2.1 Proposed Action

The only action alternative, or build alternative, under consideration is the construction of the commercial center and appurtenant improvements. No alternative sites are under consideration as the project site is the only appropriate site available to the owner for development.

2.2 No Action

Under the No Action Alternative, the shopping center and associated improvements would not be constructed. The No Action Alternative and consequent anticipated impacts are discussed as a baseline against which the build alternative's impacts are compared. Because the project site is privately owned, the owner considers the No Action

Alternative highly undesirable. Unless there is a difference between impacts from the proposed action and the No Action Alternative it is not explicitly discussed below.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The parcels upon which the commercial center would be constructed and roadway improvements would be made are referred to throughout this EA as the *project site*. The term *project area* is used to describe the general vicinity of Pāhoa Village, and in some cases, the Puna District.

The project site is located adjacent to, and to the south and west of, the intersection of Pāhoa Village Road and Kahakai Boulevard (see Figures 1 & 2), located diagonally across Pāhoa Village Road from Woodland Center. The vegetation of the project area has been extensively modified by past and ongoing uses, and the interior of project site is largely unvegetated. Adjacent land is a mix of residential and commercial uses along with vacant lands. The project site is approximately 630 feet above mean sea level and is sloping slightly upwards towards the southwest.

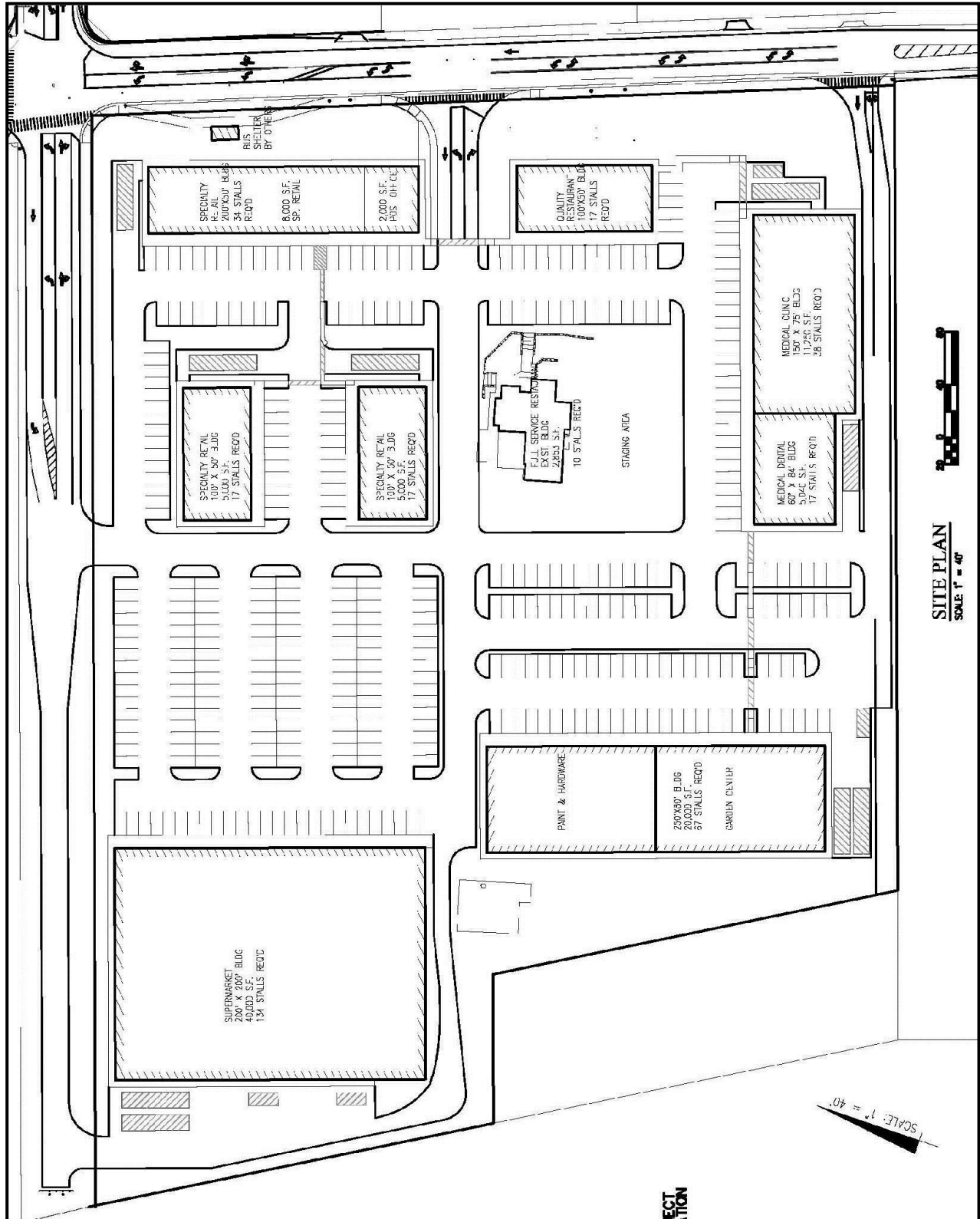
3.1 Physical Environment

3.1.1 Geology, Soils, Geologic Hazards and Climate

Environmental Setting

Geologically, the project site is located on the lower flank of Kilauea volcano. The surface consists of lava flows of the Puna Basalt series of 200 to 750 years in age, originating from the Kilauea summit area (Wolfe and Morris 1996). The project site's soil is classified by the National Resource Conservation Service (formerly Soil Conservation Service 1973) as pahoehoe Lava Flows (rLW). This surficial geology is described as being excessively drained with a wide range in hydraulic permeability, from moderately low (0.06 inches/hour) to moderately high (0.20 inches/hour). Its Land Capability Classification is 8s; Classification 8 soils are defined as miscellaneous areas having limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for aesthetic purposes. Subclass "s" soils are soils that have limitations within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content.

Figure 3 - Preliminary Site Plan



The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the United States Geological Survey in the project area as 2 on a scale of ascending risk of 9 to 1. This relatively high hazard risk is based on the fact that Kilauea is an active volcano. Volcanic hazard zone 2 areas are located adjacent to and downslope from zone 1 and have had 15-25% of land area covered by lava since the year 1800 and 25-75% covered within the past 750 years (Wright et al. 1992).

Lava tubes and caves may present geological hazards as they may jeopardize the integrity of structures, and may present a safety hazard to construction workers. They may also present a long-term hazard as their presence may not be recognized during the construction phase. The risk of such hazards is very difficult to assess. In addition to the geological hazard presented by lava tubes and caves, they are unique and valuable natural resources, representing biota not found anywhere else on Earth.

Several large lava tube caves are known in the project area, including the famous Kazumura Cave, possibly the longest known traversable cave on Earth with a length of about 35 miles (Allred & Allred 1997). The developer has drilled extensively on the project site in order to locate near-surface voids, but no voids were observed.

In order to gain local knowledge of the potential presence of caves under or near the project site, Fred Stone, Ph.D., of the Hawai'i Cave Conservancy was contacted. Dr. Stone had no knowledge of caves or lava tubes under the project site (Stone 2012).

In terms of seismic risk, the entire Island of Hawai'i is mapped within the High Seismic Risk Zone (Government Accounting Office 1992) with only the Very High Risk Zone being of higher risk. Although Hawai'i Island has significant seismic risk, these issues are mitigated as structural design is required to conform to the International Building Code (2006), as adopted by the Hawai'i County Code, which considers site-specific information to govern the structural design of buildings.

The average daily temperature is approximately 73 degrees F., and annual rainfall averages approximately 130 inches (University of Hawai'i at Hilo 1998). Hawaii's climate is generally characterized as mild with uniform temperatures, moderate humidity, and two identifiable seasons. The "summer" season, between May and October is generally warmer and drier. The "winter" season, between October and April is cooler and wetter. The project area is situated along the "windward" side of the Island of Hawai'i which is exposed to the prevailing northeasterly trade winds that causes relatively high rainfall (University of Hawai'i at Manoa 1983).

Impacts and Mitigation Measures

While seismic and volcanic hazards exist on the project site and vicinity, other developments including the community of Pāhoa Village and the Puna District have equivalent or greater risks, yet development of the area is ongoing. In view of this consideration, as well as the fact that the proposed project is a private action, the proposed project is not unreasonable to construct.

While the No Action Alternative would avoid risks related to geology and geologic hazards on the project site, other sites in the project area would face the same risks and thus would yield no preference.

3.1.2 Water Features, Flooding, Drainage and Water Quality

Existing Environment

There are no fresh surface water bodies in the immediate area. A small, ephemeral stream is located about 500 feet to the north of the project site near the southern property boundary of the Pāhoa Marketplace shopping center.

No stream poses a flooding hazard to the project site. The Flood Insurance Rate Map 1551661350C (9/16/88) is unprinted, indicating that the project site is designated Flood Zone “X”, or Special Flood Hazard areas outside of the 100- or 500-year flood plains. Therefore, a relatively low hazard from the principal sources of flooding in the area exists, although local sources can still cause flooding.

The State of Hawai‘i Department of Health’s (DOH) Underground Injection Control (UIC) maps show that the project site is located above the UIC line, meaning that the underlying aquifer is considered a drinking water source.

Impacts and Mitigation Measure

No impacts to stream banks, stream waters or other surface water features will occur, as none are present.

In order to minimize the potential for the release of polluted stormwater runoff, the contractor will perform all earthwork and grading in conformance with Chapter 10, Erosion and Sediment Control, Hawai‘i County Code. Because the project will disturb more than one acre of soil, a National Pollutant Discharge Elimination System (NPDES) will must be obtained by the contractor before the project commences, and application for this permit is in progress. This permit requires the completion of a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the project. These BMPs may include, but will not be limited to, the following:

- Minimization of soil loss and erosion by revegetation and stabilization of slopes and disturbed areas of soil, either by hydro-mulching on slopes and seeded on graded, flat surfaces, as soon as possible after working;
- Minimization of sediment loss by emplacement of structural controls possibly including silt fences, gravel bags, sediment ponds, check dams, and other barriers in order to retard and prevent the loss of sediment from the site;
- Application of sediment waddles and protective covers to soil and material stockpiles;
- Gravel check dams in swales or gutters;
- Construction and use of a stabilized construction vehicle entrance, with designated vehicle wash area that discharges to a sediment pond;
- Washing of vehicles in the designated wash area before they egress the project site;
- Use of drip pans beneath vehicles not in use in order to trap vehicle fluids;
- Routine inspection and maintenance of structural BMPs by adequately trained personnel; and
- Significant leaks or spills, if they occur, shall be properly cleaned up and disposed of at an approved site.

Although the project would construct impermeable surfaces and would therefore increase the volume and rate of stormwater runoff, the project would not increase the volume of stormwater leaving the site as required by Hawai‘i County Code (Chapter 27 - Drainage). This would be achieved through construction of dry wells requiring Underground Injection Control permits from the State of Hawai‘i Department of Health.

Wastewater from the project’s facilities will be treated using individual wastewater treatment systems and will be permitted by the State of Hawai‘i Department of Health.

3.1.1.3 Flora, Fauna and Ecosystems

Existing Environment

The natural vegetation of this part of Puna was most likely lowland rain forest dominated by ‘ohi‘a (*Metrosideros polymorpha*), kuolohia (*rhynchospora sp.*) and uluhe (*Dicranopteris linearis*) (Gagne and Cuddihy 1990). This pre-existing ecosystem, however, has been destroyed or heavily degraded by previous and ongoing site activities and the colonization and succession of invasive plant communities. Now only a narrow strip of vegetation somewhat resembling this pre-existing lowland rain forest may be found within the Kahakai Boulevard extension parcel.

A walk-through botanical survey of the project site was performed by Botanist Layne Yoshida on September 24 and November 14, 2012. Table 1 is a list of plant species detected on the project site.

Table 1 - Project Site Plant Species List

Scientific Name	Family	Common Name	Life Form	Status*
<i>Ageratum conyzoides</i>	Asteraceae	Ageratum	Herb	A
<i>Ageratum houstonianum</i>	Asteraceae	Ageratum	Herb	A
<i>Aleurites moluccana</i>	Euphorbiaceae	Kukui	Tree	A
<i>Alpinia purpurata</i>	Zingiberaceae	Red Ginger	Herb	A
<i>Alpinia sp.</i>	Zingiberaceae	Alpinia	Herb	A
<i>Ananas comosus</i>	Bromeliaceae	Pineapple	Herb	A
<i>Andropogon virginicus</i>	Poaceae	Andropogon	Herb	A
<i>Anthurium sp.</i>	Araceae	Anthurium	Herb	A
<i>Apium sp.</i>	Apiaceae	Celery	Herb	A
<i>Archontophoenix alexandrae</i>	Arecaceae	Alexandra Palm	Tree	A
<i>Ardisia elliptica</i>	Myrsinaceae	Shoebutton Ardisia	Tree	A
<i>Arundina graminifolia</i>	Orchidaceae	Bamboo Orchid	Herb	A
<i>Axonopus fissifolius</i>	Poaceae	Carpet Grass	Herb	A
<i>Begonia sp.</i>	Begoniaceae	Begonia	Herb	A
<i>Bidens sp.</i>	Asteraceae	Bidens	Herb	A
<i>Bougainvillea sp.</i>	Nyctaginaceae	Bougainvillea	Shrub	A
<i>Brachiaria mutica</i>	Poaceae	California Grass	Herb	A
<i>Buddleia asiatica</i>	Buddleiaceae	Dog Tail	Shrub	A
<i>Calotropis sp.</i>	Asclepiadaceae	Crown Flower	Shrub	A
<i>Camellia sp.</i>	Theaceae	Camellia	Shrub	A
<i>Castilleja arvensis</i>	Scrophulariaceae	Indian Paintbrush	Herb	A
<i>Cecropia obtusifolia</i>	Cecropiaceae	Cecropia	Tree	A
<i>Chamaecrista nictitans</i>	Fabaceae	Partridge Pea	Herb	A
<i>Christella parasitica</i>	Thelypteridaceae	Christella	Fern	A
<i>Cibotium glaucum</i>	Dicksoniaceae	Hapu'u	Fern	E
<i>Clidemia hirta</i>	Melastomataceae	Clidemia	Herb	A
<i>Clusia rosea</i>	Clusiaceae	Copey	Herb	A
<i>Cocos nucifera</i>	Arecaceae	Niu	Tree	A
<i>Codiaeum sp.</i>	Euphorbiaceae	Croton	Shrub	A
<i>Colocasia esculenta</i>	Araceae	Kalo	Herb	A
<i>Commelina diffusa</i>	Commelinaceae	Honohono	Herb	A
<i>Conyza bonariensis</i>	Asteraceae	Conyza	Herb	A
<i>Cordyline fruticosa</i>	Agavaceae	Ki	Shrub	A
<i>Crotalaria lanceolata</i>	Fabaceae	Crotalaria	Herb	A
<i>Crotalaria sp.</i>	Fabaceae	Crotalaria	Herb	A
<i>Cucurbita maxima</i>	Cucurbitaceae	Pumpkin	Vine	A
<i>Cuphea carthagenensis</i>	Lythraceae	Cuphea	Herb	A
<i>Cuphea ignea</i>	Lythraceae	Cigar Flower	Herb	A
<i>Cycas sp.</i>	Cycadaceae	Cycas	Shrub	A
<i>Cyperus halpan</i>	Cyperaceae	Cyperus	Herb	A
<i>Cyperus sp.</i>	Cyperaceae	Cyperus	Herb	A
<i>Desmodium sandwicense</i>	Fabaceae	Desmodium	Herb	A
<i>Desmodium tortuosum</i>	Fabaceae	Desmodium	Herb	A
<i>Desmodium triflorum</i>	Fabaceae	Desmodium	Herb	A
<i>Dicranopteris linearis</i>	Gleicheniaceae	Uluhe	Fern	I
<i>Dissotis rotundifolia</i>	Melastomataceae	Dissotis	Herb	A
<i>Dracena marginata</i>	Agavaceae	Dracena	Shrub	A
<i>Dracena sp.</i>	Agavaceae	Dracena	Shrub	A
<i>Drymaria cordata</i>	Caryophyllaceae	Drymaria	Herb	A
<i>Eleocharis geniculata</i>	Cyperaceae	Spikerush	Herb	A

Scientific Name	Family	Common Name	Life Form	Status*
<i>Emilia fosbergii</i>	Asteraceae	Emilia	Herb	A
<i>Emilia sonchifolia</i>	Asteraceae	Emilia	Herb	A
<i>Epidendrum sp.</i>	Orchidaceae	Epidendrum	Herb	A
<i>Epipremnum sp.</i>	Araceae	Pothos	Herb	A
<i>Eragrostis sp.</i>	Poaceae	Eragrostis	Herb	A
<i>Erechtites hieracifolia</i>	Asteraceae	Fireweed	Herb	A
<i>Erechtites valerianifolia</i>	Asteraceae	Fireweed	Herb	A
<i>Ficus microcarpa</i>	Moraceae	Banyan	Tree	A
<i>Fimbristylis dichotoma</i>	Cyperaceae	Fimbristylis	Herb	I
<i>Hibiscus sp.</i>	Malvaceae	Hibiscus	Shrub	A
<i>Hypericum mutilum</i>	Clusiaceae	Hypericum	Herb	A
<i>Hyptis pectinata</i>	Lamiaceae	Hyptis	Herb	A
<i>Ilex sp.</i>	Aquifoliaceae	Ilex	Shrub	A
<i>Indigofera suffruticosa</i>	Fabaceae	Indigo	Herb	A
<i>Ipomoea indica</i>	Convolvulaceae	Morning Glory	Vine	I
<i>Ipomoea sp.</i>	Convolvulaceae	Ipomoea	Vine	A
<i>Jatropha sp.</i>	Euphorbiaceae	Jatropha	Herb	A
<i>Kyllinga brevifolia</i>	Cyperaceae	Kyllinga	Herb	A
<i>Lantana camara</i>	Verbenaceae	Lantana	Herb	A
<i>Lepisorus thunbergianus</i>	Polypodiaceae	Pleopeltis	Fern	I
<i>Lindernia sp.</i>	Scrophulariaceae	Lindernia	Herb	A
<i>Ludwigia octovalvis</i>	Onagraceae	Ludwigia	Herb	A
<i>Macaranga tanarius</i>	Euphorbiaceae	Macaranga	Tree	A
<i>Macroptilium atropurpureum</i>	Fabaceae	Macroptilium	Herb	A
<i>Melastoma sp.</i>	Melastomataceae	Melastoma	Shrub	A
<i>Metrosideros polymorpha</i>	Myrtaceae	Ohia	Tree	E
<i>Michelia sp.</i>	Magnoliaceae	Michelia	Tree	A
<i>Mimosa pudica</i>	Fabaceae	Sensitive Plant	Herb	A
<i>Nandina domestica</i>	Berberidaceae	Heavenly Bamboo	Shrub	A
<i>Nephrolepis multiflora</i>	Nephrolepidaceae	Sword Fern	Fern	A
<i>Nolina recurvate</i>	Agavaceae	Ponytail	Shrub	A
<i>Oplismenus sp.</i>	Poaceae	Oplismenus	Herb	A
<i>Paederia foetida</i>	Rubiaceae	Maile Pilau	Vine	A
<i>Panicum maximum</i>	Poaceae	Guinea Grass	Herb	A
<i>Panicum repens</i>	Poaceae	Torpedo Grass	Herb	A
<i>Paraserianthes falcata</i>	Fabaceae	Albizia	Tree	A
<i>Paspalum conjugatum</i>	Poaceae	Hilo Grass	Herb	A
<i>Paspalum sp.</i>	Poaceae	Paspalum	Herb	A
<i>Paspalum urvillei</i>	Poaceae	Vasey Grass	Herb	A
<i>Pennisetum purpureum</i>	Poaceae	Napier Grass	Herb	A
<i>Persea americana</i>	Lauraceae	Avocado	Tree	A
<i>Philodendron sp.</i>	Araceae	Philodendron	Herb	A
<i>Phlebodium aureum</i>	Polypodiaceae	Phlebodium	Fern	A
<i>Phoenix sp.</i>	Arecaceae	Phoenix	Shrub	A
<i>Phyllanthus sp.</i>	Euphorbiaceae	Phyllanthus	Herb	A
<i>Phymatosorus grossus</i>	Polypodiaceae	Maile Scented Fern	Fern	A
<i>Pittosporum sp.</i>	Pittosporaceae	Pittosporum	Shrub	A
<i>Pityrogramma austroamericana</i>	Pteridaceae	Gold Fern	Fern	A
<i>Pityrogramma calomelanos</i>	Pteridaceae	Silver Fern	Fern	A
<i>Pluchea symphytifolia</i>	Asteraceae	Pluchea	Shrub	A
<i>Pluchea symphytifolia</i>	Asteraceae	Sourbush	Herb	A

Scientific Name	Family	Common Name	Life Form	Status*
<i>Plumeria sp.</i>	Apocynaceae	Plumeria	Shrub	A
<i>Polygala paniculata</i>	Polygalaceae	Polygala	Herb	A
<i>Polygonum capitatum</i>	Polygonaceae	Polygonum	Herb	A
<i>Portulaca sp.</i>	Portulacaceae	Portulaca	Herb	A
<i>Pritchardia affinis</i>	Arecaceae	Loulu	Tree	End
<i>Psidium cattleianum</i>	Myrtaceae	Waiawi	Shrub	A
<i>Psilotum nudum</i>	Psilotaceae	Moa	Fern Ally	I
<i>Pteris cretica</i>	Pteridaceae	Pteris	Fern	I
<i>Pterolepis glomerata</i>	Melastomataceae	Pterolepis	Herb	A
<i>Pycnus polystachyos</i>	Cyperaceae	Cyperus	Herb	I
<i>Pycnus sanguinolentus</i>	Cyperaceae	Cyperus	Herb	A
<i>Rhapis sp.</i>	Arecaceae	Rhapis	Shrub	A
<i>Rhododendron sp.</i>	Ericaceae	Azalea	Shrub	A
<i>Ricinus communis</i>	Euphorbiaceae	Castor Bean	Shrub	A
<i>Rubus rosifolius</i>	Rosaceae	Thimbleberry	Herb	A
<i>Rubus sp.</i>	Rosaceae	Blackberry	Shrub	A
<i>Sacciolepis indica</i>	Poaceae	Glenwood Grass	Herb	A
<i>Schefflera actinophylla</i>	Araliaceae	Octopus Tree	Tree	A
<i>Schizachyrium condensatum</i>	Poaceae	Beardgrass	Herb	A
<i>Scleria testaceae</i>	Cyperaceae	Scleria	Herb	I
<i>Setaria palmifolia</i>	Poaceae	Palm Grass	Herb	A
<i>Solanum americanum</i>	Solanaceae	Popolo	Herb	I
<i>Sonchus oleraceus</i>	Asteraceae	Pualele	Herb	A
<i>Spathoglottis plicata</i>	Orchidaceae	Spathoglottis	Herb	A
<i>Spermatocoe sp.</i>	Rubiaceae	Buttonweed	Herb	A
<i>Sphagneticola trilobata</i>	Asteraceae	Wedelia	Herb	A
<i>Stachytarpheta sp.</i>	Verbenaceae	Stachytarpheta	Herb	A
<i>Syzygium malaccense</i>	Myrtaceae	Mountain Apple	Tree	A
<i>Thunbergia fragrans</i>	Acanthaceae	White Thunbergia	Vine	A
<i>Torenia glabra</i>	Scrophulariaceae	Torenia	Herb	A
<i>Trema orientalis</i>	Ulmaceae	Gunpowder Tree	Tree	A
<i>Vigna sp.</i>	Fabaceae	Vigna	Herb	A
<i>Waltheria indica</i>	Sterculiaceae	Waltheria	Herb	I
<i>Youngia japonica</i>	Asteraceae	Youngia	Herb	A
<i>Zamia sp.</i>	Zamiaceae	Zamia	Shrub	A

A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species

The botanical survey identified 124 non-native plant species, 2 endemic species, and 10 indigenous species. One native plant species identified was the lo‘ulu palm (*Pritchardia affinis*), a species listed as endangered by the Endangered Species Act (United States Fish and Wildlife Service 2012). Two individuals of this species were identified on the project site and are part of ornamental landscaping. According to Wagner et al. (1999) the project site is not within the natural range of this species, and would not normally be found in the project area without having been cultivated. These two lo‘ulu palms were, in fact, planted by the applicant. As such, they are not representative of habitat of which they would normally be an ecological component.

The completeness of this botany survey may be limited as it represents a “snap shot” in time, and may not list some species actually present on the project site in the future due to

the ongoing processes of colonization due to seed dispersal. However, such adventive species would be, in all likelihood, non-native and invasive plant species.

The area supports a variety of common alien mammals, birds, reptiles, and amphibians. The Hawaiian Hawk or ‘io (*Buteo solitarius*), an endangered species, is likely to forage or fly over the site, and is also likely to nest in the project area. The project site contains only low trees, generally less than 30 feet tall, and apparently contains no large trees appropriate for nesting by endangered Hawaiian Hawks.

Foraging habitat for Hawaii’s only non-marine mammal, the endangered Hawaiian Hoary Bat, or ‘ope‘ape‘a, (*Lasiurus cinereus semotus*) may also be present, as it may forage over the site, although it is not likely to roost on the project site due to the lack of quality sites.

Given the character of the site and lack of quality habitat, it is highly unlikely that any other candidate, proposed, or listed threatened or endangered species are present on the project site. Although a zoological study was not performed, no animal species were observed on the project site during site studies, apart from the mongoose.

Impacts and Mitigation Measures

No listed, candidate or proposed endangered animal or plant species were found or would be expected to be found on the project sites apart from the two lo‘ulu palms identified. In terms of conservation value, no botanical or zoological resources requiring special protection are present. Because of the lack of native ecosystems, or threatened or endangered plant species, no adverse impacts would occur as a result of landscaping and improvements. The two lo‘ulu palm trees located on the project site will be incorporated into landscaping.

3.1.4 Air Quality, Noise, and Scenic Resources

Environmental Setting

Air pollution in the Puna District is mainly derived from volcanic emissions of sulfur dioxide from Kilauea Volcano, which react chemically with sunlight, oxygen, dust particles, and water in the air to produce a volcanic haze (“vog”) that occasionally blankets the district. Although the prevailing trade winds usually keep the region free of vog, it may become severe during periods of weak trade winds, particularly during the winter.

Noise on the project site varies widely from low to moderate, and is derived mainly from motor vehicles, equipment and truck operation, as well as helicopters.

The County of Hawai‘i General Plan lists areas of particular natural beauty. Neither the project site nor any sites in the project vicinity are noted for their particular natural

beauty in the General Plan. Sight lines into the project site are presently obscured by vegetation.

Impacts and Mitigation Measures

The potential for fugitive dust emissions exists during grading and construction. Short-term direct and indirect impacts on air quality could occur due to project construction, principally through fugitive dust from vehicle movement, soil excavation and exhaust emissions from on-site construction equipment. The State of Hawai'i Air Pollution Control Regulations (Chapter 11-60, HAR) prohibit visible emissions of fugitive dust from construction activities beyond the property line. Thus, an effective dust control plan for the project construction phase is essential.

Adequate fugitive dust control can usually be accomplished by the establishment of a frequent watering program to keep bare-dirt surfaces in construction areas from becoming significant sources of dust. In dust-prone or dust-sensitive areas, other control measures such as limiting the area that can be disturbed at any given time, applying chemical soil stabilizers and placing mulch may be necessary. Control regulations stipulate that open-bodied trucks be covered at all times when in motion if they are transporting materials that could become airborne. Trucks tracking dirt onto paved streets from unpaved areas is often a significant source of dust in construction areas. Washing of vehicles leaving the construction site within a designated construction wash area may be appropriate. Establishment of landscaping as early in the construction schedule as possible can also lower the potential for fugitive dust emissions.

On-site mobile and stationary construction equipment also would emit air pollutants from engine exhaust. The largest of this equipment is usually diesel-powered. Nitrogen oxide and particulate emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the standards for these pollutants are based on long averaging times, and are not likely to be violated on the project site.

In addition, in order to avoid air quality impacts from slow-moving construction vehicles traveling to and from the site on major roadways, heavy construction equipment should be moved on- and off-site during periods of low traffic volume and avoid passing through the center of Pāhoa Village.

The proposed project would modify the appearance of the project site through landscaping and removal of visual barriers of the project site interior. Areas within the project site that are presently unmaintained would be landscaped. The proposed project would remove the vegetative barrier currently obscuring sight lines into the project site and would include professional landscaping that would improve the overall appearance of the site.

The construction phase would involve grading, use of compressors, and vehicle and equipment operation. These activities may, at times, generate noise exceeding 95

decibels, potentially impacting nearby areas. Two single-family residences are in the area and may be particularly affected by construction noise. Mitigation of potential construction noise impacts will be achieved through compliance with the Administrative Rules of the Department of Health, Chapter 11-46 “Community Noise Control”. In the long-term, noise levels on the site are not expected to change significantly.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

A Phase I Environmental Site Assessment was performed on the project site by Myounghee Noh & Associates (MNA) and is attached in Appendix 2. A Phase I Environmental Site Assessment aims to identify *recognized environmental conditions* that exist on the project site, and existing *recognized environmental conditions* in the project area that have the potential to impact the subject property. The term *recognized environmental conditions* means the presence or likely presence of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property.

In a Phase I Environmental Site Assessment, evidence of *recognized environmental conditions* may be obtained by execution of the following activities in conformance with the scope and limitations of ASTM E1527-05 (American Society for Testing and Materials, 2005):

- A records search of federal and State databases of hazardous material use, storage, and releases, including, but not limited to, hazardous material generators, leaking underground storage tanks, and reported hazardous material releases;
- Interviews with landowners, nearby residents, and regulatory agency members concerning the subject property’s history of land use;
- Other records searches, including tax records, aerial photography, and, when available, fire insurance maps; and
- A visual survey of the property and immediately surrounding areas.

Phase I Environmental Site Assessment Findings

MNA’s findings are as follows:

- During site reconnaissance it was noted that the project site warehouse had five barrels/drums of motor and hydraulic oil, one aboveground storage tank (AST), and many oil cans, empty, unlabeled, and old buckets, oil tubing, and lots of scrap materials. Because there was no evidence of a release from these containers they are not considered a *recognized environmental condition*.
- One Hawaii Electric and Light Company (HELCO) owned pole-mounted transformer was located on the subject property. It was identified as not containing polychlorinated biphenyls (PCBs). Due to the absence of PCBs, the fair condition of the transformer, and observation of no material threat of release

of hazardous substances or petroleum products from the transformer, this is not a *recognized environmental condition*.

- The records search identified one underground storage tank (UST) within ¼ mile of the subject property at Woodland Center located 370 feet northeast of the subject property. Woodland Center had two gasoline tanks and one diesel tank currently in use. No violations were found during a facility inspection conducted by Hawai'i Department of Health (HDOH) Solid and Hazardous Waste Branch (SHWB) on August 9, 2011. Additionally, no UST leaks were reported in the records reviewed, including the HDOH SHWB records for this facility. Therefore, this is not a *recognized environmental condition*.
- FirstSearch identified one additional UST at a location non-geocoded. The facility was identified as Aloha Petroleum and located approximately 1,056 feet from the subject property at 15-2660 Pāhoa Village Road. Aloha Petroleum had four gasoline tanks and two diesel tanks currently in use. HDOH SHWB and Hazard Evaluation and Emergency Response (HEER) Office files showed that there were no administrative violations associated with this facility.
- Additionally, there were files related to a release from the diesel tank located on the Aloha Petroleum property described above. Cleanup of this site appears to be ongoing, based upon available records. As this property is located at a lower elevation than the subject property, potential spills and contamination in groundwater flows from this property would not migrate in the direction of the subject property. Therefore, this is not reconsidered a *recognized environmental condition*.
- The records review identified nine release incidents from two non-geocoded locations within the zip code of the subject property on the State Release List. Seven release incidents occurred at Puna Geothermal Venture, which was located at 14-3860 Pāhoa Pohoiki Road, approximately five miles away and down gradient from the subject property. Therefore, these seven release incidents are not considered *recognized environmental conditions*. Two release incidents occurred at a HELCO transformer pole located on Kahakai Boulevard, which were on an adjoining property to the west. Further inquiry with HELCO revealed that a release of approximately three gallons of non-PCB mineral oil was discovered on September 26, 2011. On September 27 and October 3, 2011, the petroleum-affected soil was excavated. Analytical results from confirmation soil samples indicated that Site Cleanup Program requirements were satisfied. HELCO submitted a final release report to the HDOH HEER Office on December 7, 2011. Therefore, this is not a *recognized environmental condition*.

In summary, the Phase I Environmental Site Assessment identified no *recognized environmental conditions* in connection with the subject property or in connection with adjacent and nearby properties that have the potential to impact the subject property. The

project site and adjacent properties were not listed in the federal and State databases searched. No other sources of offsite potential contamination were found to exist in the project area.

Impacts and Mitigation Measures

As no *recognized environmental conditions* were identified in connection with the project site, no hazardous environmental conditions are likely to be present that may have adverse impacts.

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristics

Environmental Setting and Impacts

The project would affect and benefit the Pāhoā Village area and the Puna District most directly. Table 2 provides information on the socioeconomic characteristics of the project area, here defined as both the Pāhoā-Kalapana Census County Subdivision (CCD) and the Keaau-Mountain View CCD (see Figure 4), as well as Pāhoā Village, and Hawai‘i County as a whole for comparison.

Several demographic characteristics of the project area are notable. Both the Pāhoā CDP and Pāhoā-Kalapana CCD regions have per capita incomes significantly less than that of the County of Hawai‘i as a whole. Additionally, poverty is very high for the Pāhoā-Kalapana CCD as compared to both Pāhoā Village and the County. The proposed project’s primary social benefit to residents of the Puna District would be by provision of additional services that may not presently exist in the area.

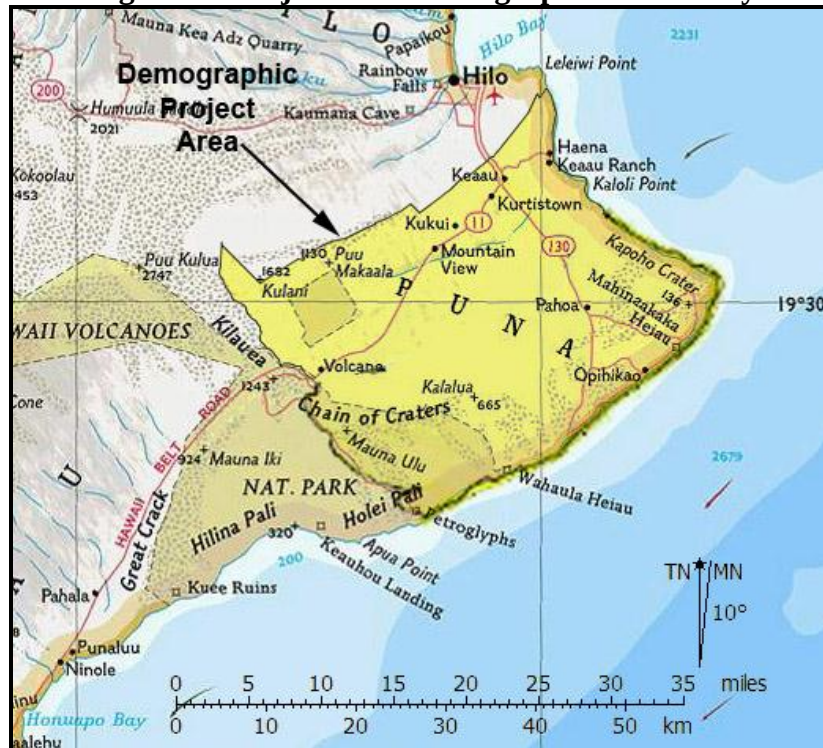
With the No Action Alternative, the project area would not benefit from the services provided by the proposed project.

Table 2 - Selected Socioeconomic Characteristics

CHARACTERISTIC	ISLAND OF HAWAI'I	PĀHOA CDP	PROJECT AREA
Total Population	186,738	983	38,711
Percent Caucasian	33.7	14.9	35.3
Percent Asian	22.2	43.5	18.2
Percent Hawaiian	12.1	12.6	11.3
Percent Two or More Races	29.5	26.1	32.2
Median Age (Years)	40.9	41.6	38.9
Percent Under 18 Years	22.8	23.3	25.6
Percent Over 65 Years	14.5	17.4	11.9
Percent Households with Children	31.8	32.1	31.8
Average Household Size	2.70	2.94	2.74
Percent Housing Vacant	18.5	9.8	17.2
Per Capita Income	\$26,079	\$19,774	\$19,184
Population Below Poverty Line	21.5%	15.3%	25.1%

Note: Project Area = Sum of Pahoa-Kalapana CCD and Keaau-Mountain View CCD
Source: U.S. Bureau of the Census, Jan. 2013. *Profiles of General Demographic Characteristics*. Hawai'i County. Oct. 2012, *Hawai'i County Data Book*.

Figure 4 - Project Area Demographics Boundary



3.2.2 Economic Impacts

Existing Environment and Impacts

According to the State of Hawai‘i Department of Labor and Industrial Relation’s (2012) most recent unemployment report for July 2012, unemployment in the County of Hawai‘i is relatively high, 9.3%, compare to that of both the State of Hawai‘i at 6.4% and the nation at 8.6%.

The project would have positive economic impacts to the project area for both the short- and long-term.

Short-term direct positive economic impacts would result from construction employment and construction spending on construction materials and equipment. Indirect economic impacts result from spending consequent from construction employment and payments to contractors, subcontractors, material suppliers. As a result of this indirect spending the total economic impact from the proposed project would be much greater than the proposed project’s total construction budget, roughly estimated at about \$20 million.

The total economic impact of a project, including direct, indirect, and induced impacts, may be estimated using the State of Hawai‘i Department of Business, Economic Development, & Tourism’s (DBEDT) input-output economic impact model, updated every five years and last published in 2007 (DBEDT 2007). The input-output model includes tables that show the economic relationship between different sectors of the economy (i.e., agriculture, transportation, health services, government, etc.). The tables describe the consequence of investments in various industries using so-called “Type I” and “Type II” multipliers. “Type I” multipliers estimate the “direct” effect of demand, that is, the effect on all other industries of an investment in a particular industry, including indirect effects, or secondary payments. The “Type II” multiplier adds to this the effect of induced demand, or demand created from payments to households. Thus Type II multipliers are considered to be more accurate and reflective of the real economic consequences of investment.

The “Type II” multiplier for the Construction Sector is 2.12, meaning that for every \$1 million of construction spending or investment the net result is \$2.12 million of impact to the State economy. As the total project construction budget is estimated at \$20 million the total impact to the State of Hawai‘i economy is \$42.4 million, strictly for the proposed project’s construction phase.

The applicant estimates that the project would employ 250 full-time employees (with part-time positions weighted at 0.5 of full-time positions). According to the United States Bureau of Labor Statistics, the average County of Hawai‘i weekly wage is \$681, or \$35,412 annually (U.S. Bureau of Labor Statistics 2012). Assuming that the project’s employment is on par with this average County of Hawai‘i wage, the project will pay out \$8.8 million in wages annually, implying that the project will increase total County

income by 0.8%, a very significant positive long-term economic impact for a single private action. It should also be noted that the per capita income for the project area is presently much smaller than that of the entire County of Hawai‘i and that the proposed project will also be a significant source of employment for the project area.

In summary, the project’s short-term and long-term impact is expected to be significant, a major source of employment in the project area.

3.2.3 Cultural Setting

Existing Environment

The purpose of this section is to document the presence of any historic properties or traditional cultural properties that might exist within the project area, assess the significance of any such resources, and provide an assessment of impact to any such resources as a result of the construction of the proposed project. This assessment relies upon published cultural and archaeological studies in order to provide a context for the search for potential historic or traditional cultural properties. Most significant among these studies is work performed for the Keaa‘u-Pāhoa Road Environmental Assessment prepared by Cultural Surveys Hawai‘i (CSH 2011). We draw primarily from this work in this discussion; other sources are referenced.

The project site is located within the ahupua‘a of Keonepoko Iki and derives its name from an apparent description of its shoreline, literally “the short sand” (Soehren 2002). CSH notes that there is not much information available concerning this ahupua‘a, which may be because it was held by the high ali‘i before being returned to the Kingdom of Hawai‘i in the Mahele of 1861.

Puna is one of six major districts on the island that remain intact today. This district organization (and likely all of the smaller land divisions) extends back in time to at least A.D. 1475 in the time of Chief Liloa. The districts were brought together under a single ruler when ‘Umi a Liloa (son of Liloa) came to power in about A.D. 1525 (Maly 1999). Barrere (1959) summarized the Precontact politics of the Puna District as follows:

Puna, as a political unit, played an insignificant part in shaping the course of history of Hawai‘i Island. Unlike the other districts of Hawaii, no great family arose upon whose support on or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Ka‘u and Hilo.

Native Hawaiian traditions of Puna illustrate the area’s significance and connection with the people of ancient times. Mythological literature shows Puna prominently associated

with legendary and historical figures including Kāne, Pele, Hi‘iaka, Hōpoe, Kūka‘ōhi‘akalaka, Keamalu, Iwa, Chief Kumukahi, Chief Kali‘ikuku, Kalohalani, Halemano, Kamalalawalu, and Kamapua‘a. These associations suggest an ancient and continuous occupation of the area, and indicate that there are several wahi pana (places sacred to Hawaiian culture and spirituality) associated with these deities and people at various locations in the Puna district.

Research and legendary sources demonstrate that the people of Puna settled primarily in the coastal region, with temporary habitation in the uplands related to agriculture with the exception of the inland settlement of ‘Ōla‘a. These settlements were located primarily along the Ala Loa (the ancient trail system that circuits the island of Hawai‘i).

The Puna District was generally under the control of outside chiefs until Kalani‘opu‘u’s reign in the 18th century. Shortly before his death in 1782, Kalani‘opu‘u’s dominion over Puna and portion of Ka‘u was challenged by the Puna chief ‘Imakakoloa. Kalani‘opu‘u resolved the unrest, but following his death the disposition of Puna once again became an issue until Kamehameha I successfully brought the entire island under his control in 1793.

Coastal Puna, well-populated by Hawaiians before 1800, was nearly abandoned in the 19th century. Ranching and agriculture dominated land use in Puna in the late 1800s. The Ala Loa was eventually improved and renamed in the 1800s and began to be called the “Old Government Road.” While this path was essentially the main thoroughfare through the Puna district before the late 1800s, as communities on the coastline began to die out, focus began to shift to the center of the Puna District and the developing sugar and related industries near Ola‘a, Hilo, and the volcano region.

The Hilo Railway Company was established and in 1900 extended tracks along the coast to the sugar fields in Kapoho passing through Kea‘au, Kahuwai, Pu‘ala‘a, Kauaea, and Kaeleau Ahupua‘a. In Puna, as it is elsewhere in Hawai‘i, agricultural practices are environmentally and ecologically adaptive. As a result of developing industries in the upland regions of Puna, and the presence of remaining communities along the coast, the original mauka-makai trail that led from the coast to the Maku‘u region was improved and extended to the recently constructed Volcano Road, effectively linking the Hilo, Volcano, and lower communities of Puna, first by foot, then by horse, cart and buggy, and finally by automobile.

Keonepoko Iki Ahupua‘a was retained as Government Land during the Māhele, and no Land Commission Award claims were made within the ahupua‘a (Waihona ‘Āina database). Beginning in 1903 a mauka portion of the ahupua‘a (in the vicinity of the current study area) was commuted as grant parcels and homestead lots.

Impacts and Mitigation Measures

No resources with traditional association of a potential traditional cultural nature (i.e., such as special landforms, groves of trees, lava tube openings, etc.) appear to be present on or near the project site. No streams or wetlands would be affected by the project. No biological resources (e.g. valuable native or Polynesian gathering plants) are found on the project site, or would be expected to be impacted by project activities. None of the entities contacted during early consultation contributed any knowledge of traditional uses or the existence of Traditional Cultural Properties on or near the project site.

The project site does not support any traditional resource uses, nor are there any Hawaiian customary and traditional rights or practices known to be associated with it, including the privately owned parcels and the Kahakai Boulevard extension parcel. In conclusion, no cultural features are present and none are likely to be impacted by the proposed project. The Draft EA has been distributed to groups knowledgeable in the area's resources to ensure that this conclusion is valid.

3.2.4 Archaeology and Historic Sites

Existing Environment, Impacts and Mitigation Measures

Archaeological inventory surveys performed in the project area include those for the following; for the Pāhoa Elementary School site selection Environmental Impact Statement, which examined an 8-acre site located approximately 0.4 miles south of the project site along Cemetery Road (State of Hawai'i 1988); an archaeological survey in the nearby Maku'u ahupua'a (Rechtman Consulting 2003); a archaeological survey performed for the Pāhoa Fire and Police Sub Station Environmental Assessment (Rechtman 2005) located approximately 500 feet northeast of the project site; and an archaeological survey performed as part of the Kea'au-Pāhoa Road Widening Project Environmental Assessment (Cultural Surveys Hawai'i 2009). These surveys identified no archaeological or cultural features that might be within the area of impact of their respective projects.

Additionally, in their work for this project (Appendix 3), Rechtman Consulting noted the following:

Only a few archaeological studies have been completed in Keonepoko Iki and most have been in the coastal portion of the *ahupua'a*. However, one prior study (Rechtman 2004) was completed for TMK: 3-1-5-07:017, which is located approximately 500 meters to the north of the current study area. The ground surface of that project area was found to have been extensively mechanically disturbed in the past and one lava tube was encountered and explored that proved to be culturally sterile. No historic properties were recorded during that study.

The project site is located outside of the Pāhoa Historic District (SIHP 50-10-45-7388). No other site registered in the State or National Register of Historic Places is located in the project area.

Based on available information, the history of land use, and the current condition of the project area, the State Historic Preservation Division issued a letter dated June 18, 2012 (Appendix 3) stating that they concur that no historic properties on the privately-owned parcels would be affected by the proposed project.

With regard to the State-owned Kahakai Boulevard extension parcel, Rechtman Consulting, LLC performed a field inspection of this parcel on December 28, 2012, and observed no surface archaeological resources and concluded that the likelihood of encountering subsurface resources is extremely remote. A letter describing the findings of this archaeological field inspection is attached in Appendix 3. Based on these negative findings, Rechtman Consulting requested that the State Historic Preservation Division issue a determination of “no historic properties affected”, and concurrence with this recommendation has been received (Appendix 3).

Due to past and ongoing uses of the project site and the lack of archaeological resources on or near the project site, it is not anticipated that there will be any impacts archaeological resources or historic sites.

In the unlikely event that archaeological resources are encountered during future development activities within the current study area, work in the immediate area of the discovery should be halted and DLNR-SHPD contacted as outlined in Hawai‘i Administrative Rules 13§13-275-12.

3.3 Utilities, Public Facilities, and Traffic

3.3.1 Utilities and Public Facilities

Existing Facilities and Services

Electrical power to the project site is supplied by Hawai‘i Electric Light Company (HELCO), a privately owned utility company regulated by the State Public Utilities Commission, via their island-wide distribution network. A transmission line is located along Pāhoa Village Road; roadway improvements to Pāhoa Village Road would require relocating four transmission line poles. The owner/developer is working with Hawai‘i Electric Company to coordinate this work.

Electrical power would be supplemented by a photovoltaic electrical generation system installed on the supermarket’s roof.

Water would be supplied by the Hawai‘i County Department of Water Supply. Telephone service is available and would be provided by Hawaiian Telcom.

Emergency Fire and Medical services are provided by the Hawai‘i Fire Department. Police services are provided by Hawai‘i Police Department. A police/fire substation is located a short distance from the project on Pāhoa Highway.

No sewer service is available in the project area. Wastewater treatment would be provided by construction of individual wastewater treatment facilities and would be permitted by the State of Hawai‘i Department of Health.

Solid waste collection for non-households is performed by commercial haulers in the County of Hawai‘i. The applicant plans to arrange for segregation of organic waste for composting, as well as collection of used cooking oils.

Impacts and Mitigation Measures

The proposed action would not have any substantial impact on existing electrical facilities or HELCO’s ability to provide electricity. No other utilities would be affected in any way. Electrical demand by the proposed project would be partially mitigated by construction of a photo-voltaic electrical generating array placed on the roof of the supermarket. Demand on solid waste collection facilities would be reduced through separate collection of organic wastes and cooking oils.

The project has been granted 42 units of water (14 units per parcel) at 400 gallons per unit per day by the Department of Water Supply. The applicant anticipates that this would satisfy the water demands of the proposed project.

In summary, the utility infrastructure for the facility is adequate and no adverse impacts are expected.

3.3.2 Traffic

Background

The project site is occupied by two single-family rental residences in addition to the B.T. Kuwahara, Inc. baseyard and office. One of these residences uses a driveway located along the southern periphery of the project site; this driveway is a portion of an easement used to access parcel TMK (3rd) 1-5-007:051 at the rear of the site. The baseyard, office, and one of the residences together utilize a second driveway near the midpoint of the site. Activities at the project site produce approximately 20 vehicle trips per day using these two driveways.

Kahakai Boulevard and Pāhoa Village Road are both two-lane thoroughfares. Kahakai Boulevard has curb, gutter, and sidewalks on the Woodland Center side (i.e., north) and a left-turn lane at the Pāhoa Village Road intersection. Pāhoa Bypass road becomes Malama Market Road beyond (i.e., to the north of) the Kahakai Boulevard intersection. Speed limits throughout the area are 30 mph and 45 mph on the Pāhoa Bypass.

In order to assess existing conditions and the anticipated traffic impacts of the proposed project a Traffic Impact Analysis Report (TIAR) was performed by Witcher Engineering

LLP (Appendix 4). In this section we summarize the TIAR and discuss its recommendations.

Section 25-2-46 of the Hawai‘i County Code stipulates concurrency requirements for zoning changes. As this Environmental Assessment is a component of a Change of Zone Application (REZ 12-155), assessment and mitigation of traffic impacts, if any, is specifically required. The pertinent portion of Section 25-2-46 states the following:

- (1) If the LOS for any transportation facility in the project area is (A) currently worse than the acceptable level of service, or (B) projected to become worse than the acceptable level of service during the five year period of the TIAR, any rezoning of the property, if approved, shall contain conditions that require mitigation of adverse traffic effects before occupancy of the project is permitted, or that occupancy be delayed until the level of service has reached the acceptable level and is no longer projected to be worse than the acceptable level.
- (2) Where the LOS deficiency is due to roadway or intersection deficiencies in the immediate vicinity of the project, the conditions of zoning shall require local mitigation. Where the deficiency in LOS is due to insufficient capacity in the transportation facilities serving the project area, the conditions of zoning shall require area mitigation.
- (3) If there is more than one way to mitigate an adverse effect, the director shall present to the council the pros and cons of the alternatives.
- (f) Mitigation requirements will be deemed satisfied when:
 - (1) A public agency has committed funds for area mitigation that will remove the LOS deficiency. In the case of the State, commitment of funds means that the governor has released funds to complete the improvement. In the case of the County, commitment of funds means that the council has appropriated funds to complete the improvement;
 - or (2) The private developer’s commitment to implement mitigation has been secured by bond or equivalent security, or mandatory participation in an improvement district, community facilities district, or other equivalent means of guaranteeing performance.

TIAR Introduction

The performance of traffic operations on roadway segments and intersections is reflected by the term Level of Service (LOS), a scale with ratings of “A”, meaning no traffic congestion, to “F”, meaning extreme congestion and delay. Transportation engineers and planners aim to design roadways to achieve an LOS “C”, or better, although LOS “D” is acceptable during peak periods in urban areas. LOS “E” and LOS “F” are typically considered unacceptable.

As congestion is worst at peak hours the TIAR examines existing conditions and models future congestion for the peak AM and PM hours of 7:00 AM to 8:00 AM, and 4:15 PM to 5:15 PM. The TIAR examines current conditions and impacts on the following intersections:

- Kahakai Boulevard-Pāhoa Village Road
- Kahakai Boulevard-Pāhoa Bypass
- Pāhoa Village Road-Pāhoa Bypass
- Pāhoa Village Road-Malama Market Road

The TIAR also makes predictions for LOS at the two proposed project site driveways on Pāhoa Village Road.

In addition to modeling LOS at project-vicinity intersections, the TIAR also modeled queuing at these intersections, a measure of the average number of vehicles that backup at intersections during these peak times. This is done primarily to assess if poor LOS at one intersection can adversely affect the LOS at another intersection.

Current Conditions

Values of vehicles movements for each traveling direction in each intersection listed above were observed during August 2011. The Level-Of-Service (LOS) at four project area intersections implied by vehicle counts is summarized in Table 4 (also see Appendix 4, Table 4):

Table 3 - Existing Project Area Intersection LOS

Movement	AM	PM
Kahakai Blvd. & Pāhoa Village Road		
Westbound Left	B	C
Westbound Right	A	B
Southbound Through	A	A
Pāhoa Bypass and Pāhoa Village Road		
Westbound Left	A	A
Northbound Left	F	F
Northbound Right	B	B
Malama Market Rd. & Pāhoa Village Rd.		
Eastbound Left	C	B
Eastbound Right	B	B
Northbound Left	A	A
Kahakai Blvd. & Pāhoa Bypass		
Northbound Right	B	B

Traffic movement near the project site is presently acceptable, with the exception of left-turning northbound traffic at the intersection of Pāhoa Bypass-Pāhoa Village Road intersection (i.e., turning onto Hwy. 130 Hilo-bound lane), with a LOS “F”. We note that

the State Department of Transportation is planning to construct a roundabout near the intersection of Pāhoa Bypass and Pāhoa Village Road, that will mitigate the LOS at this intersection. This roundabout is listed on the most current Statewide Transportation Improvement Program (STIP) revision #11 (State Department of Transportation 2012).

Future Traffic Conditions Without Improvements

The projected traffic volumes were forecast in accordance with the “Highway Capacity Manual, Special Report 209, 2nd Edition” of the Transportation Research Board (1992) and the Highway Capacity Software from the Federal Highway Administration and McTrans Center of the University of Florida, Gainesville, Florida, based upon existing conditions. The methodology assumes that a particular land use, broken down by type of commercial project (e.g., retail, clinic, quality restaurant, post office, etc., see Appendix 4, Table 5) will generate a specific number of vehicle trips. The TIAR’s traffic projections also assume a 1% annual increase in overall traffic due to population change. Furthermore, a set of assumptions of traffic movement are made, including that of the particular fractions of all traffic using each entrance/exit on the proposed commercial center site, as well as the assumption that that 25% of the project-generated traffic comes from the existing traffic. While LOS computations (Appendix 4, Table 8) were performed for both with and without a roundabout constructed near the intersection of Pāhoa Bypass and Pāhoa Village Road our further discussion assumes its construction, as it appears that this is very likely.

Impacts and Mitigation Measures

The proposed project would generally increase traffic on Pāhoa Village Road, although traffic in the area would also increase given the anticipated increase in population of the project area. Even with construction of the roundabout the intersection of Malama Market Road-Pāhoa Village Road intersection has inadequate LOS of “D” and “E” ten and twenty years from project build out for left-hand turns onto Pāhoa Village Road. The TIAR recommends, therefore, that this intersection be re-routed to the roundabout rather than using Pāhoa Village Road to access the Pāhoa Bypass. It is unknown whether HDOT will take this mitigative measure, in any case, this intersection is outside of the immediate vicinity of the proposed project vicinity.

The TIAR projects that the Pāhoa Bypass Road-Kahakai Boulevard intersection will have adequate LOS through the 20-year period.

The most critical intersection for the proposed project is the Kahakai Boulevard-Pāhoa Village Road intersection. The County has directed the developer to change this intersection from its current configuration as a “T” intersection to a 4-way junction, allowing primary access to the proposed project from Kahakai Boulevard. This intersection will have dedicated left-turn lanes for all approach directions. The TIAR predicts that the LOS for all intersection movements will have a LOS of “D” or better at

project build-out, meeting the State criteria, and that the approach LOS meets the criteria of being LOS “D” or better out to 20 years from project build-out.

In order to determine whether construction of a traffic signal is required for the Kahakai Boulevard-Pahoa Village Road intersection a signal warrant study was performed, however, no warrants were met out to twenty years from project build-out. In spite of this fact the applicant will construct the a traffic signal at the Kahakai Boulevard-Pāhoa Village Road intersection.

Signalizing this intersection will keep the LOS at this intersection at LOS “B” for the projected twenty-year period. The LOS for all movements through this signalized intersection would be maintained at LOS “C” or better until years from build-out. Signalization of this intersection would also improve LOS for left-turns at Malama Market Road by creating gaps in north-bound traffic along Pahoa Village Road.

LOS predicted for both proposed driveways accessing the site along Pāhoa Village Road are LOS “B” for both AM and PM peak hours throughout the twenty year study period. The TIAR also assessed whether allowing left turns from the driveways along Pāhoa Village Road would impair traffic flow and found that this would, in fact, improve traffic flow at the signalized intersection.

The roundabout planned for construction near the Pāhoa Village Road-Pāhoa Bypass intersection is predicted to mitigate poor LOS on Malama Market Road by eliminating the backup of traffic approaching the Pāhoa Bypass on Pahoa Village Road. If the existing configuration for Malama Market Road is maintained, it appears that left turns from Malama Market Road onto Pahoa Village will have a LOS of “D” and “E” ten and twenty years from build-out.

A conceptual laneage plan is shown in Figures 5 and 6, depicting roadway improvements that will be made as part of the proposed project. In all, the project site would have four entrances/egresses: one on Kahakai Boulevard near the rear of the site used for supermarket deliveries; a primary project entrance located along Kahakai Boulevard near the mid-point of the site; and central and southern driveways located along Pāhoa Village Road. Fronting the site, a turn lane would be added in the median between the two driveways. All approach directions to the Kahakai Boulevard-Pāhoa Village Road would include left-turn lanes. The southbound approach to this intersection would include a dedicated right-turn lane (onto Kahakai Boulevard). The center driveway would have both a left- and right-turn lane for egress. The south driveway would have a single lane for egress. These roadway improvements have been developed through consultation with the County of Hawai‘i Department of Public Works (DPW), the County of Hawai‘i Planning Department and with the State of Hawai‘i Department of Transportation Highways Division (HDOT).

Other mitigation recommended includes widening of Pāhoa Village Road to 600 feet southeast of the Kahakai Boulevard intersection in order to accommodate the turning

lanes and sidewalks. A bus stop would be located on the west side of Pāhoa Village Road approximately 150 feet south of the Kahakai Boulevard intersection.

The Kahakai Boulevard-Pāhoa Village Road intersection would include crosswalks on, at a minimum, the west and north sides of the intersection, allowing pedestrian connectivity with Woodland Center. The west side of Pāhoa Village Road, along the front of the project site, would have sidewalks in order to accommodate pedestrians. In other areas the project's roadway improvements would include paved shoulders, which would safely accommodate bicycles and pedestrians. Pedestrian ingress and egress to the site would be using sidewalks adjacent to the vehicular access points. All sidewalks constructed as part of the proposed project would be seven feet wide.

As design of the site and appurtenant roadway improvements is in progress, roadway improvements that would accommodate pedestrian and bicycle travel are also in progress, and design will be completed through consultation with the County Department of Public works and the State Department of Transportation.

As construction of the proposed project's intersection improvements and construction of the SR 130 roundabout by HDOT are not expected to be concurrent, we do not anticipate adverse traffic impacts during roadway construction apart from single-lane closures.

Regional traffic impacts resulting from the proposed project are not assessed in the TIAR. However, the proposed project would result in net positive regional traffic impacts by reducing the total traffic load on Highway 130 north of Pāhoa. In other words, the proposed project would move traffic loads closer to the project site, thereby improving traffic loads, and hence LOS, in other areas. Having additional services and employment would reduce the need Puna District residents have for travel to other commercial service areas in Kea'au, Hilo, and other areas on Hawai'i Island. While the net change in traffic load to the Hilo-Kea'au-Pāhoa portion of Highway 130 is difficult to assess, it can be estimated to be very roughly equivalent to the number of vehicle trips to the project site.

No Build Alternative

With the No Build Alternative, the roadway improvements would not be constructed, including the signalized intersection and Kahakai Boulevard extension. As the proposed project would not be built and hence there would be no consequent increase in traffic volume along Pāhoa Village Road. The LOS at particular intersections in the project area would remain inadequate however, and there would be, perhaps, less impetus to construct other roadway improvements in the area (i.e., the Pāhoa Bypass Roundabout). While some adverse, but mitigable, traffic impacts would not be observed with the No Build Alternative, the lack of additional services in the project area would mean that these services would be accessed more distantly, resulting in more vehicles traveling to those services in more distant locations, resulting in greater total use of roadways.

3.4 Secondary and Cumulative Impacts

The project would not involve any secondary or cumulative impacts, such as population changes or effects on public facilities. Although the project would provide short-term construction jobs, these would almost certainly be filled by local residents as unemployment is relatively high in the County of Hawai‘i (see Section 3.2.1).

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The adverse effects of the project - very minor and temporary disturbance to air quality and noise during construction - are limited in severity, nature and geographic scale, or are mitigable. At the current time, there are no other development projects known to have been planned near the project site that would combine in such a way as to produce adverse cumulative effects or involve a commitment for larger actions. However, it is possible that properties near the project site may be developed in a manner consistent with pertinent community and government plans. It may be anticipated, in this case, that the most significant impacts may be traffic impacts, traffic demands in the project area would increase significantly, and should be alleviated by construction of the noted roundabout at the Pāhoa Bypass/Highway 130 intersection, as well as by roadways improvements required by County of Hawai‘i Concurrency requirements.

Figure 5 - Conceptual Laneage Plan

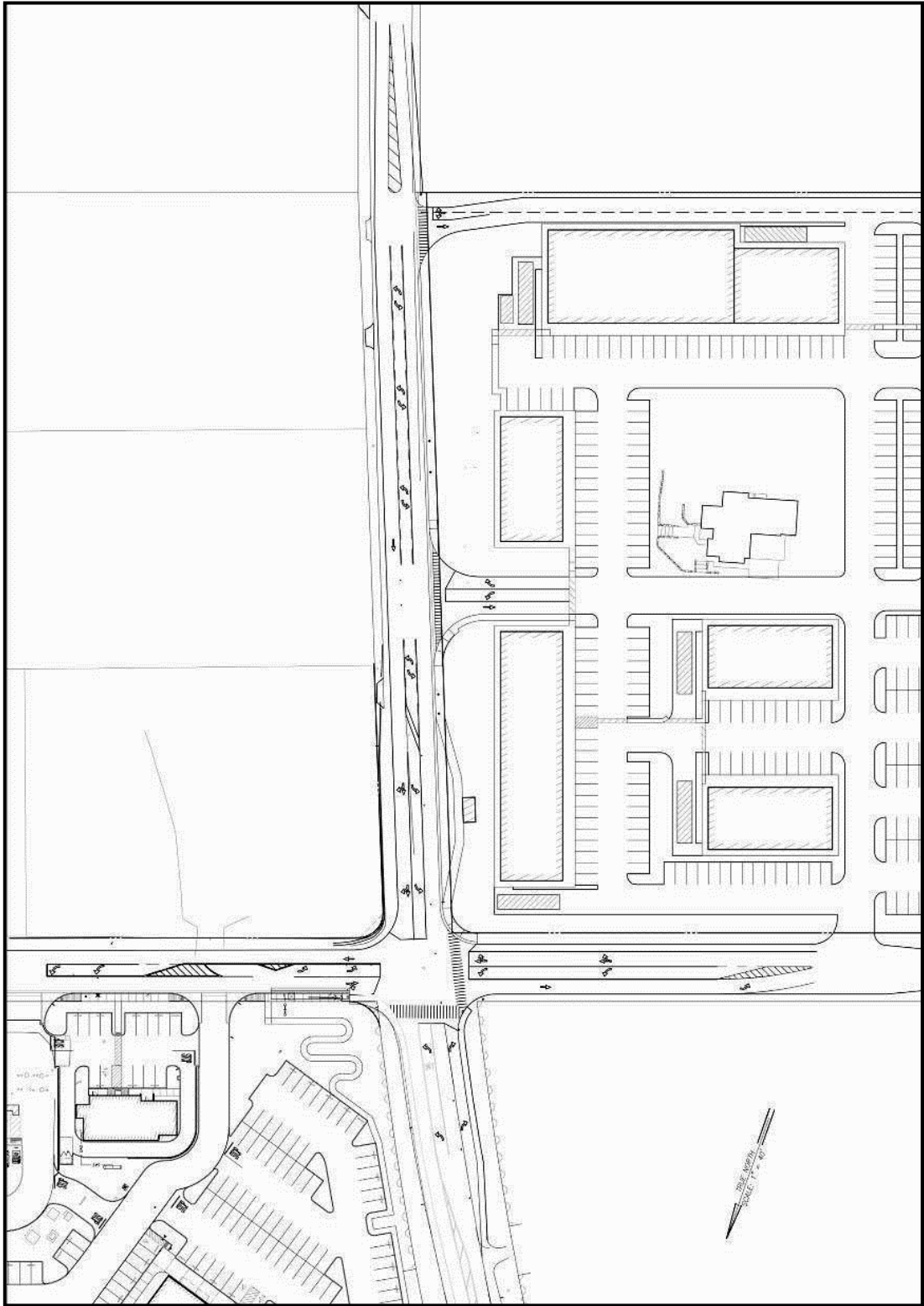
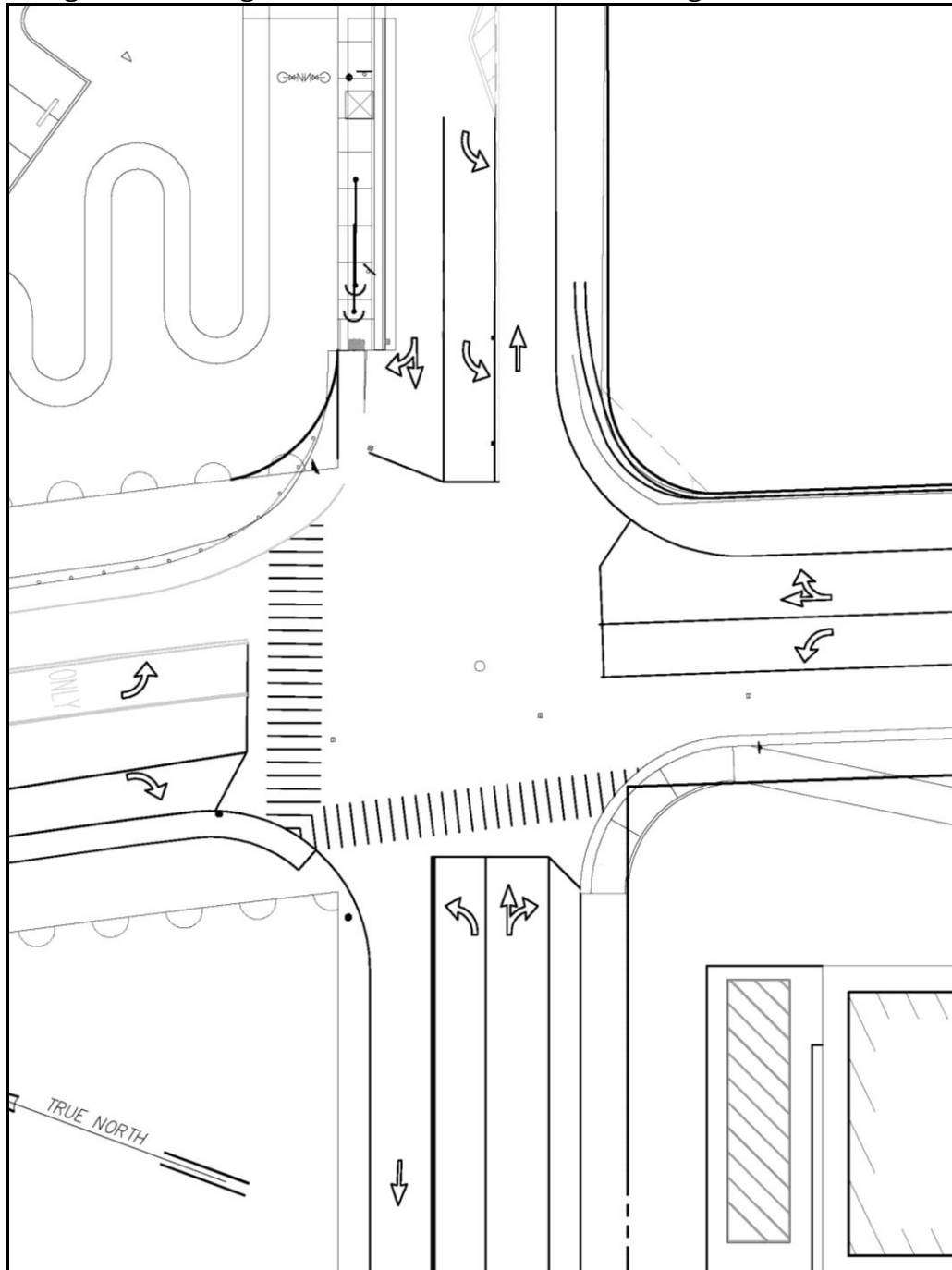


Figure 6- Laneage Plan, Kahakai Blvd.-Pahoa Village Rd. Intersection



*-Note different orientation than Fig. 7 with project site to lower right.

3.5 Required Permits and Approvals

The following permits and approvals would be required:

Hawai‘i County

Department of Public Works

Building Permit

Grading & Driveway Permits

Planning Department

State Land Use Boundary Amendment Application

Change of Zone Application

Plan Approval

State of Hawai‘i

Board of Land and Natural Resources approval for conveyance of road lot to the County of Hawai‘i

Department of Health

Underground Injection Control

Approval of Wastewater Treatment Systems

National Pollutant Discharge Elimination System (NPDES) Permit

3.6 Consistency with Government Plans and Policies

3.6.1 Hawai‘i State Plan

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State’s long-run growth and development activities. The three themes that express the basic purpose of the *Hawai‘i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. The project would promote these goals primarily by enhancing employment opportunities and by providing essential services (i.e., medical services) for the Puna District.

The Hawai‘i State Plan is intended to serve as a guide for the growth and future long range development of the State. Hawai‘i Revised Statutes Chapter 226 provides the long-term goals and policies of the Hawai‘i State Plan. A discussion of the project’s conformance to the applicable policies and goals of the Hawai‘i State Plan follows below.

Policies and Goals

- A strong, viable economy characterized by stability, diversity, and growth that enables the fulfillment of the needs and expectations of Hawaii’s present and future generations.

- A desired physical environment characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being for individuals and families that nourishes a sense of community responsibility and caring and of participation in community life.

Discussion: The proposed project is consistent with pertinent sections of the Hawai‘i State Plan, as it would serve to create a strong, viable economy and, as such, would enhance physical, social, and economic well-being for individuals in the Puna District.

3.6.2 State Land Use District

All land in the State of Hawai‘i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205 HRS. The project site’s State Land Use District designation is Agricultural, however, an application to change the LUD designation to Urban has been submitted to the County of Hawai‘i Planning Department (SLU 12-033).

3.6.3 County Zoning

County Zoning. The project site is in Hawai‘i County Agricultural Zoning Designation. The owner/developer has applied for a zoning change from Agricultural (A-1a) to Village Commercial (CV-10 – 10,000 square feet), that would result in conformance between zoning and the proposed use. Hearing on this application has been deferred by the County of Hawai‘i Planning Department until completion of this Environmental Assessment. The property is not situated within the County’s Special Management Area (SMA).

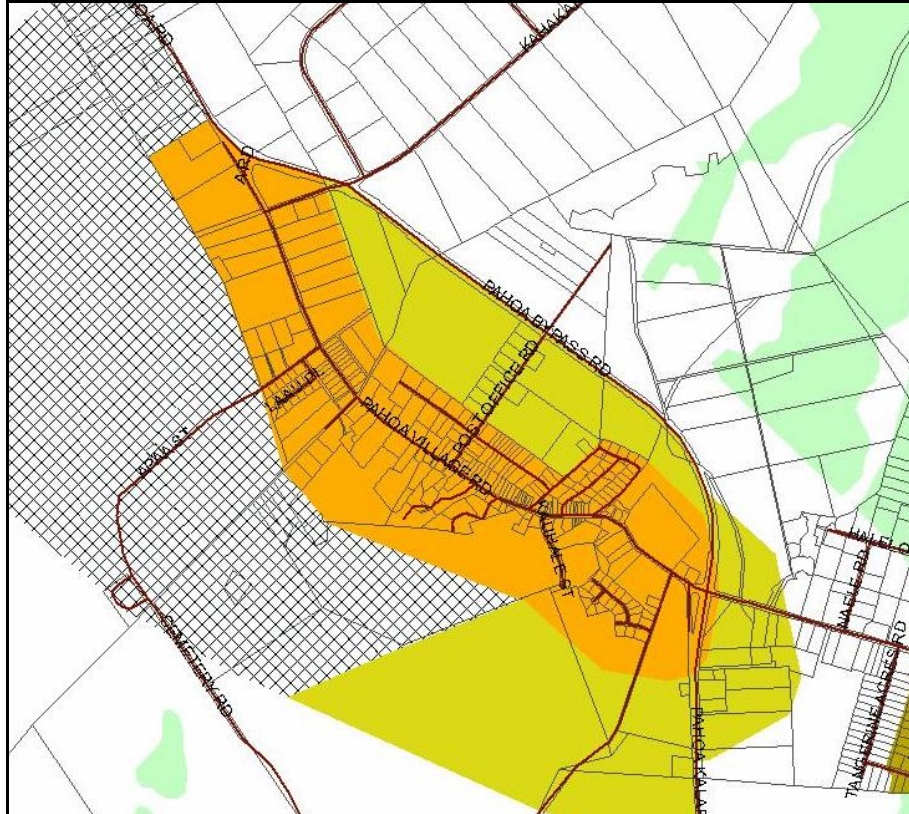
3.6.4 County of Hawai‘i General Plan

The County of Hawai‘i General Plan Land Use Pattern Allocation Guide (LUPAG). The LUPAG map component of the *General Plan* is a graphic representation of the Plan’s goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The project site is classified as medium density urban in the LUPAG (Figure 4, Hawai‘i County 2012), as adopted by County of Hawai‘i Ordinance no. 12-89 on June 27, 2012. The project is consistent with the medium density urban designation, which is intended for village and neighborhood commercial and single family and multiple family residential and related functions (Hawai‘i County 2005).

The County of Hawai‘i General Plan: The General Plan for the County of Hawai‘i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The General Plan itself is organized into thirteen elements, with policies, objectives, standards, and policies for each. There are also discussions of the

specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i.

Figure 7 - Pahoa Village LUPAG Map



Legend: Orange – medium density urban, Yellow – low density urban, Crosshatch – urban expansion, White – extensive agriculture

Most relevant to the project are the following Goals, Standards, Policies and Courses of Action of the Economic Chapter:

Chapter 2: Economic, Section 2.2 Goals

- (a) Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
- (b) Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawai'i.
- (c) Strive for diversity and stability in the economic system.
- (d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural and social environment.
- (e) Strive for an economic climate that provides its residents an opportunity for choice of occupation.

- (f) Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.
- (g) Strive for full employment.
- (h) Promote and develop the island of Hawai‘i into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

Discussion: The project satisfies relevant goals in the Hawai‘i County General Plan, Economic Chapter. The proposed project would improve the supply and diversity of employment available in the project area, would provide both short- and long-term employment. This environmental assessment facilitates assurance that development will be in balance with social and physical amenities.

Chapter 2: Economic, Section 2.3 Policies

- (d) Require a study of the significant cultural, social and physical impacts of large developments prior to approval.
- (f) Support all levels of educational, employment and training opportunities and institutions.
- (l) Identify and encourage primary industries that are consistent with the social, physical, and economic goals of the residents of the County.
- (p) Identify the needs of the business community and take actions that are necessary to improve the business climate.
- (y) Encourage new industries that provide favorable benefit-cost relationships to the people of the County. Benefit-cost relationships include more than fiscal considerations.

Discussion: The proposed project satisfies relevant policies in the Hawai‘i County General Plan, Economic Chapter. The proposed project would support a range of education and training opportunities in addition to employment. The economic impact has been discussed in Section X of this EA and is anticipated to be positive and significant.

3.6.5 Puna Community Development Plan

The Community Development Plans, developed for each judicial district on the Island, are mandated by 2005 County of Hawai‘i General Plan in order to translate broad General Plan goals, policies, and standards into implementation actions. They are also intended to serve as a forum for community input into land-use, delivery of government services, and any other matters relating to the planning area.

The Puna Community Development Plan (PCDP), as amended, was adopted by Ordinance No. 08-116 on September 10, 2008 and identifies “village centers” or “town centers” as the model on which Puna’s future land use pattern will be based. The PCDP designates Pahoia as a Regional Town Center mean to provide a wide range of services and amenities to the communities in the region (Figure 7). The Regional Town Center designation includes areas adjacent to the project site.

As the PCDP is an ongoing process, the Pahoia Community Plan Steering Committee (PPSC) has been actively soliciting community input. The applicant has sought input on the project’s design from the PPSC.

Recently the Pāhoia Regional Town Center Steering Committee has published draft design guidelines for the Pāhoia Design District, of which the proposed project site is a part (Planning Department 2013). The purpose of these design guidelines is to ensure that the unique sense of place represented by the unique characteristics of Pāhoia Town are preserved. In order to accomplish this all projects, including this proposed project, requiring Planning Department plan approval will undergo review by the Pāhoia Design Review Committee to ensure compliance.

In the following section we summarize and discuss the sections and excerpts of the Puna Community Development Plan pertinent to the proposed project.

Land Use Patterns, 3.1.3 Actions

b. Establish the following general classifications and locations for village and town centers in Puna:

1) Kea‘au, Pāhoia, and Hawaiian Paradise Park shall serve as Regional Town Centers to provide a wide range of services for the Puna district;

c. Facilitate land use entitlements and other tools for the development of existing and future village/town centers and special design districts by:

1) Recommending approval of applications for commercial zoning or use permits for existing commercial uses in designated village/town centers that do not presently have appropriate entitlements, and for proposed uses at appropriate nearby locations, provided that the size and use of the expansion area conforms to the criteria applicable to the type of village/town center at that location;

Discussion: The project site is adjacent to areas designated as the Pahoia Regional Town center. The proposed use is consistent with the uses specified for Regional Town centers.

3.0 Social Services and Housing. 3.3.1 Goals

a. Puna residents have improved access to emergency and primary medical care and preventive public health programs.

3.0 Social Services and Housing. 3.3.3 Actions

- a. Develop a centrally-located, 24-hour, full-service medical facility, with trauma care, in Puna. Establish multiple clinic level facilities offering primary medical and dental services in village centers in Upper and Lower Puna. Expand existing County-funded transportation services to carry people from subdivisions to medical facilities.

Discussion: The project satisfies relevant goals and actions relating to Social Services and Housing in the Puna Community Development Plan, as it would include a medical clinic where primary medical care would be available and public health programs would be supported. Project site medical facilities would be located very near Hele-On Bus Stops.

4.0 Transportation, 4.1 Traffic Demand Management. 4.1.1 Goals

- b. The percentage of residents who commute to employment or travel for services outside of Puna is reduced.

4.0 Transportation, 4.1 Traffic Demand Management. 4.1.2 Objectives

- c. Provide more services and employment within Puna's village and town centers.
- d. Create new employment opportunities in Puna in order to reduce long commuting.

Discussion: The project satisfies relevant goals and actions relating to Social Services and Housing in the Puna Community Development Plan, as it will include a medical clinic where primary medical care will be available and public health programs will be supported.

4.0 Transportation, 4.1 Traffic Demand Management. 4.2.1 Goals

- a. Mass transportation options are increased for all Puna residents.
- b. Transit service and improvements reinforce and complement the development of village/town centers.

4.0 Transportation, 4.1 Traffic Demand Management. 4.2.2 Objectives

- d. Strengthen County capability and resources to operate the transit system and increase ridership.
- e. Ensure that pedestrians can access bus stops safely.

Discussion: The project satisfies relevant goals and objectives specified in the Puna Community Development Plan. The proposed project would construct a second bus stop along Pahoa Village Road.

4.3 Roadway Network, 4.3.1 Goals

- c. Roadways are pedestrian and bicycle friendly.
- d. Traffic congestion and traffic-related health risks are reduced.

4.3 Roadway Network 4.3.3 Actions

Include pedestrian and bicycling requirements in all projects.

Discussion: The project satisfies relevant goals and actions relating to Roadway Network in the Puna Community Development Plan, mitigation will ensure that adverse traffic impacts are avoided. The intersection would include pedestrian crosswalks, and the project would be designed in order to protect pedestrian safety. Although site design is ongoing, the applicant plans to include sheltered bicycle racks in the project.

PART 4: ANTICIPATED DETERMINATION

Based on information to this point, the County of Hawai'i Planning Department is expected to determine that the project will not significantly alter the environment, as impacts will be minimal, and that an Environmental Impact Statement is not warranted, and is thus expected to issue a Finding of No Significant Impact (FONSI). Comments on the Draft EA will be reviewed in order to ascertain whether this anticipated determination is appropriate.

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai'i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resources would be committed or lost.
2. *The project will not curtail the range of beneficial uses of the environment.* No restriction of beneficial uses would occur.
3. *The project will not conflict with the State's long-term environmental policies.* The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project fulfills aspects of these policies calling for an improved social environment. It is thus consistent with all elements of the State's long-term environmental policies.
4. *The project will not substantially affect the economic or social welfare of the community or State.* The project is expected to have positive impacts on the economic or social welfare of the County or State, and would improve the social welfare of the project area, including the Puna District.
5. *The project does not substantially affect public health in any detrimental way.* The project would affect public health and safety in only beneficial ways by providing access to medical and dental care.
6. *The project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* No secondary effects are expected to result from the proposed action. No population changes are expected as a result of the action, and impacts on public facilities are negligible.
7. *The project will not involve a substantial degradation of environmental quality.* Environmental quality will not be adversely impacted, as impacts are minor and mitigable. The potential for noise impacts and water and air quality impacts during construction would be mitigated.
8. *The project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* The project site supports overwhelmingly alien vegetation. Impacts to rare, threatened or endangered species of flora or fauna will not

occur, with the exception of two individual listed plants that will be preserved and incorporated into landscaping.

9. *The project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* Although properties near the project site may be developed, the project is not related to other activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.

10. *The project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur. Mitigation of construction-phase impacts will preserve water quality. Ambient noise impacts due to construction will be temporary and restricted to daytime hours, and mitigated through permit compliance.

11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the project is located in an area with volcanic and seismic risk, the entire Island of Hawai‘i shares this risk, and the project is not imprudent to construct. The project site is not located near surface water features, nor is it located near the shoreline or flood plains.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic vistas and viewplanes will be adversely affected by the project.

13. *The project will not require substantial energy consumption.* The project would require electrical generation, which would be supplemented by electrical generation with photovoltaics. No adverse effects would be expected.

For the reasons above, the proposed Action is not anticipated to have any significant effect in the context of Chapter 343, Hawai‘i Revised Statutes and section 11-200-12 of the State Administrative Rules.

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APPENDIX 1

**COMMENTS RECEIVED IN RESPONSE TO EARLY
CONSULTATION**

NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAII



JOBIE M. K. MASAGATANI
CHAIRMAN DESIGNATE
HAWAIIAN HOMES COMMISSION

MICHELLE K. KAUHANE
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

P. O. BOX 1879
HONOLULU, HAWAII 96805

October 22, 2012

GK Environmental LLC
Attn: Graham Knopp, Principal
P.O. Box 1310
Honokaa, Hawaii 96727

Dear Mr. Knopp:

Subject: Environmental Assessment (EA) for Pahoa Village
Road Shopping Center and Related Roadway
Improvements, Island of Hawai'i,
TMK (3rd) 1-5-007:6,69 & 70

Thank you for the opportunity to review the Environmental
Assessment (EA) for Pahoa Village Road Shopping Center and
Related Roadway Improvements.

The Department of Hawaiian Homes Lands has no comment to
offer at this time. If you have any questions, please contact
our Planning Office at (808) 620-9480.

Aloha,

A handwritten signature in black ink, appearing to read "Jobie M.K. Masagatani".

gm Jobie M.K. Masagatani, Chairman Designate
Hawaiian Homes Commission

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
CHAIRPERSON
HAWAIIAN LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCES MANAGEMENT



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 23, 2012

GK Environmental LLC
Attention: Mr. Graham Knopp
P.O. Box 1310
Honokaa, Hawaii 96727

via email: gpknopp@gkenvllc.com

Dear Mr. Knopp:

SUBJECT: Environmental Assessment (EA) for Pahoa Village Road Shopping Center and Related Roadway Improvements, GK Environmental LLC for B.T. Kuwahara LLC, Pahoa, Puna, Hawaii; TMK: (3) 1-5-007:6, 69 & 70

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from the Engineering Division on the subject matter. Should you have any questions, please feel free to call Kevin Moore at (808) 587-0426. Thank you.

Sincerely,

A handwritten signature in blue ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



12 OCT -2 AM 10:41 ENGINEERING WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION

2012 OCT 18 A 9:34

DEP. LAND & NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 1, 2012

MEMORANDUM

TO:

DLNR Agencies:

- ☐ Div. of Aquatic Resources
- ☐ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☐ Div. of Forestry & Wildlife
- ☐ Div. of State Parks
- ☐ Commission on Water Resource Management
- ☐ Office of Conservation & Coastal Lands
- ☒ Land Division – Hawaii District
- ☒ Historic Preservation

FROM:

Russell Y. Tsuji, Land Administrator

SUBJECT:

Environmental Assessment (EA) for Pahoia Village Road Shopping Center and Related Roadway Improvements

LOCATION:

Pahoia, Puna, Hawaii; TMK: (3) 1-5-007:6, 69 & 70

APPLICANT:

GK Environmental LLC for B.T. Kuwahara LLC

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by October 22, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

- () We have no objections.
- () We have no comments.
- (✓) Comments are attached.

Signed:

Print name:

Cathy S. Chang, Chief Engineer

Date:

9/17/12

cc: Central Files

**DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION**

LD/KevinMoore

**RE: EAPahoaVillageRoadShoppingCenter
Hawaii.583**

COMMENTS

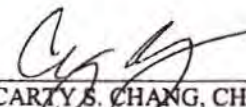
- () We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone .
- (X) **Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in an area of Minimal Tsunami Inundation. The Flood Insurance Program does not have any regulations for developments within the Minimal Tsunami Inundation areas..**
- () Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is .
- () Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- () Mr. Mario Siu Li at (808) 768-8098 or Ms. Ardis Shaw-Kim at (808) 768-8296 of the City and County of Honolulu, Department of Planning and Permitting.
 - () Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.
 - () Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
 - () Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.
- () The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.
 - () The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

- () Additional Comments: _____
- () Other: _____

Should you have any questions, please call Ms. Suzie S. Agraan of the Planning Branch at 587-0258.

Signed: 
CARY S. CHANG, CHIEF ENGINEER

Date: 10/17/12



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

September 26, 2012

In reply, please refer to:
File:

12-166
Pahoa Village

Mr. Graham Knopp, Principal
GK Environmental LLC
P.O. Box 1310
Honokaa, Hawaii 96727

Dear Mr. Knopp:

SUBJECT: Pre-Environmental Assessment for Pahoa Village Road Shopping Center and Related Roadway Improvements, Hawaii, TMK: (3) 1-5-007: 6, 69 & 70

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter, dated September 20, 2012. 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 no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

The United States Environmental Protection Agency (EPA) provides a wealth of information on their website including strategies to help protect our natural environment and build sustainable communities at: <http://water.epa.gov/infrastructure/sustain/>. The DOH encourages State and county planning departments, developers, planners, engineers and other interested parties to apply these strategies and environment principles whenever they plan or review new developments or redevelopments projects. We also ask you to share this information with others to increase community awareness on healthy, sustainable community design. If there are any questions about these comments please contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read "Laura Leialoha Phillips McIntyre", written over a horizontal line.

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office Manager
Environmental Health Administration
Department of Health
919 Ala Moana Blvd., Ste. 312
Honolulu, Hawaii 96814
Phone: 586-4337
laura.mcintyre@doh.hawaii.gov

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

10010PST.12

October 5, 2012

Mr. Graham Knopp
Principal
GK Environmental LLC
P.O. Box 1310
Honoka'a, Hawaii 96727

Dear Mr. Knopp:

**SUBJECT: Comments on the Draft Environmental Assessment for the
Pahoa Village Road Shopping Center and Related Roadway
Improvements, Pahoa, Island of Hawaii, Hawaii**

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated September 20, 2012, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: <http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf>.

1. Any project and its potential impacts to State waters must meet the following criteria:
 - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
 - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
 - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for an NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

- a. Storm water associated with 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. This includes areas used for a construction base yard and the storage of any construction related equipment, material, and waste products. An NPDES permit is required before the start of the construction activities.
- b. Storm water associated with industrial activities.
Please verify the North American Industrial Classification System (NAICS) United States Structure Code(s) and the corresponding Standard Industrial Classification (SIC) Code(s) for the facility. See <http://www.census.gov/epcd/www/naicstab.htm> to determine the NAICS Code(s) and corresponding SIC Code(s).

Facilities with SIC Codes categorized in the Code of Federal Regulations, Title 40 (Protection of Environment), Parts 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi) are required to obtain NPDES permit coverage for the discharges of storm water associated with industrial activities.

- c. Treated effluent from leaking underground storage tanks.
- d. Once through cooling water less than one (1) million gallons per day.
- e. Hydrotesting waters.
- f. Construction dewatering effluent.
- g. Treated process wastewater associated with well drilling activities.
- h. Circulation water from decorative ponds or tanks.

You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. 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>.

3. For other types of wastewater not listed in Item No. 2 above or wastewater discharging into Class 1 or Class AA waters, an NPDES individual permit will need to be obtained. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at <http://hawaii.gov/health/environmental/water/cleanwater/forms/environmental/water/cleanwater/forms/indiv-index.html>.

Mr. Graham Knopp
October 5, 2012
Page 3

10010PST.12

4. If your project involves work in, over, or under waters of the United States, it is highly recommend that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 438-9258) regarding their permitting requirements.

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 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

5. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of \$25,000 per day per violation.

If you have any questions, please visit our website at:
<http://www.hawaii.gov/health/environmental/water/cleanwater/index.html>, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,



ALEC WONG, P.E., CHIEF
Clean Water Branch

ST:jst

- c: Mr. Graham Knopp, GK Environmental LLC
[via email gpknopp@ghenvllc.com only]
DOH-EPO [via email only]

William P. Kenoi
Mayor

William T. Takaba
Managing Director



Warren H. W. Lee
Director

Brandon A. K. Gonzalez
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 • Hilo, Hawaii 96720-4224
(808) 961-8321 • Fax (808) 961-8630

October 19, 2012

Mr. Graham Knopp, Principal
GK Environmental
P. O. Box 1310
Honokaa, HI 96727

SUBJECT: ENVIRONMENTAL ASSESSMENT PREPARATION NOTICE
Pahoa Village Road Shopping Center and Related Roadway Improvements
Owner: B. T. Kuwahara, LLC
References: State Land Use Boundary Amendment Application SLU 12-000333
Change of Zone Application REZ 12-000155
Tax Map Keys: (3) 1-5-007: 006, 069 and 070

We have reviewed the subject project as described in your letter dated September 20, 2012 and offer the following comments for your consideration.

All development-generated runoff shall be disposed of on site and not directed toward any adjacent properties. A drainage study shall be prepared and the recommended drainage system shall be constructed meeting the approval of the Department of Public Works.

The subject parcels are in an area designated as Zone X on the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA). Zone X is an area determined to be outside the 500-year floodplain.

All earthwork activity, including grading and grubbing, shall conform to Chapter 10, Erosion and Sedimentation Control, of the Hawaii County Code.

The General Plan classifies Pahoa Village Road as a collector with an existing right-of-way width of approximately 50 feet fronting the subject parcels. Access shall conform to Chapter 22, County Streets, of the Hawaii County Code.

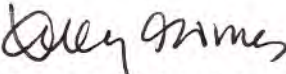
We recommend the applicant provide improvements to the development's entire Pahoa Village Road frontage consisting of, but not limited to, pavement widening with concrete curb, gutter and sidewalk, drainage improvements, and any required utility relocation, meeting the requirements of the Americans with Disabilities Act and the approval of the Department of Public Works.

Letter to Graham Knopp
October 19, 2012
Page 2 of 2

We are amenable to the recommendations made in the Traffic Impact Analysis Report. Notably, the installation of a traffic signal, two-way left turn lane, and driveways meeting acceptable levels of service. The installation of streetlights and traffic control devices shall meet the approval of the Traffic Division, Department of Public Works. The applicant will be responsible for the design, purchase, and installation of such devices.

A completed copy of the Environmental Assessment will not be necessary.

Questions may be referred to Mr. Kelly Gomes, P.E. of the Engineering Division at 961-8327.


for BEN E. ISHII, P.E.
Engineering Division Chief

KG



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

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:
HWY-PS
2.3206

October 23, 2012

Mr. Graham Knopp
Principal
GK Environmental LLC
P.O. Box 1310
Honokaa, Hawaii 96727

Dear Mr. Knopp:

Subject: Early Consultation for Environmental Assessment for Kahakai Boulevard
Extension Related to a Shopping Center, B. T. Kuwahara,
Pahoa, Puna, Hawaii, TMK: (3) 1-5-007: 006, 069 and 070

Thank you for the opportunity to provide early consultation for the subject Draft Environmental Assessment (DEA) for the Kahakai Boulevard Extension that will provide access to a shopping center proposed on 9.93 acres of private land adjacent to Pahoa Village Road. We understand that a DEA is required because the applicant is proposing to extend and improve Kahakai Boulevard to the west of its intersection with Pahoa Village Road, on the Department of Land and Natural Resources owned land.

We have the following comments:

1. We reviewed and commented on an initial Traffic Impact Analysis (TIA) that was part of a State Land Use Boundary Amendment and Change of Zone Application for the subject shopping center.
2. Prior to completion of the Chapter 343 compliance process, a revised TIA should be submitted for our review and acceptance. The applicant should be advised to continue coordinating the subject project and the TIA with the Department of Transportation.

If you have any questions, please call Ken Tatsuguchi, Head Planning Engineer, Highways Division, at (808) 587-1830.

Very truly yours,

A handwritten signature in black ink, appearing to read "Glenn M. Okimoto", is written over a horizontal line.

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

William P. Kenoi
Mayor



Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Room 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

October 4, 2012

Mr. Graham Knopp
GK Environmental
PO Box 1310
Honokaa, HI 96727

Dear Mr. Knopp,

SUBJECT: EA for Pahoa Village Road Shopping Center and related
Roadway Improvements
TMK: 1-5-0070:6, 69 & 70.

The Hawai'i Fire Department does not have any comments to offer at this time regarding the above-referenced early consultation on Environmental Assessment.

Thank you for the opportunity to comment. A copy or Notice of Availability of Environmental Assessment is not needed when completed.

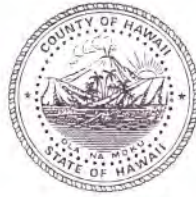
Sincerely,

DARREN J. ROSARIO
Fire Chief

KT:lc



William P. Kenoi
Mayor



Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i

POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

October 2, 2012

Mr. Graham Knopp
Principal
GK Environmental
P. O. Box 1310
Honokaa, HI 96727

Dear Mr. Knopp:

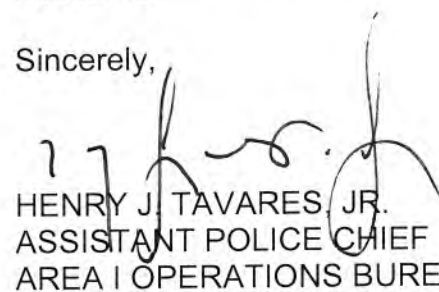
Subject: Environmental Assessment (EA) for Pahoa Village Road Shopping Center and Related Roadway Improvements, Island of Hawaii
TMK: (3rd) 1-5-007:6, 69 & 70

Staff, upon reviewing your letter of September 20, 2012, and visiting the proposed site, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Acting Captain Reed Mahuna, Puna Patrol, at 965-2716.

Sincerely,


HENRY J. TAVARES, JR.
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

RM:lli
120577

NEIL ABERCROMBIE
Governor

BRIAN SCHATZ
Lieutenant Governor

RICHARD LIM
Director

MARY ALICE EVANS
Deputy Director



LAND USE COMMISSION
Department of Business, Economic Development & Tourism
State of Hawai'i

DANIEL ORODENKER
Executive Officer

BERT K. SARUWATARI
Planner

SCOTT A.K. DERRICKSON, AICP
Planner

FRED A. TALON
Drafting Technician

RILEY K. HAKODA
Chief Clerk

September 26, 2012

Mr. Graham Knopp
GK Environmental, LLC
P.O. Box 1310
Honoka'a, Hawai'i 96727

Dear Mr. Knopp:

On September 21, 2012, the Commission received your Pre-Assessment comment request for the Draft Environmental Assessment (EA) for the Pāhoa Village Road Shopping Center and Related Roadway Improvements. We have reviewed the Project Summary and have the following comments:

1. The subject properties appear to be within the State Land Use Agricultural District. Therefore, a State Land Use Boundary Amendment would be necessary. Since the total acreage of the project is less than 15 acres, the boundary amendment would be processed through the County of Hawai'i. We recommend your draft EA address this requirement.
2. The identified trigger for compliance with Chapter 343, Hawai'i Revised Statutes (HRS), is the use of State lands. Will the project require a County General Plan (GP) amendment? If so, we assume that the applicant will be seeking the GP amendment prior to petitioning for a State Land Use Boundary Amendment. Please clarify the sequence the applicant will pursue in seeking regulatory approvals and identify the accepting authority for the EA.

We have no further comments to offer at this time. Thank you for the opportunity to comment. Should you have any questions, please feel free to contact Scott Derrickson, AICP of our office at 587-3921.

Sincerely,

DANIEL ORODENKER
Executive Officer

cc: County of Hawai'i, Planning Department

APPENDIX 2

PHASE I ENVIRONMENTAL SITE ASSESSMENT

**PHASE I
ENVIRONMENTAL SITE ASSESSMENT REPORT
TMK (3) 1-5-007:006, :055, :069, AND :070
PAHOA, HAWAI'I 96778**

MNA PROJECT 01539_5

NOVEMBER 21, 2012



Myounghee Noh & Associates

Environmental Studies and Consulting Services

94 Kohola Street, Hilo, Hawai'i, USA 96720 • 808.935.8727
99-1046 Iwaena Street, Suite 210A, Aiea, Hawai'i, USA 96701 • 808.484.9214

Phase I ESA report is prepared for:

Bryson T. Kuwahara
1142 Kaumana Drive
Hilo, Hawai'i 96720

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT TMK (3) 1-5-007:006, :055, :069, AND :070 PAHOA, HAWAI'I 96778

TMK (3) 1-5-007:006 3.311 acres
TMK (3) 1-5-007:055 0.937 acres
TMK (3) 1-5-007:069 3.311 acres
TMK (3) 1-5-007:070 3.311 acres

MNA Job No. 01539_5

November 21, 2012

I declare that, to the best of my professional knowledge and belief, I meet the definition of *environmental professional* as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.



Myounghee Noh
Principal

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LIST OF ACRONYMS AND ABBREVIATIONS

AST	Aboveground Storage Tank
ASTM	American Society of Testing and Materials
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESQG	Conditionally Exempt Small Quantity Generators
CORRACTS	RCRA Facilities that are undergoing “corrective action”
ERNS	Emergency Response Notification System
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
HDOH	Hawai’i Department of Health
HEER Office	Office of Hazard Evaluation and Emergency Response
HELCO	Hawaii Electric and Light Company
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
MNA	Myounghee Noh & Associates, L.L.C.
NFA	No Further Action
NFRAP	CERCLIS No Further Remedial Action Planned
NLR	No Longer Regulated generators
NPL	National Priorities List
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
SHWB	Solid and Hazardous Waste Branch
SQG	Small Quantity Generator
TMK	Tax Map Key
TSD	Treatment/Storage/Disposal
UIC	Underground Injection Control
UST	Underground Storage Tank
VRP	Voluntary Response Program

EXECUTIVE SUMMARY

Myounghee Noh & Associates, L.L.C. (MNA), was retained in October 2012 to conduct a Phase I Environmental Site Assessment (ESA) for the subject property located in Pahoa, Island of Hawai'i, and identified by four Tax Map Keys (TMK), Island 3, Zone 1, Section 5, Plat 007, and Parcels 006, 055, 069 and 070, TMK (3) 1-5-007:006, :055, :069, and :070, respectively. The subject properties at (3) 1-5-007:006, was owned by Bryson T., Lorna Kakeko, Royce Takeo, and Kayla Kiana Kuwahara. The subject properties at TMK (3) 1-5-007:069, and :070 were owned by BT Kuwahara LLC, and the subject property at TMK (3) 1-5-007:055 was owned by the State of Hawaii. This Phase I ESA was completed for Bryson T. Kuwahara.

The purpose of this Phase I ESA is to identify *recognized environmental conditions* (REC) at the subject property, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. A Phase I ESA consists of four parts. Three of those parts are intended to collect information that will aid in the identification of REC at the subject property. The information generating parts of the Phase I ESA consists of a review of state, federal, and local environmental records; a site reconnaissance visit; and interviews with key site personnel and other individuals with knowledge regarding the subject property. The fourth part of a Phase I ESA is a report that documents the collection of information about the subject property and evaluation of that information towards making a determination of the presence of REC at the subject property.

The subject property was located in Pahoa, in eastern Hawai'i, approximately nine miles west of the Kapoho Tide Pools. The subject property at parcel 006 was improved with a single-story residential structure. Adjacent to the building was a garage, a driveway, and a storage shed. The building was a three-bedroom, two-bathroom home built in 1975, approximately 2,088 square feet. The property was approximately 144,227 square feet. At the time of this Phase I ESA, this parcel was owned by Bryson T. Kuwahara.

The subject property at parcel 055 was an unimproved vacant lot, approximately 40,815 square feet. At the time of this Phase I ESA, this parcel was owned by the State of Hawaii.

The subject property at parcel 069 was improved with a two-story residential structure, a single-story warehouse, and a television tower. The two-story residential structure was a three-bedroom, three-bathroom home built in 1985, approximately 3,036 square feet. The single-story warehouse was built in 1981, approximately 4,000 square feet. At the time of this Phase I ESA, the warehouse was used to store petroleum products and the machinery being used to clear and restructure the subject property. The television tower was built in 2002, approximately 40 square feet. The property was approximately 144,227 square feet. At the time of this Phase I ESA, this parcel was owned by BT Kuwahara LLC.

The subject property at parcel 070 was an unimproved vacant lot, approximately 144,227 square feet. At the time of this Phase I ESA, this parcel was owned by BT Kuwahara LLC.

FINDINGS

During the October 30, 2012, site reconnaissance, it was noted that the warehouse located on parcel 069 had five barrels/drums of motor and hydraulic oil, one aboveground storage tank (AST), and many oil cans, empty, unlabeled, and old buckets, oil tubing, and lots of scrap materials. No staining was observed on the concrete beneath any of these items. The AST was unlabeled, old, and rusty with no observed holes and no staining on concrete ground. According to the owner of the property, it was used to store used motor oil. The three drums containing petroleum products were in good condition. According to the property owner, these drums were being used to fuel the heavy equipment that were involved with the restructuring of the subject property. While there was a motor oil odor present, no visual evidence of release from these ASTs and drums was present. Therefore, the petroleum products and containers present in the warehouse are not considered a *recognized environmental condition*.

One Hawaii Electric and Light Company (HELCO) owned pole-mounted transformer was located on the subject property. It was identified as not containing polychlorinated biphenyls (PCB). Due to the absence of PCB, the fair condition of the transformer, and observation of no material threat of release of hazardous substances or petroleum products from the transformer, this is not a *recognized environmental condition*.

Environmental FirstSearch™ (FirstSearch) identified one underground storage tank (UST) facility within ¼ mile of the subject property. The facility, Woodland Center, was located 370 feet northeast of the subject property at 15-1450 Kahakai Boulevard. Woodland Center had two gasoline tanks and one diesel tank currently in use. According to a facility inspection conducted by Hawaii Department of Health (HDOH) Solid and Hazardous Waste Branch (SHWB) on August 9, 2011, no violations were found. No UST leaks were reported in the FirstSearch Report or HDOH SHWB records for this facility; therefore, this is not a *recognized environmental condition*.

FirstSearch identified one additional UST at a location non-geocoded. The facility was identified as Aloha Petroleum and located approximately 1,056 feet from the subject property at 15-2660 Pahoa Village Road. Aloha Petroleum had four gasoline tanks and two diesel tanks currently in use. HDOH SHWB and Hazard Evaluation and Emergency Response (HEER) Office files showed that there were administrative violations associated with this facility. Additionally, there were files related to a release from the diesel tank located on the property. A resolution and indication of the status of the cleanup of this release was not provided. However, this property is located at a lower elevation than the subject property. Therefore, potential spills and contamination in groundwater flows from this property would not migrate in the direction of the subject property. Therefore, this is not reconsidered a *recognized environmental condition*.

FirstSearch identified nine release incidents from two non-geocoded locations within the zip code of the subject property on the State Release List. Seven release incidents occurred at Puna Geothermal Venture, which was located at 14-3860 Pahoa Pohoiki Road, approximately five miles away and down gradient from the subject property. Therefore, these seven release incidents are not considered *recognized environmental conditions*. Two release incidents occurred at a HELCO transformer pole located on Kahakai Boulevard, which were on an adjoining property to the west. Further inquiry with HELCO revealed that a release of

approximately three gallons of non-PCB mineral oil was discovered on September 26, 2011. On September 27 and October 3, 2011, the petroleum-affected soil was excavated. Analytical results from confirmation soil samples indicated that Site Cleanup Program requirements were satisfied. HELCO submitted a final release report to the HDOH HEER Office on December 7, 2011. Therefore, this is not a *recognized environmental condition*.

RECOGNIZED ENVIRONMENTAL CONDITIONS

MNA performed a Phase I ESA in conformance with the scope and limitations of ASTM E 1527-05 of the property located at TMK (3) 1-5-007:006, :055, :069, and :070, Pahoia, Island of Hawai'i. Any exceptions to, or deletions from, this practice are described in Section 2.4 of this report. This assessment has revealed no evidence of *recognized environmental conditions* in connection with the subject property.

1.0 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) conducted during October and November 2012 for the subject property consisting of four Tax Map Keys (TMK), identified by the TMK of Island 3, Zone 1, Section 5, Plat 007, and Parcels 006, 055, 069, and 070 [TMK (3) 1-5-007:006, :055, :069, and :070] in Pahoia, Island of Hawai'i. The location of the subject property is identified in Figure 1. This Phase I ESA was conducted by Myounghee Noh & Associates, L.L.C., herein referred to as MNA, for Bryson T. Kuwahara. At the time of this Phase I ESA, the subject property at parcels 006, 055, and 070 were owned and operated by Bryson T. Kuwahara. The subject property at parcel 069 was owned and operated by the State of Hawaii Department of Land and Natural Resources.

1.1 PURPOSE

The purpose of this Phase I ESA is to identify any *recognized environmental conditions* (REC) at the subject property, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. This practice is intended to permit a user to satisfy one of the requirements to qualify for the *innocent landowner defense* in CERCLA liability, "all appropriate inquiry into the previous ownership and uses of the site consistent with good commercial or customary practice." The term *recognized environmental condition* denotes the presence, or likely presence, of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property (ASTM International, 2005).

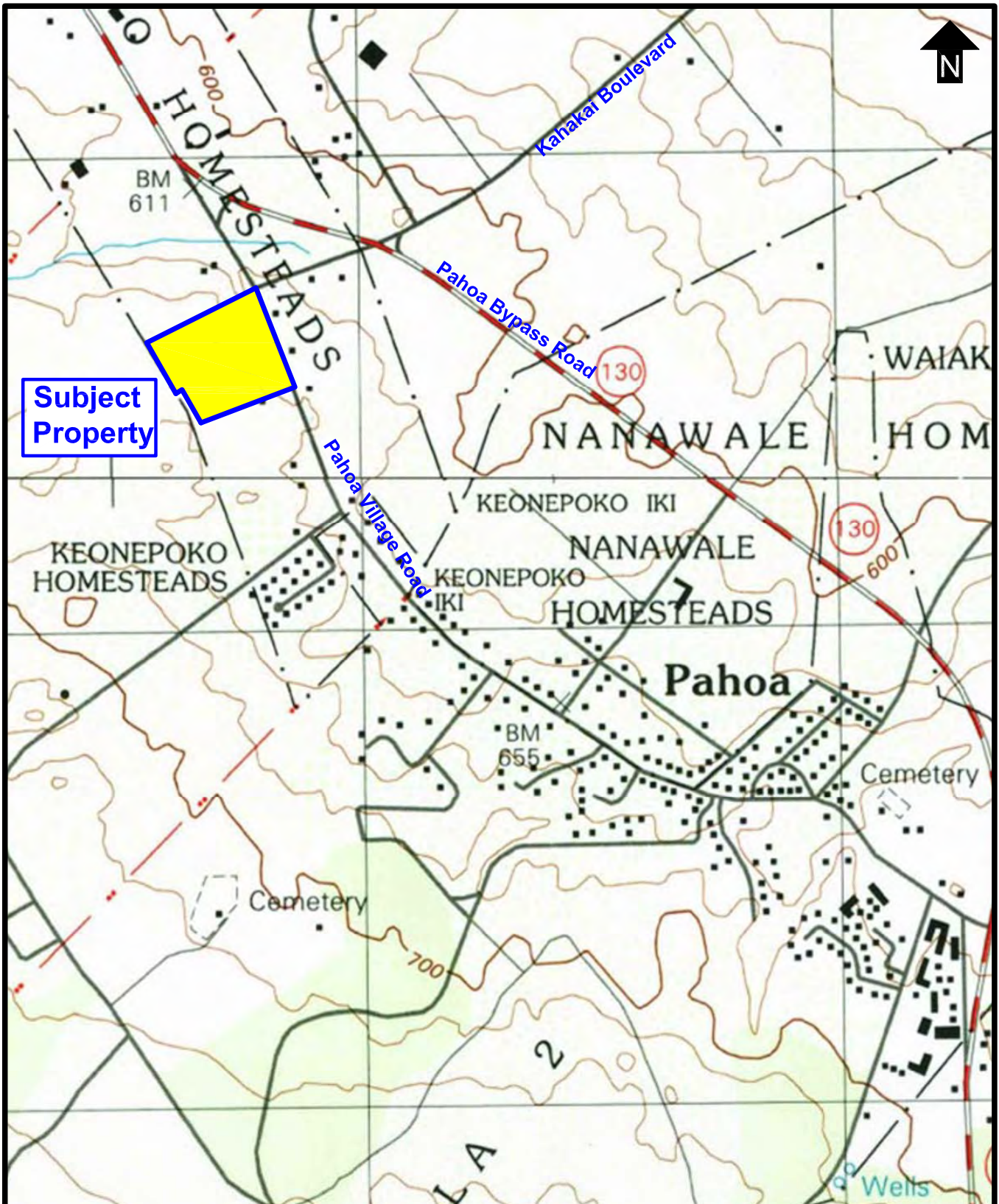
This report is part of the Phase I ESA process which was conducted for the subject property specified above. The assessment was conducted in accordance with the practices described in *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM International, 2005).

1.2 DETAILED SCOPE OF SERVICES

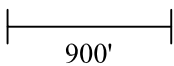
A Phase I ESA has four components: records review, site reconnaissance, interview, and report. MNA conducted this ESA utilizing information sources with the potential to identify past or current releases of hazardous substances or petroleum products into the subject property. Adjoining properties were also evaluated for their potential to impact the subject property. Per the American Society for Testing and Materials (ASTM) Phase I ESA Standard, adjoining properties include parcels touching the subject property as well as those across a roadway property (ASTM International, 2005).

1.2.1 Site History

Where available, and as needed, MNA researched historical and current topographic maps, tax records, fire insurance maps, and aerial photographs to identify previous and current uses of the subject property, adjoining properties, and surrounding areas.



Scale



900'



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Myounghee Noh & Associates, L.L.C.

Figure 1. Site Location Map
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1.2.2 Regulatory Records

MNA examined government records with respect to environmental conditions, citations, complaints, and permits at the subject property, at adjoining properties, and within the surrounding area. MNA utilized a records search, provided by Environmental FirstSearchTM, to review records from the following federal and state programs.

- National Priorities List (NPL)
- Delisted NPL
- Resource Conservation and Recovery Act (RCRA) facilities that are undergoing “corrective action” (CORRACTS)
- RCRA-Treatment, Storage, & Disposal (TSD)
- Comprehensive Environmental Response, Compensation & Liability Information System (CERCLIS) List
- CERCLIS No Further Remedial Action Planned (NFRAP) List
- Federal and Hawai’i State Brownfields
- Hawai’i Solid Waste & Landfill
- Leaking Underground Storage Tank (LUST)
- RCRA-Violators/Enforcement
- Underground Storage Tank (UST)
- Emergency Response Notification System (ERNS)
- RCRA – Generators, including those No Longer Regulated (NLR)
- Hawai’i Sites of Interest
- Hawai’i Releases
- Federal and Hawai’i State Land Use Controls
- Hawai’i Voluntary Cleanup Sites
- Tribal Lands

Additionally, MNA reviewed state environmental databases and case files from the Hawai’i Department of Health (HDOH), and Hawai’i Electric and Light Company (HELCO). County of Hawai’i Fire Department records were not available for review at the time of this writing.

1.2.3 Site Reconnaissance

MNA performed a site reconnaissance to obtain information indicating the likelihood of contamination, to interview available site personnel, and to conduct a brief assessment of the adjoining properties. During the site reconnaissance, MNA looked for a variety of indicators of environmental hazards including, but not limited to, stained surface soil, dead or stressed vegetation, hazardous substances, aboveground and underground storage tanks, disposal areas, groundwater wells, drywells, and sumps. Sampling and testing of soil and groundwater were not part of this assessment.

1.2.4 Site Geology and Hydrogeology

MNA reviewed published information, for the property and surrounding area, on surface and subsurface conditions such as topography, drainage, surface water bodies, subsurface geology, and

groundwater. MNA used this information to assess the potential for migration and impact of the subject property by releases of hazardous substances or petroleum products at off-site properties.

1.2.5 Data Evaluation and Reporting

MNA evaluated the information collected and prepared this report as part of the overall assessment. Section 2 presents the site background information; Section 3 user provided information; Section 4 information collected from records review; Section 5 site reconnaissance; Section 6 interviews; Section 7 data gaps; Section 8 key findings and opinion; and Section 9 conclusion.

1.3 SIGNIFICANT ASSUMPTIONS

The conclusion presented in this report is based upon the assumption that reasonably ascertainable and relevant information pertaining to the environmental condition of the subject property was made available to MNA during the assessment. Information obtained from government agencies and other resources is presumed to be accurate and updated. Additionally, information collected in interviews was collected in “good faith” and believed to be true and accurate to the best knowledge of the interviewee.

1.4 LIMITATIONS AND EXCEPTIONS

This Phase I ESA report provides a “snapshot” of the property conditions at the time of the assessment. Findings, opinions, and conclusions apply to property conditions existing at the time of the investigation and those reasonably foreseeable. They do not apply to conditions at, or changes to, the property, of which MNA is not aware, could not reasonably be aware, and has not had the opportunity to evaluate.

This report is based upon visual observations of the property and surrounding vicinity, interpretations of the available historical and regulatory information, reviewed documents, and interviews of individuals with knowledge of the subject or surrounding property. MNA cannot ensure the accuracy of the historical or regulatory information. This report is intended exclusively for the purpose outlined and applies only to the subject property.

This Phase I ESA excludes asbestos, lead paint, and investigation of geotechnical concerns. No surface or subsurface sampling was involved.

1.5 SPECIAL TERMS AND CONDITIONS

This Phase I ESA was conducted and prepared by MNA for the exclusive use of Bryson T. Kuwahara. This report shall not be relied upon or transferred to any other party without written authorization from Bryson T. Kuwahara.

1.6 USER RELIANCE

This report is an instrument of service of MNA, which summarizes its findings and opinions with respect to *recognized environmental conditions* at the subject property. Findings and opinions are predicated on information that MNA obtained from individuals, a site reconnaissance, public records reviewed, and ancillary Phase I ESA activities on the dates, stated herein.

This assessment relies upon the accuracy and completeness of the information provided. The information obtained for this assessment is used without extraordinary verification. It is possible that other information exists and may be discovered, or that environmental conditions change subsequent to the submittal of this Phase I ESA report, to which MNA shall not be held responsible for exclusion.

2.0 SITE DESCRIPTION

This section contains location and legal description information; site and vicinity general characteristics; current subject property uses; structures, roads, and other improvements; past subject property uses; and current and past uses of adjoining properties.

2.1 LOCATION AND LEGAL DESCRIPTION

The subject property is located at TMK (3) 1-5-007:006, :055, :069, and :070 in Pahoa, Island of Hawai'i. According to the County of Hawai'i tax records, all four parcels are zoned as agricultural. Parcel 006 consists of a 2,088 square foot residential structure on a 144,227.46 square foot property. Parcel 005 consists of a 40,815.72 square foot vacant property. Parcel 069 consists of a two-story 3,036 square feet residential structure, a single-story 4,000 square foot warehouse, and a 40 square foot television tower on a 144,227.46 square foot property. Parcel 070 consists of a 144,227.46 square foot vacant property (County of Hawaii, 2012). A TMK map is presented in Figure 2.

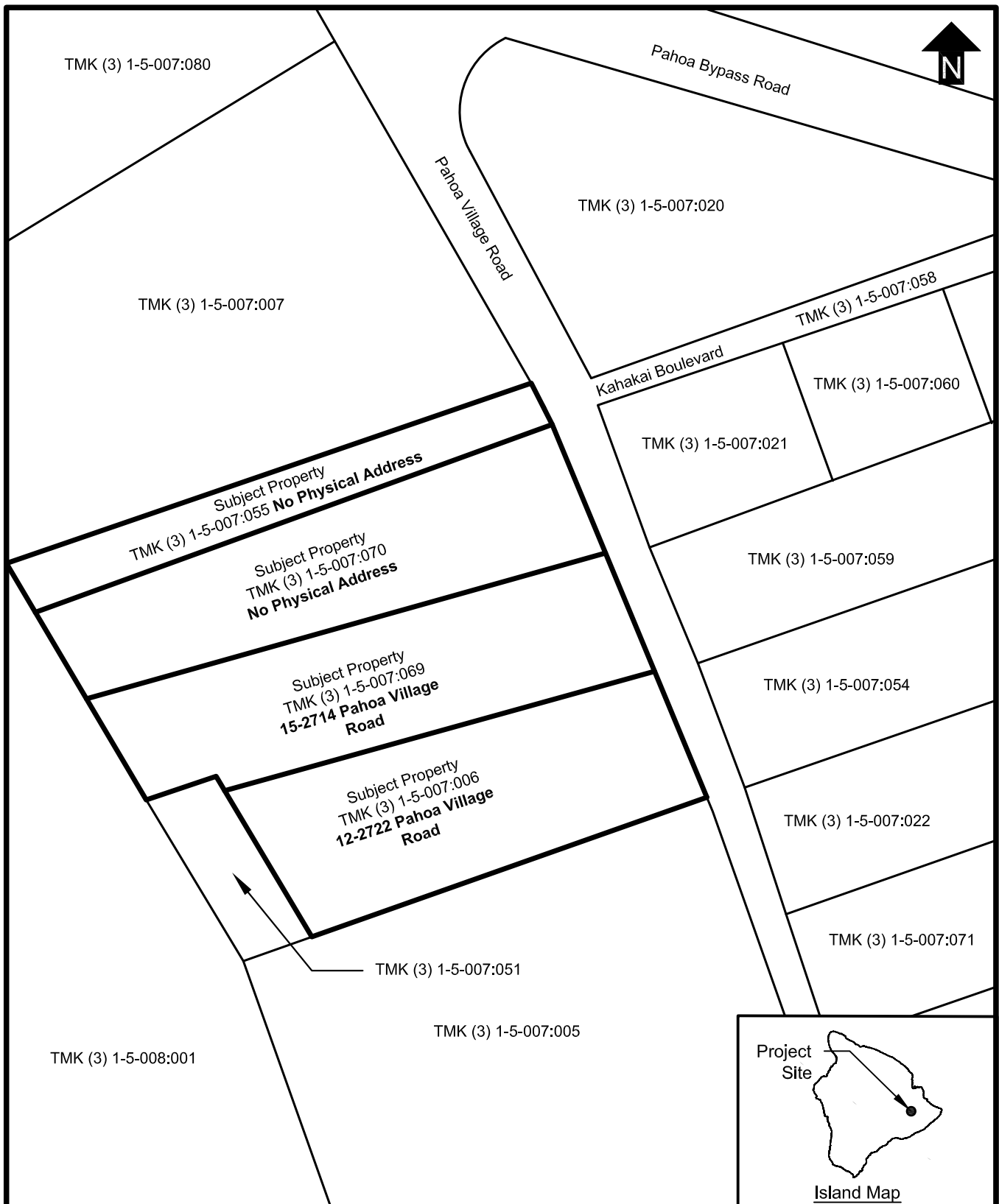
2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The subject property was located in Pahoa, in eastern Hawai'i, approximately nine miles west of the Kapoho Tide Pools. The subject property was located adjacent to Keaau Pahoa/Pahoa Village Road.

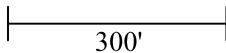
2.2.1 Geology

The Big Island of Hawaii is the youngest and most southeasterly of the emerged volcanic edifices of the Hawaiian chain largest of the Hawaiian-Emperor Seamount Chain. The area spans 90 miles from North to south and 80 miles east to west (10,478 km²). Five large volcanoes (Kohala, Mauna Kea, Hualalai, Mauna Loa, and Kilauea) coalesce to make the visible part of the island. A sixth, Loihi Seamount, 20 miles from the coast lies 3,100 feet beneath the waves. The geology of the island of Hawaii has been extensively studied because of the island's recent geological history, the stages of volcano development has barely advanced beyond the erosional stage as seen in Kohala (, the oldest at about 0.7 Ma). Mauna Kea and Hualalai (last active in 1800-01, its oldest rocks may be greater than 0.12 Ma) have reached the post-caldera stage, while Mauna Loa and Kilauea (divided into two ages, Hilina Basalt (>25,000 years) and the younger Puna Basalt (<25,000 years)) have only advanced to the caldera development and filling stages (George A.L. Yuen and Associates, Inc., 1990).

The subject property is situated in eastern Hawai'i, on the northern slope of Kilauea, the islands only active volcano, which is located on the southeast slope of Mauna Loa.



Scale



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Figure 2. TMK Map
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The rocks of Kilauea are made up of the oldest, the Hilina volcanic series, which were deposited by the volcano prior to the deposition of the Pahala ash and are comprised of lava flows and pyroclastic rocks. Additionally, the Puna volcanic series covers most of Kilauea. This was deposited during the Holocene and latest Pleistocene time. Lava tubes are numerous (Stearns, 1985).

In 1990, Mink and Lau described the geology in the vicinity of the subject property as follows:

Recent Puna Basalt covers the entire surface. Ash and cinder blown out of vents along the rift are common (Mink & Lau, 1990).

The United States Department of Agriculture Natural Resources Conservation Service classifies the soil at the subject property as Keaukaha highly decomposed plant material, 2-10 percent slopes. Typically, Keaukaha highly decomposed plant material is well-drained and composed of highly decomposed plant material from 0 to 4 inches, and bedrock from 4 to 14 inches (United States Department of Agriculture).

2.2.2 Hydrogeology

The HDOH Safe Drinking Water Branch has established an Underground Injection Control (UIC) line to serve as a boundary between drinking water and non-drinking water portions of Hawaii's aquifers. In general, areas above (mountain side) the UIC line are within drinking water portions of the aquifer, while areas below (ocean side) the UIC line are in the non-drinking water portions of the underlying aquifer. The subject property is located above the UIC line in a drinking water portion of the aquifer (Hawaii Department of Health Safe Drinking Water Branch, 1999).

The hydraulic gradient of the basal groundwater within basaltic formations, in general, are from mountain areas to the shoreline. According to the Mink and Lau Technical Report #191, the subject property is located above the Pahoa Aquifer. Mink and Lau described the hydrogeology and aquifer as follows:

The Pahoa Aquifer System lies north of the Kilauea east rift zone, which stretches from Kilauea Crater to Cape Kumukahi. The northern boundary is the Kilauea/Mauna Loa contact, which touches the sea at Kea'au. Average annual rainfall increases from 100 inches at the coast to 180 inches before diminishing to 60 inches. Noticeable erosion has not occurred. The volcano is still building. Off the rift zone high-level and basal waters occur in great volume. Except near the coast the basal water is fresh. Near the rift zone geothermal conditions prevail. Perched and dike water may occur. Along the coast basal springs discharge the basal lens (Mink & Lau, 1990).

Aquifer classification information for the Pahoa Aquifer is provided in Table 1 (Mink & Lau, 1990).

Table 1. Pahoa Aquifer Classification System

Aquifer Code	80801111
Island Code	8–Hawaii
Aquifer Sector	08–Kilauea
Aquifer System	01–Pahoa
Aquifer Type, hydrogeology	1–Basal
Aquifer Condition	1–Unconfined
Aquifer Type, geology	1–Flank
Status Code	11111
Development Stage	1–Currently Used
Utility	1–Drinking
Salinity (in mg/L Cl ⁻)	1–Fresh (<250)
Uniqueness	1–Irreplaceable
Vulnerability to Contamination	1–High

mg/L Cl⁻-milligrams per liter of chloride

2.3 CURRENT USE OF THE SUBJECT PROPERTY

The subject property at parcels 006, 055, and 070 was owned and operated by Bryson T. Kuwahara as residential rental and Bryson’s Cinders, Inc. The subject property at parcel 069 was owned and operated by the State of Hawai’i Department of Land and Natural Resources and is vacant land.

2.4 STRUCTURES, ROADS, AND OTHER IMPROVEMENTS

The subject property at parcel 006 was improved with a single-story residential structure. Adjacent to the building was a garage, a driveway, and a storage shed. The building was a three-bedroom, two-bathroom home built in 1975, approximately 2,088 square feet. The property was approximately 144,227 square feet. At the time of this Phase I ESA, this parcel was owned by Bryson T. Kuwahara.

The subject property at parcel 055 was an unimproved vacant lot, approximately 40,815 square feet. At the time of this Phase I ESA, this parcel was owned by the State of Hawaii.

The subject property at parcel 069 was improved with a two-story residential structure, a single-story warehouse, and a television tower. The two-story residential structure was a three-bedroom, three-bathroom home built in 1985, approximately 3,036 square feet. The single-story warehouse was built in 1981, approximately 4,000 square feet. At the time of this Phase I ESA, the warehouse was used to store petroleum products and the machinery being used to clear and restructure the subject property. The television tower was built in 2002, approximately 40 square feet. The property was approximately 144,227 square feet. At the time of this Phase I ESA, this parcel was owned by BT Kuwahara LLC.

The subject property at parcel 070 was an unimproved vacant lot, approximately 144,227.46 square feet. At the time of this Phase I ESA, this parcel was owned by BT Kuwahara LLC.

The electric service was provided by HELCO. Telephone service was provided by Verizon. Water service was provided by the County of Hawai’i. A site map is presented in Figure 3.

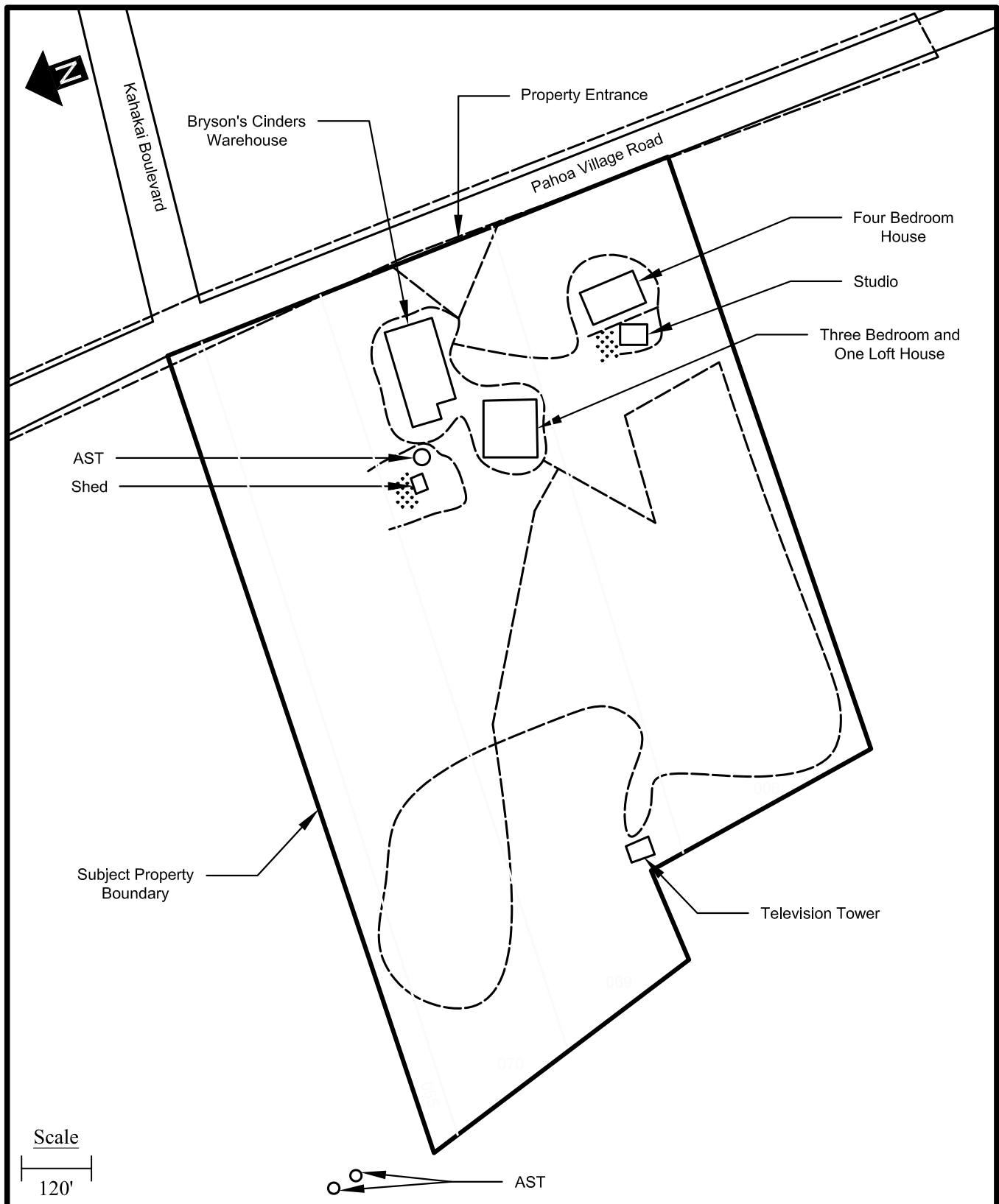


Figure 3. Site Map
Phase I Environmental Site Assessment Report
TMK (3) 1-5-007:006, :055, :069, and :070

November 2012



2.5 PAST USES OF THE SUBJECT PROPERTY

Information regarding past uses of the subject property was obtained from a review of tax records (County of Hawaii, 2012), historic topographic maps and aerial photographs (FirstSearch Technology Corporation, 2012), and interviews. Bryson Toshiki Kuwahara, Lorna Takeko Kuwahara, Royce Takeko Kuwahara, and Kayla Kiana Kuwahara Bryson have owned the property located at 15-2722 Pahoia Village Road since 2011. Bryson Kuwahara has owned the property located at 15-2714 Pahoia Village Road since 1980, and he also has owned the property located at Puna Road since 2001. The State of Hawaii has owned the property located at (3) 1-5-007:055, with no physical address, since 1967. Table 2 summarizes available information regarding the historical use and users of the subject property.

Table 2. Users and Primary Uses of Subject Property

Period (approx.)	Owner/Property User	Area (acres)	Primary Use
TMK (3) 1-5-007:006; 15-2722 Pahoia Village Road			
2011-2012	Bryson Toshiki Kuwahara, Lorna Takeko Kuwahara, Royce Takeko Kuwahara, Kayla Kiana Kuwahara	3.311	Residential/ Quarry/ Baseyard
1972-2011	Harold Kawai, Amy Kawai	3.311	Residential/ Quarry/ Baseyard
1972	Yoso Kuwahara	9.926	Residential
1963-1972	Joseph Lasic	9.926	Residential
1959-1963	Hataimi Nakamura	9.926	Residential
1954-1959	Toshio Aramori	9.926	Residential
1948-1954	Frances T. Lyman	10.7	Residential
TMK (3) 1-5-007:055; No address			
1967-2012	State of Hawaii	0.937	Undeveloped/ Agricultural
TMK (3) 1-5-007:069; 15-2714 Pahoia Village Road			
2007-2012	B T Kuwahara LLC	3.311	Residential/ Quarry/ Baseyard
1984-2007	BK Exotics, Inc.	3.311	Residential/ Quarry/ Baseyard
1980-1984	Bryson T. Kuwahara	3.311	Residential
1972-1980	Yoso Kuwahara, Kikuko Kuwahara	3.311	Residential
TMK (3) 1-5-007:070; Puna Road Other TMKs: 1-5-007:069			
2007-2012	B T Kuwahara LLC	3.311	Residential/ Quarry/ Baseyard

Period (approx.)	Owner/Property User	Area (acres)	Primary Use
TMK (3) 1-5-007:006; 15-2722 Pahoia Village Road			
2001-2007	Bryson Toshiki Kuwahara	3.311	Residential/ Quarry/ Baseyard
1995-2001	Kuwahara Family Partners	3.311	Residential/ Quarry/ Baseyard
1973-1995	Yoso Kuwahara, Trust	3.311	Residential/ Quarry/ Baseyard

2.6 CURRENT AND PAST USES OF SURROUNDING PROPERTIES

Information regarding past uses of the adjoining properties was obtained from review of tax records (County of Hawaii, 2012), historic topographic maps and aerial photographs (FirstSearch Technology Corporation, 2012) and interviews. The property use information is summarized in Table 3..

Table 3. Users and Primary Uses of Surrounding Properties

Period (approx.)	Owner/Property User	Area (acres)	Primary Use
TMK (3) 1-5-007:005; 15-2728 Pahoia Village Road Adjoining property to the South			
1952-2012	Kela Abraham, Philip Abraham, William Abraham, Henry Kauhi (All deceased)	10.000	Residential
TMK (3) 1-5-007:007; 15-2690 Pahoia Village Road Adjoining property to the North			
1993-2012	NHS Inc.	9.572	Commercial
1991-1993	Sadamu Tsubota, Russell Tsubota, Nancie Subota, Clyde Nakashima, Suzan Nakashima, Roy Amano, Hazelynn Amano	9.572	Residential
1967-1991	Sadamu Tsubota	9.572	Residential
1948-1967	Sadamu Tsubota	9.6	Residential
TMK (3) 1-5-007:020; 15-1450 Pahoia Village Road Adjoining property to the Northeast			
2008-2012	HNMP LLC/Longs Drugs Stores	4.901	Commercial
2001-2008	HNMP LLC	4.901	Commercial
1989-2001	Kaneshiro & Sons Enterprise Limited	4.901	Commercial
1987-1989	Kazumi Shimizu, Iyono Shimizu	4.901	Residential
1966-1987	Kazumi Shimizu, Iyono Shimizu	11.207	Residential
1960-1966	Kazumi Shimizu, Iyono Shimizu	11.6	Residential
1947-1960	Toshiko Shimizu	11.6	Residential

Period (approx.)	Owner/Property User	Area (acres)	Primary Use
TMK (3) 1-5-007:021; 15-2707 Pahoa Village Road Adjoining property to the East			
2006-2012	Metcalf Family Partners LP	1.500	Residential
2003-2006	Sadamu Tsubota Trust, May Tsubota Trust, Metcalf Family Trust	1.500	Residential
1999-2003	Sadamu Tsubota, May Tsubota, Duane Metcalf, Joan Metcalf	1.502	Residential
1998-1999	Sadamu Tsubota, May Tsubota	1.502	Residential
1969	Sadamu Tsubota, May Tsubota	1.756	Residential
1969	Sadamu Tsubota, May Tsubota	3.756	Residential
1968-1969	Sadamu Tsubota, May Tsubota	6.968	Residential
1967-1968	Sadamu Tsubota, May Tsubota	6.916	Residential
1967	Ah Chong Lee Kai	10.10	Residential
1956-1967	Ah Chong Lee Kai	25.70	Residential
TMK (3) 1-5-007:022 Adjoining property to the East			
1993-2012	Hawaii Assemblies of God, Inc.	3.338	Church
1980-1993	Peter Lee, Hawaii Assemblies of God, Inc.	3.338	Church
1974-1980	Peter Lee, Grace Lee	3.338	Residential
1968-1974	Ah Chong Lee Kai	10.00	Residential
1967-1968	Ah Chong Lee Kai	15.60	Residential
TMK (3) 1-5-007:051; 15-2724 Pahoa Village Road Adjoining property to the Southwest			
2011-2012	Leslie K. Wilson, Cheri T. Wilson	0.774	Residential
1974-2011	Harold M. Kawai, Amy E. Kawai	0.774	Residential
1955-1974	Harold Sherfy, Gloria Sherfy	0.774	Residential
TMK (3) 1-5-007:054; 15-2721 Pahoa Village Road Adjoining property to the East			
1998-2012	Mitsuo Miyatake Trust, Tokimi Miyatake Trust	3.184	Keonepoko Homesteads
1966-1998	Mitsuo Miyatake, Tokimi Miyatake	3.183	Residential
TMK (3) 1-5-007:058; Kahakai Road Adjoining property to the East			
1967-2012	State of Hawaii	0.847	Keonepoko Homesteads
TMK (3) 1-5-007:059; Puna Road Adjoining property to the East			
1989-2012	Sidney Tsubota, Renee Horie, Guy Tsubota	3.213	Residential
1967-1989	Sidney Tsubota, Renee Horie	3.212	Residential

Period (approx.)	Owner/Property User	Area (acres)	Primary Use
TMK (3) 1-5-008:001; No address Adjoining property to the West			
2009-2012	State of Hawaii	5,125.593	Well & Reservoir Site
1996	State of Hawaii	5,127.093	Well & Reservoir Site
1995	State of Hawaii	5,129.321	Fallout Shelter (Pahoa Cave)
1992	State of Hawaii/County of Hawaii, Civil Defense Agency	5,129.321	Fallout Shelter (Pahoa Cave)
1978	State of Hawaii/County of Hawaii, Civil Defense Agency	5,128.184	Agriculture
1976	State of Hawaii/County of Hawaii, Civil Defense Agency	5,131.952	Agriculture
1968	State of Hawaii	5,133.674	Agriculture
1967	State of Hawaii	5,138.715	Agriculture
1945	W.H. Shipman Limited, Ruddy Fah Tongg	---	---

TMK – Tax Map Key

3.0 USER PROVIDED INFORMATION

MNA personnel obtained user provided information by interviewing property owner Bryson Kuwahara on October 30, 2012. The following information was obtained from the interview.

3.1 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

Mr. Kuwahara was unaware of any environmental cleanup liens or activity use limitations for the subject property.

3.2 SPECIALIZED KNOWLEDGE

On October 30, 2012, MNA personnel interviewed Bryson Kuwahara. Mr. Kuwahara informed MNA that a Phase I Environmental Site Assessment was required for the property as part of his future plans to develop a shopping mall on the subject property. He noted that property TMK 1-5-007:007 was owned by the State and would eventually be developed into a thoroughway road; this road would serve as an entry and exit route for the future shopping mall.

Mr. Kuwahara was the property owner and operator for Bryson's Cinders, a quarry and baseyard for cinders, for approximately 30 years. At the time of the site reconnaissance, Mr. Kuwahara's brother owned and operated Bryson's Cinders from the warehouse located on the subject property at parcel 069.

Mr. Kuwahara informed MNA personnel of a catch basin he created on the property at parcel 069, which was adjacent to Pahoa Village Road and approximately 50 feet northeast of the

warehouse. According to Mr. Kuwahara, the implementation of a catch basin was required under B T Kuwahara's Notice of General Permit Coverage; however, Mr. Kuwahara has observed that no water has collected in the catch basin, and no storm water runs off the property.

Mr. Kuwahara was aware of the drums containing petroleum products and two ASTs on the subject property; he indicated that the diesel AST near the shed was out of use for more than five years, and the AST located in the warehouse was used to hold used motor oil, which was regularly disposed of off the property by a contractor. According to Mr. Kuwahara, the drums located in the warehouse were being used to fuel the heavy equipment that were involved in the current restructuring of the subject property at the time of the site reconnaissance.

MNA inquired about the adjoining property to the southwest of the subject property, which was not clearly delineated from Mr. Kuwahara's property. Mr. Kuwahara stated that particular property, TMK 1-5-007:051, was a baseyard; he also mentioned that the rest of the adjoining area to the west of his property was a forest reserve owned by the State.

Mr. Kuwahara indicated that he had no knowledge of any spills, chemical releases, environmental cleanups, environmental cleanup liens, engineering controls, land use restrictions, or institutional controls at the site.

3.3 VALUATION REDUCTION

The user had no information pertaining to the valuation reduction of the site.

3.4 OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION

The subject property was owned by Bryson Kuwahara and operated as Bryson's Cinders, a quarry and baseyard for cinders. The subject property also consisted of a studio house, a three bedroom house, a four bedroom house, and one studio unit located within the warehouse. All residential structures were occupied by tenants at the time of the Phase I ESA.

3.5 REASON FOR PERFORMING THE PHASE I ESA

The purpose of this Phase I ESA is to identify any *recognized environmental conditions* at the subject property, within the scope of ASTM Standard 1527-05 to satisfy the requirements of the future development of this property.

4.0 RECORDS REVIEW

Under ASTM 1527-05, records are to be reviewed by an environmental professional who may help identify REC in connection with the subject property.

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES

MNA used Environmental FirstSearch™ (FirstSearch) to search standard federal and state government databases for hazardous substance or petroleum product releases that could impact the subject property. A copy of the report is provided in Appendix A.

ASTM E 1527-05 specifies a minimum search distance for particular environmental record sources. The following sources are specified for incidents or sites within 1 mile of the subject property:

- Federal NPL site list
- Federal RCRA CORRACTS TSD facilities list
- State Sites of Interest

The following sources are specified for incidents or sites within ½ mile of the subject property:

- Federal Delisted NPL site list
- Federal CERCLIS list
- Federal CERCLIS NFRAP site list
- Federal RCRA non-CORRACTS TSD facilities list
- State Brownfield Sites
- State landfill and/or solid waste disposal site list
- State leaking UST list
- State voluntary cleanup program sites

The following sources are for incidents on the subject and adjoining properties:

- Federal RCRA generators list
- State registered UST list
- State IC and EC Registries
- Federal Institutional Controls (IC) and Engineering (EC) Registries

Finally, the following are for incidents for the subject property:

- Federal ERNS list
- State releases list

4.1.1 Federal National Priorities List

The NPL, maintained by the United States Environmental Protection Agency (EPA), is a list of highly contaminated sites that have been identified by Superfund. FirstSearch identified no NPL sites within one mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.2 Federal RCRA CORRACTS TSD Facilities List

The RCRA CORRACTS TSD facilities list, maintained by the EPA, contains treaters, storers, and disposers of hazardous waste that have reported violations and are subject to corrective actions. FirstSearch identified no RCRA CORRACTS TSD facilities within one mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.3 State Sites of Interest

The State Sites of Interest List, maintained by the HDOH Office of Hazard Evaluation and Emergency Response (HEER Office), contains facilities, sites, or areas in which the HEER Office has, or had an interest, or may investigate. This list includes CERCLIS sites. FirstSearch identified one site at a non-geocoded location within the zip code of the subject property (FirstSearch Technology Corporation, 2012). The site, Puna Geothermal Venture, was issued an NFA – Type Undetermined, on April 15, 1996.

4.1.4 Delisted NPL Site List

This list, maintained by the EPA, contains delisted NPL sites. FirstSearch identified no delisted NPL sites within ½ mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.5 Federal CERCLIS List

The CERCLIS list, maintained by the EPA, contains sites that are either proposed to be or are on the NPL list, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. FirstSearch identified one CERCLIS non-geocoded site within the zip code of the subject property (FirstSearch Technology Corporation, 2012). This site, Puna Geothermal Venture, received an NFRAP preliminary assessment on July 20, 2009, and had a ‘Not Proposed’ status.

4.1.6 Federal CERCLIS NFRAP Site List

The CERCLIS NFRAP list, maintained by the EPA, contains designated CERCLA sites that, to the best of the EPA’s knowledge, assessment has been completed and it has been determined that no further steps will be taken to list the sites on the NPL. FirstSearch identified no CERCLIS NFRAP non-geocoded sites within ½ mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.7 Federal RCRA non-CORRACTS TSD facilities List

The RCRA non-CORRACTS TSD facilities list, maintained by the EPA, contains RCRA permitted facilities that treat, store, or dispose of hazardous waste. FirstSearch identified no RCRA TSD facilities within ½ mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.8 State Brownfield Sites

The state brownfield site list, maintained by the HDOH HEER Office, is an inventory of state designated brownfield sites. Under the Small Business Liability Relief and Brownfields Revitalization Act, a brownfield is defined as “real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” The EPA provides grants and loans to state and local governments for the assessment, cleanup, and redevelopment of these properties. Properties located on the state brownfield list may have received federal funding under this program or be designated a brownfield for state administration or funding purposes. FirstSearch identified no

state brownfield sites within ½ mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.9 State Landfill/Solid Waste Disposal Sites

The HDOH records contain an inventory of permitted landfills in the State of Hawai'i. No permitted solid waste landfills, incinerators, or transfer stations were identified within ½ mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.10 State LUST List

The state LUST list, maintained by the HDOH Solid and Hazardous Waste Branch (SHWB), contains an inventory of sites with LUSTs. FirstSearch identified no LUST facilities within ½ mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.11 State Voluntary Cleanup Sites

The state voluntary cleanup sites list, maintained by the HDOH HEER Office, contains sites participating in the state's Voluntary Response Program. FirstSearch identified no sites participating in the state Voluntary Response Program (FirstSearch Technology Corporation, 2012).

4.1.12 Federal RCRA Generators List

The RCRA Generators list, maintained by the EPA, contains small and large quantity generators of RCRA hazardous waste. The determination of generator size is used to establish the risk that the facility poses to public health and the environment and consequently, the amount of regulation and reporting required. Large Quantity Generators (LQG) are facilities that generate more than 1,000 kilograms per month of hazardous waste and/or more than 1 kilogram per month of acute hazardous waste. Small Quantity Generators (SQG) are facilities that generate less than 1,000 kilograms per month but more than 100 kilograms per month of hazardous waste and/or less than 1 kilogram per month of acute hazardous waste. Conditionally Exempt Small Quantity Generators (CESQG) are facilities that generate less than 100 kg/month of hazardous waste and/or less than 1 kilogram per month of acute hazardous waste. The EPA also maintains the RCRA No Longer Regulated (NLR) list. This list contains facilities that were once on the RCRA generators list but are now no longer in business entirely, no longer in business at the listed address, or are no longer generating hazardous wastes in quantities that require reporting. This list also identifies the facilities of hazardous waste transporters. FirstSearch identified one LQG site at Puna Geothermal Venture, a non-geocoded location within the zip code of the subject property. Twenty-two violations were found for these sites in the FirstSearch Report; 15 of the violations were resolved on August 27, 2008, and 7 violations were resolved on December 12, 2012.

4.1.13 Federal ICs and ECs Registries

These sites are federally listed sites that have either an IC or EC. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land use controls can be either ICs or ECs. Institutional controls

are limitations on how the property may be used, such as limiting use to industrial activities. Engineering controls are physical structures or devices located on the property that contain or limit exposure to contamination. Engineering controls need to be maintained or protected to be effective. FirstSearch identified no federal ICs or ECs within ¼ mile of the subject property (HDOH Safe Drinking Water Branch, 1999).

4.1.14 State ICs and ECs Registries

The State of Hawai'i maintains a list of properties that have been remediated to a particular standard. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land Use Controls can be either ICs or ECs. Institutional controls are limitations on how the property may be used, such as limiting use to industrial activities. Engineering controls are physical structures or devices located on the property that contain or limit exposure to contamination. Engineering controls need to be maintained or protected to be effective. No sites within ¼ mile of the subject property were listed in this database (FirstSearch Technology Corporation, 2012).

4.1.15 State Registered UST List

The HDOH SHWB maintains a database of known underground storage tanks. FirstSearch identified one UST facility within ¼ miles of the subject property (FirstSearch Technology Corporation, 2012). The facility, Woodland Center, was located approximately 370 feet northeast from the subject property at 15-1450 Kahakai Boulevard. Woodland Center had two gasoline tanks and one diesel tank currently in use; all three tanks were installed on April 25, 2006. FirstSearch identified one additional UST at a location non-geocoded. The facility was identified as Aloha Petroleum and located approximately 1,056 feet from the subject property at 15-2660 Pahoa Village Road. Aloha Petroleum had four gasoline tanks and two diesel tanks currently in use; six tanks were installed on March 1, 2005.

4.1.16 Federal ERNS List

The ERNS list, maintained by the EPA, contains CERCLA hazardous substance releases or spills, as maintained at the National Response Center. FirstSearch identified two ERNS incidents from Puna Geothermal Venture, which was listed as a non-geocoded site located within the zip code of the subject property (FirstSearch Technology Corporation, 2012). One incident was a hydrogen sulfide spill which occurred on June 12, 1991. The status of this incident was reported as fixed. The second incident was a hydrogen sulfide spill which occurred on February 8, 1993; the material released through a vent during well cleaning. The status of this incident was reported as fixed.

4.1.17 State Releases List

The HDOH HEER Office maintains a database of known releases to the environment of hazardous material or petroleum products. FirstSearch identified nine release incidents from two non-geocoded locations within the zip code of the subject property (FirstSearch Technology Corporation, 2012). Seven release incidents occurred at Puna Geothermal Venture, which was located at 14-3860 Pahoa Pohoiki Road, approximately five miles away from the subject property. Two release incidents occurred at a HELCO transformer pole located on Kahakai

Boulevard, which was an adjoining property. **Error! Reference source not found.** provides summary data for nine spill incidents.

Table 4. State Releases Sites

Facility	Address	Relative Location	Status
Puna Geothermal Venture	14-3860 Kapoho Pohoiki Road	Non-GC	SOSC NFA
Puna Geothermal Venture	14-3860 Kapoho Pohoiki Road	Non-GC	SOSC NFA
Puna Geothermal Venture	14-3860 Kapoho Pohoiki Road	Non-GC	SOSC NFA
Puna Geothermal Venture	14-3860 Kapoho Pohoiki Road	Non-GC	65 gallons of turbine oil
Puna Geothermal Venture	14-3860 Kapoho Pohoiki Road	Non-GC	SOSC NFA
Puna Geothermal Venture	14-3860 Kapoho Pohoiki Road	Non-GC	SOSC NFA
Puna Geothermal Venture	14-3860 Kapoho Pohoiki Road	Non-GC	SOSC NFA
HELCO transformer	P55 Kahakai Boulevard	Non-GC	More than 3 gallons of transformer oil
HELCO transformer	P55 Kahakai Boulevard	Non-GC	More than 3 gallons of transformer oil

Ft. – Feet

GC – Geocoded

HELCO – Hawaii Electric and Light Company

NFA – No Further Action

SOSC – State On-Scene Coordinator

4.2 ADDITIONAL ENVIRONMENTAL RECORD SOURCES

MNA reviewed additional environmental record sources as needed. Additional record sources reviewed include HDOH SHWB and HELCO records.

MNA submitted records requests to the HDOH HEER Office and County of Hawai'i Fire Department. However, no records were found at the HDOH HEER Office, and no response was provided by the County of Hawai'i Fire Department.

4.2.1 Subject Property

The HDOH HEER Office, SHWB, and County of Hawai'i Fire Department identified no case files for the subject property.

MNA identified no USTs for the subject property from the HDOH UST database (Hawai'i Department of Health, 2012).

HELCO records indicated that the subject property located at 15-2722 Pahoia Village Road contained a non-PCB transformer, No. 34369, which was manufactured in 2001. No spills or leaks were reported for this transformer. Therefore, this is not a REC.

4.2.2 Surrounding Properties

First Search identified two release incidents from P55 HELCO transformer pole located on Kahakai Boulevard, which was an adjoining property. Further inquiry with HELCO revealed

that a release of approximately three gallons of non-PCB mineral oil was discovered on September 26, 2011. On September 27 and October 3, 2011, the petroleum-affected soil was excavated. Analytical results from confirmation soil samples indicated that Site Cleanup Program requirements were satisfied. HELCO submitted a final release report to the HDOH HEER Office on December 7, 2011. Therefore, this is not a REC.

HELCO information for transformers located nearby the subject property are presented in **Error! Reference source not found..** According to HELCO, all untested mineral oil transformers purchased prior to July 1, 1979 must be considered PCB-contaminated by law. However, U.S. EPA results regarding PCBs allow their use at any concentration in transformers for the remainder of their use subject to certain conditions. Since HDOH records or FirstSearch reported no spills at the following transformers, these are not considered RECs.

Table 5. HELCO Transformer Information

Transformer No.	Location	Manufacture Year	PCB Status
Unknown	15-2745 Pahoa Village Road	---	NTD
42355	15-2745 Pahoa Village Road	2010	Non-PCB
42067	15-2721 Pahoa Village Road	2010	Non-PCB
33460	15-2707 Pahoa Village Road	1999	Non-PCB
Unknown	P185, Pahoa Village Road	----	NTD
Unknown	P204, Pahoa Village Road	----	NTD
R331	Pahoa Village Road	----	NTD
R330	Pahoa Village Road	----	NTD
R319	Pahoa Village Road	----	NTD
42243	P1X, Kahakai Blvd	2010	Non-PCB
38450	P2, Kahakai Blvd	2006	Non-PCB
39117	P1, Kahakai Blvd	2006	Non-PCB
39116	P1, Kahakai Blvd	2006	Non-PCB
39115	P1, Kahakai Blvd	2006	Non-PCB
41646	Kahakai Boulevard	2010	Non-PCB

NTD – No Test Data

PCB – Polychlorinated biphenyls

MNA requested a review of HDOH HEER Office and SHWB case files for the adjoining and surrounding properties with the potential to affect the subject property. Files were provided by the SHWB for TMK (3)1-5-007:020 and 15-2660 Pahoa Road Amala Place (no TMK).

4.2.2.1 Aloha Petroleum, Limited, 15-2660 Pahoa Road, No TMK

This facility is a gas station owned and operated by Aloha Petroleum located approximately 1,056 feet northeast from the subject property. On April 12, 2004, HDOH SHWB received an Application for an Underground Storage Tank Permit from this facility, ID 9-603780, for the

installation of two 12,000-gallon gasoline, and one 12,000-gallon diesel UST steel tanks on July 1, 2004. HDOH SHWB approved the permit and issued an Installation and Operation Permit to the owner on May 20, 2004 under Permit No. P-2004-3. This permit was renewed, Permit No. P-2004-3-R1, by HDOH SHWB on February 12, 2009, and would be effective until May 20, 2014.

In a HDOH SHWB letter dated March 7, 2008, it was noted that between August and October 2007, several fuel alarms for a period ranging 3-14 days were not addressed. The letter warned Aloha Petroleum that HAR Section 11-281-63 required owners and operators of USTs to investigate and confirm suspected releases within seven days following its discovery, for similar incidents that may occur in the future.

In a September 17, 2009 letter, HDOH SHWB issued a fine, Field Citation No. 2926, to the facility due to the following violations: the owner/operator failed to maintain results of monitoring for both the tank and piping in accordance with HAR Section 11-281-54(b)(2) and HAR Section 11-281-45. On October 15, 2009, HDOH SHWB acknowledged these violations were corrected by the owner. These violations were strictly administrative, therefore not considered a REC. In an inspection conducted by HDOH SHWB on August 9, 2011, no further violations were found at the facility.

In a Confirmed Release Notification Form dated November 4, 2010, it was indicated that the diesel tank had a suspected release which triggered an interstitial alarm. Aloha Petroleum found two gallons of diesel in the interstitial space of the tank. As a result the Environmental Health and Safety Manager of Aloha Petroleum planned to empty the tank and check for the source of the leak; it was unknown if the product had leaked into the soil. On November 5, 2010, the diesel UST was modified to be temporarily out of use. After its repair, the diesel tank was indicated to be in use on December 22, 2012. No further information on the diesel UST leak was provided. However, in the case of a potential petroleum release, this property is located at a lower elevation than the subject property. Therefore, potential spills and contamination in groundwater flows from this property would not migrate in the direction of the subject property. Therefore, this is not reconsidered a REC.

4.2.2.2 Woodland Center, 15-1450 Kahakai Boulevard, TMK (3)1-5-007:020

Located approximately 370 feet northeast from the subject property, this facility was owned by Paul's Repair Service and was doing business as Woodland Center Station. On April 6, 2006, HDOH SHWB received an Application for Underground Storage Tank Permit for a 10,000-gallon gasoline and a 10,000-gallon compartmentalized tank (6,000-gallon gasoline and 4,000-gallon diesel) to be installed at this facility, ID 9-603792. The application was approved on April 19, 2006 under Permit No. P-2006-1 and renewed by HDOH SHWB on April 21, 2011. The renewed permit, Permit No. P-2006-1-R1, would be effective until April 19, 2016.

According to a facility inspection conducted by HDOH SHWB on August 9, 2011, no violations were found. No UST leaks were reported in the FirstSearch Report or HDOH SHWB records for this facility; therefore, this is not a REC.

4.3 HISTORICAL USE INFORMATION ON THE SUBJECT PROPERTY

MNA reviewed historical use information for the subject property including aerial photographs and United States Geological Survey (USGS) topographic maps.

4.3.1 Historical Aerial Photographs

Aerial photographs of the subject, adjoining, and surrounding properties were provided by FirstSearch. Photographs from the years 1954, 1961, 1977, and 2009 were reviewed (FirstSearch Technology Corporation, 2012). **Error! Reference source not found.** provides the details for those photos.

Table 6. Photograph Details

Date	Image Type	Plane Elevation (feet)	Approximate Scale
2009	C	----	1":500'
1977	B/W	----	1":500'
1961	B/W	----	1":500'
1954	B/W	----	1":500'

---- Information not provided B/W - Black and white photograph C – Color photograph

For the reviewed aerial photographs, the following observations were made:

- 1954: No building structures were visible on the subject and adjoining properties. The surrounding area was undeveloped and covered in vegetation. No roads were observable on the map, which was low in resolution. A few building structures were observed approximately 1,500 feet southeast from the subject property.
- 1961: Pahoa Village Road was developed adjacent to the subject property and extended through the area which consisted of the few building structures observed in the 1954 map. More buildings were observed approximately 1,500 feet southeast of the subject property, and a few buildings were developed within 1,500 feet northwest of the subject property.
- 1977: No development was observed on the subject property; however, a few building structures were depicted on the east adjoining properties. Kahakai Boulevard was depicted. More building structures and some squared areas of cleared vegetation were shown northwest and southeast of the subject property, along Pahoa Village Road.
- 2009: The subject property and adjoining properties to the north, east, and west included structures. Development of commercial and residential buildings was depicted in the surrounding area to the north, east, and south of the subject property. The surrounding area to the west of the subject property remained undeveloped and covered in vegetation. More road structures and modernization were shown to the east of the subject property, including the development of Pahoa Bypass Road.

4.3.2 Historical Topographic Maps

USGS topographic maps that cover the subject property and vicinity were reviewed. Maps were available for the years 1955, 1983, and 1999 (FirstSearch Technology Corporation, 2012). A

copy of the historical topographic maps provided by FirstSearch is included in Appendix A. The maps of the subject property and surrounding area depicted the following:

1924: The subject property was depicted to lie within the Keonepoko Homesteads. Nanawale Homesteads was depicted to ½ mile southeast of the subject property, and the National Guard Reservation property was located approximately one mile northwest of the subject property. Building structures were observed within one mile south of Nanawale Homesteads.

1965: More building structures were observed within Keonepoko Homesteads and within one mile south of Nanawale Homesteads. Pahoia Airstrip was depicted approximately two miles northwest of the subject property. A cinder pit was indicated 1 ½ miles southeast of the subject property, and a well was indicated two miles southeast of the subject property. Waiakahulu was delineated within the Nanawale Homesteads.

1981: Kahakai Boulevard was developed to intersect Pahoia Village Road. A cemetery was depicted about two miles southeast of the subject property. More building structures were found on the Keonepoko Homesteads and south of Nanawale Homesteads.

1997: More roads and subdivision development were visible to the north, east, and south of the subject property. The National Guard Reservation property was shaded red. A cemetery was developed two miles south of the subject property.

4.3.3 Sanborn Fire Insurance Map

No Sanborn Fire Insurance maps were available for the subject property.

5.0 SITE RECONNAISSANCE

The site reconnaissance was conducted on October 30, 2012, by Tiana Magsanoc of MNA. The site visit focused on identifying *recognized environmental conditions* with the ability to impact the subject property. A site map of the subject property is presented in Figure 3.

5.1 METHODOLOGY AND LIMITING CONDITIONS

The site reconnaissance was conducted by visually inspecting all accessible exterior and interior areas of the subject property. Entry to the second level of the warehouse was inaccessible due to equipment and materials blocking the stairway.

5.2 GENERAL SITE SETTING

At the time of the site reconnaissance, the subject property was located in a residential and commercial area and was owned and operated by Bryson Kuwahara. The subject property was surrounded on the north, east, and south by residential properties and was surrounded on the west by forest land owned by the State of Hawaii.

Photographs of the general site setting and adjoining properties are included in Appendix B, Photographs 1 through 52.

5.3 EXTERIOR OBSERVATIONS

Approximately one-fourth of the subject property consisted of one warehouse, one shed, three residential buildings, and a television tower. These structures were present on parcels 006 and 069. At the time of the site reconnaissance, the subject property was undergoing exterior construction activities. More than three-fourths of the subject property was observed to be open land with sporadic mounds of red dirt, fill material, and demolition debris. The shed, which was located northwest of the warehouse, consisted of wood materials, heavy equipment parts, paint buckets, and one old five-gallon bucket of motor oil. An old corroded diesel AST of unknown volume was approximately three feet east of the shed. No staining was observed to the soil surrounding the AST.

Adjacent to Pahoa Village Road and approximately 50 feet northeast of the warehouse was a pit created by the property owner. According to the property owner, his implementation of a catch basin was required under B T Kuwahara's Notice of General Permit Coverage; however, the property owner has observed no water to have collected in the catch basin, and no storm water runs off the property. MNA personnel observed the catch basin to consist of dry soil at the time of the site reconnaissance (Photograph 4).

The one story warehouse building at 15-2714 Pahoa Village Road (parcel 069) was constructed in 1981 and had a total footprint of approximately 4,000 square feet. The building was a metal warehouse. The exterior area to the south of the warehouse was dirt-covered and utilized as a parking area. No staining was observed in this parking area.

Hawaii tax records indicated that the subject property at 15-2714 Pahoa Village Road was improved with a two-story building for single-family occupancy in 1985. The two-story building, which consisted of three bedrooms and three bathrooms, was constructed with, plaster board, wood, plywood and roof material of corrugated iron.

Hawaii tax records indicated that the subject property located at 15-2722 Pahoa Village Road (parcel 006) was improved with a one-story building for single-family occupancy in 1975. The one-story building, which consisted of three bedrooms and two bathrooms, was constructed with, plaster board, wood, plywood and roof material of corrugated iron. No information was found regarding the studio MNA visually inspected on the subject property.

On the east edge of the subject property at 15-2714 Pahoa Village Road (parcel 069) was a Verizon television tower, which connected to power lines and poles extending to Pahoa Village Road. The television tower was built in 2002 and had a total footprint of approximately 40 square feet. The fenced-in power source surrounding the television tower was also built in 2002 and had a total footprint of approximately 40 square feet (Photographs 21-24).

The adjoining property, TMK 1-5-007:051, located immediately southwest of the Verizon television tower was observed to have two partially rusted ASTs, old tires, and scrap metal parts

(Photographs 44-46). No staining was observed to the ground surrounding the AST. According Mr. Kuwahara, this adjoining property was used as a baseyard.

5.4 INTERIOR OBSERVATIONS

The interior of the warehouse and residential buildings were observed by walking systematically through all accessible areas. The residential buildings consisted of one studio, one three-bedroom house, and one four-bedroom house. The warehouse contained one office space, one storage room, an occupied studio unit with a short term tenant, and a second level loft. MNA was unable to access the second level loft due to equipment obstructing the stairwell pathway; the property owner informed MNA that the second loft was being used for storage. Bryson's Cinders has operated out of the warehouse for approximately 30 years and was in process of relocating its business to another property at the time of this site reconnaissance. The interior of the warehouse, which served as a storage area for the current construction activities in addition to operating as Bryson's Cinders, was observed to have a strong motor oil odor. Some areas of oil stains were found on the concrete floor of the warehouse (Photograph 8).

Within the warehouse MNA personnel observed one backhoe, one construction vehicle, one water heater, and many salvage parts and materials. These included one AST, construction equipment and tools, tires, gasoline cans, oil tubing, various 5-gallon buckets, various 55-gallon drums, two 300-gallon tanks of motor oil, and one portable 200-gallon tank of diesel. The AST appeared to be old and rusted. Two 55-gallon drums of hydraulic oil, one 300-gallon tank of motor oil, one 300-gallon tank of engine oil, and one 200-gallon tank of diesel were currently in use and observed to be in fair condition; these five fuel sources were congregated in the same area. According to the owner, these drums and tanks were being used to fuel the onsite construction activities on the subject property.

The three residential buildings on the property were all occupied with tenants. One tenant from each of these buildings was interviewed by MNA. No hazardous substances or petroleum products within the houses were identified during the site reconnaissance.

Photographs of interior observations are presented in Appendix B, Photographs 6-16, 26-28, 30-32, and 34-36.

5.5 HAZARDOUS SUBSTANCES AND PETROLEUM PRODUCTS

Hazardous substances and petroleum products were observed on the subject property during the site reconnaissance. On the exterior of the subject property, one corroded, old diesel AST was found adjacent to the shed. No staining was observed to the soil surrounding the AST. Within the warehouse of the subject property, an old, rusted, and unlabeled AST was found (Photograph 9). According to the property owner, the AST on the exterior of the subject property used to contain diesel but had been out of use for more than five years. The property owner informed MNA personnel that the AST within the warehouse was used to collect used oil generated from the subject property and was regularly disposed of by a contractor. MNA also found two 55-gallon drums containing hydraulic oil, one 300-gallon tank of motor oil, one 300-gallon tank of engine oil, and one 200-gallon tank of diesel, which were currently in use and observed to be in

fair condition (Photographs 9-10). According to the owner, these drums and tanks were being used to fuel the onsite construction activities on the subject property.

The warehouse contained many salvage parts and materials, including used oil lines and various empty 5-gallon buckets (Photographs 6-7). The overall interior of the warehouse was observed to have a strong motor oil odor. Some areas of oil stains were found on the concrete floor of the warehouse.

One pole-mounted transformer was located on the subject property located at 15-2722 Pahoa Village Road. The transformer, No. 34369, was owned by HELCO, manufactured in 2001, and identified as not containing PCB. No spills, leaks, or staining were observed at this transformer.

5.6 ABOVEGROUND AND UNDERGROUND STORAGE TANKS

During the site reconnaissance, two ASTs were observed on the subject property. An old corroded diesel AST of unknown volume was located approximately three feet east of the shed (Photograph 19). According to the property owner, this AST was empty and had been out of use for more than five years. No stained soil or stressed vegetation was observed beneath the exterior AST. The second AST was located within the warehouse and was observed to be old and rusted; no staining was observed on the concrete floor beneath the warehouse AST. According to the property owner, the AST was being used to store used oil, which was regularly disposed of by a contractor.

MNA inspected the adjoining property to the southwest of the subject property, (3) 1-5-007:051 and observed a partially rusted diesel AST, in addition to old tires and scrap metal parts (Photograph 45).

MNA inspected the adjoining property to the north of the west end of the subject property, TMK (3) 1-5-007:007, and found two old and rusted diesel ASTs. No tank holes were observed. Leaks from these tanks were difficult to discern since the ASTs were surrounded by dark soil with no nearby vegetation. Adjacent to these diesel ASTs were old and rusted heavy equipment parts. This north adjoining property contained large amounts of fill material from the construction activities at the subject property (Photographs 47-51). Mr. Kuwahara informed MNA that the fill material will be removed during the future development process.

MNA did not observe any indications of UST on the subject property, such as vent pipes, fill ports, or dispensers.

6.0 INTERVIEWS

MNA interviewed three residential tenants of the subject property – Denise Oguma, Cherish Almeida, and Shea Kahookaulana. The interviews were conducted by Tiana Magsanoc of MNA.

MNA interviewed Candace Martin, Land Agent for the HDLNR, owner and operator of the subject property located at TMK (3) 1-5-007:055. The interview was conducted via email by Jessica Walsh of MNA.

6.1 Denise Oguma

On October 30, 2012, MNA interviewed Denise Oguma. Ms. Oguma was a three-year tenant of the three bedroom house on the subject property. She indicated that she was aware of the diesel AST on the subject property, as well as the fuel sources onsite, which she explained were being used for machinery operations. Ms. Oguma was also aware of the catch basin on the subject property. Ms. Oguma indicated that she has only known the subject property to be used for Bryson's Cinders and residential housing.

Ms. Oguma indicated that she had no knowledge of any spills, chemical releases, environmental cleanups, environmental cleanup liens, engineering controls, land use restrictions, or institutional controls at the site.

6.2 Cherish Almeida

On October 30, 2012, MNA interviewed Cherish Almeida. Ms. Almeida was a one-year tenant of the four bedroom house located on the south side of the subject property. She indicated that the subject and adjoining properties were being used for residential and commercial purposes. She was also aware of the catch basin pit located on the subject property.

Ms. Almeida indicated that she had no knowledge of any spills, chemical releases, environmental cleanups, environmental cleanup liens, engineering controls, land use restrictions, or institutional controls at the site.

6.3 Shea Kahookaulana

On October 30, 2012, MNA interviewed Shea Kahookaulana. Ms. Kahookaulana was a tenant of the studio located on the south side of the subject property. She indicated that she remembered the general area of the subject property was filled with overgrown bushes over 30 years ago. When inquired about any hazardous chemicals to impact the subject property, Ms. Kahookaulana mentioned that Puna Geothermal may be a possible source; however, since Puna Geothermal was about ten miles away, she was highly doubtful that releases from facility could impact the subject property.

Ms. Kahookaulana indicated that she had no knowledge of any environmental cleanups, environmental cleanup liens, engineering controls, land use restrictions, or institutional controls at the site.

6.4 Candace Martin

On November 14, 2012, MNA interviewed Candace Martin. Ms. Martin was a Land Agent for the HDLNR, owner and operator of the subject property located at TMK (3) 1-5-007:055. She indicated that the past use of the TMK was vacant and unencumbered, with a county road located on the east side. Ms. Martin also stated that Bryson Cinder Business operated on the property to the south, parcels to the north and west are vacant and unencumbered.

Ms. Martin indicated that she had no knowledge of any spills, chemical releases, environmental cleanups, environmental cleanup liens, engineering controls, land use restrictions, or institutional controls at the site.

7.0 DATA GAPS AND DEVIATIONS

Minor data gaps were encountered during this Phase I ESA. MNA was unable to visually inspect the soil under the concrete floor surface in the warehouse building located at parcel 069 to determine if petroleum products have been released. MNA was unable to visually inspect the loft in the warehouse, as the access stairwell was blocked with equipment. MNA was unable to inspect the west side exterior of both the shed and the studio on the subject property due to tall impenetrable vegetation. MNA was unable to visually determine if there was a release from the ASTs located at TMK (3) 1-5-007:007 (the adjoining property to the north and west) as they were surrounded by dark soil with no nearby vegetation.

No deviations from the *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* were conducted (ASTM International, 2005).

8.0 KEY FINDINGS & OPINION

This section evaluates the key findings of this assessment and makes a determination as to the presence of a REC.

8.1 Subject Property

During the October 30, 2012, site reconnaissance, it was noted that the warehouse located on parcel 069 had five barrels/drums of motor and hydraulic oil, one AST, and many oil cans, empty, unlabeled, and old buckets, oil lines, and lots of scrap materials. No staining was observed on the concrete beneath any of these items. The AST was unlabeled, old, and rusty with no observable holes and no staining on concrete ground. According to the owner of the property, it was used to store used motor oil. The three drums containing petroleum products were in good condition. According to the property owner, these drums are being used to fuel the heavy equipment that are involved with the current restructuring of the subject property. While there was a motor oil odor present, no visual evidence of release from these ASTs and drums was present. Therefore, the petroleum products and containers present in the warehouse are not considered a *recognized environmental condition*.

One HELCO owned pole-mounted transformer was located on the subject property. It was identified as not containing polychlorinated biphenyls (PCB). Due to the absence of PCB, the fair condition of the transformer, and observation of no material threat of release of hazardous substances or petroleum products from the transformers, this is not a *recognized environmental condition*.

8.2 Surrounding Properties

FirstSearch identified one UST facility within ¼ miles of the subject property. The facility, Woodland Center, was located 370 feet northeast from the subject property at 15-1450 Kahakai Boulevard. Woodland Center had two gasoline tanks and one diesel tank currently in use. According to a facility inspection conducted by HDOH SHWB on August 9, 2011, no violations were found. No UST leaks were reported in the FirstSearch Report or HDOH SHWB records for this facility; therefore, this is not a *recognized environmental condition*.

FirstSearch identified one additional UST at a location non-geocoded. The facility was identified as Aloha Petroleum and located approximately 1,056 feet from the subject property at 15-2660 Pahoa Village Road. Aloha Petroleum had four gasoline tanks and two diesel tanks currently in use. HDOH SHWB and HEER Office files showed that there were administrative violations associated with this facility. Additionally, there were files related to a release from the diesel tank located on the property. A resolution and indication of the status of the cleanup of this release was not provided. However, this property is located at a lower elevation than the subject property. Therefore, potential spills and contamination in groundwater flows from this property would not migrate in the direction of the subject property. Therefore, this is not reconsidered a *recognized environmental condition*.

FirstSearch identified nine release incidents from two non-geocoded locations within the zip code of the subject property on the State Release List. Seven release incidents occurred at Puna Geothermal Venture, which was located at 14-3860 Pahoa Pohoiki Road, approximately five miles away and down gradient from the subject property. Therefore, these seven release incidents are not considered *recognized environmental conditions*. Two release incidents occurred at a HELCO transformer pole located on Kahakai Boulevard, which were on an adjoining property to the west. Further inquiry with HELCO revealed that a release of approximately three gallons of non-PCB mineral oil was discovered on September 26, 2011. On September 27 and October 3, 2011, the petroleum-affected soil was excavated. Analytical results from confirmation soil samples indicated that Site Cleanup Program requirements were satisfied. HELCO submitted a final release report to the HDOH HEER Office on December 7, 2011. Therefore, this is not a *recognized environmental condition*.

9.0 CONCLUSION

MNA performed a Phase I ESA in conformance with the scope and limitations of ASTM E 1527-05 of the property located at TMK (3) 1-5-007:006, :055, :069, and :070, Pahoa, Island of Hawai'i. Any exceptions to, or deletions from, this practice are described in Section 2.4 of this report. This assessment has revealed no evidence of *recognized environmental conditions* in connection with the *subject property*.

REFERENCES

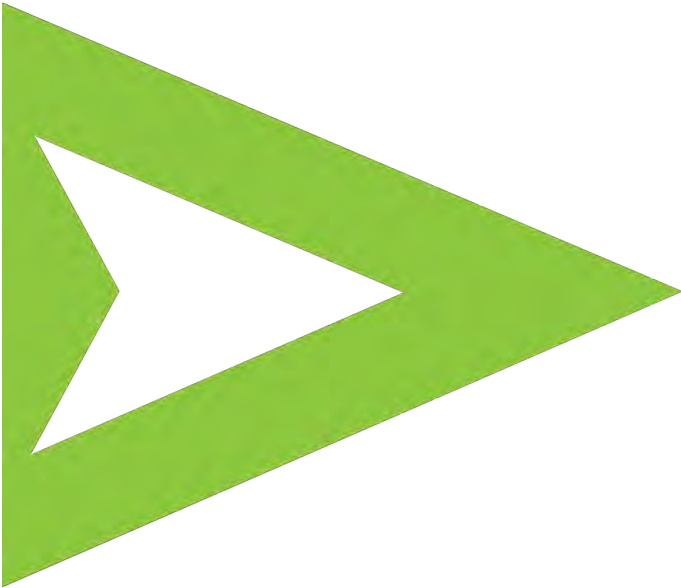
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APPENDIX A

Environmental FirstSearchTM Report and Maps



ENVIRONMENTAL FIRSTSEARCH REPORT



TARGET PROPERTY:

PAHOA PH1

15-2714 PAHOA VILLAGE RD

PAHOA, HI 96778

JOB NUMBER: 51539

PREPARED FOR:

Myounghee Noh and Associates, LLC

99-1046 Iwaena Street, Suite 210A

Aiea, HI 96701

October 24, 2012

Environmental FirstSearch Search Summary Report

Target Site: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

FirstSearch Summary

Database	Sel	Updated	Radius	Site	1/8	1/4	1/2	1/2>	ZIP	TOTALS
NPL	Y	09-20-12	1.00	0	0	0	0	0	0	0
NPL Delisted	Y	09-20-12	0.50	0	0	0	0	-	0	0
CERCLIS	Y	08-01-12	0.50	0	0	0	0	-	1	1
NFRAP	Y	08-01-12	0.50	0	0	0	0	-	0	0
RCRA COR ACT	Y	09-11-12	1.00	0	0	0	0	0	0	0
RCRA TSD	Y	09-11-12	0.50	0	0	0	0	-	0	0
RCRA GEN	Y	09-11-12	0.25	0	0	0	-	-	1	1
RCRA NLR	Y	09-11-12	0.12	0	0	-	-	-	0	0
Federal Brownfield	Y	10-14-12	0.50	0	0	0	0	-	0	0
ERNS	Y	10-04-12	0.12	0	0	-	-	-	2	2
Tribal Lands	Y	12-15-08	1.00	0	0	0	0	2	1	3
State/Tribal Sites	Y	03-12-12	1.00	0	0	0	0	0	1	1
State Spills 90	Y	03-10-12	0.12	0	0	-	-	-	9	9
State/Tribal SWL	Y	01-09-09	0.50	0	0	0	0	-	0	0
State/Tribal LUST	Y	06-08-12	0.50	0	0	0	0	-	0	0
State/Tribal UST/AST	Y	06-08-12	0.25	0	1	0	-	-	1	2
State/Tribal EC	Y	03-12-12	0.25	0	0	0	-	-	0	0
State/Tribal IC	Y	03-12-12	0.25	0	0	0	-	-	0	0
State/Tribal VCP	Y	03-12-12	0.50	0	0	0	0	-	0	0
State/Tribal Brownfields	Y	03-12-12	0.50	0	0	0	0	-	0	0
Releases	Y	10-04-12	0.25	0	0	0	-	-	0	0
State Other	Y	03-01-09	0.25	0	0	0	-	-	0	0
Federal IC/EC	Y	09-18-12	0.25	0	0	0	-	-	0	0
-TOTALS-				0	1	0	0	2	16	19

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Due to the limitations, constraints, and inaccuracies and incompleteness of government information and computer mapping data currently available to FirstSearch Technology Corp., certain conventions have been utilized in preparing the locations of all federal, state and local agency sites residing in FirstSearch Technology Corp.'s databases. All EPA NPL and state landfill sites are depicted by a rectangle approximating their location and size. The boundaries of the rectangles represent the eastern and western most longitudes; the northern and southern most latitudes. As such, the mapped areas may exceed the actual areas and do not represent the actual boundaries of these properties. All other sites are depicted by a point representing their approximate address location and make no attempt to represent the actual areas of the associated property. Actual boundaries and locations of individual properties can be found in the files residing at the agency responsible for such information.

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Environmental FirstSearch

Site Information Report

Request Date: 10-24-12
Requestor Name: Jessica Walsh
Standard: ASTM-05

Search Type: AREA
0.032 sq mile(s)
Job Number: 51539
Filtered Report

Target Site: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

Demographics

Sites:	19	Non-Geocoded:	16	Population:	NA
Radon:	-0.4 - 0.4 PCI/L				
Fire Insurance Map Coverage:	No (>350 Ft. From Coverage)				

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)		UTMs
Longitude:	-154.956635	-154:57:24	Easting:	294649.706
Latitude:	19.502164	19:30:8	Northing:	2157434.432
Elevation:	N/A		Zone:	5

Comment

Comment:

Additional Requests/Services

Adjacent ZIP Codes:					Services:		
ZIP Code	City Name	ST	Dist/Dir	Sel		Requested?	Date
					Fire Insurance Maps	Yes	10-24-12
					Aerial Photographs	Yes	10-24-12
					Historical Topos	Yes	10-24-12
					City Directories	No	
					Title Search	No	
					Municipal Reports	No	
					Liens	No	
					Historic Map Works	No	
					Online Topos	No	

Environmental FirstSearch
Target Site Summary Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

TOTAL: 19 GEOCODED: 3 NON GEOCODED: 16 SELECTED: 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

Environmental FirstSearch

Sites Summary Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

TOTAL: 19 **GEOCODED:** 3 **NON GEOCODED:** 16 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.
1	UST	WOODLAND CENTER 9-603792/CURRENTLY IN USE	15-1450 KAHAKAI BLVD PAHOA HI 96778	0.07 NE	N/A	1
2	TRIBALLA	PUNA CENSUS-TL-2176/	HI	0.79 NW	N/A	2
3	TRIBALLA	MAKUU CENSUS-TL-2207/	HI	0.88 NW	N/A	3

Environmental FirstSearch

Sites Summary Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

TOTAL: 19 GEOCODED: 3 NON GEOCODED: 16 SELECTED: 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.
	CERCLIS	PUNA GEOTHERMAL VENTURE HID984469536/NOT PROPOSED	14-3860 KAPOHO PAHOA RD PAHOA HI 96778	NON GC	N/A	4
	RCRAGN	PUNA GEOTHERMAL VENTURE HIR000001057/LGN	14-3860 KAPOHO PAHOA RD PAHOA HI 96778	NON GC	N/A	5
	ERNS	PUNA GEO-THERMAL VENTURE 305756/FIXED FACILITY	14 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	9
	ERNS	PUNA GEOTHERMAL VENTURE 226229/FIXED FACILITY	14 KAPOHO-PAHOA RD PAHOA HI	NON GC	N/A	10
	STATE	PUNA GEOTHERMAL VENTURE HIST_520/NOT REPORTED	14-3860 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	11
	SPILLS	PUNA GEOTHERMAL VENTURE HIHR19910221-2/NOT REPORTED	14-3860 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	12
	SPILLS	PUNA GEOTHERMAL VENTURE HIHR20011212-1345/NOT REPORTED	14-3860 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	13
	SPILLS	PUNA GEOTHERMAL VENTURE HIHR19910614-1/NOT REPORTED	14-3860 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	14
	SPILLS	PUNA GEOTHERMAL VENTURE HIHR20110526-1115/NOT REPORTED	14-3860 KAPOHO PAHOA RD PAHOA HI 96778	NON GC	N/A	15
	SPILLS	PUNA GEOTHERMAL VENTURE HIHR19930224/NOT REPORTED	14-3860 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	16
	SPILLS	PUNA GEOTHERMAL VENTURE HIHR19940729-25/NOT REPORTED	14-3860 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	17
	SPILLS	PUNA GEOTHERMAL VENTURE HIHR19970807-0935/NOT REPORTED	14-3860 KAPOHO-PAHOA RD PAHOA HI 96778	NON GC	N/A	18
	SPILLS	HIHR20111004-1227/NOT REPORTED	P55 KAHAKAI BLVD PAHOA HI 96778	NON GC	N/A	19
	SPILLS	HIHR20111213-1058/NOT REPORTED	P55 KAHAKAI BLVD PAHOA HI 96778	NON GC	N/A	20
	UST	ALOHA PETROLEUM 9-603780/CURRENTLY IN USE	15 - 2660 KEAAU - PAHOA RD PAHOA HI 96778	NON GC	N/A	21
	TRIBALLA	BUREAU OF INDIAN AFFAIRS CONTACT I BIA-96778/	UNKNOWN HI 96778	NON GC	N/A	22

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

UST

SEARCH ID: 1 **DIST/DIR:** 0.07 NE **ELEVATION:** N/A **MAP ID:** 1

NAME: WOODLAND CENTER
ADDRESS: 15-1450 KAHAKAI BLVD
PAHOA HI 96778
HAWAII

CONTACT:
SOURCE: HI DOH

REV: 06/08/12
ID1: 9-603792
ID2:
STATUS: CURRENTLY IN USE
PHONE:

Tank ID Number: 1
Tank Status Description: Currently In Use
Tank Capacity: 10000
Substance Description: Gasoline
Date Installed: 25-Apr-06
Date Closed

Owner Name: PAUL S AUTO REPAIR P.O. BOX 384 Pahoia HI 96778

Tank ID Number: 2
Tank Status Description: Currently In Use
Tank Capacity: 6000
Substance Description: Gasoline
Date Installed: 25-Apr-06
Date Closed

Owner Name: PAUL S AUTO REPAIR P.O. BOX 384 Pahoia HI 96778

Tank ID Number: 3
Tank Status Description: Currently In Use
Tank Capacity: 4000
Substance Description: Diesel
Date Installed: 25-Apr-06
Date Closed

Owner Name: PAUL S AUTO REPAIR P.O. BOX 384 Pahoia HI 96778

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

TRIBALLAND

SEARCH ID: 3 **DIST/DIR:** 0.79 NW **ELEVATION:** **MAP ID:** 2

NAME:	PUNA	REV:	7/15/09
ADDRESS:	HI	ID1:	CENSUS-TL-2176
		ID2:	
CONTACT:		STATUS:	
SOURCE:	CENSUS	PHONE:	

United States Census Bureau, American Indian Areas/Alaska Native Areas/Hawaiian Home Lands Cartographic Boundary Files. This data was produced from the 2000 Census.
SITE INFORMATION

NAME:PUNA
NAMELSAD00 PUNA HAWAIIAN HOME LAND
AIANNHCE00:OKLAHOMA TRIBAL STATISTICAL AREA
AIANNHID00:5206T
LEGAL DESCRIPTION CODE:HAWAIIAN HOME LAND
CLASSFP00:F1
COMPTYP00:OFF-RESERVATION TRUST LAND
AIANNHR00:FICTITIOUS ENTITY CREATED TO FILL THE CENSUS BUREAU S GEOGRAPHIC HIERARCHY.
MTFCC00:HAWAIIAN HOME LAND
FUNCSTAT00:NONFUNCTIONING LEGAL ENTITY.
ALAND00:120407
AWATER00:0

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

TRIBALLAND

SEARCH ID: 2 **DIST/DIR:** 0.88 NW **ELEVATION:** **MAP ID:** 3

NAME: MAKUU

ADDRESS:

HI

CONTACT:

SOURCE: CENSUS

REV: 7/15/09

ID1: CENSUS-TL-2207

ID2:

STATUS:

PHONE:

United States Census Bureau, American Indian Areas/Alaska Native Areas/Hawaiian Home Lands Cartographic Boundary Files. This data was produced from the 2000 Census.
SITE INFORMATION

NAME:MAKUU

NAMELSAD00 MAKUU HAWAIIAN HOME LAND

AIANNHCE00:OKLAHOMA TRIBAL STATISTICAL AREA

AIANNHID00:5146T

LEGAL DESCRIPTION CODE:HAWAIIAN HOME LAND

CLASSFP00:F1

COMPTYP00:OFF-RESERVATION TRUST LAND

AIANNHR00:FICTITIOUS ENTITY CREATED TO FILL THE CENSUS BUREAU S GEOGRAPHIC HIERARCHY.

MTFCC00:HAWAIIAN HOME LAND

FUNCSTAT00:NONFUNCTIONING LEGAL ENTITY.

ALAND00:7922641

AWATER00:0

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

CERCLIS

SEARCH ID: 4 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO PAHOA RD
PAHOA HI 96778

REV: 8/1/12
ID1: HID984469536
ID2: 0904637
STATUS: NOT PROPOSED
PHONE: 4159723160

CONTACT: EUGENIA CHOW
SOURCE: EPA

ACTION/QUALITY AGENCY/RPS START/RAA END

preliminary assessmentEPA Fund-Financed7/20/2009
NFRAP: No further Remedial Action planned

preliminary assessmentEPA Fund-Financed12/22/1993
Low priority for further assessment

discovery State, Fund Financed 11/20/1992

DESCRIPTION:

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

RCRAGN

SEARCH ID: 5 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO PAHOA RD
PAHOA HI 96778

CONTACT:
SOURCE: EPA

REV: 9/11/12
ID1: HIR000001057
ID2:
STATUS: LGN
PHONE:

SITE INFORMATION

CONTACT INFORMATION: RONALD P QUESADA
PO BOX 30
PAHOA HI 96778

PHONE: 8089652848

OWNER NAME:PUNA GEOTHERMAL VENTURE
OWNER TYPE:P-PRIVATE
OPERATOR:PUNA GEOTHERMAL VENTURE
OPERATOR_TYPE:P-PRIVATE
MAILING ADDRESS: PO BOX 30
PAHOA, HI 96
UNIVERSE INFORMATION:

RECEIVED DATE:02/16/2012

SUBJECT TO CORRECTIVE ACTION (SUBJCA)

SUBJCA:N - NO
SUBJCA TSD 3004:N - NO
SUBJCA NON TSD:N - NO
SIGNIFICANT NON-COMPLIANCE(SNC):N - NO
BEGINNING OF THE YEAR SNC:
PERMIT WORKLOAD:-----
CLOSURE WORKLOAD:-----
POST CLOSURE WORKLOAD:-----
PERMITTING /CLOSURE/POST-CLOSURE PROGRESS:-----
CORRECTIVE ACTION WORKLOAD:N - NO
GENERATOR STATUS:LQG - LARGE QUANTITY GENERATORS: GENERATES MORE THAN 1000 KG/MONTH OF HAZARDOUS WASTE

INSTITUTIONAL CONTROL:N-NOENGINEERING CONTROL:N
HUMAN EXPOSURE:N-NOGW CONTROLS:N- NO
LAND TYPE:P-PRIVATE
SHORT TERM GEN:N
TRANS FACILITY:NREC WASTE FROM OFF SITE:N

IMPORTER ACTIVITY:N - NOMIXED WASTE GEN:N - NO
TRANS ACTIVITY:N - NOTSD ACTIVITY:N - NO
RECYCLER ACTIVITY:N - NOONSITE BURNER EXEMPT:N - NO
FURNACE EXEMPTION:N - NOUNDER INJECT ACTIVITY:N - NO
REC WASTE FROM OFF SITE:N - NOUNIV WASTE DEST FAC:N
USED OIL TRANS:N - NOUSED OIL PROCESSOR:N - NO
USED OIL REFINER:N - NOUSED OIL FUEL BURNER:N - NO
UO FUEL MARKETER TO BURNER:NUSED OIL SPEC MARKETER:N - NO

NAIC INFORMATION

221119 - OTHER ELECTRIC POWER GENERATION

- Continued on next page -

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

RCRAGN

SEARCH ID: 5 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO PAHOA RD
PAHOA HI 96778

REV: 9/11/12
ID1: HIR000001057
ID2:
STATUS: LGN
PHONE:

CONTACT:
SOURCE: EPA

ENFORCEMENT INFORMATION:

AGENCY: STATEDATE: 08/09/2008
TYPE: WRITTEN INFORMAL

AGENCY: STATEDATE: 08/25/2008
TYPE: WRITTEN INFORMAL

AGENCY: STATEDATE: 08/23/2008
TYPE: LETTER OF INTENT TO INITIATE ENFORCEMENT ACTION

VIOLATION INFORMATION:

VIOLATION NUMBER: 1RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: GENERATORS - GENERAL

VIOLATION NUMBER: 5RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: GENERATORS - PRE-TRANSPORT

VIOLATION NUMBER: 6RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: GENERATORS - PRE-TRANSPORT

VIOLATION NUMBER: 7RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: PERMITS - GENERAL INFORMATION

VIOLATION NUMBER: 8RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-PREPAREDNESS AND PREVENTION

VIOLATION NUMBER: 9RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-PREPAREDNESS AND PREVENTION

VIOLATION NUMBER: 10RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-PREPAREDNESS AND PREVENTION

- Continued on next page -

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

RCRAGN

SEARCH ID: 5 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO PAHOA RD
PAHOA HI 96778

REV: 9/11/12
ID1: HIR000001057
ID2:
STATUS: LGN
PHONE:

CONTACT:
SOURCE: EPA

VIOLATION NUMBER: 11RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-PREPAREDNESS AND PREVENTION

VIOLATION NUMBER: 12RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-PREPAREDNESS AND PREVENTION

VIOLATION NUMBER: 13RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-CONTINGENCY PLAN AND EMERGENCY PROCEDURES

VIOLATION NUMBER: 14RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-CONTAINER USE AND MANAGEMENT

VIOLATION NUMBER: 15RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: TSD IS-CONTAINER USE AND MANAGEMENT

VIOLATION NUMBER: 16RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: UNIVERSAL WASTE - SMALL QUANTITY HANDLERS

VIOLATION NUMBER: 17RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: UNIVERSAL WASTE - SMALL QUANTITY HANDLERS

VIOLATION NUMBER: 18RESPONSIBLE: S - STATE
DETERMINED: 08/09/2008DETERMINED BY: S - STATE
CITATION: RESOLVED: 08/27/2008
TYPE: USED OIL - GENERATORS

VIOLATION NUMBER: 19RESPONSIBLE: S - STATE
DETERMINED: 12/31/2012DETERMINED BY: S - STATE
CITATION: RESOLVED: 12/12/2012
TYPE: GENERATORS - GENERAL

VIOLATION NUMBER: 20RESPONSIBLE: S - STATE

- Continued on next page -

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

RCRAGN

SEARCH ID: 5 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO PAHOA RD
PAHOA HI 96778

REV: 9/11/12
ID1: HIR000001057
ID2:
STATUS: LGN
PHONE:

CONTACT:
SOURCE: EPA

DETERMINED: 12/31/2012 DETERMINED BY: S - STATE
CITATION: RESOLVED: 12/12/2012
TYPE: TSD IS-CONTAINER USE AND MANAGEMENT

VIOLATION NUMBER: 21 RESPONSIBLE: S - STATE
DETERMINED: 12/31/2012 DETERMINED BY: S - STATE
CITATION: RESOLVED: 12/12/2012
TYPE: PERMITS - GENERAL INFORMATION

VIOLATION NUMBER: 22 RESPONSIBLE: S - STATE
DETERMINED: 12/31/2012 DETERMINED BY: S - STATE
CITATION: RESOLVED: 12/12/2012
TYPE: UNIVERSAL WASTE - SMALL QUANTITY HANDLERS

VIOLATION NUMBER: 23 RESPONSIBLE: S - STATE
DETERMINED: 12/31/2012 DETERMINED BY: S - STATE
CITATION: RESOLVED: 12/12/2012
TYPE: UNIVERSAL WASTE - SMALL QUANTITY HANDLERS

VIOLATION NUMBER: 24 RESPONSIBLE: S - STATE
DETERMINED: 12/31/2012 DETERMINED BY: S - STATE
CITATION: RESOLVED: 12/12/2012
TYPE: USED OIL - GENERATORS

VIOLATION NUMBER: 25 RESPONSIBLE: S - STATE
DETERMINED: 12/31/2012 DETERMINED BY: S - STATE
CITATION: RESOLVED: 12/12/2012
TYPE: TSD IS-CONTINGENCY PLAN AND EMERGENCY PROCEDURES

HAZARDOUS WASTE INFORMATION:

D001 - IGNITABLE WASTE
D002 - CORROSIVE WASTE
D004 - ARSENIC
D006 - CADMIUM
D008 - LEAD
D009 - MERCURY
D018 - BENZENE

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

ERNS

SEARCH ID: 6 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEO-THERMAL VENTURE
ADDRESS: 14 KAPOHO-PAHOA RD
PAHOA HI 96778
HAWAII

CONTACT:
SOURCE: EPA

REV: 2/8/1993
ID1: 305756
ID2:
STATUS: FIXED FACILITY
PHONE:

SPILL INFORMATION
DATE OF SPILL: 2/8/1993 TIME OF SPILL: 0902

PRODUCT RELEASED (1): HYDROGEN SULFIDE
QUANTITY (1): 162
UNITS (1): LBS

PRODUCT RELEASED (2):
QUANTITY (2):
UNITS (2):

PRODUCT RELEASED (3):
QUANTITY (3):
UNITS (3):

MEDIUM/MEDIA AFFECTED
AIR: YES GROUNDWATER: NO
LAND: NO FIXED FACILITY: NO
WATER: NO OTHER: NO
WATER BODY AFFECTED BY RELEASE:

CAUSE OF RELEASE
DUMPING: NO EQUIPMENT FAILURE: NO
NATURAL PHENOMENON: NO OPERATOR ERROR: NO
OTHER CAUSE: NO TRANSP. ACCIDENT: NO
UNKNOWN: NO

ACTIONS TAKEN: NONE
RELEASE DETECTION: MATERIAL VENTED DURING GEO-THERMAL WELL CLEANING
MISC. NOTES:

DISCHARGER INFORMATION
DISCHARGER ID: 305756 DUN & BRAD STREET #:
TYPE OF DISCHARGER: PRIVATE ENTERPRISE
NAME OF DISCHARGER: PUNA GEO-THERMAL VENTURE
ADDRESS: POB 30
PAHOA HI 96778

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

ERNS

SEARCH ID: 7 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14 KAPOHO-PAHOA RD
PAHOA HI
UNKNOWN

REV: 6/12/1991
ID1: 226229
ID2:
STATUS: FIXED FACILITY
PHONE:

CONTACT:
SOURCE: EPA

SPILL INFORMATION
DATE OF SPILL: 6/12/1991 TIME OF SPILL: 2307

PRODUCT RELEASED (1): HYDROGEN SULFIDE
QUANTITY (1): 0
UNITS ()
CAUSE OF RELEASE
DUMPING: NO EQUIPMENT FAILURE: NO
NATURAL PHENOMENON: NO OPERATOR ERROR: NO
OTHER CAUSE: NOTRANSP

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

STATE

SEARCH ID: 8 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO-PAHOA RD
PAHOA HI 96778

REV: 03/12/12
ID1: HIST_520
ID2:
STATUS: NOT REPORTED
PHONE:

CONTACT:
SOURCE: HI DOH

Organization: Puna Geothermal Venture
HID Number:
Facility Registry ID: 110000518146
Supplemental Location:
Environmental Interest: Puna Geothermal Venture (HID984469536)
Lead Agency:
Program: State
Project Manager: Unassigned
Potential Hazards and Controls: Hazard Undetermined
Hazard Priority: NFA
Action: 4/15/1996
Assessment: Assessment Ongoing
Response:

Nature of Contamination:
Nature of Residual Contamination:
Designated Areawide Contamination:
Use Restrictions: Undetermined
Engineering Controls:
Description Restrictions:
Institutional Controls:
Site Closure Type: NFA - Type Undetermined
Document Number:
Document Subject:
Document Date: 4/15/1996

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID:	9	DIST/DIR:	NON GC	ELEVATION:	MAP ID:
NAME:	PUNA GEOTHERMAL VENTURE			REV:	03/10/12
ADDRESS:	14-3860 KAPOHO-PAHOA RD			ID1:	HIHR19910221-2
	PAHOA HI 96778			ID2:	
				STATUS:	NOT REPORTED
CONTACT:				PHONE:	
SOURCE:	HI DOH				

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under: Puna Geothermal Venture
Unit: Puna Geothermal Venture, H2s & Steam
Case Number: 19910221-2
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead:
Emergency Response:
Substances: Hydrogen Sulfide
Amount (Less or Greater Than):
Assignment End Date:
Result: SOSC NFA

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 10 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO-PAHOA RD
PAHOA HI 96778

REV: 03/10/12
ID1: HIHR20011212-1345
ID2:
STATUS: NOT REPORTED
PHONE:

CONTACT:
SOURCE: HI DOH

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under: Puna Geothermal Venture
Unit: Alleged Dumping
Case Number: 20011212-1345
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead: Mike Cripps
Emergency Response: No
Substances: Heavy metals containing brine fluid
Amount (Less or Greater Than):
Assignment End Date:
Result: SOSC NFA

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 11 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO-PAHOA RD
PAHOA HI 96778

REV: 03/10/12
ID1: HIHR19910614-1
ID2:
STATUS: NOT REPORTED
PHONE:

CONTACT:
SOURCE: HI DOH

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under: Puna Geothermal Venture
Unit: PGV Uncontrolled Steam Flow
Case Number: 19910614-1
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead:
Emergency Response:
Substances: Hydrogen Sulfide
Amount (Less or Greater Than):
Assignment End Date:
Result: SOSC NFA

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 12 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO PAHOA RD
PAHOA HI 96778

REV: 03/10/12
ID1: HIHR20110526-1115
ID2:
STATUS: NOT REPORTED
PHONE:

CONTACT:
SOURCE: HI DOH

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under: Puna Geothermal Venture
Unit: Puna Geothermal turbine oil
Case Number: 20110526-1115
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead: Terry Corpus
Emergency Response: None
Substances: Turbine Oil
Amount (Less or Greater Than): 65 Gallons
Assignment End Date:
Result:

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 13 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO-PAHOA RD
PAHOA HI 96778

REV: 03/10/12
ID1: HIHR19930224
ID2:
STATUS: NOT REPORTED
PHONE:

CONTACT:
SOURCE: HI DOH

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under: Puna Geothermal Venture
Unit: Well KS-9 at Puna Geothermal Venture
Case Number: 19930224
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead:
Emergency Response:
Substances: Hydrogen Sulfide
Amount (Less or Greater Than): 162 Pounds
Assignment End Date:
Result: SOSC NFA

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 14 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO-PAHOA RD
PAHOA HI 96778

REV: 03/10/12
ID1: HIHR19940729-25
ID2:
STATUS: NOT REPORTED
PHONE:

CONTACT:
SOURCE: HI DOH

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under: Puna Geothermal Venture
Unit: Puna Geothermal Venture
Case Number: 19940729-25
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead:
Emergency Response:
Substances: SEE INCIDENT DESCRIPTION
Amount (Less or Greater Than):
Assignment End Date:
Result: SOSC NFA

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 15 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: PUNA GEOTHERMAL VENTURE
ADDRESS: 14-3860 KAPOHO-PAHOA RD
PAHOA HI 96778

REV: 03/10/12
ID1: HIHR19970807-0935
ID2:
STATUS: NOT REPORTED
PHONE:

CONTACT:
SOURCE: HI DOH

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under: Puna Geothermal Venture
Unit: PGV Pentane Release
Case Number: 19970807-0935
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead: Bill Perry
Emergency Response:
Substances: n-Pentane
Amount (Less or Greater Than):
Assignment End Date:
Result: SOSC NFA

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 16 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: **REV:** 03/10/12
ADDRESS: P55 KAHAKAI BLVD
PAHOA HI 96778 **ID1:** HIHR20111004-1227
 ID2:
CONTACT: **STATUS:** NOT REPORTED
SOURCE: HI DOH **PHONE:**

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under:
Unit: HELCO transformer pole-mounted # k454312k71a release
Case Number: 20111004-1227
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead: Curtis Martin
Emergency Response: None
Substances: Transformer Oil
Amount (Less or Greater Than): > 3 Gallons
Assignment End Date:
Result:

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

SPILLS

SEARCH ID: 17 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: **REV:** 03/10/12
ADDRESS: P55 KAHAKAI BLVD
PAHOA HI 96778 **ID1:** HIHR20111213-1058
 ID2:
CONTACT: **STATUS:** NOT REPORTED
SOURCE: HI DOH **PHONE:**

THE HAWAII DEPARTMENT OF HEALTH OFFICE OF HAZARD EVALUATION AND EMERGENCY RESPONSE (HEER) RELEASE LIST:
Island: Hawaii
Filed Under:
Unit: HELCO transformer pole mounted #110583 release
Case Number: 20111213-1058
Secondary Location Address:
Supplemental Location:
Activity Type: Response
Lead and Program: HEER EP&R
Activity Lead: Curtis Martin
Emergency Response: None
Substances: Transformer Oil
Amount (Less or Greater Than): > 3 Gallons
Assignment End Date:
Result:

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

UST

SEARCH ID: 18 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: ALOHA PETROLEUM **REV:** 06/08/12
ADDRESS: 15 - 2660 KEAAU - PAHOA RD **ID1:** 9-603780
PAHOA HI 96778 **ID2:**
CONTACT: **STATUS:** CURRENTLY IN USE
SOURCE: HI DOH **PHONE:**

Tank ID Number: TBI - 87
Tank Status Description: Currently In Use
Tank Capacity: 12000
Substance Description: Gasoline
Date Installed: 01-Mar-05
Date Closed

Owner Name: ALOHA PETROLEUM, LTD. 1132 Bishop Street, Suite 1700 Pahoia HI 96778

Tank ID Number: TBI - 87
Tank Status Description: Currently In Use
Tank Capacity: 12000
Substance Description: Gasoline
Date Installed: 01-Mar-05
Date Closed

Owner Name: ALOHA PETROLEUM, LTD. 1132 BISHOP STREET, SUITE 1700 Pahoia HI 96778

Tank ID Number: TBI - diesel
Tank Status Description: Currently In Use
Tank Capacity: 12000
Substance Description: Diesel
Date Installed: 01-Mar-05
Date Closed

Owner Name: ALOHA PETROLEUM, LTD. 1132 Bishop Street, Suite 1700 Pahoia HI 96778

Tank ID Number: TBI - diesel
Tank Status Description: Currently In Use
Tank Capacity: 12000
Substance Description: Diesel
Date Installed: 01-Mar-05
Date Closed

Owner Name: ALOHA PETROLEUM, LTD. 1132 BISHOP STREET, SUITE 1700 Pahoia HI 96778

Tank ID Number: TBI-92
Tank Status Description: Currently In Use
Tank Capacity: 12000
Substance Description: Gasoline
Date Installed: 01-Mar-05
Date Closed

Owner Name: ALOHA PETROLEUM, LTD. 1132 Bishop Street, Suite 1700 Pahoia HI 96778

Tank ID Number: TBI-92
Tank Status Description: Currently In Use
Tank Capacity: 12000
Substance Description: Gasoline
Date Installed: 01-Mar-05
Date Closed

Environmental FirstSearch

Site Detail Report

Target Property: 15-2714 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: 51539

TRIBALLAND

SEARCH ID: 19 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME:	BUREAU OF INDIAN AFFAIRS CONTACT INFORMATION	REV:	01/15/08
ADDRESS:	UNKNOWN	ID1:	BIA-96778
	HI 96778	ID2:	
	HAWAII	STATUS:	
CONTACT:		PHONE:	
SOURCE:	BIA		

BUREAU OF INDIAN AFFAIRS CONTACT INFORMATION

OFFICE: Pacific Regional Office
CONTACT: CLAY GREGORY, REGIONAL DIRECTOR

OFFICE ADDRESS: 2800 Cottage Way
Sacramento CA 95825
OFFICE PHONE: Phone: 916-978-6000
OFFICE FAX: Fax: 916-978-6099

The Native American Consultation Database (NACD) is a tool for identifying consultation contacts for Indian tribes, Alaska Native villages and corporations, and Native Hawaiian organizations. The database is not a comprehensive source of information, but it does provide a starting point for the consultation process by identifying tribal leaders and NAGPRA contacts. This database can be accessed online at the following web address <http://home.nps.gov/nacd/>

Environmental FirstSearch Descriptions

NPL: EPA NATIONAL PRIORITY LIST - The National Priorities List is a list of the worst hazardous waste sites that have been identified by Superfund. Sites are only put on the list after they have been scored using the Hazard Ranking System (HRS), and have been subjected to public comment. Any site on the NPL is eligible for cleanup using Superfund Trust money. A Superfund site is any land in the United States that has been contaminated by hazardous waste and identified by the Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health and/or the environment. FINAL - Currently on the Final NPL PROPOSED - Proposed for NPL

NPL DELISTED: EPA NATIONAL PRIORITY LIST Subset - Database of delisted NPL sites. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. DELISTED - Deleted from the Final NPL

CERCLIS: EPA COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY INFORMATION SYSTEM (CERCLIS)- CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. PART OF NPL- Site is part of NPL site DELETED - Deleted from the Final NPL FINAL - Currently on the Final NPL NOT PROPOSED - Not on the NPL NOT VALID - Not Valid Site or Incident PROPOSED - Proposed for NPL REMOVED - Removed from Proposed NPL SCAN PLAN - Pre-proposal Site WITHDRAWN - Withdrawn

NFRAP: EPA COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY INFORMATION SYSTEM ARCHIVED SITES - database of Archive designated CERCLA sites that, to the best of EPA's knowledge, assessment has been completed and has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site. NFRAP – No Further Remedial Action Plan P - Site is part of NPL site D - Deleted from the Final NPL F - Currently on the Final NPL N - Not on the NPL O - Not Valid Site or Incident P - Proposed for NPL R - Removed from Proposed NPL S - Pre-proposal Site W – Withdrawn

RCRA COR ACT: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. RCRAInfo facilities that have reported violations and subject to corrective actions.

RCRA TSD: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM TREATMENT, STORAGE, and DISPOSAL FACILITIES. - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. Facilities that treat, store, dispose, or incinerate hazardous waste.

RCRA GEN: EPA/MA DEP/CT DEP RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM GENERATORS - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. Facilities that generate or transport hazardous waste or meet other RCRA requirements. LGN - Large Quantity Generators SGN - Small Quantity Generators VGN - Conditionally Exempt Generator. Included are RAATS (RCRA Administrative Action Tracking System) and CMEL (Compliance Monitoring & Enforcement List) facilities. CONNECTICUT HAZARDOUS WASTE MANIFEST - Database of all shipments of hazardous waste within, into or from Connecticut. The data includes date of shipment, transporter and TSD info, and material shipped and quantity. This data is appended to the details of existing generator records. MASSACHUSETTES HAZARDOUS WASTE GENERATOR - database of generators that are regulated under the MA DEP. VQN-MA = generates less than 220 pounds or 27 gallons per month of hazardous waste or waste oil. SQN-MA = generates 220 to 2,200 pounds or 27 to 270 gallons per month of waste oil. LQG-MA = generates greater than 2,200 lbs of hazardous waste or waste oil per month.

RCRA NLR: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. not currently classified by the EPA but are still included in the RCRAInfo database. Reasons for non classification: Failure to report in a timely matter. No longer in business. No longer in business at the listed address. No longer generating hazardous waste materials in quantities which require reporting.

Fed Brownfield: EPA BROWNFIELD MANAGEMENT SYSTEM (BMS) - database designed to assist EPA in collecting, tracking, and updating information, as well as reporting on the major activities and accomplishments of the various Brownfield grant Programs. CLEANUPS IN MY COMMUNITY (subset) - Sites, facilities and properties that have been contaminated by hazardous materials and are being, or have been, cleaned up under EPA's brownfield's program.

ERNS: EPA/NRC EMERGENCY RESPONSE NOTIFICATION SYSTEM (ERNS) - Database of incidents reported to the National Response Center. These incidents include chemical spills, accidents involving chemicals (such as fires or explosions), oil spills, transportation accidents that involve oil or chemicals, releases of radioactive materials, sightings of oil sheens on bodies of water, terrorist incidents involving chemicals, incidents where illegally dumped chemicals have been found, and drills intended to prepare responders to handle these kinds of incidents. Data since January 2001 has been received from the National Response System database as the EPA no longer maintains this data.

Tribal Lands: DOI/BIA INDIAN LANDS OF THE UNITED STATES - Database of areas with boundaries established by treaty, statute, and (or) executive or court order, recognized by the Federal Government as territory in which American Indian tribes have primary governmental authority. The Indian Lands of the United States map layer shows areas of 640 acres or more, administered by the Bureau of Indian Affairs. Included are Federally-administered lands within a reservation which may or may not be considered part of the reservation. BUREAU OF INDIAN AFFAIRS CONTACT - Regional contact information for the Bureau of Indian Affairs offices.

State Spills 90: HI DOH RELEASES LISTING - The Hawaii Department of Health's Office of Hazard Evaluation and Emergency Response (HEER) Releases inventory of facilities, sites, or areas in which HEER has an interest, has investigated,

or may investigate.

State/Tribal SWL: HI DOH HI DOH SOLID WASTE SECTION LANDFILL DATABASE- Landfills listings for the islands of Hawaii from the Hawaii Department of Health's Office of Solid Waste Management.

State/Tribal Sites: HI DOH STATE RESPONSE LISTING-The Hawaii Department of Health's Office of Hazard Evaluation and Emergency Response (HEER) inventory of facilities, sites, or areas in which HEER has an interest, has investigated, or may investigate under HRS 128D (includes CERCLIS sites).

State/Tribal IC: HI DOH INSTITUTIONAL CONTROLS LISTING-The Hawaii Department of Health's Office of Hazard Evaluation and Emergency Response (HEER) inventory of sites with institutional controls.

State/Tribal LUST: HI DOH LEAKING UNDERGROUND STORAGE TANKS-The Hawaii Department of Health's inventory of sites with leaking underground storage tanks.

State/Tribal UST/AST: HI DOH UNDERGROUND STORAGE TANKS- The Hawaii Department of Health's inventory of underground storage tanks.

State/Tribal VCP: HI DOH VOLUNTARY RESPONSE PROGRAM LISTING-The Hawaii Department of Health's Office of Hazard Evaluation and Emergency Response (HEER) inventory of sites participating in the state's Voluntary Response Program.

State/Tribal Brownfields: HI DOH STATE BROWNFIELDS LISTING-The Hawaii Department of Health's Office of Hazard Evaluation and Emergency Response (HEER) inventory of brownfields sites.

Federal IC / EC: EPA FEDERAL ENGINEERING AND INSTITUTIONAL CONTROLS- Superfund sites that have either an engineering or an institutional control. The data includes the control and the media contaminated. RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES (RCRA) – RCRA site the have institutional controls.

Environmental FirstSearch Database Sources

NPL: EPA Environmental Protection Agency

Updated quarterly

NPL DELISTED: EPA Environmental Protection Agency

Updated quarterly

CERCLIS: EPA Environmental Protection Agency

Updated quarterly

NFRAP: EPA Environmental Protection Agency.

Updated quarterly

RCRA COR ACT: EPA Environmental Protection Agency.

Updated quarterly

RCRA TSD: EPA Environmental Protection Agency.

Updated quarterly

RCRA GEN: EPA/MA DEP/CT DEP Environmental Protection Agency, Massachusetts Department of Environmental Protection, Connecticut Department of Environmental Protection

Updated quarterly

RCRA NLR: EPA Environmental Protection Agency

Updated quarterly

Fed Brownfield: EPA Environmental Protection Agency

Updated quarterly

ERNS: EPA/NRC Environmental Protection AgencyNational Response Center.

Updated annually

Tribal Lands: DOI/BIA United States Department of the InteriorBureau of Indian Affairs

Updated annually

State Spills 90: HI DOH Office of Hazard Evaluation and Emergency Response, Hawaii State Department of Health Phone Number: (808) 586-4249

Updated biannually

State/Tribal SWL: HI DOH The Hawaii Department of Health Solid and Hazardous Waste Branch Phone Numbers: Phone: (808) 586-4226 Fax: (808) 586-7509

Updated annually/when available

State/Tribal Sites: HI DOH Office of Hazard Evaluation and Emergency Response, Hawaii State Department of Health Phone Number: (808) 586-4249

Updated biannually

State/Tribal IC: HI DOH Office of Hazard Evaluation and Emergency Response, Hawaii State Department of Health Phone Number: (808) 586-4249

Updated biannually

State/Tribal LUST: HI DOH The Hawaii Department of Health, Solid and Hazardous Waste Branch Phone: (808) 586-4226

Updated biannually

State/Tribal UST/AST: HI DOH The Hawaii Department of Health, Solid and Hazardous Waste Branch Phone: (808) 586-4226

Updated biannually

State/Tribal VCP: HI DOH Office of Hazard Evaluation and Emergency Response, Hawaii State Department of Health Phone Number: (808) 586-4249

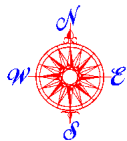
Updated biannually

State/Tribal Brownfields: HI DOH Office of Hazard Evaluation and Emergency Response, Hawaii State Department of Health Phone Number: (808) 586-4249

Updated biannually

Federal IC / EC: EPA Environmental Protection Agency

Updated quarterly



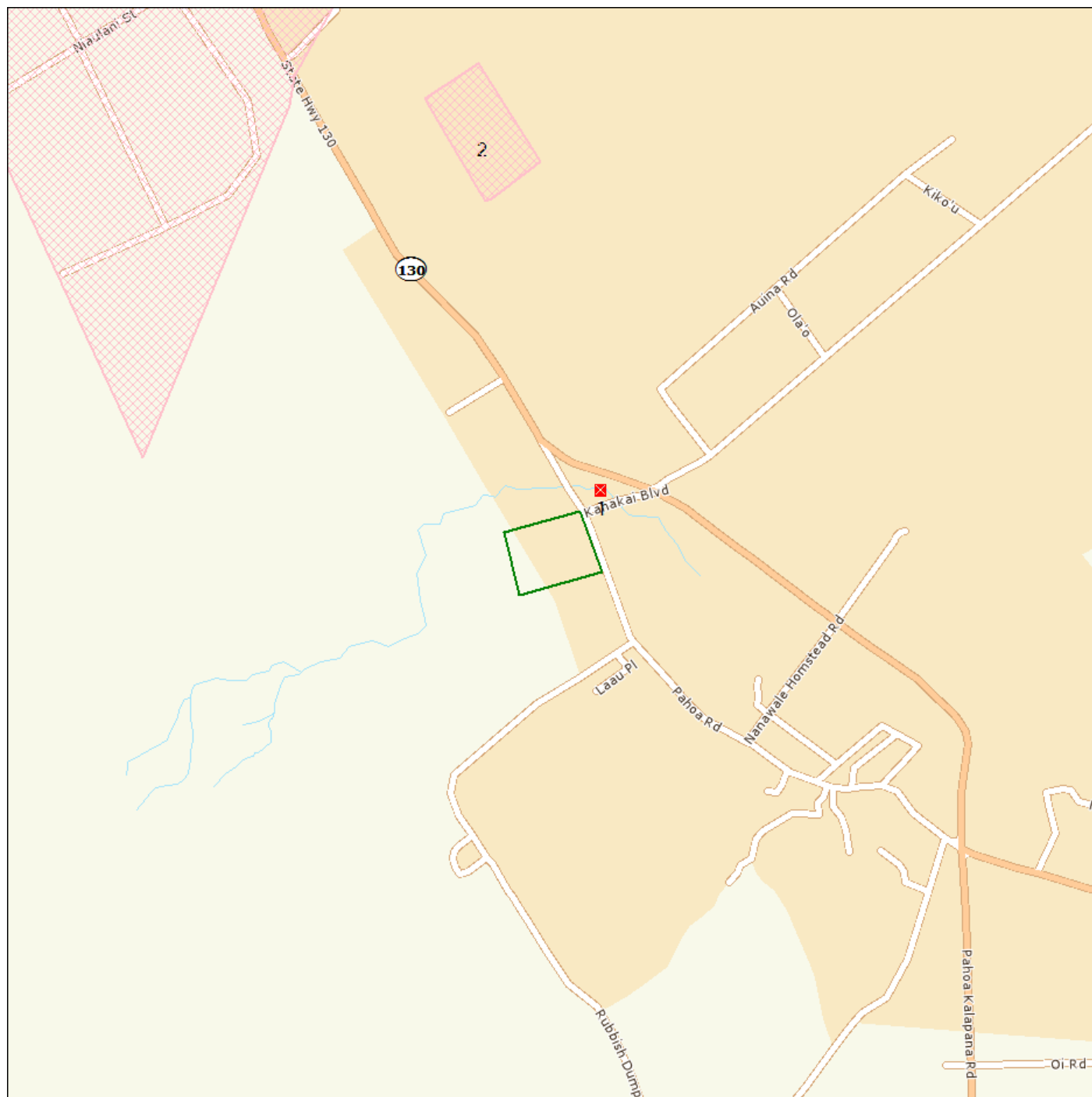
Environmental FirstSearch

1 Mile Radius from Area

Single Map:

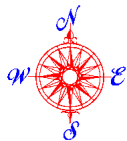
FIRSTSEARCH

15-2714 PAHOA VILLAGE RD, PAHOA, HI 96778



Source: Tele Atlas

Area Polygon	
Identified Site, Multiple Sites, Receptor	
NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste	
Triballand.....	
- Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

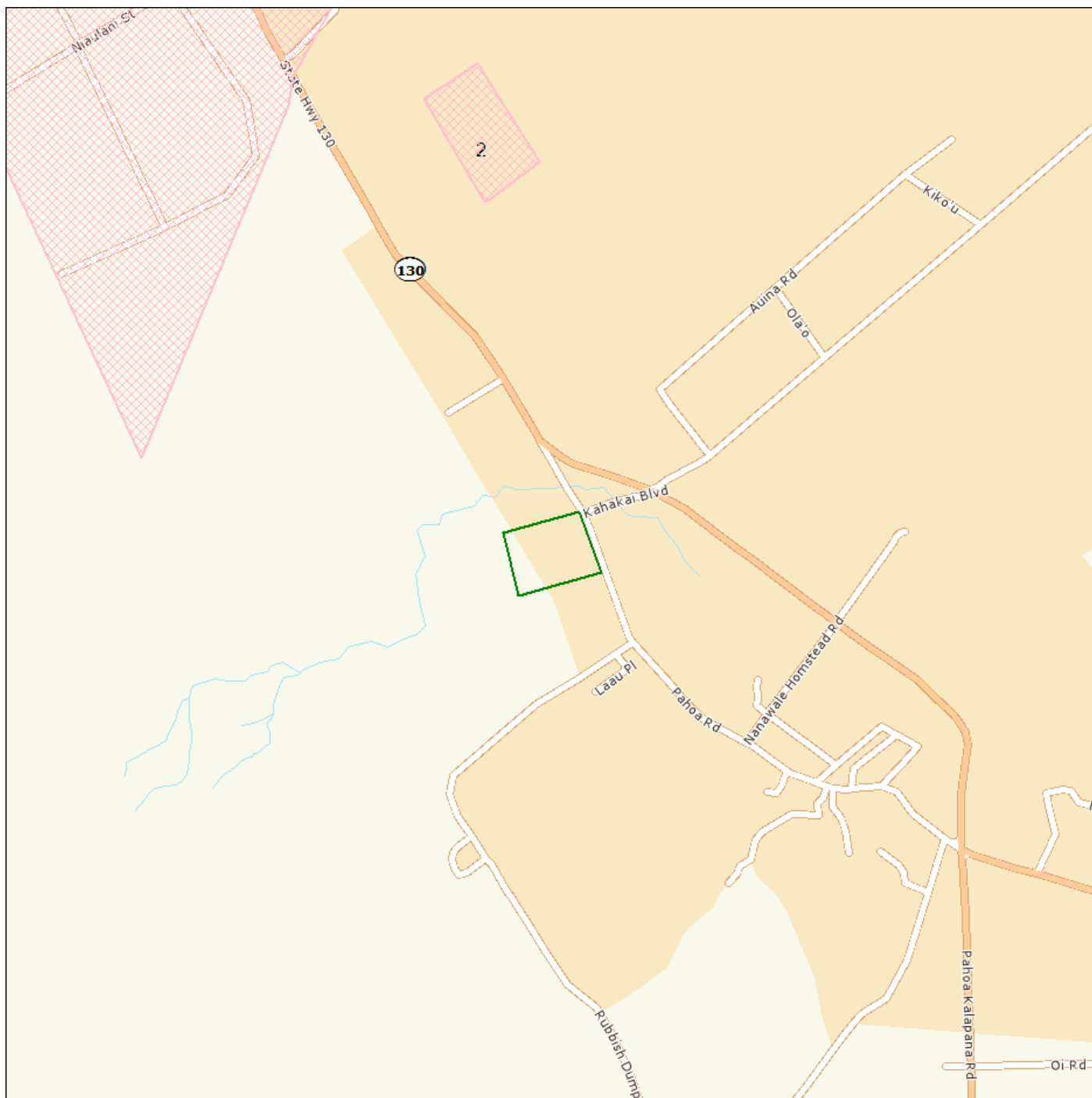


Environmental FirstSearch

1 Mile Radius from Area
ASTM-05: NPL, RCRACOR, STATE

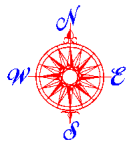
FIRSTSEARCH

15-2714 PAHOA VILLAGE RD, PAHOA, HI 96778



Source: Tele Atlas

- Area Polygon 
- Identified Site, Multiple Sites, Receptor   
- NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste 
- Triballand..... 
- Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius



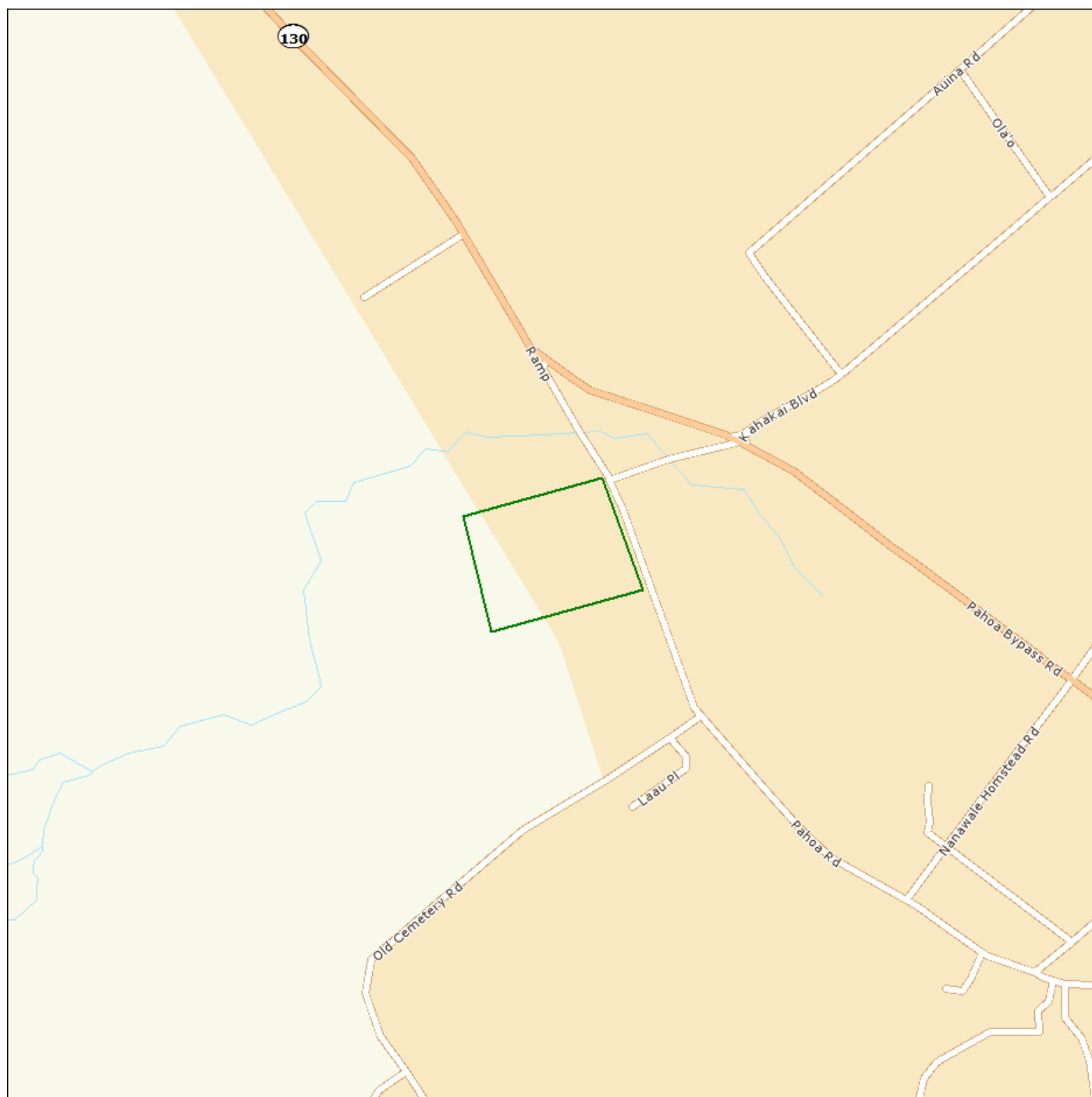
Environmental FirstSearch

.5 Mile Radius from Area

ASTM-05: Multiple Databases

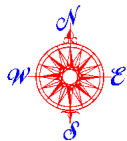
FIRSTSEARCH

15-2714 PAHOA VILLAGE RD, PAHOA, HI 96778



Source: Tele Atlas

Area Polygon				
Identified Site, Multiple Sites, Receptor				
NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste				
Triballand.....				
- Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius



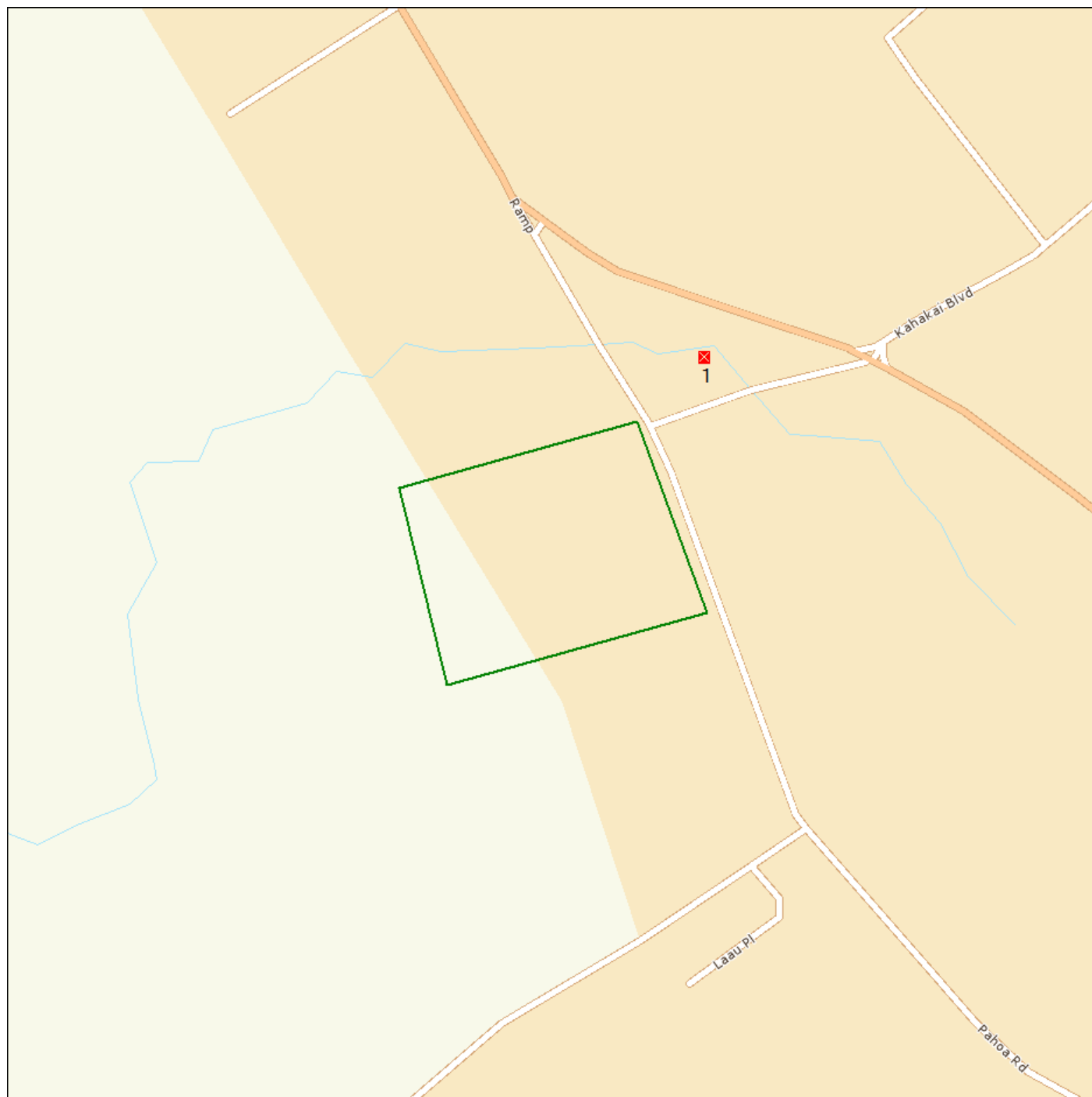
Environmental FirstSearch

.25 Mile Radius from Area

ASTM-05: Multiple Databases

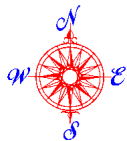
FIRSTSEARCH

15-2714 PAHOA VILLAGE RD, PAHOA, HI 96778



Source: Tele Atlas

Area Polygon				
Identified Site, Multiple Sites, Receptor				
NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste				
Triballand.....				
- Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius



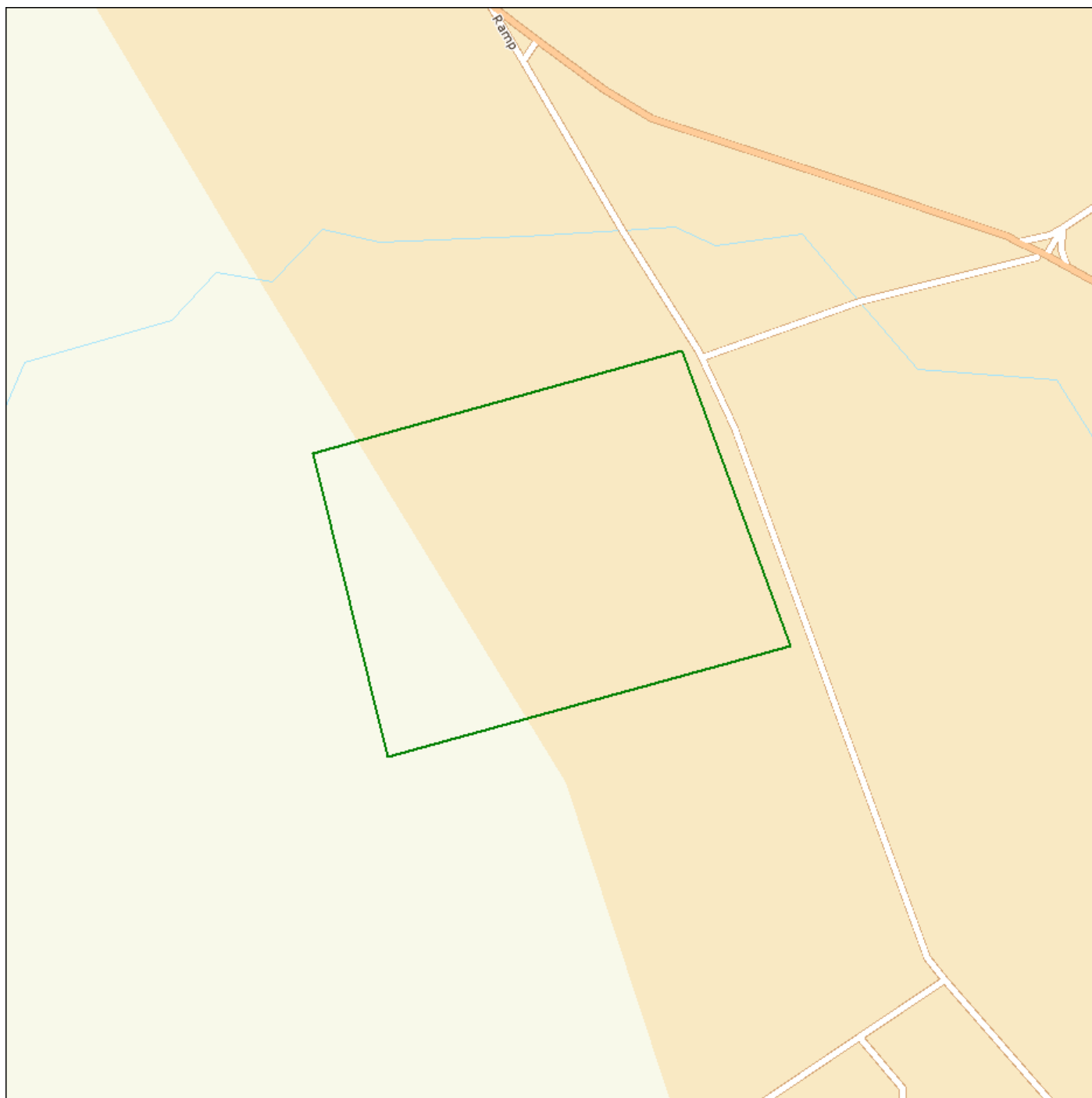
Environmental FirstSearch

.12 Mile Radius from Area

ASTM-05: RCRANLR, ERNS, SPILLS90

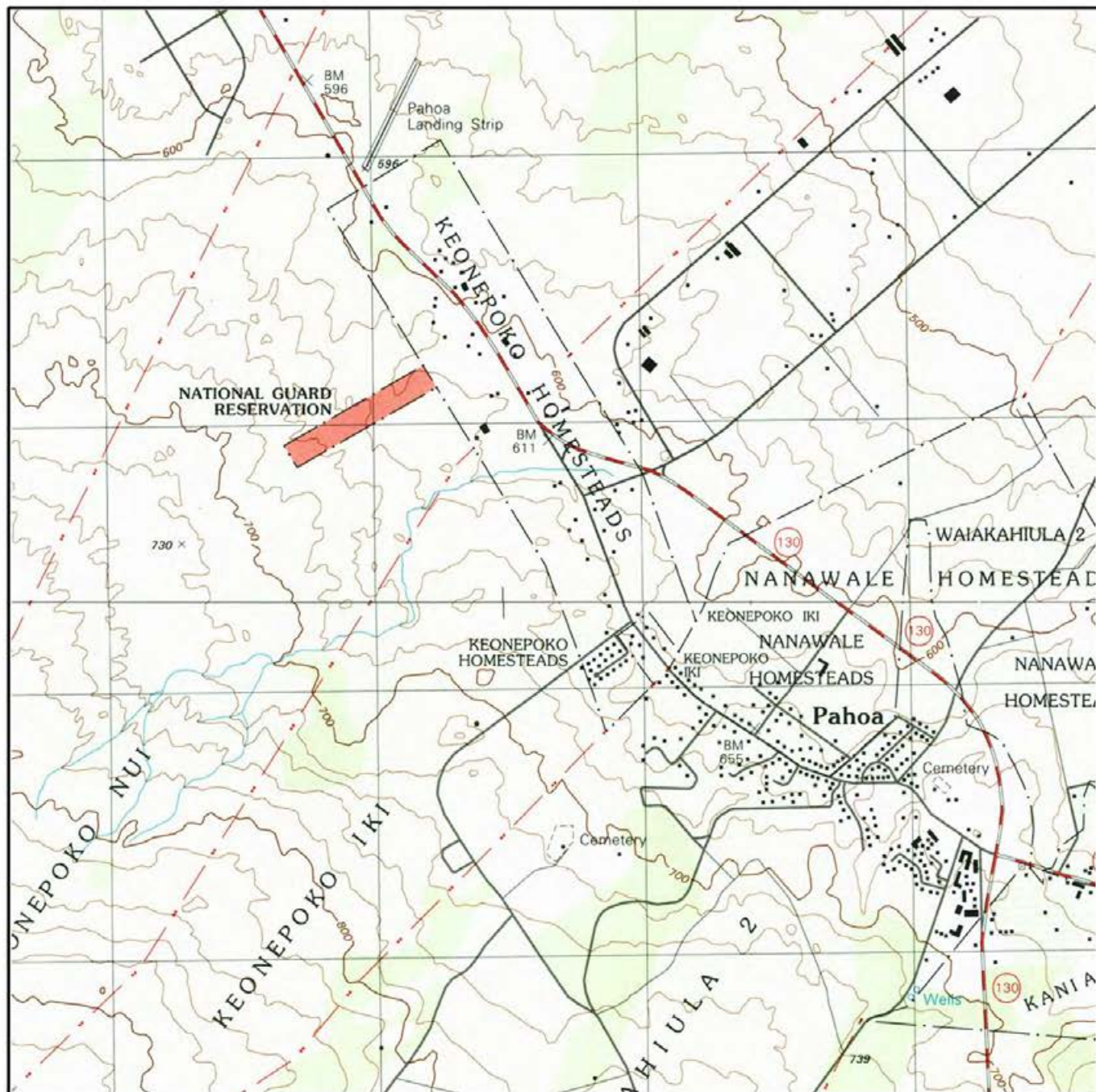
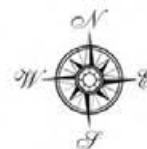
FIRSTSEARCH

15-2714 PAHOA VILLAGE RD, PAHOA, HI 96778



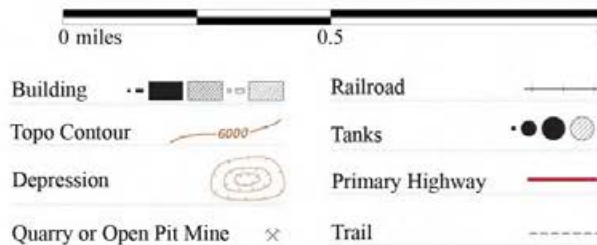
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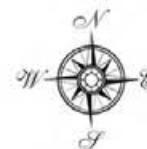
Area Polygon				
Identified Site, Multiple Sites, Receptor				
NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste				
Triballand.....				
Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius				



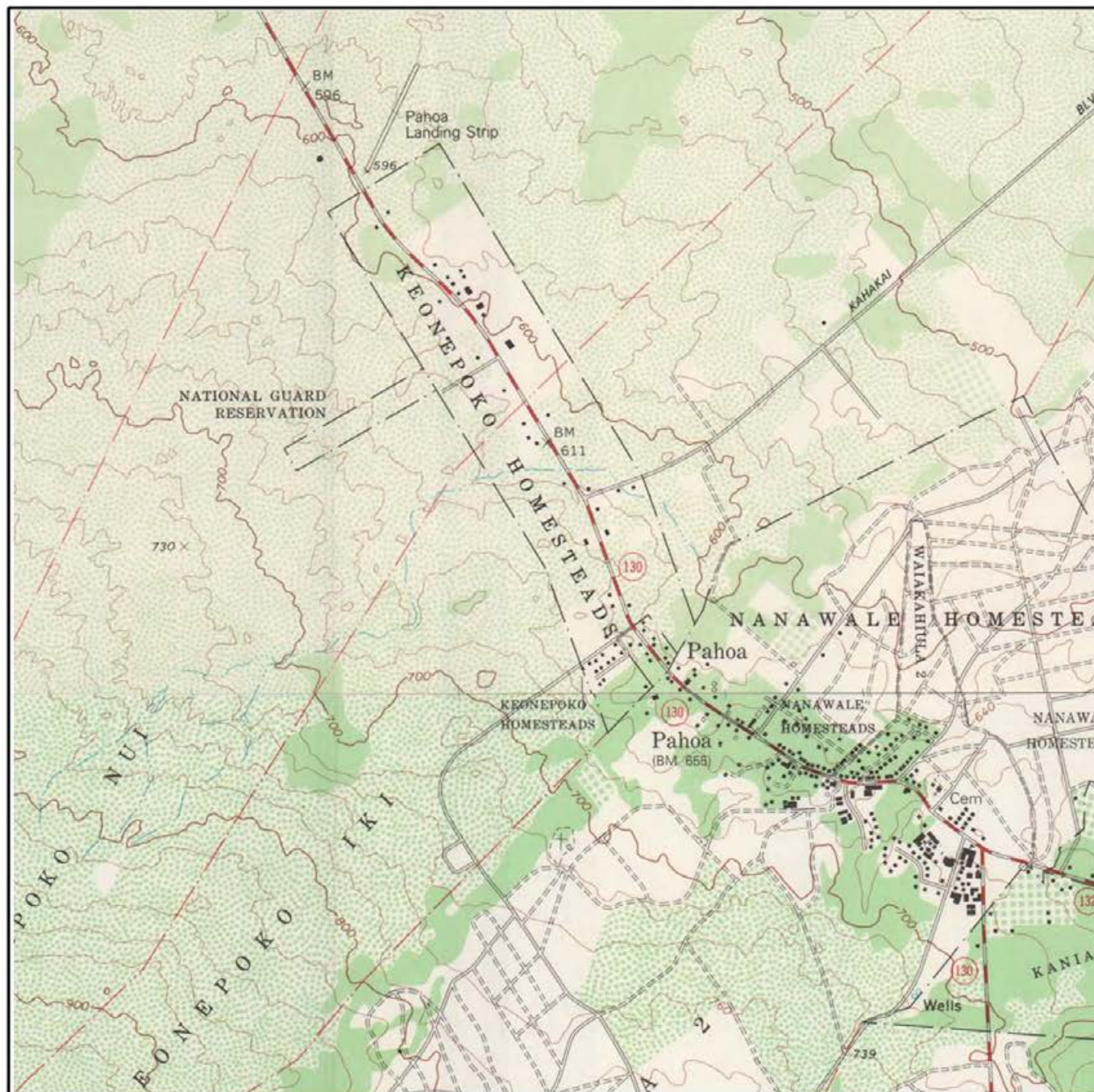
Job Number: 51539
Target Site: 19.502164, -154.956635

S Quad Name: Pahoa South, HI
Year: 1994





15-2714 Pahoa Village Rd, Pahoa, HI 96778

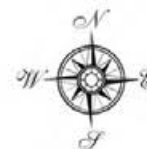


Job Number: 51539
Target Site: 19.502164, -154.956635

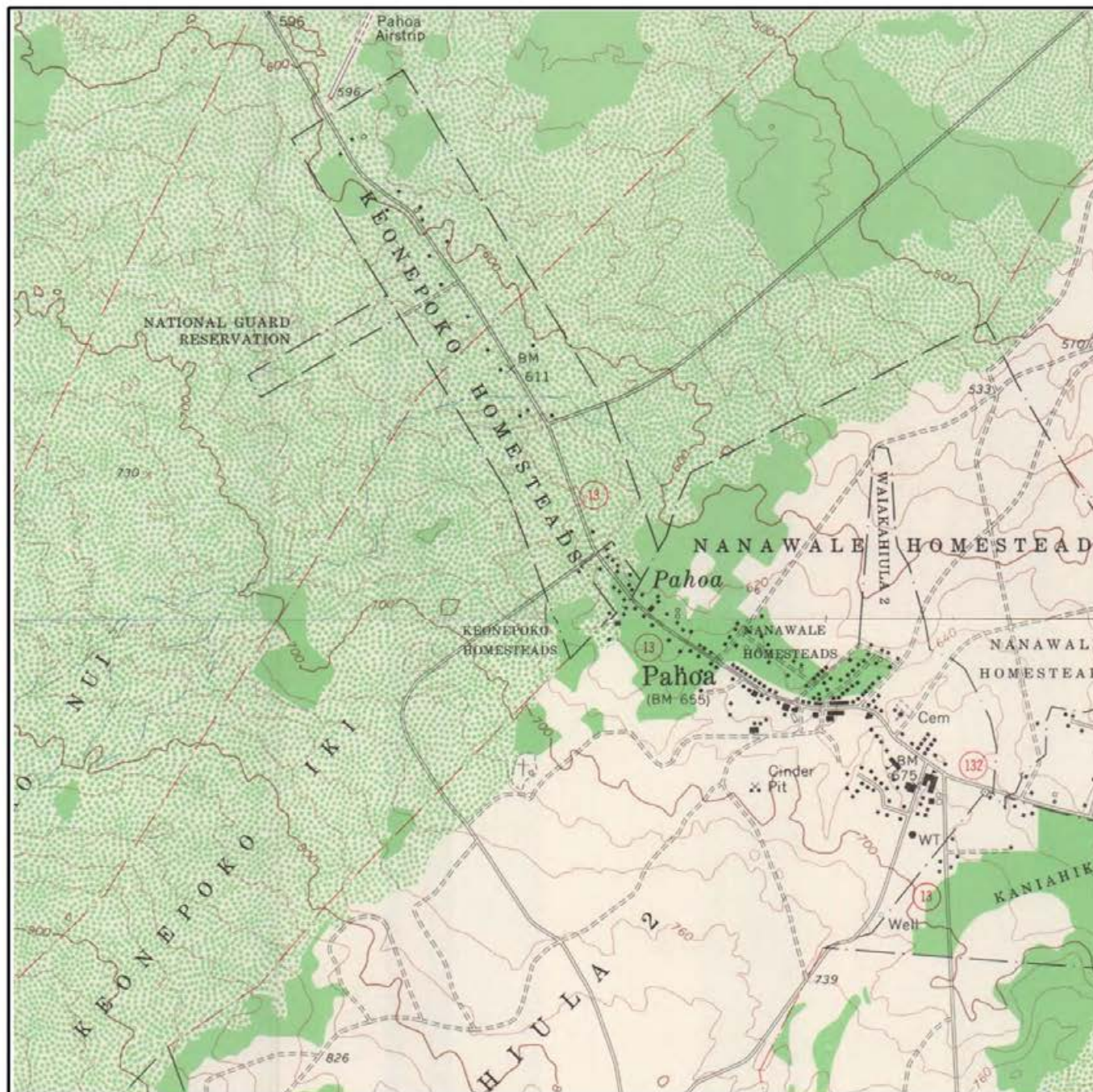
S Quad Name: Pahoa South, HI
Year: 1980

0 miles 0.5 1

Building	---■---	Railroad	—+—
Topo Contour	—6000—	Tanks	●●●●
Depression	—()—	Primary Highway	—
Quarry or Open Pit Mine	×	Trail	- - - -



15-2714 Pahoa Village Rd, Pahoa, HI 96778

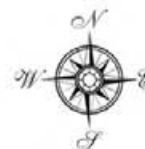


Job Number: 51539
Target Site: 19.502164, -154.956635

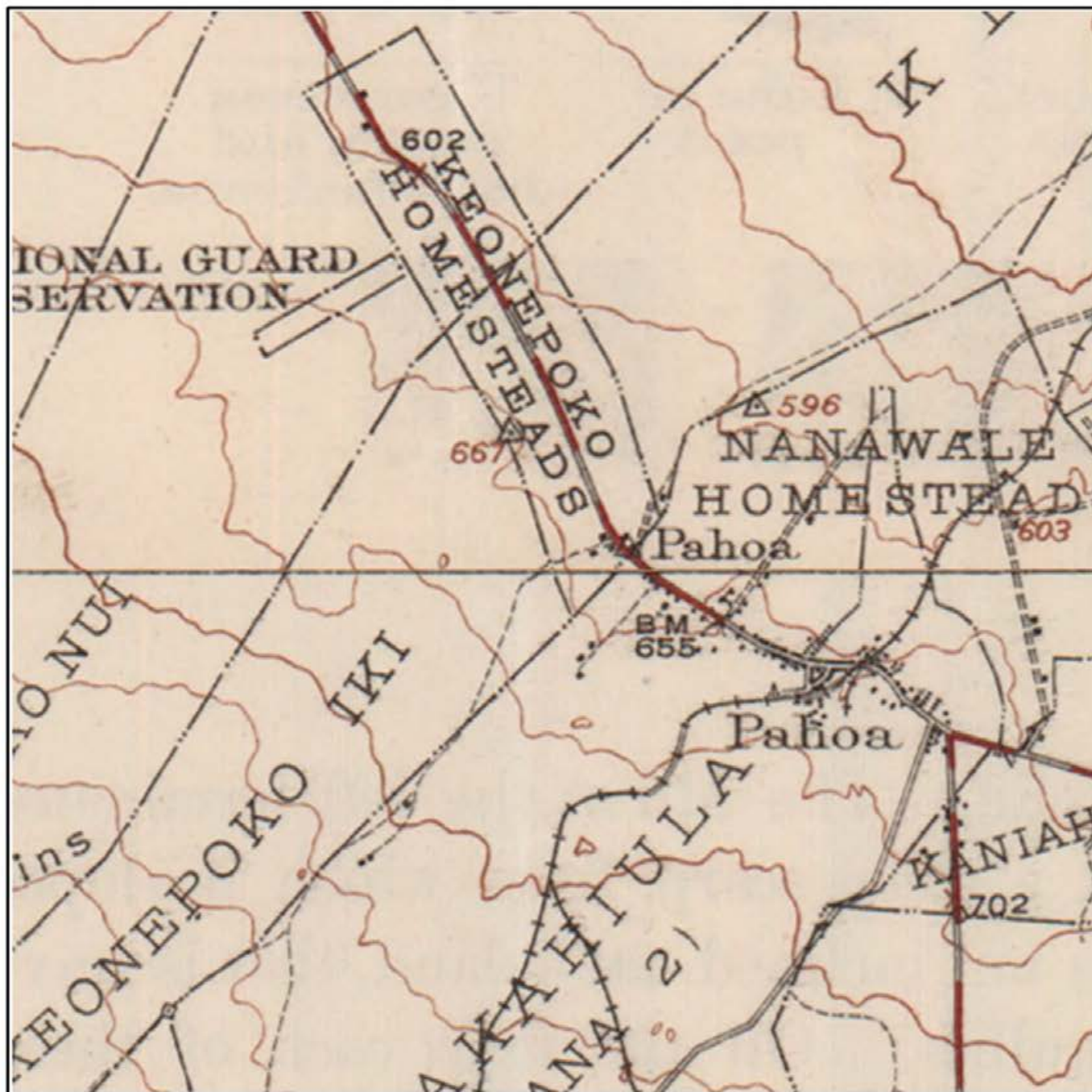
S Quad Name: Pahoa South, HI
Year: 1966

0 miles 0.5 1

Building		Railroad	
Topo Contour		Tanks	
Depression		Primary Highway	
Quarry or Open Pit Mine		Trail	



15-2714 Pahoa Village Rd, Pahoa, HI 96778



Job Number: 51539
Target Site: 19.502164, -154.956635

S Quad Name: Kalapana, HI
Year: 1924

0 miles 0.5 1

Building	---■---	Railroad	—+—
Topo Contour	—6000—	Tanks	●●●●
Depression	—()—	Primary Highway	—
Quarry or Open Pit Mine	×	Trail	- - - -

APPENDIX B

Site Reconnaissance Photographs



Photograph 1. A west facing view of the subject property (October 30, 2012).



Photograph 2. A view of the onsite construction activities on the subject property (October 30, 2012).



Photograph 3. A view facing northeast from the southwest end of the subject property (October 30, 2012).



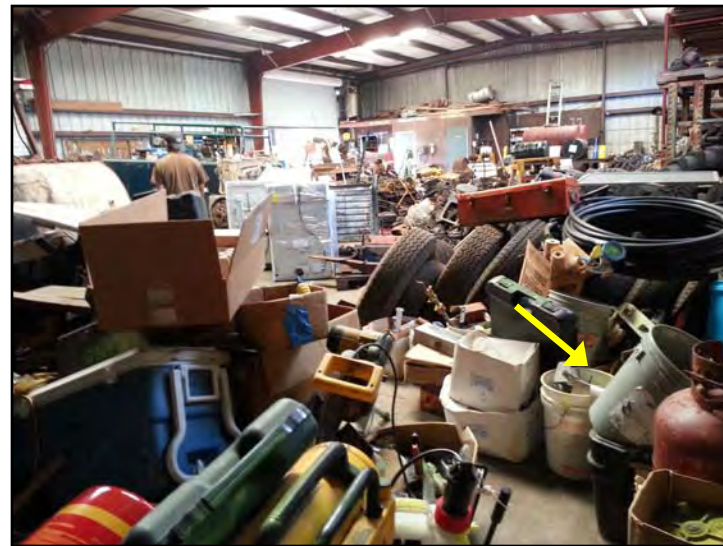
MNA 01539_5



Photograph 4. A view of the catch basin at the northeast end of the subject property (October 30, 2012).



Photograph 5. A view of the warehouse exterior on the subject property (October 30, 2012).



Photograph 6. A view of the warehouse interior on the subject property. Arrow is pointing at various empty buckets (October 30, 2012).



Photograph 7. A view of oil pipes within the warehouse on the subject property (October 30, 2012).



MNA 01539_5



Photograph 8. A view of staining on the concrete floor within the warehouse of the subject property (October 30, 2012).



Photograph 9. A view of the AST within the warehouse of the subject property (October 30, 2012).



Photograph 10. A view of the motor oil tanks and drums within the warehouse of the subject property (October 30, 2012).



Photograph 11. A view of a diesel tank within the warehouse of the subject property (October 30, 2012).



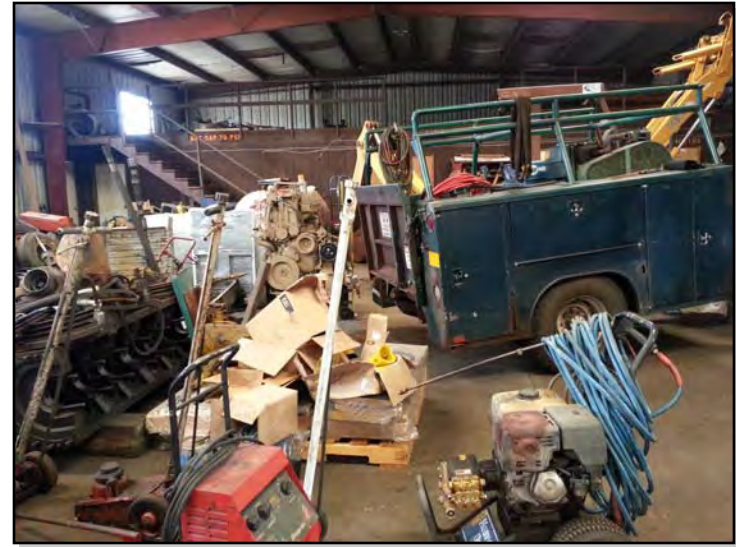
MNA 01539_5



Photograph 12. A view of storage space within the warehouse of the subject property (October 30, 2012).



Photograph 13. A view of a backhoe within the warehouse of the subject property (October 30, 2012).



Photograph 14. A view of the interior of the warehouse of the subject property (October 30, 2012).



Photograph 15. A view of the studio rental unit within the warehouse of the subject property (October 30, 2012).



MNA 01539_5



Photograph 16. A view of the stairwell within the warehouse of the subject property (October 30, 2012).



Photograph 17. A view of the shed on the subject property (October 30, 2012).



Photograph 18. A view of paint buckets within the shed on the subject property (October 30, 2012).



Photograph 19. A view of the heavy equipment parts and out of use diesel tank adjacent to the shed on the subject property (October 30, 2012).



MNA 01539_5



Photograph 20. A view of the fill material to the west of the shed on the subject property (October 30, 2012).



Photograph 21. A view of the shed on the subject property (October 30, 2012).



Photograph 22. A view of paint buckets within the shed on the subject property (October 30, 2012).



Photograph 23. A view of the heavy equipment parts and out of use diesel tank adjacent to the shed on the subject property (October 30, 2012).



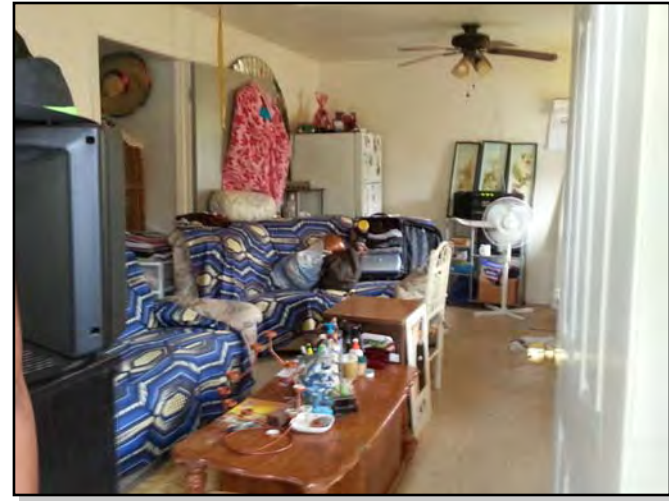
MNA 01539_5



Photograph 24. A view of the fill material to the west of the shed on the subject property (October 30, 2012).



Photograph 25. A view of the exterior of studio on the subject property (October 30, 2012).



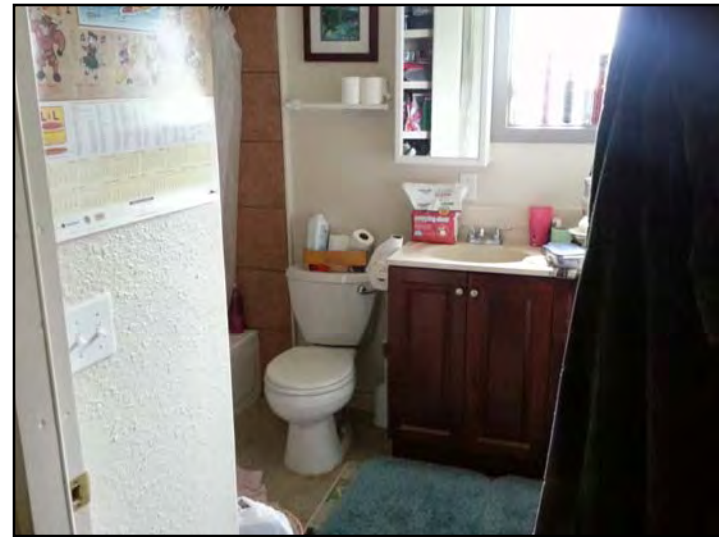
Photograph 26. A view of the interior of the studio on the subject property (October 30, 2012).



Photograph 27. A view of the interior of the studio on the subject property (October 30, 2012).



MNA 01539_5



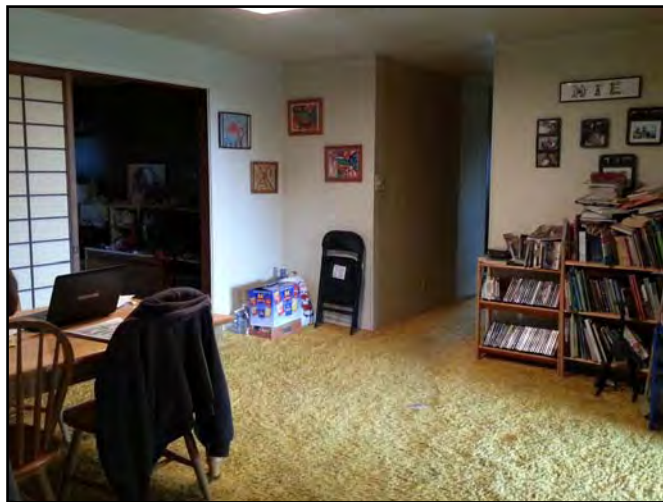
Photograph 28. A view of the adjoining property to the east of the subject property, TMK 1-5-007:059 (October 30, 2012).



Photograph 29. A view of the exterior of the four bedroom house on the subject property (October 30, 2012).



Photograph 30. A view of the interior of the four bedroom house on the subject property (October 30, 2012).



Photograph 31. A view of the interior of the four bedroom house on the subject property (October 30, 2012).



MNA 01539_5



Photograph 32. A view of the adjoining property to the east of the subject property, TMK 1-5-007:059 (October 30, 2012).



Photograph 33. A view of the exterior of the three bedroom house on the subject property (October 30, 2012).



Photograph 34. A view of the interior of the three bedroom house on the subject property (October 30, 2012).



Photograph 35. A view of the interior of the three bedroom house on the subject property (October 30, 2012).



MNA 01539_5



Photograph 36. A view of the loft within the three bedroom house on the subject property (October 30, 2012).



Photograph 37. A view of TMK 1-5-007:020, an adjoining property to the northeast of the subject property (October 30, 2012).



Photograph 38. A view of Kahakai Boulevard, TMK 1-5-007:021, an adjoining property to the northeast of the subject property (October 30, 2012).



Photograph 39. A view of TMK 1-5-007:021, an adjoining property to the east of the subject property (October 30, 2012).



MNA 01539_5



Photograph 40. A view of TMK 1-5-007:059, and adjoining property to the southwest of the subject property (October 30, 2012).



Photograph 41. A view of TMK 1-5-007:054, an adjoining property to the east of the subject property (October 30, 2012).



Photograph 42. A view of TMK 1-5-007:022, an adjoining property to the southeast of the subject property (October 1, 2012).



Photograph 43. A view of TMK 1-5-007:005, an adjoining property to the south of the subject property (October 30, 2012).



MNA 01539_5



Photograph 44. A view of TMK 1-5-007:051, an adjoining property to the southwest of the subject property (October 30, 2012).



Photograph 45. A view of an AST at TMK 1-5-007:051, an adjoining property to the southwest of the subject property, (October 30, 2012).



Photograph 46. A view of old tires and scrap metal parts at TMK 1-5-007:051, an adjoining property to the southwest of the subject property (October 30, 2012).



Photograph 47. A view of TMK 1-5-007:007, an adjoining property to the northwest of the subject property (October 30, 2012).



MNA 01539_5



Photograph 48. A view of the old and rusted heavy equipment on at TMK 1-5-007:007, an adjoining property to the north of the subject property, (October 30, 2012).



Photograph 49. A view of an old diesel AST on the adjoining property to the north of the west end of the subject property, TMK 1-5-007:007 (October 30, 2012).



Photograph 50. A view of an old diesel AST on the adjoining property to the north of the west end of the subject property, TMK 1-5-007:007 (October 30, 2012).



Photograph 51. A view of fill material on the adjoining property to the north of the west end of the subject property, TMK 1-5-007:007 (October 30, 2012).



MNA 01539_5

APPENDIX 3

SHPD CONSULTATION AND ARCHAEOLOGICAL FIELD INSPECTION REPORT

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
INTERIM FIRST DEPUTY

WILLIAM M. TAM
INTERIM 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

June 18, 2012

Jon McElvaney, RA
Inoue Hawaii Realty Corp.
101 Aupuni Street, Suite 10001
Hilo, Hawai'i 96720
(zp_nash@yahoo.com)

LOG NO: 2012.1612
DOC NO: 1206TD22
Archaeology

Aloha Mr. McElvaney:

Subject: **Chapter 6E-42 Historic Preservation Review –
State Land Use Boundary and Hawai'i County Change of Zone Application for 9.93 Acres
Keonepoko Iki Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-5-007: 006, 069 and 070**

Thank you for requesting our review of the proposed application, received May 24, 2012. The applicant is requesting a change in State zoning from agriculture to urban; and a change in County zoning from A-1a Agricultural to CV-10 Village Commercial, for the purpose of constructing a retail shopping center. Each of the three parcels are comprised of 3.3 acres and currently being used as a base yard for Bryson's Cinders, and for residential purposes. According to the application, the existing dwellings date to 1975 and 1985.

The parcels are located within the Keonepoko Homesteads subdivision and are outside the Pāhoa Historic District (SIHP 50-10-45-7388), and we have no records of historic properties within or adjacent to these parcels. We have recently reviewed a stockpiling permit for Parcel 006, and determined that no historic properties would be affected (Log 2012.0413, Doc 1203TD05). In 2000, we reviewed a special permit application for a 150-ft telecommunication tower on Parcel 069 and were informed that the parcel had been previously graded (Log 26139, Doc 0009PM05). Photographs submitted with the current application indicate that the project area has been significantly altered in connection with the current business.

Based on available information, the history of land use, and the current condition of the project area, we believe that **no historic properties will be affected** by the proposed change in zoning and future construction activities.

In the event that historic resources, including human skeletal remains, artifacts, structural remnants or lava tubes are identified during the construction activities, please cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division, Hawaii Island Section at (808) 933-7653. Please contact me at Theresa.K.Donham@hawaii.gov if you have any questions or concerns regarding this letter.

Mahalo,

A handwritten signature in black ink, appearing to read "Theresa K. Donham", is located below the text "Mahalo,".

Theresa K. Donham
Archaeology Branch Chief

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



**HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES**

601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
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
KAIHIOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

December 11, 2012

Mr. Graham Knopp
GK Environmental
P.O. Box 1310
Honoka'a, Hawai'i 96727-1310

LOG NO: 2012.2538
2012.2769
2012.3424
DOC NO: 1212SN02

Dear Mr. Knopp:

**SUBJECT: Chapter 6E-42 Historic Preservation Review – Environmental Assessment
Pahoa Village Road Shopping Center and Roadway Improvements
Keonepoko Iki Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-5-007: 006, 069, 070 and 055 Roadway**

Thank you for the opportunity to provide comments for the proposed Environmental Assessment (EA) for Pahoa Village Road Shopping Center and Related Roadway Improvements. We received your submittal September 21, 2012; we apologize for the delayed review and thank you for your patience. The proposed project will include a shopping center on a 9.93 acres of privately-owned land along Pahoa Village Road. As a result of the proposed project, roadway improvements will be necessary as well as a .937 acre extension of Kahakai Boulevard to allow access to the proposed project.

Our records indicate that this area is outside the boundaries of the Pahoa Historic District (SIHP Site 50-10-55-7388); however, there is a potential for archaeological resources, based on findings in nearby parcels. On December 1, 2012, a field inspection of the proposed shopping center project area and roadway extension of Kahakai Boulevard was conducted by SHPD staff archaeologist Sean Nāleimaile (Parcel 055). The inspection found that the project area has been previously grubbed and graded, and much of the proposed roadway has been impacted by stockpiling of materials from the adjacent project area. A portion of the proposed extension is intact and it is recommended that additional fieldwork be conducted in this area to verify the presence or absence of historic properties.

We recommend that an archaeological inspection be conducted of the undisturbed portions of Parcel 055 by a qualified archaeologist. If evidence of historic properties is found, an inventory survey report documenting the archaeological fieldwork and findings should be submitted to the SHPD for review and approval prior to any further land alteration in undisturbed areas. We will await completion of the EA prior to approval of any related grading or stockpiling permits connected with this project. Please contact Sean Nāleimaile at (808) 933-7651 or Sean.P.Naleimaile@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham", is written over a horizontal line.

Theresa K. Donham
Archaeology Branch Chief

RECHTMAN CONSULTING, LLC

507-A E. Lanikaula St. Hilo, Hawaii 96720

phone: (808) 969-6066 fax: (808) 443-0065

e-mail: bob@rechtmanconsulting.com

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

January 2, 2013

RC-0830

Sean Nāleimaile, M.A.
Assistant Hawai'i Island Archaeologist
DLNR-SHPD
40 Po'okela Street
Hilo, HI 96720

Dear Sean:

In response to a DLNR-SHPD comment letter (DOC NO: 1212SN02) concerning the use of a state-owned parcel (TMK: 3-1-5-07:055) for the extension of Kahakai Blvd in conjunction with the development of the Pāhoa Village Road Shopping Center, Graham Knopp of GK Environmental asked Rechtman Consulting, LLC to conduct a field inspection of the roughly 1 acre parcel, which is situated in Keonepoko Iki Ahupua'a, Puna District, Island of Hawai'i (Figures 1 and 2). Extending for roughly 820 feet west from Pāhoa Village Road (Figure 3), this narrow (50 feet wide) parcel was briefly inspected by DLNR-SHPD staff on December 1, 2012, and was found to be mostly previously grubbed and graded. However, DLNR-SHPD noted that a small portion of the parcel was intact and they recommended that additional fieldwork be conducted to verify the presence or absence of historic properties.

Keonepoko Iki Ahupua'a was retained as Government Land during the *Māhele*, and no Land Commission Award claims were made within the *ahupua'a* (Waihona 'Āina database). Beginning in 1903 a *mauka* portion of the *ahupua'a* (in the vicinity of the current study area) was commuted as grant parcels and homestead lots (Figure 4). Only a few archaeological studies have been completed in Keonepoko Iki and most have been in the coastal portion of the *ahupua'a*. However, one prior study (Rechtman 2004) was completed for TMK: 3-1-5-07:017, which is located approximately 500 meters to the north of the current study area. The ground surface of that project area was found to have been extensively mechanically disturbed in the past and one lava tube was encountered and explored that proved to be culturally sterile. No historic properties were recorded during that study.

On December 28, 2012, Robert B. Rechtman, Ph.D., Dave Nelson, B.A., Amy Ketner, B.A., and Lauryl Zenobi, B.A. conducted a thorough surface examination of the study parcel. Ground visibility was fair within the small undisturbed portion of the parcel (Figure 5) and excellent within the previously disturbed portion of the parcel (Figures 6 and 7). As a result of the fieldwork, there were no surface archaeological resources observed and the likelihood of encountering subsurface resources is extremely remote. Based on these negative findings, on behalf of our client, we are requesting that DLNR-SHPD issue a written determination of "no historic properties affected" in accordance with HAR 13§13-284-5(b)1.

In the highly unlikely event that archaeological resources are encountered during subsurface development activities within the current study area, work in the immediate area of the discovery will be halted and DLNR-SHPD contacted as outlined in Hawai'i Administrative Rules 13§13-275-12.

Should you require further information, please contact me directly.

Respectfully,



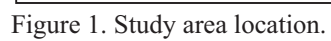
Bob Rechtman, Ph.D.
Principal Archaeologist

References Cited

Rechtman, R

2004

Request for SHPO Concurrence with a Determination of No Historic Properties Affected Pursuant to the National Environmental Policy Act and in Compliance with Section 106 of the National Historic Preservation Act (TMK:3-1-5-07:17), Keonepoko Nui and Keonepoko Iki *ahupua'a*, Puna District, Island of Hawai'i. Rechtman Consulting Letter Report RC-0277. Prepared for Brian Nishimura, Hilo, Hawai'i.



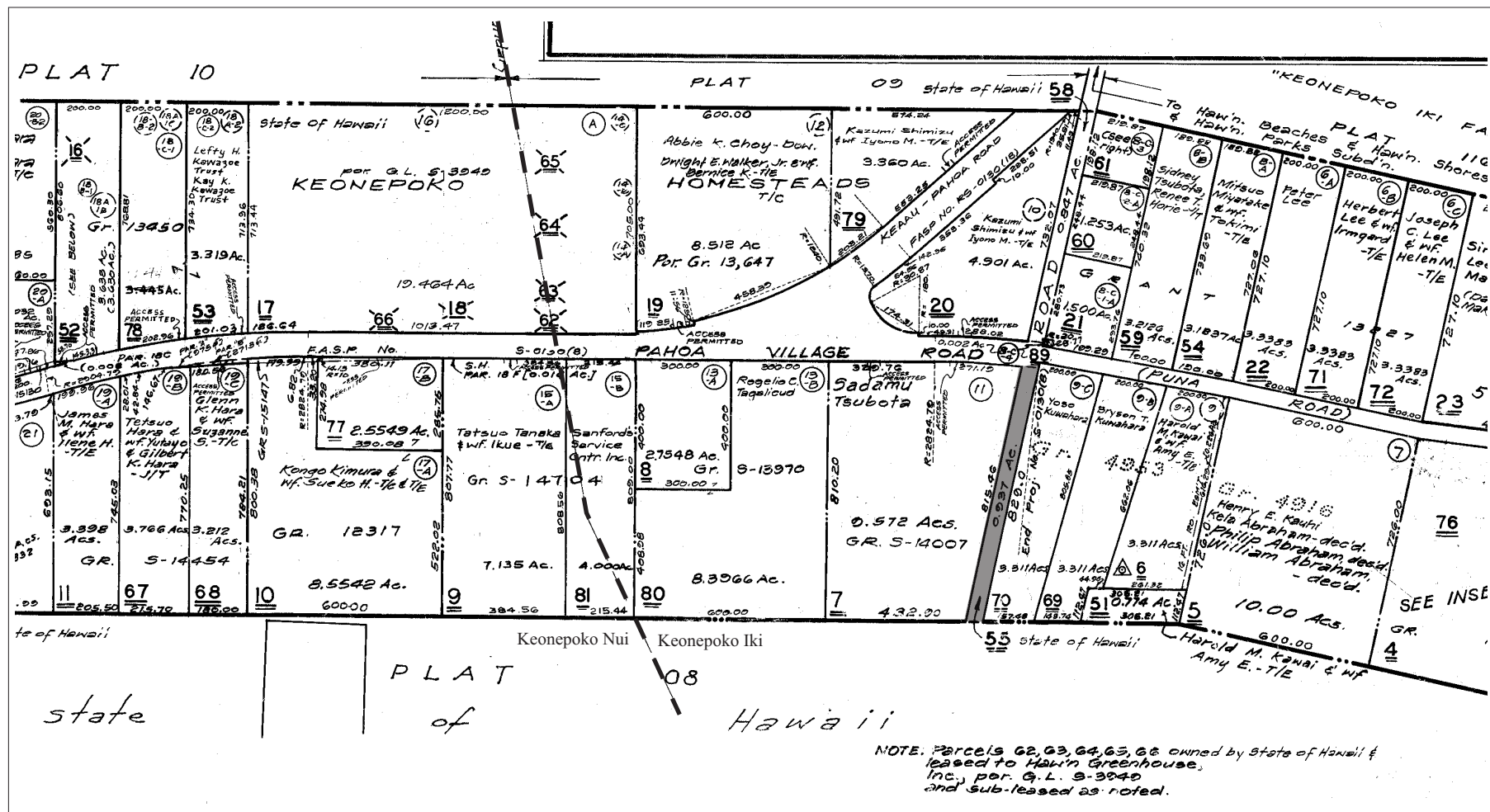


Figure 2. Portion of Tax Map 3-1-5-07 showing study parcel (055, shaded).



Figure 3. Study area as seen from existing portion of Kahakai Blvd, view to the west.

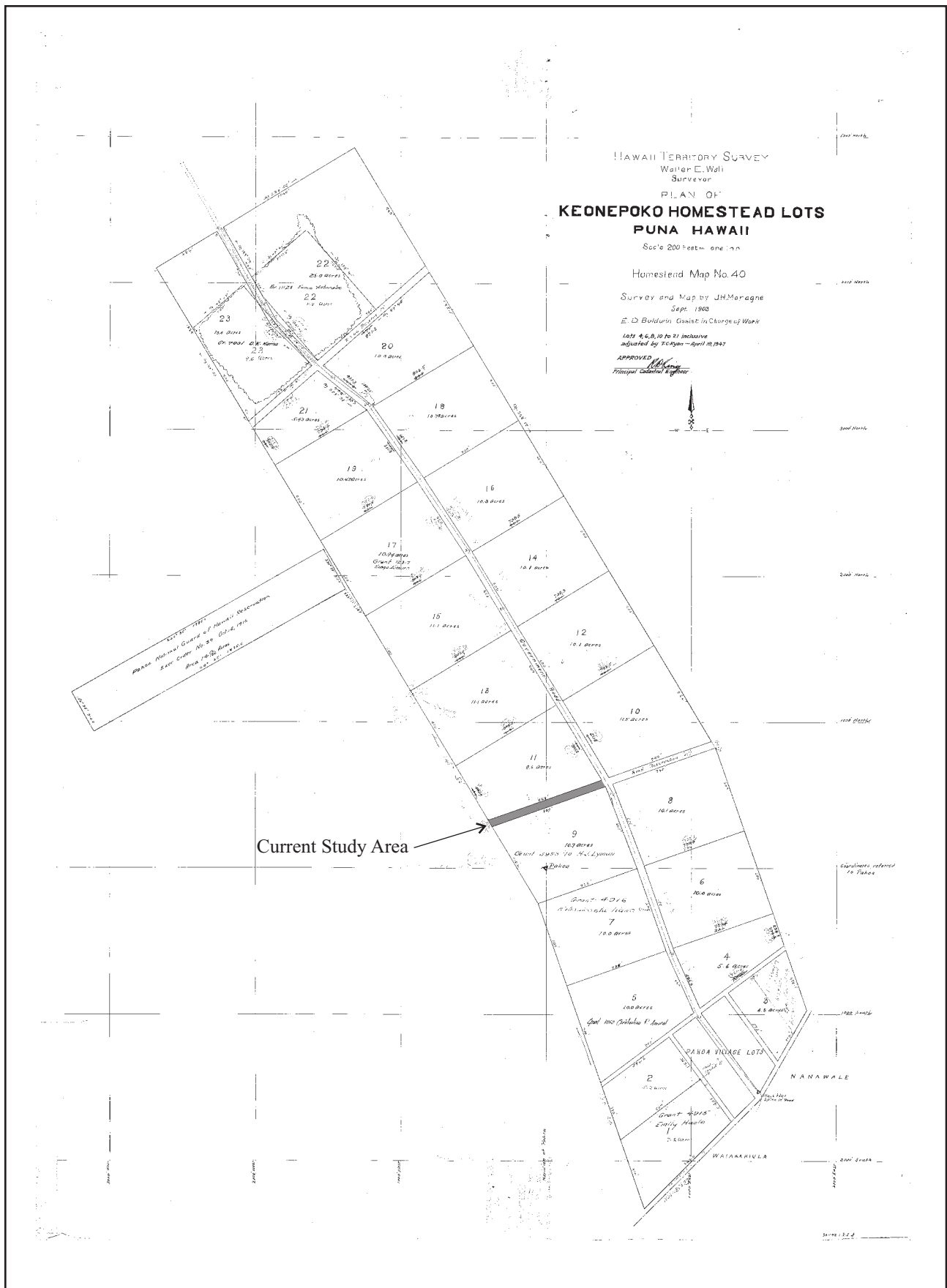


Figure 4. Hawai'i Registered Map 2084 originally prepared in 1903 and updated in 1947, showing current study area.



Figure 5. Small intact portion of study area, view to the east.



Figure 6. Graded *mauka* portion of study area, view to the west.



**HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES**

601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

January 14, 2013

Robert Rechtman, Ph.D.
Rechtmen Consulting, LLC
507-A E. Lanikaula St.
Hilo, Hawai'i 96720

LOG NO: 2013.0081
DOC NO: 1301SN02
Archaeology

Dear Dr. Rechtman:

**SUBJECT: Chapter 6E-42 Historic Preservation Review –
Archaeological Field Inspection of the Proposed Kahakai Boulevard Extension
Keonepoko Iki Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-5-007:055**

Thank you for your response to the DLNR-SHPD comment letter requesting additional fieldwork for the proposed Environmental Assessment (EA) for Pahoa Village Road Shopping Center and Related Roadway Improvements (Log No. 2012.2769 Doc. No. 1212SN02). We received your letter on January 2nd, 2013. The proposed roadway improvements will include a .937 acre extension of Kahakai Boulevard to allow access to the proposed Pahoa Village Road Shopping Center.

A field inspection of the proposed roadway extension of Kahakai Boulevard by SHPD staff archaeologist Sean Nāleimaile (Parcel 055) indicated that a portion of the proposed roadway extension was recently impacted by stockpiling of materials. A portion of the proposed extension was undisturbed and it was recommended that additional fieldwork be conducted in this area to verify the presence or absence of historic properties (Log No. 2012.2769 Doc. No. 1212SN02)..

Your letter describes the methods and findings of an archaeological field inspection that was conducted of the undisturbed portions of Parcel 055. No evidence of historic properties were identified during the inspection. Based on these findings, we concur with your recommendation that no historic properties will be affected by the proposed extension of Kahakai Blvd. Please contact Sean Nāleimaile at (808) 933-7651 or Sean.P.Naleimaile@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham", with a stylized flourish at the end.

Theresa K. Donham
Archaeology Branch Chief

cc. Mr. Graham Knopp
GK Environmental
PO Box 1310
Honoka'a, HI 96727

APPENDIX 4

TRAFFIC IMPACT ANALYSIS REPORT

**REVISED TRAFFIC IMPACT ANALYSIS
FOR A
PROPOSED SHOPPING CENTER
PAHOA, HAWAII
TMK (3)1-5-007:006, 069, 070**

DEC, 2012

**PREPARED FOR:
B. T. KUWAHARA LLC**



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

**PREPARED BY:
WITCHER ENGINEERING LLP
P.O. BOX 348
HOLUALOA, HI 96725
(808)334-0322 (808)324-0327 Fax**

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- Existing Conditions AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic (includes 5,10 and 20 year)

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- Existing Conditions AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic using Roundabout (includes 5,10 and 20 year)

APPENDIX L Traffic Movement Diagrams-- Malama Market Road & Old Pahoa Village Road

- Existing Conditions AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic (includes 5,10 and 20 year)

APPENDIX M Traffic Movement Diagrams-- Kahakai Blvd. & Keaau-Pahoa Bypass Road

- Existing Conditions AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic (includes 5,10 and 20 year)

APPENDIX N Traffic Movement Diagrams-- Center Driveway

- Conditions at Buildout, 5 Years AM & PM Peak Traffic
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APPENDIX O Traffic Movement Diagrams-- South Driveway

- Conditions at Buildout AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic

APPENDIX P Supplement to TIAR using 1% and 2% Growth Indexes

**TRAFFIC IMPACT ANALYSIS
FOR PROPOSED SHOPPING CENTER, PAHOA, HAWAII
SOUTHWEST CORNER OF PAHOA VILLAGE ROAD AND KAHAKAI
BOULEVARD
TMK (3)1-5-007:006, 069, 070**

I. INTRODUCTION AND SUMMARY

The purpose of this report is to evaluate the traffic impact of the proposed development at the above location which is southwest of the intersection of Old Pahoa Village road and Kahakai Boulevard. It is assumed that the primary entering and exiting will be to the westward extension of Kahakai Boulevard with some entering and exiting along Old Pahoa Village Road.

This report will analyze the impact on the following intersections:

Kahakai Boulevard and Old Pahoa Village Road
Kahakai Blvd and Keaau-Pahoa By Pass
Old Pahoa Village Road and Keaau-Pahoa By Pass
Old Pahoa Village Road and Malama Market
Two Driveways on Old Pahoa Village Road

II. PROPOSED DEVELOPMENT

The project is located in the Puna District of the Big Island of Hawaii. It will be diagonally opposite of the Woodland Center at the intersection of Old Pahoa Village Road and Kahakai Boulevard. The proposed project is approximately 9.93 acres on TMK (3)1-5-007:006, (3)1-5-007:069 and (3)1-5-007:070.

Current plans include the following (See Table 1). It should be noted that there will be no drive-throughs for the restaurants.

TABLE 1 PROPOSED FACILITIES

<i>Facility</i>	<i>Area in Square Feet</i>
Supermarket	40,000
Specialty Retail (3)	18,000
Paint and Hardware	10,000
Garden Center	10,000

<i>Facility</i>	<i>Area in Square Feet</i>
Clinic	11,250
Medical/Dental	5,040
Quality* Restaurant (2)	8,853
Post Office	2,000

*As defined in "Trip Generation", Institute of Traffic Engineers

III. STUDY AREA CONDITIONS

A. Study Area

The project area is surrounded by a mixture of single-family residences, commercial, and agricultural developments. Zoning varies from commercial-industrial to AG20 to Ag5 and neighborhood commercial.

Traffic from this development will have an impact on the surrounding roads. This impact will be measured for the intersections stated above.

B. Site Accessibility

The proposed development will be accessed primarily from the extension westwardly of Kahakai Blvd from Old Pahoa Village Road. Secondary access will be from two driveways along Old Pahoa Village Road, one located in the approximate center of the development and one at the southerly boundary. The Center Driveway and South Driveway are full movement.

C. Land Use

The project area is currently designated agricultural. The area is currently being used as a base yard for a cinder operation. There are two dwelling units on-site, one of which which may be converted to a restaurant. Also, there is a warehouse once used for flower distribution which currently is used as an office and equipment repair facility for Byson's Cinders.

D. Concurrency

Pursuant to Section 25-2-46, Concurrency Requirements of the Hawaii County Zoning Code, the County requires a traffic impact analysis report (TIAR) of major developments be prepared or updated within six (6) months before the submission of any change of zone that can generate 50 or more peak hour trips. The TIAR shall include projections for future traffic growth for a minimum of five-, ten- and twenty-

years including other approved or proposed development expected to impact the area with reasonable assumptions about the build-out of such development. Based on the current recession and economic conditions, we can only assume that future development within the area of the Project over the next five years will be limited. Based on the projected growth in traffic in this area, the Project will have a minimal impact on the traffic conditions in the general area.

There are several parcels in the area of study that could be developed during the five-to twenty-year period. The following is a list of these parcels:

TMK	Size in Acres
(3)1-5-007:005	10.00
(3)1-5-007:023	5.60
(3)1-5-007:007	9.57

Under the present circumstances, it is difficult to predict when and if these parcels will develop, and with what zoning. Therefore, it is assumed that their impact will be part of the 1% annum increase in traffic volume used in this report.

E. Assumptions

1. Sixty-two percent of the shopping center traffic enters the development by way of the Kahakai Boulevard extension.
2. Forty-eight percent of the shopping center traffic exits the development by way of the Kahakai Boulevard extension.
3. Thirty percent of the shopping center traffic enters the development by way of the center driveway on Old Pahoa Village Road
4. Forty percent of the shopping center traffic exits the development by way of the center driveway on Old Pahoa Village Road
5. Eight percent of the shopping center traffic enters the development by way of the south driveway on Old Pahoa Village Road
6. Twelve percent of the shopping center traffic exits by way of the south driveway on Old Pahoa Village Road
7. Based upon conversations with the County of Hawaii traffic engineer, an annual increase in traffic of one percent is assumed for this report.
8. Directional distribution is based upon the directional distribution of the traffic counts except for Center Driveway and with those exiting through Kahakai Boulevard the right turn is weighted.
9. Center Driveway allows for all turning movements, but assumes minimal left-turn-out.
10. South Driveway allows for all turning movements
11. Buildout is estimated to be December, 2014.

12. Twenty-five percent of trips generated are from pass-by traffic.
13. Shopping Center traffic remains constant.

IV. ANALYSIS OF EXISTING CONDITIONS

A. Physical Characteristics

Kahakai Boulevard is a two-lane thoroughfare with left turn lanes in the center. It has curb, gutter and sidewalk on the Woodland Center side. Old Pahoa village Rd is a two-lane road with left turn lanes. Malama Market Road is actually part of the Old Pahoa Village Road before the By Pass. Speed limits throughout the area are 30 mph and 45 mph on the By Pass.

B. Traffic Volumes

Traffic counts were take at four locations as follows:

Kahakai Boulevard and Old Pahoa Village Road
 Keaau-Pahoa Bypass and Old Pahoa Village Road
 Malama Market Rd and Old Pahoa Village Road
 Kahakai Boulevard and Keaau-Pahoa Bypass

These counts were performed on August 31, 2011 and September 1, 2011. The following is the peak hour tabulation.

TABLE 2 PEAK HOUR TABULATION

<i>Location</i>	<i>Peak Hour</i>	<i>Vehicles Per Hour (vph)</i>
Kahakai Blvd & Old Pahoa Village Road	7:15 AM to 8:15 AM	662
Kahakai Blvd & Old Pahoa Village Road	4:15 PM to 5:15 PM	872
Keaau-Pahoa Bypass & Old Pahoa Village Road	7:15 AM to 8:15 AM	1470
Keaau-Pahoa Bypass & Old Pahoa Village Road	3:30 PM to 4:30 PM	1767
Malama Market Road and Old Pahoa Village Road	7:15 AM to 8:15 AM	824
Malama Market Road and Old Pahoa Village Road	4:00 PM to 5:00 PM	1052
Kahakai Boulevard & Keaau-Pahoa Bypass	7:15 AM to 8:15 AM	1170

<i>Location</i>	<i>Peak Hour</i>	<i>Vehicles Per Hour (vph)</i>
Kahakai Boulevard & Keaau-Pahoa Bypass	4:00 PM to 5:00 PM	1019

For clarification purposes, the directional traffic flow is as follows:

Eastbound– traveling from the west to the east. An eastbound left would be making a left turn from traveling eastbound. An eastbound right would be making a right turn from the eastbound travel.

Westbound– traveling from east to west. A westbound left would be making a left turn from traveling westbound. A eastbound right would be making a right turn from the westbound travel.

Northbound– traveling from south to north. A northbound left would be making a left turn from traveling northbound. A northbound right would be making a right turn from the northbound travel.

Southbound– traveling from north to south. A southbound left would be making a left turn from traveling southbound. A southbound right would be making a right turn from the southbound travel.

TABLE 3 TRAFFIC COUNTS FOR PEAK HOURS

<i>Movement</i>	<i>AM</i>	<i>PM</i>	<i>AM**</i>	<i>PM**</i>
Kahakai Boulevard and Old Pahoa Village Road				
Westbound Left	30	42	30	42
Westbound Right	55	99	56	100
Northbound Through	171	207	173	209
Northbound Right	71	123	72	124
Southbound Left	102	145	103	146
Southbound Through	233	256	235	259
Keaau-Pahoa Bypass and Old Pahoa Village Road				
Eastbound Through	408	387	412	391
Eastbound Right	254	304	257	307
Westbound Left	140	113	141	114

<i>Movement</i>	<i>AM</i>	<i>PM</i>	<i>AM**</i>	<i>PM**</i>
Westbound Through	446	300	450	303
Northbound Left	177	260	179	263
Northbound Right	45	103	45	104
Malama Market Road and Old Pahoa Village Road				
Eastbound Left	99	168	100	170
Eastbound Right	97	161	98	163
Northbound Left	75	131	76	132
Northbound Through	151	175	153	177
Southbound Through	244	227	246	229
Southbound Right	158	190	160	192
Kahakai Boulevard and Keaau-Pahoa Bypass				
Eastbound Through	442	446	446	450
Eastbound Right	36	53	36	54
Westbound Through	603	383	609	386
Northbound Right*	89	137	90	138

*For computing purposes, Kahakai Blvd is assumed to be northbound/southbound and Keaau-Pahoa Bypass, eastbound/westbound.

**One year adjustment at 1% per year.

C. Level of Service

Level of service is defined as “a qualitative measure describing operational conditions within a traffic stream; generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.” There are six levels of operational conditions defined as follows:

Level of Service A	Little or no traffic delays
Level of Service B	Short traffic delays
Level of Service C	Average traffic delays
Level of Service D	Long traffic delays
Level of Service E	Very long traffic delays
Level of Service F	Extreme traffic delays

Levels of service were calculated for these intersections using the data gathered on August 31, 2011 and September 1, 2011. The following table shows the existing conditions.

TABLE 4 LEVELS OF SERVICE

<i>Movement</i>	<i>AM</i>	<i>PM</i>
Kahakai Boulevard and Old Pahoa Village Road		
Westbound Left	B	C
Westbound Right	A	B
Southbound Through	A	A
Kaau-Pahoa Bypass and Old Pahoa Village Road		
Westbound Left	A	A
Northbound Left	F	F
Northbound Right	B	B
Malama Market Road and Old Pahoa Village Road		
Eastbound Left	C	B
Eastbound Right	B	B
Northbound Left	A	A
Kahakai Boulevard and Kaau-Pahoa Bypass		
Northbound Right*	B	B

*For computing purposes, Kahakai Blvd is assumed to be northbound/southbound and Kaau-Pahoa Bypass, eastbound/westbound.

V. PROJECTED TRAFFIC

A. Methodology

Highway capacity analysis was performed in accordance with the "Highway Capacity Manual, Special Report 209, 2nd Edition" of the Transportation Research Board (1992) and the Highway Capacity Software from the Federal Highway Administration and McTrans, University of Florida, Gainesville, Florida. Levels of service for the various intersections were computed for the existing condition in accordance with the Highway Capacity Manual.

Level of service has been defined previously. Level of service calculations and volume-capacity-ratios are tabulated herein for both AM and PM peaks for existing and the

post development condition. Each intersection is diagramed in the appendix showing existing and post development conditions.

The trip generation methodology used in this report is based upon applications developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation", 8th Edition, 2011. Trip generations have been developed for a variety of land uses (or facility types) which correlate trips with dwelling units, area, population, vehicle ownership and intensity of use. Each facility type has a catalog number for identification purposes. As an example, Classification 210, single-family detached, is used when determining trip generation for an RS Subdivision. The various uses for this development are listed below.

B. Trip Generation

As stated previously, the shopping center will have a multitude of different business, retail sales, eating establishments and medical facilities. The following is a tabulation of these various businesses with land use codes from ITE, "Trip Generation", 8th Edition, 2011.

TABLE 5 TRIP GENERATION

Facility	Land Use Code	Area 1000ft ²	AM					PM				
			Trip Gen	Enter		Exit		Trip Gen	Enter		Exit	
				%	Trip	%	Trip		%	Trip	%	Trip
Super Market	850	40	3.59	49	70	51	73	10.50	53	222	47	197
Paint & Hardware	816	10	4.91	52	26	48	24	4.74	54	26	46	22
Garden Center	817	10	1.34	52	7	48	6	3.80	51	19	49	19
Specialty Retail	814	5	6.84	48	16	52	18	2.71	44	6	56	8
Specialty Retail	814	5	6.84	48	16	52	18	2.71	44	6	56	8
Specialty Retail	814	8	6.84	48	26	52	28	2.71	44	10	56	12
Quality Restaurant	931	5	5.57	82	23	50	5	9.02	62	28	38	17
Quality Restaurant	931	2.853	5.57	82	13	18	3	9.02	62	16	38	10
Post Office	732	2	12.19	49	12	13	12	14.67	51	15	49	14
Dental	720	5.04	3.62	66	12	51	10	4.45	40	9	60	13
Medical Clinic*	630	11.25	31.45*	50	39	34	39	31.45*	50	39	50	39
Totals		105.14			260	50	236			396		359

*Per weekday per 1,000 ft² for 9-hour period

C. Traffic Distribution

Since this development will be at the intersection of Kahakai Boulevard and Old Pahoa Village Road, traffic directional distribution will be based upon the existing directional distribution and the assumptions previously made. Traffic traveling toward the intersection will determine the directional distribution for entering the shopping center, and traffic leaving the intersection will determine the directional distribution of the traffic exiting the shopping center. The following table shows this relationship.

TABLE 6 TRIP DISTRIBUTION DIRECTIONALS

<i>Direction</i>	<i>Percentage</i>	
	<i>AM</i>	<i>PM</i>
To the intersection		
Northbound	37	38
Southbound	50	46
Westbound	13	16
Away from the intersection		
Northbound	34	35
Southbound	40	34
Eastbound	26	31

The other three intersection turning movements are based upon the existing directional distribution determined by the traffic counts.

D. Trip Assignments

Trips were assigned in accordance with the above traffic distribution discussion. For comparison purposes, the distribution and assignment is shown for the existing condition and future conditions on the following table.

TABLE 7 TRIP DISTRIBUTION AND ASSIGNMENT

<i>Direction</i>	<i>AM</i>					<i>PM</i>				
	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr 2017</i>	<i>10 Yr 2022</i>	<i>20 Yr 2032</i>	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr 2017</i>	<i>10 Yr 2022</i>	<i>20 Yr 2032</i>
KAHAKAI BOULEVARD & OLD PAHOA VILLAGE ROAD										
Eastbound Left		38	38	38	38		60	60	60	60
Eastbound Through		30	30	30	30		53	53	53	53
Eastbound Right		45	45	45	45		59	59	59	59
Westbound Left	30	30	32	33	37	42	39	41	43	48
Westbound Through		20	20	20	20		40	40	40	40
Westbound Right	56	45	47	50	55	100	92	97	102	112
Northbound Left		60	60	60	60		93	93	93	93
Northbound Through	173	169	178	187	206	209	124	132	139	154
Northbound Right	72	72	76	80	88	124	76	80	83	92
Southbound Left	103	97	102	107	118	146	136	143	150	166
Southbound Through	235	221	232	244	270	259	239	253	266	294
Southbound Right		81	81	81	81		113	113	113	113
KEAAU-PAHOA BYPASS & OLD PAHOA VILLAGE ROAD										
Eastbound Through	412	412	433	455	503	391	391	411	432	477
Eastbound Right	254	278	307	339	339	307	334	351	369	408
Westbound Left	141	154	162	170	188	114	124	130	137	157
Westbound Through	450	450	493	497	549	303	303	318	335	370
Northbound Left	179	200	210	221	244	263	250	263	276	305
Northbound Right	45	50	53	55	61	104	99	104	109	121
MALAMA MARKET ROAD & OLD PAHOA VILLAGE ROAD										
Eastbound Left	100	100	105	110	122	170	170	179	188	207
Eastbound Right	98	113	118	123	135	163	224	235	247	273
Northbound Left	76	80	84	88	97	132	119	125	131	145

<i>Direction</i>	<i>AM</i>					<i>PM</i>				
	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr 2017</i>	<i>10 Yr 2022</i>	<i>20 Yr 2032</i>	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr 2017</i>	<i>10 Yr 2022</i>	<i>20 Yr 2032</i>
Northbound Through	153	177	185	193	211	177	159	167	175	194
Southbound Through	246	283	296	309	337	229	266	279	294	325
Southbound Right	160	160	168	177	195	192	192	202	212	234
KAHAKAI BOULEVARD & KEAAU-PAHOA BYPASS										
Eastbound Through	446	446	469	493	544	450	450	473	497	549
Eastbound Right	36	56	59	60	64	54	94	97	100	106
Westbound Through	609	609	640	673	743	386	386	406	426	471
Northbound Right	90	116	121	125	137	138	191	198	205	221
SOUTH DRIVEWAY										
Eastbound Left		13	13	13	13		4	4	4	4
Eastbound Right		15	15	15	15		39	39	39	39
Northbound Left		10	10	10	10		14	14	14	14
Northbound Through		315	331	348	384		330	347	365	402
Southbound Through		328	344	381	400		385	405	425	470
Southbound Right		11	11	11	11		18	18	18	18
CENTER DRIVEWAY										
Eastbound Left		10	10	10	10		14	14	14	14
Eastbound Right		84	84	84	84		130	130	130	130
Northbound Left		37	37	37	37		53	53	53	53
Northbound Through		291	306	321	355		281	295	310	343
Southbound Through		255	268	282	311		273	286	302	333
Southbound Right		41	41	41	41		66	66	66	66

VI. LEVEL OF SERVICE COMPUTATIONS

Level of service computations were performed for the existing condition and future conditions for each of the intersections. Computations were for both, with and without. A roundabout on Keaau-Pahoa Bypass Road and Old Pahoa Village Road.

TABLE 8 LEVELS OF SERVICE

Direction	AM					PM				
	Exist	Build Out	5 Yr	10 Yr	20 Yr	Exist	Build Out	5 Yr	10 Yr	20 Yr
KAHAKAI BOULEVARD & OLD PAHOA VILLAGE ROAD										
Eastbound Left		C	C	D	D		D	E	E	F
Eastbound Through		C	C	D	D		C	C	C	C
Eastbound Right		A	A	B	B		C	C	C	C
Westbound Left	A	C	C	C	D	C	D	E	E	F
Westbound Through		C	C	C	D	B	C	C	C	C
Westbound Right	A	A	A	A	A		C	C	C	C
Northbound Left		A	A	A	A		A	A	A	A
Northbound Through		A	A	A	A		A	A	A	A
Southbound Left	A	A	A	A	A	A	A	A	A	A
Southbound Through						A				
Approach Delay	11.3	EB 17.5	18.7	19.2	21.5	12.7	23.4	25.1	27.0	33.72
		WB 15.7	16.6	17.0	18.8		20.1	21.2	22.6	27.0
Approach LOS	B	EB C	C	C	C	B	C	D	D	D
		WB C	C	C	C		C	C	C	C
KEAAU-PAHOA BYPASS & OLD PAHOA VILLAGE ROAD (WITHOUT ROUNDABOUT)										
Westbound Left	A	A	A	A	A	A	A	A	A	A
Northbound Left	F	F	F	F	F	F	F	F	F	F
Northbound Right	B	B	B	B	B	B	B	B	B	B
Control Delay WB	8.6	8.6	8.7	8.8	9.1	8.4	8.4	8.5	8.6	8.8
Approach Delay NB	98.5	239.9	474.4	708.7	146.9	89.5	98.9	194.5	357	868.4
Approach LOS NB	F	F	F	F	F	F	F	F	F	F

<i>Direction</i>	<i>AM</i>					<i>PM</i>				
	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr</i>	<i>10 Yr</i>	<i>20 Yr</i>	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr</i>	<i>10 Yr</i>	<i>20 Yr</i>
KEAAU-PAHOA BYPASS & OLD PAHOA VILLAGE ROAD (WITH ROUNDABOUT)										
Approach Delay EB	–	7.84	8.39	10.68	9.63	–	8.04	8.39	8.83	10.01
Approach LOS EB	–	A	A	B	A	–	A	A	A	B
Approach Delay WB	–	7.30	7.81	7.97	8.81	–	6.55	6.80	7.07	7.69
Approach LOS WB	–	A	A	A	A	–	A	A	A	A
Approach Delay NB	–	8.52	9.01	9.59	11.04	–	9.18	9.78	10.48	12.28
Approach LOS NB	–	A	A	A	B	–	A	A	B	B
Intersection Delay	–	8.00	8.51	9.89	10.01	–	8.40	8.86	9.40	10.80
Intersection LOS	–	A	A	A	B	–	A	A	A	B
MALAMA MARKET ROAD & OLD PAHOA VILLAGE ROAD										
Eastbound Left	B	C	C	C	E	C	C	C	D	E
Eastbound Right	B	B	B	B	B	B	B	B	B	B
Northbound Left	A	A	A	A	A	A	A	A	A	A
Control Delay NB	7.9	8.0	8.0	8.1	8.1	7.9	8.0	8.0	8.1	8.2
Approach Delay EB	12.4	13.1	13.6	14.1	15.6	16.1	16.1	17.1	18.6	23.5
Approach LOS EB	B	B	B	B	C	C	C	C	C	C
KAHAKAI BOULEVARD & KEAAU-PAHOA BYPASS										
Northbound Right*	B	B	B	B	B	B	B	B	B	C
Approach Delay	11.8	12.2	12.5	12.9	13.9	12.5	13.2	14.1	14.7	16.3
Approach LOS	B	B	B	B	B	B	B	B	B	C
SOUTH DRIVEWAY										
Eastbound Left		B	B	B	B		B	B	B	B
Eastbound Right		B	B	B	B		B	B	B	B
Northbound Left		A	A	A	A		A	A	A	A
Control Delay EB		12.0	12.3	12.8	13.3		11.3	11.5	11.7	12.2
Control Delay NB		7.9	8.0	8.1	8.1		8.1	8.2	8.2	8.4

<i>Direction</i>	<i>AM</i>					<i>PM</i>				
	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr</i>	<i>10 Yr</i>	<i>20 Yr</i>	<i>Exist</i>	<i>Build Out</i>	<i>5 Yr</i>	<i>10 Yr</i>	<i>20 Yr</i>
Approach Delay		12.0	12.3	12.8	13.3		11.3	11.5	11.7	12.2
Approach LOS		B	B	B	B		B	B	B	B
CENTER DRIVEWAY										
Eastbound Left		B	B	B	C		B	B	B	C
Eastbound Right		B	B	B	B		B	B	B	B
Northbound Left		A	A	A	A		A	A	A	A
Control Delay EB		10.6	13.9	14.3	15.1		14.5	14.8	15.3	16.2
Control Delay NB		7.9	7.9	8.0	8.0		8.1	8.1	8.1	8.7
Approach Delay		10.6	10.7	10.9	11.2		11.3	11.4	11.6	12.0
Approach LOS		B	B	B	B		B	B	B	B

*For computing purposes, Kahakai Blvd is assumed to be northbound/southbound and Keaau-Pahoa Bypass, eastbound/westbound.

VII. DISCUSSION

A. *Keaau-Pahoa Bypass Road and Old Pahoa Village Road*

From the traffic counts it was found that the level of service for Old Pahoa Village Road at the Keaau-Pahoa Bypass Road is already at level of service "F". This, during peak hours, caused some backups past Malama Market Road, particularly in the morning. The State Department of Transportation (DOT) is taking mitigating measures to correct this problem immediately, whether this project proceeds or doesn't proceed. It is understood that DOT has a consultant to design a roundabout for this location and it is nearly finished (a copy of the layout is included). Construction is scheduled to be completed by 2013, a year ahead of this project's buildout.

With the roundabout in place, the levels of service can be expected to be no worse than "B" for all movements at this location. The queue for the AM Peak will be reduced from 11.70 vehicle lengths for the AM existing on Old Pahoa Village Road to 2.7 vehicle lengths on Keaau-Pahoa Bypass Road eastbound and 2.1 vehicle lengths northbound on Old Pahoa Village Road twenty years out. The PM Peak situation should be much the same, 15.95 vehicle lengths northbound on Old Pahoa Village Road to 3.0 vehicle lengths. The geometry of the roundabout design appears to have queue space to meet this requirement.

Currently Malama Market Road is adversely affected by the back up of traffic northbound at the Keaau-Pahoa Bypass Road on Old Pahoa Village Road. The queue sometimes blocks the intersection at Malama Market Road. The existing condition is 11.70 vehicle lengths in the AM Peak and 15.95 vehicle lengths in the PM Peak. This situation will be mitigated by the construction of the roundabout at Keaau-Pahoa Bypass Road and Old Pahoa Village Road. The worst case for the queue occurs twenty years out in the PM Peak with three vehicle lengths.

B. *Malama Market Road and Old Pahoa Village Road*

The Malama Market Road intersection is expected to have a level of service "B" to "C" through the twenty years for both AM and PM peaks with the eastbound left level of service being as low as "D" and "E" ten and twenty years out. However, it is our recommendation that this intersection be re-routed to the roundabout rather than using Old Pahoa Village Road.

It should also be noted, according to the County's traffic engineer, that during the construction of the roundabout, traffic will be routed through the access to Malama Market Road. The possibility may exist that the northwest end of this access be left in operation after the construction of the roundabout.

The queue eastbound has been computed to be 1.5 vehicle lengths for the AM Peak and 5.05 vehicle lengths in the PM Peak at twenty years. Currently there does not appear to be enough storage to accommodate these lengths as existing or in the roundabout design.

C. *Keaau-Pahoa Bypass Road and Kahakai Boulevard*

The intersection of the Keaau-Pahoa Bypass and Kahakai Boulevard is basically a right turn in and right turn out intersection. Eastbound traffic exits right from the Bypass road to Kahakai Boulevard, and Kahakai Boulevard exits right onto the Bypass road to proceed eastbound. This intersection does not need any improvements for the twenty year period. The AM Peak level of service twenty years out has been computed to be a "B" with only 13.9 sec/veh approach delay. For the PM Peak the computed level of service is a "C" for twenty years in the future with a 16.3 sec/veh approach delay. In both cases, the queue length are 1.01 vehicle lengths for the AM Peak and 2.06 vehicle lengths for the PM. The geometry as now existing is adequate to accommodate these lengths. Level of service "C" is the worst case for any turning movements at this location.

D. *Old Pahoa Village Road and Kahakai Boulevard*

The intersection of Old Pahoa Village Road and Kahakai Boulevard is the principal intersection in this discussion. Initially (existing), it is a "T" intersection. The majority of the traffic to and from the project enters and exits through this

intersection. The County has directed the developer to extend Kahakai Boulevard so that most of the traffic enters and exits the project along this new thoroughfare. The remaining traffic enters and exits from and to Old Pahoa Village Road south of this intersection. As is, the level of service for the intersection is good, with the lowest level of service of "C" in the afternoon, in the westbound left turning movement.

The design for an intersection to serve the project has left turn lanes for each of the four directions. Southbound into the intersection, the design is for designated lanes for southbound left, southbound through and southbound right. For the other directions— westbound, eastbound and northbound, the through and right turn movements are shared with sufficient room for the right turn movement to store one vehicle to the side of the lane.

Level of service calculations were performed for the buildout through twenty years with the assumption that 25% of the generated traffic comes from the existing traffic. As such, the operating level of service for all movements meets the State criteria that all movements have a "D" or better level of service at buildout.

At twenty years out the approach level of service for the intersection will be "C" with a "D" for eastbound left and eastbound through for the PM peak.

A signal warrant study was performed for this twenty year condition and no warrants were met for the twenty years. This is not to say that a signal may be required by the County of Hawaii in spite of the warrant study.

In the AM queuing varies from 1.45 vehicle lengths to 2.41 vehicle lengths in the eastbound direction from buildout to twenty years (worst case). In the PM, the eastbound queue varies from 0.98 vehicle lengths to 1.34 vehicle lengths. There is adequate storage for all movements. (See computer report for queue for all movements.)

E. *Center Driveway*

For the Center Driveway, it was assumed that left turn out (eastbound left) movements were minimal since it should be easier to exit by way of Kahakai Boulevard. At buildout during the AM peak hour, the level of service eastbound will be "B" and at twenty years, "C". The queue vehicle lengths were computed to be less than one for all movements. For the PM peak hour, the level of service and queue vehicle length is much the same "B" to "C" for level of service and still less than one vehicle length in the queue. Allowing eastbound left at this location does not adversely affect traffic movements at Old Pahoa Village Road and Kahakai Boulevard.

F. *South Driveway*

The South Driveway performs much like the Center Driveway. It has level of service of "B" for both AM and PM peak hours throughout the twenty years being studied. Again queue lengths are less than one vehicle length.

II CONCLUSIONS AND RECOMMENDATIONS

As stated above, the primary access to the project is through the Old Pahoa Village Road and Kahakai Boulevard intersection. Traffic enters and exits from three different directions through this intersection. The County has already made the requirement that Old Pahoa Village Road shall be widened along the project to accommodate turn lanes into and out of the project.

The lane layouts, provided by Engineers Partners, for the intersection of Old Pahoa Village Road and Kahakai Boulevard is adequate to insure a level of service of "C" for the intersection for the AM peak through the twenty-year study period. For the PM peak the intersection level of service drops to "D" for the end of the twenty-year study period. According to the signal warrant study, a signal at this location is not warranted. However, at some time late in the study period, it may become necessary to provide a signal. The lanes, as designed, have sufficient storage to satisfy queue requirements.

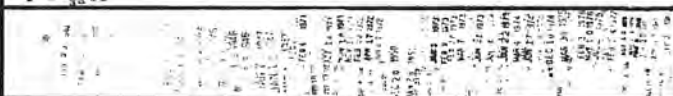
With the construction of the roundabout at the Keaau-Pahoa Bypass Road and Old Pahoa Village Road, a level of service of "B" can be maintained through the twenty-year study period. There is adequate queue available for all movements.

At the Keaau-Pahoa Bypass Road and Kahakai Boulevard intersection ?, the "as-is" configuration will provide adequate service throughout the twenty-year study period.

There is a small problem at the intersection of Malama Market Road and Old Pahoa Village Road. The Department of Transportation should re-study this area and provide a design which will provide more storage for the eastbound movement. Since this intersection is to be rebuilt with the next year by the Department of Transportation, the changes can be incorporated into its design.

This traffic study concludes that the levels of service for the primary access to the project can be maintained at acceptable levels throughout the project in compliance with the concurrency requirements for development of the project, and in compliance with traffic analysis reports of the County of Hawaii Code Section 25-2-46. The level of service can also be maintained at the secondary and tertiary accesses.

APPENDIX A
LOCATION MAP & TAX MAP KEY MAP

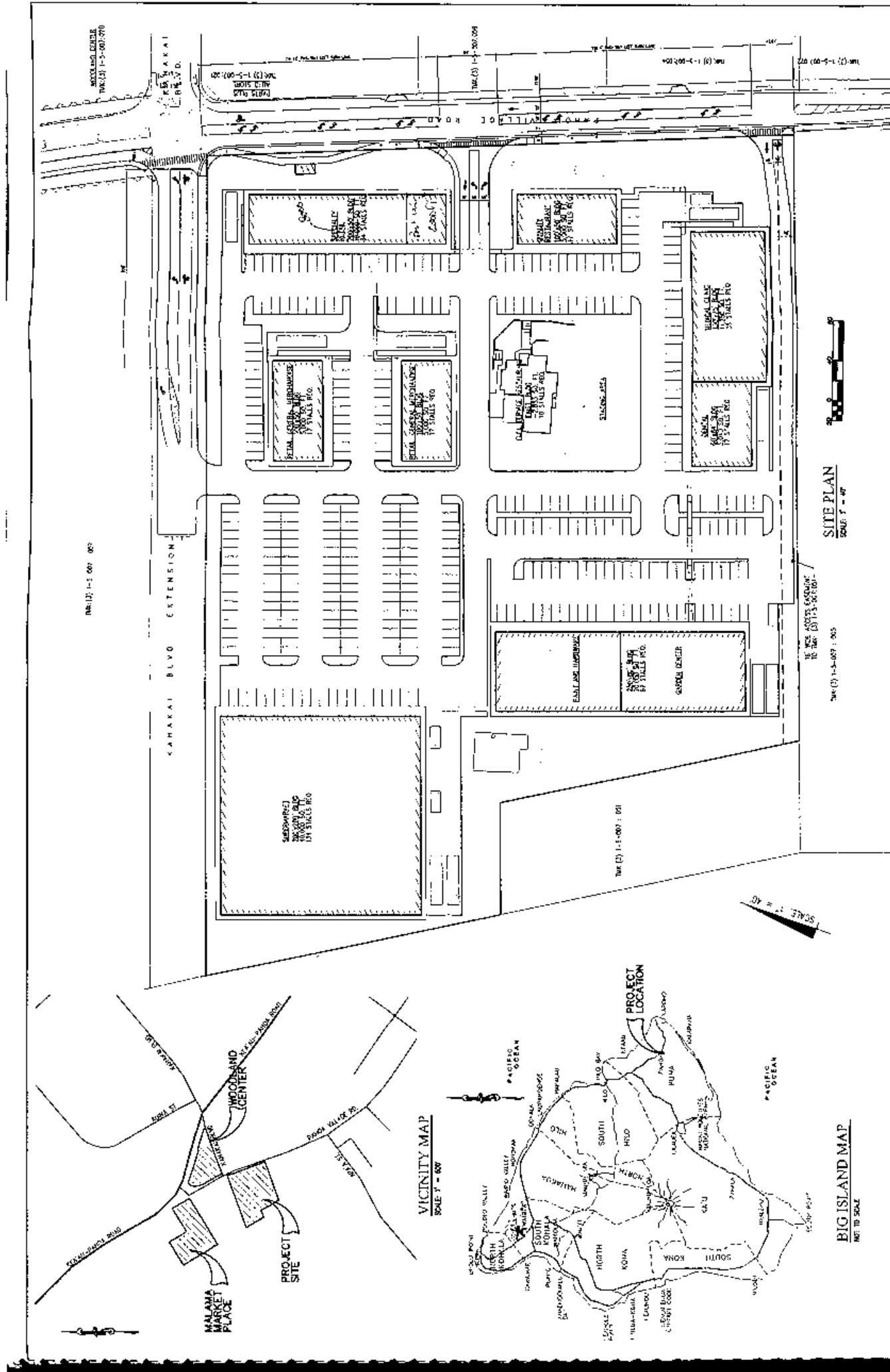


IN SET
Scale 1 in = 50 ft



THIRD	DIVISION	
ZONE	SEC.	PLAT
1	5	07
CONTAINING		PARCELS

PRINTED



APPENDIX B
LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE CRITERIA

AVERAGE TOTAL DELAY (Seconds/Vehicle)	LEVEL OF SERVICE	EXPECTED DELAY TO MINOR STREET TRAFFIC
≥5	A	Little or no delay
5.1 to 10.0	B	Short traffic delays
10.1 to 20.0	C	Average traffic delays
20.1 to 30.0	D	Long traffic delays
30.1 to 45.0	E	Very long traffic delays
>45	F	Extreme traffic delays

APPENDIX C
LEVEL OF SERVICE
KAHAKAI BLVD. & OLD PAHOA VILLAGE ROAD
SIGNALIZED INTERSECTION
AM & PM PEAK HOURS

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BEW			Intersection	TEE		
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO		
Date Performed	12/3/12			Analysis Year	Build Out		
Analysis Time Period	AM Build Out						
Project Description: Woodland TIAR Job # 602-01-11 WPVRKAMBO							
East/West Street: Kahakai Blvd				North/South Street: Old Pahoa Village Rd			
Intersection Orientation: North-South				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	60	169	72	97	221	81	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	60	169	72	97	221	81	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	0	1	1	1	1	0	
Configuration	LT		R	L		TR	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	38	30	45	30	20	45	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	38	30	45	30	20	45	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			1	
Lanes	0	1	1	0	1	1	
Configuration	LT		R	LT		R	
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LT	L	LT		R	LT	R
v (veh/h)	60	97	50		45	68	45
C (m) (veh/h)	1270	1421	270		880	274	782
v/c	0.05	0.07	0.19		0.05	0.25	0.06
95% queue length	0.15	0.22	0.68		0.16	0.98	0.18
Control Delay (s/veh)	8.0	7.7	21.4		9.3	22.5	9.9
LOS	A	A	C		A	C	A
Approach Delay (s/veh)	--	--	15.7			17.5	
Approach LOS	--	--	C			C	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/12/12			Analysis Year	Build Out			
Analysis Time Period	PM Build Out							
Project Description: Woodland TIAR Job # 602-01-11 WPVRKPMBO								
East/West Street: Kahakai Blvd				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	93	126	76	136	241	113		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	93	126	76	136	241	113		
Percent Heavy Vehicles	0	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	60	53	59	39	40	92		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	60	53	59	39	40	92		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			1		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		TR	L		TR
v (veh/h)	93	136	39		132	60		112
C (m) (veh/h)	1216	1473	167		451	181		404
v/c	0.08	0.09	0.23		0.29	0.33		0.28
95% queue length	0.25	0.31	0.90		1.23	1.45		1.14
Control Delay (s/veh)	8.2	7.7	33.1		16.3	34.7		17.3
LOS	A	A	D		C	D		C
Approach Delay (s/veh)	--	--	20.1			23.4		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	BEW		Intersection	TEE
Agency/Co.	Woodland		Jurisdiction	DOT/Hawaii CO
Date Performed	12/3/12		Analysis Year	5YR
Analysis Time Period	AM 5YR			

Project Description Woodland TIAR Job # 602-01-11 WPVRKAMR5YR

East/West Street: Kahakai Blvd

North/South Street: Old Pahoa Village Rd

Intersection Orientation: North-South

Study Period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	60	178	76	102	232	81
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	60	178	76	102	232	81
Percent Heavy Vehicles	0	—	—	0	—	—
Median Type	Undivided					
RT Channelized			1			0
Lanes	0	1	1	1	1	0
Configuration	LT		R	L		TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	38	30	45	30	31	55
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	38	30	45	30	31	55
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			1
Lanes	0	1	1	0	1	1
Configuration	LT		R	LT		R

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	L	LT		R	LT		R
v (veh/h)	60	102	61		55	68		45
C (m) (veh/h)	1259	1410	259		870	252		772
v/c	0.05	0.07	0.24		0.06	0.27		0.06
95% queue length	0.15	0.23	0.92		0.20	1.10		0.19
Control Delay (s/veh)	8.0	7.8	23.2		9.4	24.5		10.0
LOS	A	A	C		A	C		A
Approach Delay (s/veh)	--	--	16.6			18.7		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BEW			Intersection	4 Way Stop		
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO		
Date Performed	12/12/12			Analysis Year	5YR		
Analysis Time Period	PM 5Year						
Project Description: Woodland TIAR Job # 602-01-11 WPVRKPMR5Y							
East/West Street: Kahakai Blvd				North/South Street: Old Pahoa Village Rd			
Intersection Orientation: North-South				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	93	132	80	143	253	113	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	93	132	80	143	253	113	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	1	1	0	1	1	1	
Configuration	L		TR	L	T	R	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	60	53	59	41	40	97	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	60	53	59	41	40	97	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			1	
Lanes	1	1	0	1	1	0	
Configuration	L		TR	L		TR	
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L	L	L		TR	L	TR
v (veh/h)	93	143	41		137	60	112
C (m) (veh/h)	1204	1466	156		444	168	387
v/c	0.08	0.10	0.26		0.31	0.36	0.29
95% queue length	0.25	0.32	1.05		1.33	1.62	1.21
Control Delay (s/veh)	8.2	7.7	36.3		16.7	38.2	18.1
LOS	A	A	E		C	E	C
Approach Delay (s/veh)	--	--	21.2			25.1	
Approach LOS	--	--	C			D	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/ Hawaii CO			
Date Performed	12/3/12			Analysis Year	10YR			
Analysis Time Period	AM 10YR							
Project Description: Woodland TIAR Job # 602-01-11 WPVRKAMR10YR								
East/West Street: Kahakai Blvd				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	60	187	80	107	244	81		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	60	187	80	107	244	81		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration	LT		R	L		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	38	30	45	33	20	50		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	38	30	45	33	20	50		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			1		
Lanes	0	1	1	0	1	1		
Configuration	LT		R	LT		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	L	LT		R	LT		R
v (veh/h)	60	107	53		50	68		45
C (m) (veh/h)	1246	1399	242		860	246		760
v/c	0.05	0.08	0.22		0.06	0.28		0.06
95% queue length	0.15	0.25	0.83		0.19	1.13		0.19
Control Delay (s/veh)	8.0	7.8	24.0		9.4	25.2		10.0
LOS	A	A	C		A	D		B
Approach Delay (s/veh)	--	--	17.0			19.2		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	4 Way Stop			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/12/12			Analysis Year	10YR			
Analysis Time Period	PM 10Year							
Project Description: Woodland TIAR Job # 602-01-11 WPVRKPM10YR								
East/West Street: Kahakai Blvd				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	93	139	83	150	266	113		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	93	139	83	150	266	113		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	60	53	59	43	40	102		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	60	53	59	43	40	102		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			1		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		TR	L		TR
v (veh/h)	93	150	43		142	60		112
C (m) (veh/h)	1191	1457	146		434	156		372
v/c	0.08	0.10	0.29		0.33	0.38		0.30
95% queue length	0.25	0.34	1.22		1.44	1.81		1.28
Control Delay (s/veh)	8.3	7.8	39.9		17.3	42.3		18.8
LOS	A	A	E		C	E		C
Approach Delay (s/veh)	--	--	22.6			27.0		
Approach LOS	--	--	C			D		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	20YR			
Analysis Time Period	AM 20Years							
Project Description: Woodland TIAR Job # 602-01-11 WPVRKAM20Y								
East/West Street: Kahakai Blvd				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	60	206	88	118	270	81		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	60	206	88	118	270	81		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration	LT		R	L		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	38	30	45	37	20	55		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	38	30	45	37	20	55		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			1		
Lanes	0	1	1	0	1	1		
Configuration	LT		R	LT		R		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	L	LT		R	LT		R
v (veh/h)	60	118	57		55	68		45
C (m) (veh/h)	1219	1377	215		840	218		735
v/c	0.05	0.09	0.27		0.07	0.31		0.06
95% queue length	0.16	0.28	1.07		0.21	1.34		0.20
Control Delay (s/veh)	8.1	7.9	27.8		9.6	29.0		10.2
LOS	A	A	D		A	D		B
Approach Delay (s/veh)	--	--	18.8			21.5		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	4 Way Stop			
Agency/Co.	Woodland			Jurisdiction	DOT/ Hawaii CO			
Date Performed	12/12/12			Analysis Year	20YR			
Analysis Time Period	PM 20Year							
Project Description: Woodland TIAR Job # 602-01-11 WPVRKPM20YR								
East/West Street: Kahakai Blvd				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	93	154	92	166	294	113		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	93	154	92	166	294	113		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	60	53	59	48	40	112		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	60	53	59	48	40	112		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			1		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		TR	L		TR
v (veh/h)	93	166	48		152	60		112
C (m) (veh/h)	1163	1439	123		410	130		337
v/c	0.08	0.12	0.39		0.37	0.46		0.33
95% queue length	0.26	0.39	1.83		1.74	2.41		1.47
Control Delay (s/veh)	8.4	7.8	52.7		18.9	55.9		21.0
LOS	A	A	F		C	F		C
Approach Delay (s/veh)	--	--	27.0			33.2		
Approach LOS	--	--	D			D		

APPENDIX D
LEVEL OF SERVICE
KEAAU-PAHOA BYPASS RD. & OLD PAHOA VILLAGE RD.
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	Build Out			
Analysis Time Period	AM Build Out							
Project Description Woodland TIAR Job # 602-01-11 WKPBPPOPVAMBO								
East/West Street: Keeaau Pahoa Bypass				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		412	278	154	450			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	412	278	154	450	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	200		50					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	200	0	50	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		154	200		50			
C (m) (veh/h)		1158	186		644			
v/c		0.13	1.08		0.08			
95% queue length		0.46	21.17		0.25			
Control Delay (s/veh)		8.6	297.2		11.1			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	239.9					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	Build Out			
Analysis Time Period	PM Build Out							
Project Description Woodland TIAR Job # 602-01-11 WKPBPVPVPMBO								
East/West Street: Kaaau-Pahoa Bypass				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		391	334	124	303			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	391	334	124	303	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	250		99					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	250	0	99	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		124	250		99			
C (m) (veh/h)		1179	263		662			
v/c		0.11	0.95		0.15			
95% queue length		0.35	16.39		0.53			
Control Delay (s/veh)		8.4	133.6		11.4			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	98.9					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	9/8/2011 12/3/12			Analysis Year	5 YR			
Analysis Time Period	AM 5YR							
Project Description Woodland TIAR Job # 602-01-11 WKPBP0PVAM5Y								
East/West Street: Keeaau Pahoa Bypass				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		433	307	162	493			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	433	307	162	493	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	210		53					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	210	0	53	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		162	210		53			
C (m) (veh/h)		1137	166		627			
v/c		0.14	1.27		0.08			
95% queue length		0.50	31.88		0.28			
Control Delay (s/veh)		8.7	591.3		11.3			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	474.4					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	9/8/2011 12/3/12			Analysis Year	5YR			
Analysis Time Period	PM 5YR							
Project Description Woodland TIAR Job # 602-01-11 WKBPPOPVPM5Y								
East/West Street: Kaaau-Pahoa Bypass				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		411	351	130	318			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	411	351	130	318	0		
Percent Heavy Vehicles	0	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	263		104					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	263	0	104	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		130	263		104			
C (m) (veh/h)		1159	245		645			
v/c		0.11	1.07		0.16			
95% queue length		0.38	24.87		0.58			
Control Delay (s/veh)		8.5	266.8		11.7			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	194.5					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	10YR			
Analysis Time Period	AM 10YR							
Project Description Woodland TIAR Job # 602-01-11 WKPBP0PVAM10Y								
East/West Street: Keeaau Pahoa Bypass				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		455	339	170	497			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	455	339	170	497	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	221		55					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	221	0	55	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		170	221		55			
C (m) (veh/h)		1116	154		609			
v/c		0.15	1.44		0.09			
95% queue length		0.54	41.49		0.30			
Control Delay (s/veh)		8.8	882.2		11.5			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	708.7					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY									
General Information					Site Information				
Analyst	BEW				Intersection	TEE			
Agency/Co.	Woodland				Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12				Analysis Year	10YR			
Analysis Time Period	PM 10YR								
Project Description Woodland TIAR Job # 602-01-11 WKP8POPVPM10Y									
East/West Street: Kaaau-Pahoa Bypass					North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West					Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments									
Major Street	Eastbound			Westbound					
Movement	1	2	3	4	5	6			
	L	T	R	L	T	R			
Volume (veh/h)		432	369	137	335				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	0	432	369	137	335	0			
Percent Heavy Vehicles	0	--	--	0	--	--			
Median Type	Undivided								
RT Channelized			1			0			
Lanes	0	1	1	1	1	0			
Configuration		T	R	L	T				
Upstream Signal		0			0				
Minor Street	Northbound			Southbound					
Movement	7	8	9	10	11	12			
	L	T	R	L	T	R			
Volume (veh/h)	276		109						
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	276	0	109	0	0	0			
Percent Heavy Vehicles	0	0	0	0	0	0			
Percent Grade (%)	0			0					
Flared Approach		N			N				
Storage		0			0				
RT Channelized			1			0			
Lanes	1	0	1	0	0	0			
Configuration	L		R						
Delay, Queue Length, and Level of Service									
Approach	Eastbound	Westbound	Northbound			Southbound			
Movement	1	4	7	8	9	10	11	12	
Lane Configuration		L	L		R				
v (veh/h)		137	276		109				
C (m) (veh/h)		1138	226		628				
v/c		0.12	1.22		0.17				
95% queue length		0.41	36.38		0.63				
Control Delay (s/veh)		8.6	493.3		11.9				
LOS		A	F		B				
Approach Delay (s/veh)	--	--	357.0						
Approach LOS	--	--	F						

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/ Hawaii CO			
Date Performed	12/3/12			Analysis Year	20YR			
Analysis Time Period	AM 20YR							
Project Description Woodland TIAR Job # 602-01-11 WKPBPPOPVAM20Y								
East/West Street: Keeaau Pahoa Bypass				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		503	339	188	549			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	503	339	188	549	0		
Percent Heavy Vehicles	0	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	244		61					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	244	0	61	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		188	244		61			
C (m) (veh/h)		1072	124		573			
v/c		0.18	1.97		0.11			
95% queue length		0.64	65.58		0.36			
Control Delay (s/veh)		9.1	1833		12.0			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	1469					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	20YR			
Analysis Time Period	PM 20YR							
Project Description: Woodland TIAR Job # 602-01-11 WKPBPQVPM20Y								
East/West Street: Kaaau-Pahoa Bypass				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		477	408	157	370			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	477	408	157	370	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	305		121					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	305	0	121	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		157	305		121			
C (m) (veh/h)		1096	187		592			
v/c		0.14	1.63		0.20			
95% queue length		0.50	65.94		0.77			
Control Delay (s/veh)		8.8	1208		12.6			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	868.4					
Approach LOS	--	--	F					

APPENDIX E
LEVEL OF SERVICE
MALAMA MARKET RD. & OLD PAHOA VILLAGE RD.
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BEW			Intersection	TEE		
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO		
Date Performed	12/3/12			Analysis Year	Build Out		
Analysis Time Period	AM Build Out						
Project Description Woodland TIAR Job # 602-01-11 WOPVMMAMBO							
East/West Street: Malama Mkt				North/South Street: Old Pahoa Village Rd			
Intersection Orientation: North-South				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	80	177			283	160	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	80	177	0	0	283	160	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			1			1	
Lanes	1	1	0	0	1	1	
Configuration	L	T			T	R	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	100		113				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	100	0	113	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			1	
Lanes	1	0	1	0	0	0	
Configuration	L		R				
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L					L	R
v (veh/h)	80					100	113
C (m) (veh/h)	1291					427	761
v/c	0.06					0.23	0.15
95% queue length	0.20					0.91	0.52
Control Delay (s/veh)	8.0					16.0	10.6
LOS	A					C	B
Approach Delay (s/veh)	--	--				13.1	
Approach LOS	--	--				B	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	Build Out			
Analysis Time Period	PM Build Out							
Project Description: Woodland TIAR Job # 602-01-11 WOPVMPMBO								
East/West Street: Malama Mkt				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	119	159			266	192		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	119	159	0	0	266	192		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		1			1			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	170		224					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	170	0	224	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			1		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	119					170		224
C (m) (veh/h)	1309					387		753
v/c	0.09					0.44		0.30
95% queue length	0.30					2.30		1.26
Control Delay (s/veh)	8.0					21.5		11.8
LOS	A					C		B
Approach Delay (s/veh)	--	--				16.0		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	5YR			
Analysis Time Period	AM 5YR							
Project Description: Woodland TIAR Job # 602-01-11 WOPVMMAM5Y								
East/West Street: Malama Mkt				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	84	185			296	168		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	84	185	0	0	296	168		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	105		118					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	105	0	118	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			1		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	84					105		118
C (m) (veh/h)	1277					409		748
v/c	0.07					0.26		0.16
95% queue length	0.21					1.03		0.56
Control Delay (s/veh)	8.0					16.8		10.7
LOS	A					C		B
Approach Delay (s/veh)	--	--				13.6		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	5YR			
Analysis Time Period	PM 5YR							
Project Description: Woodland TIAR Job # 602-01-11 WOPVMMPM5Y								
East/West Street: Malama Mkt				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	125	167			279	202		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	125	167	0	0	279	202		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		1			1			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	179		235					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	179	0	235	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			1		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	125					179		235
C (m) (veh/h)	1308					378		706
v/c	0.10					0.47		0.33
95% queue length	0.32					2.63		1.49
Control Delay (s/veh)	8.0					23.0		12.6
LOS	A					C		B
Approach Delay (s/veh)	--	--				17.1		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	10YR			
Analysis Time Period	AM 10YR							
Project Description Woodland TIAR Job # 602-01-11 WOPVMMAM10Y								
East/West Street: Malama Mkt				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	88	193			309	177		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	88	193	0	0	309	177		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	110		123					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	110	0	123	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			1		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	88					110		123
C (m) (veh/h)	1263					392		736
v/c	0.07					0.28		0.17
95% queue length	0.22					1.16		0.60
Control Delay (s/veh)	8.1					17.8		10.9
LOS	A					C		B
Approach Delay (s/veh)	--	--				14.1		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	10YR			
Analysis Time Period	PM 10YR							
Project Description: Woodland TIAR Job # 602-01-11 WOPVMMPM10Y								
East/West Street: Malama Mkt				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	131	175			294	212		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	131	175	0	0	294	212		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		1			1			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	188		247					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	188	0	247	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			1		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	131					188		247
C (m) (veh/h)	1287					357		705
v/c	0.10					0.53		0.35
95% queue length	0.34					3.21		1.61
Control Delay (s/veh)	8.1					26.2		12.9
LOS	A					D		B
Approach Delay (s/veh)	--	--				18.6		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY									
General Information					Site Information				
Analyst	BEW				Intersection	TEE			
Agency/Co.	Woodland				Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12				Analysis Year	20YR			
Analysis Time Period	AM 20YR								
Project Description: Woodland TIAR Job # 602-01-11 WOPVMMAM20Y									
East/West Street: Malama Mkt					North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South					Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments									
Major Street	Northbound			Southbound					
Movement	1	2	3	4	5	6			
	L	T	R	L	T	R			
Volume (veh/h)	97	211			337	195			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	97	211	0	0	337	195			
Percent Heavy Vehicles	0	--	--	0	--	--			
Median Type	Undivided								
RT Channelized			1			1			
Lanes	1	1	0	0	1	1			
Configuration	L	T			T	R			
Upstream Signal		1			1				
Minor Street	Eastbound			Westbound					
Movement	7	8	9	10	11	12			
	L	T	R	L	T	R			
Volume (veh/h)	122		135						
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	122	0	135	0	0	0			
Percent Heavy Vehicles	0	0	0	0	0	0			
Percent Grade (%)	0			0					
Flared Approach		N			N				
Storage		0			0				
RT Channelized			0			1			
Lanes	1	0	1	0	0	0			
Configuration	L		R						
Delay, Queue Length, and Level of Service									
Approach	Northbound	Southbound	Westbound			Eastbound			
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	L					L		R	
v (veh/h)	97					122		135	
C (m) (veh/h)	1248					363		671	
v/c	0.08					0.34		0.20	
95% queue length	0.25					1.50		0.75	
Control Delay (s/veh)	8.1					19.9		11.7	
LOS	A					C		B	
Approach Delay (s/veh)	--	--				15.6			
Approach LOS	--	--				C			

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	20YR			
Analysis Time Period	PM 20YR							
Project Description: Woodland TIAR Job # 602-01-11 WOPVMMPM20Y								
East/West Street: Malama Mkt				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	145	194			325	234		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	145	194	0	0	325	234		
Percent Heavy Vehicles	0	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		1			1			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	207		273					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	207	0	273	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			1		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	145					207		273
C (m) (veh/h)	1263					320		676
v/c	0.11					0.65		0.40
95% queue length	0.39					5.05		2.01
Control Delay (s/veh)	8.2					36.2		13.9
LOS	A					E		B
Approach Delay (s/veh)	--	--				23.5		
Approach LOS	--	--				C		

APPENDIX F
LEVEL OF SERVICE
KAHAKAI BLVD. & KEAAU-PAHOA BYPASS RD.
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	BEW		Intersection	T&E
Agency/Co.	Woodland		Jurisdiction	DOT/Hawaii CO
Date Performed	12/3/12		Analysis Year	Build Out
Analysis Time Period	AM Build Out			

Project Description: Woodland TIAR Job # 602-01-11 WKPBRKAMBO

East/West Street: Keaau Pahoa Bypass

North/South Street: Kahakai Blvd

Intersection Orientation: East-West

Study Period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		446	36		609	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	446	36	0	609	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			1			0
Lanes	0	1	1	0	1	0
Configuration		T	R		T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			116			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	116	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	0	0	1	0	0	0
Configuration			R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					R			
v (veh/h)					116			
C (m) (veh/h)					617			
v/c					0.19			
95% queue length					0.69			
Control Delay (s/veh)					12.2			
LOS					B			
Approach Delay (s/veh)	--	--	12.2					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	Build Out			
Analysis Time Period	PM Build Out							
Project Description: Woodland TIAR Job # 602-01-11 WKPBRKPMBO								
East/West Street: Keaau Pahoa Bypass				North/South Street: Kahakai Blvd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		450	94		396			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	450	94	0	396	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	0	1	0		
Configuration		T	R		T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)			191					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	191	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	0	1	0	0	0		
Configuration			R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					R			
v (veh/h)					191			
C (m) (veh/h)					613			
v/c					0.31			
95% queue length					1.35			
Control Delay (s/veh)					13.5			
LOS					B			
Approach Delay (s/veh)	--	--	13.5					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/ Hawaii CO			
Date Performed	12/3/12			Analysis Year	5 YR			
Analysis Time Period	AM 5Yr							
Project Description Woodland TIAR Job # 602-01-11 WKPBRKAM5Y								
East/West Street: Keaau Pahoa Bypass				North/South Street: Kahakai Blvd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		469	59		640			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	469	59	0	640	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	0	1	0		
Configuration		T	R		T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)			121					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	121	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	0	1	0	0	0		
Configuration			R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					R			
v (veh/h)					121			
C (m) (veh/h)					598			
v/c					0.20			
95% queue length					0.76			
Control Delay (s/veh)					12.5			
LOS					B			
Approach Delay (s/veh)	--	--	12.5					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	5YR			
Analysis Time Period	PM 5YR							
Project Description Woodland TIAR Job # 602-01-11 WKPBRKPM5Y								
East/West Street: Keaau Paho Bypass				North/South Street: Kahakai Blvd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		473	97		406			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	473	97	0	406	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	0	1	0		
Configuration		T	R		T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)			198					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	198	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	0	1	0	0	0		
Configuration			R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					R			
v (veh/h)					198			
C (m) (veh/h)					595			
v/c					0.33			
95% queue length					1.49			
Control Delay (s/veh)					14.1			
LOS					B			
Approach Delay (s/veh)	--	--	14.1					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	BEW				Intersection	TEE		
Agency/Co.	Woodland				Jurisdiction	DOT/Hawaii CO		
Date Performed	12/3/12				Analysis Year	10 YR		
Analysis Time Period	AM 10YR							
Project Description: Woodland TIAR Job # 602-01-11 WKPBRKAM10Y								
East/West Street: Keeaau Pahoa Bypass					North/South Street: Kahakai Blvd			
Intersection Orientation: East-West					Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		493	60		673			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	493	60	0	673	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	0	1	0		
Configuration		T	R		T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)			125					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	125	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	0	1	0	0	0		
Configuration			R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					R			
v (veh/h)					125			
C (m) (veh/h)					580			
v/c					0.22			
95% queue length					0.82			
Control Delay (s/veh)					12.9			
LOS					B			
Approach Delay (s/veh)	--	--	12.9					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BEW			Intersection	TEE		
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO		
Date Performed	12/3/12			Analysis Year	10YR		
Analysis Time Period	PM 10YR						
Project Description Woodland TIAR Job # 602-01-11 WKPBKPM10Y							
East/West Street: Keaau Pahoa Bypass				North/South Street: Kahakai Blvd			
Intersection Orientation: East-West				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Eastbound			Westbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		497	100		426		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	0	497	100	0	426	0	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	0	1	1	0	1	0	
Configuration		T	R		T		
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)			205				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	0	0	205	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			0	
Lanes	0	0	1	0	0	0	
Configuration			R				
Delay, Queue Length, and Level of Service							
Approach	Eastbound	Westbound	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration					R		
v (veh/h)					205		
C (m) (veh/h)					577		
v/c					0.36		
95% queue length					1.64		
Control Delay (s/veh)					14.7		
LOS					B		
Approach Delay (s/veh)	--	--	14.7				
Approach LOS	--	--	B				

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	20 YR			
Analysis Time Period	AM 20YR							
Project Description Woodland TIAR Job # 602-01-11 WKPBRKAM20Y								
East/West Street: Keaau Pahoa Bypass				North/South Street: Kahakai Blvd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		544	64		743			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	544	64	0	743	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	0	1	0		
Configuration		T	R		T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)			137					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	137	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	0	1	0	0	0		
Configuration			R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					R			
v (veh/h)					137			
C (m) (veh/h)					543			
v/c					0.25			
95% queue length					1.01			
Control Delay (s/veh)					13.9			
LOS					B			
Approach Delay (s/veh)	--	--	13.9					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/3/12			Analysis Year	20YR			
Analysis Time Period	PM 20YR							
Project Description: Woodland TIAR Job # 602-01-11 WKPBRKPM20Y								
East/West Street: Keeaau Pahoa Bypass				North/South Street: Kahakai Blvd				
Intersection Orientation: East-West				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		549	106		471			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	549	106	0	471	0		
Percent Heavy Vehicles	0	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	0	1	1	0	1	0		
Configuration		T	R		T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)			221					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	221	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	0	1	0	0	0		
Configuration			R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					R			
v (veh/h)					221			
C (m) (veh/h)					539			
v/c					0.41			
95% queue length					2.06			
Control Delay (s/veh)					16.3			
LOS					C			
Approach Delay (s/veh)	--	--	16.3					
Approach LOS	--	--	C					

APPENDIX G
LEVEL OF SERVICE
CENTER DRIVEWAY
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BEW	Intersection	TEE
Agency/Co.	Woodland	Jurisdiction	DOT/Hawaii CO
Date Performed	12/4/12	Analysis Year	Build Out
Analysis Time Period	AM Build Out		

Project Description: Woodland TIAR Job # 602-01-11 WPVRCDWLTAMBO

East/West Street: Center Driveway

North/South Street: Old Pahoa Village Rd

Intersection Orientation: North-South

Study Period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	37	291			255	41
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	37	291	0	0	255	41
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			1			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	10		84			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	10	0	84	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	37					10		84
C (m) (veh/h)	1277					429		768
v/c	0.03					0.02		0.11
95% queue length	0.09					0.07		0.37
Control Delay (s/veh)	7.9					13.6		10.3
LOS	A					B		B
Approach Delay (s/veh)	--	--				10.6		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	BEW			Intersection	TEE		
Agency/Co.	Woodland			Jurisdiction	DOT/ Hawaii CO		
Date Performed	12/4/12			Analysis Year	Build Out		
Analysis Time Period	PM Build Out						
Project Description Woodland TIAR Job # 602-01-11 WPVRCDWLTPMBO							
East/West Street: Center Driveway				North/South Street: Old Pahoa Village Rd			
Intersection Orientation: North-South				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	53	281			273	66	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	53	281	0	0	273	66	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	1	1	0	0	1	0	
Configuration	L	T				TR	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	14		130				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	14	0	130	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			0	
Lanes	1	0	1	0	0	0	
Configuration	L		R				
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L					L	R
v (veh/h)	53					14	130
C (m) (veh/h)	1231					394	739
v/c	0.04					0.04	0.18
95% queue length	0.13					0.11	0.64
Control Delay (s/veh)	8.1					14.5	10.9
LOS	A					B	B
Approach Delay (s/veh)	--	--				11.3	
Approach LOS	--	--				B	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/4/12			Analysis Year	5YR			
Analysis Time Period	AM 5YR							
Project Description: Woodland TIAR Job # 602-01-11 WPVRCDWLTAM5Y								
East/West Street: Center Driveway				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	37	306			268	41		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	37	306	0	0	268	41		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	10		84					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	10	0	84	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	37					10		84
C (m) (veh/h)	1263					414		756
v/c	0.03					0.02		0.11
95% queue length	0.09					0.07		0.37
Control Delay (s/veh)	7.9					13.9		10.4
LOS	A					B		B
Approach Delay (s/veh)	--	--				10.7		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BEW			Intersection	TEE		
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO		
Date Performed	12/4/12			Analysis Year	5YR		
Analysis Time Period	PM 5YR						
Project Description: Woodland TIAR Job # 602-01-11 WPVRCDWLTPM5Y							
East/West Street: Center Driveway				North/South Street: Old Paho Village Rd			
Intersection Orientation: North-South				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	53	295			286	66	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	53	295	0	0	286	66	
Percent Heavy Vehicles	0	—	—	0	—	—	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	1	1	0	0	1	0	
Configuration	L	T				TR	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	14		130				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	14	0	130	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			0	
Lanes	1	0	1	0	0	0	
Configuration	L		R				
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L					L	R
v (veh/h)	53					14	130
C (m) (veh/h)	1218					381	726
v/c	0.04					0.04	0.18
95% queue length	0.14					0.11	0.65
Control Delay (s/veh)	8.1					14.8	11.0
LOS	A					B	B
Approach Delay (s/veh)	--	--				11.4	
Approach LOS	--	--				B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BEW	Intersection	TEE
Agency/Co.	Woodland	Jurisdiction	DOT/Hawaii CO
Date Performed	12/4/12	Analysis Year	10YR
Analysis Time Period	AM 10YR		

Project Description Woodland TIAR Job # 602-01-11 WPVRCDWLTAM10Y

East/West Street: Center Driveway

North/South Street: Old Pahoa Village Rd

Intersection Orientation: North-South

Study Period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	37	321			282	41
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	37	321	0	0	282	41
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			1			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	
Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	10		84			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	10	0	84	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	37					10		84
C (m) (veh/h)	1248					398		742
v/c	0.03					0.03		0.11
95% queue length	0.09					0.08		0.38
Control Delay (s/veh)	8.0					14.3		10.5
LOS	A					B		B
Approach Delay (s/veh)	--	--				10.9		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	BEW				Intersection	TEE		
Agency/Co.	Woodland				Jurisdiction	DOT/Hawaii CO		
Date Performed	12/4/12				Analysis Year	10YR		
Analysis Time Period	PM 10YR							
Project Description: Woodland TIAR Job # 602-01-11 WPVRCDWLTPM10Y								
East/West Street: Center Driveway					North/South Street: Old Paho Village Rd			
Intersection Orientation: North-South					Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	53	310			302	66		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	53	310	0	0	302	66		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	14		130					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	14	0	130	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	53					14		130
C (m) (veh/h)	1202					364		712
v/c	0.04					0.04		0.18
95% queue length	0.14					0.12		0.67
Control Delay (s/veh)	8.1					15.3		11.2
LOS	A					C		B
Approach Delay (s/veh)	--	--				11.6		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/4/12			Analysis Year	20YR			
Analysis Time Period	AM 20YR							
Project Description: Woodland TIAR Job # 602-01-11 WPVRCDWLTAM20Y								
East/West Street: Center Driveway				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	37	355			311	41		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	37	355	0	0	311	41		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1				0	
Lanes	1	1	0	0	1		0	
Configuration	L	T					TR	
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	10		84					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	10	0	84	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1				0	
Lanes	1	0	1	0	0		0	
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	37					10		84
C (m) (veh/h)	1218					365		714
v/c	0.03					0.03		0.12
95% queue length	0.09					0.08		0.40
Control Delay (s/veh)	8.0					15.1		10.7
LOS	A					C		B
Approach Delay (s/veh)	--	--				11.2		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BEW
Agency/Co.	Woodland
Date Performed	12/4/12
Analysis Time Period	PM 20YR

Site Information

Intersection	TEE
Jurisdiction	DOT/Hawaii CO
Analysis Year	20YR

Project Description: Woodland TIAR Job # 602-01-11 WPVRCDWLTPM20Y

East/West Street: Center Driveway

North/South Street: Old Pahoa Village Rd

Intersection Orientation: North-South

Study Period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	53	343			333	66
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	53	343	0	0	333	66
Percent Heavy Vehicles	0	—	—	0	—	—
Median Type	Undivided					
RT Channelized			1			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	14		130			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	14	0	130	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	53					14		130
C (m) (veh/h)	1171					334		684
v/c	0.05					0.04		0.19
95% queue length	0.14					0.13		0.70
Control Delay (s/veh)	8.2					16.2		11.5
LOS	A					C		B
Approach Delay (s/veh)	--	--				12.0		
Approach LOS	--	--				B		

APPENDIX H
LEVEL OF SERVICE
SOUTH DRIVEWAY
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

TWO-WAY STOP CONTROL SUMMARY									
General Information					Site Information				
Analyst	BEW				Intersection	TEE			
Agency/Co.	Woodland				Jurisdiction	DOT/Hawaii CO			
Date Performed	12/4/12				Analysis Year	Build Out			
Analysis Time Period	AM Build Out								
Project Description: Woodland TIAR Job # 602-01-11 WPVRSDWLTAMBO									
East/West Street: South Driveway					North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South					Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments									
Major Street	Northbound			Southbound					
Movement	1	2	3	4	5	6			
	L	T	R	L	T	R			
Volume (veh/h)	10	315			328	11			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	10	315	0	0	328	11			
Percent Heavy Vehicles	0	--	--	0	--	--			
Median Type	Undivided								
RT Channelized			1			0			
Lanes	1	1	0	0	1	0			
Configuration	L	T				TR			
Upstream Signal		0			0				
Minor Street	Eastbound			Westbound					
Movement	7	8	9	10	11	12			
	L	T	R	L	T	R			
Volume (veh/h)	13	0	15						
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	13	0	15	0	0	0			
Percent Heavy Vehicles	0	0	0	0	0	0			
Percent Grade (%)	0			0					
Flared Approach		N			N				
Storage		0			0				
RT Channelized			1			0			
Lanes	0	1	0	0	0	0			
Configuration		LTR							
Delay, Queue Length, and Level of Service									
Approach	Northbound	Southbound	Westbound			Eastbound			
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	L						LTR		
v (veh/h)	10						28		
C (m) (veh/h)	1231						541		
v/c	0.01						0.05		
95% queue length	0.02						0.16		
Control Delay (s/veh)	7.9						12.0		
LOS	A						B		
Approach Delay (s/veh)	--	--				12.0			
Approach LOS	--	--				B			

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/4/12			Analysis Year	Build Out			
Analysis Time Period	PM Build Out							
Project Description: Woodland TIAR Job # 602-01-11 WPVRSDWLTPMBO								
East/West Street: South Driveway				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	14	330			385	18		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	14	330	0	0	385	18		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	4	0	39					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	4	0	39	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	0	0		
Configuration		LTR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LTR	
v (veh/h)	14						43	
C (m) (veh/h)	1167						616	
v/c	0.01						0.07	
95% queue length	0.04						0.22	
Control Delay (s/veh)	8.1						11.3	
LOS	A						B	
Approach Delay (s/veh)	--	--				11.3		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/4/12			Analysis Year	5YR			
Analysis Time Period	AM 5YR							
Project Description: Woodland TIAR Job # 602-01-11 WPVRSDWLTAM5Y								
East/West Street: South Driveway				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	10	331			344	11		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	10	331	0	0	344	11		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	13	0	15					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	13	0	15	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	0	0		
Configuration		LTR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LTR	
v (veh/h)	10						28	
C (m) (veh/h)	1215						522	
v/c	0.01						0.05	
95% queue length	0.02						0.17	
Control Delay (s/veh)	8.0						12.3	
LOS	A						B	
Approach Delay (s/veh)	--	--				12.3		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BEW			Intersection	TEE		
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO		
Date Performed	12/4/12			Analysis Year	5YR		
Analysis Time Period	PM 5YR						
Project Description: Woodland TIAR Job # 602-01-11 WPVRSDWPM5Y							
East/West Street: South Driveway				North/South Street: Old Pahoa Village Rd			
Intersection Orientation: North-South				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	14	347			405	18	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	14	347	0	0	405	18	
Percent Heavy Vehicles	0	—	—	0	—	—	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	1	1	0	0	1	0	
Configuration	L	T				TR	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	4	0	39				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	4	0	39	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			0	
Lanes	0	1	0	0	0	0	
Configuration		LTR					
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11 12
Lane Configuration	L						LTR
v (veh/h)	14						43
C (m) (veh/h)	1147						599
v/c	0.01						0.07
95% queue length	0.04						0.23
Control Delay (s/veh)	8.2						11.5
LOS	A						B
Approach Delay (s/veh)	—	—				11.5	
Approach LOS	—	—				B	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information				
Analyst	BEW		Intersection	TEE			
Agency/Co.	Woodland		Jurisdiction	DOT/Hawaii CO			
Date Performed	12/4/12		Analysis Year	10YR			
Analysis Time Period	AM 10YR						
Project Description: Woodland TIAR Job # 602-01-11 WPVRSDWLTAM10Y							
East/West Street: South Driveway			North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South			Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	10	348			381	11	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	10	348	0	0	381	11	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	1	1	0	0	1	0	
Configuration	L	T				TR	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	13	0	15				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	13	0	15	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			0	
Lanes	0	1	0	0	0	0	
Configuration		LTR					
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L						LTR
v (veh/h)	10						28
C (m) (veh/h)	1178						491
v/c	0.01						0.06
95% queue length	0.03						0.18
Control Delay (s/veh)	8.1						12.8
LOS	A						B
Approach Delay (s/veh)	--	--				12.8	
Approach LOS	--	--				B	

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BEW			Intersection	TEE		
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO		
Date Performed	12/4/12			Analysis Year	10YR		
Analysis Time Period	PM 10YR						
Project Description Woodland TIAR Job # 602-01-11 WPVRSDWPM10Y							
East/West Street: South Driveway				North/South Street: Old Pahoa Village Rd			
Intersection Orientation: North-South				Study Period (hrs): 1.00			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	14	365			425	18	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	14	365	0	0	425	18	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			1			0	
Lanes	1	1	0	0	1	0	
Configuration	L	T				TR	
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	4	0	39				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	4	0	39	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			1			0	
Lanes	0	1	0	0	0	0	
Configuration		LTR					
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11 12
Lane Configuration	L						LTR
v (veh/h)	14						43
C (m) (veh/h)	1128						581
v/c	0.01						0.07
95% queue length	0.04						0.24
Control Delay (s/veh)	8.2						11.7
LOS	A						B
Approach Delay (s/veh)	--	--				11.7	
Approach LOS	--	--				B	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	9/8/2011			Analysis Year	20YR			
Analysis Time Period	AM 20YR							
Project Description: Woodland TIAR Job # 602-01-11 WPVRSOWLTAM20Y								
East/West Street: South Driveway				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	10	384			400	11		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	10	384	0	0	400	11		
Percent Heavy Vehicles	0	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	13	0	15					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	13	0	15	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	0	0		
Configuration		LTR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LTR	
v (veh/h)	10						28	
C (m) (veh/h)	1159						464	
v/c	0.01						0.06	
95% queue length	0.03						0.19	
Control Delay (s/veh)	8.1						13.3	
LOS	A						B	
Approach Delay (s/veh)	--	--				13.3		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BEW			Intersection	TEE			
Agency/Co.	Woodland			Jurisdiction	DOT/Hawaii CO			
Date Performed	12/4/12			Analysis Year	20YR			
Analysis Time Period	PM 20YR							
Project Description: Woodland TIAR Job # 602-01-11 WPVRSDWLTPM20Y								
East/West Street: South Driveway				North/South Street: Old Pahoa Village Rd				
Intersection Orientation: North-South				Study Period (hrs): 1.00				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	14	402			470	18		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	14	402	0	0	470	18		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	4	0	39					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	4	0	39	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	0	0		
Configuration		LTR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LTR	
v (veh/h)	14						43	
C (m) (veh/h)	1086						543	
v/c	0.01						0.08	
95% queue length	0.04						0.26	
Control Delay (s/veh)	8.4						12.2	
LOS	A						B	
Approach Delay (s/veh)	--	--				12.2		
Approach LOS	--	--				B		

APPENDIX I
LEVEL OF SERVICE
KEAAU-PAHOA BYPASS RD. & OLD PAHOA VILLAGE RD.
ROUNDAABOUT INTERSECTION
AM & PM PEAK HOURS

ROUNDBABOUT REPORT																
General Information									Site Information							
Analyst BEW Agency or Co. WOODLAND Date Performed 12/12/2012 Time Period AM BUILD OUT									Intersection EW Street Name KEEAU-PAHOA BYPASS N/S Street Name OLD PAHOA VILLAGE RD Analysis Year 2014 Project ID WOODLAND TIAR JOB#602-01-11 WRKPBPAMBO							
Project Description:																
Volume Adjustment and Site Characteristics																
	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	412	278	0	154	450	0	0	200	0	50	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			
Critical and Follow-Up Headway Adjustment																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929				
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858				
Flow Computations																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Circulating Flow (V_c), pc/h	172			224			461			900						
Exiting Flow (V_{ex}), pc/h	517			728			0			483						
Entry Flow (V_e), pc/h	363	311		-1	267		224	56								
Entry Volume veh/h	352	302		0	259		217	54								
Capacity and v/c Ratios																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Capacity (c_{PCE}), pc/h	951	951		903	903		713	713			459					
Capacity (c), veh/h	923	923		877	877		692	692			446					
v/c Ratio (X)	0.38	0.33		-0.00	0.30		0.31	0.08								
Delay and Level of Service																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Lane Control Delay (d), s/veh	8.2	7.4		4.1	7.3		9.1	6.0								
Lane LOS	A	A		A	A		A	A								
Lane 95% Queue	1.8	1.4		-0.0	1.2		1.3	0.3								
Approach Delay, s/veh	7.84			7.30			8.52									
Approach LOS, s/veh	A			A			A									
Intersection Delay, s/veh	8.00															

Intersection LOS	A
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ROUNDBABOUT REPORT																
General Information									Site Information							
Analyst BEW Agency or Co. WOODLAND Date Performed 12/12/2012 Time Period PM BUILD OUT									Intersection EW Street Name KEEAU-PAHOA BYPASS N/S Street Name OLD PAHOA VILLAGE RD Analysis Year 2014 Project ID WOODLAND TIAR JOB#602-01-11 WRKPBPPMBO							
Project Description:																
Volume Adjustment and Site Characteristics																
	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	391	334	0	124	303	0	0	250	0	99	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			
Critical and Follow-Up Headway Adjustment																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929	
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858	
Flow Computations																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Circulating Flow (V_c), pc/h	139				280				438				758			
Exiting Flow (V_{ex}), pc/h	549				619				0				513			
Entry Flow (V_e), pc/h	382	374			-1	180			280	111						
Entry Volume veh/h	371	363			0	175			272	108						
Capacity and v/c Ratios																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Capacity (c_{PCE}), pc/h	983	983			854	854			729	729				530		
Capacity (c), veh/h	954	954			829	829			708	708				515		
v/c Ratio (X)	0.39	0.38			-0.00	0.21			0.38	0.15						
Delay and Level of Service																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Lane Control Delay (d), s/veh	8.1	8.0			4.3	6.6			10.1	6.8						
Lane LOS	A	A			A	A			B	A						
Lane 95% Queue	1.9	1.8			-0.0	0.8			1.8	0.5						
Approach Delay, s/veh	8.04				6.55				9.18							
Approach LOS, s/veh	A				A				A							
Intersection Delay, s/veh	8.40															

Intersection LOS	A
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ROUNDAABOUT REPORT																
General Information									Site Information							
Analyst BEW Agency or Co. WOODLAND Date Performed 12/12/2012 Time Period AM5YR									Intersection E/W Street Name KEEAU-PAHOA BYPASS N/S Street Name OLD PAHOA VILLAGE RD Analysis Year 2017 Project ID WOODLAND TIAR JOB#602-01-11 WRKPBAM5YR							
Project Description:																
Volume Adjustment and Site Characteristics																
	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	433	307	0	162	493	0	0	210	0	53	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			
Critical and Follow-Up Headway Adjustment																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929				
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858				
Flow Computations																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Circulating Flow (V_c), pc/h	181			235			485			968						
Exiting Flow (V_{ex}), pc/h	544			787			0			525						
Entry Flow (V_e), pc/h	390	344		-1	293		235	59								
Entry Volume veh/h	379	334		0	284		228	57								
Capacity and v/c Ratios																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Capacity (c_{PCE}), pc/h	943	943		893	893		696	696			429					
Capacity (c), veh/h	916	916		867	867		676	676			417					
v/c Ratio (X)	0.41	0.36		-0.00	0.33		0.34	0.08								
Delay and Level of Service																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Lane Control Delay (d), s/veh	8.7	8.0		4.1	7.8		9.7	6.2								
Lane LOS	A	A		A	A		A	A								
Lane 95% Queue	2.1	1.7		-0.0	1.4		1.5	0.3								
Approach Delay, s/veh	8.39			7.81			9.01									
Approach LOS, s/veh	A			A			A									
Intersection Delay, s/veh	8.51															

Intersection LOS	A
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ROUNDAABOUT REPORT																
General Information									Site Information							
Analyst BEW Agency or Co. WOODLAND Date Performed 12/12/2012 Time Period PM 5YR									Intersection E/W Street Name KEEAU-PAHOA BYPASS N/S Street Name OLD PAHOA VILLAGE RD Analysis Year 2017 Project ID WOODLAND TIAR JOB#602-01-11 WRKPBPPM5YR							
Project Description:																
Volume Adjustment and Site Characteristics																
	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	411	351	0	130	318	0	0	263	0	104	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			
Critical and Follow-Up Headway Adjustment																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929	
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858	
Flow Computations																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Circulating Flow (V_c), pc/h	146				294				460				796			
Exiting Flow (V_{ex}), pc/h	576				650				0				539			
Entry Flow (V_e), pc/h	401	393			-1	189			294	116						
Entry Volume veh/h	389	382			0	183			285	113						
Capacity and v/c Ratios																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Capacity (c_{PCE}), pc/h	977	977			842	842			713	713				510		
Capacity (c), veh/h	949	949			817	817			692	692				495		
v/c Ratio (X)	0.41	0.40			-0.00	0.22			0.41	0.16						
Delay and Level of Service																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Lane Control Delay (d), s/veh	8.5	8.3			4.4	6.8			10.9	7.0						
Lane LOS	A	A			A	A			B	A						
Lane 95% Queue	2.0	2.0			-0.0	0.9			2.0	0.6						
Approach Delay, s/veh	8.39				6.80				9.78							
Approach LOS, s/veh	A				A				A							
Intersection Delay, s/veh	8.86															

Intersection LOS	A

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ROUNABOUT REPORT																
General Information									Site Information							
Analyst <i>BEW</i> Agency or Co. <i>WOODLAND</i> Date Performed <i>12/12/2012</i> Time Period <i>AM10YR</i>									Intersection EW Street Name <i>KEEAU-PAHOA BYPASS</i> N/S Street Name <i>OLD PAHOA VILLAGE RD</i> Analysis Year <i>2022</i> Project ID <i>WOODLAND TIAR JOB#602-01-11 WRKBPAM10YR</i>							
Project Description:																
Volume Adjustment and Site Characteristics																
	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	455	439	0	170	497	0	0	221	0	55	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			
Critical and Follow-Up Headway Adjustment																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929	
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858	
Flow Computations																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Circulating Flow (V_c), pc/h	190				247				509				993			
Exiting Flow (V_{ex}), pc/h	571				803				0				681			
Entry Flow (V_e), pc/h	470	491			-1	295			247	62						
Entry Volume veh/h	456	477			0	286			240	60						
Capacity and v/c Ratios																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Capacity (c_{PCE}), pc/h	934	934			883	883			679	679				419		
Capacity (c), veh/h	907	907			857	857			659	659				407		
v/c Ratio (X)	0.50	0.53			-0.00	0.33			0.36	0.09						
Delay and Level of Service																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Lane Control Delay (d), s/veh	10.4	10.9			4.2	8.0			10.4	6.5						
Lane LOS	B	B			A	A			B	A						
Lane 95% Queue	2.9	3.1			-0.0	1.5			1.7	0.3						
Approach Delay, s/veh	10.68				7.97				9.59							
Approach LOS, s/veh	B				A				A							
Intersection Delay, s/veh	9.89															

Intersection LOS	A
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ROUNDAABOUT REPORT

General Information		Site Information	
Analyst	BEW	Intersection	
Agency or Co.	WOODLAND	EW Street Name	KEEAU-PAHOA BYPASS
Date Performed	12/12/2012	N/S Street Name	OLD PAHOA VILLAGE RD
Time Period	PM 10YR	Analysis Year	2022
		Project ID	WOODLAND TIAR JOB#602-01-11 WRKPBPPM10YR

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	432	369	0	137	335	0	0	276	0	109	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	153			309			484			837		
Exiting Flow (V_{ex}), pc/h	606			684			0			566		
Entry Flow (V_e), pc/h	422	413		-1	199		309	122				
Entry Volume veh/h	410	401		0	193		300	118				

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h	970	970		830	830		696	696			489	
Capacity (c), veh/h	942	942		806	806		676	676			475	
v/c Ratio (X)	0.43	0.43		-0.00	0.24		0.44	0.18				

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	8.9	8.8		4.5	7.1		11.7	7.3				
Lane LOS	A	A		A	A		B	A				
Lane 95% Queue	2.2	2.2		-0.0	0.9		2.3	0.6				
Approach Delay, s/veh	8.83			7.07			10.48					
Approach LOS, s/veh	A			A			B					
Intersection Delay, s/veh	9.40											

Intersection LOS	A
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ROUNDAABOUT REPORT																
General Information									Site Information							
Analyst <i>BEW</i> Agency or Co. <i>WOODLAND</i> Date Performed <i>12/12/2012</i> Time Period <i>AM20YR</i>									Intersection EW Street Name <i>KEEAU-PAHOA BYPASS</i> N/S Street Name <i>OLD PAHOA VILLAGE RD</i> Analysis Year <i>2032</i> Project ID <i>WOODLAND TIAR JOB#602-01-11</i> <i>WRKPBAM20YR</i>							
Project Description:																
Volume Adjustment and Site Characteristics																
	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	503	339	0	188	549	0	0	244	0	61	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			
Critical and Follow-Up Headway Adjustment																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Critical Headway (sec)	5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929		5.1929	5.1929	5.1929	
Follow-Up Headway (sec)	3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858		3.1858	3.1858	3.1858	
Flow Computations																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Circulating Flow (V_c), pc/h	210				273				563				1098			
Exiting Flow (V_{ex}), pc/h	631				888				0				590			
Entry Flow (V_e), pc/h	443	380			-1	326			273	68						
Entry Volume veh/h	430	369			0	317			265	66						
Capacity and v/c Ratios																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Capacity (c_{PCE}), pc/h	916	916			860	860			644	644				377		
Capacity (c), veh/h	889	889			835	835			625	625				366		
v/c Ratio (X)	0.48	0.41			-0.00	0.38			0.42	0.11						
Delay and Level of Service																
	EB				WB				NB				SB			
	Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass		Left	Right	Bypass	
Lane Control Delay (d), s/veh	10.2	9.0			4.3	8.8			12.1	7.0						
Lane LOS	B	A			A	A			B	A						
Lane 95% Queue	2.7	2.1			-0.0	1.8			2.1	0.4						
Approach Delay, s/veh	9.63				8.81				11.04							
Approach LOS, s/veh	A				A				B							
Intersection Delay, s/veh	10.01															

Intersection LOS	B
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ROUNDBABOUT REPORT																
General Information									Site Information							
Analyst BEW Agency or Co. WOODLAND Date Performed 12/12/2012 Time Period PM 20YR									Intersection EW Street Name KEEAU-PAHOA BYPASS N/S Street Name OLD PAHOA VILLAGE RD Analysis Year 2032 Project ID WOODLAND TIAR JOB#602-01-11 WRKPBPPM20YR							
Project Description:																
Volume Adjustment and Site Characteristics																
	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	1		1	1	0		1	0	1		0	0	0	
Volume (V), veh/h	0	477	408	0	157	370	0	0	305	0	121	0	0	0	0	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			
Critical and Follow-Up Headway Adjustment																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929				
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858				
Flow Computations																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Circulating Flow (V_c), pc/h	176			341			534			931						
Exiting Flow (V_{ex}), pc/h	669			755			0			633						
Entry Flow (V_e), pc/h	466	457		-1	219		341	135								
Entry Volume veh/h	452	444		0	213		331	131								
Capacity and v/c Ratios																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Capacity (C_{PCE}), pc/h	948	948		804	804		662	662			445					
Capacity (c), veh/h	920	920		781	781		643	643			432					
v/c Ratio (X)	0.49	0.48		-0.00	0.27		0.51	0.20								
Delay and Level of Service																
	EB			WB			NB			SB						
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass				
Lane Control Delay (d), s/veh	10.1	9.9		4.6	7.7		14.0	8.0								
Lane LOS	B	A		A	A		B	A								
Lane 95% Queue	2.8	2.7		-0.0	1.1		3.0	0.8								
Approach Delay, s/veh	10.01			7.69			12.28									
Approach LOS, s/veh	B			A			B									
Intersection Delay, s/veh	10.80															

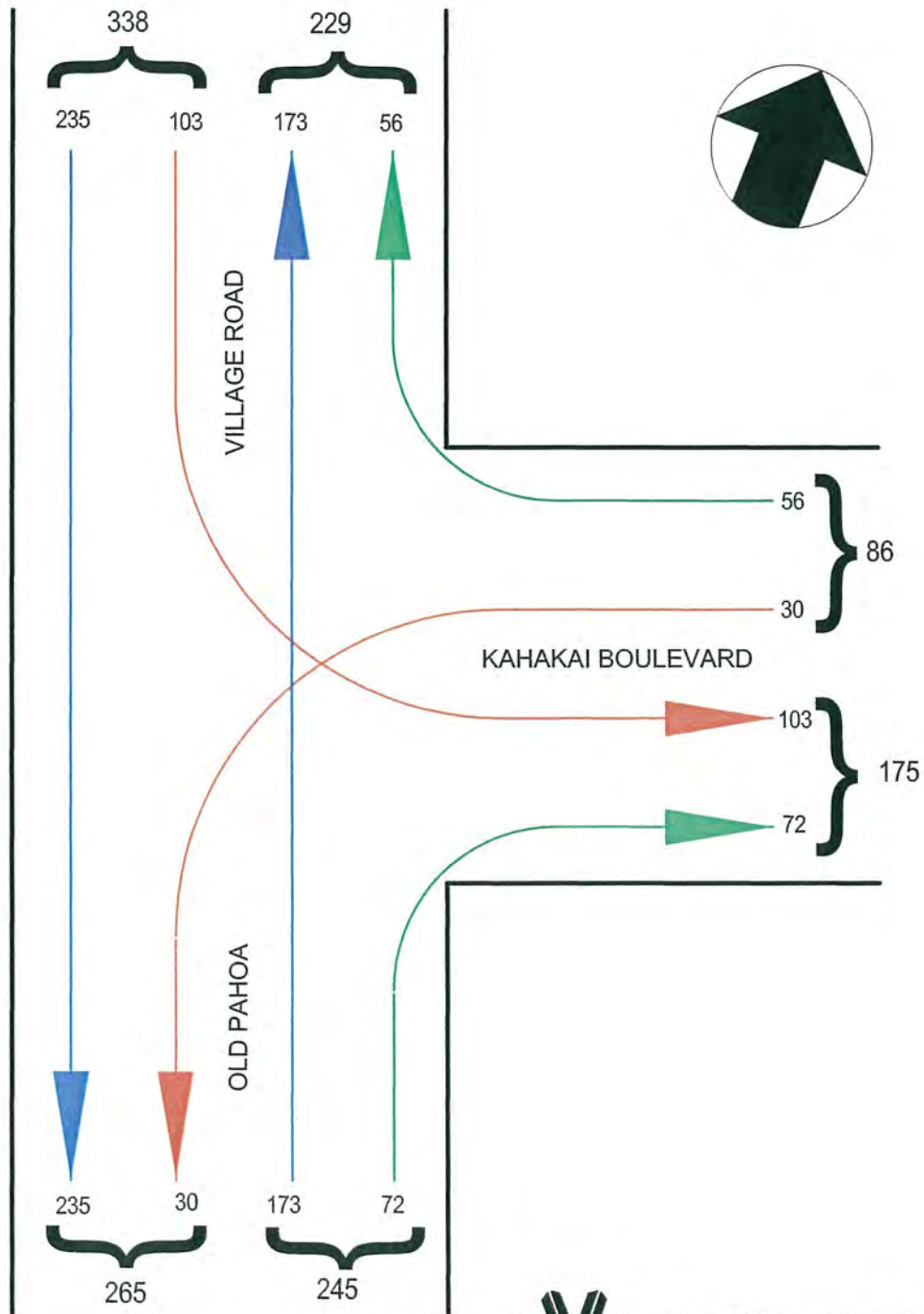
Intersection LOS	B
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APPENDIX J
TRAFFIC MOVEMENT DIAGRAMS
KAHAKAI BLVD. & OLD PAHOA VILLAGE RD.
SIGNALIZED INTERSECTION
AM & PM PEAK HOURS

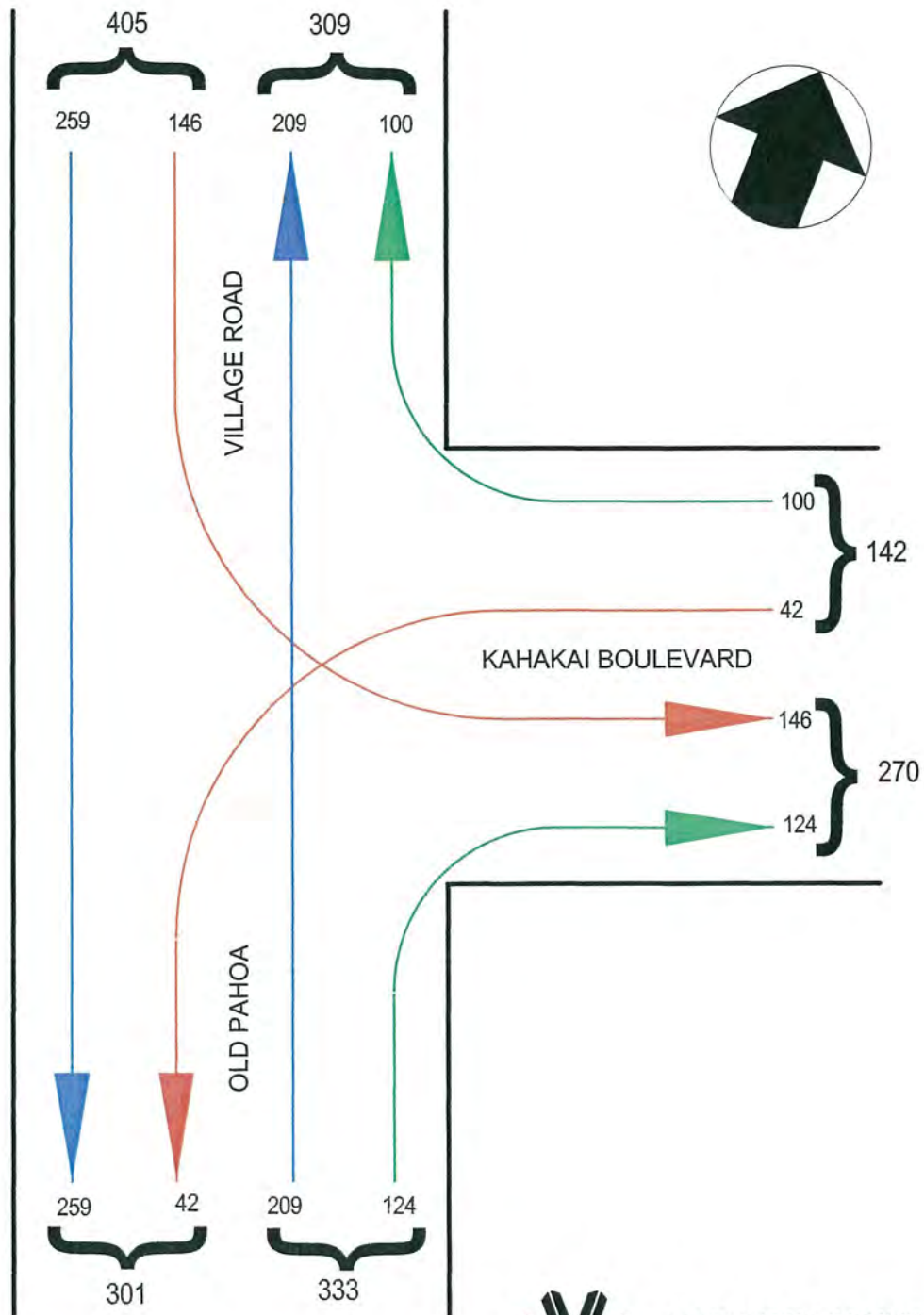
Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - Existing Condition

AM Peak Hour - 7:15 AM to 8:15 AM



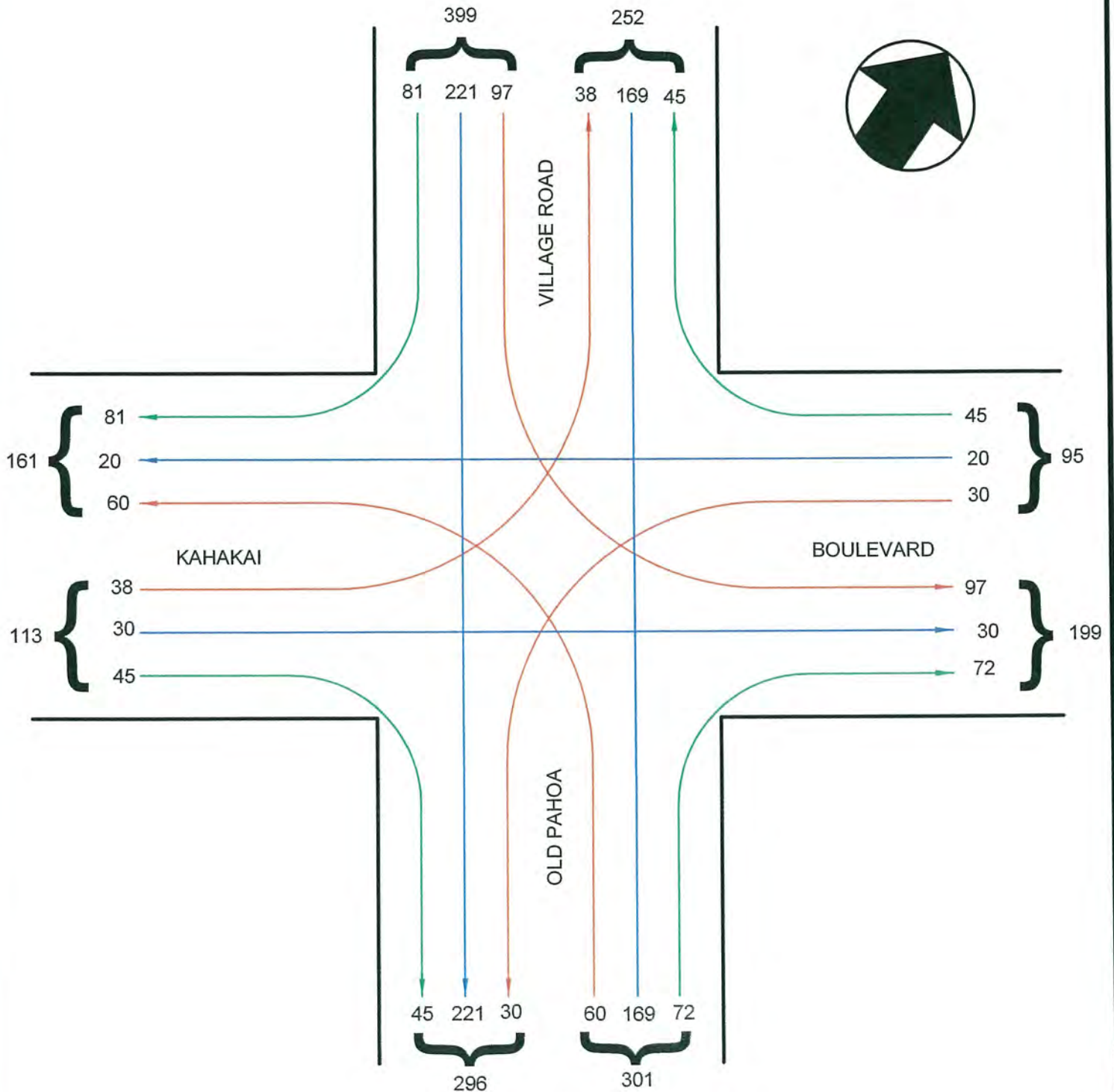
Kahakai Blvd. & Old Pahoa Village Road Traffic Movement - Existing Condition PM Peak Hour - 4:15 PM to 5:15 PM



Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - Buildout Condition

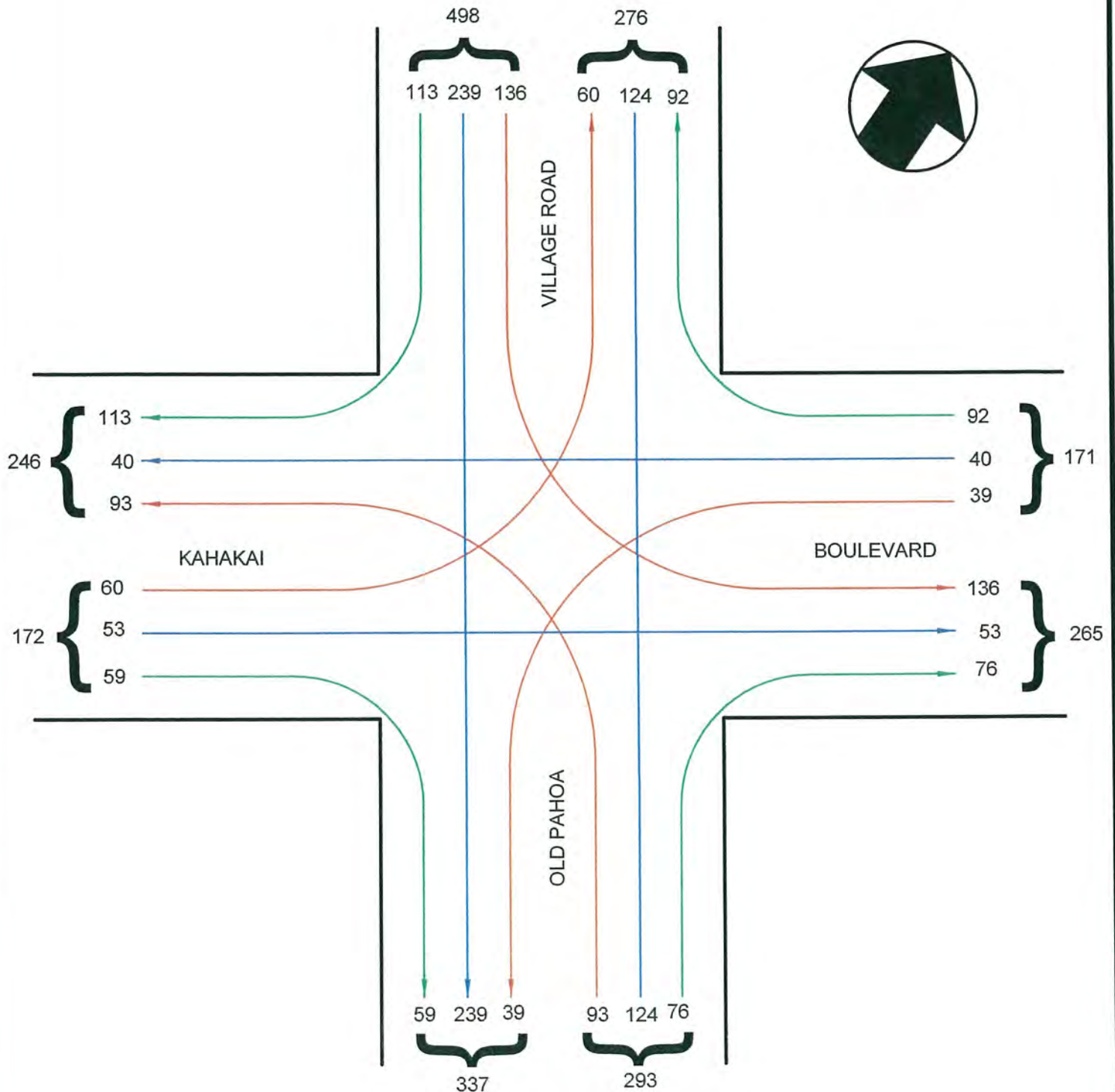
AM Peak Hour - 7:15 AM to 8:15 AM



Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - Buildout Condition

PM Peak Hour - 4:15 PM to 5:15 PM



WITCHER ENGINEERING LLP

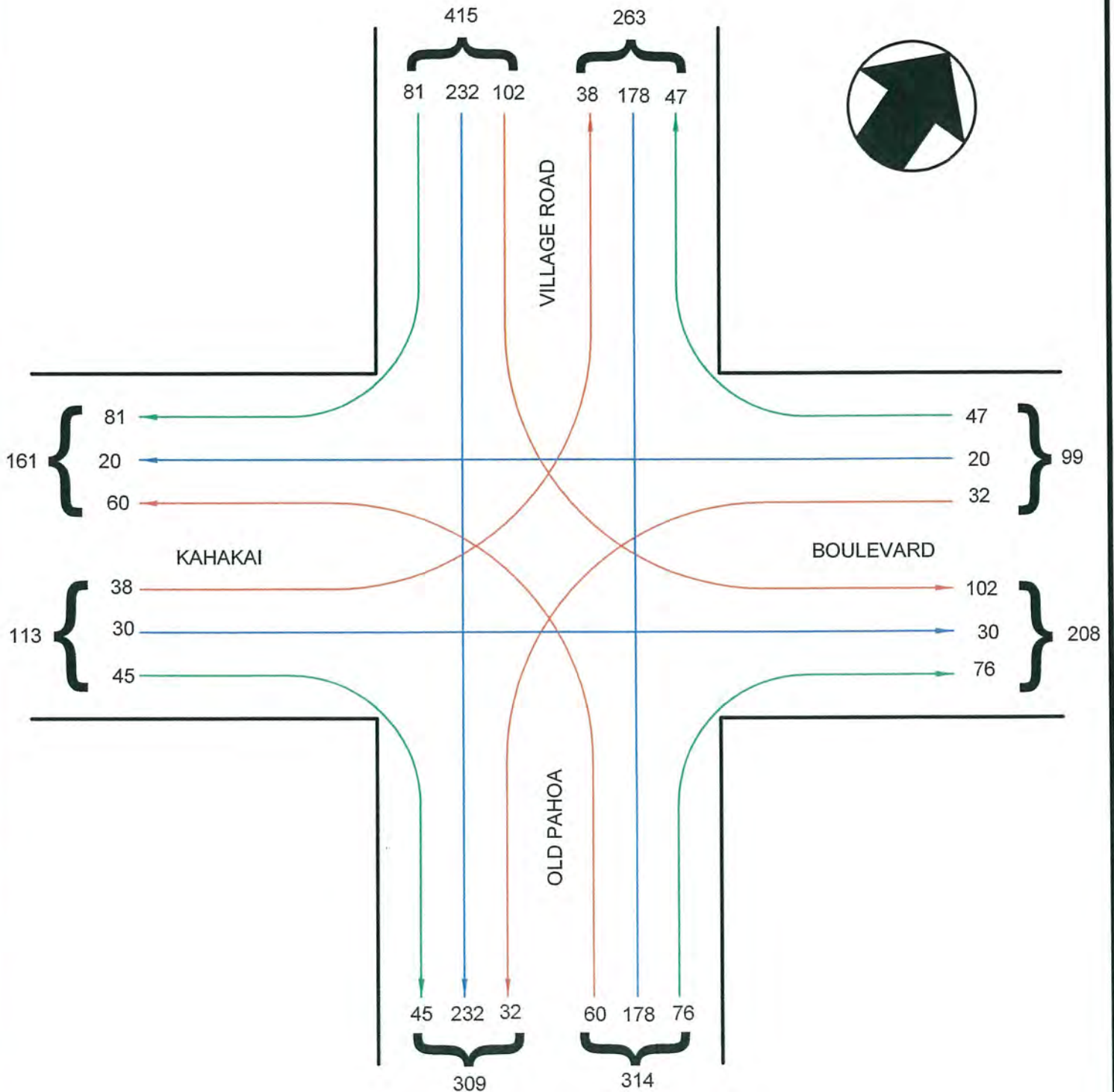
P.O. Box 348
Holualoa, Hawaii 96725
(808) 334-0322

Consulting Civil Engineers
Construction Managers

Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - 5-Year Condition

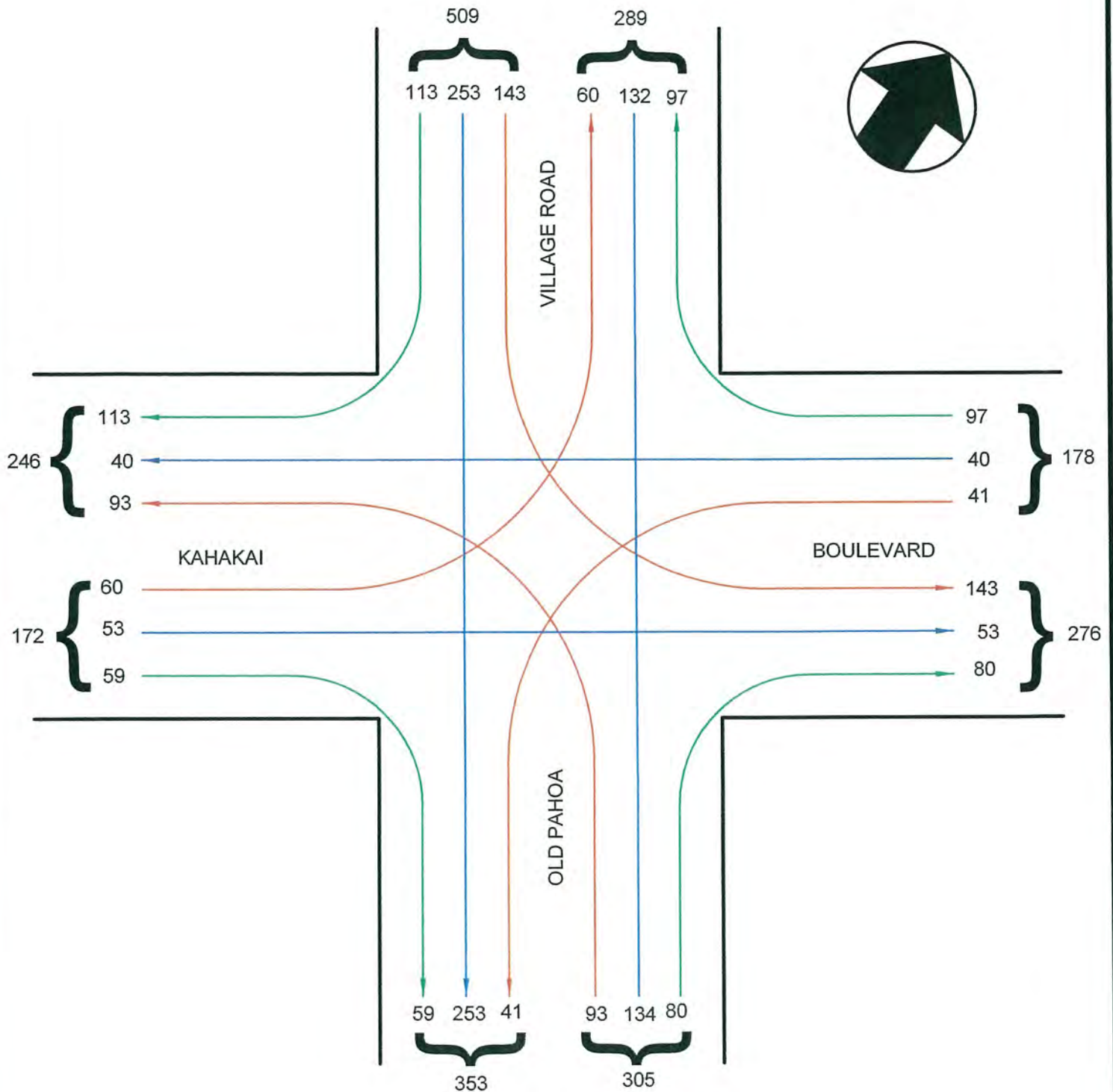
AM Peak Hour - 7:15 AM to 8:15 AM



Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - 5-Year Condition

PM Peak Hour - 4:15 PM to 5:15 PM



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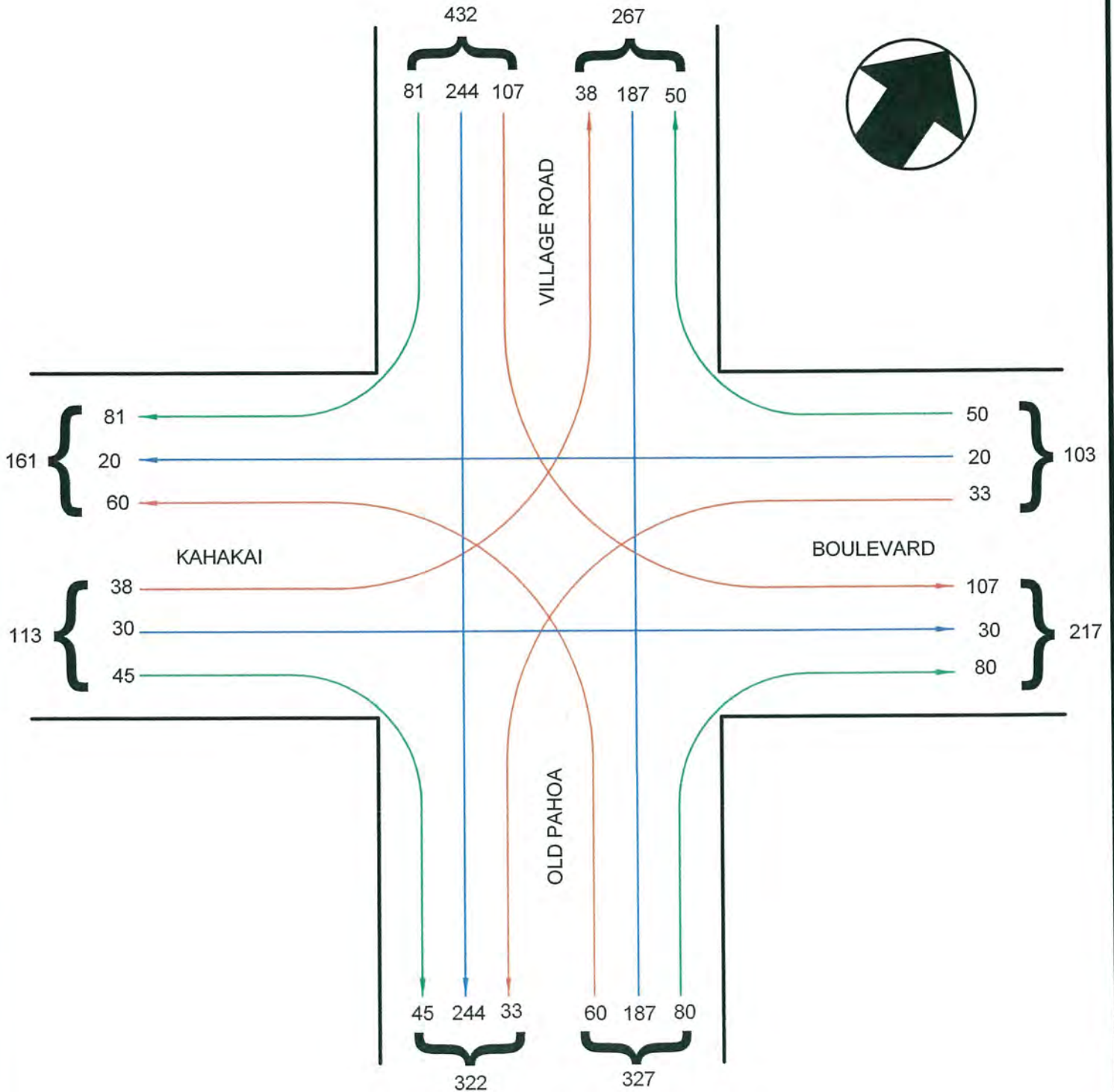
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Holualoa, Hawaii 96725
(808) 334-0322

Consulting Civil Engineers
Construction Managers

Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - 10-Year Condition

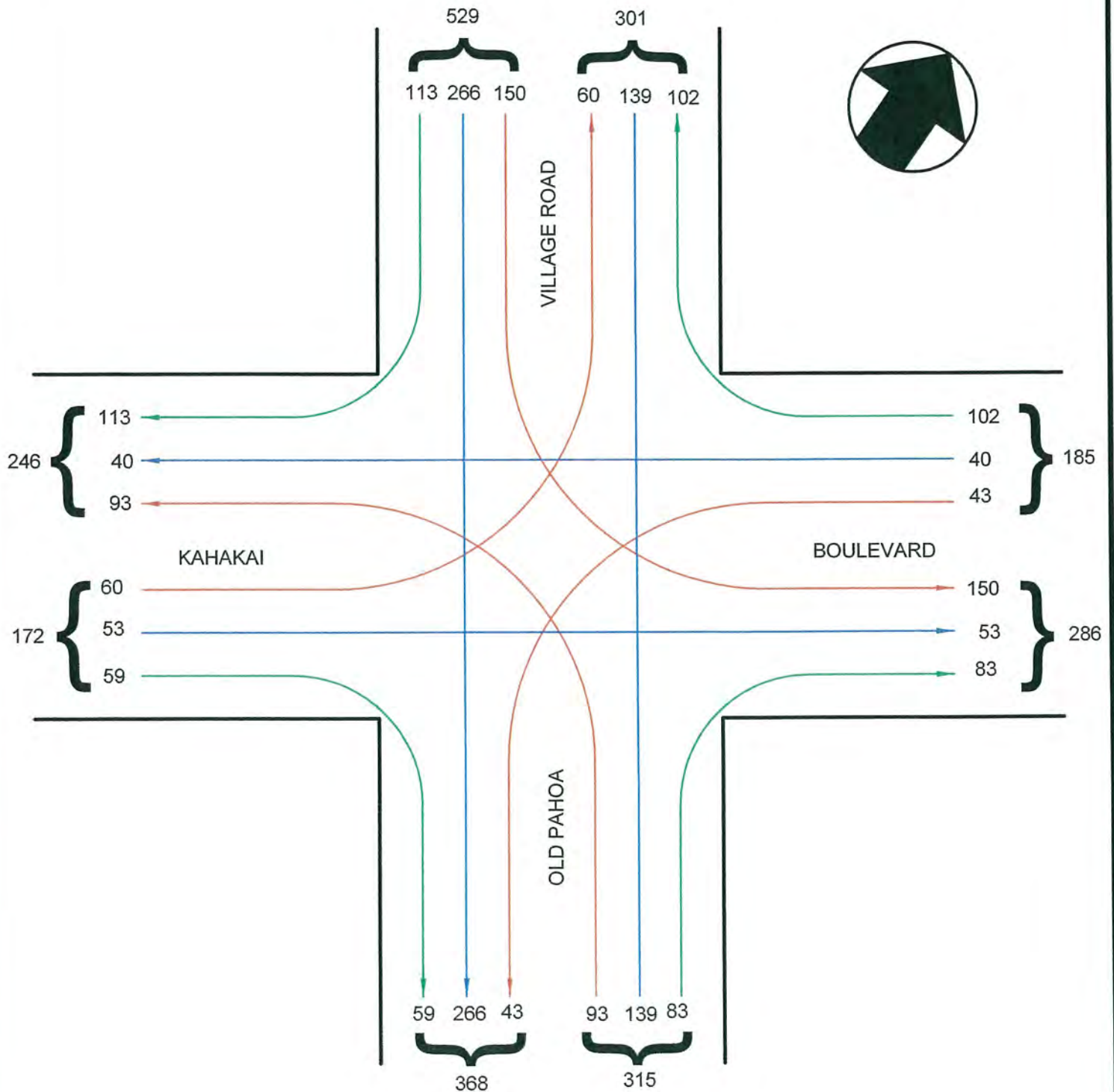
AM Peak Hour - 7:15 AM to 8:15 AM



Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - 10-Year Condition

PM Peak Hour - 4:15 PM to 5:15 PM



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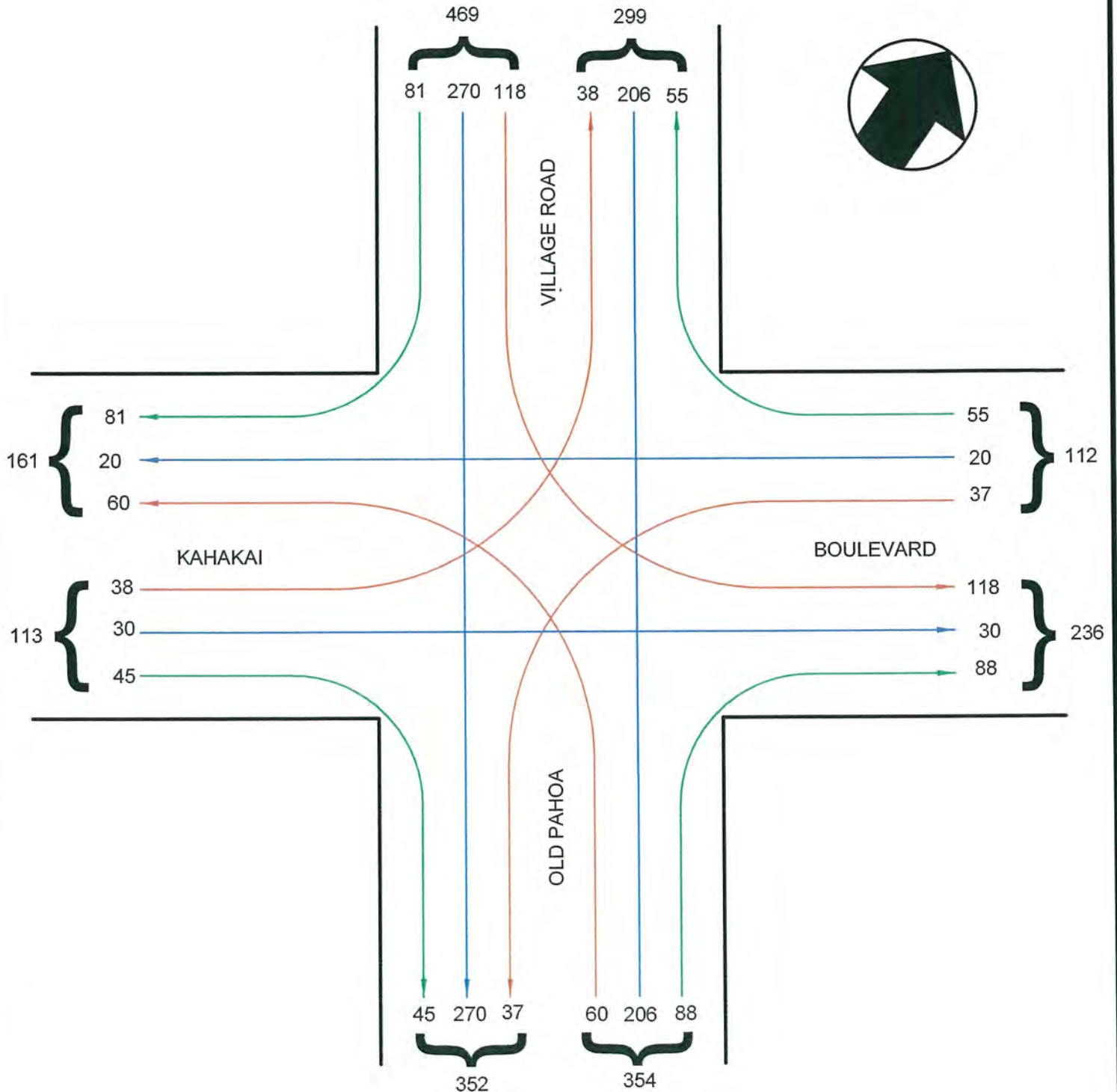
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Holualoa, Hawaii 96725
(808) 334-0322

Consulting Civil Engineers
Construction Managers

Kahakai Blvd. & Old Pahoa Village Road

Traffic Movement - 20-Year Condition

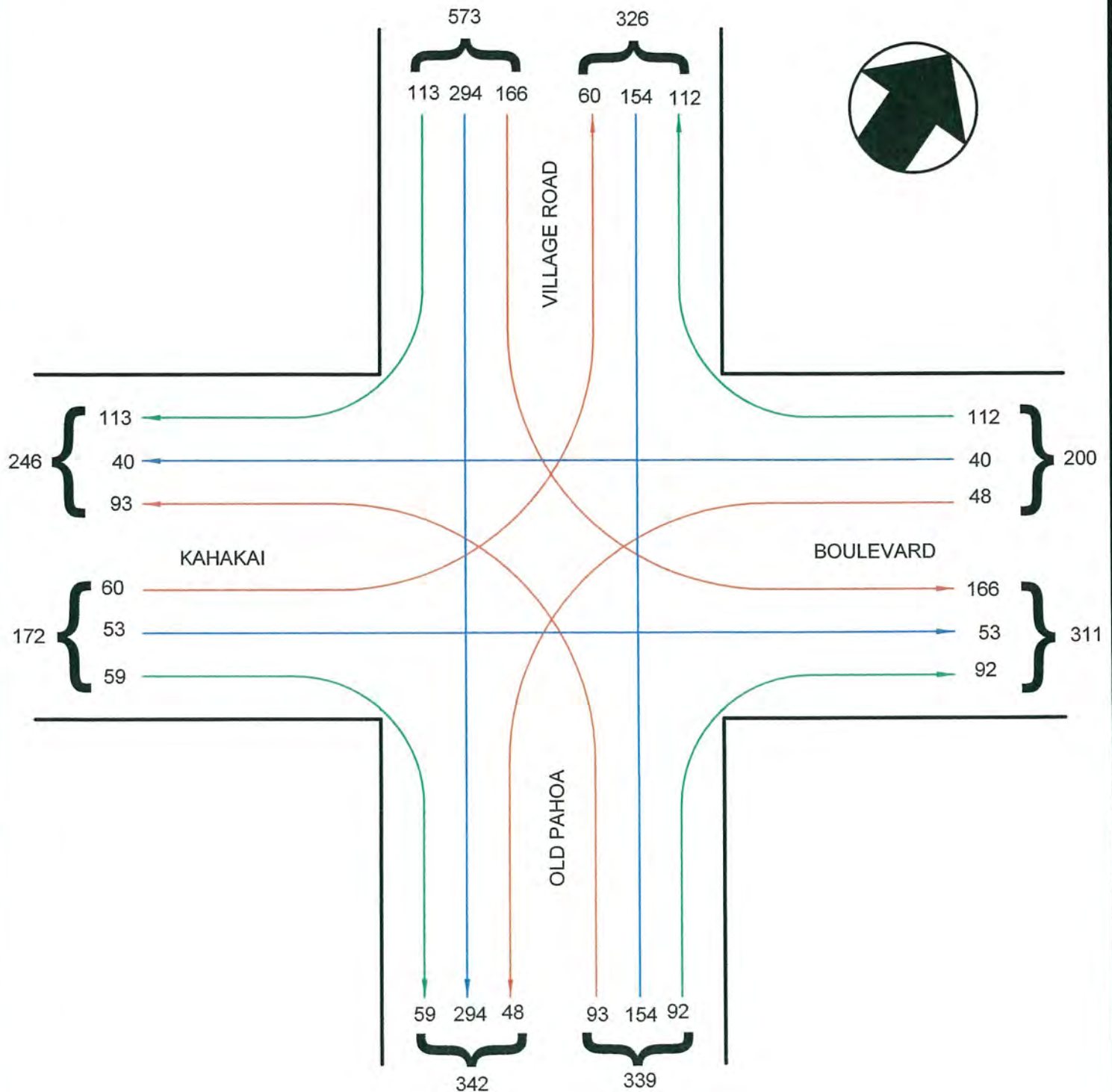
AM Peak Hour - 7:15 AM to 8:15 AM



Kahakai Blvd. & Old Pahoa Village Road

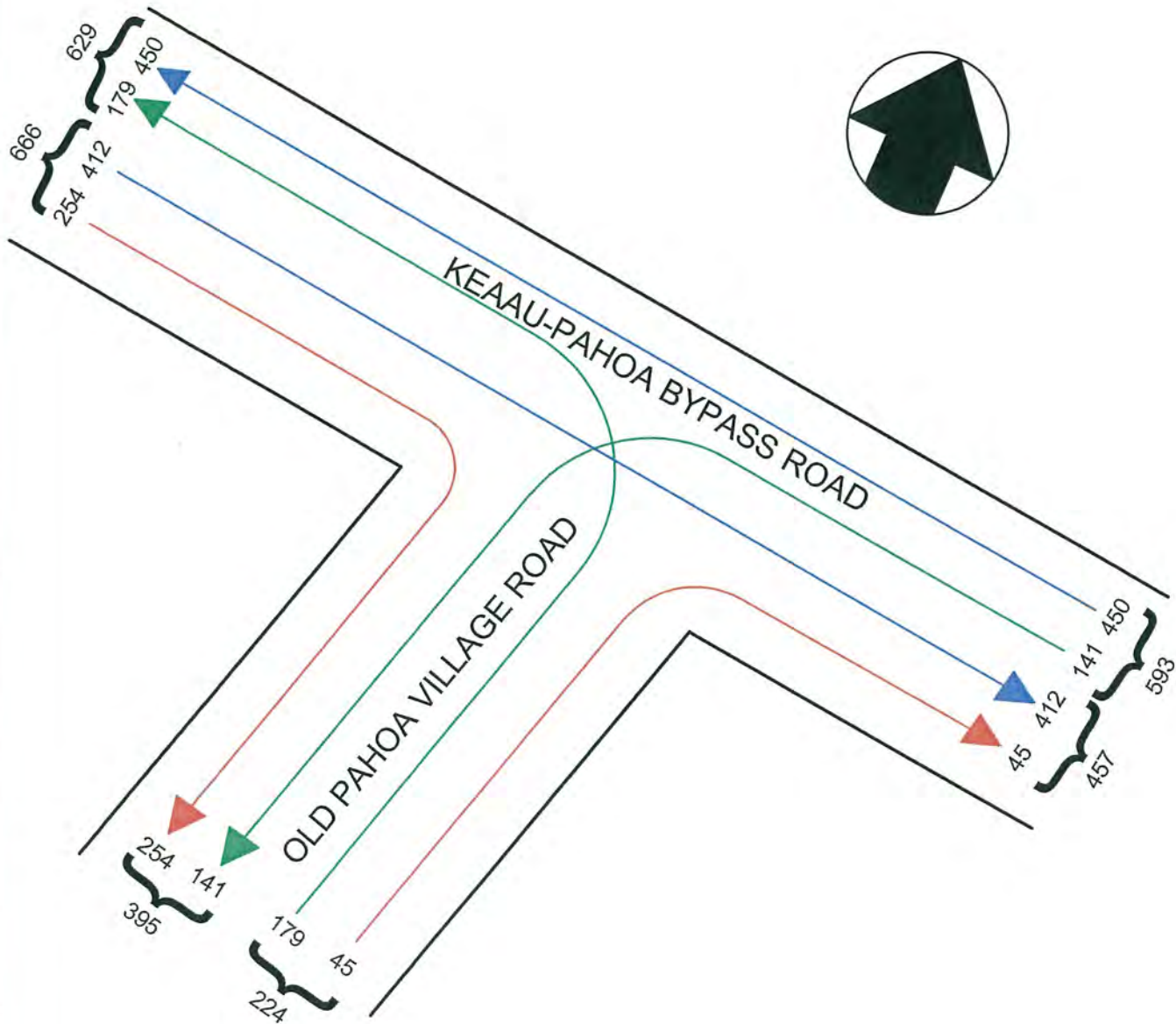
Traffic Movement - 20-Year Condition

PM Peak Hour - 4:15 PM to 5:15 PM



APPENDIX K
TRAFFIC MOVEMENT DIAGRAMS
KEAAU-PAHOA BYPASS RD. & OLD PAHOA VILLAGE RD.
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

Proposed Shopping Center, Pahoa, Hawaii Keaau-Pahoa Bypass and Old Pahoa Village Road Traffic Movement-Existing Conditions AM Peak Hour - 7:15 AM to 8:15 AM

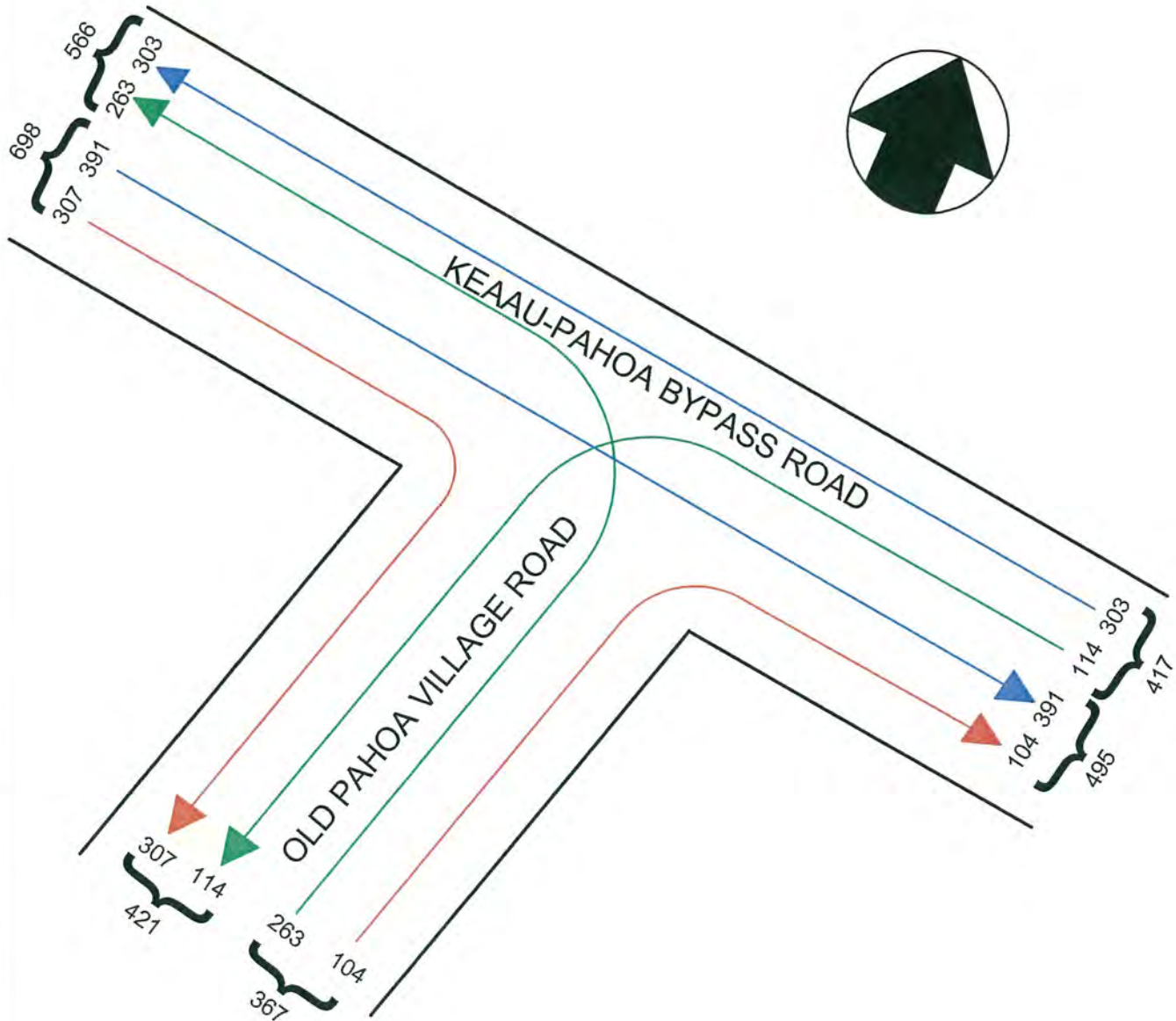


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Proposed Shopping Center, Pahoa, Hawaii Keaau-Pahoa Bypass and Old Pahoa Village Road Traffic Movement-Existing Conditions PM Peak Hour - 4:15 PM to 5:15 PM

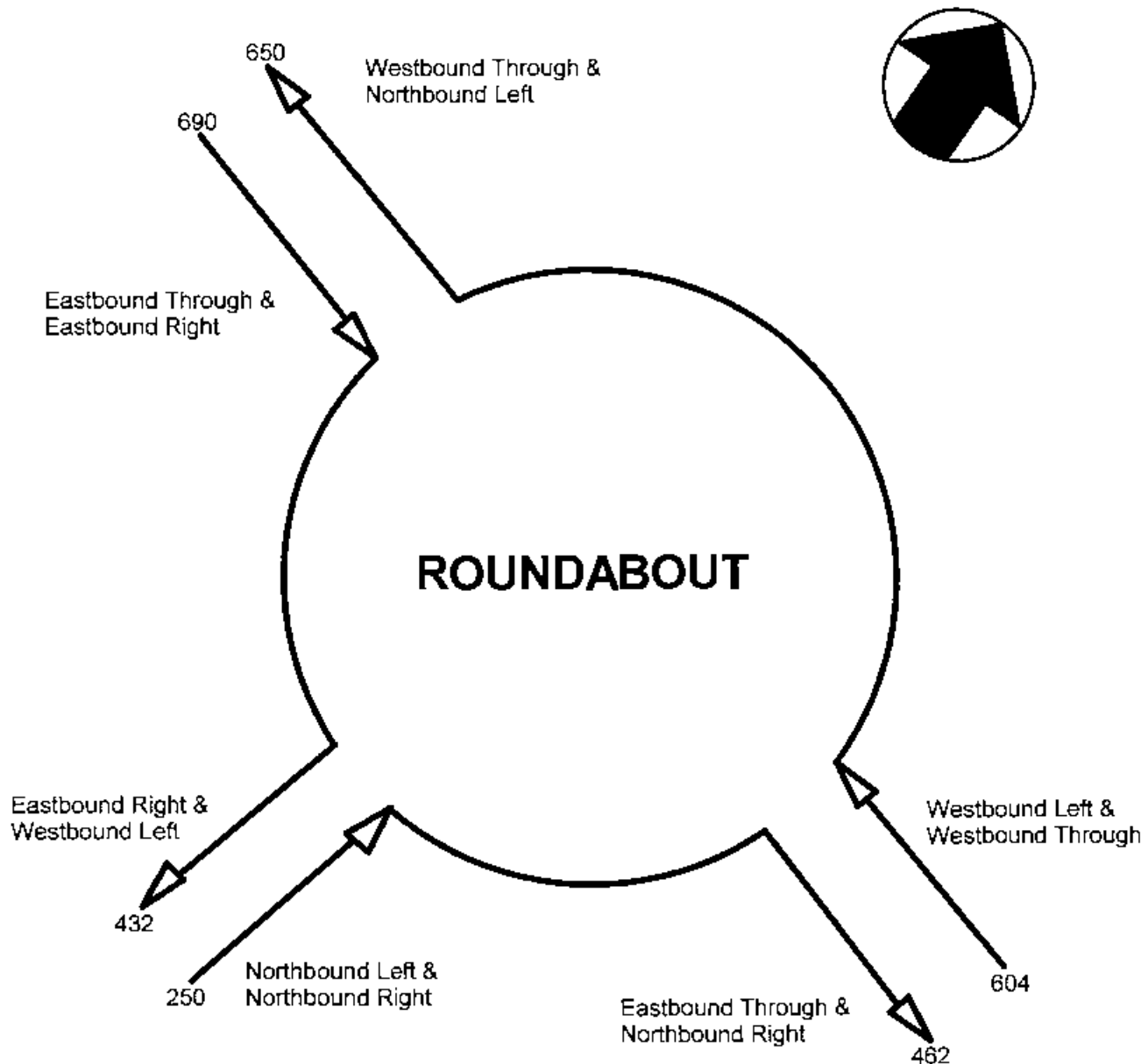


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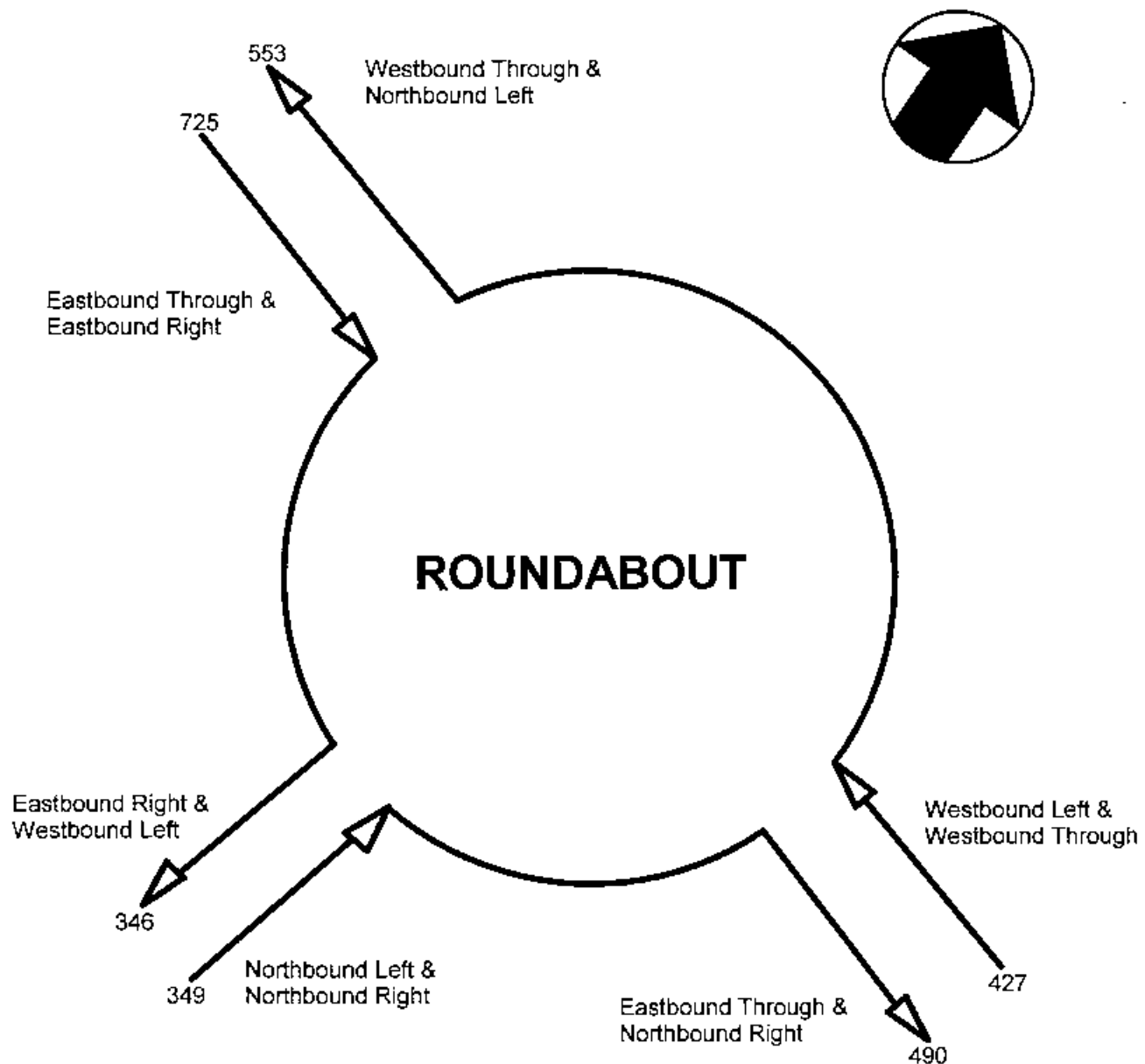
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Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - Buildout Condition AM Peak Hour - 7:15 AM to 8:15 AM



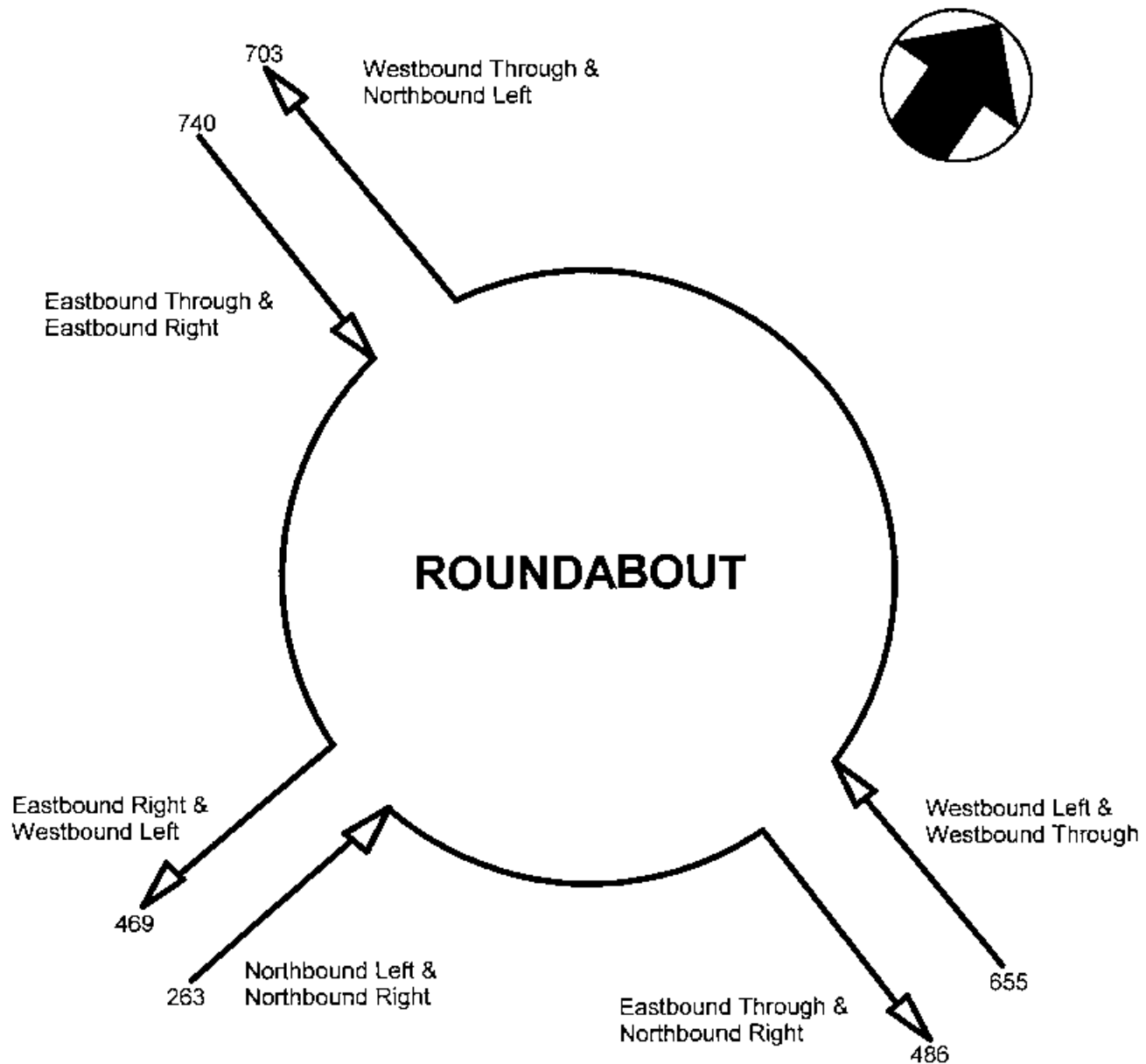
Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - Buildout Condition PM Peak Hour - 4:15 PM to 5:15 PM



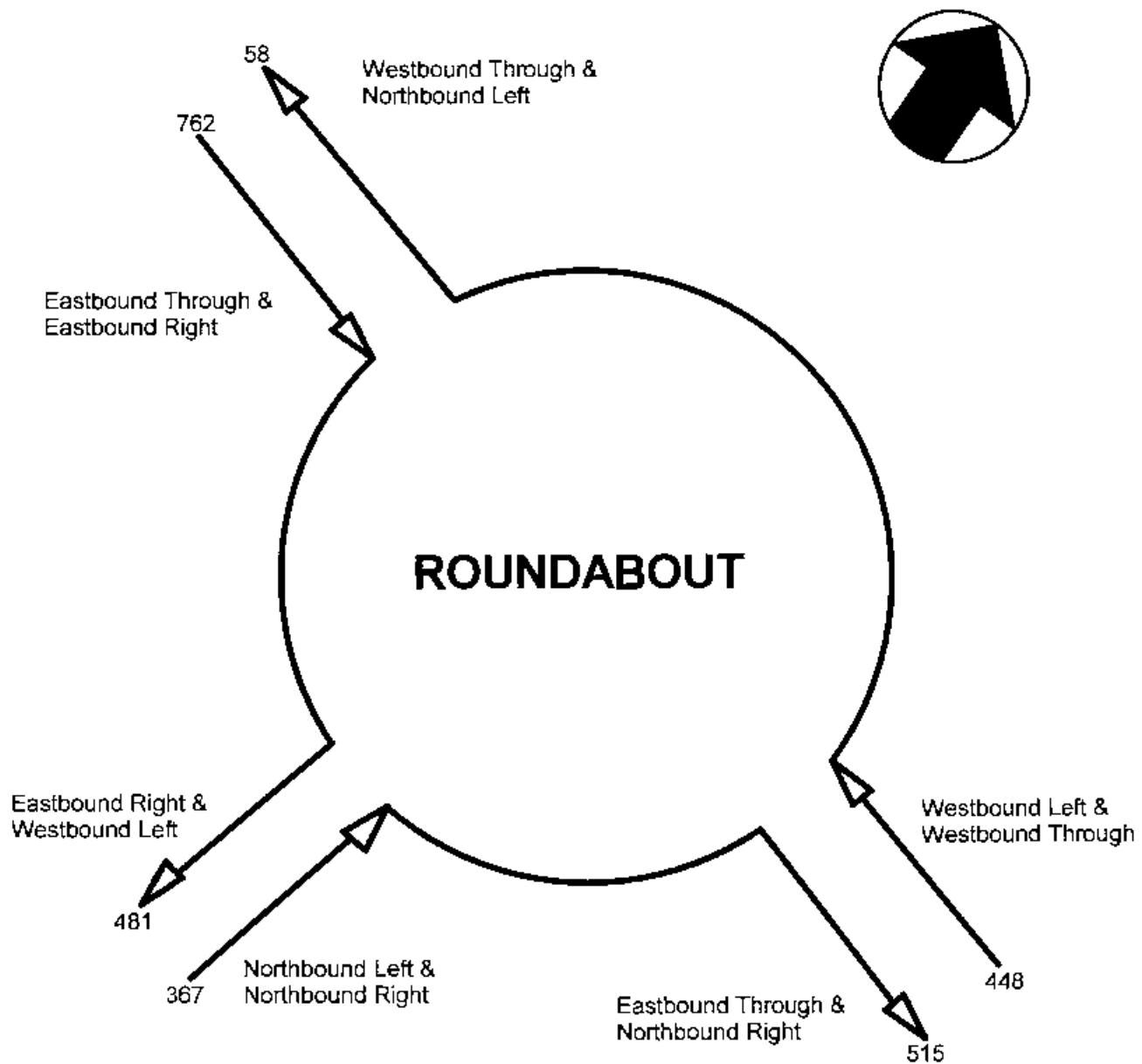
Keaau-Pahoa ByPass Road & Old Pahoa Village Road

Traffic Movement - 5-Year Condition

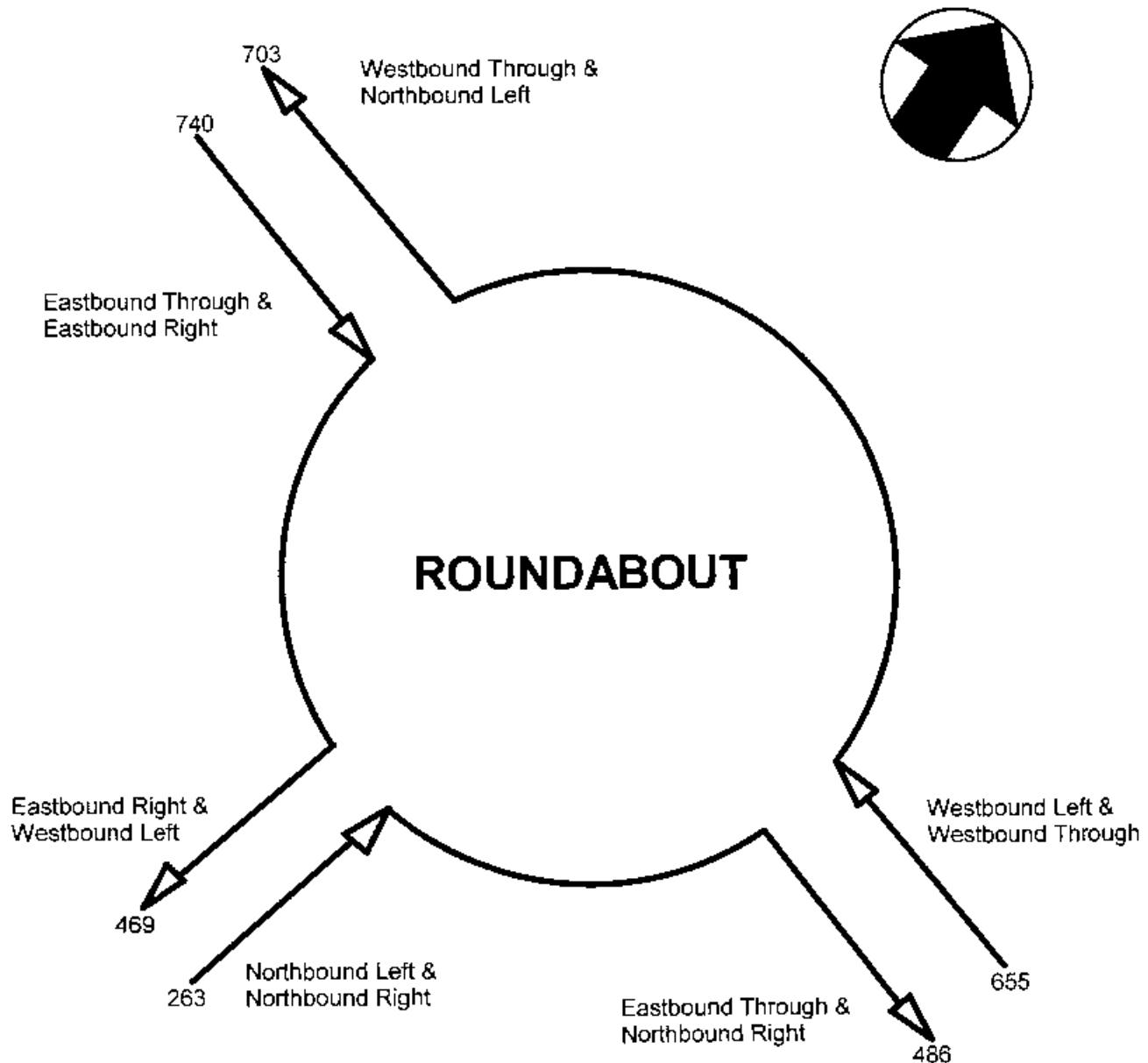
AM Peak Hour - 7:15 AM to 8:15 AM



Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - 5-Year Condition PM Peak Hour - 4:15 PM to 5:15 PM



Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - 5-Year Condition AM Peak Hour - 7:15 AM to 8:15 AM

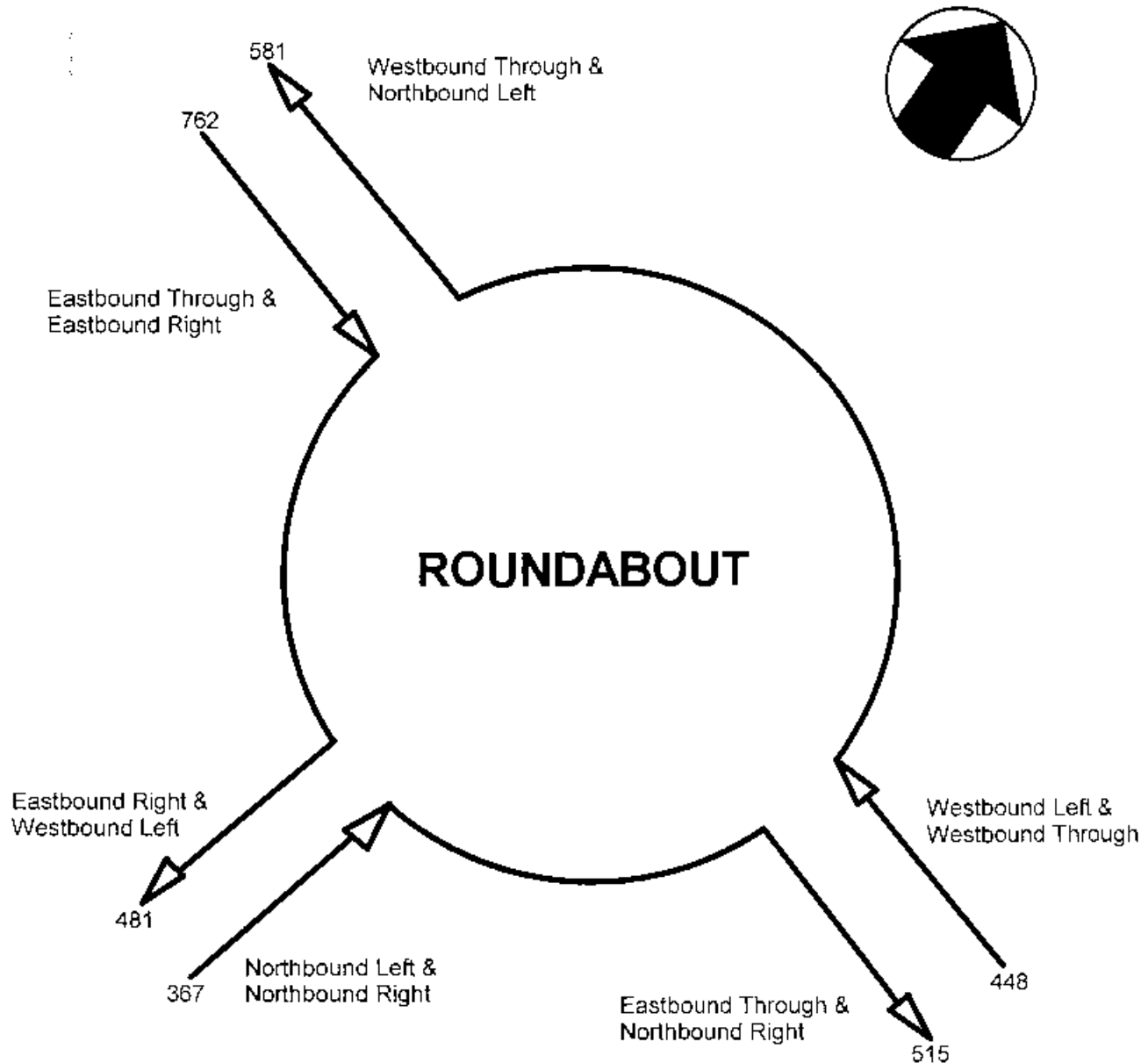


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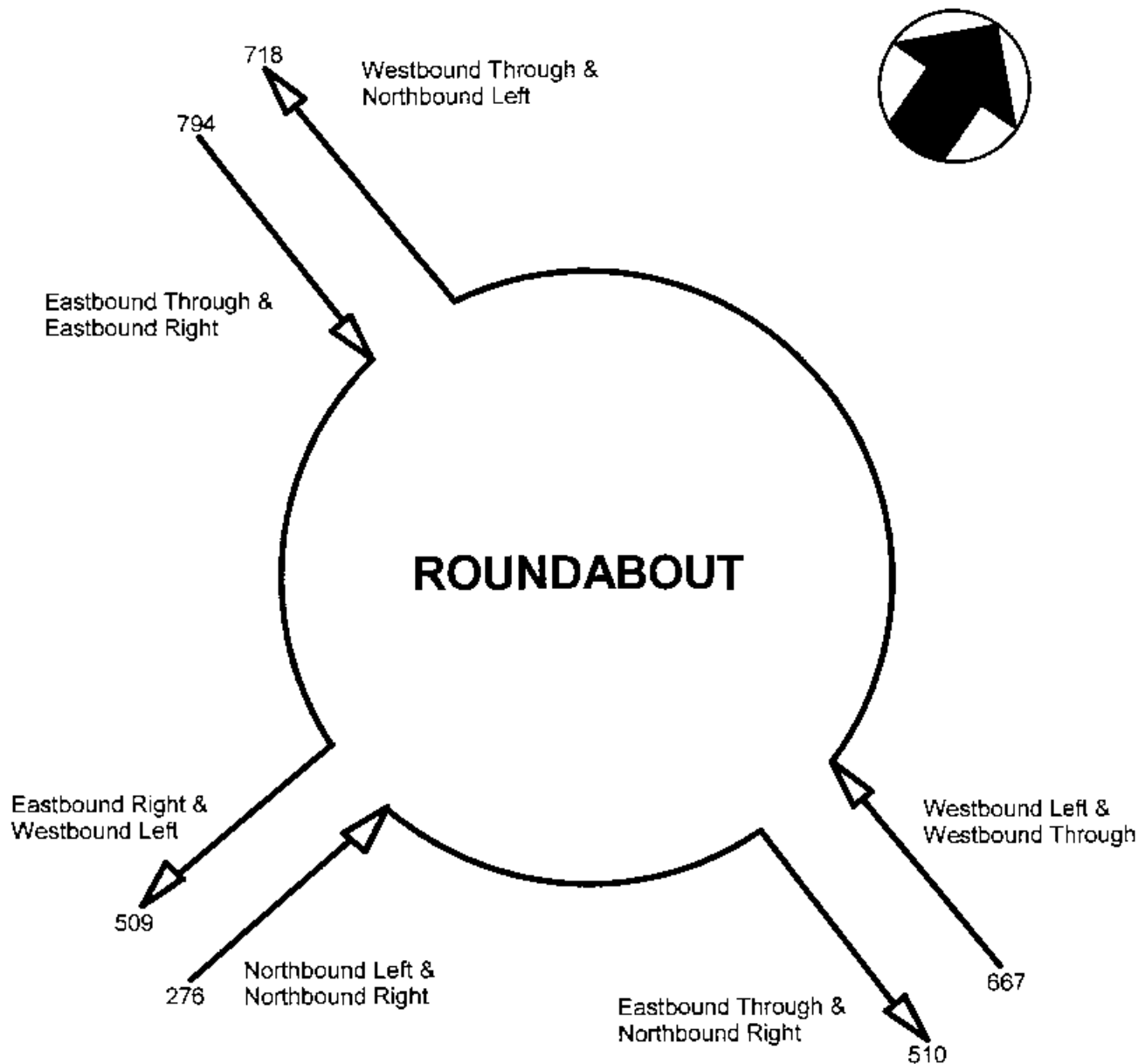
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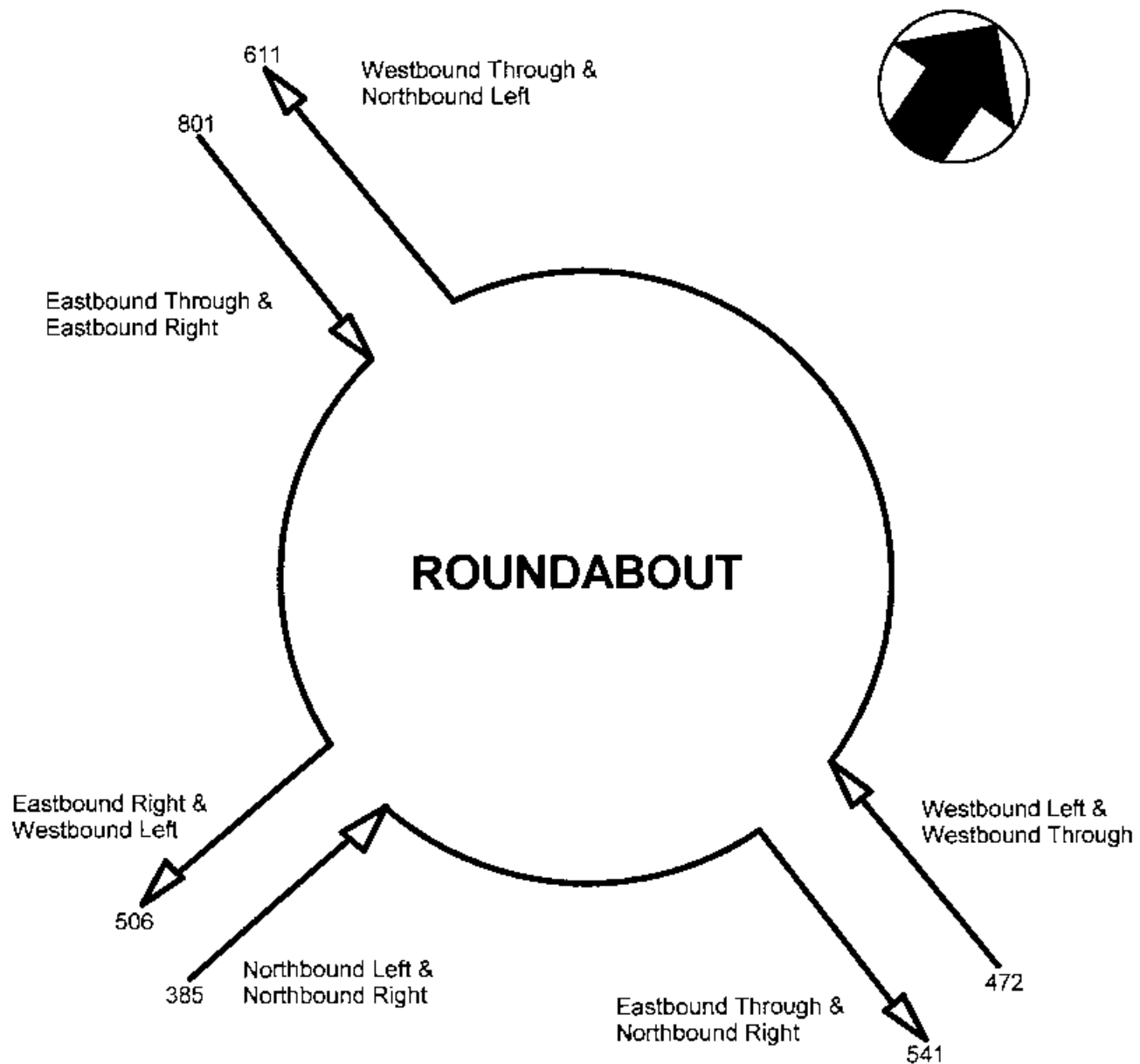
Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - 5-Year Condition PM Peak Hour - 4:15 PM to 5:15 PM



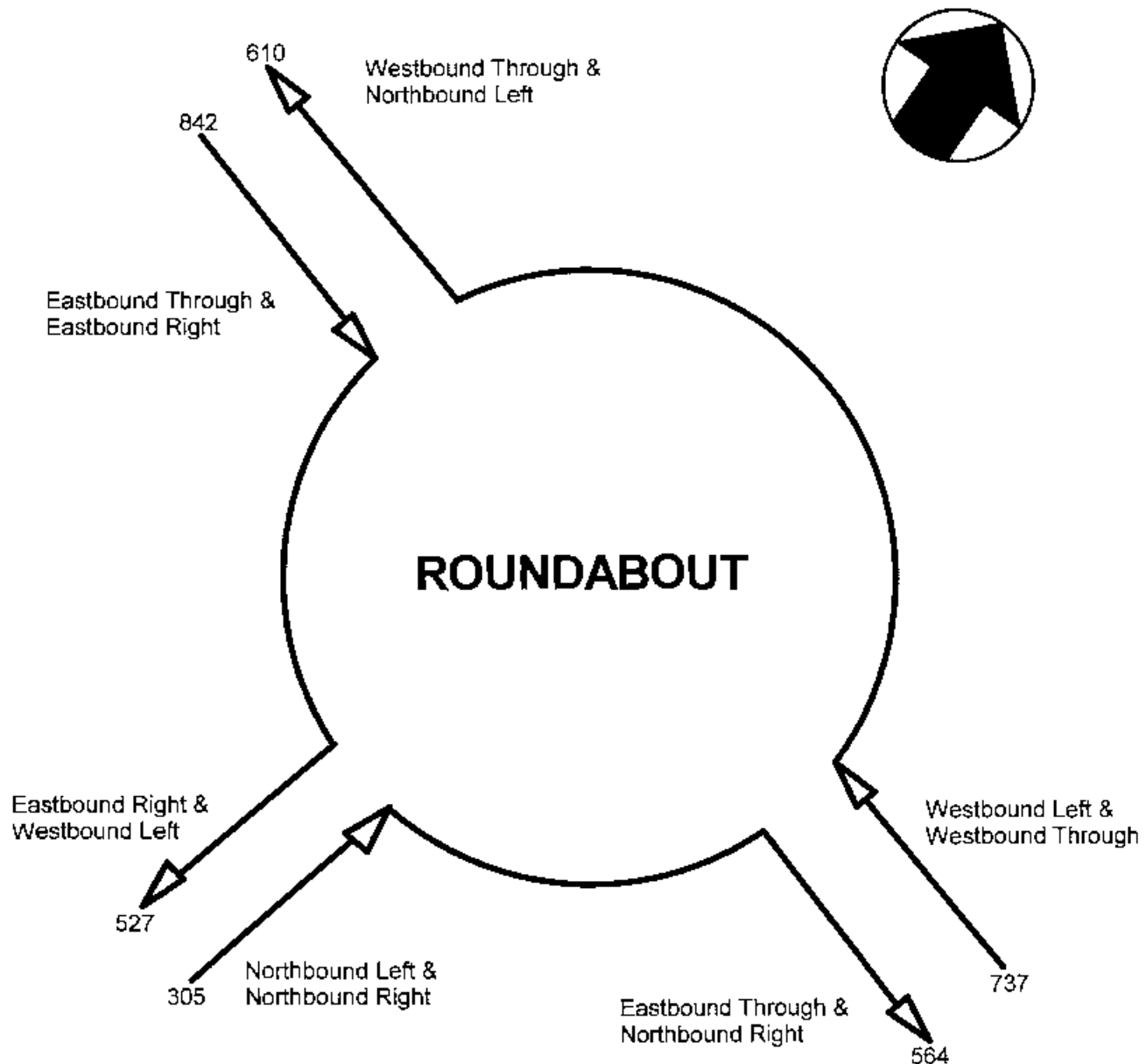
Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - 10-Year Condition AM Peak Hour - 7:15 AM to 8:15 AM



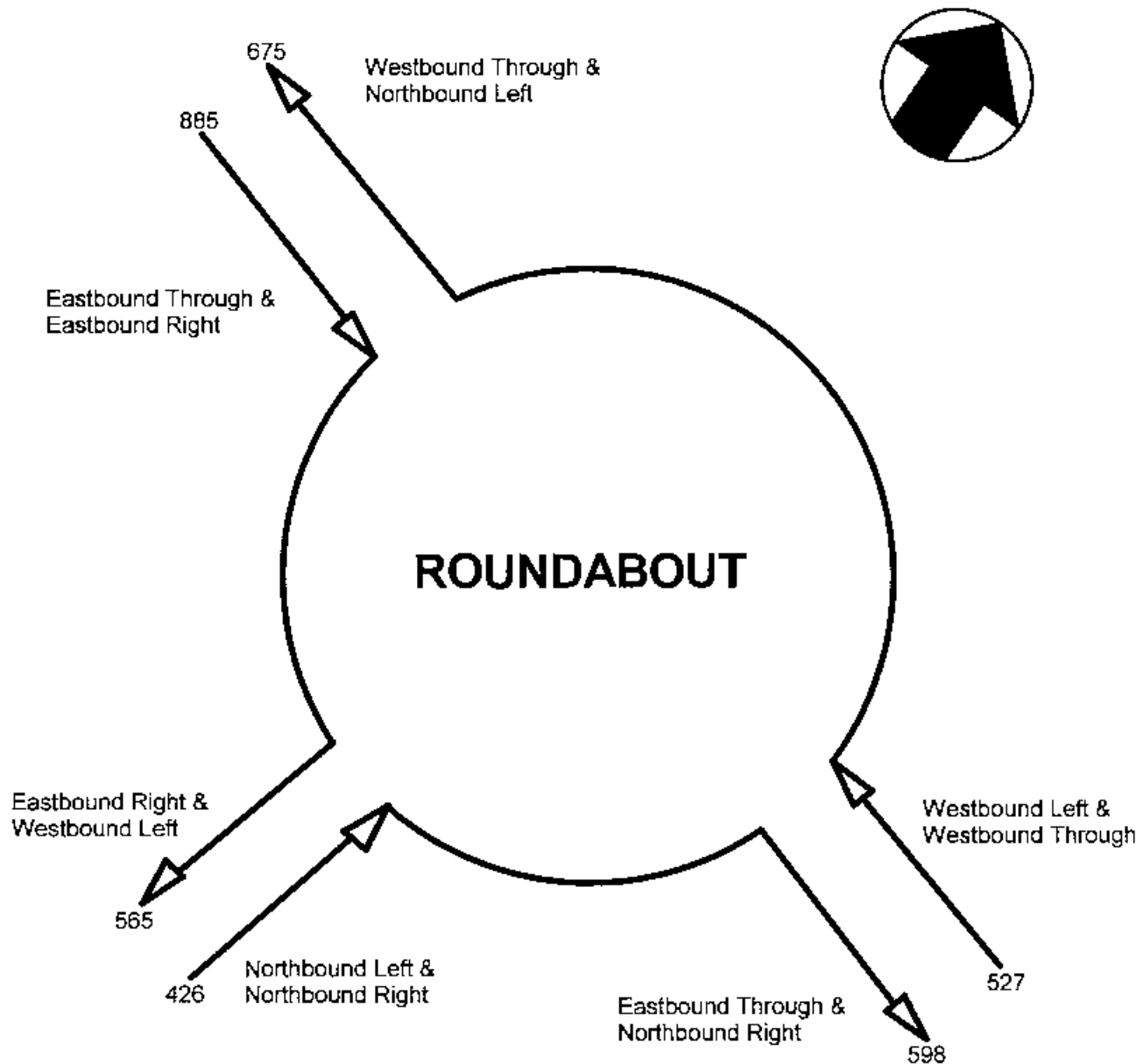
Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - 10-Year Condition PM Peak Hour - 4:15 PM to 5:15 PM



Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - 20-Year Condition AM Peak Hour - 7:15 AM to 8:15 AM

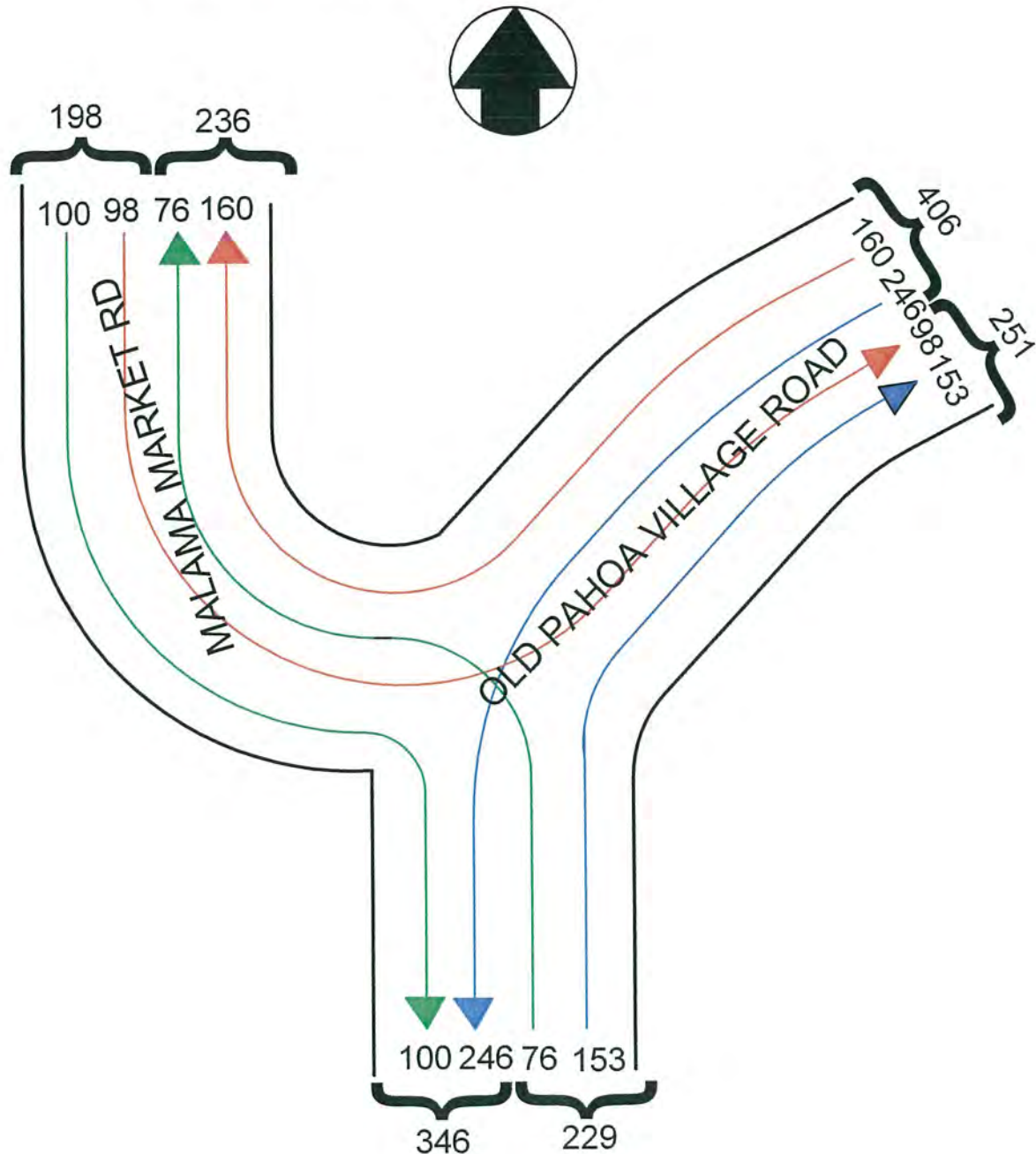


Keaau-Pahoa ByPass Road & Old Pahoa Village Road Traffic Movement - 20-Year Condition PM Peak Hour - 4:15 PM to 5:15 PM

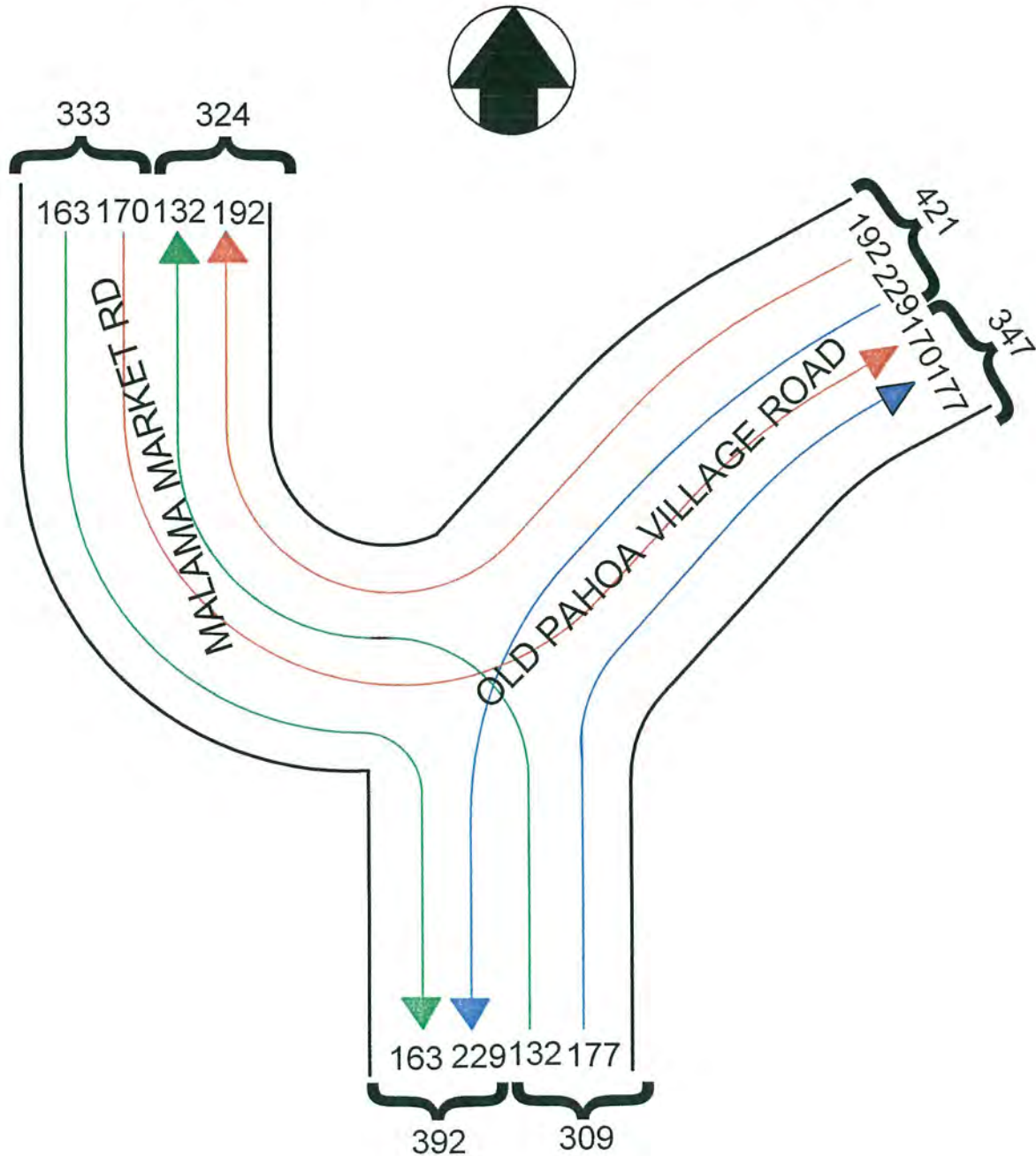


APPENDIX L
TRAFFIC MOVEMENT DIAGRAMS
MALAMA MARKET RD. & OLD PAHOA VILLAGE RD.
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

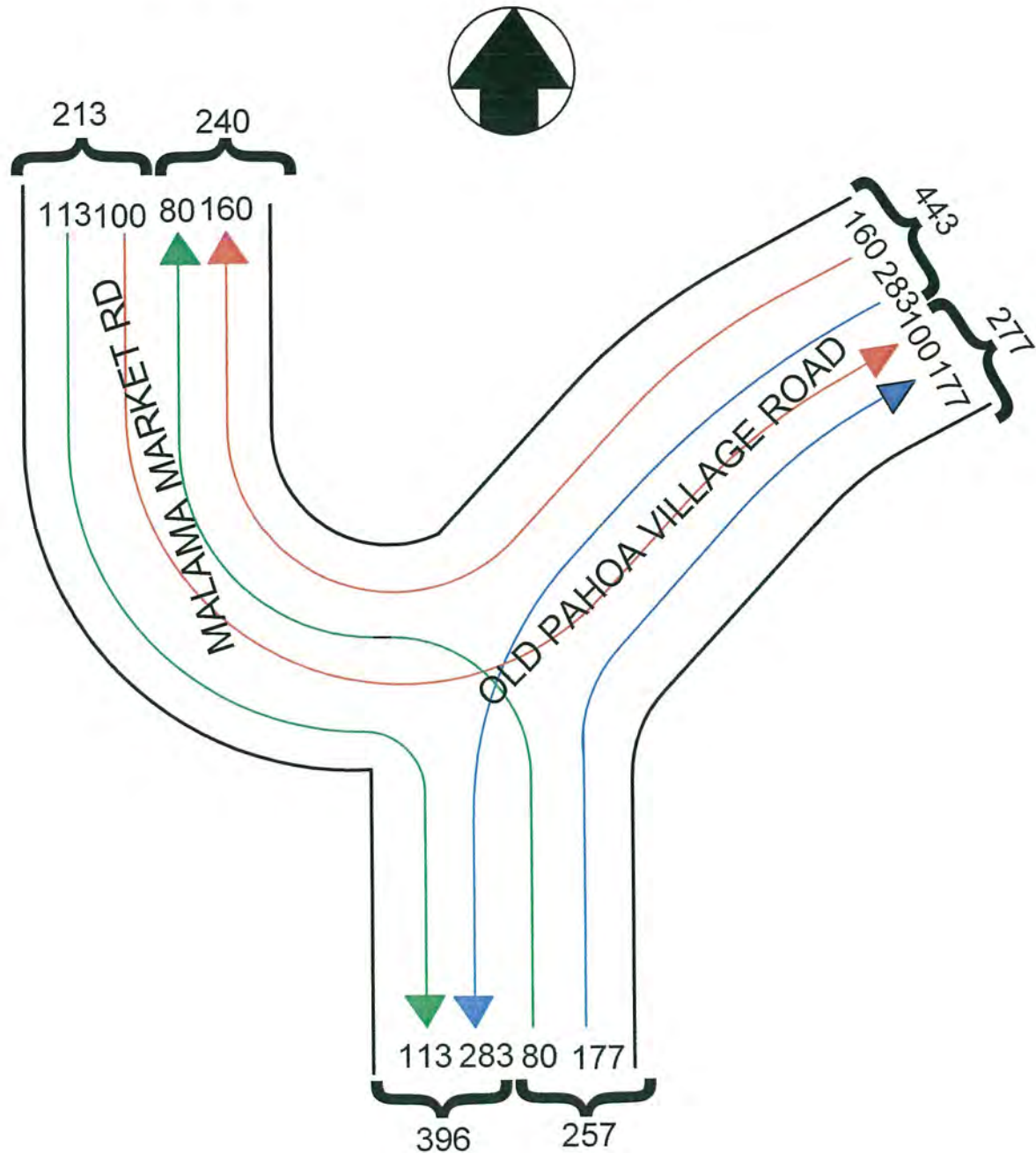
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - Existing Conditions AM Peak Hour - 7:15 AM to 8:15 AM



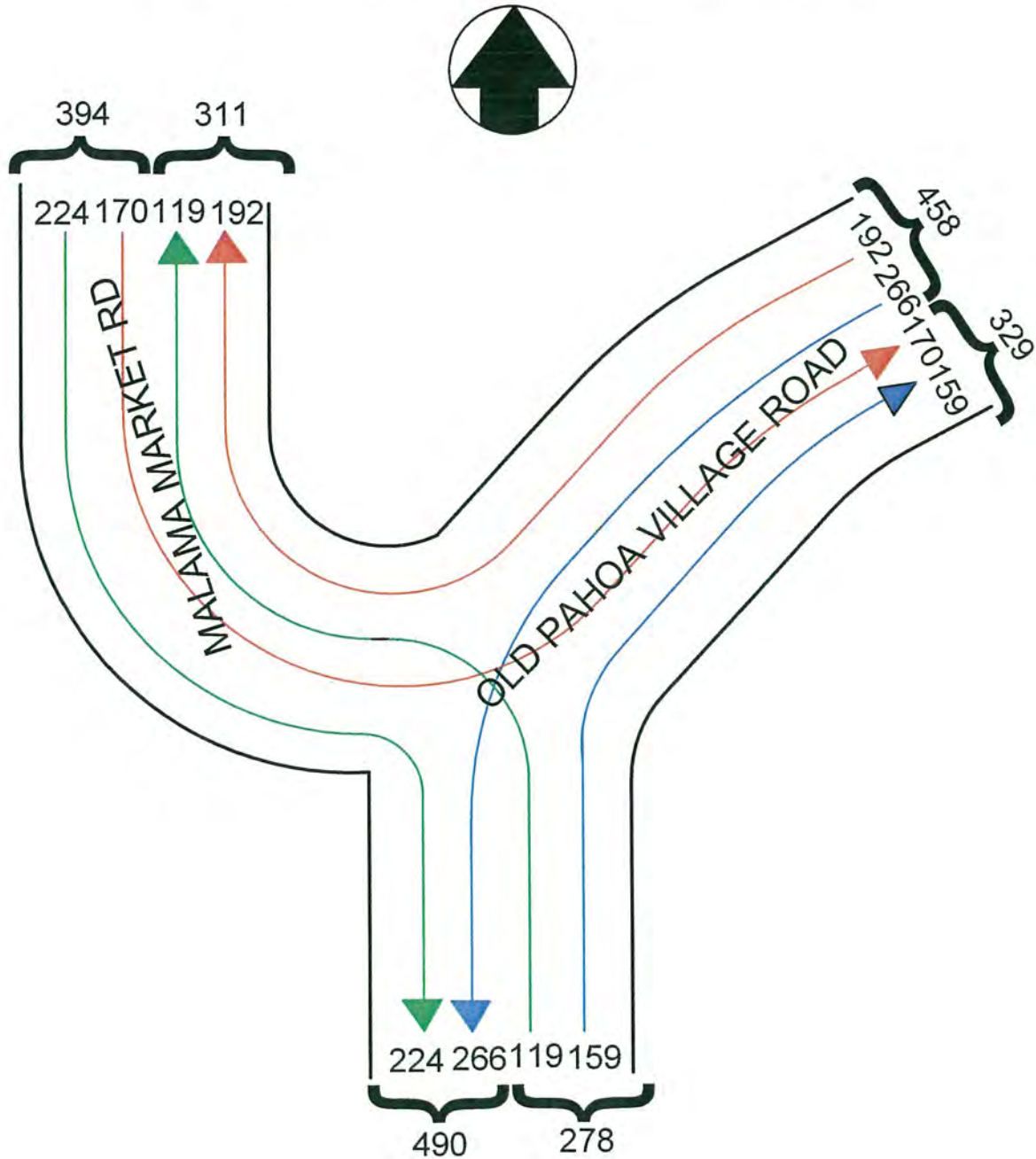
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - Existing Conditions PM Peak Hour - 4:00 PM to 5:00 PM



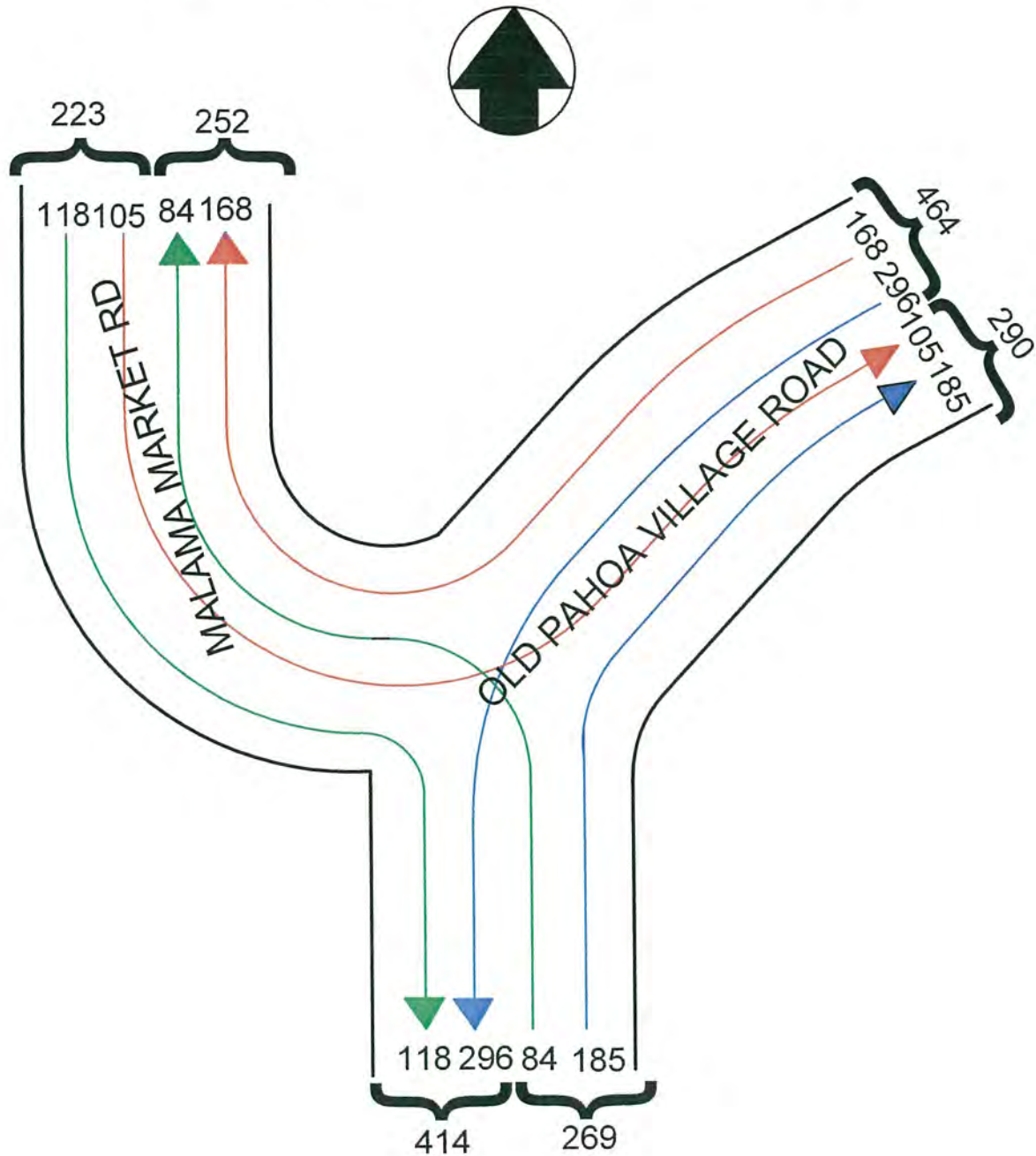
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - Buildout Conditions AM Peak Hour - 7:15 AM to 8:15 AM



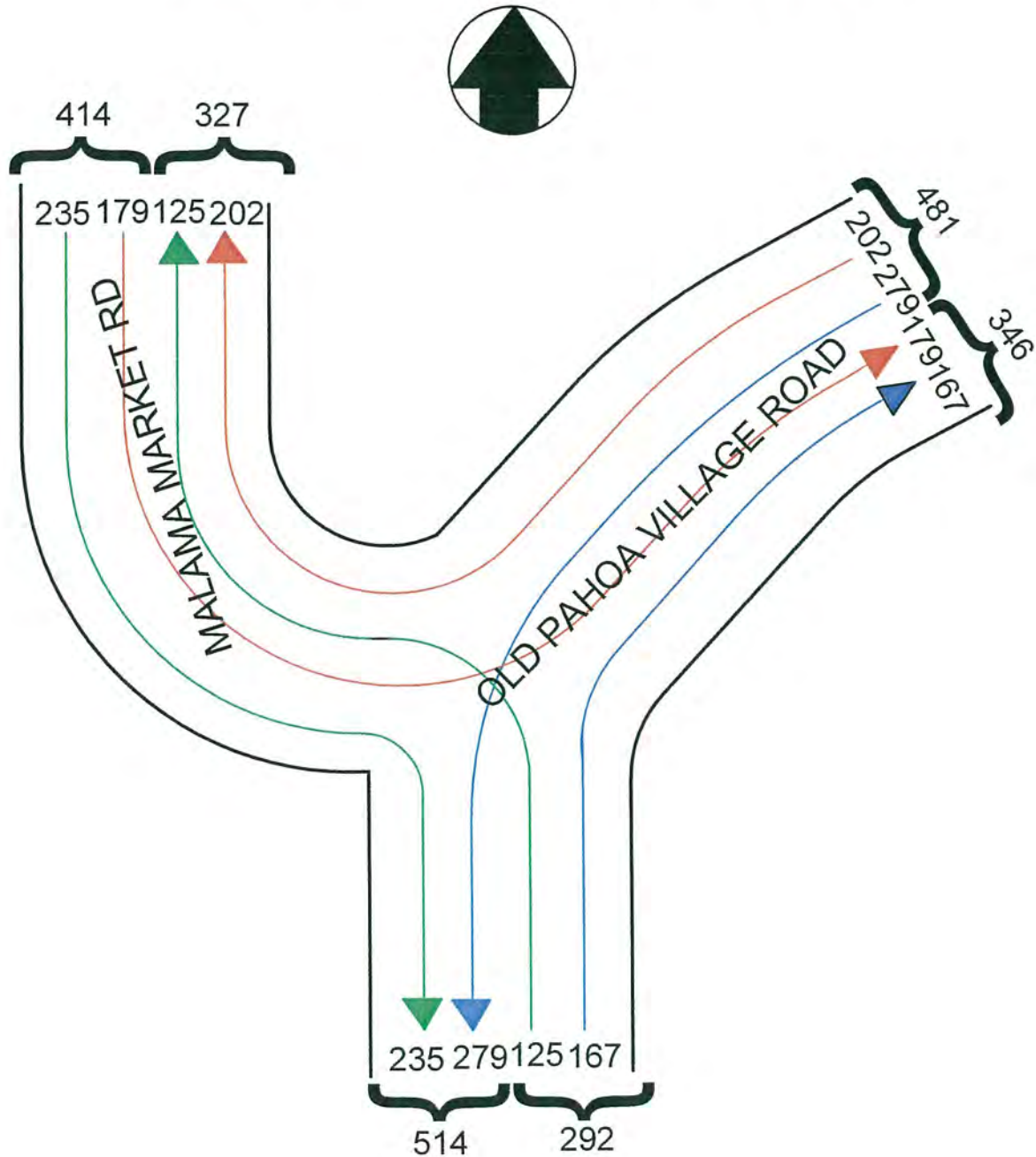
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - Buildout Conditions PM Peak Hour - 4:00 PM to 5:00 PM



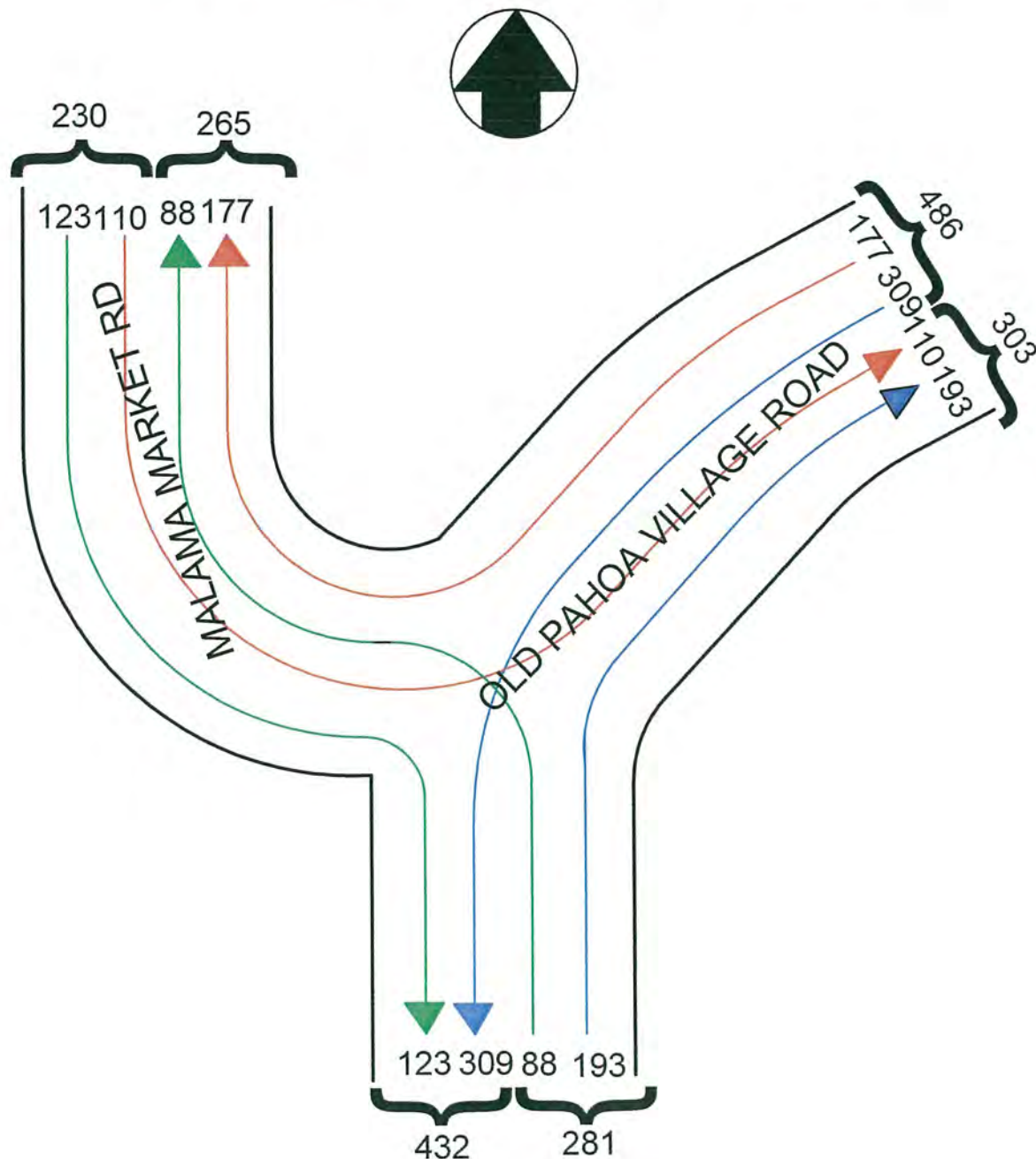
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - 5-Year Conditions AM Peak Hour - 7:15 AM to 8:15 AM



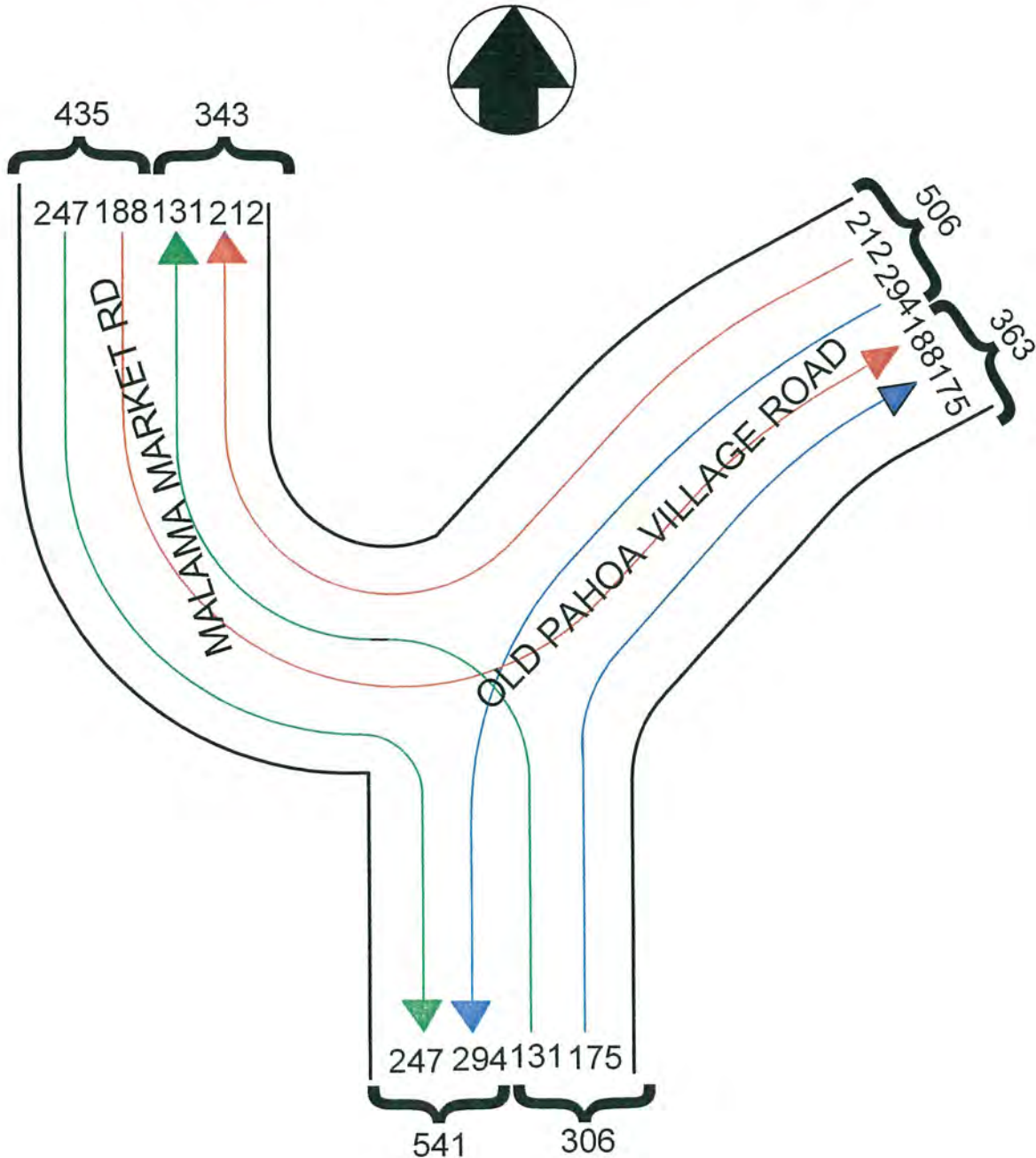
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - 5-Year Conditions PM Peak Hour - 4:00 PM to 5:00 PM



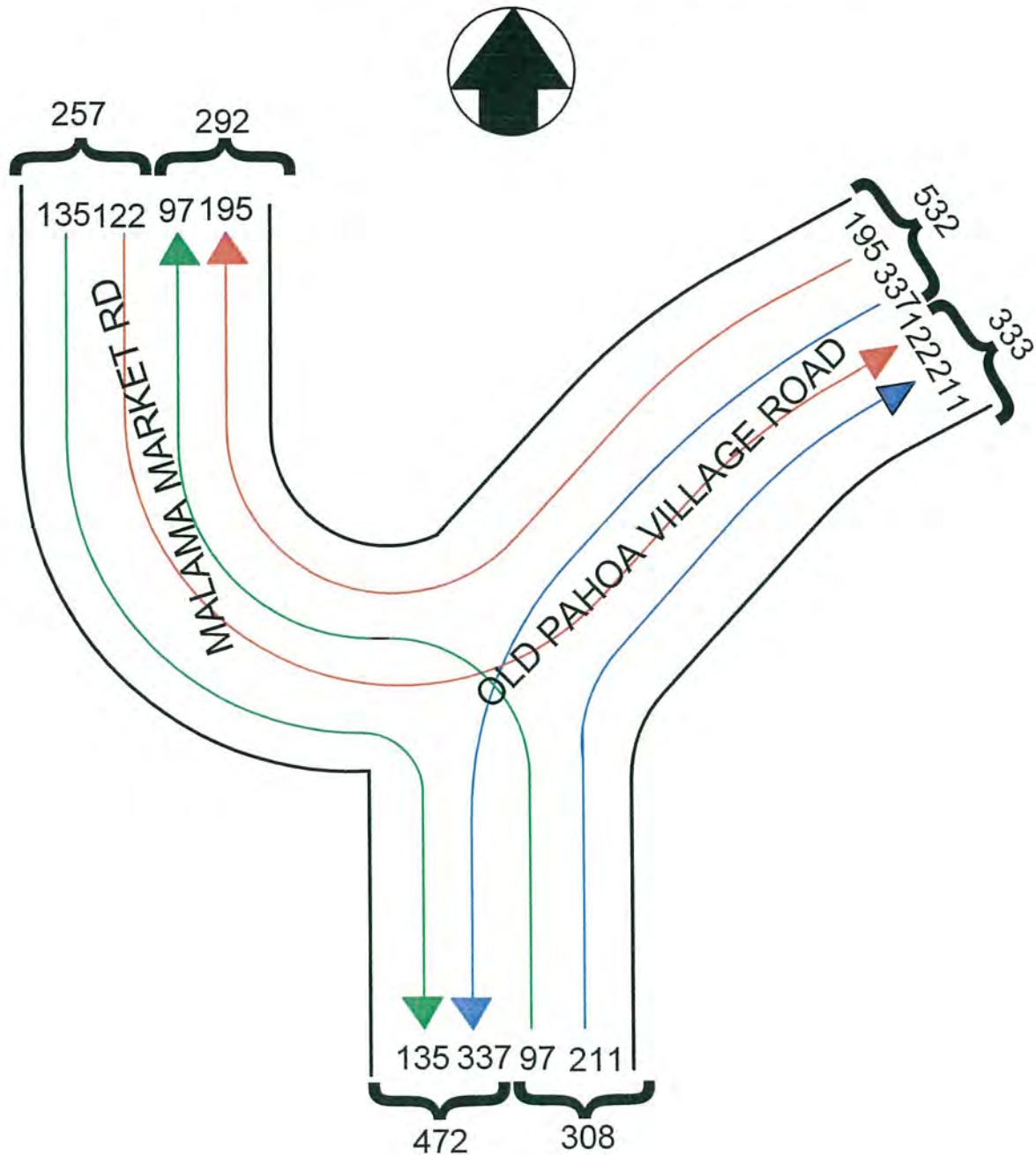
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - 10-Year Conditions AM Peak Hour - 7:15 AM to 8:15 AM



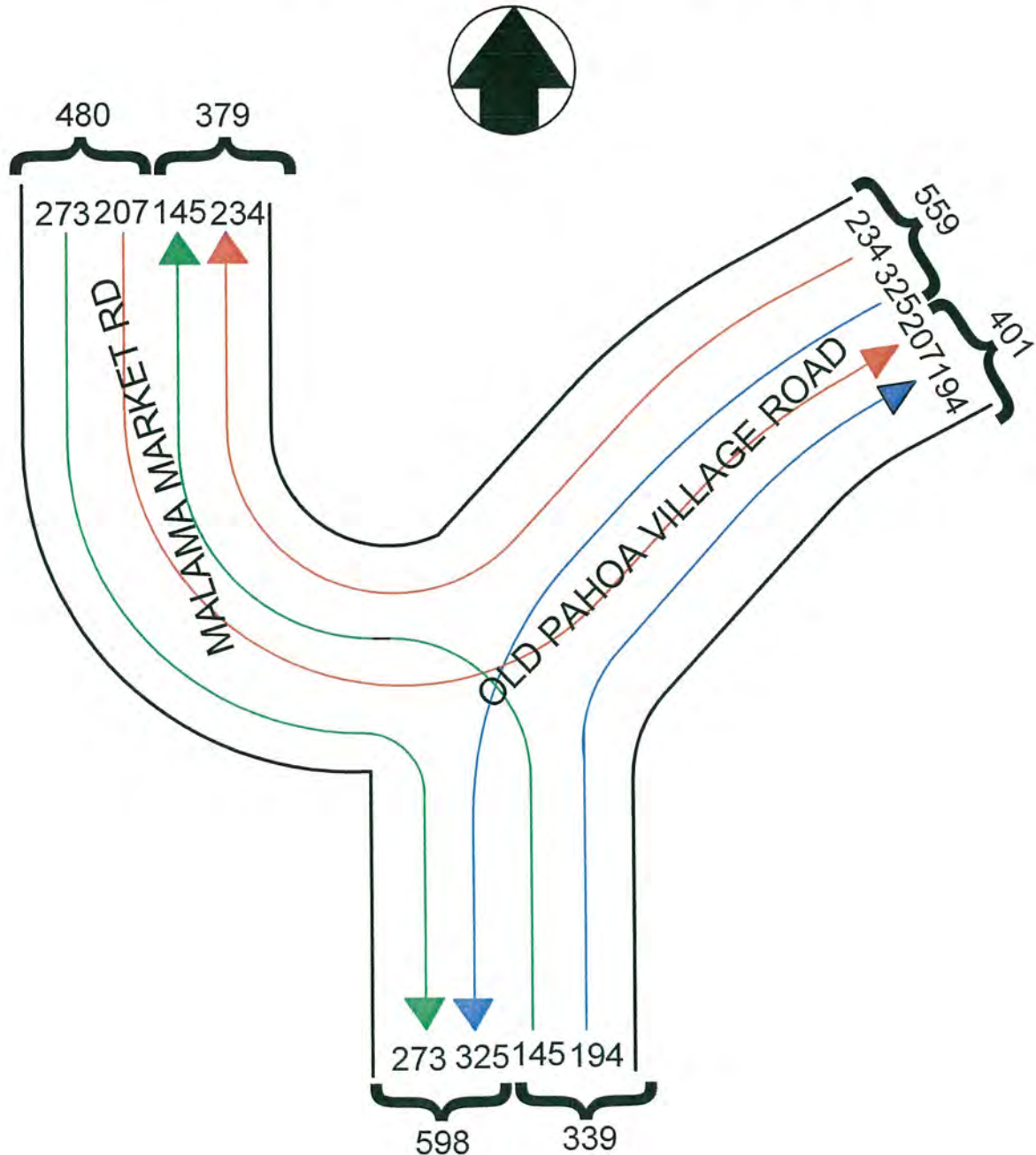
Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - 10-Year Conditions PM Peak Hour - 4:00 PM to 5:00 PM



Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - 20-Year Conditions AM Peak Hour - 7:15 AM to 8:15 AM

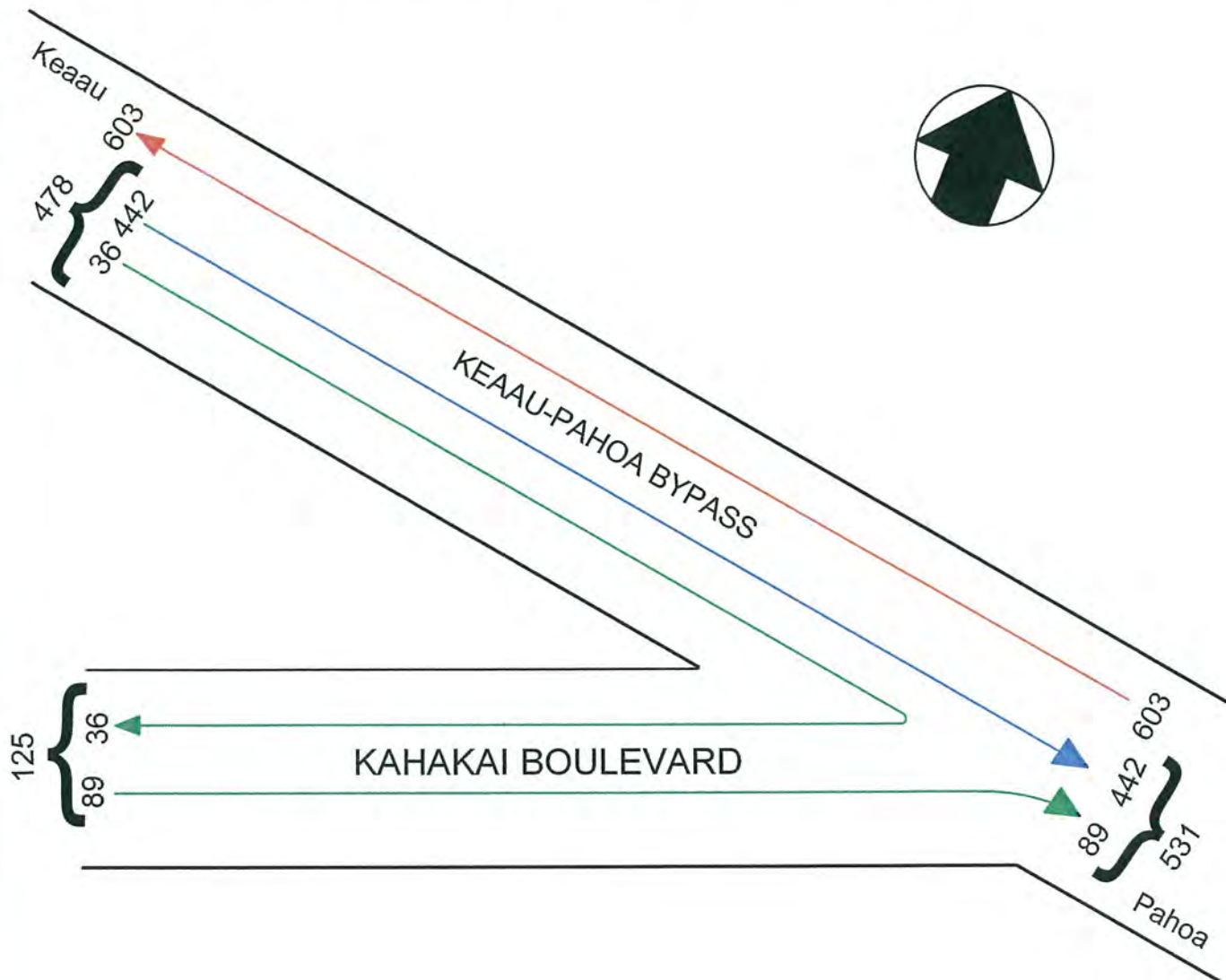


Proposed Shopping Center, Pahoa, Hawaii Malama Market Road & Old Pahoa Village Road Traffic Movement - 20-Year Conditions PM Peak Hour - 4:00 PM to 5:00 PM



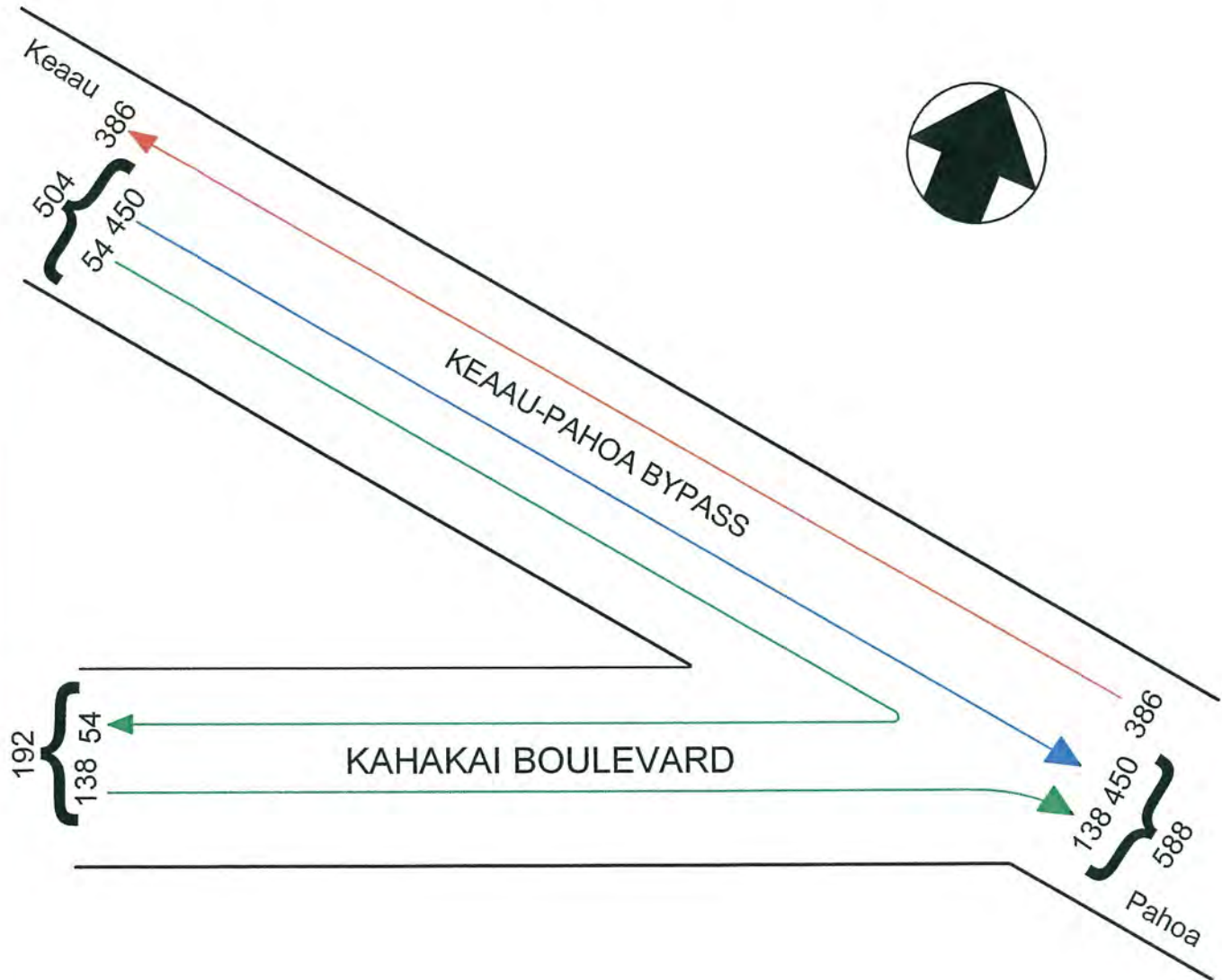
APPENDIX M
TRAFFIC MOVEMENT DIAGRAMS
KAHAKAI BLVD. & KEAAU-PAHOA BYPASS RD.
UNSIGNALIZED
AM & PM PEAK HOURS

Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - Existing Condition
AM Peak Hour - 7:15 AM to 8:15 AM



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Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - Existing Condition
PM Peak Hour - 4:15 PM to 5:15 PM

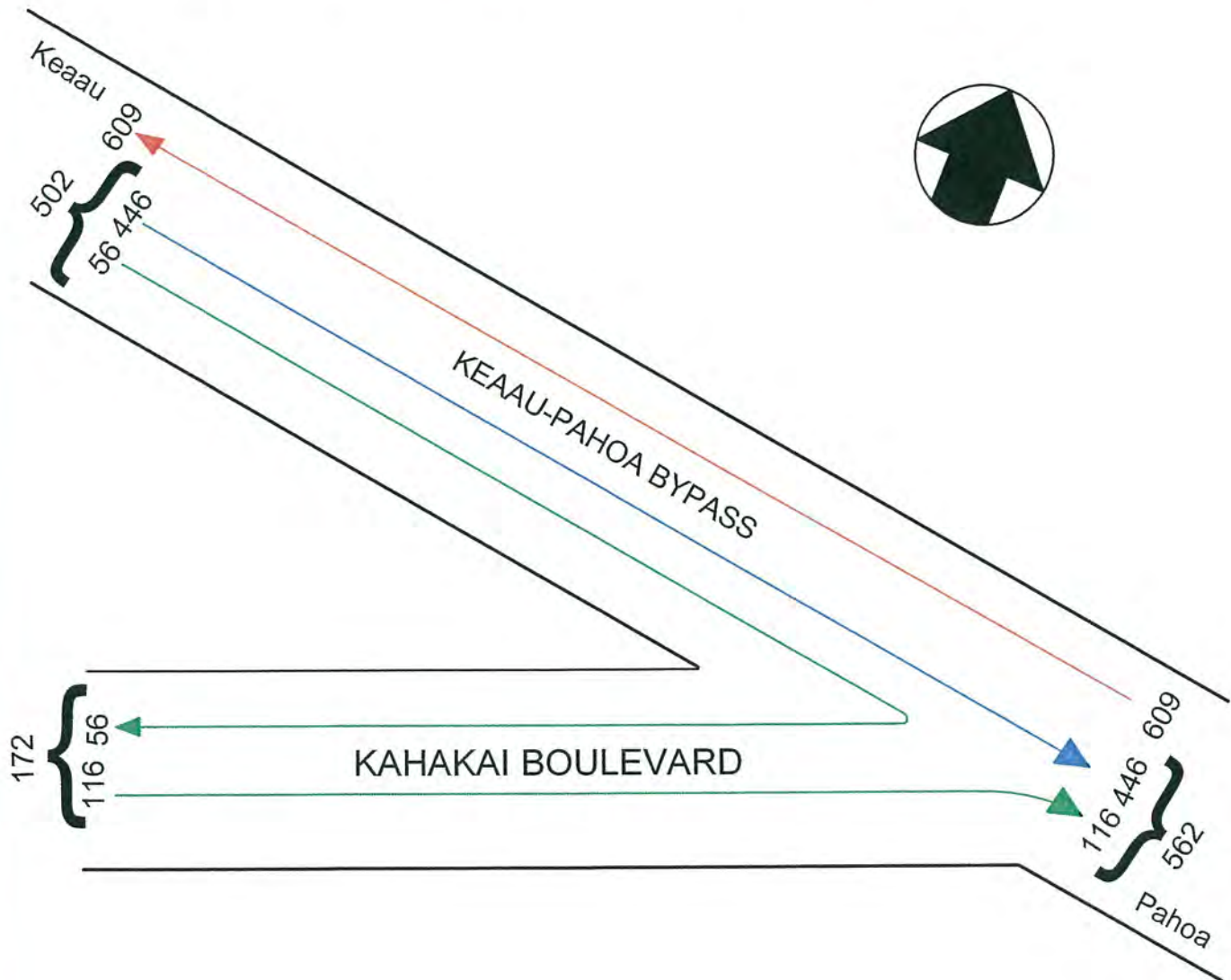


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Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - Buildout Condition
AM Peak Hour - 7:15 AM to 8:15 AM

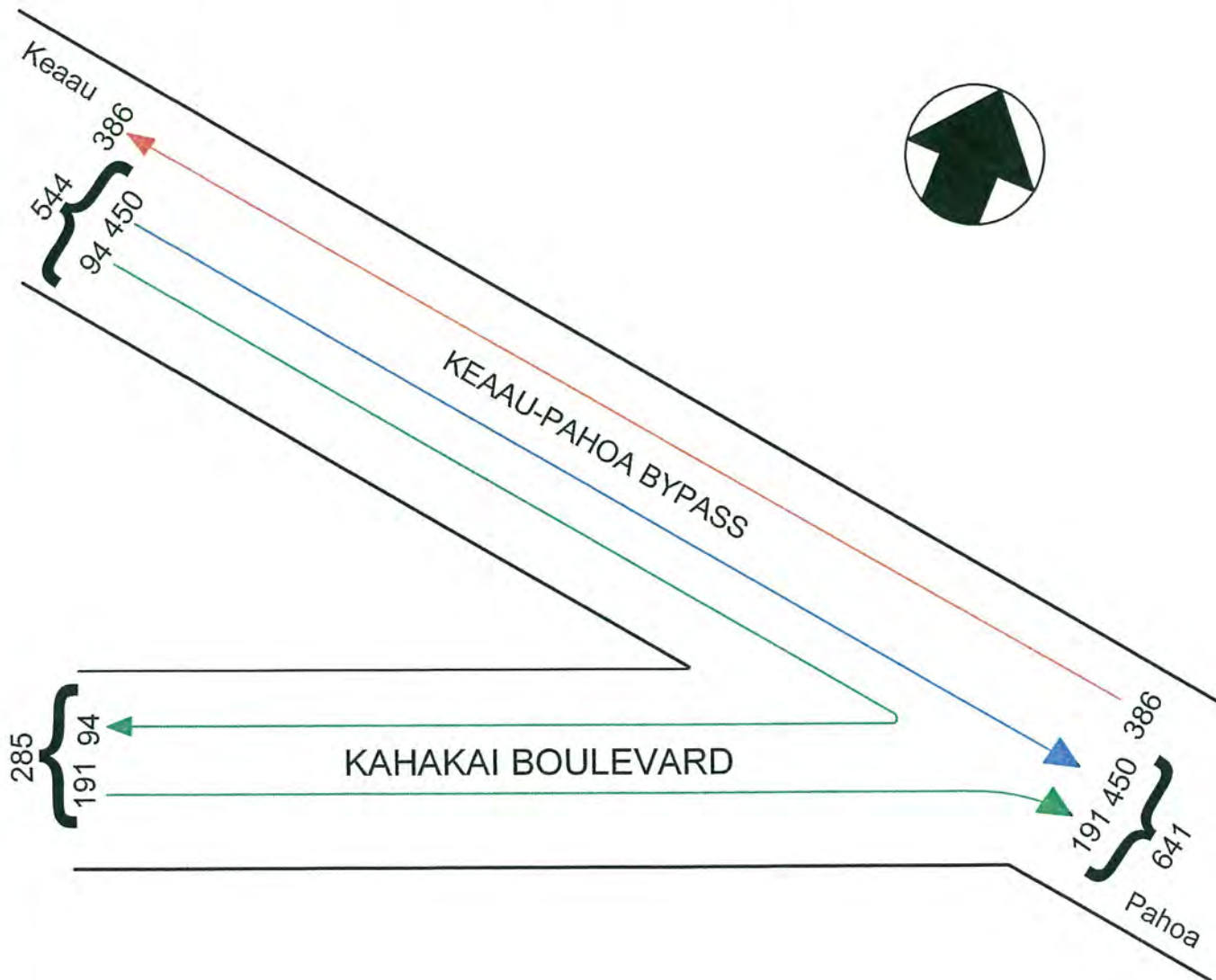


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Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - Buildout Condition
PM Peak Hour - 4:15 PM to 5:15 PM

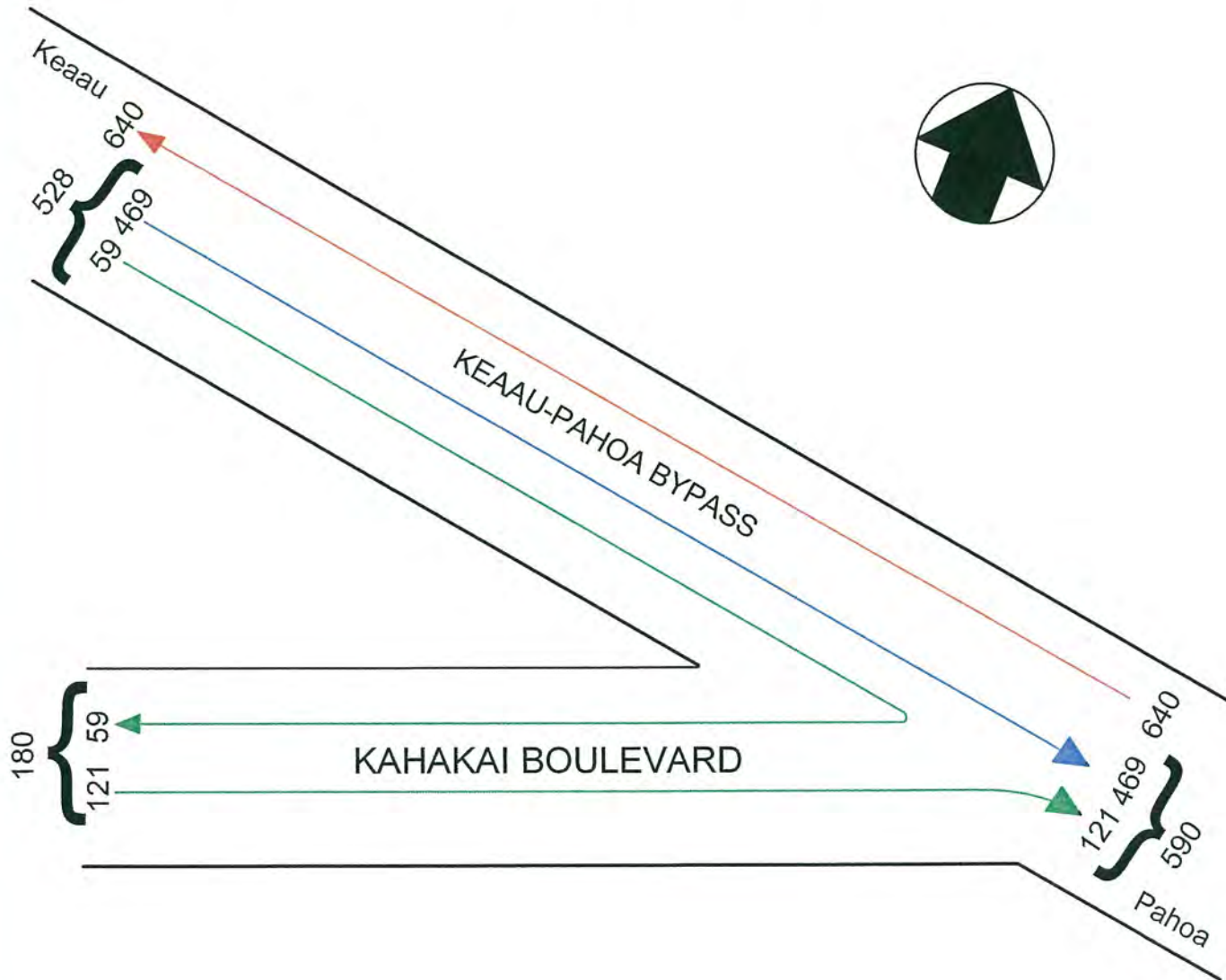


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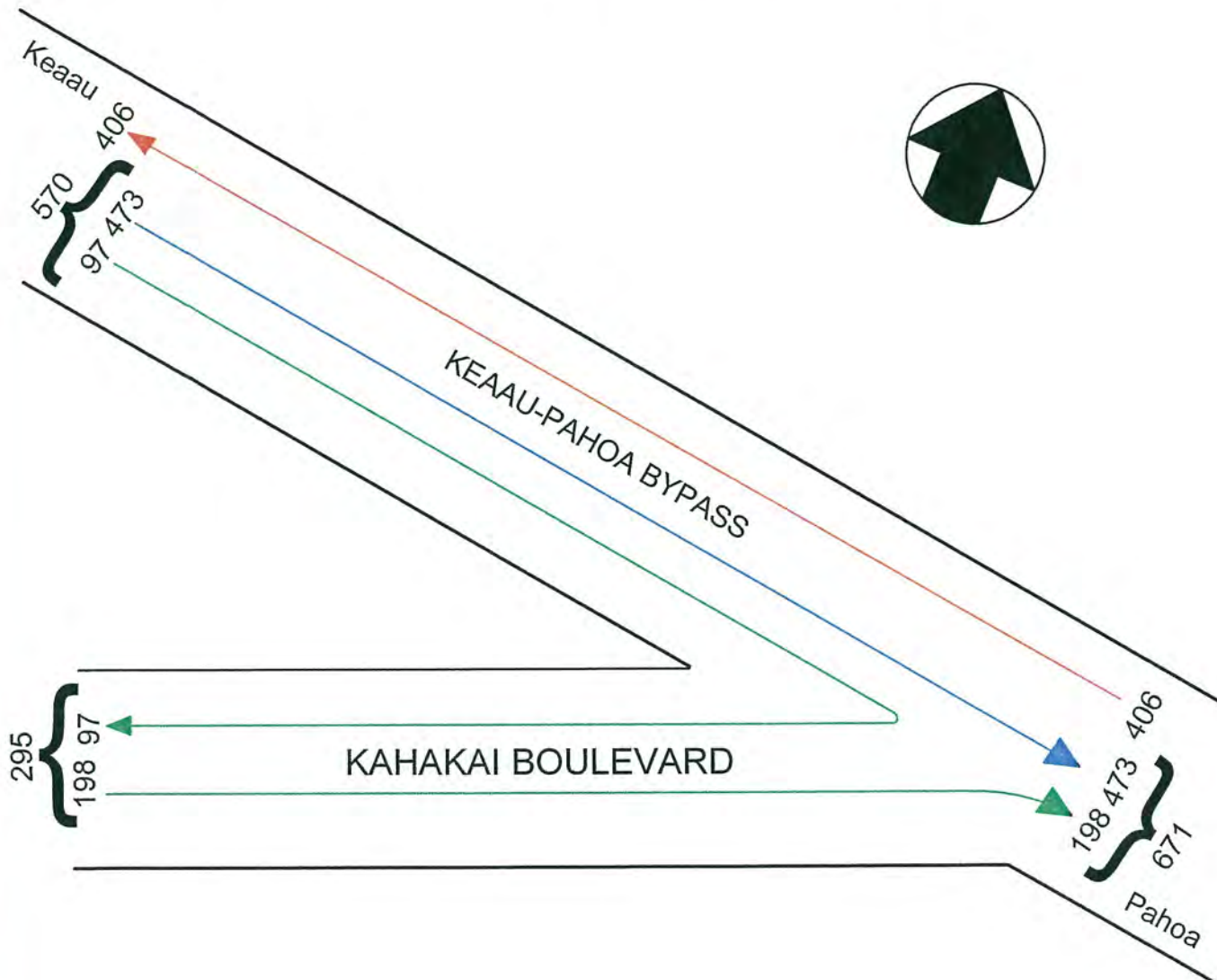
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Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - 5-Year Condition
AM Peak Hour - 7:15 AM to 8:15 AM



Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - 5-Year Condition
PM Peak Hour - 4:15 PM to 5:15 PM

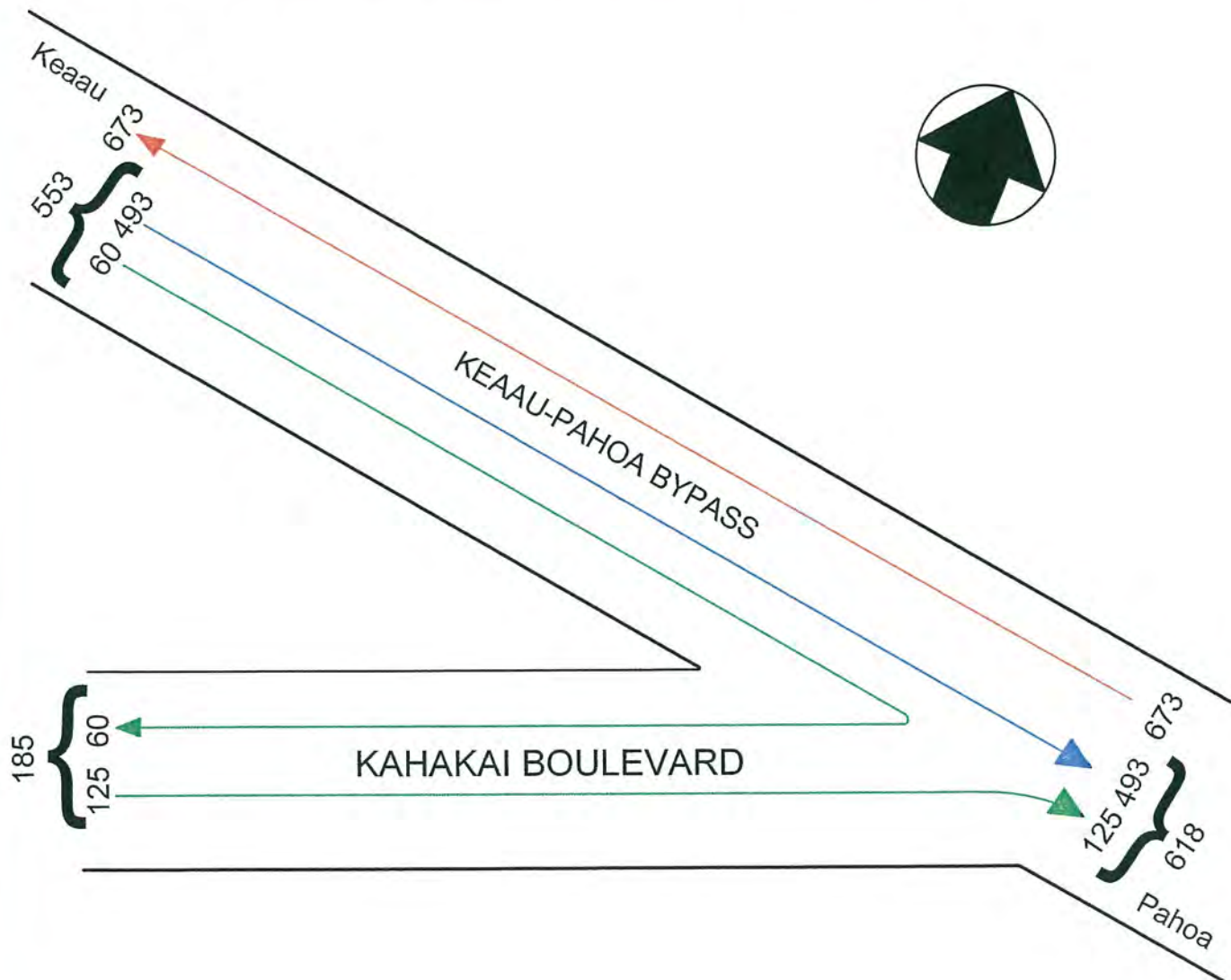


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Proposed Shopping Center, Pahoa, Hawaii **Kahakai Boulevard and Keaau-Pahoa ByPass Road** **Traffic Movement - 10-Year Condition** **AM Peak Hour - 7:15 AM to 8:15 AM**

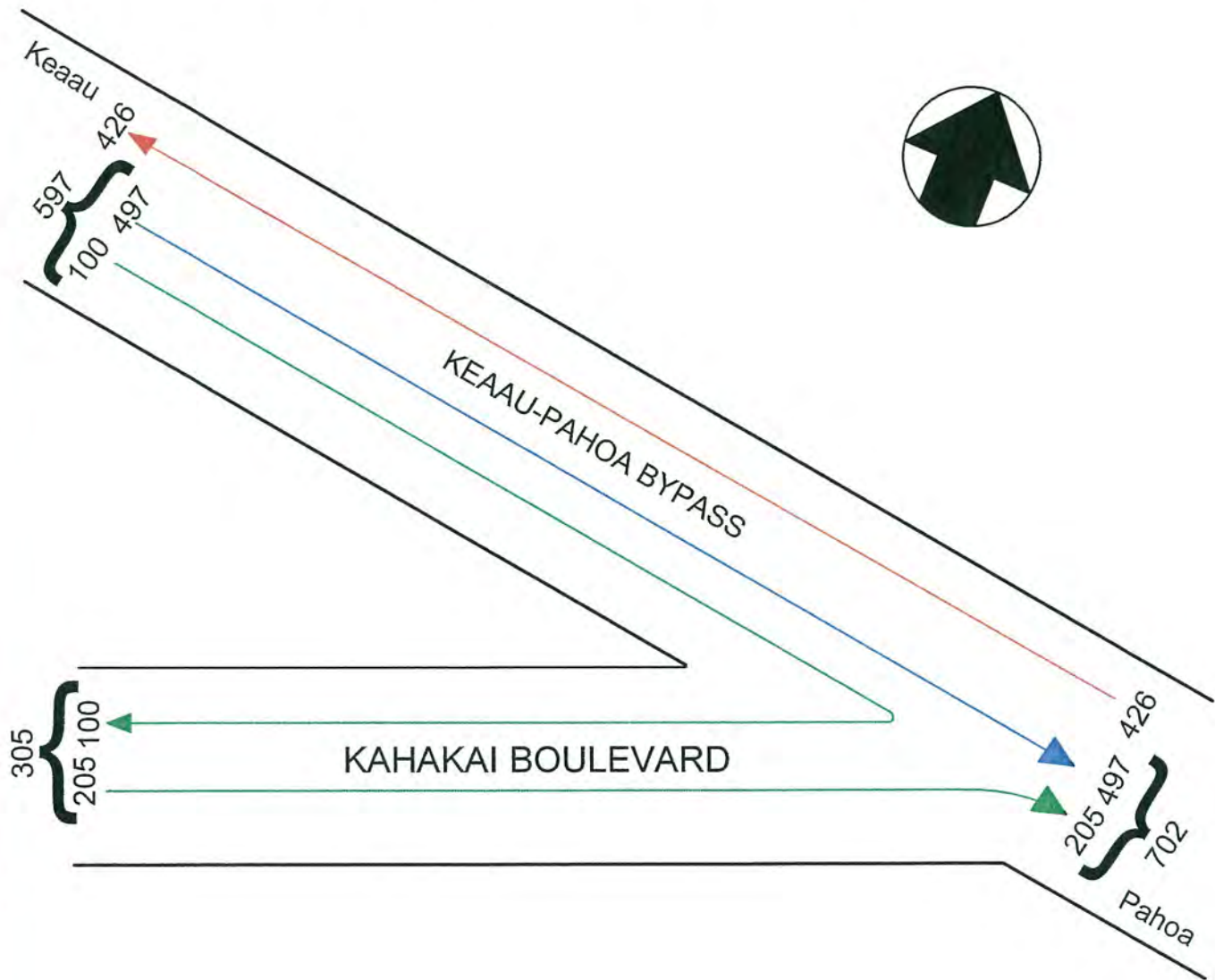


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Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - 10-Year Condition
PM Peak Hour - 4:15 PM to 5:15 PM

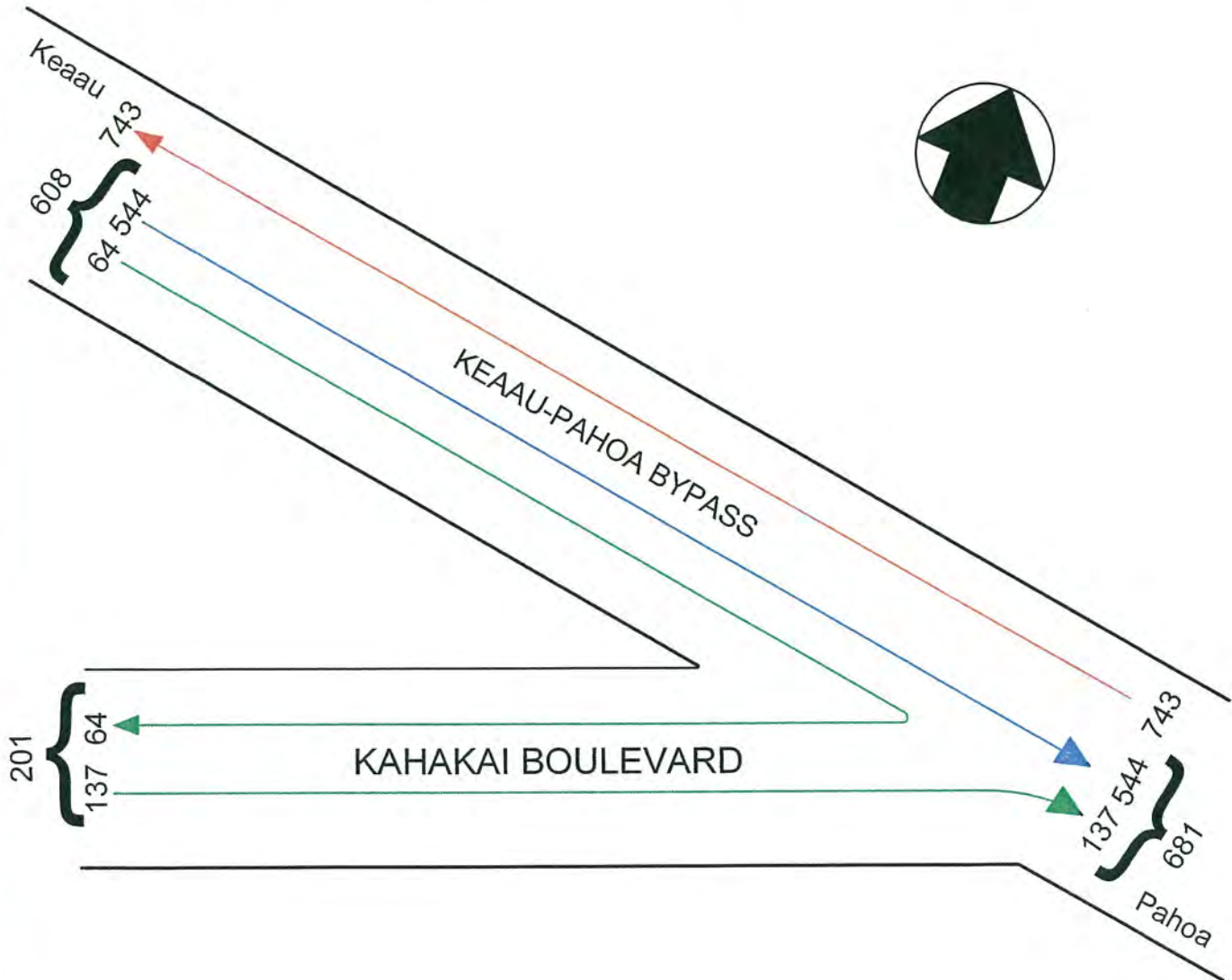


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Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - 20-Year Condition
AM Peak Hour - 7:15 AM to 8:15 AM

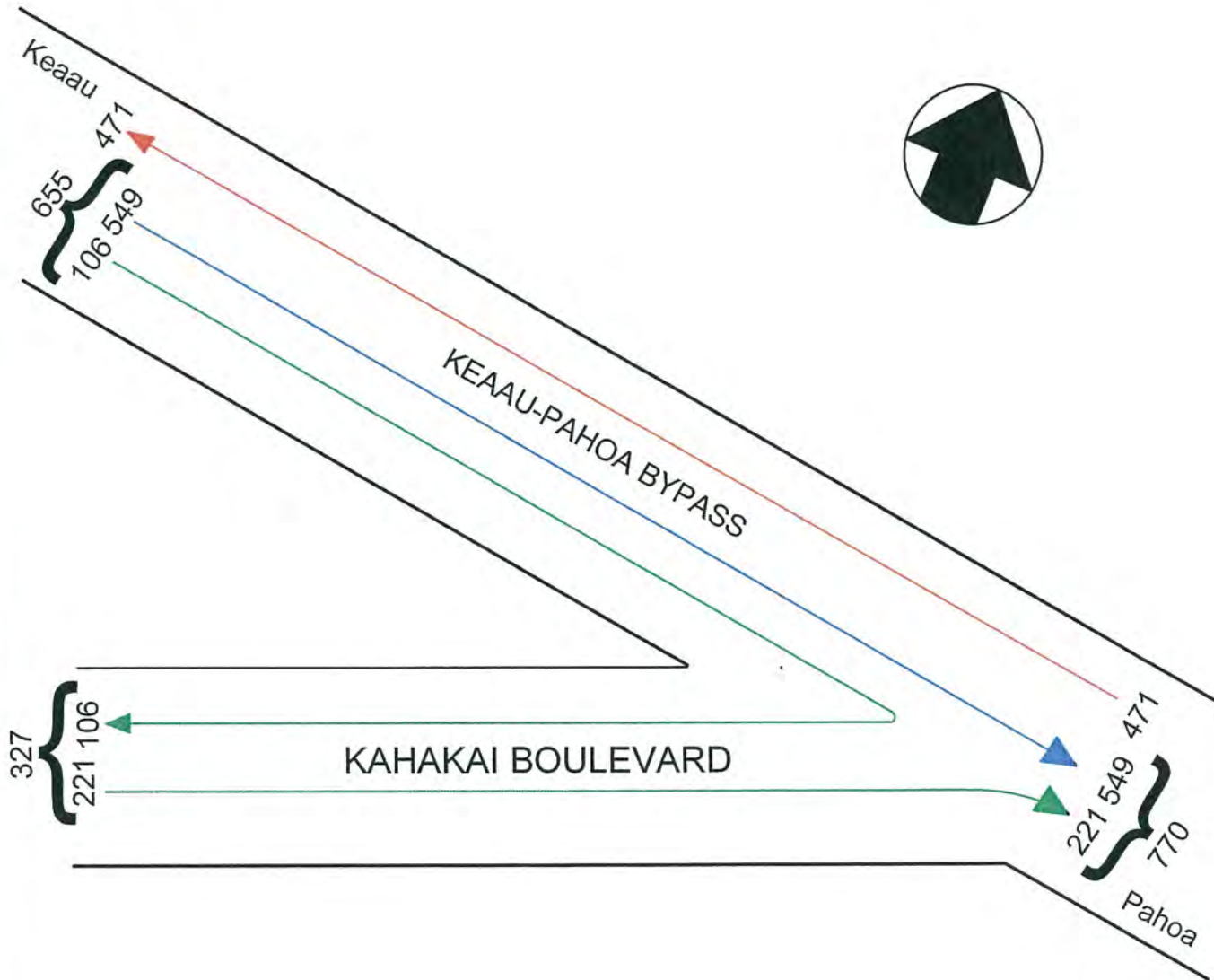


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Proposed Shopping Center, Pahoa, Hawaii
Kahakai Boulevard and Keaau-Pahoa ByPass Road
Traffic Movement - 20-Year Condition
PM Peak Hour - 4:15 PM to 5:15 PM



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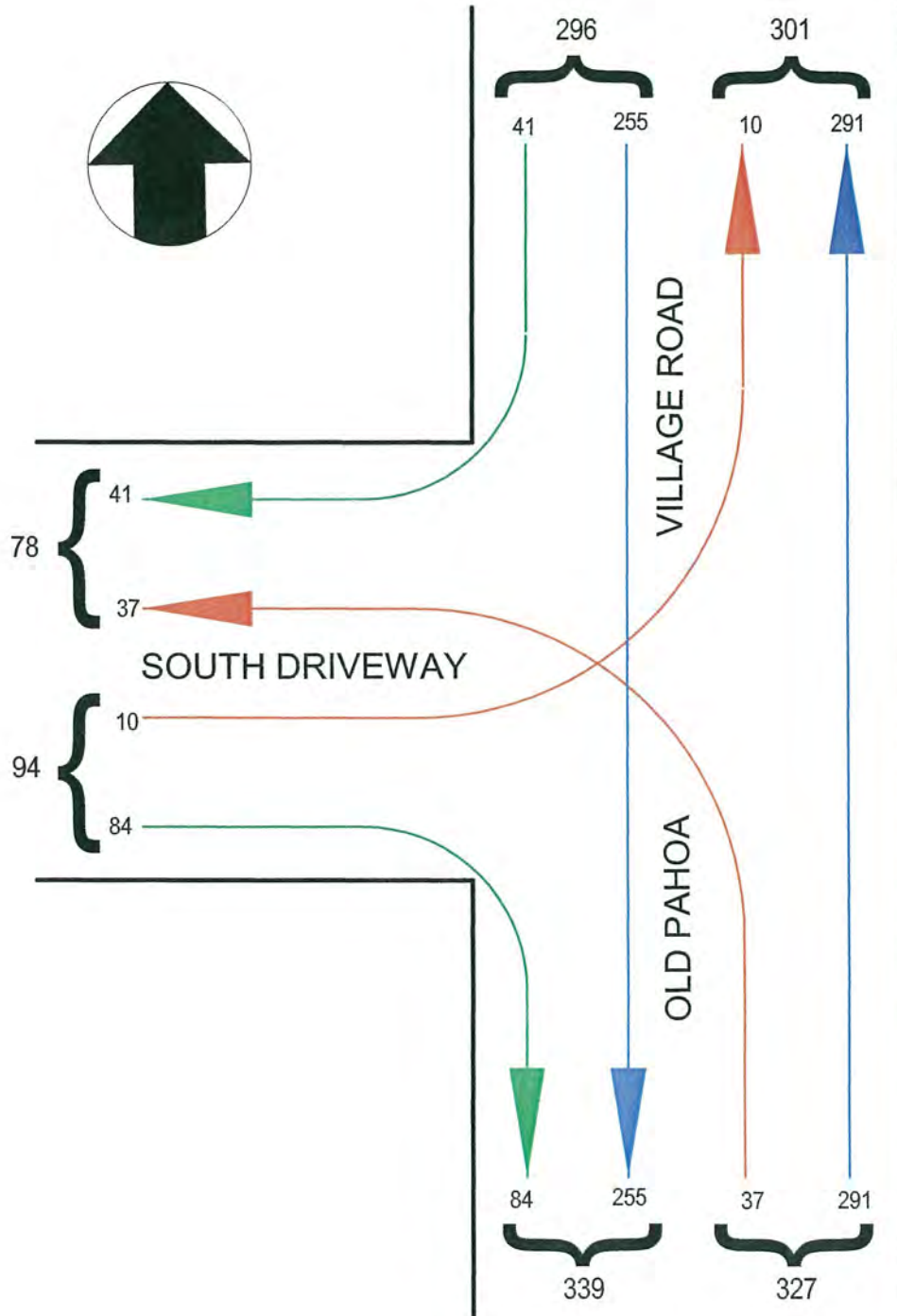
APPENDIX N
TRAFFIC MOVEMENT DIAGRAMS
CENTER DRIVEWAY
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - Buildout Condition

AM Peak Hour - 7:15 AM to 8:15 AM



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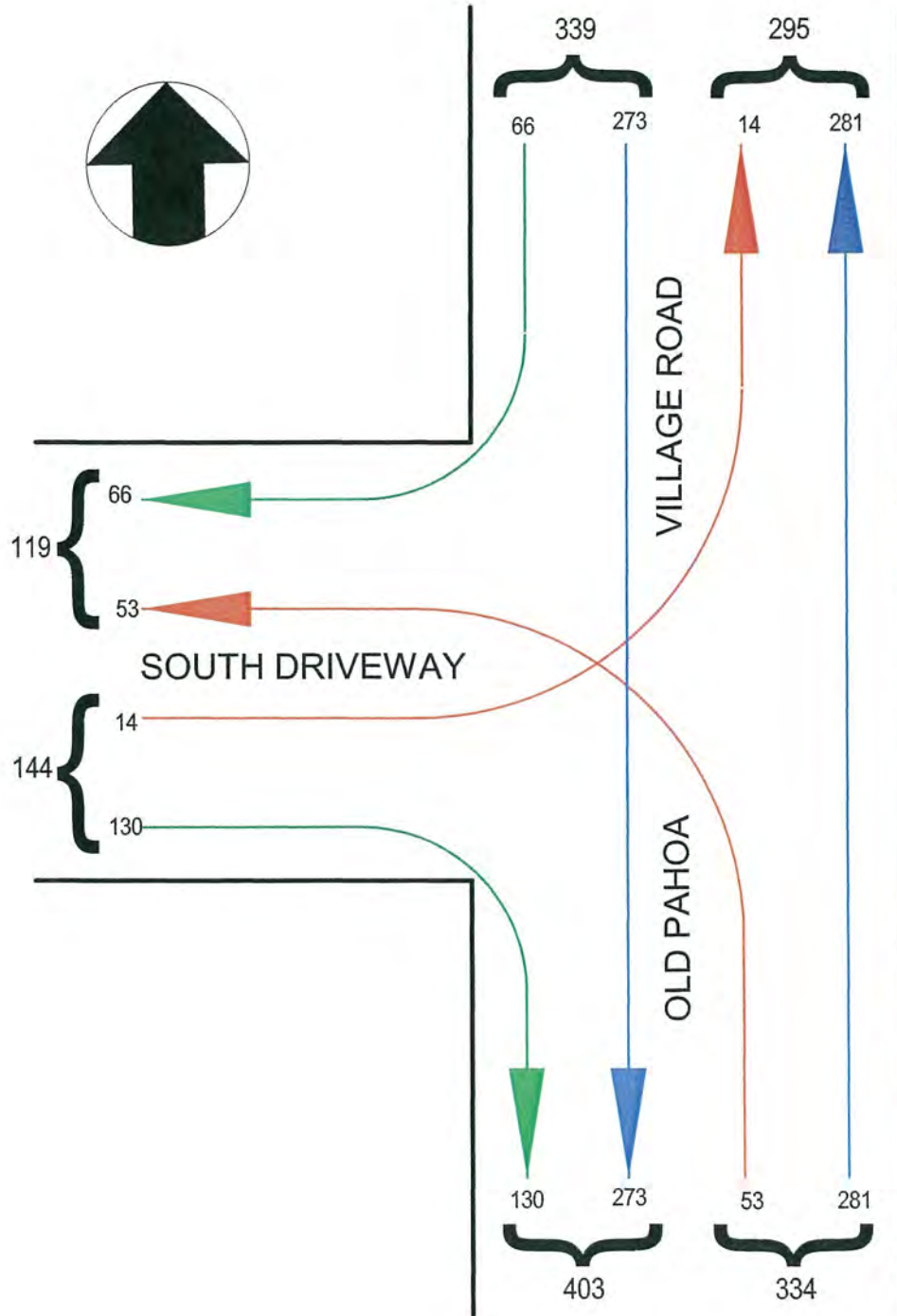
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - Buildout Condition

PM Peak Hour - 4:15 PM to 5:15 PM



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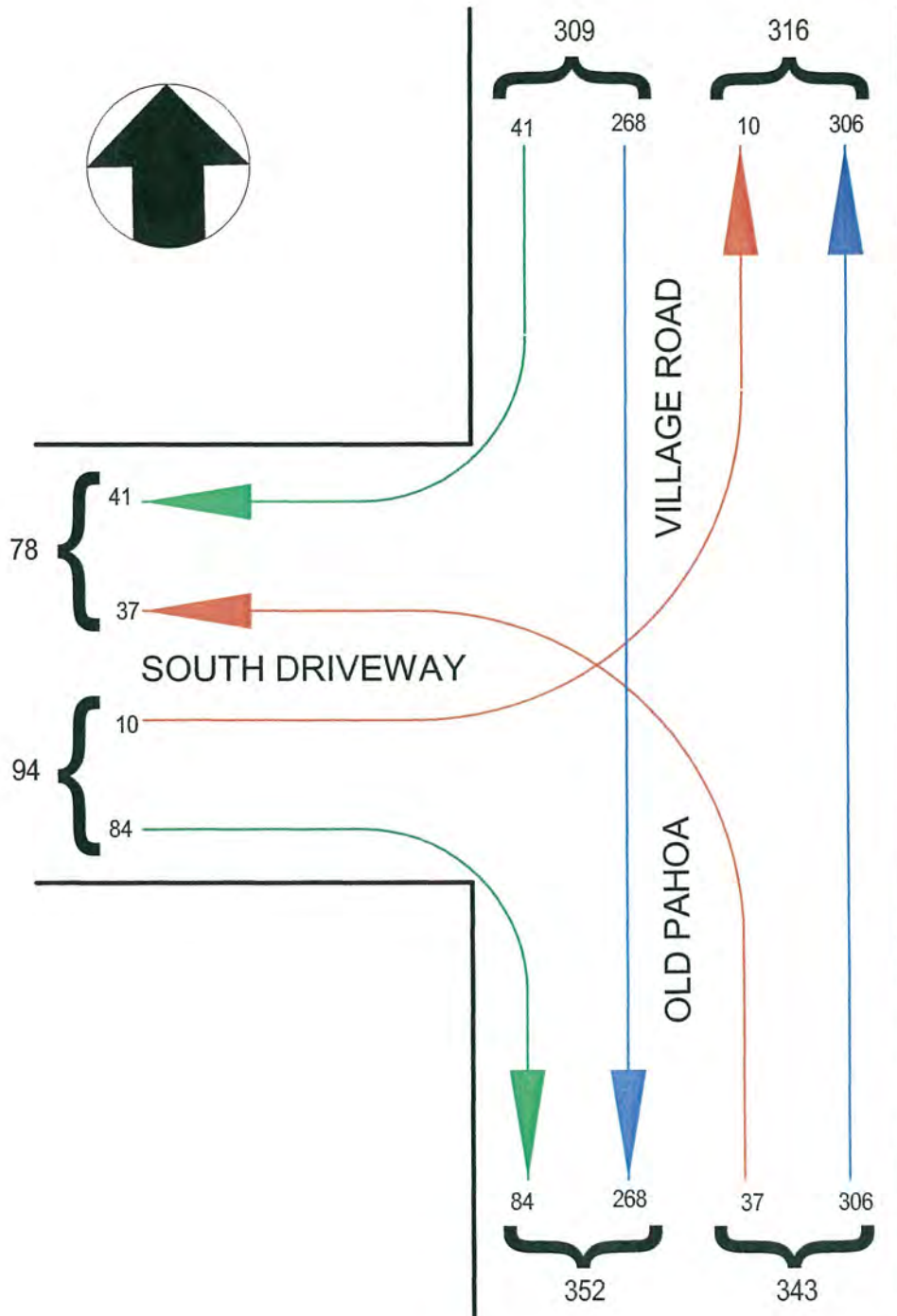
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - 5-Year Condition

AM Peak Hour - 7:15 AM to 8:15 AM



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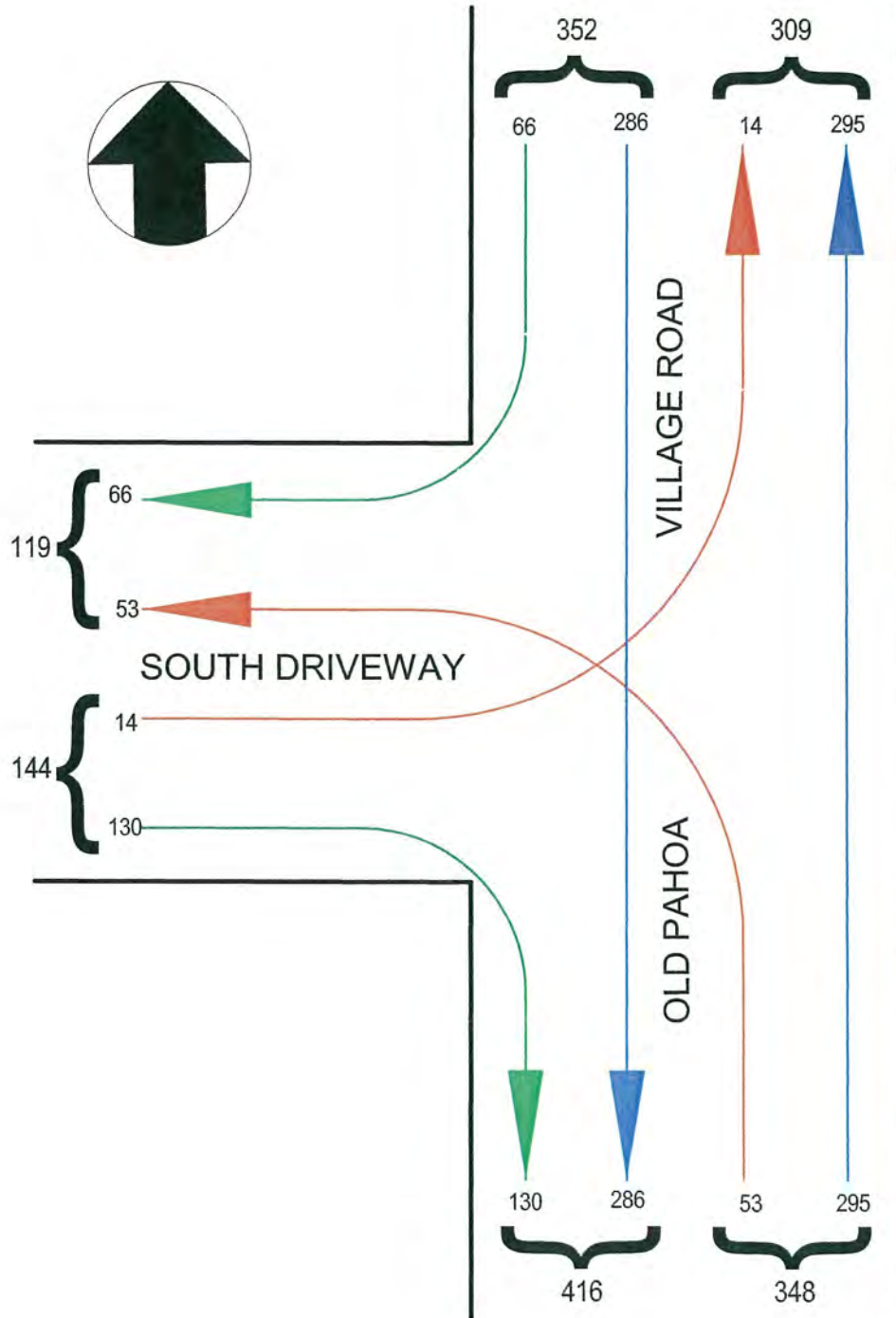
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - 5-Year Condition

PM Peak Hour - 4:15 PM to 5:15 PM



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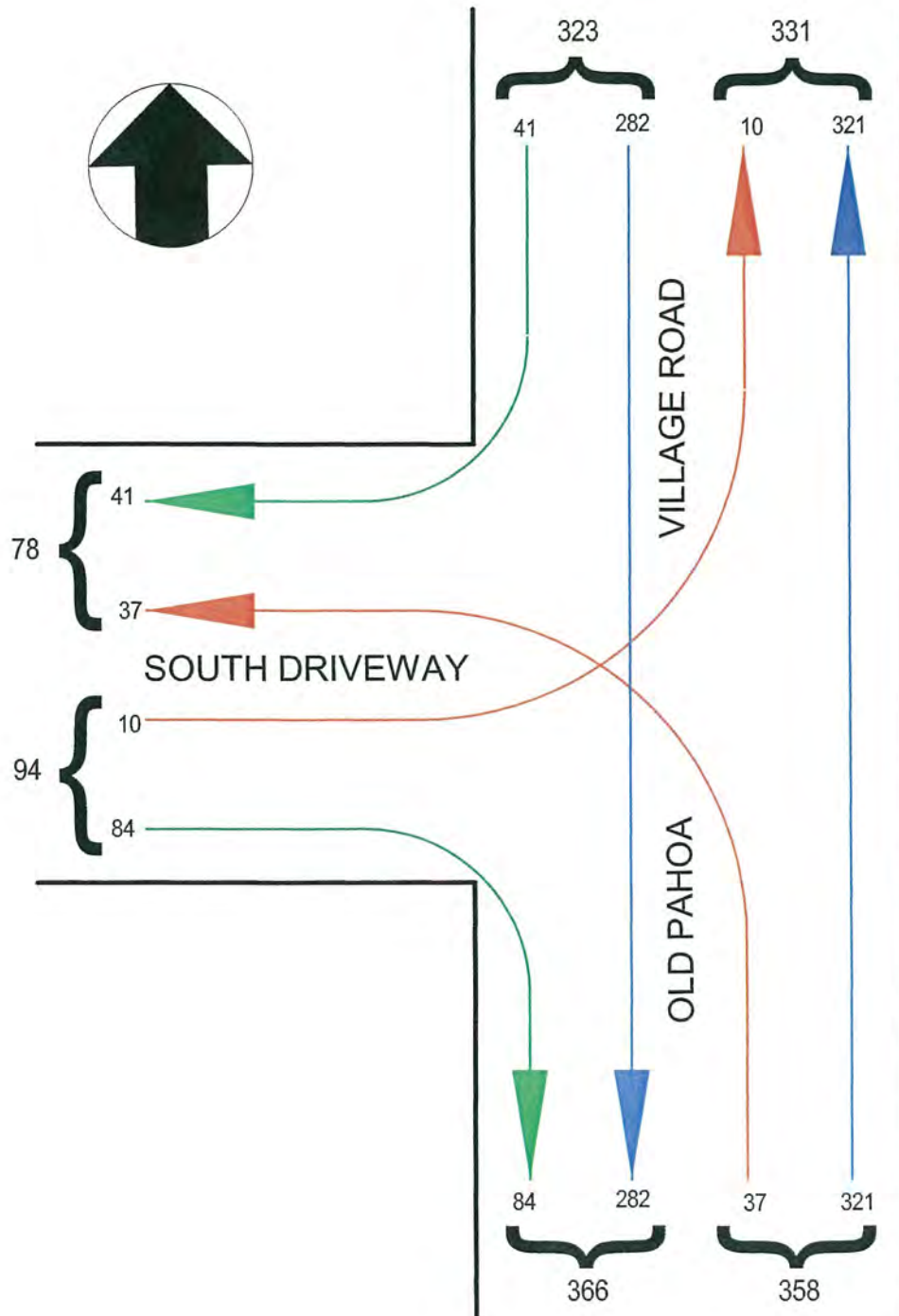
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - 10-Year Condition

AM Peak Hour - 7:15 AM to 8:15 AM



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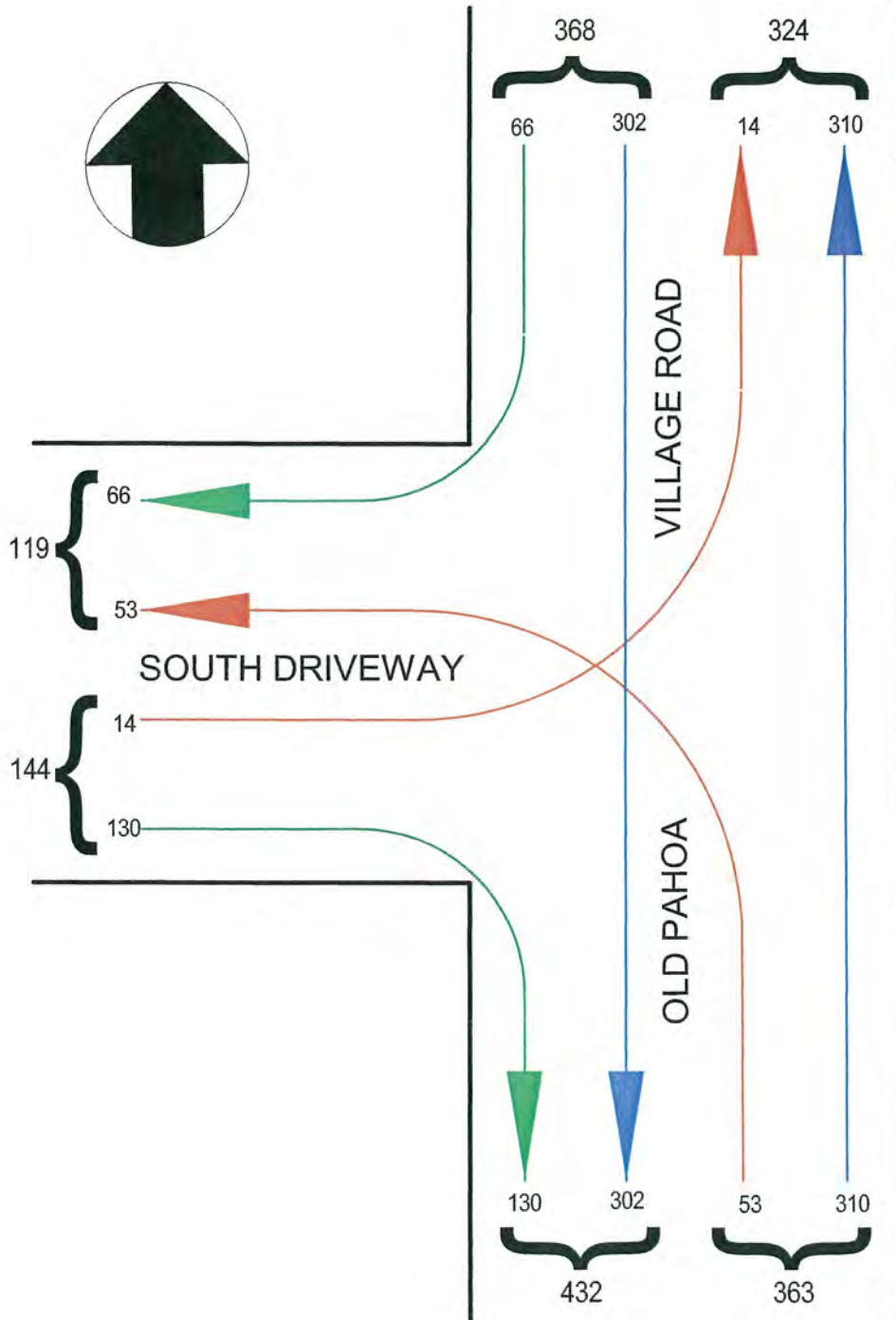
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - 10-Year Condition

PM Peak Hour - 4:15 PM to 5:15 PM



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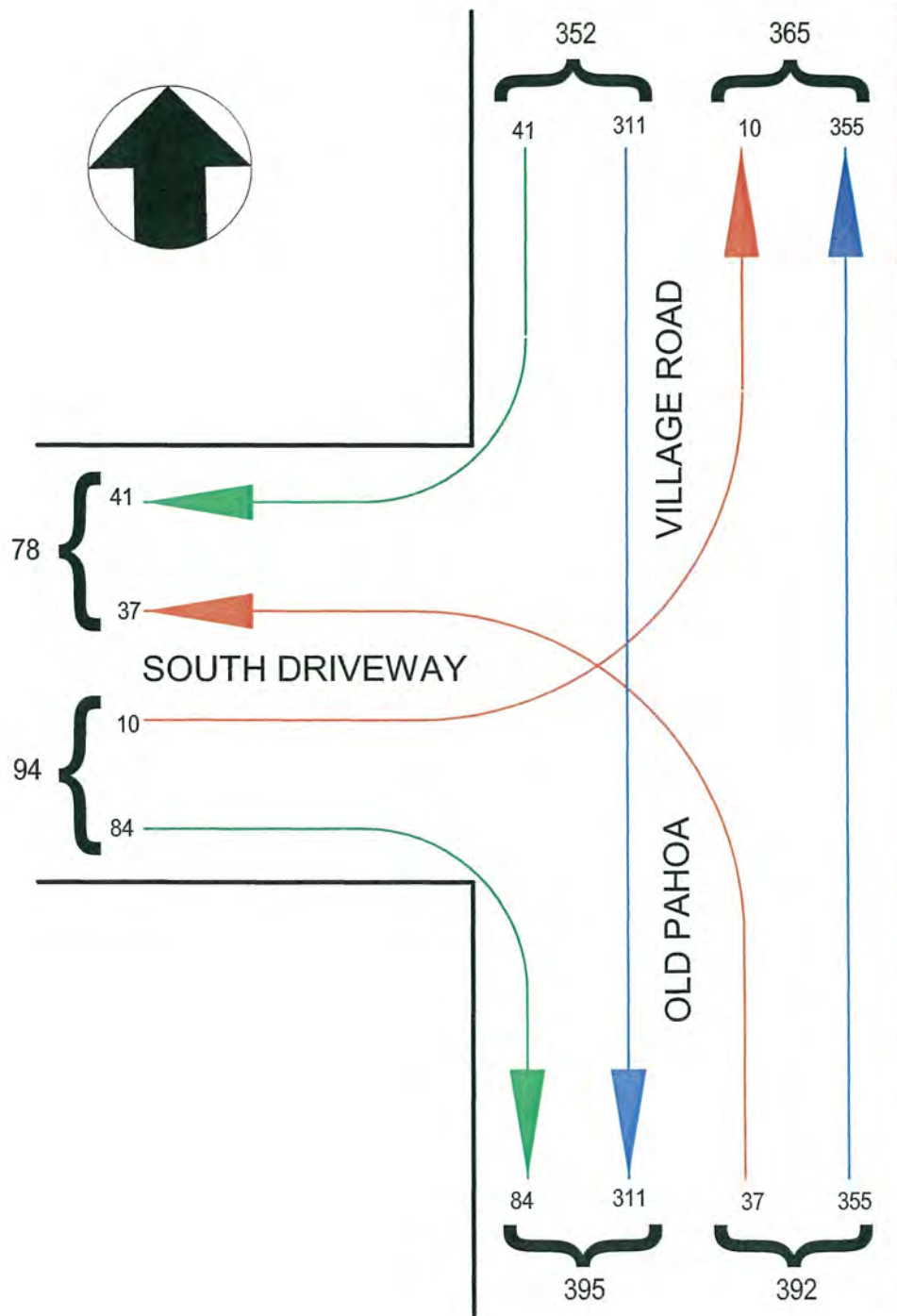
JN 602-01-11
12/11
WPVRCDWLTPMBO

Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - 20-Year Condition

AM Peak Hour - 7:15 AM to 8:15 AM



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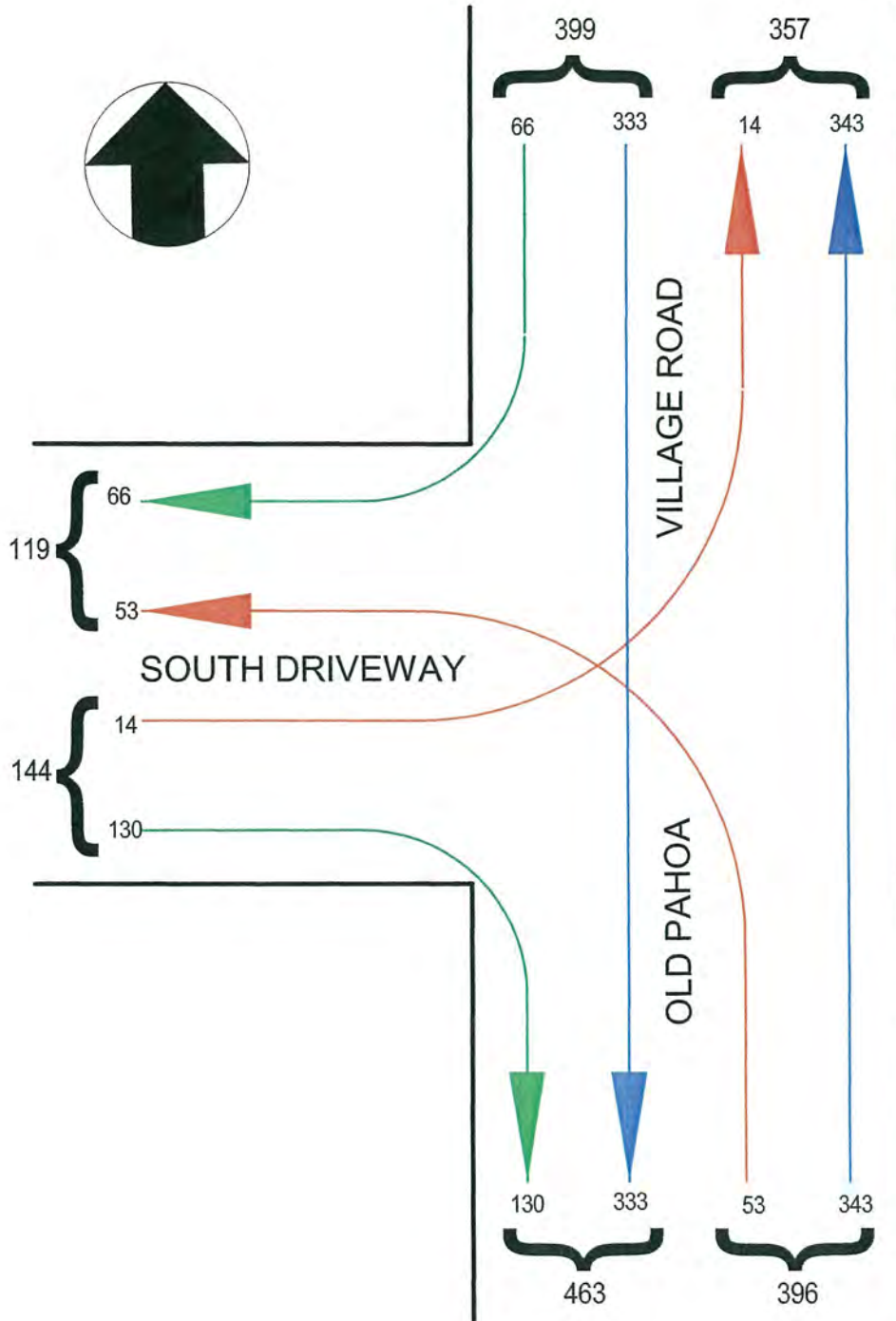
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & Center Driveway

Traffic Movement - 20-Year Condition

PM Peak Hour - 4:15 PM to 5:15 PM



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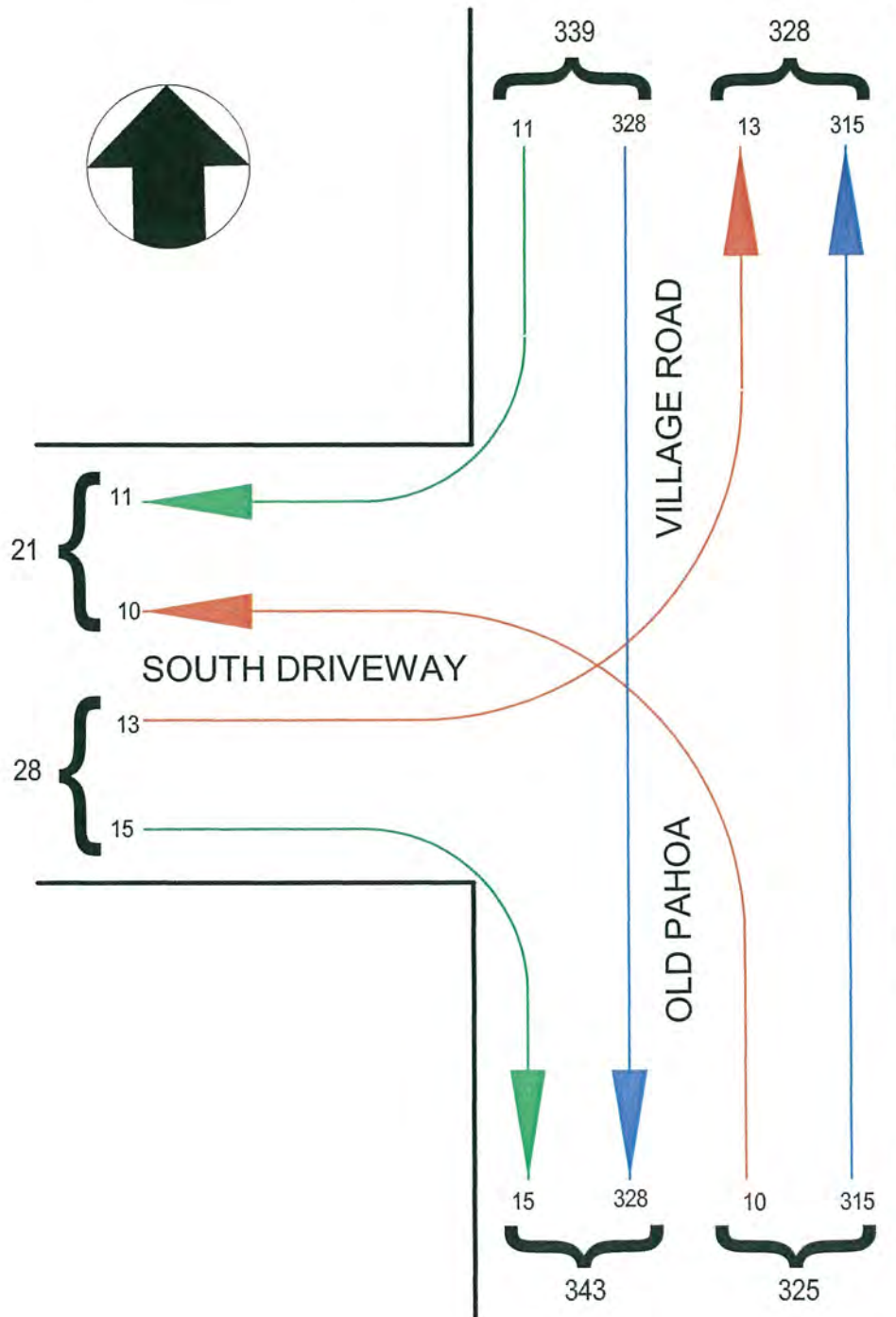
APPENDIX O
TRAFFIC MOVEMENT DIAGRAMS
SOUTH DRIVEWAY
UNSIGNALIZED INTERSECTION
AM & PM PEAK HOURS

Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & South Driveway

Traffic Movement - Buildout Condition

AM Peak Hour - 7:15 AM to 8:15 AM



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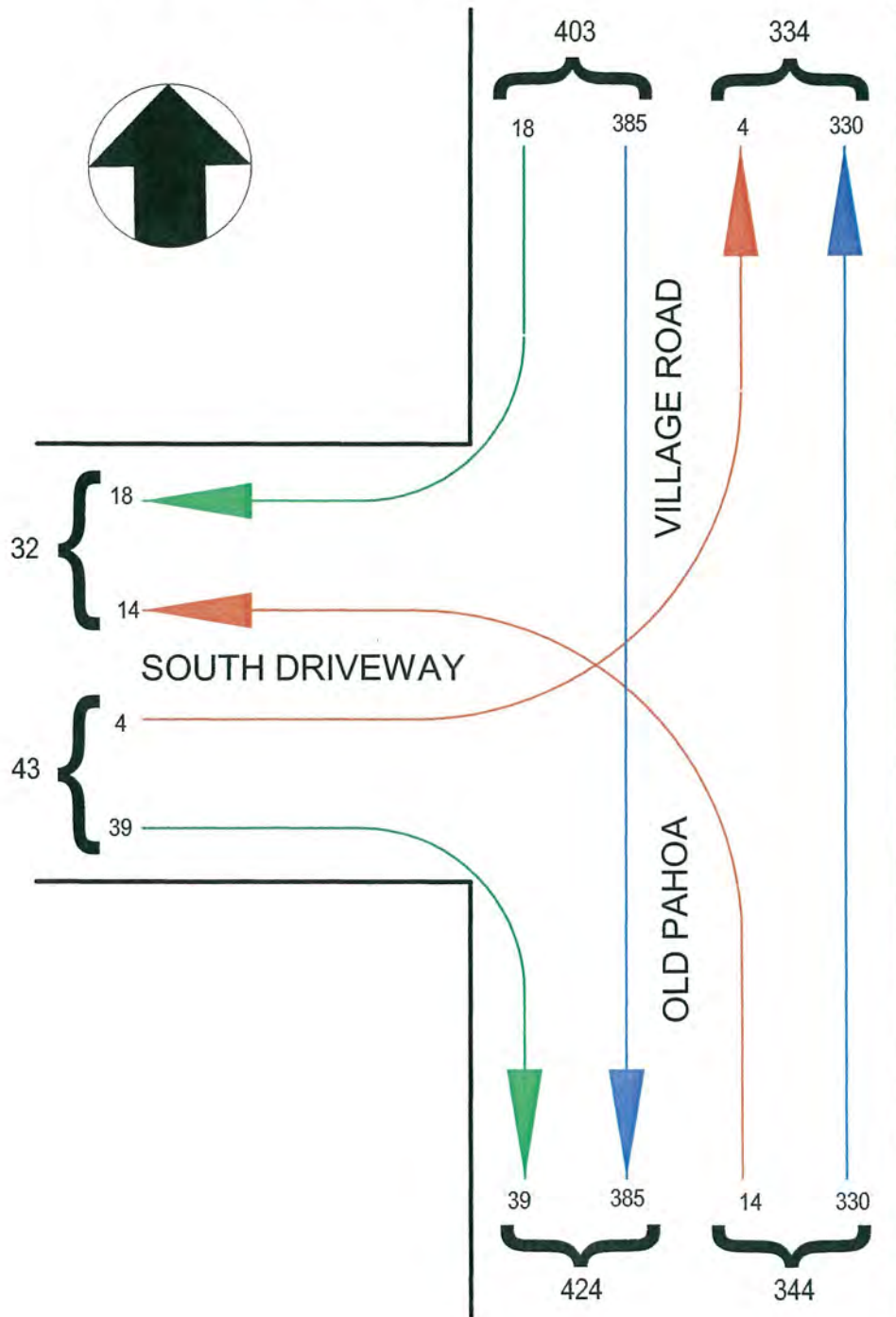
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & South Driveway

Traffic Movement - Buildout Condition

PM Peak Hour - 4:15 AM to 5:15 AM



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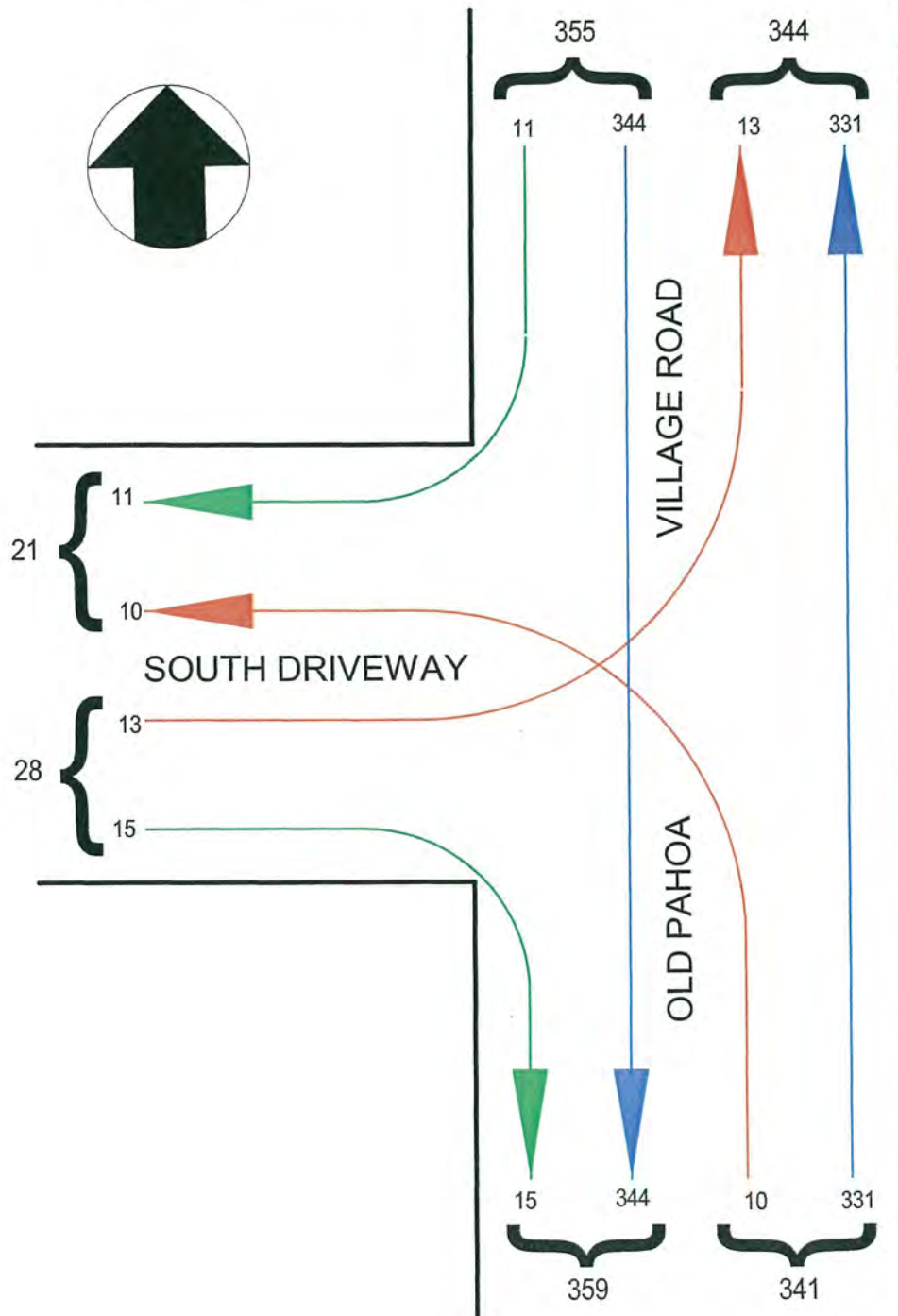
JN 602-01-11
12/11
WPVRSDWLTPMBO

Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & South Driveway

Traffic Movement - 5-Year Condition

AM Peak Hour - 7:15 AM to 8:15 AM



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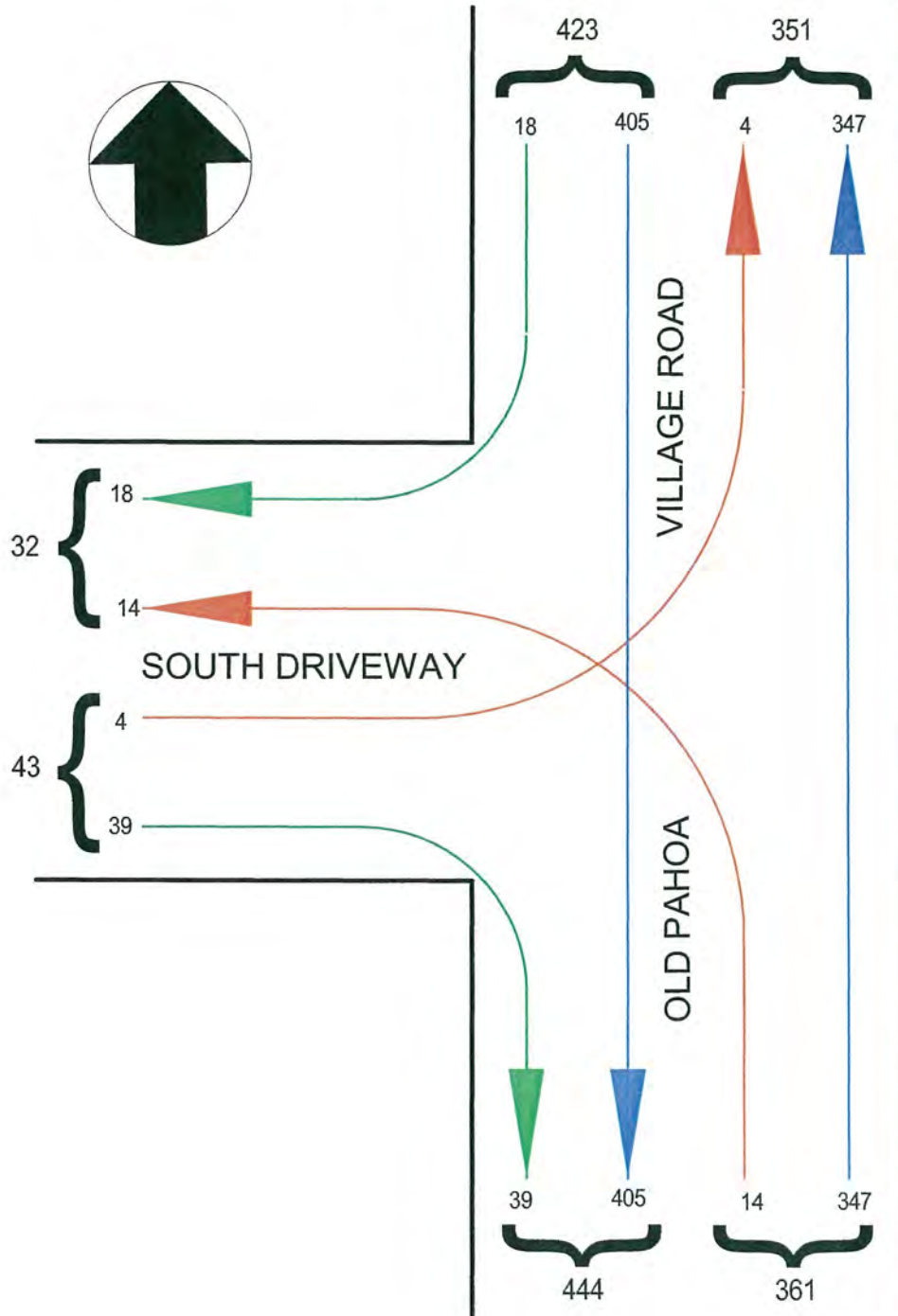
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & South Driveway

Traffic Movement - 5-Year Condition

PM Peak Hour - 4:15 AM to 5:15 AM



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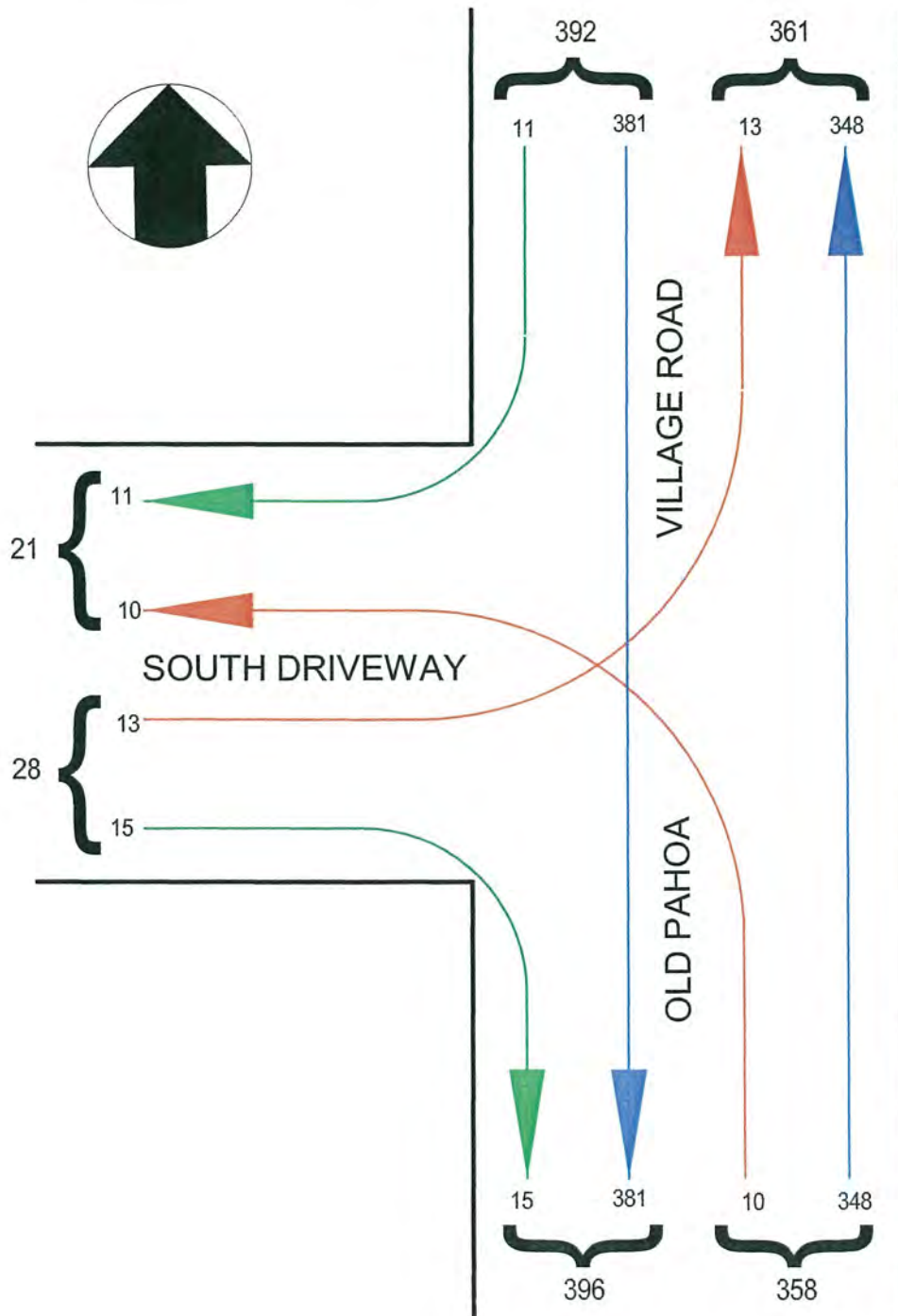
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Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & South Driveway

Traffic Movement - 10-Year Condition

AM Peak Hour - 7:15 AM to 8:15 AM



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Construction Managers

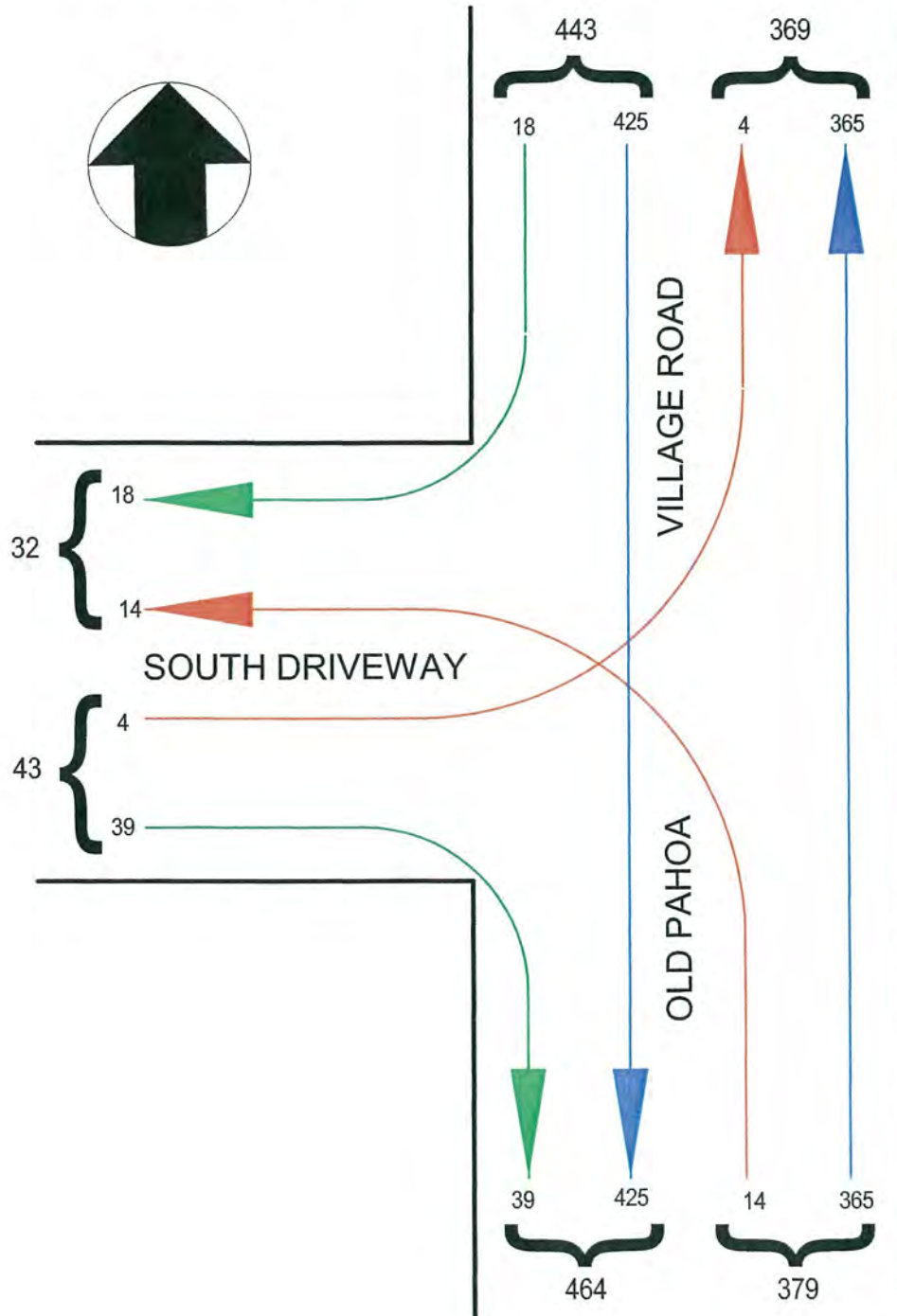
JN 602-01-11
12/11
WPVRSDWLTAMBO

Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & South Driveway

Traffic Movement - 10-Year Condition

PM Peak Hour - 4:15 AM to 5:15 AM



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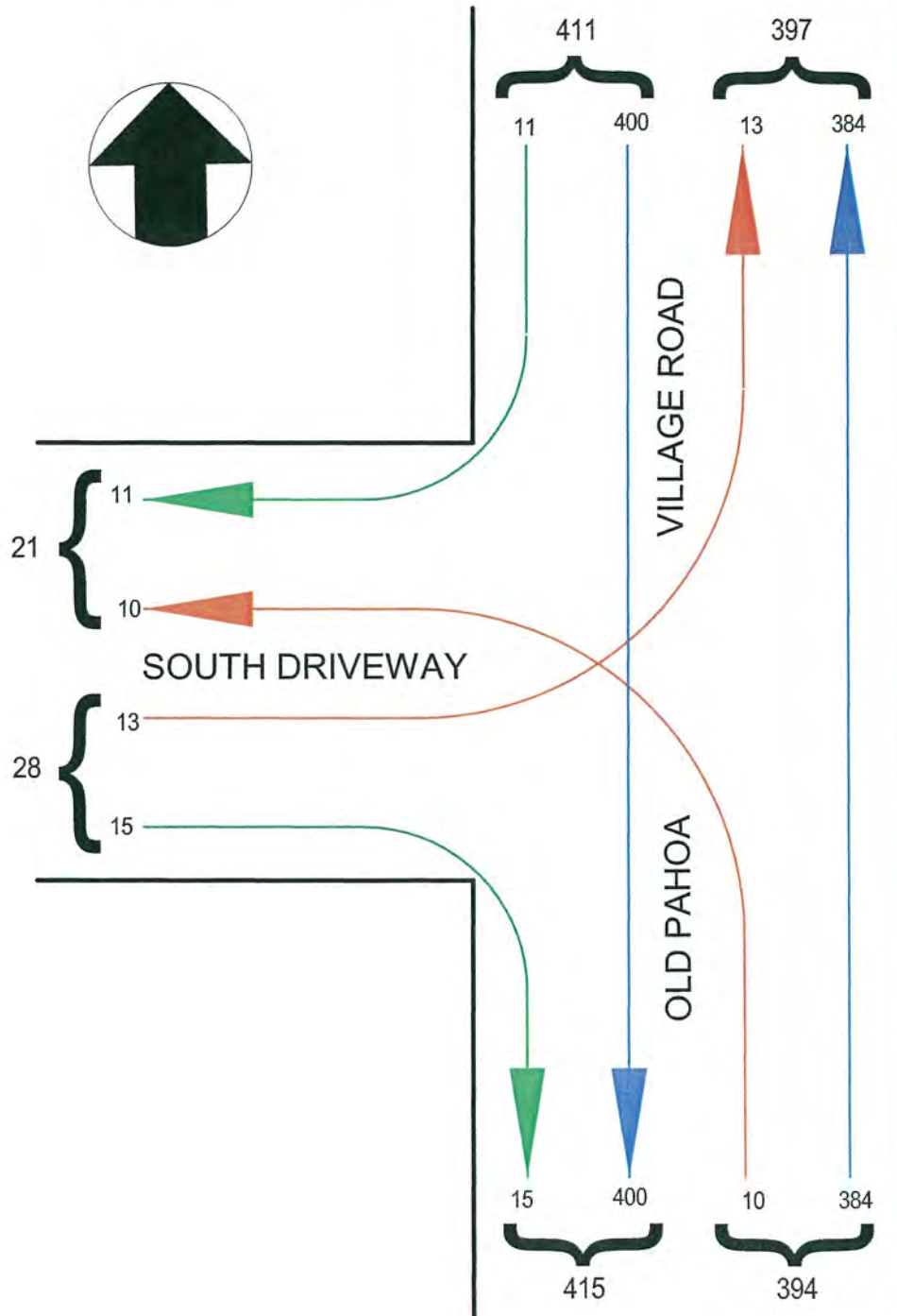
JN 602-01-11
 12/11
 WPVRSDWLTPMBO

Proposed Shopping Center, Pahoa, Hawaii

Old Pahoa Village Road & South Driveway

Traffic Movement - 20-Year Condition

AM Peak Hour - 7:15 AM to 8:15 AM



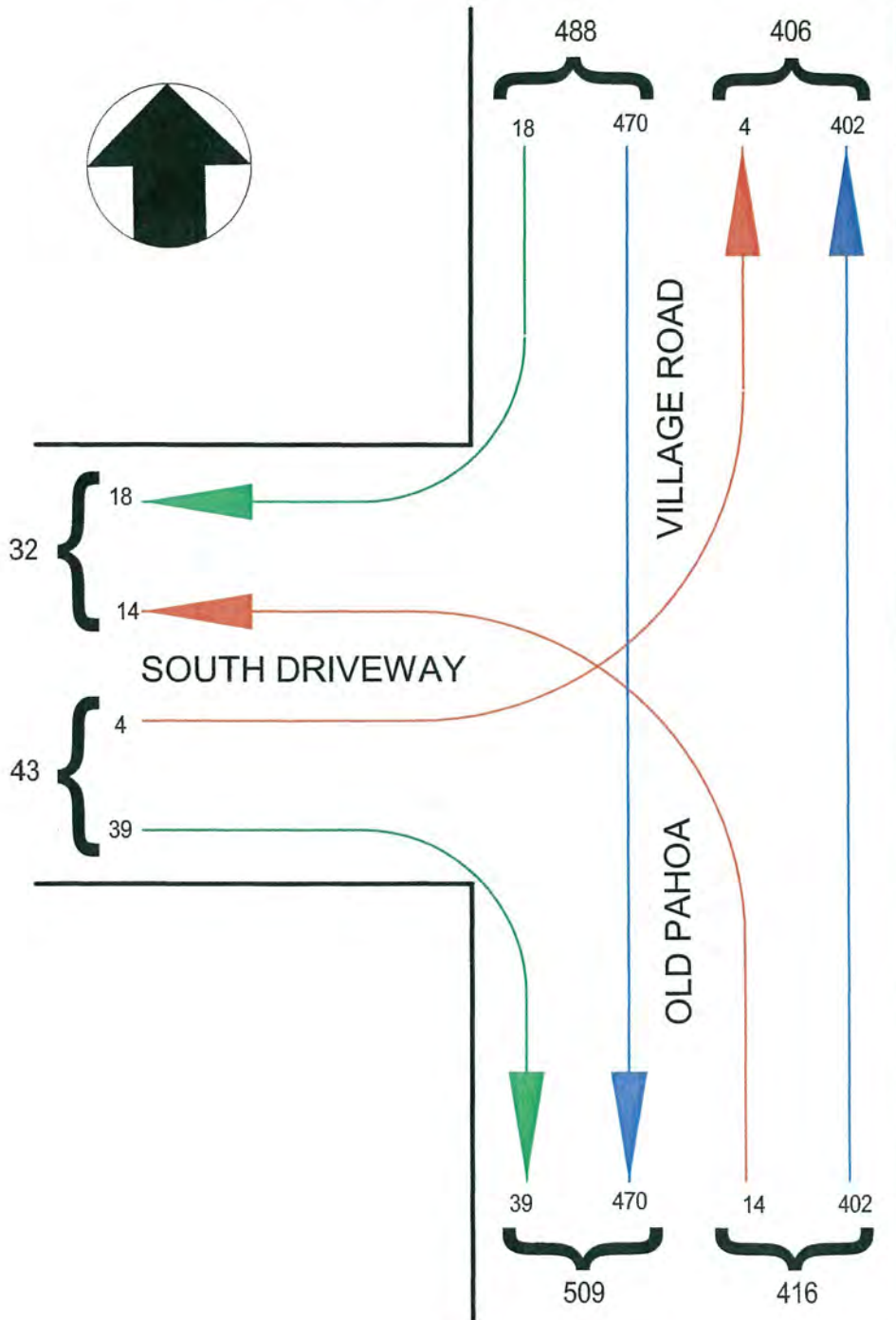
WITCHER ENGINEERING LLP

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Construction Managers

JN 602-01-11
12/11
WPVRSDWLTAMBO

Proposed Shopping Center, Pahoa, Hawaii Old Pahoa Village Road & South Driveway Traffic Movement - 20-Year Condition PM Peak Hour - 4:15 AM to 5:15 AM



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APPENDIX P
SUPPLEMENT TO TIAR BASED ON 1% GROWTH AND 2%
GROWTH INDEXES

**INTERSECTION OF OLD PAHOA VILLAGE ROAD & KAHAKAI BLVD
SUPPLEMENT TO THE REVISED
TRAFFIC IMPACT ANALYSIS
FOR PROPOSED SHOPPING CENTER, PAHOA, HAWAII
SOUTHWEST CORNER OF PAHOA VILLAGE ROAD AND KAHAKAI
BOULEVARD
TMK (3)1-5-007:006, 069, 070**

For comparison purposes, the following tables show the level of service for the subject intersection. The tables are broken down as follows:

1. A 1% per year increase in traffic with no signal
2. A 2% per year increase in traffic with no signal
3. A 2% per year increase in traffic with a signal

There is an AM Peak Hour table and a PM Peak Hour with Build-out, 5-Year, 10-Year and 20-Year conditions.

**TABLE 1 LEVEL OF SERVICE COMPARISONS AM PEAK HOUR
OLD PAHOA VILLAGE ROAD AND KAHAKAI BOULEVARD**

Direction	Build-Out			5-Year Condition			10-Year Condition			20-Year Condition		
	1%	2%	2% w/sig	1%	2%	2% w/sig	1%	2%	2% w/sig	1%	2%	2% w/sig
Eastbound Left	C	D	C	C	D	C	D	E	C	D	F	C
Eastbound Through	C	D	C	C	D	C	D	E	C	D	F	C
Eastbound Right	A	D	A	A	B	A	B	B	A	B	B	A
Westbound Left	C	A	C	C	D	C	C	D	C	D	F	C
Westbound Through	C	C	C	C	D	C	C	D	C	D	F	C
Westbound Right	A	C	A	A	A	A	A	A	A	A	B	A
Northbound Left	A	A	C	A	A	C	A	A	C	A	A	C
Northbound Through	A	A	B	A	A	B	A	A	B	A	A	B
Northbound Right			A			A			A			A
Southbound Left	A	A	C	A	A	C	A	A	C	A	A	C
Southbound Through			B			B			B			B
Southbound Right			A			A			A			A
Approach Delay Eastbound	17.5	22.9	24.3	18.7	28.0	24.9	19.2	39.5	25.0	21.5	272.1	26.0
Approach LOS Eastbound	C	C	C	C	D	C	C	E	C	F		C
Approach Delay Westbound	15.7	15.7	14.1	16.6	17.6	14.2	17.0	21.2	14.1	45.0		14.3
Approach LOS Westbound	C	C	14.0/B	C	D	B	C	C	B	F		C
Intersection Delay/LOS						14.3/B			14.9/B			15.9/C

**TABLE 2 LEVEL OF SERVICE COMPARISONS PM PEAK HOUR
OLD PAHOA VILLAGE ROAD AND KAHAKAI BOULEVARD**

Direction	Build-Out			5-Year Condition			10-Year Condition			20-Year Condition		
	1%	2%	2% w/sig	1%	2%	2% w/sig	1%	2%	2% w/sig	1%	2%	2% w/sig
Eastbound Left	D	F	D	E	F	C	E	F	C	F	F	D
Eastbound Through	C	D	C	C	E	C	C	F	D	C	F	C
Eastbound Right	C	D	A	C	E	A	C	F	A	C	F	A
Westbound Left	D	F	C	E	F	C	E	F	C	F	F	C
Westbound Through	C	C	C	C	D	C	C	E	C	C	F	C
Westbound Right	C	C	A	C	D	A	C	E	A	C	F	A
Northbound Left	A	A	B	A	A	C	A	A	C	A	A	C
Northbound Through			C			B			B			C
Northbound Right			A			A			A			A
Southbound Left	A	A	B	A	A	C	A	A	D	A	A	D
Southbound Through			C			B			B			C
Southbound Right			A			A			A			A
Approach Delay Eastbound	23.4	87.4	30.0	25.1	263.3	28.6	27.0	866.7	29.0	33.2	-	32.3
Approach LOS Eastbound	C	F	C	D	F	D	D	F	C	D	-	C
Approach Delay Westbound	20.1	29.8	14.5	21.2	41.9	13.5	22.6	105.2	14.2	27.0	-	13.8
Approach LOS Westbound	C	D	B	C	E	B	C	F	B	D	-	B
Intersection Delay/LOS			17.7/B			16.8/B			17.6/B			19.8/B

In addition there is a table showing the results of the Signal Warrant Study for both a 1% per year increase in traffic and a 2% per year increase for the 20-year period.

SIGNAL WARRANTS FOR 1% GROWTH

	Summary										
	Major	Minor	Total	Delay	1A	1A	1B	1B	2	3A	3B
Hours	Volume	Volume	Volume	(Veh-hr)	100%	80%	100%	80%	100%	100%	100%
07-08	823	113	1048	2.7	No	No	No	Yes	No	No	No
08-09	581	84	749	1.1	No	No	No	No	No	No	No
09-10	559	87	731	1.3	No	No	No	No	No	No	No
10-11	590	97	778	0.8	No	No	No	No	No	No	No
11-12	551	95	735	0.7	No	No	No	No	No	No	No
12-13	584	107	787	1.2	No	No	No	No	No	No	No
13-14	604	112	817	1.1	No	No	No	No	No	No	No
14-15	700	140	965	1.9	No	No	No	No	No	No	No
15-16	859	180	1200	8.0	No	Yes	No	Yes	No	No	No
16-17	912	200	1284	6.5	Yes	Yes	Yes	Yes	No	No	No
17-18	813	177	1143	3.4	No	Yes	No	Yes	No	No	No
18-19	606	133	853	1.1	No	No	No	No	No	No	No
Total	8182	1525	11090		1	3	1	4	0	0	0

SIGNAL WARRANTS FOR 2% GROWTH AND NO LEFT TURNS FROM EITHER CENTER DRIVEWAY OR SOUTH DRIVEWAY

Hours	Summary										
	Major Volume	Minor Volume	Total Volume	Delay (Veh-hr)	1A 100%	1A 80%	1B 100%	1B 80%	2 100%	3A 100%	3B 100%
07-08	972	136	1240	5.2	No	No	Yes	Yes	No	No	No
08-09	686	108	893	1.3	No	No	No	No	No	No	No
09-10	660	110	873	1.5	No	No	No	No	No	No	No
10-11	695	127	926	1.3	No	No	No	No	No	No	No
11-12	649	117	878	1.1	No	No	No	No	No	No	No
12-13	686	126	938	1.4	No	No	No	No	No	No	No
13-14	710	132	965	1.1	No	No	No	No	No	No	No
14-15	822	164	1123	1.8	No	Yes	No	Yes	No	No	No
15-16	1006	212	1405	9.2	Yes	Yes	Yes	Yes	Yes	No	No
16-17	1068	237	1495	6.7	Yes	Yes	Yes	Yes	Yes	No	No
17-18	952	208	1340	3.1	Yes	Yes	Yes	Yes	No	No	No
18-19	709	156	1000	1.3	No	No	No	No	No	No	No
Total	9615	1823	13076		3	4	4	5	2	0	0