TO: GENEVIEVE SALMONSON, DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: BRIAN K. MINAAI
DIRECTOR OF TRANSPORTATION

SUBJECT: FINAL ENVIRONMENTAL ASSESSMENT – INTERIM PIILANI HIGHWAY
IMPROVEMENTS, MOKULELE HIGHWAY TO KILOHANA DRIVE,
ISLAND OF MAUI

April 25, 2002

In accordance with the provisions of Chapter 343, Hawaii Revised Statutes, and Title
11, Chapter 200 of the Administrative Rules of the State Department of Health, a Final
Environmental Assessment has been prepared for the proposed project.

The Department of Transportation has reviewed comments received during the public
comment period and has determined that there will be no significant impacts as a result
of the proposed project. Therefore, we are filing a Finding of No Significant Impact
(FONSI).

We enclose one copy of the OEQC Publication form and four copies of the Final
Environmental Assessment. A revised project summary will be e-mailed to your office
for publication. We request that notice of the availability of the Final EA be published in
the next edition of the Environmental Notice.

If you have any questions, please contact Mr. Ferdinand Cajigal, Maui District Engineer,
at (808) 873-3535.

Enclosures
Appendix B

Conceptual Layout - Piilani Highway Interim Improvements Mokulele Highway to Kilohana Drive, March 22, 2002
2" Min. A.C., Mix IV Above Swale. 1" Wide Strip (Typ.)

Existing Ground

Grass, Concrete, or Soil/Cement Swale. See Roadway Grading and Drainage Plans for Swale Type and Location

ROW Varies (See Plan)

TANGENT SECTION
Scale: 1/4" = 1'-0"

SUPERELEVATED SECTION
Scale: 1/4" = 1'-0"

TYPICAL SECTIONS — 1 MOKULELE HWY. TO LIPOA STREET
Scale: As Shown
Notes:
Contractor shall remove Strispings, Markings, and Raised Povt. Markers that conflicts with New Strispings, Markings, and Raised Povt. Markers.

SIGNING & STRIPING PLAN - INTERSECTION
SCALE: 1" = 10'
Appendix B-1
Construction Cost Estimate and Schedule
STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ENGINEER'S PRELIMINARY DETAIL ESTIMATE

FOR
PIILANI HIGHWAY INTERIM WIDENING
MOKULELE HIGHWAY TO KILOHANA DRIVE
DISTRICTS OF WAILUKU AND MAKAWAO
ISLAND OF MAUI

PROJECT NO. 31AB-01-02

MARCH 22, 2002
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<td>Removal of Traffic Island (310 S.Y.)</td>
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**TOTAL FOR CONTRACT ITEMS**

**TOTAL (exclusive of Construction Engineering and Administration)**

TOTAL (exclusive of Construction Engineering and Administration)
Appendix C

Acoustic Study for the Interim Piilani Highway Improvements, April 2002
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CHAPTER I. SUMMARY

The existing and future traffic noise levels in the environs of the proposed Interim Piilani Highway Improvements (between Mokulele Highway and Kilohana Drive) Project in Kihei and Wailea on the island of Maui were studied to evaluate potential noise impacts associated with the Build Alternative. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated.

Existing traffic noise levels in the project area currently exceed the U.S. Federal Highway Administration (FHWA) and Hawaii State Department of Transportation, Highways Division (HDOT) noise abatement criteria. Future (CY 2011) traffic noise levels are expected to exceed the "66 Leq" HDOT noise abatement criteria along the mauka (east) and makai (west) Rights-of-Way, under the Build or No-Build Alternatives. The noise abatement criteria will continue to be exceeded at noise sensitive dwelling units with or without the project, but not at any public use facilities or park lands. Traffic noise mitigation measures in the form of speed reduction or noise barrier construction may be applied at the affected residences, but should be examined according to the criteria of reasonable and feasible. Because of the potential visual impacts of the noise barriers and the potential for graffiti, landscaping should be used on the roadway side of the barrier or the use of lava rock facade is recommended to soften the visual impacts of the walls and to minimize the potential for graffiti.

The following general conclusions can be made in respect to the number of impacted structures and lands which can be expected by CY 2011 under the Build Alternative. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- The HDOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive structure.

- Under the Build Alternative, future traffic noise levels at residences which are located within 125 to 150 feet of the highway centerline and within the limits of project construction are expected to exceed the HDOT "66 Leq" criteria. No parks or public structures (such as churches) within the limits of project construction should be affected by the proposed project or require noise mitigation measures under the Build Alternative.

- Future traffic noise levels at two commercial structures south of Ohukai Road may exceed current HDOT and FHWA noise criteria. Additional noise mitigation measures should not be required due to the use of closure and air conditioning of both commercial structures.

- With a 5 mile per hour reduction in the average vehicle speed during free traffic flow, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten year period between 2001 and 2011 are typically less than 1.5 dB, and are not considered to be significant. The anticipated increases in
future traffic noise levels with or without the project are also substantially less than the "15 dBA increase", which is considered to be the criteria for substantial change by the HDOT. Because the project is an interim improvement of Piilani Highway, and because the highway noise attenuation measures required by FHWA and HDOT noise abatement criteria are essentially remedial in nature (i.e., directed towards reducing currently high noise levels), substantial capital investments in highway noise mitigation measures should be deferred until more substantial improvements are made to Piilani Highway.

- If the proposed Upcountry Road connection to Piilani Highway is completed by 2011, the resulting traffic volumes and traffic noise levels should not alter the conclusions listed above. Resulting traffic volumes south of Kulanihakoi Street should be the same as those without the Upcountry Road project. North of Kulanihakoi Street, traffic volumes and noise levels should be lower during the critical AM peak hour following completion of the Upcountry Road project.

Potential short term construction noise impacts are possible during the project construction period along the entire project corridor. However, minimizing these types of noise impacts is possible using standard curfew periods, property muffled equipment, administrative controls, and construction barriers as required.
CHAPTER II. GENERAL STUDY METHODOLOGY

Noise Measurements. Existing traffic and background ambient noise levels at sixteen locations in the project area were measured in July 2001. The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate the Base Year (CY 2001) and future (CY 2011) traffic noise levels under the No Build and Build Alternatives. The background ambient noise measurements were used to define existing noise levels at noise sensitive receptors which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to "substantially exceed" existing background ambient noise levels at these noise sensitive receptors, and therefore exceed FHWA and HDOT noise standards and criteria.

The noise measurement locations ("B" through "N-2") are shown in Figure 1, and the letters of the measurement locations are keyed to the highway segment identifiers shown in Table 1. The results of the traffic noise measurements are summarized in Table 2. In the tables, Leq represents the average (or equivalent), A-Weighted, Sound Level. A list and description of the acoustical terminology used are contained in Appendix B.

Traffic Noise Predictions. The Federal Highway Administration (FHWA) Traffic Noise Model, Version 1.1 (or TNM, see Reference 1) was used as the primary method of calculating Base Year and future traffic noise levels, with model parameters adjusted to reflect terrain, ground cover, and local shielding conditions. At all traffic noise measurement locations along the project corridor, the measured noise levels were compared with model predictions to insure that measured and calculated noise levels for the existing conditions were consistent and in general agreement. As indicated in Table 2, spot counts of traffic volumes were also obtained during the measurement periods and were used to generate the Equivalent Sound Level (Leq) predictions shown in the table. The average vehicle speeds entered into the TNM were higher than posted speeds so as to achieve agreement between measured noise levels and those calculated by the TNM. With these input speed adjustments, the agreement between measured and predicted traffic noise levels was considered to be good and sufficiently accurate to formulate the Base Year and future year traffic noise levels.

Base Year traffic noise levels were then calculated along the project corridor using Base Year (2001) traffic volume data for the AM and PM peak hours from Reference 2. These traffic volumes are summarized in Appendices C and D. Traffic mix by vehicle types and average vehicle speeds for the various sections of the existing and future roadway were derived from observations during the noise monitoring periods and from Reference 2. Determinations of the periods of highest hourly traffic volumes along the project corridor were made after reviewing the AM and PM peak hour traffic volumes from Reference 2 and the noise measurement results. Total two-way traffic volumes were generally highest during the PM peak hour. However, measured and
LOCATIONS OF NOISE MEASUREMENT SITES
INTERIM PIILANI HIGHWAY IMPROVEMENTS

FIGURE 1 (CONT.)
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<tr>
<td>C</td>
<td>Uwapo Road to Moi Place</td>
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<tr>
<td>D</td>
<td>Moi Place to Ohukai Street</td>
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<tr>
<td>E</td>
<td>Ohukai Street to Kaonoulu Street</td>
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<td>F</td>
<td>Kaonoulu Street to Kulanihakoi Street</td>
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<td>I</td>
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<td>K</td>
<td>E. Welakahao Rd. to Kanani Rd.</td>
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<tr>
<td>L</td>
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<tr>
<td>M</td>
<td>Ke Alii Alanui to Keonekai Road</td>
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<td>N</td>
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<tr>
<td>O</td>
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<td>----------</td>
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<tr>
<td>L</td>
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N-2 59 FT from the center-line of Piilani Highway (7/6/01)
predicted traffic noise levels were highest during the AM peak hour at some locations due to traffic congestion and lower average vehicle speeds during the PM peak hour. For this reason, predictions of traffic noise levels for both the AM and PM peak hours were performed for this study, and the periods with the highest noise levels were used to model the highest traffic noise levels.

The Equivalent (or Average) Hourly Sound Level [Leq(h)] noise descriptor was used to calculate the Base Year and CY 2011 traffic noise levels as required by Reference 3. Aerial photomaps, tax maps, and project plans (where available) of the area were used to determine terrain, ground cover, and local shielding effects and distances from building structures, which were entered into the noise prediction model. Topographic maps of the areas outside the highway Rights-of-Way were not available, so receptor elevations were assumed to be equal to the original ground elevations along the highway centerline.

Future year (2011) traffic noise levels were then developed for the No Build and Build (roadway improvement) Alternatives using the future traffic assignments of Reference 2. Forecast traffic volumes, mixes, and speeds for Year 2011 were initially assumed to be identical to their Base Year values for the No Build and Build Alternatives. The CY 2011 traffic assignments for the No Build and Build Alternatives were also assumed to be identical. Future traffic noise levels were also evaluated for conditions with 5 mile per hour reductions in average vehicle speeds, which may occur as a result of reducing the posted speed limit from 45 to 40 mph.

**Impact Assessments and Mitigation.** Following the calculation of the future traffic noise levels, evaluations of the future traffic noise levels and impacts at noise sensitive receptor locations along Pilani Highway within the limits of construction were made. Comparisons of predicted future traffic noise levels with FHWA and HDOT noise abatement criteria (see Table 3) were made to determine specific locations where the noise abatement criteria are expected to be exceeded.

The HDOT 66 Leq(h) noise abatement criteria and the HDOT "greater than 15 dB increase" criteria were applied to all noise sensitive buildings along the project corridor. By Reference 4, the HDOT has replaced the FHWA 67 Leq(h) criteria with their 66 Leq(h) criteria. Along the project corridor, the locations of the 66 and 71 Leq(h) traffic noise contours, without the benefit of shielding from natural terrain or man-made sound barriers, were also used to identify noise sensitive and commercial receptor locations, respectively, where the HDOT's noise abatement criteria would not be exceeded, and which would not require more detailed evaluations. In addition, the HDOT's criteria of "greater than 15 dB increase above existing background noise levels" was also used as a noise abatement criteria for this project (from Reference 4). Where noise mitigation measures were indicated for this project, the effectiveness of sound attenuation barriers and other possible noise mitigation measures were evaluated. The ability to meet the HDOT criteria of 5 dBA noise reduction was also examined for various barrier heights.
### TABLE 3

**FHWA & DOTH NOISE ABATEMENT CRITERIA**  
[Hourly A—Weighted Sound Level—Decibels (dBA)]

<table>
<thead>
<tr>
<th>ACTIVITY CATEGORY</th>
<th>LEQ (h)*</th>
<th>DESCRIPTION OF ACTIVITY CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>57</td>
<td>Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.</td>
</tr>
<tr>
<td>B</td>
<td>67</td>
<td>Picnic areas, recreation areas, playgrounds, activity sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals.</td>
</tr>
<tr>
<td>C</td>
<td>72</td>
<td>Developed lands, properties, or activities not included in Categories A or B above.</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>Undeveloped lands.</td>
</tr>
<tr>
<td>E</td>
<td>52</td>
<td>Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.</td>
</tr>
</tbody>
</table>

* The Hawaii State Department of Transportation, Highways Division, utilizes Leq criteria levels which are 1 Leq unit less than the FHWA values shown.
CHAPTER III. EXISTING ACOUSTICAL ENVIRONMENT

For the purposes of this study, 2001 was used as the Base Year for computing changes in traffic noise levels between the No Build and Build Alternatives. The Base Year noise environment along the project corridor was described by computing the Hourly Equivalent Sound Levels [Leq(h)] along the existing roadway during the AM and PM peak traffic hours for the 2001 time period. The hourly sound levels, expressed in decibels, represent the average levels of traffic noise along the project roadways during the AM or PM peak hour of the study’s Base Year.

Table 4 presents the traffic volume, speed, and mix assumptions used to calculate the Base Year noise levels during the AM and PM peak hours along the existing Piilani Highway. Shown in Table 4 are the calculated AM and PM peak hour Leq(h)'s at reference distances of 50, 100, and 150 FT from the geometrical centerlines of the inbound and outbound lanes of the highway. The calculated distances to the 66 and 71 Leq noise contour lines under unobstructed, line-of-sight conditions to the roadway are shown in Table 5 for the AM and PM peak hours. The actual distances to the contour lines will generally be less than indicated in Table 5 when intervening structures or terrain obstructions exist between the roadway and a receptor. This reduction (or shrinkage) of the traffic noise contour distances from the roadway's centerline is the result of noise shielding (or attenuation) effects caused by the intervening structures or natural terrain features.

By using the traffic noise data shown in Tables 4 and 5, and aerial photomaps of the existing improvements on the west (makai) and east (mauka) sides of the project corridor, the relationship of the existing free-field traffic noise contours to existing noise sensitive dwellings and public use structures in the project area were obtained. No park lands border the project corridor. Additional evaluations were performed using the FHWA Traffic Noise Model at the public and private structures where the HDOT noise abatement criteria may be exceeded along the project corridor during the Base Year.

Table 6 presents the Base Year traffic noise levels at the various noise sensitive structures on both sides of the Rights-of-Way. The relationships of these receptor locations to the existing highway are shown in Figures 2 through 9. The existing traffic noise levels exceed the 66 Leq criteria at approximately 81 single family and one multifamily structures within the limits of project construction. From Table 6, existing traffic noise levels exceed the 66 Leq criteria at most of the residences located within 100 feet from the centerline of the highway. Existing traffic noise levels do not exceed the 66 Leq criteria at the Kihei Community Center/Pool Complex or at the Kihei and Lokelani Intermediate Schools which are located near the South Lipoa Street intersection. Traffic noise measurements at Locations I-1, I-2, and I-3 indicated that existing noise levels do not exceed the 66 Leq criteria at the Kihei and Lokelani Intermediate Schools. The Kihei Community Center is located at least 125 feet from the centerline of Piilani Highway, and is shielded by the edge of the highway cut/berm, and is also air conditioned, so traffic noise mitigation measures at the community center are not required.
## TABLE 4

**CY 2001 TRAFFIC VOLUMES AND NOISE LEVELS ALONG PILANI HIGHWAY AND AT VARIOUS DISTANCES FROM THE CENTERLINE**

<table>
<thead>
<tr>
<th>PILANI HWY. SEGMENT</th>
<th>SPEED</th>
<th>TOTAL</th>
<th>MEDIUM</th>
<th>HEAVY</th>
<th>**** HOURS LEQ IN dB ****</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(MPH)</td>
<td>VPH</td>
<td>AUTOS</td>
<td>TRUCKS</td>
<td>@ 50' @ 100' @ 150'</td>
</tr>
<tr>
<td>N. of Uwapo Road (Seg. B) (AM)</td>
<td>50</td>
<td>2,160</td>
<td>2,074</td>
<td>54</td>
<td>32</td>
</tr>
<tr>
<td>N. of Uwapo Road (Seg. B) (PM)</td>
<td>40</td>
<td>2,895</td>
<td>2,250</td>
<td>34</td>
<td>11</td>
</tr>
<tr>
<td>S. of Uwapo Road (Seg. C) (AM)</td>
<td>50</td>
<td>2,065</td>
<td>1,982</td>
<td>52</td>
<td>31</td>
</tr>
<tr>
<td>S. of Uwapo Road (Seg. C) (PM)</td>
<td>40</td>
<td>2,320</td>
<td>2,273</td>
<td>51</td>
<td>12</td>
</tr>
<tr>
<td>N. of Ohukai Road (Seg. D) (AM)</td>
<td>50</td>
<td>2,825</td>
<td>1,944</td>
<td>51</td>
<td>30</td>
</tr>
<tr>
<td>N. of Ohukai Road (Seg. D) (PM)</td>
<td>40</td>
<td>2,355</td>
<td>2,308</td>
<td>35</td>
<td>12</td>
</tr>
<tr>
<td>S. of Ohukai Road (Seg. E) (AM)</td>
<td>50</td>
<td>1,950</td>
<td>1,872</td>
<td>49</td>
<td>29</td>
</tr>
<tr>
<td>S. of Ohukai Road (Seg. E) (PM)</td>
<td>40</td>
<td>2,300</td>
<td>2,253</td>
<td>35</td>
<td>12</td>
</tr>
<tr>
<td>N. of Piikea Avenue (Seg. G) (AM)</td>
<td>52</td>
<td>2,175</td>
<td>2,088</td>
<td>54</td>
<td>33</td>
</tr>
<tr>
<td>N. of Piikea Avenue (Seg. G) (PM)</td>
<td>40</td>
<td>2,445</td>
<td>2,396</td>
<td>37</td>
<td>12</td>
</tr>
<tr>
<td>S. of Piikea Avenue (Seg. H) (AM)</td>
<td>52</td>
<td>2,110</td>
<td>2,025</td>
<td>53</td>
<td>32</td>
</tr>
<tr>
<td>S. of Piikea Avenue (Seg. H) (PM)</td>
<td>40</td>
<td>2,455</td>
<td>2,406</td>
<td>37</td>
<td>12</td>
</tr>
<tr>
<td>N. of Lipoa Street (Seg. H) (AM)</td>
<td>52</td>
<td>2,110</td>
<td>2,025</td>
<td>53</td>
<td>32</td>
</tr>
<tr>
<td>N. of Lipoa Street (Seg. H) (PM)</td>
<td>40</td>
<td>2,440</td>
<td>2,391</td>
<td>37</td>
<td>12</td>
</tr>
<tr>
<td>S. of Lipoa Street (Seg. I) (AM)</td>
<td>52</td>
<td>1,835</td>
<td>1,761</td>
<td>46</td>
<td>28</td>
</tr>
<tr>
<td>S. of Lipoa Street (Seg. I) (PM)</td>
<td>40</td>
<td>2,145</td>
<td>2,102</td>
<td>32</td>
<td>11</td>
</tr>
<tr>
<td>N. of Ke Alii Alanui St. (Seg. L) (AM)</td>
<td>50</td>
<td>1,620</td>
<td>1,555</td>
<td>41</td>
<td>24</td>
</tr>
<tr>
<td>N. of Ke Alii Alanui St. (Seg. L) (PM)</td>
<td>50</td>
<td>1,680</td>
<td>1,647</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>S. of Ke Alii Alanui St. (Seg. M) (AM)</td>
<td>45</td>
<td>1,265</td>
<td>1,240</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>S. of Ke Alii Alanui St. (Seg. M) (PM)</td>
<td>45</td>
<td>1,435</td>
<td>1,408</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>N. of Kilohana Drive (Seg. N) (AM)</td>
<td>55</td>
<td>1,220</td>
<td>1,184</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>N. of Kilohana Drive (Seg. N) (PM)</td>
<td>55</td>
<td>1,665</td>
<td>1,615</td>
<td>25</td>
<td>25</td>
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<tr>
<td>S. of Kilohana Drive (Seg. O) (AM)</td>
<td>50</td>
<td>985</td>
<td>955</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>S. of Kilohana Drive (Seg. O) (PM)</td>
<td>50</td>
<td>1,365</td>
<td>1,325</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

**Notes:**

1. See Table 1 for identification of Pilani Highway roadway segments.
2. All distances shown are from the center of Pilani Highway.
<table>
<thead>
<tr>
<th>STREET SECTION</th>
<th>66 Leq SETBACK (FT)</th>
<th>71 Leq SETBACK (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. of Uwapo Road (Seg. B) (AM)</td>
<td>130</td>
<td>60</td>
</tr>
<tr>
<td>N. of Uwapo Road (Seg. B) (PM)</td>
<td>89</td>
<td>34</td>
</tr>
<tr>
<td>S. of Uwapo Road (Seg. C) (AM)</td>
<td>127</td>
<td>58</td>
</tr>
<tr>
<td>S. of Uwapo Road (Seg. C) (PM)</td>
<td>90</td>
<td>35</td>
</tr>
<tr>
<td>N. of Ohukai Road (Seg. D) (AM)</td>
<td>126</td>
<td>57</td>
</tr>
<tr>
<td>N. of Ohukai Road (Seg. D) (PM)</td>
<td>91</td>
<td>34</td>
</tr>
<tr>
<td>S. of Ohukai Road (Seg. E) (AM)</td>
<td>122</td>
<td>55</td>
</tr>
<tr>
<td>S. of Ohukai Road (Seg. E) (PM)</td>
<td>90</td>
<td>34</td>
</tr>
<tr>
<td>N. of Piikea Avenue (Seg. G) (AM)</td>
<td>137</td>
<td>65</td>
</tr>
<tr>
<td>N. of Piikea Avenue (Seg. G) (PM)</td>
<td>92</td>
<td>36</td>
</tr>
<tr>
<td>S. of Piikea Avenue (Seg. H) (AM)</td>
<td>136</td>
<td>64</td>
</tr>
<tr>
<td>S. of Piikea Avenue (Seg. H) (PM)</td>
<td>94</td>
<td>36</td>
</tr>
<tr>
<td>N. of Lipoa Street (Seg. H) (AM)</td>
<td>136</td>
<td>64</td>
</tr>
<tr>
<td>N. of Lipoa Street (Seg. H) (PM)</td>
<td>92</td>
<td>36</td>
</tr>
<tr>
<td>S. of Lipoa Street (Seg. I) (AM)</td>
<td>126</td>
<td>58</td>
</tr>
<tr>
<td>S. of Lipoa Street (Seg. I) (PM)</td>
<td>87</td>
<td>32</td>
</tr>
<tr>
<td>N. of Ke Ali Alanui St. (Seg. L) (AM)</td>
<td>111</td>
<td>48</td>
</tr>
<tr>
<td>N. of Ke Ali Alanui St. (Seg. L) (PM)</td>
<td>103</td>
<td>44</td>
</tr>
<tr>
<td>S. of Ke Ali Alanui St. (Seg. M) (AM)</td>
<td>75</td>
<td>29</td>
</tr>
<tr>
<td>S. of Ke Ali Alanui St. (Seg. M) (PM)</td>
<td>82</td>
<td>31</td>
</tr>
<tr>
<td>N. of Kilohana Drive (Seg. N) (AM)</td>
<td>103</td>
<td>46</td>
</tr>
<tr>
<td>N. of Kilohana Drive (Seg. N) (PM)</td>
<td>123</td>
<td>59</td>
</tr>
</tbody>
</table>

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See TABLES 4 and 7A for traffic volume, speed, and mix assumptions.
(3) Setback distances are for unobstructed line-of-sight conditions.
(4) Soft ground conditions assumed along all roadways.
**TABLE 6**

EXISTING AND FUTURE TRAFFIC NOISE LEVELS
WITHOUT AND WITH 5 MPH SPEED REDUCTION
(4.92 FT RECEIVER, AM OR PM PEAK HOUR)

<table>
<thead>
<tr>
<th>RECEPTOR LOCATION</th>
<th>PEAK HOUR</th>
<th>EXISTING (CY 2001)</th>
<th>FUTURE (CY 2011)</th>
<th>5 MPH / (CHANGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NO BUILD / (CHANGE)</td>
<td>BUILD / (CHANGE)</td>
<td></td>
</tr>
<tr>
<td>ROADWAY SEGMENT B (MAKA):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-8-77:010</td>
<td>AM</td>
<td>68.2 *</td>
<td>69.9 /1.7 *</td>
<td>69.4 / 1.2 *</td>
</tr>
<tr>
<td>ROADWAY SEGMENT C (MAKA):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-8-77:001-A</td>
<td>AM</td>
<td>64.9</td>
<td>65.5 /1.6 *</td>
<td>66.8 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-8-77:001-B</td>
<td>AM</td>
<td>65.2</td>
<td>65.8 /1.6 *</td>
<td>67.1 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-8-77:001-C</td>
<td>AM</td>
<td>66.9 *</td>
<td>68.5 /1.6 *</td>
<td>68.4 / 1.5 *</td>
</tr>
<tr>
<td>Receiver 3-8-77:001-D</td>
<td>AM</td>
<td>68.4 *</td>
<td>70.0 /1.6 *</td>
<td>70.2 / 1.6 *</td>
</tr>
<tr>
<td>Receiver 3-8-77:001-E</td>
<td>AM</td>
<td>68.6 *</td>
<td>70.2 /1.6 *</td>
<td>70.6 / 2.0 *</td>
</tr>
<tr>
<td>Receiver 3-8-77:001-F</td>
<td>AM</td>
<td>67.2 *</td>
<td>68.8 /1.6 *</td>
<td>69.0 / 1.8 *</td>
</tr>
<tr>
<td>ROADWAY SEGMENT C (MAUKA):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-8-74:017</td>
<td>AM</td>
<td>64.5</td>
<td>66.1 /1.6 *</td>
<td>66.2 / 1.7 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:016</td>
<td>AM</td>
<td>64.6</td>
<td>66.2 /1.6 *</td>
<td>66.5 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:015</td>
<td>AM</td>
<td>65.8</td>
<td>67.4 /1.6 *</td>
<td>67.2 / 1.4 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:014</td>
<td>AM</td>
<td>63.3</td>
<td>64.9 /1.6 *</td>
<td>65.2 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:013</td>
<td>AM</td>
<td>66.2 *</td>
<td>67.8 /1.6 *</td>
<td>68.3 / 2.1 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:012</td>
<td>AM</td>
<td>68.2 *</td>
<td>68.8 /1.6 *</td>
<td>69.9 / 1.7 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:011</td>
<td>AM</td>
<td>67.7</td>
<td>69.3 /1.6 *</td>
<td>69.3 / 1.6 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:010</td>
<td>AM</td>
<td>67.3 *</td>
<td>68.9 /1.6 *</td>
<td>69.0 / 1.7 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:009</td>
<td>AM</td>
<td>66.0 *</td>
<td>68.6 /1.6 *</td>
<td>70.0 / 2.0 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:008</td>
<td>AM</td>
<td>68.8</td>
<td>70.4 /1.6 *</td>
<td>70.6 / 1.8 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:007</td>
<td>AM</td>
<td>67.9</td>
<td>69.5 /1.6 *</td>
<td>68.8 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:006</td>
<td>AM</td>
<td>69.2 *</td>
<td>70.8 /1.6 *</td>
<td>70.7 / 1.5 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:005</td>
<td>AM</td>
<td>68.4</td>
<td>70.0 /1.6 *</td>
<td>70.3 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:004</td>
<td>AM</td>
<td>68.6</td>
<td>70.2 /1.6 *</td>
<td>69.6 / 1.0 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:003</td>
<td>AM</td>
<td>66.5</td>
<td>68.1 /1.6 *</td>
<td>68.2 / 1.7 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:002</td>
<td>AM</td>
<td>66.1 *</td>
<td>67.7 /1.6 *</td>
<td>68.0 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:001-A</td>
<td>AM</td>
<td>66.5</td>
<td>68.1 /1.6 *</td>
<td>68.3 / 1.8 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:001-B</td>
<td>AM</td>
<td>66.9</td>
<td>68.5 /1.6 *</td>
<td>68.5 / 1.6 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:001-C</td>
<td>AM</td>
<td>66.7</td>
<td>68.3 /1.6 *</td>
<td>68.8 / 2.1 *</td>
</tr>
<tr>
<td>Receiver 3-8-74:001-D</td>
<td>AM</td>
<td>68.7</td>
<td>70.3 /1.6 *</td>
<td>70.3 / 1.6 *</td>
</tr>
<tr>
<td>Receiver 3-8-24:027</td>
<td>AM</td>
<td>67.8</td>
<td>68.4 /1.6 *</td>
<td>70.1 / 2.3 *</td>
</tr>
<tr>
<td>ROADWAY SEGMENT D (MAKA):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-29:031</td>
<td>AM</td>
<td>67.8 *</td>
<td>69.5 /1.7 *</td>
<td>69.3 / 1.5 *</td>
</tr>
<tr>
<td>Receiver 3-9-29:003</td>
<td>AM</td>
<td>67.6</td>
<td>69.3 /1.7 *</td>
<td>69.3 / 1.7 *</td>
</tr>
<tr>
<td>Receiver 3-9-29:034</td>
<td>AM</td>
<td>67.4</td>
<td>69.1 /1.7 *</td>
<td>69.3 / 1.9 *</td>
</tr>
<tr>
<td>Receiver 3-9-01:139</td>
<td>AM</td>
<td>67.5</td>
<td>68.2 /1.7 *</td>
<td>69.3 / 1.8 *</td>
</tr>
</tbody>
</table>

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### TABLE 6 (CONTINUED)

**EXISTING AND FUTURE TRAFFIC NOISE LEVELS**

**WITHOUT AND WITH 5 MPH SPEED REDUCTION**

(4.92 FT RECEPTOR, AM OR PM PEAK HOUR)

<table>
<thead>
<tr>
<th>RECEPTOR LOCATION</th>
<th>PEAK HOUR</th>
<th>EXISTING (CY 2001)</th>
<th>FUTURE (CY 2011) Leq</th>
<th>NO BUILD / (CHANGE)</th>
<th>BUILD / (CHANGE)</th>
<th>-5 MPH / (CHANGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROADWAY SEGMENT D (MAUKA):</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Receiver 3-9-24: 002 AM</td>
<td>68.7</td>
<td>68.4 / 1.7</td>
<td>69.2 / 2.5</td>
<td>68.0 / 1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-47: 101 AM</td>
<td>69.8</td>
<td>71.3 / 1.7</td>
<td>72.1 / 2.5</td>
<td>70.8 / 1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-47: 102 AM</td>
<td>68.6</td>
<td>71.3 / 1.7</td>
<td>72.2 / 2.6</td>
<td>70.9 / 1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-47: 103 AM</td>
<td>68.7</td>
<td>71.4 / 1.7</td>
<td>71.9 / 2.2</td>
<td>70.8 / 0.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-47: 105 AM</td>
<td>67.4</td>
<td>69.1 / 1.7</td>
<td>69.5 / 2.1</td>
<td>68.3 / 0.9</td>
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</tr>
<tr>
<td>ROADWAY SEGMENT E (MAUKA):</td>
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<tr>
<td>Receiver 3-9-45: 010 AM</td>
<td>69.9</td>
<td>71.8 / 1.9</td>
<td>72.2 / 2.3</td>
<td>70.8 / 1.0</td>
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<tr>
<td>Receiver 3-9-45: 007/008 AM</td>
<td>70.3</td>
<td>72.2 / 1.9</td>
<td>72.7 / 2.4</td>
<td>71.3 / 1.0</td>
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<tr>
<td>ROADWAY SEGMENT E (MAKA):</td>
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</tr>
<tr>
<td>Receiver 3-9-39: 012 AM</td>
<td>61.0</td>
<td>62.9 / 1.9</td>
<td>62.2 / 1.2</td>
<td>60.9 / 0.1</td>
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<td></td>
</tr>
<tr>
<td>Receiver 3-9-39: 013 AM</td>
<td>62.3</td>
<td>64.2 / 1.9</td>
<td>63.8 / 1.5</td>
<td>62.5 / 0.2</td>
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<td></td>
</tr>
<tr>
<td>Receiver 3-9-39: 065 AM</td>
<td>63.4</td>
<td>65.3 / 1.9</td>
<td>65.5 / 2.1</td>
<td>64.3 / 0.9</td>
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</tr>
<tr>
<td>Receiver 3-9-39: 048 AM</td>
<td>64.7</td>
<td>66.5 / 1.9</td>
<td>67.1 / 2.4</td>
<td>66.0 / 1.3</td>
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<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 123 AM</td>
<td>69.0</td>
<td>70.9 / 1.9</td>
<td>70.8 / 1.6</td>
<td>69.5 / 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 126 AM</td>
<td>69.1</td>
<td>71.0 / 1.9</td>
<td>71.1 / 2.0</td>
<td>69.9 / 0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 127 AM</td>
<td>68.4</td>
<td>70.3 / 1.9</td>
<td>71.1 / 2.7</td>
<td>70.0 / 1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 128 AM</td>
<td>67.7</td>
<td>69.6 / 1.9</td>
<td>70.0 / 2.3</td>
<td>68.8 / 1.1</td>
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<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 129 AM</td>
<td>67.3</td>
<td>69.2 / 1.9</td>
<td>68.9 / 1.6</td>
<td>67.8 / 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 130 AM</td>
<td>66.6</td>
<td>68.5 / 1.9</td>
<td>68.4 / 1.8</td>
<td>67.3 / 0.7</td>
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</tr>
<tr>
<td>Receiver 3-9-48: 131 AM</td>
<td>66.5</td>
<td>68.4 / 1.9</td>
<td>68.0 / 1.5</td>
<td>66.9 / 0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 133 AM</td>
<td>69.1</td>
<td>71.0 / 1.9</td>
<td>70.9 / 1.8</td>
<td>69.7 / 0.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 134 AM</td>
<td>68.9</td>
<td>70.8 / 1.9</td>
<td>71.0 / 2.1</td>
<td>69.8 / 0.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 137 AM</td>
<td>69.4</td>
<td>71.3 / 1.9</td>
<td>71.3 / 1.9</td>
<td>70.1 / 0.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 138 AM</td>
<td>68.9</td>
<td>70.8 / 1.9</td>
<td>70.8 / 1.9</td>
<td>69.7 / 0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 141 AM</td>
<td>67.8</td>
<td>69.7 / 1.9</td>
<td>70.0 / 2.2</td>
<td>68.8 / 1.0</td>
<td></td>
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</tr>
<tr>
<td>Receiver 3-9-48: 142 AM</td>
<td>66.7</td>
<td>68.6 / 1.9</td>
<td>68.1 / 2.4</td>
<td>67.9 / 1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 146 AM</td>
<td>66.2</td>
<td>68.1 / 1.9</td>
<td>68.1 / 1.9</td>
<td>67.0 / 0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 147 AM</td>
<td>65.2</td>
<td>67.1 / 1.9</td>
<td>67.3 / 2.1</td>
<td>66.2 / 1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-48: 148 AM</td>
<td>63.8</td>
<td>65.7 / 1.9</td>
<td>65.8 / 2.0</td>
<td>64.7 / 0.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ROADWAY SEGMENT F (MAKA):**

| Receiver 2-2-25: 018 AM | 72.4 | 74.3 / 1.9 | 73.8 / 1.4 | 72.5 / 0.1 |
| Receiver 2-2-25: 019 AM | 64.1 | 68.0 / 1.9 | 64.8 / 0.5 | 63.4 / 0.7 |
| Receiver 2-2-25: 020 AM | 66.0 | 67.9 / 1.9 | 67.3 / 1.3 | 65.1 / 0.1 |
| Receiver 2-2-25: 021 AM | 71.3 | 73.2 / 1.9 | 72.0 / 0.7 | 70.8 / 0.5 |
| Receiver 2-2-25: 022 AM | 71.2 | 73.1 / 1.9 | 71.9 / 0.7 | 70.7 / 0.5 |
| Receiver 2-2-25: 023 AM | 71.0 | 72.9 / 1.9 | 72.1 / 1.1 | 70.8 / 0.2 |

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**TABLE 6 (CONTINUED)**

**EXISTING AND FUTURE TRAFFIC NOISE LEVELS**
**WITHOUT AND WITH 5 MPH SPEED REDUCTION**
**(4.92 FT RECEPTOR, AM OR PM PEAK HOUR)**

<table>
<thead>
<tr>
<th>RECEPTOR LOCATION</th>
<th>PEAK HOUR</th>
<th>EXISTING (CY 2001)</th>
<th>NO BUILD / (CHANGE)</th>
<th>BUILD / (CHANGE)</th>
<th>-5 MPH / (CHANGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROADWAY SEGMENT G (MAKA):</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiver 2-2-25:024</td>
<td>AM</td>
<td>70.1</td>
<td>71.2 /1.1</td>
<td>71.3 /1.2</td>
<td>70.1 / 0.0 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:025</td>
<td>AM</td>
<td>68.6</td>
<td>69.7 /1.1</td>
<td>70.3 /1.7</td>
<td>69.0 / 0.4 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:026</td>
<td>AM</td>
<td>69.7</td>
<td>70.8 /1.1</td>
<td>70.1 /0.4</td>
<td>68.9 / 0.8 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:027</td>
<td>AM</td>
<td>68.2</td>
<td>67.3 /1.1</td>
<td>67.5 /1.3</td>
<td>68.3 / 0.1 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:028</td>
<td>AM</td>
<td>69.1</td>
<td>67.2 /1.1</td>
<td>68.0 /1.7</td>
<td>66.6 / 0.5 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:029</td>
<td>AM</td>
<td>69.4</td>
<td>67.5 /1.1</td>
<td>68.0 /1.6</td>
<td>68.6 / 0.4 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:030</td>
<td>AM</td>
<td>69.7</td>
<td>67.8 /1.1</td>
<td>68.3 /1.6</td>
<td>67.1 / 0.4 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:031</td>
<td>AM</td>
<td>67.2</td>
<td>68.3 /1.1</td>
<td>68.9 /1.7</td>
<td>67.6 / 0.4 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:032</td>
<td>AM</td>
<td>68.0</td>
<td>69.1 /1.1</td>
<td>69.8 /1.8</td>
<td>68.6 / 0.6 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:033</td>
<td>AM</td>
<td>68.8</td>
<td>69.9 /1.1</td>
<td>69.7 /0.9</td>
<td>68.5 / 0.3 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:034</td>
<td>AM</td>
<td>68.8</td>
<td>69.9 /1.1</td>
<td>69.4 /0.6</td>
<td>68.2 / 0.6 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:037</td>
<td>AM</td>
<td>70.2</td>
<td>71.3 /1.1</td>
<td>70.5 /0.3</td>
<td>69.3 / 0.9 **</td>
</tr>
<tr>
<td>Receiver 2-2-25:038</td>
<td>AM</td>
<td>69.8</td>
<td>70.9 /1.1</td>
<td>70.8 /1.0</td>
<td>69.8 / 0.2 **</td>
</tr>
</tbody>
</table>

| Receiver 3-9-36:035 | PM | 69.6 | 71.3 /1.7 | 71.8 /2.2 | 70.6 / 1.0 ** |
| Receiver 3-9-36:036 | PM | 68.7 | 70.4 /1.7 | 70.0 /1.3 | 68.9 / 0.2 ** |
| Receiver 3-9-36:037 | PM | 68.6 | 68.3 /1.7 | 68.0 /1.4 | 66.9 / 0.3 ** |
| Receiver 3-9-36:038 | PM | 68.9 | 68.5 /1.7 | 68.3 /1.4 | 67.1 / 0.2 ** |
| Receiver 3-9-36:039 | PM | 69.9 | 68.5 /1.7 | 68.6 /1.7 | 67.5 / 0.6 ** |
| Receiver 3-9-36:040 | PM | 67.7 | 69.4 /1.7 | 69.0 /1.3 | 67.9 / 0.2 ** |
| Receiver 3-9-36:041 | PM | 67.3 | 68.0 /1.7 | 68.9 /1.6 | 67.8 / 0.5 ** |
| Receiver 3-9-36:042 | PM | 68.7 | 70.4 /1.7 | 71.0 /2.3 | 69.8 / 1.1 ** |
| Receiver 3-9-36:043 | PM | 68.3 | 70.0 /1.7 | 70.2 /1.9 | 69.0 / 0.7 ** |
| Receiver 3-9-36:044 | PM | 68.6 | 70.3 /1.7 | 70.5 /1.9 | 69.4 / 0.8 ** |
| Receiver 3-9-37:059 | PM | 68.8 | 68.5 /1.7 | 68.9 /2.1 | 67.7 / 0.9 ** |
| Receiver 3-9-37:059 | PM | 67.4 | 69.1 /1.7 | 69.4 /2.0 | 68.3 / 0.9 ** |
| Receiver 3-9-37:057 | PM | 69.4 | 71.1 /1.7 | 71.0 /1.6 | 69.8 / 0.4 ** |
| Receiver 3-9-37:056 | PM | 68.6 | 70.3 /1.7 | 70.2 /1.6 | 68.1 / 0.5 ** |
| Receiver 3-9-37:055 | PM | 68.4 | 71.1 /1.7 | 70.9 /1.5 | 68.8 / 0.4 ** |
| Receiver 3-9-37:054 | PM | 68.2 | 69.9 /1.7 | 70.0 /1.8 | 68.9 / 0.7 ** |
| Receiver 3-9-37:053 | PM | 69.3 | 71.0 /1.7 | 71.1 /1.8 | 69.9 / 0.6 ** |
| Receiver 3-9-37:052 | PM | 67.2 | 68.9 /1.7 | 69.2 /2.0 | 68.1 / 0.9 ** |
| Receiver 3-9-37:051 | PM | 66.0 | 67.7 /1.7 | 66.5 /2.5 | 67.4 / 1.4 ** |
| Receiver 3-9-37:050 | PM | 65.3 | 67.0 /1.7 | 67.0 /1.7 | 65.8 / 0.5 ** |
| Receiver 3-9-37:049 | PM | 65.1 | 66.8 /1.7 | 66.6 /1.5 | 65.5 / 0.4 ** |
| Receiver 3-9-37:022 | PM | 59.0 | 60.7 /1.7 | 60.3 /1.3 | 59.3 / 0.3 ** |
### TABLE 6 (CONTINUED)

**EXISTING AND FUTURE TRAFFIC NOISE LEVELS**

**WITHOUT AND WITH 5 MPH SPEED REDUCTION**

(4.92 FT RECEPTOR, AM OR PM PEAK HOUR)

<table>
<thead>
<tr>
<th>RECEPTOR LOCATION</th>
<th>PEAK HOUR</th>
<th>EXISTING (CY 2001) Leq</th>
<th>FUTURE (CY 2011) Leq</th>
<th>NO BUILD / (CHANGE)</th>
<th>BUILD / (CHANGE)</th>
<th>-5 MPH / (CHANGE)</th>
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</thead>
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<tr>
<td><strong>ROADWAY SEGMENT N (MAKAI) (Continued):</strong></td>
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<tr>
<td>Receiver 3-9-37:021</td>
<td>PM</td>
<td>59.2</td>
<td>59.9 / 1.7</td>
<td>59.4 / 1.2</td>
<td>58.3 / 0.1</td>
<td></td>
</tr>
<tr>
<td>Receiver 3-9-37:020</td>
<td>PM</td>
<td>56.7</td>
<td>58.4 / 1.7</td>
<td>57.8 / 1.1</td>
<td>56.8 / 0.1</td>
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<tr>
<td><strong>ROADWAY SEGMENT N (MAUKA):</strong></td>
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<td></td>
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<tr>
<td>Receiver 2-1-15:016</td>
<td>PM</td>
<td>69.8 *</td>
<td>71.5 / 1.7 *</td>
<td>71.3 / 1.5 *</td>
<td>70.2 / 0.4 **</td>
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</tr>
<tr>
<td>Receiver 2-1-15:017</td>
<td>PM</td>
<td>65.6</td>
<td>67.3 / 1.7 *</td>
<td>66.6 / 1.0 *</td>
<td>65.5 / -0.1 **</td>
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</tr>
</tbody>
</table>

**Notes:**

1. All receivers were assumed to be at 4.92 feet above ground level.
2. * Denotes exceedance of HDOT "6 Leq" criteria for residences.
3. ** Denotes noise attenuation does not meet HDOT’s 5 dB attenuation criteria for "substantial noise reduction."

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LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT E AT OHUKAI RD.)
SEGMENT "E"

LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT E AT KAONOULU ST.)

FIGURE 5
SEGMENT "G"

LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT G AT WAIPUILANI GULCH)

FIGURE 7
LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT N AT KILOHANA DR.)

FIGURE 9
At areas removed from Pilani Highway, Base Year noise levels are much lower than along the highway's Rights-of-Way due to distance factors and local shielding effects from buildings. Base Year noise levels in areas removed from the highway are typically less than 66 Leq(h), and possibly as low as 55 Leq(h).
CHAPTER IV. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The future traffic noise levels in the immediate vicinity of the project during CY 2011 were evaluated for the No Build and Build Alternatives. The same methodology that was used to calculate the Base Year noise levels was also used to calculate the Year 2011 noise levels. It should be noted that forecast traffic volumes for both the No Build and Build Alternatives were assumed to be identical along Pilani Highway for the Year 2011. Under both the No Build and Build Alternatives, average vehicle speeds and traffic mix were initially assumed to be identical to the Base Year values.

Tables 5, 6, and 7A summarize the traffic conditions, noise levels, and setback distances for the No Build or Build Alternatives during the AM and PM peak hours in CY 2011. As indicated in Table 6, future traffic noise levels in the immediate vicinity of the project are predicted to increase by approximately 1.1 to 1.9 dB between CY 2001 and CY 2011 solely as a result of projected traffic volume increases under the No Build Alternative. Under the No Build Alternative, the HDOT 66 noise abatement criteria will continue to be exceeded at the majority of the existing dwelling units within 120 feet of the centerline of Pilani Highway. Traffic noise levels should not exceed 66 Leq at public use structures or park lands under the No Build Alternative in CY 2011.

Under the Build Alternative, restriping of the highway is planned so that the existing two, 12 foot wide lanes are to be replaced with four, 11 foot wide lanes. Figures 2 through 9 present the noise sensitive receptor (or receiver) locations where future traffic noise levels were calculated for the No Build and Build Alternatives using the FHWA Traffic Noise Model. Plans for the new homes under construction on the south side of Waipualani Gulch (see Figure 7) were not available, but the lots, house setback distances, and traffic noise levels were assumed to be similar to the existing homes on the north side of the gulch. The predicted CY 2011 traffic noise levels at the various receptor locations along Pilani Highway where traffic noise levels could exceed 66 Leq(h) are shown in Table 6 for the No Build and Build Alternatives. Predictions of future traffic noise levels under the Build Alternative for the condition with average vehicle speeds reduced by 5 miles per hour are also shown in Table 6. Also indicated in Table 6 are the increases in traffic noise levels expected under the No Build and Build Alternatives. Table 7B presents the expected noise levels under the Build Alternative with 5 miles per hour speed reduction during the noisiest peak hours when free flow conditions prevail.

The 66 Leq criteria should not be exceeded at any public use structures or park lands under the No Build or Build Alternatives. The 71 Leq criteria for commercial properties will be exceeded at two multistory commercial buildings on the mauka side of Pilani Highway and south of the Ohukai Road intersection (TMK: 3-9-45:010 and TMK: 3-9-45:007/008). Because both commercial buildings are presently air conditioned, additional noise mitigation measures should not be required.
<table>
<thead>
<tr>
<th>PILANI HWY SEGMENT</th>
<th>SPEED</th>
<th>TOTAL</th>
<th>MEDIUM</th>
<th>HEAVY</th>
<th>@ 50'</th>
<th>@ 100'</th>
<th>@ 150'</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. of Uwapo Road (Seg. B) (AM)</td>
<td>50</td>
<td>3,050</td>
<td>2,928</td>
<td>76</td>
<td>46</td>
<td>74.3</td>
<td>69.7</td>
</tr>
<tr>
<td>N. of Uwapo Road (Seg. B) (PM)</td>
<td>40</td>
<td>3,310</td>
<td>3,243</td>
<td>50</td>
<td>17</td>
<td>71.3</td>
<td>66.9</td>
</tr>
<tr>
<td>S. of Uwapo Road (Seg. C) (AM)</td>
<td>50</td>
<td>2,970</td>
<td>2,851</td>
<td>74</td>
<td>45</td>
<td>74.2</td>
<td>69.5</td>
</tr>
<tr>
<td>S. of Uwapo Road (Seg. C) (PM)</td>
<td>40</td>
<td>3,340</td>
<td>3,273</td>
<td>50</td>
<td>17</td>
<td>71.3</td>
<td>66.9</td>
</tr>
<tr>
<td>N. of Ohukal Road (Seg. D) (AM)</td>
<td>50</td>
<td>2,930</td>
<td>2,813</td>
<td>73</td>
<td>44</td>
<td>74.1</td>
<td>69.5</td>
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**Notes:**
1. See Table 1 for identification of Pilani Highway roadway segments.
2. All distances shown are from the center of Pilani Highway.
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<th><em><strong>HOURLY LEQ IN dB</strong></em></th>
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Notes:
1. See Table 1 for identification of Piilani Highway roadway segments.
2. All distances shown are from the center of Piilani Highway.
3. 5 MPH reduction in speed assumed.
Appendix D contains the forecast traffic volumes along Piilani Highway if the proposed Upcountry Road is completed by CY 2011. Traffic volumes with or without the Upcountry Road in CY 2011 are expected to be identical south of Kulanihakoi Street. North of Kulanihakoi Street, the traffic volumes (and resulting traffic noise levels) during the AM peak hour are expected to be less with the Upcountry Road than without the Upcountry Road. Because the traffic noise levels are expected to be highest during the AM peak hour, and because the traffic noise study utilized the AM peak hour to evaluate the noise levels along these roadway sections, it was concluded that the completion of the Upcountry Road project by CY 2011 should not alter the results of the current study for the Interim Piilani Highway Improvement Project.

The following general conclusions can be made in respect to the impacted structures and lands which can be expected by CY 2011 under the Build Alternative. These conclusions are valid as long as the future traffic volumes and mixes do not differ from the assumed values.

- The HDOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive structure.

- Exceedance of the 66 Leq noise mitigation criteria at public use structures or park lands are not expected to occur under the No Build or Build Alternatives.

- Under the No Build or Build Alternatives, with no change in average vehicle speeds, future traffic noise levels at existing single and multifamily dwellings on both sides of the highway will continue to exceed the 66 Leq criteria. At least 94 residential structures are predicted to be affected by future traffic noise levels which exceed the 66 Leq HDOT noise criteria. At two commercial buildings (TMK: 3-9-45:010 and TMK: 3-9-45:007/008) mauka of the highway, future traffic noise levels will exceed the 71 Leq criteria for commercial structures under the Build Alternative.

- Under the Build Alternative, with a reduction of 5 miles per hour in vehicle speeds during free flow conditions, the total number of existing single and multifamily dwellings which experience noise levels above the 66 Leq criteria will be reduced by approximately 9 percent. In addition, the argument for the use of additional traffic noise mitigation measures (such as the construction of sound walls) is less persuasive because the predicted increases in future traffic noise levels under the Build Alternative are not significant (see Table 6) if a reduction in average vehicle speeds (by 5 miles per hour) occurs as a result of the project.

- If the proposed Upcountry Road connection to Piilani Highway is completed by 2011, the resulting traffic volumes and traffic noise levels should not alter the conclusions listed above. Resulting traffic volumes south of Kulanihakoi Street should be the same as those without the Upcountry Road project. North of Kulanihakoi Street, traffic volumes and noise levels should be lower during the critical AM peak hour following completion of the Upcountry Road project.
CHAPTER V. POSSIBLE NOISE MITIGATION MEASURES

Possible noise mitigation measures considered included the following:

A. Restricting the Growth In the Number of Noisy Buses, Heavy Trucks, Motorcycles, and Automobiles with Defective Mufflers. The percentage contribution to the total traffic noise by heavy trucks, buses, and noisy vehicles is currently less than 50 percent, and elimination of these noise sources would reduce total traffic noise levels by less than 3 Leq(h) units. Restricting the growth rate of these vehicles (to growth rates below passenger automobile growth rates) could produce noise reductions in the order of 1 or 2 dB, which are not considered significant for the level of regulatory efforts required.

B. Alteration of the Horizontal Or Vertical Alignment of the Roadway. This project involves the restriping of the northbound and southbound lanes of the highway and does not involve alterations to the vertical or horizontal alignments of Pilani Highway. Major alterations of the horizontal alignment of the existing highway lanes were not considered appropriate due to the scope of this roadway improvement project, and due to the constraints imposed by the locations of the intersections along the project corridor. The majority of the noise sensitive receptor locations where the 66 Leq criteria is exceeded are located on the west (or makai) side of the highway, and mitigation of traffic noise on the west side using roadway realignment techniques would require relocation of the northbound and southbound lanes toward the east by 50 to 100 feet.

C. Acquisition of Property Rights for Construction of Noise Barriers, and/or Construction of Noise Barriers Along the Right-of-Way. For single story, noise sensitive buildings, construction of a sound attenuating wall is normally the preferred noise mitigation measure. The 5 to 7 dB of noise attenuation achievable with a 6 FT high wall is normally sufficient for single story structures. Many of the structures along Pilani Highway are multistory dwelling units, and the upper floors of those structures will not benefit from sound attenuation walls which are 6 to 8 feet high. Wall heights in the order of 15 to 20 feet above ground level will be required to attenuate traffic noise at the upper floor spaces. It should also be noted that the sound barrier will block the views to the roadway which some of the residents may enjoy. For this reason, concurrence from the affected homeowners should be obtained prior to construction of a sound barrier as a noise mitigation measure.

D. Acquisition of Real Property Interests To Serve As A Noise Buffer Zone. Where tall (or multistory) structures are expected to be impacted by future traffic noise, the use of sound attenuating barriers (see para. C above) will not be practical due to the excessive heights required to shield the upper levels from traffic noise. In these situations, the only other noise mitigation possibilities are sound insulation of the affected upper level units or acquisition of the property interests. Noise buffer zones extending approximately 120 to 150 feet from the
center of the highway and at substantial cost would be required to meet the HDOT 66 Leq criteria. In general, the acquisition of property for the creation of noise buffer zones for noise mitigation has seldom been applied in Hawaii.

E. **Noise Insulation of Public Use or Nonprofit Institutional Structures.** No public use structures should require noise insulation as a result of the proposed highway improvements.
CHAPTER VI. FUTURE TRAFFIC NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES

Future traffic noise levels are predicted to exceed the HDOT 66 Leq(h) noise abatement criteria by CY 2011 under the Build Alternative at existing noise sensitive structures on both sides of the highway, with the majority of the affected structures located west of the highway and within the limits of construction for this project. Table 8 presents the predicted performances of sound attenuation walls located along the east and west Rights-of-Way in front of the affected structures for the Build Alternative. The locations of the sound attenuation walls are shown in Figures 2 through 9. In the figures, the top wall elevations shown are required to comply with the minimum 5 dB attenuation criteria of HDOT for ground level receptors. It should be noted that accurate topographic maps along the highway Rights-of-Way and at the dwelling units were not available for this study, and the wall heights shown in Figures 2 through 9 are best estimates based on the original highway plans and profiles.

Mitigation of future traffic noise at the second or third floors of the existing apartment building at Uwapo Road (TMK: 3-8-77:010) will not be feasible using a sound wall along the property line, since a wall height in excess of 11 to 13 feet above roadway grade is required to shield the second floor living units from traffic noise, and even higher walls are required for the third floor units. In addition, attenuation of traffic noise at the upper floors of 2-story homes and townhomes which are located on some of the lots along the highway will not be feasible due to the large wall heights required to shield the upper floors from the highway traffic. The other mitigation measures discussed in Chapter V are also not feasible at these upper floor receptor locations. Attenuation of traffic noise to meet HDOT criteria will usually be possible for the ground floors of the affected dwellings using the sound attenuation walls shown in Figures 2 through 9. A sound attenuation wall at the locations of the new housing units which were under construction along the west side of the highway and south of the Waipulani Bridge is shown in Figure 7. Plans and topographic maps were not available for this development, but a probable wall height of 6 feet above grade is shown in the figure based on the results at the existing housing units north of the bridge (see Figure 5).

The predicted future noise levels for the wall heights shown in Figures 2 through 9 are shown in Table 8 under the "POTEN. WALL" column. Because the HDOT "5 dBA noise reduction" criteria will not be met in all cases with 6 foot wall heights, the construction of 7 to 10 foot high walls will be required at some locations. A variance from local building codes may be required to construct the 7 to 10 foot high walls which are required to achieve at least 5 dBA of noise reduction. The sound attenuating walls must be continuous without see-through openings, and may be constructed from solid materials which have a minimum surface weight of 5 pounds per square foot. Use of landscaping on the roadway side of the wall or the use of lava rock facade are also recommended to soften the visual impacts of the walls and to minimize the potential for graffiti.
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<th>FUTURE NOISE LEVELS (CY 2011)</th>
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<td>63.8 /-2.3</td>
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<td>AM</td>
<td>66.7</td>
<td>68.8 /2.1</td>
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### Table 8 (Continued)

**Predicted Traffic Noise Attenuation vs. Barrier Heights (4.92 ft high receptor)**

<table>
<thead>
<tr>
<th>Receptor Location</th>
<th>Peak Hour (CY 2001)</th>
<th>Existing (Change)</th>
<th>Future Noise Levels (CY 2011) (Change)</th>
<th>Potential Wall (Change)</th>
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<td><strong>Roadway Segment C (Ma'uka):</strong> (continued)</td>
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<td>Receiver 3-9-74:001-D</td>
<td>AM 68.7 *</td>
<td>70.3 /1.6 *</td>
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<td>Receiver 3-9-24:027</td>
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<td>70.1 /2.3 *</td>
<td>63.4 /-4.4</td>
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<td><strong>Roadway Segment D (Ma'uka):</strong></td>
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<tr>
<td>Receiver 3-9-29:031</td>
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<td>69.3 /1.5 *</td>
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<td>69.3 /1.7 *</td>
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<td>69.3 /1.8 *</td>
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<td>72.2 /2.6 *</td>
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<td>71.9 /2.2 *</td>
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<td>AM 69.0 *</td>
<td>70.6 /1.6 *</td>
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<td>61.3 /-7.7</td>
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<td>AM 69.1 *</td>
<td>71.1 /2.0 *</td>
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<td>71.1 /2.7 *</td>
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<tr>
<td>Receiver 3-9-48:128</td>
<td>AM 67.7 *</td>
<td>70.0 /2.3 *</td>
<td>63.3 /-4.4</td>
<td>62.3 /-5.4</td>
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TABLE 8 (CONTINUED)

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS

(4.92 FT HIGH RECEPTOR)

<table>
<thead>
<tr>
<th>RECEPTOR LOCATION</th>
<th>PEAK HOUR</th>
<th>EXISTING (CY 2001)</th>
<th>FUTURE NOISE LEVELS (CY 2011)</th>
<th>POTENTIAL WALL</th>
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<tr>
<td></td>
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<td>W/O BAR/</td>
<td>6.0 FT WALL/</td>
<td>7.0 FT WALL/</td>
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<td></td>
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<td>CHANGE/</td>
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<td>(CHANGE)</td>
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<td>ROADWAY SEGMENT F (MAKA): (continued)</td>
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<tr>
<td>Receiver 3-9-48:129</td>
<td>AM 67.3</td>
<td>68.9 /1.6</td>
<td>61.3 /-8.0</td>
<td>60.4 /-6.9</td>
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<td>Receiver 3-9-48:130</td>
<td>AM 68.6</td>
<td>68.4 /1.8</td>
<td>61.6 /-5.0</td>
<td>60.8 /-5.8</td>
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<td>Receiver 3-9-48:131</td>
<td>AM 66.5</td>
<td>68.0 /1.5</td>
<td>61.8 /-4.7</td>
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<td>Receiver 3-9-48:133</td>
<td>AM 69.1</td>
<td>70.9 /1.9</td>
<td>63.9 /-5.2</td>
<td>62.6 /-6.5</td>
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<td>Receiver 3-9-48:134</td>
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<td>71.0 /2.1</td>
<td>64.2 /-4.7</td>
<td>62.9 /-6.0</td>
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<td>68.1 /1.9</td>
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<td>Receiver 3-9-48:148</td>
<td>AM 63.8</td>
<td>65.8 /2.0</td>
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<td>ROADWAY SEGMENT F (MAKA):</td>
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<td>Receiver 2-2-25:018</td>
<td>AM 72.4</td>
<td>73.8 /1.4</td>
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<td>61.8 /-10.6</td>
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<td>Receiver 2-2-25:019</td>
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<td>64.6 /0.5</td>
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<tr>
<td>Receiver 2-2-25:020</td>
<td>AM 66.0</td>
<td>67.3 /1.3</td>
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<tr>
<td>Receiver 2-2-25:021</td>
<td>AM 71.3</td>
<td>72.0 /0.7</td>
<td>62.5 /-8.8</td>
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<tr>
<td>Receiver 2-2-25:022</td>
<td>AM 71.2</td>
<td>71.9 /0.7</td>
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<td>72.1 /1.1</td>
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<td>Receiver 2-2-25:024</td>
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<tr>
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<td>67.8 /1.7</td>
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<td>AM 66.4</td>
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<td>66.4 /0.0 **</td>
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<td>RECEIVER LOCATION</td>
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<td>FUTURE NOISE LEVELS (CY 2011)</td>
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<td>----------------------</td>
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<td>7.0 FT WALL CHANGE</td>
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<td>ROADWAY SEGMENT N (MAKA)</td>
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<td>68.9</td>
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<td>68.9</td>
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<tr>
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<td>70.9</td>
<td>65.5</td>
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<td>70.0</td>
<td>65.1</td>
<td>63.9</td>
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<td>71.1</td>
<td>66.0</td>
<td>64.5</td>
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<td>69.2</td>
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### TABLE 8 (CONTINUED)

**PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS**

(4.92 FT HIGH RECEPTOR)

<table>
<thead>
<tr>
<th>RECEPTOR LOCATION</th>
<th>PEAK HOUR</th>
<th>EXISTING (CY 2001)</th>
<th>FUTURE NOISE LEVELS (CY 2011) Leq</th>
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<tr>
<td></td>
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<td>W/O BARR. (CHANGE)</td>
<td>6.0 FT WALL/ (CHANGE)</td>
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<td>(CHANGE)</td>
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<td><strong>ROADWAY SEGMENT N (MAKAI):</strong> (continued)</td>
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<td>Receiver 3-9-37:051</td>
<td>PM</td>
<td>66.0</td>
<td>68.5 /2.5</td>
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<td>65.3</td>
<td>67.0 /1.7</td>
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<td>66.6 /1.5</td>
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<td>PM</td>
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<td>60.3 /1.3</td>
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<td>59.4 /1.2</td>
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<td>PM</td>
<td>56.7</td>
<td>57.8 /1.1</td>
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</tbody>
</table>

| **ROADWAY SEGMENT N (MAUKAI):** |           |                    |                    |                    |                    |          |
| Receiver 2-1-15:016 | PM       | 69.8               | 71.3 /1.5          | * 63.2 /-6.6        | 61.9 /-7.9        | 60.9 /-8.9      | 63.2 /-6.6 |
| Receiver 2-1-15:017 | PM       | 65.6               | 68.6 /1.0          | * 58.9 /-8.7        | 58.1 /-7.5        | 57.4 /-8.2      | 58.9 /-8.7 |

**Notes:**

1. Right-of-Way (RAW) wall locations as shown in Figures 2 through 9.
3. ** Denotes need for additional barrier height to meet State DOT "5 dBA Minimum Attenuation" Criteria.
4. *** Traffic Noise Model is probably over estimating actual noise levels due to large cut in roadway.
In view of the relatively small increases in traffic noise levels attributable to the project, the anticipated costs of sound attenuation walls should be compared to the other construction costs associated with the restriping project. If the costs of the sound attenuation walls are disproportionately high, the inclusion of sound attenuating walls in the project can be considered to be unreasonable, particularly if the added costs of the walls make the highway restriping project unfeasible. Traffic noise levels along the project corridor will remain high and above FHWA and HDOT noise abatement criteria with or without the restriping project, and if a 5 miles per hour reduction in posted speed limit is incorporated into the project as planned, significant or noticeable increases in traffic noise levels may not occur through the Year 2011. When more permanent improvements to the highway occur in the future, the added costs of sound attenuating walls may be more reasonable and feasible, because they will probably be less disproportionate to the total construction costs of the highway improvements.

It is anticipated that potential noise impacts at any new noise sensitive or commercial establishments located in the project area may be mitigated through the inclusion of sound walls or other noise mitigation measures within the individual lot development plans. In addition, any new commercial establishments, public use facilities, or housing units which may be planned alongside the roadway represent areas of potential adverse noise impacts if adequate noise mitigation measures are not incorporated into the planning of these future projects. It is anticipated that the project's roadway improvements will be completed prior to any redevelopment of the presently open areas or commercial lots adjacent to a roadway, and that noise abatement measures such as adequate setbacks, sound attenuating walls or berms, or closure and air conditioning will be incorporated into these new developments along the roadway as required. In any event, new structures whose building permits were obtained after the date of this noise study will not qualify for noise abatement measures under existing HDOT procedures.
CHAPTER VII. CONSTRUCTION NOISE IMPACTS

Short-term noise impacts associated with construction activities along the existing highway may occur. These impacts can occur as a result of the short distances (less than 150 FT) between existing dwelling units and commercial establishments to the anticipated construction corridor. The total duration of the construction period for the proposed project is not known, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 FT distance. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 10. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

Construction noise levels at existing structures can intermittently exceed 90 dB when work is being performed at close distances in front of these structures. Along the roadway improvement project, distances between the construction sites and receptors are expected to be between 10 and 200 FT, and construction noise levels may intermittently exceed 90 dB. The State Department of Health currently regulates noise from construction activities under a permit system (Reference 5). Under current permit procedures (see Figure 11), noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally restricted to the hours of 9:00 AM to 6:00 PM on Saturdays, with construction not permitted on Sundays. These restrictions minimize construction noise impacts on noise sensitive receptors along the roadway project corridor, and have generally been successfully applied. In this way, construction noise impacts on noise sensitive receptors can be minimized.

In addition, the use of quieted portable engine generators and diesel equipment should be specified for use within 500 FT of noise sensitive properties. Heavy truck and equipment staging areas should also be located at areas which are at least 500 FT from noise sensitive properties whenever possible. Truck routes which avoid residential communities should be identified wherever possible. The use of 8 to 12 FT high construction noise barriers may also be used where close-in construction work to noise sensitive structures is unavoidable.
ANTICIPATED RANGE OF CONSTRUCTION
NOISE LEVELS VS. DISTANCE

FIGURE 10
AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 11
APPENDIX A. REFERENCES


(2) "Traffic Analysis Report - Piilani Highway Interim Widening, Mokulele Highway to Kilohana Drive;" Julian Ng, Incorporated; March 2002.


(5) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.
APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E, ....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the A be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the Ldn with the LDN.

Although not included in the tables, it is also recommended that "Lpn" and "LcpN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq is designated the "equivalent sound level". For Ld, Ln, and LDN, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNDB, and EPNDB are not to be used. Examples of this preferred usage are the Perceived Noise Level (LPN was found to be 75 dB, LPN = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighted Loss of Hearing" (PHL) shall be used consistent with ORWA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).
### APPENDIX B (CONTINUED)

#### TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

<table>
<thead>
<tr>
<th>TERM</th>
<th>SYMBOL</th>
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</thead>
<tbody>
<tr>
<td>1. A-Weighted Sound Level</td>
<td>$L_A$</td>
</tr>
<tr>
<td>2. A-Weighted Sound Power Level</td>
<td>$L_{WA}$</td>
</tr>
<tr>
<td>3. Maximum A-Weighted Sound Level</td>
<td>$L_{max}$</td>
</tr>
<tr>
<td>4. Peak A-Weighted Sound Level</td>
<td>$L_{Apk}$</td>
</tr>
<tr>
<td>5. Level Exceeded x% of the Time</td>
<td>$L_x$</td>
</tr>
<tr>
<td>6. Equivalent Sound Level</td>
<td>$L_{eq}$</td>
</tr>
<tr>
<td>7. Equivalent Sound Level over Time (T) (1)</td>
<td>$L_{eq(T)}$</td>
</tr>
<tr>
<td>8. Day Sound Level</td>
<td>$L_{d}$</td>
</tr>
<tr>
<td>9. Night Sound Level</td>
<td>$L_{n}$</td>
</tr>
<tr>
<td>10. Day-Night Sound Level</td>
<td>$L_{dn}$</td>
</tr>
<tr>
<td>11. Yearly Day-Night Sound Level</td>
<td>$L_{dn(Y)}$</td>
</tr>
<tr>
<td>12. Sound Exposure Level</td>
<td>$L_{SE}$</td>
</tr>
</tbody>
</table>

(1) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

**SOURCE:** EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,
## APPENDIX B (CONTINUED)

### TABLE II

**RECOMMENDED DESCRIPTOR LIST**

<table>
<thead>
<tr>
<th>TERM</th>
<th>A-WEIGHTING</th>
<th>ALTERNATIVE(1)</th>
<th>OTHER(2)</th>
<th>UNWEIGHTED</th>
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</thead>
<tbody>
<tr>
<td>1. Sound (Pressure) Level</td>
<td>( L_A )</td>
<td>( L_{pA} )</td>
<td>( L_B ) ( L_{pB} )</td>
<td>( L_p )</td>
</tr>
<tr>
<td>2. Sound Power Level</td>
<td>( L_{WA} )</td>
<td>( L_{max} )</td>
<td>( L_{WB} )</td>
<td>( L_W )</td>
</tr>
<tr>
<td>3. Max. Sound Level</td>
<td>( L_{Apk} )</td>
<td>( L_{Amax} )</td>
<td>( L_{Bmax} )</td>
<td>( L_{pmax} )</td>
</tr>
<tr>
<td>4. Peak Sound (Pressure) Level</td>
<td>( L_{x} ) ( L_{Ax} ) ( L_{Bx} )</td>
<td>( L_{px} ) ( L_{peq} ) ( L_{peq(T)} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Level Exceeded x% of the Time</td>
<td>( L_{eq} ) ( L_{Aeq} ) ( L_{Beq} )</td>
<td>( L_{Beq(T)} ) ( L_{peq(T)} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Equivalent Sound Level</td>
<td>( L_{eq(T)} ) ( L_{Aeq(T)} ) ( L_{Beq(T)} ) ( L_{peq(T)} ) ( L_{peq(T)} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Equivalent Sound Level (4) Over Time(T)</td>
<td>( L_{eq(T)} ) ( L_{Aeq(T)} ) ( L_{Beq(T)} ) ( L_{peq(T)} ) ( L_{peq(T)} )</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8. Day Sound Level</td>
<td>( L_d )</td>
<td>( L_{Ad} )</td>
<td>( L_{Bd} )</td>
<td>( L_{pd} )</td>
</tr>
<tr>
<td>9. Night Sound Level</td>
<td>( L_n ) ( L_{An} )</td>
<td>( L_{Bn} )</td>
<td>( L_{pn} )</td>
<td></td>
</tr>
<tr>
<td>10. Day-Night Sound Level</td>
<td>( L_{dn} ) ( L_{Adn} ) ( L_{Bdn} )</td>
<td>( L_{pdn} ) ( L_{pdn} )</td>
<td>( L_{pdn} )</td>
<td></td>
</tr>
<tr>
<td>11. Yearly Day-Night Sound Level</td>
<td>( L_{dn(Y)} ) ( L_{Adn(Y)} ) ( L_{Bdn(Y)} )</td>
<td>( L_{pdn(Y)} ) ( L_{pdn(Y)} )</td>
<td>( L_{pdn(Y)} )</td>
<td></td>
</tr>
<tr>
<td>12. Sound Exposure Level</td>
<td>( L_{S} ) ( L_{SA} ) ( L_{SB} )</td>
<td>( L_{Sp} ) ( L_{peq(e)} )</td>
<td>( L_{peq(e)} )</td>
<td></td>
</tr>
<tr>
<td>13. Energy Average Value Over (Non-Time Domain) Set of Observations</td>
<td>( L_{eq(e)} ) ( L_{Aeq(e)} ) ( L_{Beq(e)} )</td>
<td>( L_{peq(e)} ) ( L_{peq(e)} )</td>
<td>( L_{peq(e)} )</td>
<td></td>
</tr>
<tr>
<td>14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations</td>
<td>( L_{x(e)} ) ( L_{Ax(e)} ) ( L_{Bx(e)} )</td>
<td>( L_{px(e)} ) ( L_{px(e)} )</td>
<td>( L_{px(e)} )</td>
<td></td>
</tr>
<tr>
<td>15. Average ( L_x ) Value</td>
<td>( L_x )</td>
<td>( L_{Ax} ) ( L_{Bx} )</td>
<td>( L_{px} )</td>
<td></td>
</tr>
</tbody>
</table>

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is \( L_{eq} \)). Time may be specified in non-quantitative terms (e.g., could be specified as \( L_{eq(WASH)} \) to mean the washing cycle noise for a washing machine.

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### APPENDIX C

**SUMMARY OF BASE YEAR AND FUTURE YEAR TRAFFIC VOLUMES**

<table>
<thead>
<tr>
<th>ROADWAY Lanes</th>
<th>CY 2001 AM VPH</th>
<th>PM VPH</th>
<th>CY 2011 (NO BUILD) AM VPH</th>
<th>PM VPH</th>
<th>CY 2011 (BUILD) AM VPH</th>
<th>PM VPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>North of Uwapo Road (NB)</td>
<td>1,380</td>
<td>995</td>
<td>1,855</td>
<td>1,480</td>
<td>1,855</td>
<td>1,480</td>
</tr>
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<td>1,830</td>
<td>1,195</td>
<td>1,830</td>
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<td>3,310</td>
<td>3,050</td>
<td>3,310</td>
</tr>
<tr>
<td>South of Uwapo Road (NB)</td>
<td>1,180</td>
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<td>1,660</td>
<td>1,520</td>
<td>1,660</td>
<td>1,520</td>
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<td>1,820</td>
<td>1,310</td>
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<td>1,790</td>
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<td>1,130</td>
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<td>2,660</td>
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<td>3,100</td>
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<td>1,330</td>
<td>1,330</td>
<td>1,330</td>
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<td>North of Lipoa Street (SB)</td>
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<td>1,330</td>
<td>1,770</td>
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<td>Two-Way (Segment I)</td>
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<td>1,235</td>
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<td>1,235</td>
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<td>South of Lipoa Street (SB)</td>
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<td>1,205</td>
<td>1,600</td>
<td>1,205</td>
<td>1,600</td>
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<td>Two-Way (Segment J)</td>
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<td>2,145</td>
<td>2,505</td>
<td>2,835</td>
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<td>2,835</td>
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</tbody>
</table>

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APPENDIX C (CONTINUED)

SUMMARY OF BASE YEAR AND FUTURE YEAR TRAFFIC VOLUMES

<table>
<thead>
<tr>
<th>ROADWAY LINES</th>
<th>**** CY 2001 *****</th>
<th>CY 2011 (NO BUILD)</th>
<th>CY 2011 (BUILD)</th>
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<tbody>
<tr>
<td></td>
<td>AM VPH</td>
<td>PM VPH</td>
<td>AM VPH</td>
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<tr>
<td>North of Ke Alii Alanui Street (NB)</td>
<td>820</td>
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<td>805</td>
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</tr>
<tr>
<td>South of Ke Alii Alanui Street (SB)</td>
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<td>710</td>
<td>920</td>
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<tr>
<td>Two-Way (Segment M)</td>
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<td>1,800</td>
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<td>730</td>
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<td>935</td>
<td>980</td>
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<td>Two-Way (Segment N)</td>
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<td>730</td>
<td>935</td>
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<td>Two-Way (Segment O)</td>
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</table>

(APPENDICES C AND D BASED ON MARCH 2002 TRAFFIC STUDY REPORT AND EXHIBITS RECEIVED 3/27/02)
## APPENDIX D

### SUMMARY OF BASE YEAR AND FUTURE YEAR (WITH UPCOUNTRY ROAD) TRAFFIC VOLUMES

<table>
<thead>
<tr>
<th>ROADWAY LANES</th>
<th><strong>2001</strong></th>
<th></th>
<th><strong>2011 (NO BUILD)</strong></th>
<th></th>
<th><strong>2011 (BUILD)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM VPH</td>
<td>PM VPH</td>
<td>AM VPH</td>
<td>PM VPH</td>
<td>AM VPH</td>
</tr>
<tr>
<td>North of Uwapo Road</td>
<td>1,380</td>
<td>995</td>
<td>1,965</td>
<td>1,480</td>
<td>1,965</td>
</tr>
<tr>
<td>(NB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>855</td>
<td>1,775</td>
<td>855</td>
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<tr>
<td>(SB)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Way (Segment B)</td>
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<td>2,860</td>
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</tr>
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### SUMMARY OF BASE YEAR AND FUTURE YEAR (WITH UPCOUNTRY ROAD) TRAFFIC VOLUMES

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Appendix D

Oral Testimony Taken at Informational Open House, March 21, 2002
STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

INTERIM PIILANI HIGHWAY IMPROVEMENT PROJECT

Taken at the Kihei Community Center, Kihei, Maui, Hawaii, commencing at 6:00 p.m. on March 21, 2002, pursuant to notice.

REPORTED BY: RACHELLE PRIMEAUX, RPR/CSR #370

IWADO COURT REPORTERS, INC.
APPEARANCES

State Department of Transportation,
Ferdinand Cajigal, District Engineer

Bob Siarot, Consultant

RM Towill Corporation,
Burt Toba
Craig Luke

Julian Ng, Inc.,
Julian Ng

Y. Ebisu & Associates,
Yoichi Ebisu

Munekiyo & Hiraga
Michael Munekiyo
Mitch Hirano

IWADO COURT REPORTERS, INC.
MR. KENNY BARR: My name is Kenny Barr, B A R R, representing Kihei Taxi. And everyone who drives this highway -- I don't have any comments on the plans.

It's obviously going to help, but what I do want to comment on is about the traffic light situation on the highway in that when you're riding along the highway, anytime one car comes up any of the side streets, it trips the trip meter and the highway, no matter how many cars is in a line, have to jam on their brakes and stop.

And my suggestion is that when the cars come up the side streets, that when they hit the trip meter, that it sets a time where for one minute which the lights on the highway will stay green and that the person coming out of the side street would wait up to one minute before the light would change. This way when you're riding down the highway and you see out of the corner of your eye one car coming up a side street that you don't have to jam on your brakes so that the highway has to stop for the one car.

It seems common sense, and I think every driver would feel the same way. And if I'm coming up the side street, I would understand that I'm going to wait a minute to get to the highway, and this way you're
not interrupting the flow of the major highway in
Kihei.

MR. JACK CROPPER: My name is Jack Cropper. And
I'm visiting here from California. And I worked for
the California Department of Transportation since 1948
in planning, design, construction and maintenance, so
I know what congestion is. I first came to Maui in
1945 courtesy of the United States Navy and I love
this island and I hate to see congestion ruin it.
I'm glad to see that the State is finally
recognizing that there is a problem, and I have
several suggestions that they and the County might
want to consider to overcome the congestion problems.
In the Kihei area, you have two transportation
corridors, Kihei Road, which is administered by the
County and the Piilani Highway, which is administered
by the State. These two roads have to be operated in
concert.

Whatever is done to one highway has an effect on
the other highway. The proposed project I think will
go a long way toward solving Kihei's transportation
problems. But there are other things that could be
done and maybe should be done right now. The first is
to perform an origin and destination survey on both
roads to find out where the people are going, where
they're coming from and when. Once you have that
information, you can move ahead intelligently on
improvements.

Thoughts that I think should be considered are
stagger the working hours among the employed in the
Kihei area. The people who live and work here are the
ones that are causing the congestion. Their employers
put them on the highway at more or less the same
time. Another item that should be strongly considered
are increasing the number of carpools and park and
ride lots for the working people. I wouldn't go so
far as to make carpools mandatory, but it's a very
easy way to reduce congestion.

The existing traffic signals need
synchronization and coordination. Do not install
anymore unless you absolutely have to because traffic
signals do nothing but create congestion. Kihei Road
should be looked at more closely for more two-way left
turn lanes. This will reduce accidents also. It
appears as though the new design on the intersections
that are not signalized are going to be deficient for
acceleration lanes both in the median and on the
outside.

There used to be a road that went from the
general vicinity of Makena or Wailea up to the highway
that goes by the winery. That road has been closed
for a long time, but if it could be replaced with a
new minimum standard highway, I would be surprised if
it didn't take an awful lot of traffic off of the
Piilani Highway. Here again, an O and D survey will
show that. O and D is origin and destination.

MR. CHARLES PLUNKETT: My name is Charles
Plunkett, yeah. And I live on 251 Kaiola Place, and
my concern is that when they widen the road on the
shoulder that where I live, there's a drop, you know.
What I'm worried about is the safety factor because I
don't have no guardrail or anything in front of my
house. And what I'm worried about, if cars speed and
just fly off the shoulder and end up in my property.
So I'm worried about a safety factor for my family and
if that do happen, who I going sue? That's about it.

I live between Ohukai and Moi Street. And I
live right in between the two streets, and there's
like a 6 feet drop right off the shoulder when you
widen it, yeah. And I'm really concerned about the
safety factor, because there's only a fence that's
protecting me and my family, yeah. And I live close
to the fence, so I'm worried about the safety issue.

MS. JUANITA KANAMOTO: I'm Juanita Kawamoto, and
I'm President for Royal Kiale, Inc., which is a
1 general partner of Royal Kiawe Ventures. It's a
2 family limited liability partnership that's been in my
3 family for over eight years, and we own property on
4 the corner of Lipoa and South Kihei Road. And our
5 interest here is how the Piilani Highway's
6 improvements will affect the traffic flow around our
7 properties. And so far that we can see is it looks
8 like it will reduce traffic. The intention is to
9 reduce traffic off South Kihei Road and draw a lot of
10 it away into the Piilani Highway, so based on that and
11 what we're seeing and hearing from the consultants, it
12 seems like a good idea. And we would like to see
13 traffic minimized on South Kihei Road or to move
14 smoothly because we hope to develop our project
15 someday.
16 So as far as if it's a question of whether in
17 favor of the development or not in favor, personally,
18 I think I would be in favor of the development
19 expansion.
20 MS. EUGENIA SMITH: Basically what she feels,
21 and also I guess the idea is to improve traffic for
22 the whole of Kihei and what they explained to us is
23 that they're restriping the highway, which they
24 already have the asphalt laid and everything in
25 place. It's just a matter of restriping the lines to

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1. make the traffic flow better, and there's also some
2. intention to also improve Mokulele Highway, which will
3. create that flow straight through down to the airport,
4. so I think the intentions that they're doing it with
5. good intentions to alleviate traffic on South Kihei
6. Road.
7. And anything that will try to improve traffic in
8. the whole area of Kihei is just a plus. It just will
9. benefit the whole community and the businesses that
10. reside in the area.

Ms. Juanita Kawamoto: One other point is we did
12. hear from some of the people who live in the community
13. and they're very concerned about it actually
14. increasing traffic on South Kihei Road, and that, I
15. don't know how accurate that information is. Based on
16. what we're seeing here today, it's still proposing
17. close to what the master plan was set for 20 years.
18. So if it's a concern to the community though as a
19. whole, then we probably would consider that. We don't
20. see the potential problem right now. It seems to be
21. that some people in the community are against it, and
22. that is a little bit of concern to us, what the others
23. say. That's it.

Mr. Arnold Pratt: My name is Arnold Pratt, and
24. I just noticed in the newspaper that they were having

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a meeting today. And originally I thought it was
about the walls they were talking about putting up.
But I just thought I would come down anyway to see
what else is happening and decided that I should make
some comments about what I've been thinking for a long
time, the fact that I'm wondering why -- what happened
to the alternative roads they talked about, the ones
going upcountry especially? Or, you know, even an
alternative road going to Kahului from let's say the
Kihei side, you know, just to take the traffic off of
the Piilani Highway. That's my main concern. Why
aren't we working on the alternative roads?
I believe one alternate road, whichever one they
take, would alleviate a lot of the traffic, at least
one-third. And that would reduce the need of widening
the four lanes, of making the Piilani into a four-lane
now.
It's primarily all I wanted to put out there. I
think just, you know, what happened -- why don't we
ever hear anymore about alternative roads and
upcountry roads? That's all.
(The meeting concluded at 8:45 p.m.)
CERTIFICATION

I, Rachelle Primeaux, Notary Public for the State of Hawaii, certify:

That on the aforementioned date and time the proceedings contained herein were had;

That the proceedings were taken by me in machine shorthand and were thereafter produced in transcript form under my supervision;

That the foregoing represents, to the best of my ability, a true and accurate transcript of the proceedings had in the foregoing matter.

I further certify that I am neither attorney for any of the parties hereto nor in any way concerned with the cause.

Dated this 1st day of March, 2002.

[Signature]

Notary Public, State of Hawaii
My Commission Expires June 14, 2004

IWADO COURT REPORTERS, INC.
Final Environmental Assessment
INTERIM (PIILANI HIGHWAY IMPROVEMENTS) (MOKULELE HIGHWAY TO KILOHANA DRIVE)

Prepared for: State of Hawaii, Department of Transportation

April 2002

MUNEKIYO & HIRAGA, INC.
Final
Environmental Assessment
INTERIM PIILANI HIGHWAY IMPROVEMENTS (MOKULELE HIGHWAY TO KILOHANA DRIVE)

Prepared for: State of Hawaii, Department of Transportation

April 2002
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Preface

The State of Hawaii, Department of Transportation, Highways Division (DOT), proposes the design and implementation of restriping and related improvements to approximately 5.9 miles of the Pillani Highway from the intersection at Mokulele Highway to the intersection at Kilohana Drive in the Kihei District of the island of Maui, Hawaii. The proposed improvements will utilize the existing highway right-of-way to provide two (2) additional travel lanes, one (1) in each direction. The proposed project will be funded by State and County governments, as well as contributions of planning and design services from Makena Resort Corp. and WCPT Land Associates, LLC.

Pursuant to Chapter 343, Hawaii Revised Statutes (HRS), this Environmental Assessment (EA) documents the project’s technical characteristics, environmental impacts and alternatives, and advances findings and conclusions relative to the project.
Chapter I

Project Overview
I. PROJECT OVERVIEW

A. PROJECT LOCATION AND LAND OWNERSHIP

The State of Hawaii, Department of Transportation, Highways Division (DOT) proposes to implement restriping to create two (2) additional lanes and related improvements to a 5.9-mile section of the Piilani Highway from the intersections at Mokulele Highway in the north, to Kilohana Drive in the south on the island of Maui. See Figure 1.

Piilani Highway (Route 31) is a two (2) lane principal arterial from Mokulele Highway to Wailea Ike Drive in Wailea. The highway right-of-way along the project corridor ranges from 105 feet to 225 feet. The highway runs in a north-south direction, with travel lanes separated by a double yellow striped pavement marking. See photographs in Figure 2, Figure 3, and Figure 4. The highway also contains a bike route on each side of the roadway. Piilani Highway provides access to residential and resort areas of Kihei, Wailea and Makena. The posted speed limit is 45 miles per hour. There are fourteen (14) intersections along the proposed project improvement corridor. The intersections are signalized at Mokulele Highway, Uwapo Road, Ohukai Road, Piikea Avenue, Lipoa Street, Ke Alii Alanui and Kilohana Drive.

Within the 5.9-mile project limits, Piilani Highway traverses lands which are bordered primarily by single-family residences, condominiums, apartment complexes, commercial and retail businesses, schools, public utilities, recreational uses, and agricultural lands.

All proposed works and improvements to the Piilani Highway along this corridor will be conducted within the roadway’s existing right-of-way (ROW). (As used in this document, “corridor” or “project corridor” shall be defined as the existing Piilani Highway right-of-way, between Mokulele...
Figure 1  Interim Piilani Highway Improvements Project Limits

Prepared for: State of Hawaii, Department of Transportation
Figure 2  Interim Piilani Highway Improvements
Photographs of Existing Roadway Conditions

Source: Munekiyo & Hiraga, Inc.
Figure 3  Interim Piilani Highway Improvements
Photographs of Existing Roadway Conditions

Source: Munekiyo & Hiraga, Inc.
Figure 4 Interim Piilani Highway Improvements
Photographs of Existing Roadway Conditions
Highway and Kilohana Drive.

The ownership of the Pilani Highway rests with the State of Hawaii. The proposed project is located outside the limits of the Special Management Area (SMA) for the island of Maui.

B. **PROPOSED ACTION**

1. **Project Need**

   The segment of Pilani Highway that is proposed to be improved begins in the north at the intersection of Mokulele Highway and terminates in the south at the intersection of Pilani Highway and Kilohana Drive, a distance of approximately 5.9 miles. Within this segment of highway, the roadway has a pavement width varying from 50 feet to 89 feet (including shoulders). There are fourteen (14) intersections (including the old and new intersection at Welakahao Road) within this segment of Pilani Highway of which seven (7) (including the Mokulele Highway intersection) are controlled by traffic signals and seven (7) with stop signs.

   The Pilani Highway is a key component of the regional transportation system and serves two (2) transportation functions. Primarily, it is the major arterial for the communities of Kihei, Wailea and Makena providing the main north-south transportation corridor to central and west Maui. The Pilani Highway is also used increasingly as an intra-community transportation circulator in certain areas, serving short distance trips of less than one mile for the residents of Kihei, Wailea and Makena.

   The need to improve the Pilani Highway from two (2) lanes to four (4) lanes has been identified in the following studies:
a. County of Maui Long-Range Land Transportation Plan, Final Report, February 1997, published cooperatively by the State of Hawaii, Department of Transportation (SDOT), the Maui County Department of Public Works and Waste Management (DPWWM) and the Maui County Department of Planning;

b. Kihei Traffic Master Plan, October 1996, published cooperatively by the State of Hawaii, Department of Transportation (SDOT), the County of Maui, Department of Public Works and Waste Management (DPWWM) and the County of Maui, Department of Planning;

c. Kihei-Makena Community Plan (1998), County of Maui Ordinance No. 2641, Bill No. 5 (1998);

d. Traffic Study, Wailea 670 Development, May 2001, Parsons Brinckerhoff Quade & Douglas for WCPT Land Associates, LLC (owners of Wailea 670 property); and


The first two (2) plans anticipated the need to widen Piilani Highway from two (2) lanes to four (4) lanes after 2005. However, due to the growth in the Kihei, Wailea and Makena communities, the widening of Piilani Highway is presently needed.

In the Kihei Traffic Master Plan, October 1996, an intersection capacity analysis was carried out on the existing intersections of the Piilani Highway to determine the Level of Service (LOS) during the peak AM and PM periods. LOS designations are qualitative measures ranging from "A" through "F", and are used to describe the condition of traffic operations. LOS "A" defines good conditions, while LOS "E" defines poor conditions. LOS "F" describes over capacity conditions or very long delays. Figure 5
Figure 5  Interim Piilani Highway Improvements
Existing (Year 1994) Intersection Levels of Service

Source: Kibei Traffic Master Plan, 1996
Prepared for: State of Hawaii, Department of Transportation
summarizes the results of the analysis for the 10 existing (1994) intersections within the proposed improvement area of the Piilani Highway.

The LOS recognized in the 1996 study as the minimum Level of Service to reflect the more urban nature of the Kihei area was LOS D.

In 1994 only one (1) intersection at Piilani Highway and Lipoa Street in the project corridor met the acceptable level of service for both the AM and PM peak hour periods. The intersection at Piilani Highway and Uwapo Road/Kaiwahine Street operated at a PM peak hour LOS of D, however, the AM peak hour LOS operated at a LOS F. The other eight (8) intersections along the project corridor operated at a LOS of E or F. The level of service deteriorates south of the Piilani Highway and Lipoa Street intersection to LOS F mainly due to the stop-sign controlled left-turn movements onto the highway.

Since the 1996 study, two (2) new intersections have been developed and an existing intersection has been signalized in the study area. Namely, a new signalized T-intersection has been built at Piikea Avenue and Piilani Highway to service the new Piilani Shopping Center and providing east-west access between South Kihei Road and Piilani Highway; a new signalized T-intersection at Ke Alii Alanui Street which also provides east-west access between Piilani Highway and South Kihei Road has been built; and a traffic signal at the intersection at Kiloana Drive has been installed.

It is estimated by the State Highways Division that traffic volumes on Piilani Highway will continue to increase at an average rate of
approximately three (3) percent per year. The average daily traffic on Piilani Highway for the odd-numbered years since 1991 and projections to 2021 are shown in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>Mokulele Highway to Lipoa Street</th>
<th>Lipoa Street to Kilohana Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>20,639</td>
<td>15,627</td>
</tr>
<tr>
<td>1993</td>
<td>20,757</td>
<td>16,682</td>
</tr>
<tr>
<td>1995</td>
<td>23,036</td>
<td>18,585</td>
</tr>
<tr>
<td>1997</td>
<td>25,813</td>
<td>19,822</td>
</tr>
<tr>
<td>1999</td>
<td>25,852</td>
<td>20,731</td>
</tr>
<tr>
<td>2001</td>
<td>27,900</td>
<td>22,400</td>
</tr>
<tr>
<td>2011</td>
<td>38,100</td>
<td>30,500</td>
</tr>
<tr>
<td>2021</td>
<td>48,200</td>
<td>38,700</td>
</tr>
</tbody>
</table>


Based on the above projections, the traffic assessment report for the Piilani Highway improvements concluded that the widening of Piilani Highway to four (4) lanes at signalized intersections is necessary to address existing delays. See Appendix A. The report also concluded that the widening of the highway between the intersections would be needed as volume increases. The projected year 2011 overall Level of Service assessment of the signalized intersections with the project, and with new traffic signals at the Kaonoulu Street and the Welakahao Road intersections, for the AM and PM peak periods are presented in Figure 6. The traffic
Figure 6  Interim Piilani Highway Improvements

Year 2011 Signalized Intersection Overall Levels of Service

* Assumes traffic signals to be in place at these intersections by 2011.

Source: Traffic Assessment Report, Piilani Highway Interim Widening, 2002

Prepared for: State of Hawaii, Department of Transportation
assessment confirmed that provision of four (4) lanes would be necessary to achieve Level of Service D or better on the highway. See Appendix A.

The traffic study also assessed Level of Service operations at the unsignalized intersections. The results of the unsignalized intersection Level of Service analyses of future peak hour volumes with the right in and right out, only movements (except for southbound left on Moi Place) are presented in Figure 7. The traffic assessment confirmed that restricting turning movements to right turns from and onto the highway would achieve Level of Service D or better at unsignalized intersections.

2. **Proposed Improvements**

The proposed improvements to the Piilani Highway will involve the following work elements:

1. Restripe and convert the existing 10 ft. wide paved shoulders on each edge of road to an additional traffic lane. The existing 10 ft. shoulders shall be overlayed with asphaltic concrete to provide proper cross slope.

2. Pave into existing gutters to provide minimum 6 ft. wide paved shoulders. At bridges, a minimum of 2 ft. wide shoulders shall be provided, which will require adjustments to travel lane widths.

3. Construct an operational and functional drainage system as appropriate.

4. Modify intersections by removing and/or relocating median islands in order to permit shoulder lane passage through intersections.

5. Piilani Highway left turn storage lane widths may be narrowed from 12 feet to a minimum of 10 feet to accommodate the shoulder lanes.
Figure 7  Interim Piilani Highway Improvements

Year 2011 Unsignalized Intersection
Overall Levels of Service

* Assumes traffic signals to be in place at these intersections by 2011.

** Future Connection

Source: Traffic Assessment Report, Piilani Highway Interim Widening, 2002

NOT TO SCALE
6. Relocate existing traffic signals, controllers and traffic loops at all applicable intersections as necessary to permit shoulder lane passage through the intersections. These intersections include but may not be limited to Uwapo Road, Ohukai Road, Piikea Avenue, Lipoa Street and Ke Alii Alanui.

7. Replace traffic signal mast arms and add signal heads, as necessary, for the two new shoulder lanes along the route.

8. Restripe intersections and crosswalks.

9. Add, change and/or relocate regulatory traffic signs.

10. Adjust traffic signal phasing and provide coordination between signals, as practical and feasible, to facilitate the flow of traffic during peak hours of congestion. Install interconnect cables to coordinate the traffic signal systems from Mokulele Highway to Ohukai Road.

Left turn movements at unsignalized intersections are proposed to be prohibited at Kulanihakoi Street, Waipullani Road, and Keonekai Street.

All plans, specifications and estimates shall be in compliance with DOT requirements, with all work being conducted within the existing State right-of-way. See Figure 8. Conceptual engineering plans for these improvements are contained in Appendix B.

3. **Overall Costs, Cost-Sharing and Time Schedule**

The proposed project will involve the use of State and County funds and a contribution of the planning and design of the project from the private sector, Makena Resort Corp. and WCPT/GW Land Associates, LLC, owners of Makena Resort lands, and Wailea 670, respectively. It is estimated that the planning and design of the proposed project will cost $750,000.00 and construction of the proposed improvements will cost $5.7 million. See Appendix B-1.
Figure 8  Interim Piilani Highway Improvements
Proposed Restriped Tangent Section

Source: R.M. Towill Corporation
Prepared for: State of Hawaii, Department of Transportation
Construction of the project will commence upon the receipt of applicable regulatory permits and approvals and contractor selection. The project is estimated to last about eleven (11) months.
Chapter II

Description of the Existing Environment
II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. PHYSICAL SETTING

1. Surrounding Land Uses

The project corridor alignment ranges from approximately 0.5 to 1.0 mile inland from the south Maui shoreline in the community of Kihei. It runs in a north to south direction for a distance of 5.9 miles commencing at the intersection of Piilani and Mokulele Highways in the north and terminating at Kilohana Drive intersection in the south.

The area is known for the resort destinations of Kihei, Wailea and Makena, its magnificent beaches, as well as its desirable residential, retail and commercial developments.

These lands are primarily occupied by single-family residences, condominium and apartment complexes, retail and commercial developments, a high-tech office complex, golf course, two (2) elementary schools, one (1) intermediate school, public utilities, recreational uses and agricultural lands. Notable uses along the project alignment include the Kihei Gateway Plaza, Piilani Village Shopping Center, Elleair Golf Course, Kihei Elementary School, Lokelani Elementary School, Kamalëi Elementary School, Kaonoulu residential area, Piilani residential area and the Kihei Wastewater Reclamation Facility.

2. Climate

The Kihei coast is generally sunny, warm and dry the entire year. The average annual temperatures in Kihei range between the low 60's to the low 90's. June through August are historically the warmer months of the year, while the cooler months are January
to March.

Average rainfall distribution in the Kihei-Makena region varies from under ten (10) inches per year to twenty (20) inches per year in the higher elevations. Rainfall in the Kihei-Makena region is highly seasonal, with most of the precipitation occurring in the winter months.

Northeast tradewinds prevail approximately 80 to 85 percent of the time. Winds average ten (10) to fifteen (15) miles per hour during afternoons, with slightly lighter winds during mornings and nights.

3. **Topography and Soils**

The project corridor is oriented in a north-south direction and ranges approximately 0.5 to 1.0 mile from the shores of Kihei.

The topography along the project corridor gradually inclines from a north to south direction from an elevation of 14 feet to 100 feet above mean sea level (amsl).

Underlying the project corridor are the soils of the Pulehu-Ewa-Jaucas association and Waiakoa-Keahua-Molokai association. The *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii* characterizes the soils of these associations as deep, nearly level to moderately sloping, well-drained and excessively drained soils that have a moderately fine textured to course-textured subsoil or underlying material and well drained soils that have a moderately fine textured subsoil, respectively. See Figure 9.
Figure 9  Interim Piilani Highway Improvements
Soil Association Map

Source: USDA, Soil Conservation Service
Prepared for: State of Hawaii, Department of Transportation

NOT TO SCALE
Soils underlying the project corridor are of the Puuone sand (PZUE), Pulehu clay loam (PsA), Alae sandy loam (Aab), Waialoa extremely stony silty clay loam (WID2), Makena loam, stony complex (MXC), and Keawekapu extremely stony silty clay loam (KNXD). See Figure 10.

4. **Flood and Tsunami Hazard**
   The Flood Insurance Rate Maps indicate that the northern portion of the project corridor is located in Zones A0 and A4. Zone A0, which extends from the Mokulele Highway intersection south to Uwapo Road, is an area of 100-year shallow flooding where depths are between one (1) and three (3) feet; and Zone A4, which occurs in a small northwestern portion of the intersection with the Mokulele Highway, is an area of the 100-year flood with a base flood elevation of eleven (11) feet. The remainder of the project corridor is situated within Zone C, an area of minimal flooding.

5. **Flora and Fauna**
   Plant life along the project corridor is characterized by the typical flora associated with developed properties for single- and multi-family residences and ornamental landscaping generally associated with condominium and commercial/retail developments. Tree species generally include palms, wiliwili, hibiscus, monkeypod and lauhala.

   Plant life in the undeveloped parcels can be grouped into two (2) categories. The first is the disturbance community which is composed mostly of alien species including khaki weed, pakai kuku, cow pea, and spurgès. The second category is the dry forest community which is dominated by buffelgrass, kiawe, koa haole,
Figure 10
Interim Piilani Highway Imp
Soils Classification

Source: USDA, Soil Conservation Service
Prepared for: State of Hawaii, Department of Transportation
slender mimosa, as well as two (2) indigenous species, 'ilimi and 'uhaloa (Paul, 1995). There are no legally protected, threatened or endangered species of plant life within the project corridor.

Animal life along the project corridor is typical of the urbanized regions of Kihei. Fauna typically found in the vicinity include cats, dogs, mice, rats, and mongoose.

Kealia Pond is located adjacent to Ma'alaea Bay approximately 0.5 mile northwest from the northern terminus of the project corridor. Kealia Pond is an important nesting and feeding habitat for the Hawaiian black necked stil (Ae'o). The Ae'o is considered endemic and endangered. The Ae'o has also been sighted occasionally at water features within the region’s golf courses. Collectively, open bodies of water, such as water hazards at golf courses and irrigation ponds on the island, are used as a limited loafing and feeding habitat for the Ae'o.

The American Golden Plover (kolea) and the Black Crowned Night Heron ('auku'u) also frequent Kealia Pond. The kolea and 'auku'u are considered indigenous but not endangered. Kolea are generally found on mudflats, lawns, and fields. 'Aku'u frequent water features such as ponds, streams, marshes and lagoons.

Other avifauna found in the vicinity of the project corridor include the Northern Cardinal, Grey and Black Francolin, House Finch, Zebra Dove, Spotted Dove, Common Mynah, Ring-necked Pheasant, and the Japanese white-eye.
6. **Air Quality and Noise Characteristics**

There are no point sources of airborne emissions in the immediate vicinity of the project site. Airborne pollutants are primarily attributed to automobile exhaust from the urban traffic. Another source of airborne emissions may include smoke from sugar cane burning which occurs in the Central Maui isthmus. This source, however, is intermittent. Nevertheless, the air quality of the Kihei area is considered good and prevailing tradewinds quickly disperse particulates which are generated from these sources.

Existing noise along the project corridor is primarily attributed to vehicular traffic. At times, prevailing tradewinds also contribute to ambient noise conditions along the project corridor.

7. **Scenic and Open Space Resource**

In proximity to the project corridor, the lands makai (west) of the Piilani Highway are predominantly developed with residential, commercial/retail and public facility uses, and defined by the built up urban landscape of Kihei. The lands mauka (east) of the project and in the northern portion of the project corridor are characterized by the residential single-family subdivision of Kihei Heights and the Kihei Gateway Plaza commercial project. Further south along the project corridor mauka of the Piilani Highway, the adjacent landscape is more open and gently landscaped characterized by the Elleair Golf Course. The Kihei Research and Technology Park is located mauka of Piilani Highway in the vicinity of Lipoa Street. Continuing in a southerly direction, the lands are open undeveloped agricultural lands except for the 10-acre parcel utilized for the County of Maui’s Kihei Wastewater Treatment Plant. The agricultural lands continue to the residential development of
Mauli Meadows which is mauka of the southern terminus of the proposed highway improvements.

While the project corridor is bordered by residential, commercial and public/quasi-public uses to the west, the Pacific Ocean and the offshore island of Kahoolawe to the south and West Maui coastline may be visible from selected points along the roadway. In addition, Haleakala, Upcountry, and the West Maui Mountains comprise the other scenic vistas from the project corridor.

The proposed works within the project corridor will not impinge upon the significant scenic view corridors or open space resources.

8. Archaeological Resources
The land underlying the project corridor was previously disturbed during the construction of the Pilani Highway. Since no further expansion beyond the existing right-of-way is planned with the improvements, an archaeological resources inventory will not be required.

B. SOCIO-ECONOMIC ENVIRONMENT
1. Community Character
From a regional standpoint, the project corridor is in the Kihei-Makena Community Plan region which encompasses the area from Ma'alaea to La Perouse Bay. The region includes a diverse range of physical and socio-economic environments. With its dry and mild climate and proximity to recreation-oriented shoreline resources, the visitor-based economy has grown steadily over the past few years. The town of Kihei serves as the commercial and residential center of the region with the master-planned
communities of Wailea and Makena serving as the focal point for visitor activities.

It is noted in the updated Kīhei-Makena Community Plan (1998) that the community is generally characterized by its friendly, capable and caring residents. It is an ethnically diverse community with a strong interest in events or actions which affect the region (Kīhei-Makena Community Plan, 1998, p. 13).

2. **Population**

The population of the County of Maui has exhibited a relatively strong growth over the past decade. Between 1990 and 2000, the U.S. Census found that the State of Hawaii population grew from 1,108,229 to 1,211,537, a 9.3 percent growth over ten years. This translates to an average annual growth rate of 0.89 percent. County of Maui population, however, has grown from 100,374 in 1990 to 128,241 in 2000, an average annual growth rate of 2.7 percent (U.S. Census 2000). Growth in County of Maui is expected to continue, with resident population projections to the year 2010 estimated to be on the order of 140,000 (Community Resources, Inc., January 1994).

The resident population of the Kīhei-Wailea-Makena area has increased dramatically in the past two decades. Population gains were especially pronounced in the 1970’s as the rapidly developing visitor industry attracted many new residents. The 1990 resident population of the Kīhei-Wailea-Makena area was approximately 15,365. The 2000 resident population was 22,420. This represents a 46 percent increase over the 1990 population (County of Maui Data Book, 2001).
3. **Economy**

The economy of Maui is heavily dependent upon the visitor industry. The dependency on the visitor industry is especially evident in Kihei-Makena, which is one of the State’s major resort destination areas. The foundation for the region’s visitor strength lies in world-class resorts and recreational facilities located in Wailea and Makena. Support for the visitor industry is found in Kihei, where numerous retail commercial centers are found.

During recent years, much of the island’s economic growth has been from businesses not directly affiliated with tourism. From May 1997 to May 2000, hotel jobs grew 8.9 percent. Meanwhile, construction jobs grew 41 percent; transportation, telecommunication and utility jobs grew 22.4 percent; agricultural jobs grew 17.5 percent; and federal government jobs grew 80 percent (Pacific Business News, July 28, 2000).

According to data from the State Department of Labor and Industrial Relations, about 71,550 individuals were employed on the island of Maui in September 2001. The island’s growth rate remains steady and unemployment continues to be low. In September 2001, Maui’s job count was up 8.5 percent from the previous year, while unemployment was down to 4.6 percent.

C. **PUBLIC SERVICES**

1. **Police and Fire Protection**

The County of Maui’s Police Department is headquartered in Wailuku at its Mahalani Street facility. The Maui Police Department (MPD) consists of several patrol, investigative and administrative divisions. The MPD’s Kihei Patrol covers the Kihei-Makena region.
The department's Kihei Substation is located at the Kihei Town Center about 0.5 mile west of the project corridor.

Fire prevention, suppression and protection services are offered by the County's Department of Fire Control. The department's Kihei Station, which services the Kihei-Makena region is located on South Kihei Road near Kalama Park, approximately 0.5 mile west of the project corridor. Additionally, a new Wailea Fire Station is proposed along Kilohana Drive, just makai (west) of its intersection with Piilani Highway.

2. **Medical Facilities**

Maui Memorial Medical Center, the only major medical facility on the island, services the Kihei-Makena region. Acute, general and emergency care services are provided by this facility, which is licensed for 196 beds and is situated in Wailuku, in the vicinity of Mahalani Street and Maui Lani Parkway. Privately operated medical/dental offices are located in the Kihei area to serve the region's residents and visitors.

3. **Recreational Facilities**

Diverse recreational opportunities are available in the Kihei-Makena region. Recreational facilities in Kihei include Kalepolepo Park, the Elleair Golf Course, Kalama Park, and Kamaole Beach Parks I, II and III. Shoreline recreation includes swimming, fishing, picnicking, snorkeling, and windsurfing.

The 36.5-acre Kalama Park is located about 0.5 mile to the west of the project corridor. In addition to shoreline activities, this park has baseball and soccer fields, as well as tennis and basketball
courts.

The Wailea and Makena resort areas to the south offer additional opportunities for golf, tennis and ocean-related activities.

In addition, the County's new Kihei Community Center complex located a quarter of a mile from the project corridor near Lipoa Street, was recently completed and provides for a community center, swimming pool, and athletic playfields.

4. **Schools**

The State Department of Education (DOE) operates three (3) schools in the Kihei area. Kihei Elementary School and Kamali'i Elementary School cover grades K to 5, with 2000-2001 enrollments of approximately 779 and 848 students, respectively. Lokelani Intermediate School includes grades 6 to 8, with a 2000-2001 enrollment of approximately 673 students. Public school students in grades 9 through 12 attend Maui High School in Kahului.

5. **Solid Waste**

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by County crews are disposed at the County's 55-acre Central Maui Landfill located 4.0 miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies. Privately owned facilities, such as the Maui Demolition and Construction Landfill and the Pohakulepo Concrete Recycling Facility accept solid waste and concrete from demolition and
construction activities. These facilities are located about 3.0 miles to the northwest of the project corridor, near Honoapiilani Highway's junctions with North Kihei Road and Kuilialani Highway. A privately operated green waste recycling facility, Campaign Recycle Maui, is situated near Waikapu, while a County operated facility is located at the Central Maui Landfill.

D. INFRASTRUCTURE

1. Roadway System

Access to the Kihei region from West Maui and the Wailuku area is provided by North Kihei Road, while access from the Kahului and “Upcountry” areas is provided by Mokulele Highway. These roadways are two-lane roadways which are under the control of the State Department of Transportation. North Kihei Road becomes South Kihei Road, near its junction with Mokulele Highway and continues southward through Kihei Town.

In the future, the Mokulele Highway/Piilani Highway intersection will be re-aligned and reconfigured so that both highways will be on the same alignment to form a continuous highway. This new alignment will be mauka of the existing ROWs. North Kihei Road will be extended to intersect the re-aligned highway. The project will go out to bid in 2003 and completed in phases. The proposed interim widening and related improvements are anticipated to start in July 2002 and completed in 2003. No overlap is anticipated between the two (2) projects.

In the Wailea-Makena area, south of Kiloana Drive, both Piilani Highway and South Kihei Road transition into the existing Wailea roadway system. In this system, Wailea Alanui provides primary
north-south mobility. South of Wailea, this road is known as Makena Alanui. Wailea Alanui is a two-lane roadway between Kilohana Drive and Okolani Drive, a 4-lane roadway to Kaukahi Street and a two-lane roadway south of Kaukahi Street.

As previously noted, Pillani Highway is the primary arterial highway for South Maui, beginning at the North Kihei Road-Mokulele Highway intersection and terminating at Wailea Ike Drive in Wailea.

2. **Bike Route System**

The existing ten (10) foot shoulder along the outer edges of the existing Pillani Highway roadway provides for a bicycle route from the Mokulele Highway intersection in the north to Wailea Ike Drive in the south, a distance of approximately 7 miles. This route is part of a Kihei-Wailea bike route system initiative started by the County in 1991 and designed to circumscribe Kihei by connecting with South Kihei Road and to provide cyclists safe access to Honoapiilani Highway via North Kihei Road. This bike route is also part of the State Department of Transportation's Bike Plan Hawaii Master Plan.

3. **Water System**

The Kihei-Makena region is served by the Central Maui Water System. The Central Maui Water System is served by the Iao Aquifer which includes the Mokuhau well fields, the CMJV wells, the Waihehu Heights Wells, the Kepaniwai well, and the Iao Tunnel and the Waihee Aquifer which includes the North Waihee, Kupaa and Kanoa wells.

The water system in the area includes a 2.0 million gallon (MG)
reservoir located east of Ohukai Road, approximately 1.0 mile mauka of the project corridor. A 16-inch outflow line connects to an 18-inch transmission line from the Central Maui source. The outflow main crosses under the Piilani ROW at Ohukai Road. The 18-inch transmission line which runs in a north-south direction feeds the distribution system in the Kihei district. The water distribution system crosses under the Piilani Highway ROW at the following intersections: a 12-inch water main along Mokulele Highway, 12-inch main along Uwapo Road, 12-inch main along Moi Place, 16-inch main along Ohukai Road, 12-inch main along Lipoa Street, and a 12-inch main along Kilohana Drive. A 36-inch concrete water main also services the Kihei region and runs in a southerly direction in the vicinity of the project corridor. This main crosses under the Piilani ROW near Kulanihakoi Gulch and parallels the 18-inch transmission line. It connects to a 30-inch line at Welakahao Street and runs south along Kanakanui Road, west along Keonekai Road and south along Kauhale Street to Kilohana Drive.

4. **Wastewater System**

The service area for the County's Kihei Wastewater Reclamation System extends from North Kihei to Wailea. The system consists of a number of pump stations and force mains which convey wastewater through the County's transmission lines. The combined flows are transported to the Kihei Wastewater Reclamation Facility, which is located adjacent to the Elleair Golf Course. The existing design capacity of the Kihei Wastewater Reclamation Facility is 8.0 million gallons per day (MGD).
5. **Drainage**

The Kihei watershed is on the western slope of Mount Haleakala on a curved band that extends from the northern terminus of the project corridor to approximately 8 miles to the south in Wailea. It extends eastward approximately 15 miles from the shore to the summit of Haleakala. The coastal area is relatively dry with a mean annual rainfall of 10 inches. The mountain slopes in this watershed are drained by 32 gulches, ravines, and gullies. There are seven (7) well defined watercourses which flow in a westerly direction traversing the project corridor.

Surface runoff along the project corridor is collected in concrete swales on either side of the roadway surface and directed to catch basins and drained into channels discharging into the ocean.

With the proposed project, surface runoff along the project corridor will be channeled or collected in lined or grass swales and directed to catch basins and existing drainage facilities which will drain into existing channels discharging into the ocean.

6. **Electrical, Telephone and CATV Systems**

Electrical, telephone, and cable television (CATV) services in the Kihei-Wailea-Makena area are provided by Maui Electric Company, Verizon Hawaii, and Hawaiian Cablevision, respectively.
Chapter III

Potential Impacts and Mitigation Measures
III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. IMPACTS TO THE PHYSICAL ENVIRONMENT
1. Surrounding Land Uses
   The proposed action is intended to address existing traffic capacity constraints, as well as projected increases in volume along the project corridor. While additional traffic flows will be accommodated by the improvements, the action is viewed as an interim mitigative measure as opposed to new capacity introduced to facilitate specific growth patterns. Accordingly, land use patterns along the corridor and beyond are not anticipated to change as a result of the proposed action. Land use designations set forth by the Kihei-Makena Community Plan will continue to guide growth and development along the project corridor.

2. Flood and Tsunami Hazard
   Although a northern portion of the project corridor is situated within Zones A0 and A4, which are areas of 100-year flooding with depths ranging from one (1) to eleven (11) feet, the highway bed is on fill conditions raising it to approximately 14 feet amsl at the Mokulele intersection and at approximately 41 feet amsl at the Uwapo Road intersection, well above the flood level. The remainder of the project corridor is situated within Zone C, an area of minimal flooding. The existing concrete swales in the project corridor will be paved over to create a 6-foot wide shoulder area. However, lined or grass swales will be constructed to maintain drainage patterns along the project corridor. All runoff will be directed to catch basins and drained into existing channels discharging into the ocean. Drainage intensity and discharge points will generally remain the same after completion of the proposed project. As such, there will be no adverse impacts to surrounding properties.
resulting from the proposed project.

3. **Flora and Fauna**
   Work associated with the proposed action will be contained within the existing highway right-of-way. The proposed project will not affect any open bodies of water or wetlands such as Kealia Pond. As such, there should be no adverse impacts to flora, avifauna and fauna within the region.

4. **Air Quality**
   The proposed improvements to the Piilani Highway are required to accommodate existing volumes of traffic and general growth in traffic in the Kihei-Wailea-Makena area. The main source of adverse air quality impacts would be emissions from vehicular traffic. The proposed action is intended to accommodate existing and projected traffic volumes and is not deemed a new traffic generator. In addition, the proposed improvements will facilitate traffic flow and reduce emission concentration levels. The presence of relatively constant tradewinds will dissipate vehicular emissions minimizing the potential adverse air quality impacts.

Localized air quality impacts from construction vehicles may occur during restriping of the roadway and modifications resulting, for example, from paving activities or the relocation of lighting structures and traffic signals at the major intersections. These emissions are anticipated to have a negligible impact on regional air quality as the emissions would be relatively small and readily dissipated.
5. **Noise Characteristics**

There will be short-term noise impacts from construction activity associated with the proposed project. Most of the construction will involve modification to existing traffic signals and underground electrical services and in some cases, may require relocating existing services. The construction noise impacts will be mitigated through compliance with the provision of the State of Hawaii, Department of Health Administrative Rules, Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules. In complying with Chapter 46, the contractor will be responsible for minimizing noise by properly maintaining noise mufflers and other noise-attenuating equipment. Construction will be limited to normal daylight hours.

An Acoustic Study for the proposed project was prepared by Y. Ebisu & Associates in January 2002. The existing and future traffic-related noise levels along the project corridor were studied to evaluate potential noise impacts associated with the proposed project. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated. The Acoustic Study was updated in April 2002 based on data from the Revised Traffic Assessment Report (March 2002). Although minor changes were noted in noise level impacts within certain segments of the roadway, the general conclusion remains as follows.

The study indicates that existing traffic noise in the project corridor area currently exceeds the U.S. Federal Highway Administration
(FHWA) and State Department of Transportation, Highways Division (DOT) noise abatement criteria. This noise abatement level is "66 Leq" which represents the equivalent sound level of 66 decibels (dB). Study measurements recorded levels of 57.7 to 72.6 Leq (dB) at various stations along the project corridor and at ranges from 50 to 150 feet from the centerline.

The study notes that the following general conclusions can be made with respect to potential traffic noise impacts which can be expected by Year 2011 with the proposed improvements.

- The DOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive structure.

- Under the Build Alternative, future traffic noise levels at residences which are located within 125 to 150 feet of the highway centerline and within the limits of project construction are expected to exceed the HDOT "66 Leq" criteria. No parks or public structures (such as churches) within the limits of project construction should be affected by the proposed project or require noise mitigation measures under the Build Alternative.

- Future traffic noise levels at two commercial structures south of Ohukai Road may exceed current HDOT and FHWA noise criteria. Additional noise mitigation measures should not be required due to the use of closure and air conditioning of both commercial structures.

- With a 5 mile per hour reduction in the average vehicle speed during free traffic flow, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten year period between 2001 and 2011 are typically less than 1.5 dB, and are not considered to be significant. The anticipated increases in future traffic noise levels with or without the project are also substantially less than the "15 dBA increase", which is considered to be the criteria for substantial change by the HDOT. Because the project is an interim improvement of Pilani Highway, and because the
highway noise attenuation measures required by FHWA and HDOT noise abatement criteria are essentially remedial in nature (i.e., directed towards reducing currently high noise levels), substantial capital investments in highway noise mitigation measures should be deferred until more substantial improvements are made to Pili`ani Highway.

6. **Scenic and Open Space Resources**

Since all work associated with the proposed project are confined within the existing highway right-of-way and developed surfaces, there will be no impact to scenic and open space resources as a result of implementation. The proposed project will not create a visual character inconsistent with its present use nor with surrounding uses.

7. **Archaeological Resources**

The proposed action will not create any new disturbances outside the area which has already been cleared and developed. Based on the Draft EA review and comments received from the State Historic Preservation Division (SHPD), a mitigation plan will be submitted to SHPD prior to and an archaeological monitor will be present during any ground altering activities within the Puuone sands deposits. These measures will assure that proper mitigation and consultation will occur to protect archaeological and cultural resources which may be encountered during project development.

8. **Cultural Impact Assessment**

a. **Settlement Context**

Archaeological research establishes the earliest settlement on the island of Maui to have occurred between A.D. 300-600 along the windward regions. Settlement of the drier, leeward regions of Maui, such as Kihei, is postulated to
have occurred between A.D. 1000-1200 (Kirch 1985, Cordy and Athens 1988). The latter settlements occurred in the upland area of Kula to exploit forest and agricultural resources where dryland taro was cultivated in moist pockets of soil (Handy 1940). As well, the areas along the coast near Kalepolepo in Kihei and Maluaka in Makena were settled to exploit available marine resources. Trails from the mountain (mauka) settlements to the coast (makai) settlements were established to link the settlements to one another. This settlement pattern is developed from archaeological surveys and inventories which have uncovered prehistoric evidence of more permanent habitation along the coast and upland areas. Sites uncovered between these areas, however, are fewer in numbers and more representative of temporary shelters. Ross Cordy (1977) postulated that this area between the inhabited coast and upland area is an intermediate or "barren" zone. Mainly due to the hot, dry and windswept conditions, the area was mainly used for trails and little human prehistoric activity was considered to have occurred in this area.

b. Early Archaeology

Cox (1976) and Cordy (1977) carried out archaeological surveys in association with the construction of the Pilani Highway. In the Cox survey, six (6) sites were located. The only possible prehistoric site was considered to be a boundary marker or a burial. Excavation yielded only a soil fill, but no burial or dates. In the Cordy survey, two (2) sites were uncovered in the project corridor. Both sites were
considered to be prehistoric short-term shelters. Volcanic glass recovered from the site established a date of AD 1724 to 1784. Since these studies, a number of archaeological surveys have been conducted in the Kihei area near the project corridor. Kennedy (1986) conducted a surface reconnaissance survey of 125 acres for the Silversword Golf Course (now Elleair golf course located mauka of the project corridor and Lipoa Street intersection) and reported that no archaeological features were found. Fredericksen (1995) conducted an archaeological inventory survey for the proposed Road "C" corridor (makai of Pilani Highway and Lipoa Street intersection). A low overhang shelter was identified during this survey. Donham (1989) carried out an archaeological survey of 114 acres for the Pilani residential Community Phase I (makai of Pilani Highway and north of Kulanihakoi Road). Five (5) sites were discovered during this survey. The most significant of the sites was recommended for data recovery. Subsurface test excavations did not produce human remains, or evidence of cultural deposits. However, further data recovery (Donham, 1990) indicated a more developed agricultural complex representing modification of natural slopes for cultivation. This has led Donham to suggest that a "coastal perimeter zone" may have occurred which could possibly have been of seasonal usage during periods of increased rainfall or in response to land pressures in the coastal zone (Fredericksen 1995). Sinoto (1992) carried out an archaeological survey for the Kihei Gateway Complex, covering an area of 29 acres located in the northern portion of the project corridor near the intersection with Mokulele
Highway and South Kihei Road. No surface archaeological remains, nor evidence of any other significant cultural activities, were encountered during the survey. All the archaeological evidence corroborates the Cordy (1977) findings which postulates that there is very little prehistoric information of value within the project corridor due to its location in the “barren” zone between the coastal settlements and upland agricultural settlements.

c. **Historical Documentary Research**

Within the historic cultural context, the project corridor traverses six (6) traditional Hawaiian land units (ahu'pua'a). The ahu'pua'a span from the slopes of Haleakala to the ocean. From north to south, the ahu'pua'a are Pulehunui, Waiakea, Kaonoulu, Waiohuli, Keokea, and Kamaole. The northern Pulehunui ahu'pua'a is located in the Wailuku District and the remaining five (5) southern ahu'pua'a are located in the Makawao District (Modern era). Subsequent to the division of Hawaiian lands, known as the Mahele in the mid-19th century, indication of the historical settlement can be assessed from reviewing Land Commission Awards (LCAs). The LCAs were presented to tenants who could prove occupancy on the parcels before 1845. From the north, in the Pulehunui ahu'pua'a, only one (LCA #5230) was awarded (Sinoto 1992). In the ahu'pua'a of Waiohuli, most of the LCAs took place on the coast in Kalepolepo and in Kula. The commission noted that residents with land awards outside of Kalepolepo used their land for the cultivation of Irish potatoes, some taro farming and cattle pasture (Sinoto 1992). However, in the vicinity of the project
corridor, no LCAs of native Kuleana (house and/or garden plots) were awarded (Fredericksen 1995). The lack of LCAs within the vicinity of the project corridor supports the archaeological findings that the area would not likely be considered a traditional Hawaiian settlement area.

Documentary data indicates in the mid- to late-1800's, the lands within the vicinity of the project corridor became more heavily used in association with sugar cane cultivation in the northern area near Mokulele Highway intersection and further south in the Honuaula District. Hawaii Commercial and Sugar Company had large acreages under cultivation in this area, with a narrow gauge railroad in place to transport sugar cane to the mill. In the Honuaula area, M.J. Nowlein and S.D. Burrows leased lands from Kamehameha III at Ulupalakua to grow sugar cane and Irish potatoes. Linton L. Torber expanded sugar cane cultivation and also started cattle ranching. A severe drought in 1878 ended the production of sugar cane and cattle ranching became the dominant agricultural activity in the southern area (Fredericksen 1995). In the early 1900's in the eastern portion of Waiohuli ahupua'a the Haleakala Ranch Company was using the land for cattle grazing. The importation of grasses (i.e., buffelgrass) for livestock feed has altered the natural flora and is still in evidence today. See Figure 11.

d. **Additional Informant Data**
In order to obtain a range of cultural resource perspectives in the vicinity of the project corridor, interviews were held with two (2) knowledgeable Kihei residents. Interviews with
Figure 11  Interim Piilani Highway Improvements  
Current Ahupua`a Boundaries and Cultural Land Uses 1850-1900s

Prepared for: State of Hawaii, Department of Transportation
Mr. Bully Kapahulehua and Mr. Roy Suda are summarized as follows.

(1) **Leonard "Bully" Kapahulehua**

Mr. Kapahulehua was born on Kauai in 1947. He graduated from Kauai High School in 1965 and studied business administration for three (3) years at Church College of Hawaii (now Brigham Young University). He moved to Maui in 1970 and has been living in Kihei since 1986. He is a member of the Kihei Canoe Club located in Waiakoa Ahupua'a and Halau Maui Nui-O-Kama, a native cultural organization. He is also president of Ke-ie-ie-loko-ia Fishpond in Kalepolepo. Halau Maui Nui-O-Kama is very active in teaching native cultural practices in hula, chants and dissemination of cultural information. It is presently working in partnership with the U.S. Fish and Wildlife Service identifying native plants, native birds and native insects in the Ma'alaea-Kihei area and with the National Oceanic Atmospheric Administration to identify the sea animals along the coast from Ma'alaea Bay to Makena. Halau Maui Nui-O-Kama teaches native culture at the Kihei Charter High School one (1) hour per week and canoeing and paddling three (3) days per week. In their native cultural studies, the organization actively walks, hikes and paddles the Kihei coastline. They are also active in the reforestation of native plants and sand dune restoration. The main area of their work is in the area makai of South Kihei Road and
along the coast from Ma'alea Bay to Makena.

Mr. Kapahulehua referred to the area mauka of the project corridor as pasture lands. He identified the Ualoa plant growing in the vicinity of the project corridor. This plant is used for medicinal purposes, such as a cure for a sore throat. However, he mentioned this plant is not harvested near the roadside due to dust and automobile exhaust. He stated that this plant is not endangered or an endemic plant which is specific to the State of Hawaii. He is not aware of any native cultural practices or harvesting of plants in the vicinity of the project corridor.

(2) **Roy Suda**

Mr. Suda was born and raised in Kihei. He is 58 years old. Mr. Suda's mother and father were born in Puunene. He went to grade school at Kihei Elementary School.

Mr. Suda is owner/operator of Suda Kihei Store, Inc. It is located on the northeast corner of South Kihei Road and Uwapo Road. The store was formerly owned and operated by Alexander and Baldwin Sugar Company. The Suda family took over the store operations in 1965.

Mr. Suda remembers when sugar plantation workers would get vouchers in payment for work from the
company and use the vouchers to purchase items at the company store.

Mr. Suda recalled that the area mauka of the store was full of kiawe bushes. Further beyond the kiawe was A&B sugar cane fields to the north and Haleakala Ranch lands to the east. In the area of the project corridor from Uwapo Road to Ohukai Road was the Hashimoto farm lands. He remembers this farm as a large tract of land in the order of 50 acres. They grew watermelons, tomatoes and mangos. He recalls walking through the kiawe bushes to pick mangos at the Hashimoto farm in his childhood. The farm was in operation from about 1940 to 1966. Another farm, about a quarter of a mile to the south of his store, was owned by the Gushiguma family. They grew tomatoes, onions and watermelon.

During Mr. Suda's early years, most of the activities were along South Kihei Road, since it was the only transportation route in the area. He recalled the old Kihei pier just down the road from the store. About nine (9) tuna boats used to anchor at the pier and the crew used to stay on the boats. The pier was torn down around 1959. He mentioned that you could still see remnants of the old pier.

Mr. Suda recalled a few native Hawaiian families living in the area. He mentioned the Kenolio, Plunkett, Kakahiko, and Ahsu families living behind
the store. There was an old automobile trail to their homes. Mr. Suda did not recall seeing any native cultural practices being carried out in the area nor the cultivation or use of native Hawaiian plants.

He recalled when the Piilani Highway was built. He said the highway went through klawe bushes. He said South Kihei Road was the only route in and out of Kihei before Piilani Highway was built. He said he could not imagine the congestion along South Kihei Road if the Piilani Highway was not built.

e. **Cultural Impact Assessment**

The proposed interim improvements to the Piilani Highway will traverse lands, which in the prehistoric period were used for trails between the mauka and makai settlements and in the period after 1850 was mainly used for cattle ranching. There are no known archaeological resources which will be adversely impacted by the proposed action. Based on informant information and the existing land use context, there is no evidence of current or recently occurring cultural practices along the project corridor. In this regard, the proposed interim improvements are not anticipated to adversely impact cultural resources. To ensure the protection of cultural resources, a mitigation plan will be submitted to SHPD and an archaeological monitor will be present prior to any ground altering activities within the Puuone sands deposits.
B. IMPACTS TO THE SOCIO-ECONOMIC ENVIRONMENT AND PUBLIC SERVICES

1. **Economy**

   On a short-term basis, the proposed action will support construction and construction-related employment. Over the long term, the proposed project will provide for the more efficient movement of people and goods throughout the Kihei-Wailea-Makena area and thereby improve business production and operation levels. Equally important, the improvements to the Piilani Highway will provide a key component to the orderly development of the regional transportation network in South Maui.

2. **Police, Fire and Medical Services**

   Through the increase in the level of service expected to be LOS D or better at peak times on the Piilani Highway resulting from the proposed action, there will be a positive benefit to the service capabilities of police, fire and emergency medical operations by reducing emergency response time in the area.

   During project construction, appropriate coordination will be undertaken with emergency services to ensure that response requirements for such services are not adversely impacted due to delays which may be attributed to construction work.

3. **Recreational and Educational Facilities**

   The proposed action is not considered a direct population generator, but rather infrastructure services which will provide for an improved regional transportation network. As such, the proposed improvements will not place any new demand on recreational facilities. Similarly, school enrollments or locations will
not be affected by the proposed project.

4. **Solid Waste**
   Construction waste from the removal and alteration to traffic medians, curbs and pavement resulting from the realignment of intersections will not be transported to the County landfill. Instead, alternative sites, such as the Maui Demolition and Construction Landfill and Pohakulepo Concrete Recycling Facility, will be utilized. The proposed action is not anticipated to adversely impact the County's solid waste disposal facilities.

5. **Public Safety**
   The restriping of the travel lanes from 2 to 4 lanes will require the narrowing of the travel lanes from 12 feet to 11 feet and the outside lanes to 10-feet 8-inches at bridges. Consequently, it could limit the safety margins for vehicular movement within each lane, if there were no changes to the posted speed limits. Based on the procedures of the Highway Capacity Manual (2000), a 5 mph reduction in the speed limit along the project corridor from 45 mph to 40 mph would be appropriate as a result of reducing the travel lanes widths. The proposed improvements will maintain and meet all Federal and State DOT standards of criteria for highway vehicular safety.

C. **IMPACTS TO INFRASTRUCTURE.**

1. **Traffic**
   A Traffic Assessment Report (TAR) dated March 2002, prepared by Julian Ng, Incorporated, analyzed the impact of the proposed interim improvements on highway traffic operating conditions. See Appendix A. This report updated the January 2002 TAR. The following excerpts from the TAR highlights key benefits associated
with the proposed action.

The widening of the highway to four lanes not only at signalized intersections, is needed to provide acceptable (Level of Service D or better) conditions...If the Highway were widened only at the signalized intersections, traffic must merge causing fluctuations in the flow...With the highway widened to four lanes, highway conditions would be Level of Service "C" or better during the peak hours. (Page 9)

The foregoing conclusion is further detailed in Table 2. The TAR confirmed that the signals at the Mokulele Highway, Uwapo Road, and Ohukai Road should be interconnected so they can be coordinated. As noted in the TAR, the 2011 analyses assumed that the realignment of the Mokulele Highway and Pillani Highway intersection would be completed. However, in order to facilitate existing traffic flow, a double left turn from Mokulele Highway onto Pillani Highway has been provided in the proposed project in response to comments by the County of Maui, Department of Public Works and Waste Management during the 30-day agency review period.
Table 2

<table>
<thead>
<tr>
<th>Peak Hour (AM/PM)</th>
<th>Two-Lane Highway</th>
<th>Four-Lane Highway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Southbound</td>
<td>Northbound</td>
</tr>
<tr>
<td>North of Uwapo Road</td>
<td>D/F</td>
<td>F/D</td>
</tr>
<tr>
<td>North of Ohukai Road</td>
<td>D/F</td>
<td>E/E</td>
</tr>
<tr>
<td>South of Ohukai Road</td>
<td>D/E</td>
<td>E/E</td>
</tr>
<tr>
<td>South of Kaonoulu Street</td>
<td>D/E</td>
<td>D/D</td>
</tr>
<tr>
<td>South of Piikea Avenue</td>
<td>D/E</td>
<td>D/D</td>
</tr>
<tr>
<td>South of Lipoa Street</td>
<td>D/E</td>
<td>D/D</td>
</tr>
<tr>
<td>South of Welakahao Street</td>
<td>C/D</td>
<td>C/D</td>
</tr>
<tr>
<td>South of Kanani Road</td>
<td>C/D</td>
<td>C/D</td>
</tr>
<tr>
<td>South of Keonekai Street</td>
<td>C/D</td>
<td>C/C</td>
</tr>
<tr>
<td>South of Kilohana Drive</td>
<td>C/C</td>
<td>B/C</td>
</tr>
</tbody>
</table>

Source: Appendix A.

As previously noted, the traffic assessment report also confirmed that restricting the turning movements at unsignalized intersections to right turns from and onto the highway would be necessary to achieve Level of Service C or better at unsignalized intersections. Left turns at the unsignalized intersections, therefore, will not be permitted at Kulanihakoi Street, Waipuilani Road, and Keonekai
Street. Left-turn movements would be allowed southbound on Pillani Highway onto Moi Place and westbound from Moi Place onto Pillani Highway and southbound from Pillani Highway into the County’s Wastewater Treatment Facility mauka of Old Welakahao Road and onto Kanani Road. It should be noted that the 2011 traffic analysis assumed Kaonoulou Street and Welakahao Road would be signalized, Waipuilani Road would be connected to Pillani Highway with right-in and right-out turns, and Old Welakahao Road would be closed makai of Pillani Highway.

The relocation of traffic to nearby signalized intersections resulting from the turn prohibitions at the designated unsignalized intersections were incorporated in the traffic assignments and Level of Service analysis. The signalized intersections were found to operate at LOS D or better, which is considered acceptable for urban conditions. The relocation of traffic to any segment of South Kihei Road is estimated to be no more than 100 movements during the peak hours and less than 35 vehicles per hour for left-turn movements. This additional volume of traffic will not adversely impact Levels of Service at the signalized intersections or South Kihei Road.

Impacts of the proposed project are, therefore, viewed as positive from a traffic circulation standpoint. Moreover, the proposed action will help to establish a hierarchy of roadways that will conduct sub-regional traffic efficiently to and from the Kihei-Makena area.

The accommodation of traffic during project construction will be an area of concern. There will be increased congestion to traffic during the restriping and related improvements. This will be short
term only during the construction stage. Two (2) travel lanes (one lane in each direction) will always be open during construction and construction will not be performed during the peak hours. The work will also be coordinated with County of Maui, Department of Public Works and Waste Management and traffic will be detoured, as necessary, to minimize congestion.

2. **Bike Route**

   The restriping of the Piilani Highway to create two (2) additional lanes will reduce the shoulder widths in typical cross sections of the highway to six (6) feet with a five (5) foot bike route through intersections and a minimum design requirement of two (2) feet at bridges. This restriping would still allow bike use along the route. However, cyclists will have to share the travel lane at bridges. Appropriate signage will be placed where applicable to notify cyclists and drivers to share the lane.

   The proposed Kihei Greenway project, a four (4) mile long greenway along the North-South Collector running between and parallel to Piilani Highway and South Kihei Road is being implemented. This route will offer an alternative north-south bike route.

3. **Water System**

   The proposed action will not adversely affect County or private domestic water services and facilities.

   Should construction conditions require a need to adjust vertical or horizontal profiles of the County's waterlines, such adjustments will be coordinated with the Department of Water Supply.
4. **Wastewater**

The proposed restriping and related improvements are not expected to adversely impact the wastewater collection system.

If necessary, relocation or adjustment to wastewater system improvements will be coordinated with the Department of Public Works and Waste Management’s Wastewater Reclamation Division.

5. **Drainage and Erosion Control**

The existing concrete swales on both sides of the roadway will be paved over to create a 6-foot wide shoulder area. Twelve-foot wide grass swales will be constructed at the toe of fill slopes and concrete strips will be laid at the toe of cut slopes to maintain drainage patterns along the project corridor. Drainage intensity and discharge points will generally remain the same after completion of the proposed project.

6. **Electrical and Telephone Services**

The relocation of poles, utility boxes and transmission lines will be coordinated with Maui Electric Company, Verizon Hawaii Inc. and Hawaiian Cablevision, as necessary. The proposed project is not anticipated to adversely impact electric and telephone services.
Chapter IV

Relationship to Governmental Plans, Policies, and Controls
IV. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICTS
Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four (4) major Land Use Districts in which all lands in the State are placed. The Districts are classified "Urban", "Rural", "Agricultural", and "Conservation". The project corridor traverses lands located along the "Urban", "Agricultural" and "Rural" districts. See Figure 12. Public roadways are permissible within these districts.

B. HAWAII STATE PLAN
Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive plan which serves as a guide for the future long-range development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The objectives and policies which contribute to the implementation rationale for the proposed project include the following:

Sec. 226-14 Objective and policies for facility systems - in general.

Objective (a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

Policy (b) (1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

Sec. 226-17 Objectives and policies for facility systems - transportation.

Policy (b) (2) Coordinate state, county, federal, and private transportation activities and programs toward the
Figure 12  Interim Piilani Highway Improvements
State Land Use District Boundaries

NOT TO SCALE

Prepared for: State of Hawaii, Department of Transportation
achievement of statewide objectives.

Policy (b) (6) Encourage transportation systems that serve to accommodate present and future development needs of communities.

Policy (b) (10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment.

The proposed project will promote the public health and safety by providing roadway sections which accommodate vehicles and pedestrians in keeping with current design and safety standards.

C. **STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION**

The proposed project supports the long range traffic implementation plan for DOT identified in the Kihei Traffic Master Plan, October 1996 and the Maui Long-Range Land Transportation Plan, Final Report, February, 1997, both published in cooperation with County of Maui, Department of Public Works and Waste Management and County of Maui, Planning Department. In these reports, implementation of a plan to widen the Piliani Highway from two (2) to four (4) lanes in Kihei from Mokulele Highway to Wailea was identified.

D. **MAUI COUNTY GENERAL PLAN**

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the County of Maui Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic and environmental effects of such development and set forth the desired sequence, patterns and characteristics of future development."
The proposed action is in keeping with the following General Plan objectives and policies:

**Objectives:**

To support an advanced and environmentally sensitive transportation system which will enable people and goods to move safely, efficiently, and economically.

To develop a program for anticipating and enlarging the local street and highway systems in a timely response to planned growth.

**Policy:**

Ensure that transportation facilities are anticipated and programmed for construction in order to support planned growth.

**E. KIHEI-MAKENA COMMUNITY PLAN (1998)**

The project corridor is located in the Kihei-Makena Community Plan region which is one (1) of nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The lands adjoining the project corridor include the following uses identified by the Community Plan land use map: Single Family and Multi-Family Residential (SF, MF), Project District (PD), Business (B), Light Industrial (LI), Public (P), Agriculture (AG), and Park (Pk). See Figure 13 and Figure 14.

1. **Community Plan Theme**

   In 1998, the County of Maui completed its comprehensive update of the Kihei-Makena Community Plan. One of the underlying
Figure 13

Interim Piilani Highway Improvement Community Plan Land Use Designations Along Project Corridor

Source: Kihei-Makena Community Plan

Prepared for: State of Hawaii, Department of Transportation
Pacific Ocean

provements
Along Project Corridor

NOT TO SCALE
Interim Piilani Highway Improvements
Community Plan Land Use Designations Along Piilani Highway

Source: Kihei-Makena Community Plan

Prepared for: State of Hawaii, Department of Transportation
Improvements Along Project Corridor

NOT TO SCALE
themes which provides the basis or rationale affecting a broad spectrum of functional areas is the "provision of needed public facilities and infrastructure". The plan states:

"The County of Maui in general, and Kihei-Makena in particular, witnessed significant growth in the 1980s and early 1990s. In many instances, however, public facility and infrastructure improvements lagged behind development in the region. As such, a significant upgrade and expansion of existing public facilities and infrastructure is necessary."

The proposed restriping and related improvements to the Piilani Highway is supportive of this basic theme and will help upgrade the transportation infrastructure in the Kihei-Makena area.

2. Community Plan Land Use Goal

A goal in the Community Plan related to land use states:

"A well-planned community with land use and development patterns designed to achieve the efficient and timely provision of infrastructure and community needs while preserving and enhancing the unique character of Ma'alaea, Kihei, Wailea and Makena as well as the region's natural environment, marine resources and traditional shoreline uses."

The Piilani Highway restriping and related improvements is a response to this goal by providing the timely transportation infrastructure to address community needs.

3. Community Plan Implementing Actions

Three (3) transportation implementing actions set out in the Kihei-Makena Community Plan are:
1. Widen Piilani Highway, between Mokulele Highway and Wailea Ike Drive, to four (4) lanes;

2. Provide clear signage with adequate lighting along Piilani Highway to indicate Kihei access points; and

3. Provide left turn storage lanes and acceleration/deceleration lanes on Piilani Highway, and traffic signals at important intersections along South Kihei Road.

The proposed project supports these implementing actions.

F. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

Although Piilani Highway is not within the County of Maui’s Special Management Area, coastal zone management issues should be examined. See Figure 15. This section addresses the project’s relationship to applicable coastal zone management considerations, as set forth in Chapter 205A and the Rules and Regulations of the Maui Planning Commission.

(1) Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

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

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

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

(ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when
Figure 15
Interim Piilani Highway Improvements
Special Management Area Boundary Map

Source: County of Maui Special Management Area Map
Prepared for: State of Hawaii, Department of Transportation
such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

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

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

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

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

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

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

Response: The proposed action is not anticipated to affect existing coastal recreational resources. Access to the shoreline areas will remain unaffected by the proposed roadway improvements.

(2) Historic Resources

Objective:

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

(A) Identify and analyze significant archeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: All work will be confined to the existing highway ROW. A mitigation plan will be submitted to SHPD and an archaeological monitor will be present during ground altering activities within the Puuone sands deposits. As a result, the proposed project will not affect historic resources.

(3) Scenic and Open Space Resources

Objective:

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

Policies:

(A) Identify valued scenic resources in the coastal zone management area;
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
(D) Encourage those developments that are not coastal dependent to locate in inland areas.

Response: The proposed project is not anticipated to impact coastal and scenic open space resources.
(4) Coastal Ecosystems

Objective:

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

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
(B) Improve the technical basis for natural resource management;
(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: The proposed roadway improvements are not expected to adversely impact coastal ecosystems.

(5) Economic Uses

Objective:

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

Policies:

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

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

(i) Use of presently designated locations is not feasible;
(ii) Adverse environmental effects are minimized; and
(iii) The development is important to the State's economy.

Response: The project will support short-term construction and construction-related jobs. The project area does not affect coastal development necessary to the State's economy.

(6) **Coastal Hazards**

**Objective:**

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

**Policies:**

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

(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;

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

(D) Prevent coastal flooding from inland projects.

Response: The northern portion of the project corridor between Mokulele Highway and Uwapo Road is located within Zones A0 and A4, which are areas of 100-year flooding with depths ranging from one (1) to eleven (11) feet. The roadbed at these locations
are on fill and raised above the flood level. The remainder of the project corridor lies within Zone "C", which is defined as areas of minimal flooding. It is noted that changes in drainage patterns are not anticipated with the construction of the proposed improvements and no adverse drainage impacts to surrounding properties are anticipated.

(7) **Managing Development**

**Objective:**

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

**Policies:**

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

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

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

**Response:** The proposed project shall be reviewed and processed pursuant to Chapter 343, Hawaii Revised Statutes (HRS). Public review will be coordinated through this process. A public Informational Open House was held at the Kihei Community Center on March 21, 2002 with approximately 30 people in attendance. Information on the proposed project was provided at the Open House.
Public Participation

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

Policies:

(A) Promote public involvement in coastal zone management processes;
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: As noted above, opportunity for public awareness, education and participation pertaining to significant resource attributes of the coastal zone is provided through Chapter 343, HRS procedures.

Beach Protection

Objective:
Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;
(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and
(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.
Response: The proposed project will not impact shoreline activities. No adverse impact to beach processes is anticipated.

(10) Marine Resources

Objective:

Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

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

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

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

(D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

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

Response: The interim improvements proposed for Piilani Highway will not adversely impact ocean resources. Construction activities will be limited to the existing highway ROW.
Chapter V

Summary of Adverse Environmental Effects Which Cannot Be Avoided
V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed project will result in impacts as described in Chapter III, Potential Impacts and Mitigation Measures.

Potential effects include noise-generated impacts occurring from construction activities associated with alteration work on intersections and restriping activities. In addition, impacts will result in increased traffic congestion during restriping and work on intersections. These impacts will be temporary and not expected to create long-term adverse environmental effects.

In the long term, traffic noise levels will increase as a result of increased traffic along the corridor. However, by reducing the speed limit from 45 mph to 40 mph along the project corridor, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten-year period between 2001 and 2010 are typically less than 1.5 dB. This increase is not considered to be a significant impact to noise levels.

The restriping of the travel lanes will require the narrowing of the lanes from 12 feet to 11 feet (outer two lanes to 10-feet 8-inches at bridges). This narrowing will limit the margin for vehicular movement within each lane. A 5 mph reduction in the speed limit from 45 mph to 40 mph would be appropriate as a result of narrowing the lanes from 12 feet to 11 feet.

The proposed project is intended to improve roadway operating conditions along Pillani Highway and increase the level of service to LOS D or better during peak flows from the intersection at Mokulele Highway to Kilohana Drive. From a long-term perspective, there are no significant adverse environmental effects anticipated which cannot be mitigated as a result of the proposed highway improvements.
Chapter VI

Alternatives to the Proposed Action
VI. ALTERNATIVES TO THE PROPOSED ACTION

A. PREFERRED ALTERNATIVE
   The proposed project represents the preferred alternative. The restriping and related improvements to intersections will improve vehicular traffic flow along the 5.9 mile segment of roadway between Mokulele Highway and Kilohana Drive in Kihei. The proposed improvements are not anticipated to generate new traffic, however, it is anticipated to accommodate present and future traffic along the project corridor with a LOS D or better.

B. CONTRAFLOW ALTERNATIVE
   A "contraflow" alternative would include restriping the highway to three (3) lanes and reversing the flow in the third lane during the peak period. This alternative would require that the added lane be provided northbound in the AM peak period and southbound in the PM peak period. Widening to provide two (2) through lanes across each signalized intersection would still be required and merging areas would be needed. Adequate traffic control through merging areas during contraflow operations would be difficult to achieve. With this alternative, densities between Uwapo Road and Kaonoulu Street would remain at Level of Service E and therefore, not an acceptable alternative for consideration.

C. IMPROVING ALTERNATE ROADWAYS
   The Piilani Highway is a two-lane arterial roadway that provides regional mobility to the Kihei-Wailea-Makena areas. Another north-south access in the area is provided by South Kihei Road. This road is largely a two-lane collector road providing north-south mobility and property access within the Kihei community. A North-South Collector Road has been an integral part of Kihei planning, however, it has been implemented incrementally as development warrants and is not completed.
Widening South Kihei Road to accommodate more traffic to lessen the volume on Piilani Highway is an alternative that would have considerably greater impacts and costs due to the urban and commercial build up along this roadway.

D. **PERMANENT WIDENING OF PIILANI HIGHWAY**

The proposed action represents an interim measure to provide additional throughput to address existing and near-term capacity issues. From a long-term perspective, permanent improvements will be required to address the region's transportation needs. The scope of permanent improvements would likely involve work outside of the currently improved section of the highway and would result in higher costs with a different set of impact considerations. From a planning, design, funding and implementation standpoint, increasing the scope of work to meet the long-term facility potential of Piilani Highway is not deemed prudent in light of the current capacity constraints which require timely response as provided by the proposed interim action.

E. **NEW HIGHWAY ALIGNMENT ALTERNATIVE**

This alternative would involve a new highway alignment mauka of the existing Piilani Highway. The transportation planning process includes many tiers of evaluation, including regional plans (Maui Long Range Transportation Plan, 1997), sub-regional plans (Kihei Traffic Master Plan, 1996) and project plans, such as the current effort for Piilani Highway. Each tier narrows the scope and each subsequent tier builds upon information from the studies of the broader area. The timeframe associated with a new highway alignment is beyond the regional and sub-regional plans which identified projects for implementation to the year 2020. From a planning and evaluation process perspective, consideration of a new highway alignment is not deemed a prudent alternative in light
of the current capacity constraints which require a timely response as provided by the proposed interim action.

F. **NO ACTION ALTERNATIVE.**
   In light of the established need for the proposed improvements, the "no action alternative" does not represent a responsible option toward improving traffic circulation for the Kihel-Makena-Wailea area since problems with traffic congestion and internal circulation will persist.

G. **DEFERRED ACTION ALTERNATIVE.**
   A "deferred action" alternative will have similar consequences as a "no action" alternative as problems relating to traffic congestion will continue to persist and potentially increase. Deferring the development of the proposed improvements may also result in higher implementation costs in the future due to inflation.
Chapter VII

Irreversible and Irretrievable Commitments of Resources
VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The design and implementation of the proposed project will involve the commitment of certain material and fiscal resources. The commitment of the resources for the project is consistent with the need to improve the existing transportation system in the area. Impacts relating to the use of these resources should be weighed against the expected positive benefits to be derived from the project versus the consequences of taking no action.
Chapter VIII
Findings and Conclusions
VIII. FINDINGS AND CONCLUSIONS

Piilani Highway is a two-lane arterial roadway under the jurisdiction of the State of Hawaii that begins in the north at its intersection with Mokulele Highway and proceeds in a southerly direction to its terminus with Wailea Ike Drive, a distance of approximately 7.0 miles. The proposed project will involve restriping the road to create two (2) additional travel lanes and related improvements to an approximately 5.9 mile segment of Piilani Highway that extends from Mokulele Highway in the north to Kiiohana Drive in the south. The proposed project will enhance accessibility and traffic circulation in the area. The proposed improvements will be conducted within the roadway's existing ROW.

Since the proposed action is on State lands and State and County funds are proposed to be utilized for the project, an Environmental Assessment (EA) has been prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS), and Chapter 200 of Title 11, Administrative Rules of the State Department of Health.

Every phase of the proposed action, expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Administrative Rules. Based on the analysis, the proposed project is not anticipated to result in any significant impacts. Discussion of project conformance to the criteria is noted as follows:

1. **No Irrevocable Commitment to Loss or Destruction of any Natural or Cultural Resource Would Occur as a Result of the Proposed Project**

Flora occupying undeveloped parcels bordering the project corridor generally consists of kiawe, koa haole, buffelgrass and scrub vegetation, while developed properties are vegetated with landscaping typical of single-family residential developments and ornamental landscaping, such as hibiscus and palms, generally associated with condominiums and
apartment complexes. No wetlands will be impacted by the proposed action.

From an archaeological standpoint, the lands underlying and immediately surrounding the project corridor have been previously altered by existing development of the highway. All work will be carried out within the ROW. A monitoring plan will be submitted to SHPD prior to construction. An archaeologist will monitor construction activity in the Puuone sands deposits to ensure the proposed project will not adversely impact archaeological resources.

The area in the vicinity of the project corridor has not been used for cultural gatherings, nor has it been cultivated using traditional Hawaiian practices. The proposed project is not anticipated to adversely impact cultural resources.

2. *The Proposed Action Would Not Curtail the Range of Beneficial Uses of the Environment*

The roadway segment encompassed by the proposed project traverses lands which are designated for urban and agriculture uses. The proposed action is not anticipated to have a significant effect on beneficial uses of the environment.

3. *The Proposed Action Does Not Conflict With the State’s Long-Term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, HRS*

The State Environmental Policy and Guidelines are set forth in Chapter 344, HRS. The proposed action is in consonance with the following policies and guidelines:
**Environmental Policy:**
Enhance the quality of life by:

* * *

(A) Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian.

**Guidelines:**

* * *
Transportation

* * *

(A) Encourage transportation systems in harmony with the lifestyle of the people and environment of the State.

4. **The Economic or Social Welfare of the Community or State Would Not Be Substantially Affected**

The proposed project will directly benefit the local economy by providing construction and construction-related employment. The proposed project will also have a beneficial effect upon the socio-economic fabric of the community by providing for the safe, convenient and efficient movement of traffic in the Kihei-Wailea-Makena area. By improving roadway conditions, the proposed project will promote the public welfare by providing vehicular facilities which meet current design and safety standards.

5. **The Proposed Action Does Not Affect Public Health**

No adverse impacts to the public's health and welfare are anticipated.
6. **No Substantial Secondary Impacts, Such as Population Changes or Effects on Public Facilities, are Anticipated**

No significant population changes are anticipated as a result of the proposed project. The project involves the provision of additional travel lanes and related intersection modifications to improve the level of service along the 5.8 mile section of the Piilani Highway from Mokulele Highway in the north to Kilohana Road in the south.

As necessary, the DOT will coordinate the relocation of improvements (e.g., waterlines, utility poles) with the appropriate agencies and utility companies to ensure that the proposed road widening activities do not impact their facilities.

The improvements would increase the handling capacity of Piilani Highway and provide the necessary transportation infrastructure for the orderly accommodation of near-term traffic projections for the Kihei-Wailea-Makena area.

Stormwater runoff will not be affected by the proposed project and there will be no impact to the existing drainage system. In addition, the proposed project is not anticipated to have any adverse impacts upon public services and facilities.

7. **No Substantial Degradation of Environmental Quality is Anticipated**

Construction activities will create temporary short-term nuisances related to noise and dust. Appropriate dust control and noise mitigation measures will be implemented by the contractor to ensure that fugitive dust and noise generated in connection with construction is minimized.
8. **The Proposed Action Does Not Involve a Commitment to Larger Actions, Nor Would Cumulative Impacts Result in Considerable Effects On The Environment**

The proposed action is part of the DOT's ongoing effort to upgrade roadways to accommodate current vehicular traffic requirements. This action is not expected to result in additional environmental effects as all project-related work will be carried out within existing road surfaces and highway ROW.

It is noted that voluntary funding participants for the proposed action include private landowners with plans for future development in the Wailea-Makena subregion. The landowners, Makena Resort Corp. (owner of Makena Resort lands) and WCPT/GW Land Associates, LLC (owner of the Wailea 670 property), have plans which have development schedules spanning 15- to 20-year horizons. Traffic volumes generated by new developments within the Wailea 670 and Makena Resort project areas will be accommodated by the proposed Piilani Highway improvements. However, the project in itself is not a master planned component of the Wailea 670 and Makena Resort projects. It is the intent of the proposed interim widening project to address current and near-term capacity constraints attributed to traffic generated within the greater Kīhei-Makena region and beyond. In this context, the proposed action is not considered to be a part of a larger action.

In consideration of cumulative impacts, if the Upcountry Highway is constructed and connected to Piilani Highway opposite Kaonoulu Street, as proposed, it is expected to affect traffic volumes north of Kaonoulu Street. As set out in the Traffic Assessment Report, traffic densities on Piilani Highway north of Kaonoulu Street with the interim improvements and the Upcountry Highway are within the limits for LOS C or better. At
the intersections, conditions in the AM peak hour would not be significantly different than if the Upcountry Highway were not built. Similar layouts with adjustment in signal timing would provide adequate service at the Mokulele Highway, Uwano Road, and Ohukai Street intersections. At Kaonoulu Street, modifications in signal phasing would be necessary to maintain acceptable conditions at the intersection (Appendix A, Traffic Assessment Report, pages 12 and 13). The cumulative impact on the acoustical environment from the Upcountry Highway would not alter the traffic noise level findings and conclusions (Appendix C, Acoustic Study, page 2). The resulting noise levels south of Kualihako Street would be the same as those without the Upcountry Highway since traffic volumes would remain the same. North of Kaonoulu Street, traffic volumes and noise levels would be lower during the critical (higher) AM peak hour following completion of the Upcountry Highway. In consideration of the proposed project and the Upcountry Highway, the cumulative impact would not result in considerable effects on the environment.

9. No Rare, Threatened or Endangered Species or Their Habitats Would be Adversely Affected By The Proposed Action

Rare, threatened or endangered species of flora, fauna, avifauna or their habitats are not expected to be impacted by the proposed project as all work will be conducted within existing roadway rights-of-way.

10. Air Quality, Water Quality or Ambient Noise Levels Would Not Be Detrimentally Affected By The Proposed Project

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, and erection of dust screens will be implemented to minimize wind-blow emissions. Short-term noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as
well as proper equipment and vehicle maintenance, are anticipated to mitigate noise from construction activities.

In the long term, traffic noise levels will increase as a result of increased traffic along the corridor. However, by reducing the speed limit from 45 mph to 40 mph along the project corridor, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten-year period between 2001 and 2010 are typically less than 1.5 dB. This increase is not considered to be a significant impact to noise levels.

11. **The Proposed Project Would Not Affect Environmentally Sensitive Areas, Such As Flood Plains, Tsunami Zones, Erosion-prone Areas, Geologically Hazardous Lands, Estuaries, Fresh Waters or Coastal Waters**

Existing drainage patterns will be maintained. There will be no net increase in storm water runoff as a result of the proposed project. There will be no adverse impacts to environmentally sensitive areas nor to fresh or coastal waters.

12. **The Proposed Project Will Not Substantially Affect Scenic Vistas and Viewplanes Identified in County or State Plans or Studies**

The proposed project will not affect coastal scenic and open space resources and will not affect scenic view corridors.

13. **The Proposed Project Will Not Require Substantial Energy Consumption**

The proposed project will involve the commitment of fuel for construction equipment, vehicles, and machinery during construction activities. However, this use will be short term and is not anticipated to result in a substantial consumption of energy resources.
Based on the foregoing findings, it is concluded that the proposed action is not anticipated to result in any significant impacts. Accordingly, this final environmental assessment is being processed as a final Finding of No Significant Impact (FONSI).
Chapter IX

List of Permits and Approvals
IX. LIST OF PERMITS AND APPROVALS

The following approval will be required prior to the implementation of the project:

State of Hawaii

2. Work to Perform Within State Highway Right-of-Way.
Chapter X

Public Informational Open House, March 21, 2002
The purpose of the Open House was to provide information and to receive public comment on the proposed project. Approximately 30 people attended the informational Open House. Project consultants in highway design, traffic engineering, acoustic engineering, and environmental assessment were available at designated stations to provide information and to respond to questions. Opportunities were also provided for the public to submit written comments and to submit oral testimony on the proposed project.

A summary of the written comments received from the meeting follows.

1. Concern was raised with sound walls and their visual impact on the landscape and viewscape. Suggestions were made to provide more landscaping along the highway right-of-way to reduce noise, to provide visual buffers, and to help reduce carbon dioxide from car exhaust.

2. Concern was raised about a bicycle route next to the highway. It was suggested that the bike route should be located on the North-South Collector route.

3. The narrowing of lanes from 12 feet to 11 feet was raised as a safety concern.

4. The left-turn lanes on and off of Piilani Highway should be allowed at Kanani and Keonekai Roads.

5. Residents would like to see construction be as low impact as possible with suggestions such as working at night when traffic is minimal, provide traffic control during construction, and requiring Maui Police Department to divert traffic during construction.

6. A new highway mauka of the existing Piilani Highway was also suggested as an alternative.

Five (5) individuals submitted oral testimony on the proposed project. See Appendix D. In general, the oral testimonies were in support of the proposed project. Suggestions were made to synchronize and coordinate the traffic
signals to facilitate traffic flow and to add guardrails near Ohukai Road and Moi Place for safety.
Chapter XI

Agencies Consulted During the Preparation of the Draft Environmental Assessment; Letters Received and Responses to Substantive Comments
XI. AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during the preparation of the Draft Environmental Assessment. Agency comments and responses to substantive comments are also included in this section.

1. Neal Fujiwara, Soil Conservationist
   Natural Resources Conservation Service
   U.S. Department of Agriculture
   210 Iml Kala Street, Suite 209
   Wailuku, Hawaii 96793-2100

2. William Lennan
   Department of the Army
   U.S. Army Engineer District, Hnl.
   Attn: Operations Division
   Bldg. T-1, Room 105
   Fort Shafter, Hawaii 96858-5440

3. Robert P. Smith
   Pacific Islands Manager
   U.S. Fish and Wildlife Service
   P.O. Box 50167
   Honolulu, Hawaii 96850

4. David Blans, Director
   State of Hawaii
   Office of Planning
   Department of Business, Economic Development and Tourism
   P.O. Box 2359
   Honolulu, Hawaii 96804

5. Paul LeMahieu, Superintendent
   State of Hawaii
   Department of Education
   P.O. Box 2360
   Honolulu, Hawaii 96804

6. Gwen Uneka
   Maui District Superintendent
   Department of Education
   54 High Street, 4th Floor
   Wailuku, Hawaii 96793

7. Denis Lau, Chief
   Clean Water Branch
   State of Hawaii
   Department of Health
   919 Ala Moana Blvd., Room 300
   Honolulu, Hawaii 96814

8. Herbert Matsubayashi
   District Environmental Health Program Chief
   State of Hawaii
   Department of Health
   54 High Street
   Wailuku, Hawaii 96793

9. Gilbert Colona-Agaran
   State of Hawaii
   Department of Land and Natural Resources
   P.O. Box 621
   Honolulu, Hawaii 96809

10. Don Hibbard
    State of Hawaii
    Department of Land and Natural Resources
    State Historic Preservation Division
    601 Kamokila Blvd., Room 555
    Kapolei, Hawaii 96707

11. Brian Minaal, Director
    State of Hawaii
    Department of Transportation
    869 Punchbowl Street
    Honolulu, Hawaii 96813

12. Colin Kippen, Deputy Administrator
    Office of Hawaiian Affairs
    711 Kapahulani Boulevard, Suite 500
    Honolulu, Hawaii 96813
13. Clayton Ishikawa, Chief
   County of Maui
   Department of Fire Control
   200 Dairy Road
   Kahului, Hawaii 96732

14. Alice Lee, Director
   County of Maui
   Department of Housing and
   Human Concerns
   200 S. High Street
   Wailuku, Hawaii 96793

15. John Min, Director
    County of Maui
    Department of Planning
    250 South High Street
    Wailuku, Hawaii 96793

16. Floyd Miyozono, Director
    County of Maui
    Department of Parks and Recreation
    1580-C Kaahumanu Avenue
    Wailuku, Hawaii 96793

17. Mayor James Kimo Apana
    County of Maui
    Office of the Mayor
    200 South High Street
    Wailuku, Hawaii 96793

18. Tom Phillips, Chief
    County of Maui
    Police Department
    55 Mahalani Street
    Wailuku, Hawaii 96793

19. David Goode, Director
    County of Maui
    Department of Public Works
    and Waste Management
    200 South High Street
    Wailuku, Hawaii 96793

20. David Craddick, Director
    County of Maui
    Department of Water Supply
    200 South High Street
    Wailuku, Hawaii 96793

    P.O. Box 398
    Kahului, Hawaii 96732

22. Barney Elting, Chair
    Planning and Development Committee
    Kihei Community Association
    P.O. Box 2311
    Kihei, Hawaii 96753

23. Rudy Luwai
    Makana Homeowners Association
    5100 Makana Road
    Kihei, Hawaii 96753

24. Dorothy Williams, President
    Maui Meadows Homeowners Association
    P.O. Box 1935
    Kihei, Hawaii 96753

25. Ron Stutz, President
    Maui Meadows Neighborhood Association
    874 Kumulani Drive
    Kihei, Hawaii 96753

26. Bill Overton, Manager
    Wailea Community Association
    555 Kaahalani Street, Suite 214
    Wailea, Hawaii 96793

27. Clyde Murashige, Sr. Vice President
    Wailea Resort Company, Ltd.
    161 Wailea Ike Place
    Wailea, Hawaii 96753
DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, HONOLULU  
FORT SHAFTER, HAWAII  

November 20, 2001  

Regulatory Branch  

Mr. Michael T. Munekiyo, A.I.C.P.  
Munekiyo & Hiroga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793  

Dear Mr. Munekiyo:  

This letter responds to your request for a jurisdictional determination for the Interim Pilani Highway Widening Improvements project, dated November 12, 2001. Based on the information you provided I have determined that a Department of the Army (DA) permit will not be required for this project.  

If you have any questions concerning this determination, please contact William Leman of my staff at 438-6986 or FAX 438-4050, and reference File No. 200200078.  

Sincerely,  

George P. Young, P.E.  
Chief, Regulatory Branch  

January 17, 2002  

George P. Young, P.E., Chief  
Regulatory Branch  
Department of the Army  
U.S. Army Engineer District, Honolulu  
Fort Shafter, Hawaii 96850-5440  

SUBJECT: Pilani Highway Widening Improvements, Mokuleia Highway to Higbana Drive (Job No. 31AB-01;02)  

Dear Mr. Young:  

Thank you for your letter of November 20, 2001 on the above subject.  

We acknowledge the Department of the Army's (DA) determination that a DA permit will not be required for the project.  

Again, thank you for your response.  

Very truly yours,  

Mich Hiroga, AICP  

CC:  
Roy Figueirado, Makena Resort Corp.  
Charles Jencks, WCPTIXW Land Associates  
Fred Cabel, Dept. of Transportation-Highways Division, Maui  
Bob Sato, Dept. of Transportation-Highways Division, Maui  
Bet Toba, R. M. Tawill Corporation
NOV 28 2001

BRUCE S. WHITMORE, M.D., L.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 879
HONOLULU, HAWAII 96813-0879

November 23, 2001

11076FGY.01

Mr. Michael T. Munekiyo,
A.I.C.P.
Project Manager
Munekiyo & Hinga, Incorporated
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Munekiyo:

Subject: Interim Piiholo Highway Widening Improvements,
Makalea Highway to Kilohana Drive, Project No. 31AB-01-02
Kīhei, Maui, Hawaii

The Department of Health, Clean Water Branch (CWB) has reviewed the October 17, 2001
transmittal of the subject document and has the following comments:

1. The Army Corps of Engineers should be contacted to identify whether a Federal permit
(including a Department of Army permit) is required for any of the future projects. If it is
determined that a Federal permit is required for the subject project, then a
Section 401 Water Quality Certification would also be required from our office.

2. If the construction project involves any of the following discharges into State waters, a
National Pollutant Discharge Elimination System (NPDES) permit coverage is required for
each activity:

a. Storm water runoff associated with construction activities, including clearing,
grading, and excavation that result in the disturbance of equal to or greater than five
(5) acres 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.

Note: After March 10, 2003, an NPDES permit will be required for discharges of
storm water associated with construction activities, including clearing, grading, and
evacuation that result in the disturbance of one (1) acre or more.

b. Hydrotreating water; and

c. Construction dewatering effluent.

Notices of Intent (NOI) for NPDES general permit coverages should be submitted at least 30
days before the discharge is to occur. NPDES individual permit applications should be
submitted at least 180 days before the discharge is to occur. NOI and NPDES individual permit
application forms can be downloaded from the CWB website at

The transmission did not mention when the various activities would begin. The NPDES Notice of
General Permit Coverages will expire at midnight September 21, 2003 or when amendments to
Chapter 11-55, Appendices (the NPDES general permits) are adopted, whichever occurs first.
Therefore, the Permittee would need to reapply for all NPDES general permit coverages prior to
the expiration date, if construction will be continued after September 21, 2003, an NPDES
individual permit coverage may be issued for a term of less than five (5) years and would
eliminate the requirement to reapply for any NPDES general permit coverages if construction
was completed within the term of the NPDES individual permit.

If you have any questions, please contact Mr. Gerald Yonashiro of the Engineering Section,
CWB, at 808-440-9.

Sincerely,

DENIS R. LAI, P.E., CHIEF
Clean Water Branch

GY'er
January 17, 2002

Denis R. Lau, P.E., Chief
Clean Water Branch
Department of Health
P. O. Box 3378
Hilo, Hawaii 96720-0378

SUBJECT: Interim Pillani Highway Widening Improvements; Mokulele Highway to Kihapana Drive (Project No. 3148-01-02)

Dear Mr. Lau:

Thank you for your letter dated November 23, 2001 in response to the early consultation letter on the above subject.

The Army Corps of Engineers' response to the early consultation letter is that a Department of Army permit will not be required for this project. A copy of this letter is enclosed for your information and file.

We also note the comments regarding a National Pollutant Discharge Elimination System (NPDES) permit requirements and have forwarded your letter to the project engineer for review and applicability.

Again, thank you for your response to the early consultation letter.

Very truly yours,

Mits Hirano, AICP

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hirano, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

November 20, 2001

Regulatory Branch

Dear Mr. Munekiyo:

This letter responds to your request for a jurisdictional determination for the Interim Pillani Highway Widening Improvements project, dated November 12, 2001. Based on the information you provided I have determined that a Department of the Army (DA) permit will not be required for this project.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986 or FAX 438-9969, and reference File No. 200200078.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

MH:fm
Enclosure

cc: Roy Figuerola, Makana Resort Corp. (w/ enclosure)
Charles Jericks, WCPT/GW Land Associates (w/ enclosure)
Fred Cagalil, Dept. of Transportation-Highways Division, Maui (w/ enclosure)
Bob Sanot, Dept. of Transportation-Highways Division, Maui (w/ enclosure)
Bert Toba, R. M., Towill Corporation (w/ enclosure)
Ref: PILANIHWY.RCM

November 21, 2001

Munekyo & Hiraga, Inc.
Michael T. Munekyo, A.I.C.P.
305 High Street, Suite 194
Wailuku, Hawaii 96793

Dear Mr. Munekyo:

SUBJECT: Review: Draft Environmental Assessment
Project: Pilani Highway Widening Improvements
Location: Molokai Highway to Kilohana Drive
Job No.: 31AB-01-02

Thank you for your letter dated November 12, 2001, informing the department of the proposed improvement to Pilani Highway.

Please provide four (4) copies of the Draft Environmental Assessment (DEA) document covering the proposed project to the DLNR Land Division located at 1151 Punchbowl Street, Room 220, Honolulu, Hawaii 96813.

The DEA document will be submitted to the following divisions for their review and comment:
- Division of Forestry and Wildlife – Commission on Water Resource Management - Land Division Engineering Branch and District Land Office
- Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 1 (808) 587-0438.

Very truly yours,

HARRY M. YADA
Acting Administrator

Munekyo Hiraga, Inc.

January 17, 2002

Harry M. Yada, Acting Administrator
Department of Land and Natural Resources
Land Division
P. O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Draft Environmental Assessment for Pilani Highway Widening Improvements, Molokai Highway to kilohana Drive (Job No. 31AB-01-02)

Dear Mr. Yada:

Thank you for your letter of November 21, 2001 on the above subject.

We have noted your comments and will forward four (4) copies of the Draft Environmental Assessment to your department for further review.

Again, thank you for your early consultation letter response.

Very truly yours,

Mich Hirano, AICP

MHir

cc: Roy Figueroa, Makaha Resort Corp., Charles Jenkins, WCPT/GW Land Associates, Fred Cajigal, Dept. of Transportation-Highways Division, Maui, Bob Sarret, Dept. of Transportation-Highways Division, Maui, Bart Toba, R. M. Tawill Corporation
December 4, 2001

Mr. Michael T. Minamiyo, AICP
Project Manager
Minamiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Minamiyo:

Subject: Proposed design and implementation of restriping and related improvements to Piilani Highway

This letter is provided as a response to your initial consultation letter and materials concerning the above referenced project. OHA offers the following comments relating to project:

As part of your HRS 343 compliance, OHA reminds SDOT that it must complete a cultural impact assessment so that information may be gathered about cultural practices and cultural features that may be affected by actions subject to Chapter 343.

OHA recommends that SDOT seek as broad a consultation as possible with knowledgeable Native Hawaiian organizations and individuals to complete this cultural impact assessment. This consultation should include the incorporation of the contacts listed below to assist you and SDOT in identifying cultural and historic resources, cultural practices and significance, evaluating cultural places implicated by this project, assessing adverse effects to them, and developing appropriate mitigation and alternatives (where necessary):

- Local Hawaiian civic clubs
- Local chapters of the royal societies
- Maui Island Burial Council
- Individuals familiar with cultural practices of the areas affected by your undertaking

OHA’s community resource coordinators on the island of Maui may also be of assistance in helping to identify knowledgeable Native Hawaiian organizations and individuals. Their information follows below:

Thank you for the opportunity to comment and provide concerns in this phase of the proposed project. We look forward to reviewing your Draft EA when available. If you have any questions, please contact Wayne Kawamura, Policy Analyst at 594-1045, or email him at: wayne@oha.org.

Sincerely,

Colin Kippen, Jr.
Deputy Administrator

cc: BOT
ADM
Maui CRC
January 17, 2002

Colin Kippen, Jr.
Deputy Administrator
State of Hawaii, Office of Hawaiian Affairs
711 Kapalani Boulevard, Suite 500
Honolulu, Hawaii 96813

SUBJECT: Interim Pilani Highway Improvements; Mokulele Highway to Kohala Drive (Project No. 31AR-01-02)

Dear Mr. Kippen:

Thank you for your letter of December 4, 2001. We have noted your comments and have included a cultural impact assessment in the Draft Environmental Assessment for the proposed project. In obtaining cultural information on the proposed project corridor, we have consulted with Mr. Leonard "Euly" Kapahulehua, who is a respected member of Haalau Maui Nui-e-Kona, an active native cultural organization in Kihei and presently working in partnership with the U.S. Fish and Wildlife Service in identifying native plant, birds and insects in the Kihei area and with the National Oceanic Atmospheric Administration to identify the sea animals along the coast of Kihei. Mr. Kapahulehua is also president of Ke-a-ia-loka-ia Fishpond in Kaitokepe and a member of Kihei Canoe Club. We have also interviewed Mr. Roy Suda, a long-time Kihei resident, to obtain cultural resource perspectives in the vicinity of the proposed project.

A copy of the Draft Environmental Assessment will be provided to your office for review and comment.

Again thank you for your response to the early consultation letter.

Very truly yours,

Mich Hirono, AICP

cc: Roy Figueiroua, Makena Resort Corp.
Charles Jencks, WCPTI/GW Land Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Sitar, Dept. of Transportation-Highways Division, Maui
Bill Toba, R. M. Towill Corporation
Mr. Michael T. Munekiyo  
Munekiyo & Hiraga, Inc.  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

Subject: Interim Piilani Highway Widening Improvements - Early Consultation

The Department of Education has no comment on the proposed project at this time.

Thank you for the opportunity to respond.

Very truly yours,

Patricia Hamamoto  
Interim Superintendent

cc: A. Suga, DAS
Mr. Michael T. Munskiyo, AICP  
Munskiyo & Hiraga, Inc.  
305 South High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Mr. Munskiyo:

RE: Pre-Environmental Assessment Comments for the Proposed Interim  
Pillani Highway Widening Improvements, Mokulele Highway to  
Kiobana Drive, Project No. 31AM-01-02

The Maui Planning Department has reviewed the summary for the proposed  
project and has the following comments to offer:

1. The draft environmental assessment should contain maps and  
written descriptions of the proposed improvements in relation to  
the County Special Management Area (SMA) and the existing  
highway right-of-way.

2. On July 11, 2000, the Maui Planning Commission granted a  
Special Management Area Use Permit (SM1 2000/007) to the  
State DOT as part of proposed improvements to Mokulele Highway  
which included improvements to the intersection of Mokulele and  
Pillani Highways. Discuss the relationship between the two  
projects including the phasing of the various improvements and  
potential overlaps that may occur during implementation.

We will reserve further comments until we have had the opportunity to review  
a completed document.
January 17, 2002

John E. Min, Director
January 17, 2002
Page 2

Again, thank you for your comments.

Very truly yours,

Mich Hirano, AICP

Subject: Proposed Interim Pilani Highway Widening Improvements, Mokulele Highway to Kihaha Drive, Project No. 3140-01-02

Dear Mr. Min:

Thank you for your letter of November 19, 2001 providing comments to the early consultation letter on the above subject.

We met with the Department of Planning staff representative, Ms. Robyn Loudemilk, on December 3, 2001 to review the project limits in relation to the Special Management Area boundaries. We understand from this meeting that the County SMA boundaries are makai of the Pilani Highway and the Mokulele Highway right-of-way. Since all the improvements of the proposed project are within the Pilani Highway right-of-way, we believe the actions are outside of the SMA boundaries. We will, however, provide maps and written descriptions of the proposed improvements in relation to the County SMA boundaries in the Draft Environmental Assessment.

We also note your comments regarding discussion of the relationship between the proposed improvements to Mokulele Highway, including improvements to the Pilani Highway intersection that was reviewed by the Planning Department in May 2000 and the improvements proposed in the Interim Pilani Highway Improvement project. We have requested information from the Department of Transportation on the status and timeframe of the Mokulele Highway proposal in order to incorporate discussion of their relationship in the Draft Environmental Assessment.

cc: Roy Figuelosa, Makena Resort Corp.
Charles Jencks, Wailea 670 Associates
Fred Gelgel, Dept. of Transportation-Highways Division, Maui
Bob Sladik, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation
November 27, 2001

Michael T. Munekiyo, P.E.,
Project Manager
Munekiyo & Hinga, Inc.
305 High Street, Suite 164
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

SUBJECT: Interim Piilani Highway Widening Improvements, Mokulele Highway to Kihihana Drive, Project No. 31AB-01-02

We have reviewed the proposed improvements to Piilani Highway and are in support of the project.

Thank you for the opportunity to review and comment. Should there be any questions, please contact Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

LOI ONI
Director

cc: Patrick Matsui, Chief of Planning and Development

November 19, 2001

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hinga, Inc.
305 High Street
Wailuku, Hawaii 96793

Subject: Interim Piilani Highway Widening Improvements, Mokulele Highway to Kihihana Drive, Project No. 31AB-01-02

Dear Mr. Munekiyo,

Thank you for the opportunity to provide comments in preparation of the Draft Environmental Assessment.

There are several Department water lines in the project area. Construction plans need to be reviewed by the Department of Water Supply. Water valve covers must be lifted to match the finished grade of the roadway. Enclosed are sections of our water system map pertaining to the project area. Please contact our engineering division at 270-7385 in regard to these issues.

We have attached Best Management Practices (BMPs) for principal operations for your reference. These are designed to minimize information from all construction activities and related vehicle operations. Additional information is available from the State Department of Health.

In order to conserve water resources, we recommend the following measures:

* Use non-porous waste, where feasible, for dust control and any irrigation during and after construction.
* Use climate-adapted and salt-tolerant native plants where any roadside landscaping is intended and when revegetating the construction corridor. The project site is located in "Maui County Planning Plan" - Plant Zones 3 and 5. Please refer to the "Maui County Planning Plan", and to the attached documents. Native plants adapted to the area, conserve water and further protect the watershed from degradation due to invasive alien species.

Should you have any questions, please contact the Water Resources Planning Division at 270-7199.

Sincerely,

David Caddick
Director

By Water All Things Find Life
Saving Water in The Yard
What and How to Plant in Your Area

1. Wet Windward Areas
2. Cool Dry Upper Elevations
3. Warm to Hot Low Elevations
4. Wetter Low Areas Near Mountains
5. Windward Coastal Salt Spray Zones

Tips from Maui County Department of Water Supply
By Mida All Things Food Life
Selection

As a general rule, it is best to select the largest and healthiest specimens. However, be sure to note that they are not pot-bound. Smaller, younger plants may result in a low rate of plant survival. When selecting native species, consider the size they are to be planted in, and the space that you have to plant. For example: Mountain species such as tea and madu will not grow well in hot coastal areas exposed to strong ocean breezes. Lowland and coastal species such as wiliwili and Koa require abundant sunshine and porous soil. They will not grow well with frequent cloud cover, high rainfall and heavy soil.

Consider too, the size that the species will grow to be. It is not wise to plant trees that will grow too large. Overplanting tends to be a big problem in the landscape due to the underestimation of a species’ height, width or spread.

A large, dense canopied tree such as the kiawe is a good shade tree for a lawn. However, its canopy size and density of shade will limit what can be planted in the surrounding area. Shade cast by a koa and ohia lehua is relatively light and will not inhibit growth beneath it.

Keep seasons in mind when you are selecting your plants. Not all plants look good year round, some plants such as ilima will look scruffy after they have flowered and formed seeds. Avoid planting large areas with only one native plant. Mixing plants which naturally grow together will ensure the garden will look good all year round. Looking at natural habitats helps to show how plants grow naturally in the landscape.

When planting an area with a mixed-ecosystem, keep in mind the size and ecological requirements of each plant. Start with the hardiest and most easily grown species, but allow space for fragile ones in subsequent plantings.

Acquiring natives

Plants in their wild habitat must be protected and maintained. It is best and easiest to get your plants from nurseries (see list), or friends gardens. Obtain proper permits from landowners and make sure you follow a few common sense rules:

- collect sparingly from each plant or area
- some plants are on the state or Federal Endangered Species list. Make sure you get permits (see app. A)

Soil

Once you have selected your site and the plants you wish to establish there, you must look at the soil conditions on the site. Proper soil is necessary for the successful growth of most native plants, which perform poorly in hard pan, clay or adobe soils. If natives are to be planted in these types of soil, it would be wise to dig planting holes several times the size of the rootball and backfill with 50-75% compost. A large planting hole ensures the development of a strong root system. The plant will have a headstart before the roots penetrate the surrounding poor soil.

It is recommended that native plants not be planted in ground that is more dense than potting soil. If there is no alternative, dig a hole in a mound of soil mixed with volcanic cinder which encourages maximum root development. Fill the hole with water, if the water tends to puddle or drain too slowly, dig a deeper hole until the water does not puddle longer than 1 or 2 minutes. Well-drained soil is one of the most important things when planting natives as you will see in the next section.

Irrigation

Most natives do very poorly in waterlogged conditions. Do not water if the soil is damp. Water when the soil is dry and the plants are wilting. Once established, a good soaking twice a week should suffice. Deep soaking encourages the development of stronger, and deeper root systems.

The following is a watering schedule from Kenneth Nagata’s Booklet, How To Plant A Native Hawaiian Garden:

<table>
<thead>
<tr>
<th>WATER REQUIMENT</th>
<th>WATER FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy</td>
<td>3x/week</td>
</tr>
<tr>
<td>Moderate</td>
<td>2x/week</td>
</tr>
<tr>
<td>Light</td>
<td>1x/week</td>
</tr>
</tbody>
</table>

Red clay soils hold more water for a longer period of time than sandy soils do. If your area is very sunny or near a beach, things will dry out faster. Even in the area of one garden, there are parts that will need more or less water. Soils can vary and amount of shade and wind differ. After plants are established (a month or two for most plants, up to a year for some trees), you can back off watering.

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1 K. Nagata, p. 6
2 K. Nagata, p. 9
3 Nagata, p. 9
Propagation

There are many ways to propagate and plant-out native Hawaiian species. One of the most thorough and helpful books is Honolulu’s book, Growing Native Hawaiian Plants. The easiest, and best way to obtain natives for the novice gardener is to get them from a reputable nursery (see appendix c). That way, all you will have to do is know how to transplant (if necessary) and plant-out when you are ready. These are the two methods I have listed here.

Transplanting

1. Use pots that are one size bigger than the rooted plant is in
2. Get your potting medium right.

Good potting medium is a 50-50 mixture of peat moss and perlite. If the plant is from a dry or coastal area, add chunks of cinder or extra perlite. If it is a wet forest species, add more peat moss or compost. Be aware that peat moss is very acidic and certain plants react severely to acidity.

If the plant is to eventually be planted into the ground, make a mix of equal parts peat moss, perlite, and soil from the area in which the plant is to be planted. Slow-release fertilizer can be mixed into the potting medium.

3. Once potted, potting medium, fertilizer and water are ready, you can begin re-potting.

Keep the plant in the same depth at the same time. Do not move the plant to a new pot until it is in the original pot. Avoid putting the plant in too large a pot, as the plant may not be able to soak up all the water in the soil and the roots may drown and rot.

Mix potting medium and add slow-release fertilizer at this time. Pre-wet the medium to keep dust down and lessen shock to the plant. Put medium in bottom of pot. Make sure there is from 1 to 2 inches from the top of the pot so the plant can get adequate water. Try to stand the plant upright and center the stem in the middle of the pot.

Water the plant thoroughly after transplanting. A vitamin B-1 transplanting solution can help to lessen the transplant shock. Keep the plant in the same type of environment as it was before, sun or shade. If roots were broken, trim off some of the leaves to compensate for the loss.

Planting out

1. Place most native Hawaiian plants in a sunny location in soil that is well-drained.
2. Make the planting hole twice as wide as the root ball or present pot, and just as deep. If the soil is clay-like, and drains slowly, mix in some coarse sand or cinder, coarse perlite or

Automatic sprinkler systems are expensive to install and must be checked and adjusted regularly. Above-ground systems allow you to monitor how much water is being put out, but you lose a lot due to malfunctioning of sprinkler heads and wind. The most efficient way to save water and make sure your plants get enough water, is to hand-water. This way you are getting our precious water to the right places in the right amounts.

Fertilizer

An all-purpose fertilizer 10-10-10 is adequate for most species. They should be applied at planting time, 3 months later, and 6 months thereafter. Use half the dosage recommended for ornamentals and pay special attention to native plants which are sensitive to strong fertilizers. Use of organic compost and aged animal manures is suggested instead of chemical fertilizers. In addition, use of cinders for providing trace minerals is strongly recommended.

Natives are plants which were here hundreds of years before the polynesians inhabited the Hawaiian Islands. They were brought here by birds, or survived the harsh ocean conditions to float here. They are well-adapted to Hawaii’s varying soil and environmental conditions. This is why they make prime specimens for a xeriscape garden. However, natives will not thrive on their own, especially under harsh conditions. On the other hand, like any other plant, if you over-water and over-fertilize them, they will die. Follow the instructions given to you by the nursery you buy the plant from, or from this booklet. Better yet, buy a book (suggested readings can be found in the bibliography at the back of this pamphlet), read it, and learn more about native plants. I guarantee that you will be pleased with the result.

Bornhorst, p. 19-20
Nagisa, p. 6
coarse compost. Place some slow-release fertilizer at the bottom of the hole.
3. Carefully remove the plant from the container and place it in the hole.
The top of the soil should be at the same level as the top of the hole, if it is too high or too low, adjust the soil level so that the plant is at the right depth.
4. Water thoroughly after you transplant.

Mulch

Most natives cannot compete with weeds, and therefore must be weeded around constantly in order to thrive. Mulch is a practical alternative, which discourages and prevents weeds from growing.

Hawaii’s hot, humid climate leads to the breaking down of organic mulches. Thick organic mulches such as wood chips and leaves, may also be hiding places for pests.

Stone mulches are attractive, permanent and can help to improve soil quality. Red or black cinder, blue rock chips, smooth river rocks and coral chips are some natural choices.10 Macadamia nut hulls are also easy to find and can make a nice mulch.11

Never pile up mulch right next to the stem or trunk of a plant, keep it a few inches away.

PLACES TO SEE NATIVES ON:

The following places propagate native Hawaiian plants from seeds and/or cuttings. Their purpose is to protect and preserve these native plants. Please contact them before going to view the sites, they can provide valuable information and referral to other sources.

Maui:
1. Hoolawa Farms, P.O. Box 731, Haiku, Hawaii, 96708 572-4835
2. The Hawaiian Collection, 1127 Manu St., Kula, Hawaii, 96790 878-1701
3. Kula Botanical Gardens, RR 4, Box 228, Kula, Hawaii, 96790 878-1715
4. Maui Botanical Gardens, Kanaio Avenue across from stadium 243-7337
5. Kula Forest Reserve, access road at the end of Waipouli Rd. Call the Maui District Forester 984-8100
6. Wailea Point, Private Condominium residence, 4000 Wailea Alanui, public access points at Four Seasons Resort or Polo Beach 875-9557
8. Kahului Library Courtyard, 20 School Street, Kahului, Hawaii 873-3097

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10 Bomboist, p. 24
11 Nagata, p. 7
ZONES

The Maui County Planning Plan has compiled a system of 5 zones of plant growth for Maui County. The descriptions of zones and maps for these zones are as follows:

Zone 1:
Wet areas on the windward side of the island. More than 40 inches of rain per year. Higher than 3,000 feet.

Zone 2:
Cool, dry areas in higher elevations (above 1,000 feet). 20 to 40 inches of rain per year.

Zone 3:
Low, drier area, warm to hot. Less than 20 inches of rain per year. Sea level to 1,000 feet.

Zone 4:
Lower elevations which are wetter due to proximity of mountains. 1,000 to 3,000 feet.

Zone 5:
Salt spray zones in coastal areas on the windward side.

These zones are to be used as a general guide to planting for Maui County. In addition to looking at the maps, read the descriptions of the zones and decide which zone best fits your area. Plants can be fitted in more than one zone and can be planted in a variety of conditions. For best results, take notes on the rainfall, wind, sun and soil conditions of your site. Use the zones as a general guide for selection and read about the plants to decide which best fits your needs as far as care and function.

PLACES TO BUY NATIVES ON:

Maui:

1. Hoolawa Farms, P.O. Box 731, Halma, Hawaii, 96708
   The largest and best collection of natives in the state
   They will deliver, but it's worth the drive to go and see!
   Will propagate upon request
   572-4835

2. Kula True Value Nursery
   Many natives in stock
   Get most of their plants from Hoolawa farms
   They take special requests
   878-2557

3. Kihei Garden and Landscape
   244-3804

4. Maui Garden and Hardware
   Will bring in special orders
   877-0447

5. Kahana Nursery, Kihei
   879-1165

6. Peiklani Plant Company, Jimmy Jones
   Commercial wholesale only
   572-8950

7. The Hawaiian Collection
   Specialize in Sandalwood propagation
   Will propagate special requests
   878-1701
### Zone-specific Native and Polynesian plants for Maui County

#### Zone 3

<table>
<thead>
<tr>
<th>Type</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Height</th>
<th>Spread</th>
<th>Elevation</th>
<th>Water req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS</td>
<td>Hevea brasiliensis var. pachypoda</td>
<td>Banyan tree</td>
<td>3m</td>
<td>4m</td>
<td>see to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>SS</td>
<td>Gmelina arborea</td>
<td>Leadwood</td>
<td>7m</td>
<td>3m</td>
<td>see to 1,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>SS</td>
<td>Calophyllum inophyllum</td>
<td>Indian rosewood</td>
<td>15m</td>
<td>5m</td>
<td>see to 1,000'</td>
<td>Medium to Medium</td>
</tr>
</tbody>
</table>

#### Zone-specific Native and Polynesian plants for Maui County

## Zone 3

<table>
<thead>
<tr>
<th>TYPE</th>
<th>F Fern</th>
<th>G Gross</th>
<th>Gr Ground Cover</th>
<th>Sh Shrub</th>
<th>P Palm</th>
<th>S Sedge</th>
<th>Tr Treo</th>
<th>V Vine</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Pipturus nodatum</td>
<td>Pipturus</td>
<td>0.5'</td>
<td>see to 3,000'</td>
<td>Dry to Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Gynura esculenta</td>
<td>Gynura</td>
<td>0.5'</td>
<td>see to 3,000'</td>
<td>Dry to Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gr</td>
<td>Grindelia tomentosa</td>
<td>Grindelia</td>
<td>0.5'</td>
<td>see to 3,000'</td>
<td>Dry to Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sh</td>
<td>Schiedea densiflora</td>
<td>Schiedea</td>
<td>0.5'</td>
<td>see to 3,000'</td>
<td>Dry to Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Pipturus ascendens</td>
<td>Pipturus</td>
<td>0.5'</td>
<td>see to 3,000'</td>
<td>Dry to Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Gynura esculenta</td>
<td>Gynura</td>
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<td>Dry to Medium</td>
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<td></td>
<td></td>
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<th>Height</th>
<th>Spread</th>
<th>Elevation</th>
<th>Water req</th>
</tr>
</thead>
<tbody>
<tr>
<td>1F</td>
<td>Morinda citrifolia</td>
<td>Indian mulberry, nona</td>
<td>20'</td>
<td>15'</td>
<td>sea to 1,000'</td>
<td>Dry to Wet</td>
</tr>
<tr>
<td>1F</td>
<td>Nootka myrcinaea</td>
<td>keahi</td>
<td>15'</td>
<td>15'</td>
<td>sea to 2,000'</td>
<td>Dry</td>
</tr>
<tr>
<td>1F</td>
<td>Mastix sandwicensis</td>
<td>paipua</td>
<td>15'</td>
<td>15'</td>
<td>1,000' to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>1F</td>
<td>Pinus densiflora</td>
<td>kani, sukale (PICEA)</td>
<td>30'</td>
<td>25'</td>
<td>sea to 1,000'</td>
<td>Dry to Wet</td>
</tr>
<tr>
<td>1F</td>
<td>Planchonella acuminata</td>
<td>kokepe</td>
<td>20'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1F</td>
<td>Halimodendron hirsutum</td>
<td>koa</td>
<td>15'</td>
<td>15'</td>
<td>1,000' to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>1F</td>
<td>Haploppappus sandwicensis</td>
<td>ohi</td>
<td>30'</td>
<td>20'</td>
<td>sea to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>1F</td>
<td>Smilax osyphaca</td>
<td>kokele sandwood, wahi</td>
<td>6'</td>
<td>6'</td>
<td>sea to 3,000'</td>
<td>Dry to Wet</td>
</tr>
<tr>
<td>1F</td>
<td>Thespesia populnea</td>
<td>halo</td>
<td>30'</td>
<td>20'</td>
<td>sea to 3,000'</td>
<td>Dry to Wet</td>
</tr>
</tbody>
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<th>Elevation</th>
<th>Water req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sh</td>
<td>Hedyotis sp.</td>
<td><em>hui</em> pako</td>
<td>3'</td>
<td>2'</td>
<td>1,000' to 3,000'</td>
<td>Dry to Wet</td>
</tr>
<tr>
<td>Sh</td>
<td>Lichocoma samoana</td>
<td><em>ama</em></td>
<td>3'</td>
<td>3'</td>
<td>sea to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Costus rhizomatus</td>
<td><em>pata</em></td>
<td>4'</td>
<td>6'</td>
<td>sea to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Dictyadum roxburghii</td>
<td><em>hulua</em></td>
<td>3'</td>
<td>6'</td>
<td>sea to 1,700'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Sinarra tenuifolia</td>
<td><em>otu</em></td>
<td>5'</td>
<td>7'</td>
<td>sea to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Palmae integrifolia</td>
<td><em>kakau</em></td>
<td>3'</td>
<td>1'</td>
<td>sea to 1,200'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Vitis quinquangularis</td>
<td><em>mala</em></td>
<td>3'</td>
<td>1'</td>
<td>sea to 1,200'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Waiawa kahili eaulanais suilua</td>
<td><em>holualo</em></td>
<td>10'</td>
<td>10'</td>
<td>sea to higher</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Dodonaea viscosa</td>
<td><em>kahi</em></td>
<td>5'</td>
<td>6'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Sh</td>
<td>Dodonaea viscosa</td>
<td><em>kahi</em></td>
<td>5'</td>
<td>6'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Tr</td>
<td>Caesalpinia glauca</td>
<td><em>akakau</em></td>
<td>20'</td>
<td>20'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Tr</td>
<td>Ceanothus thyrsiflorus</td>
<td><em>niihaua</em></td>
<td>20'</td>
<td>10'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Tr</td>
<td>Huperzia selago</td>
<td><em>niihaua</em></td>
<td>20'</td>
<td>10'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Tr</td>
<td>Pandura kahili eaula</td>
<td><em>palapala</em></td>
<td>25'</td>
<td>25'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>Tr</td>
<td>Therapetes popoula</td>
<td><em>popoula</em></td>
<td>20'</td>
<td>20'</td>
<td>sea to 3,000'</td>
<td>Dry to Medium</td>
</tr>
<tr>
<td>V</td>
<td>Spondias porifica</td>
<td><em>mau</em> maunawalea, koricanui*</td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
</tr>
</tbody>
</table>

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### Zone-specific Native and Polynesian plants for Maui County

<table>
<thead>
<tr>
<th>TYPE: F Fern</th>
<th>G Grass</th>
<th>Gr Ground Cover</th>
<th>Sh Shrub</th>
<th>P Palm</th>
<th>S Sedge</th>
<th>Tr Tree</th>
<th>V Vine</th>
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</thead>
<tbody>
<tr>
<td>Type</td>
<td>Scientific Name</td>
<td>Common Name</td>
<td>Height</td>
<td>Spread</td>
<td>Elevation</td>
<td>Water req.</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Harpephalum aestivum</td>
<td><em>hui</em> pako</td>
<td>3'</td>
<td>3'</td>
<td>sea to 1,000'</td>
<td>Dry to Wet</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Enhalus sp.</td>
<td><em>hua</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Fimbristylis eugeniae</td>
<td><em>apa</em> kahiko</td>
<td>0.5'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Dichotoma hexagona</td>
<td><em>kaa</em></td>
<td>0.5'</td>
<td>2'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Cladium jamaicense var. tenuiflorum</td>
<td><em>kaa</em></td>
<td>1.5'</td>
<td>2'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
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<tr>
<td>G</td>
<td>Gracilis tenella</td>
<td><em>lau</em></td>
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<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
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</tr>
<tr>
<td>G</td>
<td>Halodule uninervis var. argentea</td>
<td><em>kakahihi</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
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</tr>
<tr>
<td>G</td>
<td>Justicia capensis</td>
<td><em>hoku</em></td>
<td>0.5'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Gossypium hirsutum</td>
<td><em>hau</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Sesuvium portulacastrum</td>
<td><em>kapalapa</em></td>
<td>0.5'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
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</tr>
<tr>
<td>G</td>
<td>Sida variegata</td>
<td><em>huina</em></td>
<td>0.5'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Trianthopsis purpurea var. purpurea</td>
<td><em>hau</em></td>
<td>2'</td>
<td>2'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Maranta arundinacea var. hirta</td>
<td><em>hau</em></td>
<td>2'</td>
<td>2'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Lycopus salicifolius</td>
<td><em>hau</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Cocos nucifera</td>
<td><em>hau</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Phyllostachys edulis</td>
<td><em>hau</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
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<tr>
<td>S</td>
<td>Morus alba</td>
<td><em>hau</em></td>
<td>0.5'</td>
<td>0.5'</td>
<td>sea to 1,000'</td>
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</tr>
<tr>
<td>Sh</td>
<td>Aristida sp.</td>
<td><em>hau</em></td>
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<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>Sh</td>
<td>Atricharia filifolia</td>
<td><em>hau</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
</tr>
<tr>
<td>Sh</td>
<td>Eleocharis microstachys var. microstachys</td>
<td><em>hau</em></td>
<td>1'</td>
<td>1'</td>
<td>sea to 1,000'</td>
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</tr>
<tr>
<td>Sh</td>
<td>Chloris viridula</td>
<td><em>hau</em></td>
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<td>0.5'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
<td></td>
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<tr>
<td>Sh</td>
<td>Echinochloa crus-galli</td>
<td><em>hau</em></td>
<td>2'</td>
<td>2'</td>
<td>sea to 1,000'</td>
<td>Dry to Medium</td>
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</tr>
<tr>
<td>Sh</td>
<td>Cenchrus echinatus</td>
<td><em>hau</em></td>
<td>2'</td>
<td>2'</td>
<td>sea to 1,000'</td>
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<td></td>
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</tbody>
</table>
### DO NOT PLANT THESE PLANTS !!!

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>Plant family</th>
</tr>
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<td>...</td>
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Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990
Chapter 4

| VII. ROADS, HIGHWAYS, AND BRIDGES |

NOTE: Management Measures 2A and 2B of this chapter also apply to planning, siting, and developing roads and highways.

1. Management Measure for Planning, Siting, and Developing Roads and Highways:

   a. Plan, site, and develop roads and highways to:
      1. Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;
      2. Limit land disturbance such as clearing, grading, and cutting and fill to reduce erosion and sediment loss and
      3. Limit disturbance of natural drainage features and vegetation.

   b. Applicability

This measure is intended to be applied by States in size development and land disturbing activities for new, relocated, and reconstructed (widened) roads (including residential streets) and highways in order to reduce the generation of nonpoint source pollutants and to mitigate the impacts of urban runoff and associated pollutants from such activities.

Under the Coastal Zone Management Act Amendments of 1992, States are subject to a number of requirements as they develop coastal NPS programs in accordance with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in the Coastwide Pollution Control Program: Program Development and Approval Guidance, published jointly by the U.S. Department of the Environment Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA). The U.S. Department of Commerce.

2. Description

The intent is to address erosion of NPS pollutants from roads and highways during the initial planning and design phases. New roads and highways should be located with consideration of natural drainage patterns and planned to avoid encroachment on surface waters and wetlands. Where this is not possible, appropriate controls will be needed to maintain the impact of NPS runoff on surface waters.

This management measure emphasizes the importance of planning to identify potential NPS problem areas in the design process. This process involves a detailed analysis of environmental features associated with NPS pollution sources and sediment problems such as topography, drainage patterns, soils, climate, existing land use, external traffic volume, and sensitive land areas. Highway locations selected, planned, and designed with consideration of these features will greatly minimize erosion and sedimentation and prevent NPS pollutants from entering waterbodies during and after construction. An important consideration in planning is the distance between

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 CASE STUDY: MINNEAPOLIS, MARYLAND

Plow road surfacing and design resulted in concentrated runoff flows and heavy erosion that threatened several lake areas adjacent to the road. Swilled搬到 runoff was also discharged into Honey Lake. To protect the Mississippi Lake and the nearby houses, the county corrected the problem by installing erosion controls, a subsurface-urban runoff system, and a rock wall barrier system, at a total cost of $100,000 (Munsey, 1992).

3. Management Measure Selection

This management measure was selected because it follows the approach to highway development recommended by the American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHWA) guidelines, and highway location and design guidelines used by the States of Virginia, Maryland, Washington, and others.

Additionally, AASHTO has location and design guidelines (AASHTO, 1990, 1992) available for State highway agency use that describe the considerations necessary to control erosion and highway-related pollutants. Federal Highway Administration policy (FHWA, 1991) requires that Federal-aid highway projects and highways constructed under direct supervision of the FHWA be located, designed, constructed, and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface water sources and ground water resources.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. These practices are not intended to guarantee implementation of these practices. However, as a practical matter, EPA anticipates that the management measures described above will be applied by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

a. Consider type and location of permanent erosion and sediment controls (e.g., vegetated filter strips, grassed swales, pond systems, infiltration systems, constructed urban runoff wetlands, and energy dissipaters and velocity control) during the planning phase of roads, highways, and bridges. (AASHTO, 1990; Hartigan et al., 1993)

b. All watersheds that are within the highway corridor and that cannot be avoided should be mitigated. These actions will be subject to Federal Clean Water Act section 404 requirements and State regulations.

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c. Assess and establish adequate setback distances near wetlands, waterbodies, and riparian areas to ensure protection from encroachment in the vicinity of these areas.

Setback distances should be determined on a site-specific basis since several variables may be involved such as topography, soils, floodplains, cut-and-fill slopes, and design geometry. In areas of gently sloping terrain, a general rule of thumb is to establish a setback of 50 to 100 feet from the edge of the wetland or riparian area and the right-of-way setbacks from major waterbodies (streams, lakes, reservoirs, rivers) should be in excess of 100 to 1000 feet.

d. Avoid locations requiring excessive cut and fill. (AASHTO, 1991)

e. Avoid locations subject to subsidence, sink holes, landslides, rock outcroppings, and highly erodible soils. (AASHTO, 1991; TRB, Campbell, 1988)

f. Silt rights-of-way to include space for silt runoff pollution control structures as appropriate. (AASHTO, 1991; Marten, et al., 1990)

Erosion and sediment control structures (siltation detention dry ponds, permeable sediment traps, septic tank basins, etc.) should be planned and located during the design phase and included as part of the design specifications to ensure that such structures, where needed, are provided within the highway right-of-way.

g. Plan residential residential and streets in accordance with local subdivision regulations, zoning ordinances, and other local site planning requirements (International City Managers Association, Model Zoning/Subdivision Code). Residential road and street pavements should be designed with minimum widths. Local roads and streets should have a right-of-way width of 32 to 50 feet, with lane widths of 10 to 12 feet. Minimum pavement widths for residential streets where street parking is permitted range from 24 to 28 feet between curbs. In large lots subdivisions (1 acre or more), gravel driveway swales can be used in lieu of curbs and gutters and the width of paved road sections can be between 18 and 20 feet.

h. Select the most economic and environmentally sound route location. (FHWA, 1991)

i. Use appropriate computer models and methods to determine urban runoff impacts with all proposed route options. (DiCiccio, 1990)

Computer models to describe urban runoff from streets and highways include TR-55 (Soil Conservation Service model) for calculating peak runoff; the P-5 model to determine effective capacity (McCormick and Wallis); the FHWA computer analysis model (FHWA, 1990); and others (e.g., SWMM, EPA's stormwater management model (ESPM computer analysis model). (FHWA, 1990)

j. Comply with National Environmental Policy Act requirements including other State and local requirements (FHWA, 1990)

k. Coordinate the design of pollution controls with appropriate State and Federal environmental agencies. (Maryland DOE, 1982)
4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. These programs need not implement all of these practices. However, the(orig p. has been left off)
the EPA anticipates that the management measures set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth above have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measures described above.

Additional criteria and specific management practices are defined in the construction section for urban sources of pollutants (Management Measure IV).

- a. Coordinate design with FHWA, USG, COE, and other State and Federal agencies as appropriate.
- b. Review National Environmental Policy Act requirements to ensure that environmental concerns are met (FHWA, 1975-6, and 25 CFR 771).
- d. Direct pollutant loadings away from bridge decks by channeling runoff waters to land for treatment.

Bridge decks should be designed to accommodate vehicle flow and control pollutant loadings. Runoff waters should be conveyed away from contact with the water surface and directed to a stable storm drainage, wetland, or detention pond. Conveyance systems should be designed to withstand the velocities of projected peak discharge.

- e. Prevent the use of captured runoff at bridge decks less than 400 feet in length and on bridges crossing very sensitive ecosystems.

- f. Site and design new bridges in sensitive ecosystems.

- g. On bridges with captured runoff, provide equivalent urban runoff treatment in terms of pollutant load reduction elsewhere on the project to compensate for the loading discharged off the bridge.

5. Effectiveness Information and Cost Information

Effectively controlling NPS pollutants such as road contamination, fugitive dust, and debris and preventing accidental spills from runoff surface waters via bridge decks are necessary to protect wetlands and other sensitive ecosystems. Therefore, management practices such as minimizing the use of captured runoff and diverting runoff to land use may be required to protect sensitive ecosystems.

Tables 4.1-4.8 in Section 5 provide costs and effectiveness data for ponds, constructed wetlands, and filtration devices.
C. Management Measure for Construction Projects

1. Applicability

This management measure is intended to be applied by States to new, replaced, repaired, and rehabilitated roadway, and bridge construction projects in order to control erosion and other movements of sediments from such projects. It is applicable to all State DOTs and any Federal transportation agencies in the United States.

2. Description

Erosion and sedimentation from construction of roads, highways, and bridges, and from uncontrolled cut-and-fill areas, can significantly impact waterways and wetlands with silt and other pollutants including heavy metals, mimicking erosion problems at construction sites before any land-disturbing activity begins. Additional relevant practices are described in Management Measure III.A.1 and III.B.1 of this chapter.

Bridge construction projects include grade separations (bridges over roads) and pedestrian crossings. Erosion problems at grade separations result from water entering the bridge deck during construction. Controlling this runoff can prevent erosion of slope fills and the eroding of the bridge deck. Bridge construction over waterways requires careful planning to limit the disturbance of shoreline. Silt materials excavated for foundations or fill near the water should be removed before construction begins. Protecting the shoreline during construction can be effective in preventing sediment from reaching the waterbody.

Wetland areas will need special consideration if affected by highway construction, particularly in areas where construction involves filling, cutting, or grading fill areas. In wetland areas, the construction process should consider the environmental impact of the project to avoid disturbance of the wetland areas.

3. Management Measure Selection

This management measure was selected because it represents FHWA’s erosion and sediment control policy for all highway and bridge construction projects and in the administrative policy of several State highway departments and local governmental agencies involved in land development activities. Examples of erosion and sediment control are described in AASHTO guidelines and to several State erosion control manuals (AASHTO, 1991; North Carolina DOT, 1991; Washington State DOT, 1988). A detailed discussion of cost-effective management practices is available in the Urban Development Section (Section III) of this chapter. These erosion control measures are also effective in highway construction projects.

Practices

As discussed fully in the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need to require implementation of these practices. However, in a practical sense, EPA anticipates that the management measure as forth above will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section (Section III) of this chapter.

- b. Erosion control practices

4. Construction and scheduling of the project work with State and local authorities are major considerations in controlling uncontrolled erosion and sediment problems. The following considerations are included in the project work schedule and plan that indicate planned implementation of temporary and permanent erosion control practices, including the use of erosion control practices, and the maintenance of project work schedules.

Erosion control measures and their significance are described in the Urban Development Section (Section III) of this chapter. These erosion control measures are also effective in highway construction projects.

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CASE STUDY - BRIDGING WETLANDS IN LOUISIANA

To provide protection for an environmentally critical wetland outside New Orleans, the Louisiana Department of Transportation and Development (DOTD) utilized a special construction technique to build almost 2 miles of new navigable structures for the Intracoastal Waterway between I-10 and U.S. Route 60. A technique known as "on-" construction was employed to work from the shore of the structures, building each section of the bridge from the top of the last completed section and using large cranes to push each section forward one day at a time. The cranes were also used to position steel platforms, drive in support piles, and lay deck slabs, eliminating this procedure between each day. Without this technique, the Louisiana DOTD would not have been permitted to build this structure. The new $100 million bridges took 46 days to complete at a cost of $24.5 million (Engineering News Record, 1991).

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c. Install permanent erosion and sediment control structures at the earliest practicable time in the construction phase.

Permanent or temporary soil stabilization practices should be applied to cleared areas within 15 days after final grade is reached on any portion of the site. Soil stabilization should also be applied within 15 days to disturbed areas that may be at final grade but will remain exposed to rain for 30 days or more. Soil stabilization practices protect soil from the erosive forces of rainfall, wind, and flowing water. Temporary erosion control practices usually include seeding, mulching, establishing vegetation, and applying a gravel base on areas to be paved. Permanent soil stabilization practices include reseeding, fishtail, and structural devices.

d. Coordinate temporary erosion and sediment control structures with permanent practices.

All temporary erosion and sediment controls should be removed and disposed of within 10 days after final soil stabilization is achieved, or before the temporary practices are no longer needed. Trapped sediment and other disturbed soil areas resulting from the placement of temporary controls should be permanently stabilized to prevent further erosion and sedimentation (AASHTO, 1991).

e. Wash all vehicles prior to leaving the construction site to remove mud and other debris. Vehicles entering or leaving the site with trash or other loose materials shall be covered to prevent transport of dust, dirt, and debris. Install and maintain mud and silt traps.

f. Mitigate wetland areas destroyed during construction.

Wetlands and some types of wetlands can often be developed in areas where fill material was otherwise needed, or in areas that were developed for construction purposes. Mitigation of wetlands areas established along the wetland areas (FHWA, 1991).

g.Advance the area that is cleared for construction.

h. Construct cut-and-fill slopes in a manner that will minimize erosion.

Cut-and-fill slopes should be constructed in a manner that will minimize erosion by taking into consideration the length and steepness of slopes, soil types, upland drainage areas, and water flow conditions. Suggested treatments for cut-and-fill slopes are as follows: reduce the length of long steep slopes; adding diverts to or terraces; prevent concentrating runoff from flowing down long cut-and-fill slopes by controlling pore flow within fill or slope drain structures; and create reinforced soil surfaces on cut-and-fill slopes by storing runoff flow directly on the steep surface. Wherever a slope face exceeds 25 degrees, adequate subsoil drainage should be provided.

i. Minimize runoff entering and leaving the site through perimeter and create sediment controls.

j. Inspect and maintain erosion and sediment control practices (both on-site and perimeter) and disturbed areas are permanently stabilized.
Chapter 4

4. Practices

As discussed more fully in the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. Since progress needs more implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

The practices that are applicable to this management measure are described in Section III.B.

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness data presented in the Section III.A of this chapter describing NPS controls for construction projects in urban development areas are also applicable to highway construction projects.
Management Measure for Operation and Maintenance
Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

1. Applicability
This management measure is intended to be applied by States to existing, renewed, and rehabilitated roads, highways, and bridges. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of measures by States is described more fully in Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description
Substantial amounts of eroded material and other pollutants can be generated by operation and maintenance procedures for roads, highways, and bridges. When conducted improperly, these operations can result in increased pollutant loadings. This measure is intended to ensure that pollutant loadings from roads, highways, and bridges are minimized by the development and implementation of a program and operational procedures to ensure that maintenance and highway activities do not cause excessive surface runoff. The program to be developed, using the practices described in this management measure, should consist of, and identify standard operating procedures for preventive and corrective maintenance, responsible maintenance, and maintenance guidelines (e.g., capture of on-site plant debris and other materials from bridge maintenance operations, surfacing, and periodic inspection).

3. Management Measure Selection
This management measure for operation and maintenance was selected because (1) it is recommended by FHWA as a cost-effective practice; (2) it is effective in controlling erosion by vegetating slopes; (3) it is effective in controlling sediment; (4) it is effective in minimizing pollutant loadings from road pavements; (5) it is effective in controlling sediment; (6) it is effective in minimizing pollutant loadings from road pavements; and (7) both Federal and State highway agencies (Mississippi Pollution Control Agency, 1985; FHWA, 1973) advocate highway maintenance as an effective practice for minimizing pollutant loadings.

Maintenance of erosion and sediment control practices is of critical importance. Both temporary and permanent erosion control practices require frequent and periodic removal of accumulated sediment. Any crumbling or flaking device, such as all fences, sediment basins, buffers, ditches, and check dams, should be checked and cleaned out when approximately 50 percent of their capacity is reached and determined by the erodible nature of the soil, flow velocity, and quantity of runoff. Seasonal and climatic differences may require more frequent cleaning of these structures. The sediments removed from these control devices should be deposited in permanetly stabilized area to prevent further erosion and sediment from reaching drainage and existing streams. After periods of use, control devices may require replacement of damaged materials such as sump basins and silt fence fabrics, or removal and reconstruction of sediment basins and sump installations.

4. Practices
As discussed more fully at the beginning of this chapter and in Chapter 4, the following practices are described for illustrative purposes only. These practices are intended to illustrate the potential benefits of implementing these practices. However, as a practical matter, EPA anticipates that the management measures set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measures described above.

- a. Seed and fertilize, seed and mulch, and/or sod damaged vegetated areas and slopes.
- b. Establish best management use and nutrient management programs.
- c. Maintain erosion and sediment control practices.
- d. Use alternative erosion control materials, such as soil or soil substitutes, where sensitive ecosystems should be protected.
- e. Maintain erosion and sediment control practices.
- f. Maintain erosion and sediment control practices.
- g. Maintain erosion and sediment control practices.
- h. Maintain erosion and sediment control practices.
- i. Maintain erosion and sediment control practices.
- j. Maintain erosion and sediment control practices.
- k. Maintain erosion and sediment control practices.
- l. Maintain erosion and sediment control practices.
- m. Maintain erosion and sediment control practices.
- n. Maintain erosion and sediment control practices.
Chapter 4

VII. Roads, Highways, and Bridges

5. Effectiveness Information and Cost Information

Preventive maintenance is a time-proven, cost-effective management approach. Operation schedules and maintenance procedures to remove vegetation, proper management of salt and fertilizer application, regular cleaning of urban roadways, and frequent cleaning and vacuuming of urban streets have effective results in pollution control. Proper inspection, clean-up, and fix-up practices are low-cost means for eliminating sources of pollutants, as is the proper operation information to site costs and effectiveness of operations and maintenance practices for roads, highways, and bridges. Many States and communities are already implementing several of these practices within their budget constraints. Table 4-10 presents some cost-savings for various measures. The use of various alternatives such as calcium magnesium acetate (CMA) can be very costly. Some researchers have indicated, however, that reducing the use of CMA, the use of more effective salt application, and the use of less material that needs to be applied may offset the higher cost of CMA. This reduction in the use of salt and salt minimization practices such as salt storage practice and special salt operating equipment reduces the amount of salt that a State or community must purchase. Consequently, implementation of these practices can also lead to decreased expenditures for materials.
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<th>Pb</th>
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* - not applicable.
* Measured as reduction in salt.
* Measured as reduction of all pollutants.

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<tr>
<td>Average</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Reported Range:</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Probable Range:</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>STREET SWEEPING</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>Arg: $50/cu yd Reported Range: $10-$300 cu yd mile</td>
</tr>
<tr>
<td>Smooth Street, Frequent Clearing (One Pass Per Year)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Reported Range:</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Probable Range:</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Infrquent Clearing (One Pass Per Month or Less)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Reported Range:</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Probable Range:</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>LITTER CONTROL</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Generally accepted as an economical approach to control excessive use</td>
</tr>
<tr>
<td>Average</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Reported Range:</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Probable Range:</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>
3. Management Measure Selection

This management measure was selected because of the demonstrated effectiveness of runoff control for existing roads and highways that were constructed with inadequate or no stormwater pollution controls or without such controls. Traditional practices for mitigating pollution runoff from existing highways are described in the literature (Sherman, 1988).

4. Practices

At the time of this guide, no specific practices are recommended for this measure. These practices are not specific to this project. However, some general practices that may be considered include:

- Locate runoff treatment facilities within existing rights-of-way or in medians and interchange loops.
- Develop multiple-use treatment facilities on adjacent lands (e.g., parks and golf courses).
- Acquire additional land for locating treatment facilities.
- Use underground storage where no alternative is available.
- Maximize the length and width of vegetated filter strips to slow the travel time of sheet flow and increase the infiltration rate of urban runoff.

5. Effectiveness Information and Cost Information

Cost and effectiveness data for structural urban runoff management and pollution control facilities are outlined in Tables 4-15 and 4-16 in Section III and discussed in Section IV of this chapter and are applicable to determine the costs and effectiveness of runoff projects. Runoff projects can only be more easily constructed because of the need to locate the required structures within existing space or to locate the structures within adjacent property that requires purchase. However, the use of multiple-use facilities on adjacent lands, such as diverting runoff from public or golf course, can offset this cost. Nonstructural practices designed to be used in urban areas can also be effective in achieving source control. As with other sections of this document, the costs of loss of fabric, fisheries, and recreation areas must be weighed against the cost of constructing control structures within existing rights-of-way.

6. Pollutants of Concern

Table 4-11 lists the pollutants currently found in urban runoff from roads, highways, and bridges and their sources. The magnitude of pollutants is measured in high runoff are site-specific and are affected by traffic volume, road or highway design, surrounding land use, climate, and accidental spills. The FPAW conducted an extensive field monitoring and laboratory analysis program to determine the pollutant concentration in highway runoff from 31 sites in 17 states (Dixell et al., 1990). The study was conducted in the study for a number of pollutants are presented in Table 4-12. The study also indicated that for highway discharging into streams, the pollutants of major concern are phenols and heavy metals. For highways discharging into streams, the pollutants of major concern are heavy metals—cadmium, copper, lead, and zinc.
### Table 4-31: Highway Runoff Constituents and Their Primary Sources

<table>
<thead>
<tr>
<th>Constituents</th>
<th>Primary Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraffins</td>
<td>Paved pavement, vehicles, atmosphere, maintenance</td>
</tr>
<tr>
<td>Nitrogen, Phosphorus</td>
<td>Atmospheric, nutrients, fertilizer application</td>
</tr>
<tr>
<td>Lead</td>
<td>Leaded gasoline (auto exhaust), tire wear (lead oxide fiber material), lubricating oil and grease, bearing wear</td>
</tr>
<tr>
<td>Zinc</td>
<td>Tire wear (fiber material), motor oil (dissolving additives), grease</td>
</tr>
<tr>
<td>Iron</td>
<td>Auto body rust, steel highway structures (guard rails, bridges, etc.), moving engine parts</td>
</tr>
<tr>
<td>Copper</td>
<td>Metal plating, leaking and breaking wear, moving engine parts, brake lining wear, Ginsoids and insulators</td>
</tr>
<tr>
<td>Chromium</td>
<td>Tire wear (fiber material), incineration application</td>
</tr>
<tr>
<td>Nickel</td>
<td>Metal plating, moving engine parts, brake lining wear</td>
</tr>
<tr>
<td>Manganese</td>
<td>Moving engine parts</td>
</tr>
<tr>
<td>Cyanide</td>
<td>Antiseptic compound (lead ferrocyanide, sodium ferrocyanide, yellow prussiate of soda) used to keep deicing salt granular</td>
</tr>
<tr>
<td>Sodium, Calcium, Chloride</td>
<td>Deicing salt</td>
</tr>
<tr>
<td>Sulfate</td>
<td>Roadway bed, fuel, deicing salt</td>
</tr>
<tr>
<td>Petroleum</td>
<td>Spills, leaks or spillage of motor lubricants, antifreeze and hydraulic fluids, spent surface fuels</td>
</tr>
</tbody>
</table>

In order to reduce the chances of pollution, the use of chemicals and devices are the largest source of pollutants during winter months. Deicing salt (usually sodium chloride, NaCl) is the most commonly used agent. Potential pollutants from deicing salt include sodium chloride, lead ferrocyanide (used to keep the salt in granular form), and sulfates such as ginsol. Table 4-33 summarizes several environmental impacts caused by road salt. Other chemicals used as a salt substitute include calcium magnesium acetate (CMA) and less frequently, urea and glycol compounds. Research on the effects of deicing chemicals on the environmental release of CMA compared to those of road salt (Chesman Chemical Company, 1997; Setzler, updated; Transportation Research Board, 1991).

### Table 4-32: Pollutant Concentrations in Highway Runoff (Chesman et al. 1990)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Event Mean Concentration for Highways With Fewer Than 30,000 Vehicles/Day* (mg/L)</th>
<th>Event Mean Concentration for Highways With More Than 30,000 Vehicles/Day* (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>142</td>
<td>41</td>
</tr>
<tr>
<td>Volatile Suspended Solids</td>
<td>39</td>
<td>12</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
<td>114</td>
<td>49</td>
</tr>
<tr>
<td>Nitrate and Nitrite</td>
<td>0.76</td>
<td>0.46</td>
</tr>
<tr>
<td>Total Dissolved Nitrogen</td>
<td>1.83</td>
<td>0.87</td>
</tr>
<tr>
<td>Phosphate Phosphorus</td>
<td>0.40</td>
<td>0.15</td>
</tr>
<tr>
<td>Copper</td>
<td>0.054</td>
<td>0.022</td>
</tr>
<tr>
<td>Lead</td>
<td>0.400</td>
<td>0.060</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.323</td>
<td>0.060</td>
</tr>
</tbody>
</table>

*Event mean concentrations are for the 50% median site.

### Table 4-33: Potential Environmental Impacts of Road Salt

<table>
<thead>
<tr>
<th>Environmental Resource</th>
<th>Potential Environmental Impact of Road Salt (NaCl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sols</td>
<td>May accumulate in soil. Breaks down soil structure, increases erosion. Causes soil compaction that results in decreased permeability.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Causes stress and soil composition harm root systems. Spray causes leaves and stems to die. Many plant species are susceptible.</td>
</tr>
<tr>
<td>Ground Water</td>
<td>Causes water pollution. NaCl and Cl ions readily reach ground water. Increases NaCl concentration in well water, as well as salinity and hardness.</td>
</tr>
<tr>
<td>Surface Water</td>
<td>Causes density stratification in ponds and lakes that can prevent oxygenation. Increases risk of heavy metals and nutrients through increased erosion.</td>
</tr>
<tr>
<td>Aquatic Life</td>
<td>Maintains fit and Cl ions stress aquatic biota. Toxic levels: NaCl &gt; 500 ppm for anadromous; Cl &gt; 400 ppm for most</td>
</tr>
<tr>
<td>Human/Mammalian</td>
<td>Sodium is linked to heart disease and hypertension. Chloride causes respiratory illness in drinking water. May cause skin and eye irritation. Acute oral LD₅₀ in rats is approximately 3,000 mg/kg (lightly toxic).</td>
</tr>
</tbody>
</table>
APPENDIX C

REFERENCES FOR FURTHER READING

◆ BEST MANAGEMENT PRACTICES


"Hobbs Brook Reservoir Sodium Chloride Study". MDPW, City of Cambridge, and Geotechnical Engineers, Inc., 1985.


GROUNDWATER


LAND MANAGEMENT AND ZONING


"Guidelines for Zone II Delinication", Division of Water Supply. DEP.

"Inventory of Local Regulations Pertaining to Water Quality in Buzzards Bay". Southeastern Regional Planning and Economic Development District., 1987.


"Listing of Water Supply Protection Controls for Communities Within Massachusetts". DEP, Division of Water Supply., 1989.


LEGAL


Title 5: Minimum Requirements For The Subsurface Disposal Of Sanitary Sewage. Massachusetts State Environmental Code, 310 CMR 15.00.
MUNICIPAL BOARDS AND COMMISSIONS


"Directory of Selected Environmental and Planning Outreach and Technical Assistance Programs in Massachusetts". DEP-Division of Water Pollution Control, 1991.


NONPOINT SOURCE POLLUTION


"Buzzards Bay Project, Bacterial Contamination of Shellfish, Fact Sheet #1". EPA, 1989.


"Effects of Stormwater Surface Runoff on Freshwater Wetlands". R. Newton, University of Massachusetts, 1985.


"Nonpoint Source Pollution: An Outline of Basic Information".  DEP, Div. of Water Pollution Control., 1987.

"Nonpoint Source Pollution Assessment Report".  DEP, Div. of Water Pollution Control., 1995.

"Nonpoint Source Pollution Management Plan".  DEP, Div. of Water Pollution Control., 1989.


"Pollution Sources in Butternut Bay".  Buzzards Bay Project Brochure.


"Wastewater Management Alternatives for Rural Lakefront Communities".  Griffen, R. and R. Nott, University of Massachusetts, Department of Civil Engineering, Amherst, MA., 1985.

■ SURFACE WATER

(Ponds, Lakes, Reservoirs, Creeks, Rivers, Estuaries, Coastal Areas)

"Adopt-A-Stream Workbook—How to Protect Your Favorite River, Stream, or Brook".  Massachusetts Department of Fish and Wildlife, Division of Environmental Protection, 1983.

"Guide to Land Use in Massachusetts".  Massachusetts DEM., 1981.


"Water Resources Protection Techniques".  Metropolitan Area Planning Council (MAPC), Boston, MA.

■ SURFACE WATER

(Wetlands)


"Planning Work in a Waterway or Wetland".  U.S. Army Corps. of Engineers.


November 20, 2001

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Interim Pilani Highway Widening Improvements
Mokulele Highway to Kilohana Drive, Project No. 3148-01-02

Dear Mr. Munekiyo,

We appreciate the opportunity to comment on this project per your letter dated November 15, 2001. We have no objections to your request for the subject project.

However, we suggest our Company must review the subject project's detailed plans to assess possible relocation of Maui Electric facilities. We would also like to take this opportunity to mention that a design submittal and project timeline from the Consulting Consultant would be greatly appreciated.

Should you have any further questions, please contact me at (808) 871-2366.

Sincerely,

Gregory Kauhi
Distribution Engineering Supervisor

January 17, 2002

David Craddick, Director
Department of Water Supply
County of Maui
P. O. Box 1109
Wailuku, Hawaii 96793-8109

SUBJECT: Interim Pilani Highway Widening Improvements: Mokulele Highway to Kilohana Drive (Project No. 3148-01-02)

Dear Mr. Craddick:

Thank you for your letter of November 19, 2001 on the above subject.

Your comments with respect to the waterlines in the project area are noted and your letter has been forwarded to the project engineer for coordination and action.

We have also forwarded the Best Management Practices and recommendations to conserve water resources to the project engineer for consideration.

Again thank you for your comments.

Very truly yours,

Mich Hirano, AICP

cc: Roy Figueroa, Makena Resort Corp.
Charles Jencks, WCPTGW Land Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Staniol, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation
January 17, 2002

Gregory Kauhi
District Engineering Supervisor
Maui Electric Company, Ltd.
P.O. Box 359
Kahului, Hawaii 96733-0359

SUBJECT: Interim Pilani Highway Widening Improvements; Mokulele Highway to Kahana Drive (Project No. 31AB-01-02)

Dear Mr. Kauhi:

Thank you for your letter of November 20, 2001 on the above subject.

We have noted your comments and have forwarded your letter to the project engineer so that possible relocation of Maui Electric facilities could be coordinated with your office.

Again, thank you for your response to the early consultation letter.

Very truly yours,

Mich Hirose, AICP

Munekiyo & Hinga, Inc.
365 High St., Suite 104
Wailuku, HI 96793

Subject: Pilani Highway Widening Improvements

Attention: Michael T. Munekiyo,
Project Manager

Thank you for your letter of November 12 on the above subject. Our Board of Directors has decided that we will wait to comment on this project until public comments are solicited as part of the Environmental Assessment process.

Mahalo for your consideration.

James V. Williamson, for
Douglas R. Williams, President
Chapter XII

Comments Received During the 30-Day Draft Environmental Assessment Comment Period
February 11, 2002

Mr. Ferdinand Cajigal
District Engineer
Highways Division
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal,

This letter responds to your request for comments on the Draft Environmental Assessment for Interim Pillani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui, dated February 5, 2002. My previous letter concerning this project, dated November 26, 2001, is contained in Chapter 2. I have no additional comments.

If you have any questions concerning this matter, please contact William Leman of my staff at 438-6986 or FAX 438-4060, and reference File No. 200200076.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

February 28, 2002

Mr. Ferdinand Cajigal, District Engineer
State of Hawaii
Department of Transportation
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal,

SUBJECT: Draft EA – Interim Pillani Highway Improvements, Mokulele Highway to Kilohana Drive

I have reviewed the subject Draft EA and offer the following comments: The grass swales providing drainage from the highway should lead to an acceptable outlet. Drainage from the highway should not impact adjacent private properties significantly. Grass variety should be applicable to the area. Bermuda grass is recommended.

Thank you for allowing us to comment.

Sincerely,

Neil S. Fujimori
District Conservationist
Mr. Neal S. Fujivara
District Conservationist
USDA, Natural Resources Conservation Service
210 Kamaha Street, Suite 209
Wailuku, Hawaii 96793-2100

Dear Mr. Fujivara:

SUBJECT: Draft Environmental Assessment – Interim Pilani Highway Improvements, Mokuaile Highway to Kiholea Drive, Island of Maui

Thank you for your February 28, 2002 comments on the Draft Environmental Assessment for the proposed project.

Grass swales providing drainage from the highway have been designed to discharge into an acceptable outlet. Drainage improvements associated with the project have been designed to maintain the existing drainage pattern along the project corridor and will not impact adjacent properties. Your recommendation regarding planting grass swales with a variety of grass applicable to the area, such as Bermuda, has been incorporated into the construction specifications.

If you have additional comments or concerns, please call me at (808) 873-3535.

Very truly yours,

Ferdinand Cajigal
District Engineer, Maui

MEMO TO: Mr. Ferdinand Cajigal, District Engineer
Highways Division - Maui-DOT

From: Patricia Hamamoto, Superintendent
Department of Education

SUBJECT: Interim Pilani Highway Improvements
Draft Environmental Assessment

The Department of Education has no comment on the draft environmental assessment.

Thank you for the opportunity to respond.

PhSB:by
cc: A. Suga, ODS

F9:10 0369
February 19, 2002

Mr. Ferdinand Caigal
District Engineer
Highways Division
Department of Transportation
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Caigal:

Subject: Draft Environmental Assessment – Interim Pillani Highway Improvements

Thank you for the opportunity to comment on the Draft Environmental Assessment. Our concerns have been addressed in the document. We have no further comments to offer at this time.

Should you have any questions, please call me at 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

Cc: Minetaka (PhD)
Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below:

[List of comments]

We acknowledge the CWRM determination that the six watercourses within the proposed project corridor do not require a stream channel alteration permit.

We also acknowledge the Engineering Branch's comments regarding the flood zones in the northern portion of the project corridor and have amended the EA document accordingly.

If you have additional comments or concerns, please call me at (808) 673-3535.

Very truly yours,

Ferdinand Cajigal
District Engineer, Maui

FC.dml
Given the above information, we recommend a qualified archaeological monitor be present during all ground disturbing activities located within the Pu'oume Sand Deposits in order to identify, document, record, and provide appropriate mitigation measures, as necessary. This should mitigate any adverse effects to significant historic sites that might occur. An acceptable monitoring plan will need to be submitted to this office for review prior to the commencement of any ground disturbing activities. An acceptable report documenting the findings of the monitoring activities will need to be submitted to this office for review within 180 days of the completion of this project.

Please call Cathleen Dapher at 808-583-1302 if you have any questions.

Aloha,

[Signature]

Dina Hopkins, Administrator
State Historic Preservation Division

CD: jen

[Note: Handwritten note]

[Signature]

[Second handwritten note]
Mr. Don Hibbard
State Historic Preservation Division
Department of Land and Natural Resources
Kukuihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

SUBJECT: Draft Environmental Assessment – Interim Pilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your March 11, 2002 comments on the Draft Environmental Assessment for the proposed project.

Your recommendation for archaeological monitoring during all ground disturbing activities within the Pu'oune Sand Deposits will be incorporated into the project's specifications and contract documents. Furthermore, submitting an appropriate monitoring plan to your office for review will be included in the specifications.

Again, thank you for your comments and recommendations. If you have any questions or concerns, please call me at (808) 573-5255.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

Fred Califal
Department of Transportation
610 Pala'a Drive
Kahului, HI 96732

Subject: Draft Environmental Assessment (EA) Pilani Highway Improvements, Mokulele Hwy. to Kilohana Drive, Kihei

Dear Mr. Califal:

In the final EA provide a discussion of the cumulative impacts of this project and the proposed Upcountry Highway. The draft EA mentions the status of the Upcountry Highway project as unknown. However, the final EIS has just been completed and submitted to our office.

The Traffic Assessment Report (appendix A) in this draft EA gives a brief discussion of future conditions, considering both projects. The noise study (appendix C) does not mention the latter, however. A discussion of cumulative impacts is required by HA; §11-200.

If you have any questions call Nancy Hainrich at 586-4185.

Sincerely,

GENEVIEVE SALMONSON
Director

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

April 12, 2002

Dear Ms. Salmonson:

SUBJECT: Draft Environmental Assessment – Interior Pālani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your February 21, 2002 comments on the Draft Environmental Assessment for the proposed project.

The EA has been amended to assess the cumulative impacts of the subject project and the proposed Upcountry Highway. Additionally, a revision of the Acoustic Study now includes a discussion of the cumulative impacts of both projects.

If you have additional comments or concerns, please call me at (808) 873-3935.

Very truly yours,

Ferdinand Cajigal  
District Engineer, Maui  
FCDinfra

March 25, 2002

Ferdinand Cajigal  
District Engineer, Maui  
State of Hawaii Department of Transportation  
Highways Division, Maui District  
650 Palapala Drive  
Kahului, HI 96732

Dear Mr. Cajigal:

Subject: Draft Environmental Assessment: Interior Pālani Highway Improvements, Mokulele Highway to Kilohana Drive

This is in response to the above referenced materials. Upon review of the materials, OHA understands that your determination is that no historic properties or cultural resources will be affected by this project. OHA will rely on your assurances that proper mitigation and consultation shall occur should any unanticipated cultural, historic, or burial sites or items be encountered during project development.

Thank you for the opportunity to review and comment regarding the proposed project. If you have any questions, please contact Wayne Kawanui, Policy Analyst at 594-1945, or email him at waynek@oha.org.

Sincerely,

Wayne Kawanui  
Policy Analyst, Hawaiian Rights Division  
PA:wk

cc: BDT  
ADM
Ms. Puaaakalani D. Au
Acting Director
Office of Hawaiian Affairs
711 Kapolei Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Ms. Au:

SUBJECT: Draft Environmental Assessment – Interim Pi'ilani Highway Improvements, Mokulele Highway to Klahana Drive, Island of Maui

Thank you for your letter of March 25, 2002, on the referenced subject matter.

We enclose a letter from the Department of Land and Natural Resources, State Historic Preservation Division, requiring a mitigation plan to be submitted to SHPD prior to any ground disturbing activities and that an archaeological monitor be present during these activities within the Pu'icane Sand Deposits.

We confirm that an archaeological monitoring requirement and mitigation plan submitted will be incorporated into the project’s specifications and contract documents as required by SHPD. These measures will ensure that proper mitigation and consultation will occur to protect cultural resources which may be encountered during project development.

If you have further comments or questions, please call me at (808) 872-3535.

Very truly yours,

FERDINAND CALGAI
District Engineer, Maui
FC:dmf
Enclosure

March 11, 2002

Mr. Ferdinand Calgai
District Engineer, Maui
Department of Transportation – State of Hawaii
Highways Division – Maui District
500 Pauwela Drive
Kīhei, Hawaii 96732

LOG NO: 29357

SUBJECT: Chapter 65-A Historic Preservation Review Pertaining to the Draft Environmental Assessment for the Proposed Interim Pi'ilani Highway Improvements, Mokulele Highway to Klahana Drive, Island of Maui

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) pertaining to the proposed interim Pi'ilani Highway Improvements (Mokulele Highway to Klahana Drive). Our review is based on reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was conducted of the subject parcel.

Based on the submitted DEA, we understand the proposed undertaking will be located along approximately 5.8 miles of the Pi'ilani Highway, extending from the intersection at Mokulele Highway to Klahana Drive. The proposed improvements will be conducted within the existing right-of-way and will include (but are not limited to): constructing an operational and functional drainage system; modifying intersections by removing and rehashing median islands; relocating existing traffic signals, controllers, and traffic loops; adding, changing, and/or relocating regulatory traffic signals; installing interchange cables from Mokulele Highway to O'ahu Road.

A search of our records indicates an archaeological inventory survey has not been conducted of the subject parcel. The general area seems likely to have been the location of pre-Contact farming, perhaps with scattered houses. In addition, the DEA and the USDA Soil Survey indicate that portions of the proposed project corridor extend through Pu'icane Sand deposits. This type of deposit is known to contain both isolated and clusters of human burials, and possibly habitation deposits, as well. As the proposed project area has been previously disturbed during the initial highway construction, we believe it is possible that disturbed remnants of these types of historic sites may be present in portions of the proposed project corridor.
Given the above information, we recommend a qualified archaeological monitor be present during all ground disturbing activities located within the Pu‘unene Sand Deposits in order to identify, document, record, and provide appropriate mitigation measures, if necessary. This should mitigate any adverse effects to significant historic sites that might occur. An acceptable monitoring plan will need to be submitted to this office for review prior to the commencement of any ground-disturbing activities. An acceptable report documenting the findings of the monitoring activities will need to be submitted to this office for review within 180 days of the completion of this project.

Please call Cathleen Dagher at 692-6023 if you have any questions.

Aloha,

Don Hinkley, Administrator
State Historic Preservation Division

CDjen

March 11, 2002

Brian K. Minaia, Director
State of Hawaii
Department of Transportation
Highways Division
Maui District Office
650 Palapala Drive
Kahului, HI 96732

Dear Mr. Minaia:

SUBJECT: Draft Environmental Assessment for Interim Pilani Highway Improvements, McKingley Highway to Kihohana Drive, Maui

Relative to the above Draft Environmental Assessment I would like the applicant to address the following questions and concerns:

Dwight extensive discussion on the Makaha Resort Corporation's request for rezoning, your Deputy Director, Fred Y. Utusu, twice told the County Council's Land Use Committee that any rezoning of Pilani Highway would require an update to the Maui Long Range Transportation Plan. The Draft EA does not mention any necessary update. Can you please clarify the requirement to make any changes to the existing plan for widening Pilani Highway that is currently in the Maui Long Range Transportation Plan?

Your Draft EA states that it is the Makaha Resort Corp. and WCPTGW Land Associates, LLC, who propose to implement restriping of Pilani Highway. Why are they not listed as the proposing applicant?

Both Makaha Resort Corp. and WCPTGW's land (known as Waloea 670) have received State District Boundary Amendments from the State Land Use Commission with conditions to fund, design, and construct their pro-rata share of the...
necessary local and regional roadway improvements necessitated by their proposed
developments. Has DOT made a determination as to what these pro-rata shares will
be? Will the “voluntary” funding by the developer’s for the interim restriping of the
highway, in the total amount of $750,000 as stated in the Draft EA, be credited
toward this eventual “pro-rata” share? Will the developers be required to contribute
a pro-rata share to the eventual permanent widening of Pilani Highway?

Will the interim restriping of Pilani Highway delay scheduling and funding of
the permanent widening of Pilani Highway as reflected in the Maui Long Range
Transportation Plan?

Will the proposed interim alterations to Pilani Highway in any way affect the
highways’ future eligibility for Federal Highway funding?

Thank you for your attention to these concerns.

Sincerely,

Wayne K. Nishik
Councilmember
South Maui District

Cc: Mnakiki

March 27, 2002

The Honorable Wayne K. Nishiki
County Council
County of Maui
200 South High Street
Waikiki, Hawaii 96793

Dear Councilmember Nishiki:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR INTERIM PILANI
HIGHWAY IMPROVEMENTS, MOKULELE HIGHWAY TO KILOHANA
DRIVE, MAUI

Thank you for your comments on the Draft Environmental Assessment for the subject
project. We provide the following responses to the issues raised in your letter.

Project Relationship to Maui Long Range Transportation Plan:

The interim widening and related improvements to Pilani Highway, as proposed, are
consistent with the findings of the Maui Long Range Transportation Plan (MLRTP).
This plan identified the need for two additional lanes on Pilani Highway, from Mokulele
Highway to Wailea. The proposed project will provide a short term, interim relief until
the permanent widening improvements to Pilani Highway are built. In this context, the
proposed project is consistent with the MLRTP.

Proposing Agency/Applicant:

Makena Resort Corp. and WCPT/GW Land Associates, LLC (developers) are not listed
as the proposing applicant because this a State of Hawaii, Department of
Transportation project. As such, the State of Hawaii, Department of Transportation is
the applicant. The role of Makena Resort Corp. and WCPT/GW Land Associates, LLC
is limited to their contribution towards the planning and design of the project. We also
note that the County of Maui is a funding participant in this project.
Pro-Rata Share Pursuant to SLUC Conditions:
The State of Hawaii, Department of Transportation, has not finalized the pro rata share
Makana Resort Corp. and WCPT/GW Land Associates, LLC must contribute towards
local and regional roadway improvements as a condition of their State District Boundary
Amendments. As established by an agreement between the State Department of
Transportation and Makana Resort Corp. and WCPT/GW Land Associates, LLC, the
developers’ contribution towards the planning and design of the proposed project will be
credited towards their pro rata share of local and regional roadway improvements.
Makana Resort Corp. and WCPT/GW Land Associates, LLC may be required to
contribute towards the permanent widening of Pilani Highway. As yet, this requirement
has not been determined.

Implementation of Permanent Pilani Highway Improvements:
The proposed project will provide a timely response to improve operating conditions to
Level of Service “D” or better during peak hour flows on Pilani Highway. As set out in
the MLRTF, the permanent widening improvements to Pilani Highway are scheduled to
occur between 2006 and 2020. Although the State Department of Transportation
hopes to narrow this interval in the next update of the MLRTF, the proposed project will
not delay plans for the permanent widening of Pilani Highway. Furthermore, the
proposed project will not affect future eligibility for federal funding for the permanent
widening of Pilani Highway.

Thank you once again for participating in the environmental review process. If you have
any further questions please me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FCdml

Mr. Ferdinand Cajigal
District Engineer, Maui
Highways Division
Department of Transportation
State of Hawaii
550 Pauwela Drive
Kahului, Hawaii 96732

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT-INITIAL
PILANI HIGHWAY IMPROVEMENTS,
KONOLELE HIGHWAY TO KILOMARA DRIVE,
ISLAND OF MAUI

We have reviewed the draft Environmental Assessment report
for the subject project and wish to inform you that we have no
comment to offer.

Thank you for the opportunity to comment. We are returning
the draft Environmental Assessment report for your use.

Very truly yours,

ALICE L. LEE
Director

Enclosure

To: Housing Administrator

抄: 专职顾问
February 12, 2002

Mr. Ferdinand Cajigal
District Engineer, Maui
State of Hawaii - DOT
Highways Division
650 Palaipapa Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
ITEM: PIILANI HIGHWAY IMPROVEMENTS

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the subject project.

At this time, we have no comments or objections to the proposed action. If there are any questions, please contact me or Mr. Patrick Masui, Chief of Parks Planning and Development, at 270-7737.

Sincerely,

Floyd S. Miyazono
Director

c: Patrick Masui, Chief - Parks Planning and Development

xc: MuneKiyo (01/10/02)

Mr. Ferdinand Cajigal, Maui District Engineer
Department of Transportation, Highways Division
Maui District Office
650 Palaipapa Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal:

RE: Draft Environmental Assessment Comments for Interm Piloti
Highway Improvements, Mokulele Highway to Kilohana Drive,
Island of Maui

The Maui Planning Department has reviewed the referenced document and notes that our comments on the relationship of the County Special Management Area with the Highway right-of-way, and the relationship of this project with the previously reviewed Mokulele Highway improvements have been addressed to our satisfaction.

We have no further comments to offer.

Should you have any questions, please contact Ms. Robyn Loudenmilk, Staff Planner, of this office at 270-7739.

Very truly yours,

John E. Min
Planning Director

JEM:RLL:cmx
C: Clayton J. Yoshida, AICP, Deputy Planning Director
Mich Hirano, AICP, MuneKiyo and Hiraga, Inc
Roy Figuerola, Makana Resort
Charles Jencks, Wailea 670 Associates
Robyn L. Loudenmilk, Staff Planner
Ann Cua, Staff Planner
Colleen Suyama, Staff Planner
General File
KINP_ADDS/PLANNING/LETTERSrev_2002/0217alohaHVresponse.wpd
Mr. Ferdinand Cajigal
March 25, 2002

Page 2

With these issues in mind, we would like to offer the following additional comments to the Draft Environmental Assessment.

We believe that the traffic signals in North Kihei at Mokulele, Uwapa, and Ohukai should be synchronized to maximize traffic flow through the area. Also, the traffic signals in Central Kihei at Pilikoua and Pūpū are should be synchronized. Since the set of North Kihei traffic signals and the Central Kihei signals are located in fairly close proximity with each other, the benefits of synchronization can be maximized.

Since Pi'ilani Highway is being re-profited to four (4) lanes with two (2) travel lanes in each direction, the importance of having two (2) left-turn lanes from Mokulele onto Pi'ilani Highway cannot be overstated. While we realize that Mokulele Highway improvements are proposed in phases, this project does underscore the importance of expeditiously completing construction at the Kihei end of Mokulele Highway.

Regarding the issue of bikeways, we concur that an alternative bike route is being implemented as part of the County's North-South Collector Road. A segment from Hālekūlani to Wai'pu'ukai is already in place and plans proceeding on the next segment from Wai'pu'ukai to Kamehameha. Moreover, recently redeveloped segments of South Kihei Road also have bike lanes.

We would also like to request that a left-turn lane be included at the entrance to the County's Kihei Wastewater Reclamation Facility. This is also the entrance to Mānana Assay and, as well as a composting operation. There have been several calls for vehicles turning left into our facility. A left-turn lane would accommodate increasing vehicular turn movements, as well as improve the safety and operating characteristics of the highway in this vicinity.

Thank you for the opportunity to provide our comments. If you have any questions or need further information, please call me.

Sincerely,

DAVID GOODE
Director

DG:MA:jo
X: Milton Arakawa, AICP, Deputy Director of Public Works and Waste Management
Lloyd Lee, Engineering Division Chief
S:mitonidit
Mr. David C. Goode, Director  
Department of Public Works & Waste Management  
200 South High Street  
Wailuku, Hawaii 96793

Dear Mr. Goode:

SUBJECT: Draft Environmental Assessment — Interim Pilani Highway Improvements, Mokuleia Highway to Kilohana Drive

Thank you for your letter of March 25, 2002, on the above subject. In response to your comments, we offer the following information:

We acknowledge and agree that the proposed project will help address capacity and near-capacity conditions on Pilani Highway. The implementation of this project is considered a high priority for our Department. We also agree with your comments that this project is an interim measure to relieve traffic congestion until the permanent widening of Pilani Highway is implemented or other long-term alternatives are considered.

We acknowledge your comments regarding the synchronization of traffic signals at Mokuleia, Uwapo, and Okukal interchanges to maximize traffic flow. As mentioned in the Draft EA, the installation of interconnected signals to coordinate the traffic signal system from Mokuleia Highway to Chukal Road was identified in the proposed improvements. The need for the interconnection of signals to facilitate traffic flow along this roadway segment was confirmed in the Traffic Assessment (Appendix A, Draft EA) and will be implemented with the proposed project. As also indicated in the Traffic Assessment Report, the Pilika Street and Lipoa Street signals are already interconnected.

We acknowledge your comment with respect to the importance of having two left-turn lanes from Mokuleia Highway onto Pilani Highway to facilitate traffic flow and will accommodate this movement in the proposed project.

We acknowledge your comment regarding the County’s implementation of the bikeway system as part of the North-South Collector Road system. As appropriate, we will coordinate with your Department to ensure that adequate bike route linkages between Pilani Highway and local roads are implemented.

We acknowledge your request for a left-turn lane at the entrance to the County’s Kihei Wastewater Reclamation Facility near the Old Wetakahao intersection. Based on our review of this request, we confirm that provisions for a left turn at this location would be appropriate within the scope of the proposed project.

Again, thank you for your comments. If you have additional concerns, please call me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL  
District Engineer, Maui  
FCDM

Mr. David C. Goode  
Page 2  
April 22, 2002

HWY-M 2.118-02
March 13, 2002

Mr. Ferdinand Cajigal, District Engineer
State of Hawaii Department of Transportation
Highways Division, Maui District
650 Paliapa Drive
Kahului, Hawaii 96732

Subject: Draft Environmental Assessment - Interim Filanii Highway Improvement,
Makakole Highway to Kilohana Drive,

Dear Mr. Cajigal,

Thank you for the opportunity to provide comments to this Draft Environmental Assessment.

Please refer to our comment letter to this project of November 19, 2001. We have no further comments at this time.

Should you have any questions, please contact the Water Resources Planning Division at 270-7199.

Sincerely,

David Craddick
Director

cc: Engineering Division

November 19, 2001

Mr. Michael T. Munioki, A.L.C.P.
Munioki & Iwasa, Inc.
305 High Street
Wailuku, Hawaii 96793

Subject: Interim Filanii Highway Widening Improvement, Makakole Highway to Kilohana Drive,
Project No. 31AB-01-02

Dear Mr. Munioki,

Thank you for the opportunity to provide comments in preparation of the Draft Environmental Assessment.

There are several Department water lines in the project area. Construction plans need to be reviewed by the Department of Water Supply. Water valve covers must be lifted to match the finished grade of the roadway. Enclosed are sections of our water system map pertaining to the project area. Please contact our engineering division at 270-7199 in regard to these issues.

We have attached Best Management Practices (BMPs) for principle operations for your reference. These are designed to minimize infiltration from all construction activities and related vehicle operations. Additional information is available from the State Department of Health.

In order to conserve water resources, we recommend the following measures:

- Use non-potable water, where feasible, for dust control and any irrigations during and after construction.
- Use native-adapted and site-appropriate native plants where any roadside landscaping is intended and when revegetating the construction corridors. The project site is located in "Maui County Planning Plan" - Plant Zones 3 and 5. Please refer to the "Maui County Planning Plan", and to the enclosed documents. Native plants adapted to the area, conserve water and further protect the watershed from degradation due to invasive alien species.

Should you have any questions, please contact the Water Resources Planning Division at 270-7199.

Sincerely,

David Craddick
Director

cc: Engineering Division
Mr. Caligai
February 22, 2002
Page 2

The existing bike route system should be diverted to a location off the Pilani Highway. The plan shows the shoulder being decreased to 6 feet and down to 2 feet across the bridges. Having bicycle traffic competing with automobile traffic for this limited area would not be in the cyclist's best interest even though it is planned to decrease the speed limit to 40MPH due to decreased lane width. A temporary bike path to be located within the county's planned NIS Collector Road right-of-way should be part of this planning initiative.

In the longer term, the Pilani Highway should be considered as a limited-access facility with access at selected locations only via grade separated intersections. Planning and land use allocations should be initiated at this time to achieve this long term goal.

The County of Maui supports this interim measure as it will address current demand situations however would urge the State Department of Transportation to continue with long term plans for permanent highway improvements.

Yours truly,

JAMES "KIMO"AFANA
Mayor, County of Maui

cc: David Goody, Director
Department of Public Works and Waste Management
John E. Min, Director
Department of Planning
Don Medeiros, Transportation Coordinator
Brian McKee, Long Range Planning Division

Mr. Caligai/Interim/Pilani/DEA: JA/EM
cc: Manef/
The Honorable James "Kimo" Apana
Mayor, County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mayor Apana:

SUBJECT: Draft Environmental Assessment - Interim Pililani Highway Improvements, Nokulele Highway to Kiloana Drive

Thank you for your letter of February 22, 2002, providing comments in response to the above subject. We wish to respond to your comments as follows.

Interim Improvements

The Interim improvements indicate that the project is intended to meet demands for less than the normal 20-year planning horizon. The proposed project will provide a timely response to improve roadway operating conditions and improve the level of service to LOS D or better during peak hour flows on Pililani Highway. The Traffic Assessment Report, prepared by Julian Ng, Inc. estimates that the improvements will increase capacity to meet projected demand over the next few years.

Left Turn Restrictions at Unsignalized Intersections

The net effect of the left turn restriction has been estimated to be less than 100 vehicles per hour in any segment of South Kihei Road, and less than 35 vehicles per hour for left turn movements, which are most affected by increased traffic volumes at any intersection.

In more general terms, increases in traffic volumes on South Kihei Road will be greater if Pililani Highway is not widened. If improvements are not made on Pililani Highway resulting in increased peak-hour congestion, some of the traffic that would otherwise use Pililani Highway would seek an alternative path, in this case South Kihei Road. Additional discussion of impacts to other streets in the Kihei area are being addressed in the update to the Kihei traffic master plan that is currently being prepared for the County of Maui.

Bike Route

Based on comments we have received from the public during the Draft EA review period, we have revised our bike route system within the proposed project limits to allow for a 6-foot bike route through the intersections and will provide appropriate signage to bridges to inform both drivers and cyclists of shared road conditions. These revisions would improve safety for cyclists using the bike route. We understand the County is intending to provide an alternative bike path system within the N/S Collector right-of-way as per the Kihei-Makema Community Plan. We acknowledge that in the future further discussion needs to take place between State Department of Transportation and the County to plan for the eventual provision of this alternate route and how the bike route on Pililani Highway can be rerouted to the County bike path.

Long Term Planning for Pililani Highway

Your comments with respect to the long-term plans for Pililani Highway are noted. The State Department of Transportation will review these comments in the context of the next update of the Maui Long Range Transportation Plan.

In closing the State Department of Transportation acknowledges and appreciates the County of Maui's support and funds committed toward the proposed project. We look forward to working with you to ensure the project's timely implementation.

Very truly yours,

Ferdinand Cajiapag
District Engineer, Maui
FC: cdtf
April 11, 2002

Mr. Ferdinand Caiigal
State Dept. of Transportation
Highways Division
650 Pawai Drive
Kahului, HI 96732

Dear Mr. Caiigal:

SUBJECT: Draft Environmental Assessment - Interim Pillani Highway Improvements, Mokulea Highway to Kiloana Drive

Thank you for your letter of February 5, 2002, requesting comments on the above subject.

We have reviewed the proposed summary and have no comments or recommendations at this time. Thank you for giving us the opportunity to comment on the proposed project. We are returning the Draft EA which was submitted for our review.

Very truly yours,

[Signature]

Assistant Chief, Robert Tam-Ho
for: Thomas M. Phillips
Chief of Police

Enclosure

c: John E. Min, Planning Department

X: Mission
The Kihei Community Association Planning and Development Committee recognizes the need to make improvements to the Piliani Highway. This highway, 3.8 miles, can be done with respect for our environment and citizens. The Kihei Community is the fastest growing in the state with Wai'anae 670 and Makena, large private developments, that plan and build beautiful communities for the future. It is time that Kihei plans and build for the future the right way not with the hand-aid short-sited approach this plan represents.

The Kihei Community Association is a non-profit citizens volunteer group with a 1 year track record of promoting the needs of our community. Our mission statement is to create a beautiful town within a park. We prefer to work in partnership with the State DOT.

Sincerely,

[Signature]

Daniel F. Wuthrich
Member Planning and Development Committee
Kihei Community Association

---

Mr. Daniel F. Wuthrich
Member, Planning and Development Committee
Kihei Community Association
P.O. Box 662
Kihei, Hawaii 96753

Dear Mr. Wuthrich,

SUBJECT: Draft Environmental Assessment - Interim Piliani Highway Improvements
Mokulele Highway to Kiihana Drive

Thank you for your letter of April 11, 2002, presenting the Kihei Community Association Planning and Development Committee's comments on the above subject. We offer the following information in response to your comments.

Response to Item 1.

We acknowledge your comment with respect to the goal of a divided highway with a grade separated highway median. We wish to note that the resurfacing of the highway from 2-lanes to 4-lanes was identified by the Mayor’s Transportation Action Committee after extensive community consultation as an interim action to address present capacity and near capacity conditions on Piliani Highway. Although the grade separated highway median is beyond the scope of the interim improvements, this work may be considered within the scope of future permanent widening improvements. The reduced travel lane widths are based on acceptable guidelines set by the American Association of State Highway Transportation Officials (AASHTO). The typical section illustrated in Appendix B, Draft EA has been adjusted to provide a 2-foot shoulder and four 11-foot travel lanes.

Based on the procedures of Highway Capacity Manual (2000) by the Transportation Research Board, National Research Council, there will be a 5 mph reduction in the speed limit due to the narrowing of lanes.
Response to Item 2.

We acknowledge the KCA’s position regarding the sound attenuation walls. We confirm that sound attenuation walls are not part of this project since modeled increases in the ecological environment as a result of the proposed project are well below the State "10 dB increase" criteria for significant change.

Response to Item 3.

We acknowledge your comments regarding inclusion of a reclaimed water line from the County’s Kīhei Wastewater Treatment Facility for landscape irrigation. Although this work is not provided in the proposed interim project, provision of irrigation for highway landscaping may be considered within the scope of future permanent widening improvements.

Response to Item 4.

The present bike route along the Pilani Highway will be maintained. Pedestrian crosswalks and signalization as appropriate at the intersections will be provided. In regard to your comment about alternative routes, we acknowledge the County of Maui’s implementation of the North-South Collector system and the bike and pedestrian facilities planned within this corridor. The Department of Transportation will coordinate with the County of Maui, Department of Public Works and Waste Management, as appropriate, to ensure adequate bike route linkages between Pilani Highway and local roads are implemented.

We acknowledge KCA’s recognition for the need to make improvements to the Pilani Highway. In this context, the Department of Transportation considers this improvement project a critical capital project that will address the current and near term capacity issues in a timely manner.
February 13, 2002

Mr. Ferdinand Cajigal
District Engineer, Maui
State of Hawaii Department of Transportation
Highways Division, Maui District
650 Pupukau Dr.
Kahului, HI 96732

Dear Mr. Cajigal:

Subject: Draft Environmental Assessment – Inteih Piipai Highway Improvements, Mokulele Highway to Kihana Drive, Island of Maui

Thank you for allowing us to comment on the subject project.

In reviewing the information transmitted and our records, we have no objection to the subject project. Please reference Maui Electric's letter dated November 20, 2001 to Munekiyo & Hiraga, Inc. for our earlier comments. (See attached)

If you have any questions or concerns, please call Dan Takehata at 871-2385.

Sincerely,

[Signature]

Neal Shiyama
Manager, Energy Delivery

Attachment

X: Munekiyo (3/1/02)
November 20, 2001

Mr. Michael T. Munekyo, AICP,
Munekyo & Higasa, Inc.,
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Interim Pillani Highway Widening Improvements, Mokulele Highway to Kilohana Drive, Project No. 3148-01-02

Dear Mr. Munekyo,

We appreciate the opportunity to comment on this project per your letter dated November 12, 2001. We have no objections to your request for the subject project.

However, we suspect our Company must review the subject project's detailed plans to address possible relocation of Maui Electric facilities. We would like to take this opportunity to mention that a design submittal and project timeframe from the present's consultant would be greatly appreciated.

Should you have any further questions, please contact me at (808) 871-2396.

Sincerely,

Gregory L. Kauli
Distribution Engineering Supervisor

Mr. Neal Shinya,
Manager, Energy Delivery
Maui Electric Company, Ltd.
210 West Kamahameha Avenue
Kahului, Hawaii 96732

April 15, 2002

Mr. Neal Shinya,
Manager, Energy Delivery
Maui Electric Company, Ltd.
210 West Kamahameha Avenue
Kahului, Hawaii 96732

Dear Mr. Shinya:

SUBJECT: Draft Environmental Assessment — Interim Pillani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your letter of February 13, 2002, on the referenced project.

We acknowledge your request to review the project's detailed plans and timeframe to address possible impacts on your facilities. The request has been forwarded to the project engineers for their information and appropriate attention.

If you have any further comments or questions, please call me at 873-3535.

Very truly yours,

Ferdinand C. O'Conner,
District Engineer, Maui
PC-dm
February 28, 2002

Dorothea Williams, President

Subject: Draft Environmental Assessment
Interim Pilinau Highway Improvement
Mokulele Highway to Kileana Drive
January, 2002

As requested, I have reviewed the subject document. My comments to be forwarded to the State Department of Transportation on behalf of the Maui Meadows Homeowners Association, follow:

I. GENERAL

1) The title of this draft EA is misleading.
   
   a) This is not an INTERIM four lane highway, since no final solution is presented. The term "interim" was apparently introduced so that there is a basis for relaxing highway design standards, including project life, as has been done throughout this document. We, and others, have objected to the interim label, since once this construction is four lanes is completed, it will be almost impossible to obtain financing for a final fix for many years, if ever, beyond 2011.

   b) As I will discuss in more detailed comments, the proposed changes are not IMPROVEMENTS. Instead, the result will be to change the existing Pilinau Highway from a well designed two lane arterial highway to a standard four lane urban road, with reduced speed limit and safety.

   c) The draft EA relates to discontinuing the four lane work at Kileana Drive at Maui Meadows. Our association, and others, have objected to the concept of only partly making the change to Pilinau Highway. Further, at the Maui County Planning Commission workshop on July 31, 2001, the project traffic consultant, Wayne Yoshikawa assured all of us that earlier plans to stop the realigning at Kileana Drive had been scrapped to create the four lane road all the way to Waihtua Drive. This was reported in The Maui News; just who are we to believe?

2) The Project Manager in charge of preparing the draft EA is a principal of the firm Makskey & Hingas, Inc. This is a conflict of interest, since this same firm is a consultant to the Waikea 670 developer WCPTGW Land Associates.

3) The bike lanes as prescribed by Federal Highway administration regulations, have been eliminated. However, the alternative given for the same width limits and continuity of these routes is vague at best.

4) I understand the design on the change to four lanes is proceeding quickly. The EA process should be completed before any design starts. Following this procedure is essential, since comments on the EA could result in major changes to the project concept and design.
I believe that approval of these “improvements” by the Federal Highway Administration is necessary. The existing highway was 90% financed by the FHWA to its standards, and adequate bike lanes incorporated to meet its requirements. How can a structure built using taxpayers’ money be changed to a lowered standard of engineering and safety?

With all of the adverse impacts of the “improvements” project discussed herein, I believe it requires an EIS rather than an EA.

II. DETAILED COMMENTS

1) P 10 - It is incomprehensible to me that an INTERIM fix is being contemplated to meet traffic needs on Piliani Highway for only six years (2005 to 2011). The travelling public will be subject to significant disruption during the construction period which I estimate to last for about eighteen months. This, for a six year substandard plan to “improve” the major highway route in South Maui which will cost the County and State millions of dollars. What then? It should be noted that the existing highway has been in operation since 1990.

2) P 10 - My comments on the traffic assessment are included under Appendix A.

3) P 12 and Appendix B - “Proposed Improvements”
As I have said before, the devil is in the details:

a) The existing 10 foot shoulders are not being overlayed with asphaltic concrete to “provide proper cross slope.” Instead, the AC with 2% cross slope as shown in Appendix B (versus 5% existing), is necessary to arrive at the same outside pavement thickness to the existing travel lanes for adequate strength.

b) The existing main pavement consists of 5-3/4” AC, 6” aggregate base and 6” subbase, whereas the outer limits of the existing shoulder has only about 2-1/4” AC, presumably on the same underlying thickness of base layers. With the connected cross slope, the structural strength at the edge of the existing shoulder may be adequate. However, immediately beyond this toward the gutter there is a plan of serious weakness unless the basic thicknesses are extended toward the gutter, to provide support for traffic.

c) 2” AC over a “levelling” course for the new shoulder will not provide adequate capacity in the gutter area, and early failures are certain with the arrangement shown.

d) I disagree with eliminating the gutter for this improvement. Much of the highway length is in cut and a grass swale is not possible. Even where the road is in fill elevation of the embankment is again possible.

e) Where the roadway section has rock cuts, the shoulders will meet the toe of the excavation which is another unsafe condition (question: what are concrete strips?).

f) Shoulders of 6 foot width are narrow enough. However, reducing this width to 2 feet is completely unacceptable and I believe was outlawed by the FHWA for safety reasons years ago. The existing highway not only continues the 10 shoulders across bridges, but in addition provides 2 feet more of clearance. The bridge must be WIDENED.

g) A four lane road without a dividing median strip is marginal. However, a double lane opposing lanes is a must and will reduce the nominal width of lanes so less than 11 feet.

h) Shoulder lane passage through intersections by removing the median islands is considered too hazardous when added to very overcrowded intersections.

i) As discussed in Appendix A, prohibiting left turn movements at unsignalized intersections will be difficult to enforce.

j) It is stated that all work will be conducted within the State right-of-way. However, in a number of locations the existing right-of-way doesn’t allow this. For example, top of cut slopes are already at the boundary fence line, and it will be impossible to fit in the new cross section.

k) The cross slopes shown in Fig. 8 do not agree with Appendix B, and this drawing is incorrect.

4) P 14 - Costs and Time Schedule:

a) It is not possible to make a reasonable estimate of the cost of the work and its schedule, without any solid information being given. The EA has to include a breakdown by item and costs of the various work tasks for a reasonable review to be made. Also, a critical path schedule is a necessary component.

b) There is no bondy material to substantiate the total estimated cost of the work at $4 million. In my judgement, the cost will far exceed this estimate and could even be twice that, or more.

c) Similarly, the estimated schedule for construction is not substantiated. In my judgement that the time could be at least 18 months. Considering the upfront time for the environmental process, permitting, design, contract bidding and work, it would not be reasonable to expect construction to be completed sooner than the end of 2003.

5) P 29 - There is no way the project can start in July 2002 and be completed in 2003. As stated above, a more reasonable estimate for finishing the work is a year later.

As discussed previously, the public opposed the concept of terminating the improvements at Kilohana Drive instead of Wailea Ike Drive.

6) P 30, 39 - The Bike Route system, which is also part of the HDOT’s own Bike Plan Hawaii Master Plan, will be eliminated. Page 50 discusses the use of the 6 foot shoulders (2 foot, or is it 2 foot at bridges) for bike use. This cannot be a serious suggestion. It would be COMPLETELY UNSAFE for motorists and bikes. Bicyclists should be turned from the four lane road.

7) P 32, 33, 34 - As discussed previously, the concept of collecting drainage in grass swales is not for the most part practical since much of the highway road section is below grade, i.e. in cut. P 51 relates to concrete strips being laid at the toe of cut slopes, but no details are given. Furthermore, there will not be room available for any kind of drain once the existing gutter is covered over.

8) P 35, 36 - Regarding noise study and conclusions, see our comments for Appendix C.

9) P 46, 48 - Because of the restrictions to traffic flow, including the reduction in speed limit, as discussed in my comments for P 12 and Appendix A, there will probably be a reduction in the level of service with the “improvements.”

10) P 69 - The discussion on alternatives to the proposed action dismisses a permanent solution in view of higher costs and the need for a timely response due to the current heavy traffic situation. These “constraints” are no excuse for the substandard route proposed with reduced safety. As I said before, let’s do it right the first time even if it requires more time...
The obvious alternative to the poorly conceived proposal, not mentioned in the EA, is an additional two lanes Mauka generally paralleling the existing highway. This route, if it were to be used at the junction of Mokuleia Highway, would proceed on ranch land around the residential developments near Waiakea Gulch, Mauka of the Technology Park and Elite Golf Course, and then going back south, too close to, but separable from the Piilani Highway. It would pass through land zoned agricultural and across some park land. It would terminate at the junction of Piilani Highway and Kilihana Drive. I am unaware of the HDO’s plan for a permanent route, but surely they must have one.

Because of the obvious need to reduce the traffic congestion on the existing highway in a sound engineering manner as soon as possible, I have the following recommendation. Since expanding Piilani must have priority over Mokuleia, defer further work on the Mokuleia Highway widening project after Phase II A. Use the remaining funds from that project to go toward design and construction of an additional two lanes for Piilani Highway as discussed above, on a fast track basis. This effort will be costly and take time, but it will result in a solution with a long life, like the existing highway, instead of just six years. Further it will be well designed and a safe structure, meeting all applicable AASHTO standards. It will also avoid impacting existing highway during construction.

11) P. 75 - For reasons discussed previously, the “improvements” will not increase the handling capacity of Piilani Highway, or provide for the orderly accommodation of short-term traffic projections.

12) P. 78 - How can there be a final finding of no significant impact, when there “improvements” change the existing well designed two lane arterial highway to a substantially more urban road? The change would result in speed limit reduction. Safety would be lowered with narrow lanes, minimal shoulder widths, no median strip and congested intersections.

III. APPENDIX A: Traffic Report
1) P. 2 - Free flow speed on the highway is 55 mph, but the speed limit is posted at 45 mph. What relevant does the free flow speed limit have when the highway cannot now pass the traffic at 45 mph?

2) P. 3 - From our observation looking down on the stretch of Piilani Highway from Kilihana Drive to Wailea Ike Drive, we do not believe that the traffic volume is half that of Kilihana. Regardless, if four lanes of traffic are dumped onto a two lane road, there could be congestion problems on this stretch adjacent to Maui Meadows.

3) Table 4 shows that the average delay at the Kilihana Drive traffic signal is much greater than at Ke Alii Alani. This is not our experience.

4) P. 9 - If the proposed lower speed limit of 40 mph is consistent with the geometry of the proposed roadway, how on earth can the design be based on 50 mph? With the limitations imposed on the design cross section as we have discussed previously, it is doubtful that traffic level of service C and D can be attained. Furthermore, AASHTO requirements could result in an even lower speed limit (e.g., 35 mph) for safety, particularly with two additional traffic signals. Question: how do lower speed limits equate with the present traffic congestion?

5) P. 10, 11 - Eliminating left turns from the intersections listed in Table 9 will be difficult to enforce.

6) P. 11 - If an Upcountry Road is connected at Kamehamea Street, we believe that traffic south of this intersection will be increased, not reduced. This is because much of the existing peak traffic results from upcountry residents traveling to work at South Maui hotels.

IV. APPENDIX C: Acoustic Study
1) P. 1 - The summary states that traffic noise mitigation by noise barriers, complete with landscaping on the roadway side, may be applied to the affected residences. It goes on to say that the need for these barriers should be examined according to criteria of reasonable and feasible.

What is the purpose of preparing a voluminous acoustic study, when the need for mitigation is ignored because it would cost too much (see also p. 40)? In other words, the affected residences will just have to put up with even more noise.

2) P. 2 - Because this is an interim “improvement” project, the rationale is to consider the work as temporary, so that Federal and State noise abatement criteria can be ignored. Hence, investments in noise mitigation should be deferred until more substantial improvements are made to Piilani Highway. This is impossible, since substantial improvements to the highway will be made in another location because there is no room in the existing right-of-way.

3) Table 6, Footnote 3 - Relates to the noise attenuation provided by a 4.92 foot high noise barrier not meeting the HDO’s own, 55 decibel attenuation criteria for the full length of the highway. Of course, the noise will be much louder, since no such barrier is planned.

4) P. 26 - Landscaping on the roadway side of the 7 to 10 foot high walls is recommended to soften the visual impacts of the walls. It doesn’t mention that there is not enough room in the highway right-of-way for even a 5 foot wall, let alone landscaping.

5) P. 42 - States that because of cost, the sound attenuation walls can be considered unreasonable because these added costs could make the highway restriping job unfeasible.

So, why do the study when this is known from the beginning?

Any questions call,

James Williamson, Vice President, P.E. SVTD
Ms. Dorothy R. Williams
May 25, 2003

The existing bike route on Pilialii Highway will not be eliminated with the proposed improvements. A 6-foot wide bike lane will be provided on both shoulders of the highway, a 6-foot wide bike route will be provided through intersections, and at bridges where only a 2-foot wide shoulder will be provided, bicyclists will share the road with vehicles. Appropriate signage will be posted to warn bicyclists and motorists to share the road at bridges. The bike route is designed according to the Manual on Uniform Traffic Devices (MUTCD).

4. The State Department of Transportation is following a critical path for the proposed project where project design is proceeding in parallel with the environmental assessment and review process. We note that comments received during the 30-day comment period have been considered with respect to the project as a whole. If design modifications are deemed appropriate as a result of the comments, such modifications will be described in the Final EA, as appropriate. Construction contracts will not be awarded until the Final EA is completed.

5. The proposed improvements are funded by private, State and County funds within the State highway right-of-way. No federal funds will be applied to the proposed project and FHWA approval is not required for the proposed project. We note that the proposed improvements will be constructed in compliance with State highway design standards to ensure the continued functional and operational integrity of the highway.

6. The proposed action has been assessed with regard to significance criteria set forth in HUR Title 11. Based on this analysis, we believe the proposed action will have no significant impacts. It is in this context that we anticipate the filing of the Final EA as a Finding of No Significant Impact (FONSI).

Response to Item IV. Detailed Comments

1. As stated in the Draft EA (p.74) the proposed improvements are intended to address current and near-term capacity constraints attributed to traffic generated within the greater Kihei-Maunaloa region and beyond. The inconveniences to residents and visitors traveling the Piliali Highway during the construction of the proposed improvements have been identified and discussed in the Draft EA in Chapters III, Potential Impacts and Mitigation Measures and IV, Summary of Adverse Environmental Effects Which Cannot Be Avoided. These impacts were identified as short term, which would only occur during the construction period, estimated to be approximately 11 months. During construction of the proposed improvements, two travel lanes, one lane in each direction, will always be open.
Mr. Dorothy R. Williams  
Page 4  
April 23, 2002

and work will not be carried out during the peak hours. As well, DOT will coordinate detour routes with the County of Maui, Department of Public Works and Waste Management, as required to facilitate traffic movement during construction.

2. Refer to Responses to Item III, Appendix A.

3. a. The minimum recommended roadway cross slope is 1.5 percent. The designed 3 percent roadway cross slope exceeds the minimum slope requirements and is standard on most roads.

b. The existing AC pavement thickness is 1-3 inches from Mokulele Highway to Liho Street and 4 inches from Liho Street to Kilohana Drive. We appreciate your observation regarding the structural strength of the proposed roadway design elements and will finalize the shoulder pavement design and specifications in consultation with the project's geotechnical engineer.

c. As with 3. b) above, the proposed roadway design specifications will be determined in consultation with the project's geotechnical engineer.

d. The proposed drainage improvements are designed to meet the specifications of the DOT's Highway Storm Drainage Design Standards and Highway Design Guidelines. The concrete strips converted to AC (asphaltic concrete) are used to prevent erosion.

e. The restriping of the roadway and at bridges meet the DOT design guidelines and the Manual on Uniform Traffic Control Devices (MUTCD). As previously noted, appropriate signage will be placed at bridges to inform users of shared road conditions. Although the widening of bridges are beyond the scope of the proposed project, this work may be considered within the scope of future permanent improvements.

f. We acknowledge and agree with your comments regarding highway safety and have designed the proposed improvements to meet the specifications of the DOT's Highway Storm Drainage Design Standards and Highway Design Guidelines. The concrete strip converted to AC (asphaltic concrete) are used to prevent erosion.

g. We acknowledge and agree with your comments regarding highway safety and have provided a double stripe between opposing lanes. The lane widths are defined from the center line to center line. In the case of the double stripe between opposing lanes of traffic, the measurement is taken in the center of the double stripe to the center of the opposing lane stripes.

h. We acknowledge your comments regarding shoulder lane passage through intersections and safety. Where median islands presently exist, a new median island will be constructed.

Mr. Dorothy R. Williams  
Page 5  
April 23, 2002

1. The restriction of left turn movements onto and off of Pillani Highway at unsignalized intersections will be achieved by lane channelization, highway signage, and pavement markings. Lane channelization would prevent prohibited left turn movements from occurring.

2. The typical sections that were provided in the Draft EA are not applicable to all roadway segments. In the detailed plans the roadway sections illustrated in Figure 8 and Appendix A of the Draft EA may vary from the typical section displayed in the Draft EA due to site specific field investigations that may vary from one particular segment of roadway to another. The design parameters in this engineering design are noted in Appendix B are for a typical section of roadway along the project corridor from Station 622 +00 to 733 +15.66 and Station 55 +00 to 65 +00.

3. We acknowledge and agree with your comment that the roadway sections illustrated in Figure 8 and Appendix A of the Draft EA are different. As in the response to Item 1.3.4. above, the typical roadway sections illustrated in Figure 8 of the Draft EA may vary from one particular segment of roadway to another. The design parameters noted in Appendix B are for a typical section of roadway along the project corridor from Station 622 +00 to 733 +15.66 and Station 55 +00 to 65 +00.

4. We acknowledge your comment and will provide an updated cost breakdown for the proposed project in the Final Environmental Assessment. The updated construction cost estimate is $5.7 million. A detailed project implementation schedule will be submitted in coordination with the project engineer and selected contractor.

5. A breakdown of the project costs is attached for your information and review.

6. We acknowledge your comments and have provided a project schedule in the Final Environmental Assessment. The construction schedule is subject to administrative procedures (including permits and bid solicitations), as well as pre-construction coordination, we have attempted to narrow our projects implementation objectives to initiate construction by mid-July 2002, with completion by May 2003 covering a period of eleven (11) months.

7. See response to 1.4. above regarding project schedule. In response to the project limits terminating at Kilohana Drive in the south, see response to Item 1.1. c.

8. See response to 1.3. above. With respect to the suggestion that bicyclists should be banned from Pillani Highway, we note that the County of Maui is considering an alternative bike path system within the North-South Collector roadway. The north-south collector provision of this bike path needs to take place before the eventual bike path. The north-south collector would be routed to the County bike path.

9. The proposed drainage system for the Pillani Highway improvements have been designed in accordance with the State Department of Transportation Storm Drainage Standards. Design details will be developed in the grading.
drainage, erosion control plans. As set out in the scope of work for the proposed project, a functional drainage system with all proposed improvements within the existing highway right-of-way will be provided.

8. See responses to item V, below.

9. The highway density analyses in the traffic study which are sensitive to the reduction in speed limit, have considered the level of service analysis. The results from the analyses show improved levels of service.

10. The identification of alternatives was developed within the context of the Kailua Traffic Master Plan, October 1990 and Maili Long Range Transportation Plan, February 1991. The alternative of a new highway of the existing Piliakalua Highway was not considered in these regional planning processes. Nevertheless, the findings of the Kailua Traffic Master Plan and the Maili Long Range Transportation Plan, the final EA will address other options which may be deemed appropriate as long range solutions. In this context, we note that the proposed alternative improvements are intended to address the immediate capacity issues facing the South Maui community.

We consider the Mokuleia Highway widening project to be a critical capital project for Maui. Deferral of the project is not considered an appropriate alternative given the current capacity issues on Mokuleia Highway.

11. The analyses carried out and contained in the Traffic Assessment Report, March 2003, (Table 8 and Table 9) show that the widening will improve conditions and will be able to accommodate projected short-term (2011) peak hour traffic (2005) by the Transportation Research Board, National Council of State, Level of Service D is considered acceptable for urban areas.

12. Refer to responses to Item I, no. 4. The proposed improvements will provide a level of service D or better for the 2011 traffic conditions, and the roadway design and striping plan meet State Highway guidelines and standards as set out in the project scope.

Responses to Item III, Appendix A, Traffic Assessment Report (TAR)

1. The free-flow speed of 25 mph is used to describe the highway's geometry and establish the density criteria for the level of service.

2. The volumes shown in Table 1 (TAR) are representative of the extended drive to Maili Long Range Drive and should not be read as volume just north or just south of the detailed analysis. Traffic volumes are higher to the north and slightly decrease as one proceeds to the south.

3. Table 3 (TAR) shows the results of the analyses assuming the traffic signals are operated optimally. The table reports the average delay for all users of each intersection and may not correspond to those experienced by a specific user.

4. Speed limits are typically set at 15 to 20 miles per hour less than the design speed. The highway density analyses, which are sensitive to the reduction in speed limit, used a highway speed of 40 miles per hour. The anticipated addition of two new traffic signals should not affect the speed, since the minimum spacing of signalized intersections for the corridor is not affected. Below 40 miles per hour, the density criteria would not apply and intersection conditions will determine the level of service. The setting of present traffic congestion is not due to the lowering of the speed limit, the additional lane in each direction provides the increased capacity to ease existing and future congestion.

5. The design of the unsignalized intersections with the left turn restrictions will be implemented with signage, lane channelization and pavement markings to restrict prohibited turning movements.

6. The traffic analyses recognizes that most of the traffic on a Kailua-Uluoa Road to Hana Highway would travel south of the proposed connection at Kamehameh Avenue.

Responses to Item IV, Acoustic Study

1. A traffic noise study is required for projects of this type by DOT when federal funding is used. The detailed study was required to determine how high the sound barriers would need to be constructed to comply with DOT’s minimum attenuation criteria of 20 db. The tests associated with constructing the sound barrier were then used to determine if the sound barriers are acceptable or not. The application of this methodology is not unique to the present project, and non-application of the noise study methodology could lead to arbitrary conclusions.

2. a. Federal and State noise abatement criteria were not applied during the analysis of the location and height of the sound barriers. The values shown in Figures 2 through 9 are based on the data available for the project site.

b. The construction of sound barriers could be considered to be justified, since the existing traffic noise levels are not the future traffic noise levels. Further, the sound barriers are the primary determinants of the location and height of the sound barriers shown in Figures 2 through 9.
3. Footnote 3 indicates that the double asterisk (**) marking was used at 
these receptor locations where a 5 mph speed reduction will not be sufficient to 
meet the State DOT 5 dB attenuation criteria for substantial noise reduction. 
In this context, we wish to note that the 5 mph speed limit reduction as 
depicted in Table 6 reduces the 2011 year noise level from the present 
noise level at many locations. We also wish to note that despite the indication 
of not meeting the 5 dB reduction in noise levels, the increase in noise levels 
ranges from -0.7 to 2.2, which are well below the criteria for significant 
change.

4. As indicated in 2.b. above, adequate right-of-way acquisition of real 
property (as appropriate) could be considered for implementation of the noise 
mitigation measures, such as a landscaped sound barrier. As previously noted, 
however, sound walls are not proposed for the interim improvements.

5. The added costs of the sound attenuation walls could not be determined 
without first performing the study. In this regard, the noise study provides 
insight as to noise mitigation measures which could potentially be expected with 
the future permanent improvements.

I hope the above responses have clarified the issues raised in your letter.

Thank you again for the comments provided by the Maui Meadows Homeowners 
Association to the Draft EA.

If you have any further questions please call me at 879-5535.

Very truly yours,

FERDINAND CAJIGAL 
District Engineer, Maui

PC/nb
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**Total for Contract Items**: $5,447,800.00
**Contingencies (5%)**: $272,400.00
**Total (exclusive of Construction Engineering and Administration)**: $5,720,200.00
March 9, 2002

Department of Transportation, Highways Division
823 Paipala Drive
Kahului, Maui, Hawaii 96762
Attention: Fred Caligal

OFFICIAL COMMENTS ON DRAFT ENVIRONMENTAL ASSESSMENT FOR INTERIM ILLI' ANI HIGHWAY IMPROVEMENTS (MOKULELE HIGHWAY TO KILOHANA DRIVE)

Dear Sir,

In my capacity as Conservation Chair of the Sierra Club, Maui (SCM), I have reviewed the Draft Environmental Assessment (DEA) for interim Illi' ani Highway Improvements (Mokulele to KiloHana Drive). I found it incomplete and deficient in providing specific data to address potential impacts, pursuant to Chapter 543, Hawaii Revised Statutes (HRS). I hereby request that the DEA be amended as necessary to comply with the requirements of the Environmental Impact Statement, as the issuance of a Finding of No Significant Impact (FONSI) may be inequitable to the economic and social welfare of the community, and may involve a commitment for larger actions.

The Sierra Club, Maui group is a 501(c)(4) non-profit, a member of the Maui community for more than 25 years. With nearly 1000 current members, many of these members reside or work in South Maui and use the Illi' ani Highway. Furthermore, the Sierra Club has long been responsible for guiding responsible planning for long term vision of preserving and enhancing the quality of life that the following comments are offered.

1. Conflicts of Interest.
(a) The DEA has the same agency listed as both the Applicant and the Approving Agency/Authority. This has no independence of judgment in reviews, it does not engender the intent and integrity of the public review process.
(b) The DEA was prepared for the State of Hawaii Department of Transportation (DOT) by planning consultants Muroyoki & Associates, Inc. The same consultants are involved in planning and consulting with both the Wailuku and Seabury Makana Development Proposals. It is noted on page 11 of the DEA that both are voluntarily participants in the proposed funding for design of the proposed Illi' ani Highway Improvements. This financial relationship, and the necessity of public participation before project approvals, underscores the appearance of impropriety. While this may or may not be a legal matter, it is certainly an ethical matter.

2. Cost of Project.
No budget or cost analysis is provided to support the suggested cost of $4.75 million. The section titled Proposed Improvements (page 12 and 14) fails to list replacement of lightpoles and guardrails within the Highway Right Of Way (ROW). Additionally, a DOT letter dated 2/15/03 to the Maui County Council estimated a cost of $5-5.5 million for construction of Mokulele Highway Widening, a project of similar length. While there are disparities to the project, (e.g., cost of acquiring ROW for Mokulele), there is such a great disparity in pricing that the modest cost of interim improvements for the Illi' ani Highway must be questioned. A budget should have been provided.

3. Projected Duration of Project.
Page 16 of the DEA states that the project is estimated to last about eleven months. However, the above-referenced 2/15/03 letter (attached) from the DOT states: "we anticipate to start construction in July 2002 and complete by end of 2003." This represents a duration of 18 months. A project work schedule and timeline needs to be incorporated to address this discrepancy.

4. Drainage and Erosion Control.
Page 51 of the DEA states: "Twelve-foot wide grass swales will be constructed at the toe of all slopes and concrete slabs will be laid out for the toe of cut slopes." First, this raises the question of improvements made to the existing highway, which is delineating boundary of the SMA (map, page 60). It is stated that all improvements would take place within the existing highway ROW, but this work is never stated, nor is the easement into the SMA jurisdiction. Second, there are sections of the highway where neither of the alternatives quoted above would be practicable. An example is the end of the project near KilaHana, where steep slopes of blue rock preclude either one.

5. Public Safety.
Page 47 of the DEA states that the proposed improvements will meet all Federal and State DOT standards for highways, and maintain safety. Nothing is said of bicycle safety, or pedestrian safety. Certainly the reduced shoulders and shared lanes on bridges would endanger bicyclists. Reduced lane size would adversely endanger all motorists, and place the state and county and taxpayers at greater liability. The suggestion of a 5 mph reduction in speed limit as mitigating this risk merely obfuscates the legitimate impact. No supporting evidence or data was supplied for the validity of this mitigating measure.

6. Incomplete Discussion of Alternatives.
As required in HRS 343-5, 544-1, the proposing agency shall analyze alternatives to the proposed action. An often mentioned proposed solution for current Illi' ani traffic is a new transportation corridor (a realignment of the existing highway). There was no consideration of this alternative, except that implied on page 70 during a discussion of long-term, permanent improvements to the Illi' ani Highway. Nor was there any consideration of public transportation, staggered work and school schedules, carpooling, or other alternative modes of transportation other than vehicles or buses. "Deferral action alternative" was rejected prematurely due to fear of inflated future costs. Anything worth doing is worth doing right, whatever the cost.
7. Economic Impacts.

The economic and social impacts to the community are of great concern. Page 46 of the DEA offers the projected impacts as short-term benefits to the construction sector of the economy, and long-term benefit to more efficient movement of people and goods. No studies are submitted to support these hypotheses of economic impacts. Certainly there would be inconvenience to travelers, residents and visitors alike, during the duration of the proposed project. Page 74, under Findings and Conclusions, asserts: "The economic or social welfare of the community or state would not be substantially affected." This is a bold assertion, based on no studies incorporated in the DEA. The economic and social welfare of residents and visitors alike may suffer due to 15 months of increased congestion (pages 48 and 68) on a highway already suffering from levels of Service "F" at a majority of intersections (page 8, 1994 study). Visitor preference studies, both formal and informal, have cited concerns over increasing traffic and congested highways on Maui. Review of economic impacts in a formal EIS of this proposed project necessitates inclusion of studies and surveys of this kind.


Pages 46 and 47 of the DEA state that "appropriate coordination would be undertaken to ensure that emergency services (police, fire, medical) are not adversely affected." Construction zones typically limit the travel lanes of all highway users, including emergency services, and often bring traffic to a standstill. There is no discussion of how this migration might occur.


The Traffic Assessment Report, Appendix A of the DEA, is deficient of appropriate data, expressed in accuracy, and confusing as to methodology. This report does not fulfill the requirements of a formal Traffic Impact Analysis Report (TIAR). Instead, the report outlines years of the studies/pages 4, 5), methods used to project LOS/pages 2, 8), projected future traffic volumes/page 7), and trivializes conclusions and recommendations. A complete TIAR is warranted, referencing complete regional and island-wide traffic studies, including projections of traffic from future South Maui development, connection with Kileaua Upcountry roadway(s), and volume of construction traffic (pages 48, 68).

10. Incomplete Inclusion of Written Comments.

Pages 80 and 81 of the DEA list Agencies Consulted and Letters Received during the preparation of the DEA, as identified in Subchapter 6 (11-030-10 (6)) of the CEQA rules, titled Determination of Significance. While 27 agencies and individuals are listed, fifteen (15), or more than 50%, are not printed for review in the DEA. The result is an incomplete record of public and official comment and input to the proposed actions.

11. Incomplete Description of Roadway Design.

Figure 8, page 15 of the DEA, shows a simplified cross-section of proposed highway improvements. There is no depiction of how to handle sections of the highway ROW bordering blue rock, bridges, changes in elevation, guardrails, or dealing with removing and replacing roadway signs, lightpost standards, drainage culverts, and sound walls.


The Traffic Assessment Report (TAR) assumes a projected growth rate of 3% per year (page 7, Appendix A). However, page 25 of the DEA (Description of Existing Environment, 2. Socio-Economic Environment: Population) contradicts that figure. It shows an increased growth rate of South Maui (Kileaua-Makena) of 46% for the five-year period from 1990 to 2000. This multiplier undermines and subjugates all the traffic data professed in the TAR, and indeed in the entire DEA.

13. Commitment to Greater Action.

Page 75 of the DEA, under Findings and Conclusions, states: "The proposed action does not involve a commitment to larger actions, nor would the cumulative impacts result in considerable effects on the environment." This is contradicted by an earlier statement on page 69: "The proposed action represents an interim measure. From a long-term perspective, permanent improvements will be needed to address the region's traffic needs." The very word "interim" demonstrates a temporary fix, and therefore a commitment to the larger action of "permanent improvements." This triggers the earlier referenced rules and regulations pertaining to HRS 343, under 11-030-12(6).


Pages 36 and 77 of the DEA state that scenic views along the highway would not be substantially affected. However, page 34 of Appendix C, (Acoustic Study), admits that sound walls as noise barriers would be a possible noise mitigation measure, due to anticipated noise in decibel levels above federal standards for residential areas. Wall heights are described ranging from 6 to 10 feet to 15 to 20 feet for second story levels.

15. Daytime Construction.

Page 35 of the DEA states, "Construction will be limited to normal daylight hours." The purpose of this statement appears to be to comply with construction noise levels. However, this consideration may overlook and exacerbate expected increases in traffic congestion during peak daytime hours. An EIS needs to consider nighttime work and costs, especially in sections not bordering populated sections of the highway.


A detailed analysis should be provided to describe Proposed Improvements, above and beyond the cursory listing of pages 12 and 14 of the DEA. This section overlooks data such as:

(a) Guardrails: No mention is made of relocating guardrails within a foot or two of the existing roadway shoulder North of Kileaua Road (mauka and makai), at Piikea (mauka and makai), between Kanekal and Wailakohe (makai), at Kanekal (mauka and makai), at Alaus Heli, and both North and South of Kileaua Road (mauka and makai).

(b) Drainage: Particularly at Piikea, Lipoa, and Kileaua, where a severe dropoff would inhibit measures to provide fit within existing highway ROW.
(c) Bridges. Kulahekua, Waiulani, and Wekapuaa all present substantial widths with regard to roadway safety, bike lanes, pedestrian, and emergency flow.

(d) Lightpoles. Many MECO lightpoles are within a foot or two of the existing highway shoulder, and would have to be relocated. There is incomplete discussion of this in the DEA. There would be six (6) such poles at both Kulahekua and Kula Koa all levels, and there would be 11 such poles at the intersection for Kula Koa.

(e) Roadway signs. Page 14 (B) mentions the need to add, change, and/or relocate regulatory road signs. The scope of this work is unreported. By my own count, some 200 signs would require relocating on the mauka side of the Pīilani Highway, and approximately 215 signs on the makai side.

17. Conceptual Layout

No index is provided to describe three conceptual layout maps in Appendix B.

18. Funding Sources

The key for two foldout pages of Appendix B, titled "Typical Sections", references a Federal Aid Project Number (316B-01-C2). Page 14 of the DEA describes State, County, and private funding sources, but does not discuss availability or applicability of Federal funding.

19. Bike Corridors

Pīilani Highway, a well-designed two-lane arterial highway with wide shoulders as bike lanes, has long been used by recreational and competitive joggers and bicyclists, both for training, and as part of actual race courses. The proposed actions would diminish these options, and greatly increase safety risks. Such actions would be contrary to language in the Kīhei-Ma'alaea Community Plan (1999), discussion of which is marginalized on pages 59 through 60 of the DEA.

20. Incomplete Presentation on Proposed Mitigations

Suggestions to reduce speed limit from 45 mph to 40 mph, and to prohibit left turns on and off of unsignalized intersections are assumed to be appropriate mitigation measures for safety and LOS concerns, respectively. No supporting studies are provided to demonstrate that proposed mitigations would actually improve, and not worsen the problems they are intended to address.

21. Permits and Approvals Needed

Page 79 of the DEA shows only one needed permit or approval needed, which is clarify an incomplete assessment. The letters and comments section requests at least three other permits or approvals:

(1) Cultural Impact Statement (CHIA letter).
(2) NPDES Permit (OIC letter).
(3) Design Submittal (MECO letter).

A PONSII or final EIS approval would be another needed approval omitted.

In summary, there are at least 21 main criteria which were omitted or not adequately met in the initial review titled "Draft Environmental Assessment: Improvements Pīilani Highway Improvements (Mokulele Highway to Kīhaua Drive)." The Sierra Club Maui, collectively, as well as myself, individually, and representing SCM, find this Draft Environmental Assessment severely deficient in compliance with HRS 343. As such, a PONSII would be immediately challengeable in Circuit Court, pursuant to HRS 343 and CEQA Rules and Regulations, Subchapter 6, 1-200-1.1. It is our intent that the applicant seek an independent planning consultant, perhaps from out of the state of Hawai'i, to prepare a complete Environmental Impact Statement of the proposed actions for interim repproving and associated improvements to the Pīilani Highway. This course of action should help ensure the economic and social welfare, as well as the overall quality of life and public health of the greater community of Maui, Hawai'i.

I look forward to the timely response to the comments and concerns addressed herein.

Matupa nui koa, mauina pono,

Robert Parsons, Conservation Chair
Sierra Club Maui
3318 K H Kea Drive
Kihei, Maui, Hawai'i 96753
(808) 875-9956

c: Munioki & Hiura, Inc.
Genwâke Salmosen, CEQA Director
John Mii, Maui County Planning Director
David Good, Maui County Public Works Director
Maui County Council Members (all nine)
James Aipana, Maui County Mayor

The Honorable Patrick S. Kawano  
February 15, 2002

Makena Resort Rezoning
State Department of Transportation Highway Issues

This letter is to inform you that as we are occupied in addressing our current legislative matters here in Honolulu, we are unable to send appropriate staff to attend the rescheduled hearing for the Makena Resort rezoning before the Maui County Council of February 21, 2002. We respectfully provide you with information that may be of assistance in clarifying or validating the ongoing matters that have been brought up in past committee or council meetings related to that of the State Department of Transportation.

1. Makena Highway Widening, Kuhelani Highway to Pillani Highway Project.

With respect to our Makena Highway Widening project, the first phase to be constructed is Phase IIa, Kuhelani Hwy to the vicinity of Cane Haul Rd. Projected Notice to proceed for construction is May 2002. It is anticipated to take approximately 1-1/2 years to construct with appropriate staging of traffic to allow continuing use of a minimum of two lanes (one in each direction) during construction. The project length is 1.4 miles.

The second phase that is Phase IIb, from the Cane Haul Rd to the Animal Shelter (No. Mehamela Lp.) will be advertised late this year.

As noted at various hearings, we estimate the construction cost of all 5 phases of the Makena Widening to be approximately $85-$90 million.

The construction schedule for the remaining 3 phases is contingent on the availability of funding as determined by a Statewide Transportation Improvement Program prioritization process.

2. Pillani Highway Interim Widening Project, between Makuluiua Highway and Kilohana Drive.

The environmental assessment has been published with OEGC and the project plans are at their present stages. Having no challenges to the published environmental assessment, we anticipate to start construction in July 2002 and complete by end of 2003. Just to reinforce the scope of work entailed, we will be using the existing paved shoulders for travel lanes so that we may provide four lanes on Pillani Highway. Extensive modifications to adjoining drainage facilities and intersection improvements are required in conjunction with this effort. The State has committed $3 Million and the County of Maui has committed an additional $1M for the construction of the proposed improvements.

3. Pillani Highway Extension (from Waiola the through Waiola 670 to Makaelulupalaua).

The Pillani Highway Extension will primarily service the major developments in the area, providing an alternative access and improved traffic circulation. As such, the costs for the "Extension" should be shared by the developers and made a condition of development.

4. Developer's Pro-rata Share.

The State DOT is working with the County of Maui Planning Department to formulate the impact fee assessment.

The State DOT and the developer have a formal agreement under the Pillani Highway Interim Widening Project, which for their contributions to the planning and design of the highway project, the State is also willing to grant the developer credit against the amount of any impact fee which may be assessed against the developer by the state for transportation improvements on the Island of Maui during the ten year period following the date of our formal agreement. The State will grant the developer credit against such impact fees as may be assessed by the State in the amount of expenses paid by the developer, approved by the State under the said agreement.
The State and the developer have both acknowledged in writing that although the State is currently developing an impact fee mechanism, the State may implement or assess Impact Fees in the foreseeable future. The developer has agreed to assume the risk that the State may not implement or assess impact fees during the ten year period following the date of the agreement signed between Makana, Wallis 670 and the State DOT, and after the expiration of such ten year period, the State will not be obligated to credit the developer for any expenses paid by the developer against such impact fees. If the State implements or assesses impact fees within such ten year period, the State will credit the developer for any expenses paid by the developer against such impact fees in accordance with said agreement. Notwithstanding the expiration of the State's obligation to credit the developer for any expenses paid by the developer against such impact fees, the State, as per our signed agreement, will recognize the developers partial fulfillment of the participation condition to the extent of the expenses paid by the developer toward the planning and design of the highway project.

We hope that this meets to your satisfaction.

Very truly yours,

BRIAN K. MINAI
Director of Transportation

cc: Hon. Dain P. Kane, Vice Chair, Maui County Council
Hon. Charmaine Tavares, Council member
Hon. Alan M. Arakawa, Council member
Hon. Robert Carroll, Council member
Hon. G. Riki Hokama, Council member
Hon. JoAnne Johnson, Council member
Hon. Michael J. Molina, Council member
Hon. Wayne K. Nishiki, Council member
Mr. John Min, Maui County Planning Director
Mr. David Goode, Maui County Public Works Director
Mr. Roy Figureoa, Makana Resort Corp.
April 23, 2002

Mr. Robert Parsons, Conservation Chair
Sierra Club Maui
3318 A Keha Drive
Kiholo, Maui, Hawaii 96753

Dear Mr. Parsons:

SUBJECT: Draft Environmental Assessment - Interim Pilihana Highway Improvements (Mokule Highway to Kilohana Drive), Koihe, Maui

Thank you for your letter of March 9, 2002 on the above subject. We offer the following information in response to your comments.

Response to Item 1. Possible Conflicts of Interest:

(a) The Draft Environmental Assessment was prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Hawaii Administrative Rules (HAR) Title 11 Department of Health, Chapter 200 Environmental Impact Statement Rules. The identification of the accepting authority is in compliance with Subchapter 4, Responsibilities. The identification of the applicant and agency actions pursuant to HRS 343, are in compliance with Subchapter 5, Applicability, Section 11-200-5 (a), (b), and (c). We concur with your observation regarding the need to maintain the integrity of the public review process. In this context, we also believe the processes established through Chapter 343, HRS and HAR Title 11 provide a sound mechanism for enabling public input to project development.

(b) Munekiyo & Hiraga, Inc. are providing consulting services under the direction of the State Department of Transportation, Highways Division. Although contributions towards planning...
and design are being made by private landowners, project control in terms of design management, design criteria formulation and construction implementation is within the full jurisdiction of the DOT. As with our response to Item 2. above, the checks and balances to conflict of interest are provided by the public review process which enables DOT to consider issues of concern to the community.

Response to Item 3. Cost of Project

We acknowledge your comment and have provided an updated cost breakdown for the proposed project in the Final Environmental Assessment. The updated construction cost estimate is $6.7 million. A breakdown of these costs is attached for your information and review. As described in the Draft EA, the proposed improvements involve restriping, relocation of signs and intersection improvements within an existing right-of-way. The construction scope of the Molokai Highway widening project on the other hand, involves right-of-way modifications and new roadway construction.

Response to Item 4. Projected Duration of Project

We acknowledge your comment and have provided a project schedule in the Final Environmental Assessment. While construction scheduling is subject to administrative procedures (relating to advertising and bid solicitation), as well as pre-construction coordination, we have attempted to narrow our project implementation objectives to initiate construction by mid-July 2002, with completion by May 2003 covering a period of 11 months.

Response to Item 5. Drainage

The Pillani Highway Right-of-Way varies along the project corridor from 105 feet to 225 feet. The details of the existing right-of-way are shown on the construction plans. We confirm that all improvements will be carried out within the highway right-of-way. As stated in the Draft EA, Chapter IV, F., the Pillani Highway is not within the County Special Management Area which we understand to be makai of the right-
of-way. The proposed drainage design is in compliance with State Department of Transportation, Highways Division Storm Drainage Design Standards.

Response to Item 6. Public Safety

The reduced travel lane widths are based on acceptable guidelines set by the American Association of State Highway Transportation Officials (AASHTO). The bicycle route is designed according to the Manual on Uniform Traffic Devices (MUTCD). The MUTCD allows for bicyclists to share the lane under the conditions required on the Pillani Highway at bridges where there will be 2-foot shoulders. Appropriate signage will be posted based on the MUTCD to warn bicyclists and motorists to share the road at bridges. With respect to pedestrian safety, the restriping project will provide pedestrian crosswalks and signalization, where appropriate. The 5 mph reduction in the speed limit due to the narrowing of lanes from 12 feet to 11 feet is based on the procedures of the Highway Capacity Manual (2000) by the Transportation Research Board, National Research Council.

Response to Item 7. Discussion of Alternatives

The identification of alternatives were developed within the context of the Kihue Traffic Master Plan, October 1996 and Maui Long Range Transportation Plan, February 1997. Alternatives noted in your comment, including a new highway right-of-way for the existing Pillani Highway were not considered in these regional planning processes. Notwithstanding the findings of the Kihue Traffic Master Plan and the Maui Long Range Transportation Plan, the Final EA will address other options which may be deemed appropriate as longer range solutions. In this context, we note that the proposed interim Pillani improvements are intended to address the immediate capacity issues facing the South Maui community.

Response to Item 8. Economic Impacts

The need to minimize inconveniences to the traveling public is a primary objective in the implementation of this project. While delays will be unavoidable, we have instructed our project designers to consider appropriate traffic control options which will maintain traffic flow at its most efficient
levels. During construction of the proposed improvements, two travel lanes, one lane in each direction, will always be open and work will not be carried out during the peak hours. As well, DOT will coordinate detour routes with the County of Maui, Department of Public Works and Waste Management, as required to facilitate traffic movement during construction.

With regard to the conclusions advanced in the Draft EA, we note that upon completion of the project, improved level of service measures will offer a significant benefit to the South Maui community. While not based on technical economic analysis and study, we believe the conclusions to be appropriate when viewed in the context of existing highway conditions.

Response to Item 6, Emergency Services

Appropriate coordination would include advance notification to emergency service providers informing them of the location of construction zones and potential delays caused by construction so they may plan their travel routes accordingly. During roadway construction to direct traffic, they will direct traffic to facilitate emergency service vehicle movements within the construction zone at times of heavy congestion.

Response to Item 7, Traffic Assessment Report

A typical Traffic Impact Analysis Report compares future conditions with and without a development project that can be expected to generate new traffic or to significantly alter traffic patterns. The traffic study for this project does not make this comparison because the highway project itself would not generate new traffic and changes to peak hour traffic per hour. The report presents a general overview of existing conditions for the project area using the latest available information for average daily traffic (1999), provides additional details of existing conditions using estimates of traffic volumes during an average day in 2001, and provides estimates of future year (2011) traffic volumes and analyses of future conditions. Levels of service are identified for the highway based on traffic densities (vehicles per lane per mile) and for intersections based on estimated user delays (seconds per vehicle) at the intersections.

Response to Item 10, Incomplete Inclusion of Written Comments

The list of agencies consulted, responses received and responses to agencies included in Chapter X of the Draft EA was carried out pursuant to Hawaii Administrative Rules, Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Subchapter 6, Section 11-200-9 (1). Early consultation letters providing information on the proposed project were sent to the listed agencies and organizations on November 12, 2001 with a requested response date of November 30, 2001. All responses received up until early January, 2002 were included in the Draft EA. Responses to all substantive comments were sent to the respective agencies and organizations and included in the Draft EA.

Response to Item 11, Incomplete Depiction of Roadway Design

The intent of the Figure 6, Draft EA was to give a typical cross section to conceptually illustrate how the restriping of the roadway would create two additional lanes, change the width of lanes (from 12 to 11 feet), create new shoulders as a result of paving over the existing concrete median, and establish the drainage pattern along side the new shoulders. The details of roadway improvements along the project corridor are shown in the roadway plans; grading, drainage and erosion control plans; site and grading plans; signage and striping plans; traffic control plans; and traffic signal plans which are more typically reviewed during the construction document phase of the project.

Response to Item 12, Projected Growth

The projected 3 percent traffic growth rate figures included in the Traffic Assessment Report prepared by Julian Ng, Inc. were provided by the State Department of Transportation. These projections were based on historical traffic counts, Kihei Traffic Master Plan, Maui Long Range Transportation Plan, and planned growth as set out in the Kihei-Makena Community Plan. The 4 percent increase in population from
1990 to 2000 for the Kihel-Waiakea-Makena region in the Draft EA, Chapter 11, B.2., was taken from the County of Maui Data Book based on the census figures for 1990 and 2000, respectively. This translates into an average annual growth rate of 4.6 percent. We note that population increases may not be linearly correlated to vehicle trip increases. For example, a new family moving into the Kihel-Makena Community Plan region would not necessarily increase trip counts by the number of family members.

Response to Item 15, Commitment to Greater Action
The “interim” improvements indicates that the project is intended to meet demands for less than the normal 20-year planning horizon. In Appendix A, Traffic Assessment Report, Julian Ng, Inc., January 2002, it states, “The proposed project is an interim project being designed for traffic volumes expected in year 2011” (Page 7).

With regard to the relationship between the proposed interim improvements and the permanent highway improvements, we note that the full scope of the permanent improvements are not known at this time. Once the permanent widening project has been defined, a decision to carry out an environmental assessment or an environmental impact statement will be made. Implementation of a permanent widening project will be initiated after the impacts of the project are identified and assessed. In this context, the proposed project is considered an action separate from and independent of a permanent improvement action.

Response to Item 18, Scenic Viewas
Construction of sound walls are not proposed as a mitigation for noise within the scope of the interim highway improvements. The increase in noise levels in the year 2011 as a result of the project will be approximately 1.5 dB from existing levels.

Response to Item 16, Proposed Improvements
The listing of improvements was established to capture the scope of work of the proposed project in order to assess the impacts of the proposed action. Guardrail requirements are determined by the Federal guidelines for guardrail design. Upon field investigation approximately 115 guardrails, totaling approximately 1,200 linear feet, will require relocation. With respect to your comments on drainage, we agree that where a severe dropoff occurs, this would not allow the provision of fill within the existing highway right-of-way. The restriping plan has been refined to allow for four 11-foot travel lanes and 2-foot shoulders at bridges. The light poles are breakaway type poles and do not have to be relocated according to State Department of Transportation standards. The proposed striping and signage plans account for all required signage. All signs will not have to be relocated.

Response to Item 17, Conceptual Layout
An index to the conceptual layouts presented in Appendix B of the Draft EA was not provided since each figure is titled.

Response to Item 18, Funding Sources
There will be no federal funds applied to the proposed project. Therefore, there was no discussion on the applicability of federal funding in the Draft EA.

Response to Item 19, Bike Corridors
Pillani Highway provides a north south bike route in South Maui and has been identified in the State of Hawaii bike plan. The proposed project will continue to provide a bike route along the project limits with a 6-foot wide shoulder on either
side of the highway and a 5-foot wide bike route through intersections. Appropriate signage will be posted to warn bicyclists and motorists to share the road at bridges where there will only be a 2-foot shoulder. In the Kihei-Makena Community Plan, reference is made to a proposed trail/greeway/bikeway system to provide an alternative means of transportation. We note that the County of Maui is currently implementing its North-South Collector Road system which will provide an alternative bike route. As appropriate, the DOT will coordinate with the County's Department of Public Works and Waste Management to ensure that adequate bike linkages between Piilani Highway and local roads are implemented.

Response to Item 20, Incomplete Presentation on Proposed Mitigations

The 5 miles per hour reduction in the speed limit due to the narrowing of lanes from 12 feet to 11 feet is based on the procedures of the Highway Capacity Manual (2000) by the Transportation Research Board, National Research Council. The restriction of the left turn movements from and onto Piilani Highway was analyzed in the Traffic Assessment Report prepared by Julian Ng, Inc. The existing lane configurations and LOS are presented in Exhibit 4 (Appendix A) and indicate, for example, the Kanani Road left turn movement is currently operating at LOS F for AM and PM peak hour periods. The future conditions (2011) at the unsignalized intersections are shown in Table 9 (Appendix A) and indicate that the intersection movement at Kanani Road with the left turn restrictions operate at LOS B and C during AM and PM peak hour periods, respectively.

Response to Item 21, Permits and Approvals Needed

We note that in the Environmental Notice, February 8 publication, the Permits required listed the National Pollution Discharge Elimination System Permit (NPDES) and Work to Perform Within State Highway Right-of-Way. We acknowledge that the Draft EA did not cite the NPDES and this will be included in the Final EA. The letter from the Office of Hawaiian Affairs points out that a cultural impact assessment be carried out and included in the Draft EA in compliance with
<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>UNIT</th>
<th>PRICE</th>
<th>AMOUNT</th>
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<td>0. Removal of Traffic Island (210 S.F.)</td>
<td>L.S.</td>
<td>L.S.</td>
<td>$25,000.00</td>
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<td>1. Removal of Drain Inlet (3 Each)</td>
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<td>L.S.</td>
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<td>2. Roadway Excavation</td>
<td>150</td>
<td>C.Y.</td>
<td>$85.00</td>
<td>$12,750.00</td>
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<td>4. Structure Excavation for 24-inch Reinforced Concrete Pipe (650 G.C.Y.)</td>
<td>L.S.</td>
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<td>5. Structure Backfill for Cement Rubble Masonry Headwall (10 G.C.Y.)</td>
<td>L.S.</td>
<td>L.S.</td>
<td>$1,000.00</td>
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<td>6. Water Pollution and Erosion Control</td>
<td>F.A.</td>
<td>F.A.</td>
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<td>7. Aggregate Base</td>
<td>625</td>
<td>C.Y.</td>
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<td>8. Aggregate Subbase</td>
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<td>C.Y.</td>
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<td>9. Concrete Low Strength Material (CLSM) Leveling Course</td>
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<td>10. Asphalt Concrete, Mix No. IV</td>
<td>10,000</td>
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<td>$750,000.00</td>
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<td>11. Asphalt Concrete, Mix No. V</td>
<td>7,210</td>
<td>TON</td>
<td>$75.00</td>
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<td>12. Paving Fabric</td>
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<td>S.Y.</td>
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<td>13. Concrete Reinforced Concrete Jacket for 36-Inch Waterline (Class B) (13.5 C.Y.)</td>
<td>L.S.</td>
<td>L.S.</td>
<td>$4,850.00</td>
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<td>14. Bed Course Material for Culvert</td>
<td>L.S.</td>
<td>L.S.</td>
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<td>15. 24-Inch Reinforced Concrete Pipe, Class III</td>
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<td>L.F.</td>
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<td>16. Grated Inlet Box, 4.00 feet to 4.99 feet</td>
<td>4</td>
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<td>17. Type A Storm Dams Manhole, 0 feet to 6 feet</td>
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<td>EACH</td>
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<td>18. Type A Storm Dams Manhole, 6 feet to 8.99 feet</td>
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<td>19. Storm Drain Inlet Box, 3 feet to 3.99 feet</td>
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<td>20. Storm Drain Inlet Box, 4 feet to 4.99 feet</td>
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<td>$5,000.00</td>
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<td>21. Storm Drain Inlet Box, 5 feet to 5.99 feet</td>
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<td>22. Strong Post W-Beam Guardrail</td>
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<td>L.F.</td>
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<td>23. FIELD-310</td>
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<td>24. Concrete Traffic Islands</td>
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<td>S.Y.</td>
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<td>25. Curb for Traffic Islands, Type 2D</td>
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<td>L.F.</td>
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<tr>
<td>20</td>
<td>Reflector Marker HM-4 with Post</td>
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<td>30</td>
<td>Regulatory and Warning Sign (10 Square Feet or Less) with Post</td>
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<td>$300.00</td>
</tr>
<tr>
<td>10</td>
<td>Regulatory and Warning Sign (10 Square Feet or Less) without Post</td>
<td>EACH</td>
<td></td>
<td>$300.00</td>
</tr>
<tr>
<td>59</td>
<td>Recondition of Existing Sign with New Post</td>
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<td></td>
<td>$175.00</td>
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<tr>
<td>18</td>
<td>Type I Traffic Signal Standard, H=10 Feet</td>
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<td>16</td>
<td>Remove Type I Signal Standard and Assembly</td>
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<tr>
<td>11</td>
<td>Type II Traffic Signal Standard, 25 Feet Mast Arm</td>
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<td>3</td>
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<td>Remove Type II Signal Standard and Assembly</td>
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<td></td>
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<tr>
<td>1</td>
<td>Foundation for Type I Signal Standard</td>
<td>EACH</td>
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</tr>
<tr>
<td>2</td>
<td>Foundation for Type II Signal Standard</td>
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<td>Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section, Top of Pole Mount)</td>
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<tr>
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<tr>
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<td>Traffic Signal Assembly, (1-Way, 12-Inch, 3-Sections, Bracket Mount)</td>
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<td>$1,100.00</td>
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<tr>
<td>1</td>
<td>Traffic Signal Assembly, (1-Way, 12-Inch, 3-Sections, Mast Arm Mount)</td>
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<td></td>
<td>$1,100.00</td>
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<tr>
<td>5</td>
<td>Pedestrian Sign Assembly, (1-Way, 12-Inch, Bracket Mount)</td>
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<td></td>
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<tr>
<td>5</td>
<td>Pedestrian Pulsation With Instruction Sign</td>
<td>EACH</td>
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<td>$350.00</td>
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<tr>
<td>7</td>
<td>Opticom Receiver, (Top of Pole Mount)</td>
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</tr>
<tr>
<td>1</td>
<td>Opticom Receiver, ( Mast Arm Mount)</td>
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<td>$1,200.00</td>
</tr>
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<tr>
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<td>Traffic Signal Ductline, Four-2 Inch Conduit (1,570 L.F.)</td>
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<tr>
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<td>Traffic Signal Ductline, One-2 Inch PVC Coated Rigid Steel (150 L.F.)</td>
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<tr>
<td>50</td>
<td>Type A Pushbox</td>
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<td>$500.00</td>
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</tbody>
</table>

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*Note:* The table above is a partial listing of items and quantities for a project related to the Highway Internship Widening, Molokai Highway to Kilohana Drive.

*Source:* copy of Preliminary Detail Estimate, Highway Internship Program, Molokai Highway to Kilohana Drive.
The document appears to be a bill or a financial report. It contains a table with columns labeled "Item" and "Unit Price Amount." The table includes entries with numerical values and some text annotations. The document seems to be related to financial transactions or accounting details. Due to the nature of the content, a detailed transcription is not provided here.
TO:  
Ferdinand Cajigal  
District Manager  
Department of Transportation  
Highways Division  
650 Palaipala Driveway  
Kahului, HI 96732  

FROM:  
RELICYER  
VALUE ENGINEERING  
C.E.O. Arnold Pratt  
1183 Lawai Pl.  
Kahului, HI 96732  
808-879-3269  

Consultant to HI Transportation and planning department  
At issue, proposed striping of Piihali highway to 4 lanes & Mokulele Hwy  
construction project, both a total waste of limited funding that would be far  
better spent on a total cure that would be sufficient for decades into the future.  
The problem starts at Lipa ave. traffic light where the traffic quickly backs  
up coming mainly from Makana & S. Keha Ma’ili Meadows- the plan of  
re-striping offers a narrow stacking lanes, which is really more stop and go.  
For 4 lane more congestion Band-Aid cure. Costs for Piihali 1/2 plan 6 mil.  
Cost for Mokulele? It makes more sense to put the money available on a  
good plan rather than a Band-Aid project that never really solves issues of  
the future. Plans should be for the future to consider saving energy,  
pollution, money, time, stress levels for the public.  
Taking a value engineering approach, what is best for public as whole  
& environment.  
Energy savings are of most important priority! Which will be  
compounded by future costs to all, also to consider POLLUTION and TIME,  
which can be very critical.  

QUESTIONS:  
Has the proposed re-stripping of Piihali hwy been reviewed using value  
engineering procedures? All large monetary Gov’t share funded project  
should require!  
Instead should focus on a 5-mile alternative hwy to bypass congestion  
area and offer Tsunami Evacuation safety for the populace.  
The life you save could be your own or loved ones!  

Let’s have a public vote on the alternative bypass hwy would be done in  
stages starting with the most advantageous part 1st.  
Lipa—concrete plant road  
Stage 2: Concrete plant road—to Pa‘auwe  
Stage 3: Pa‘auwe—Hana Hwy  
Stage 4: Lipa—Makana  
Stage 1 of the Alternative Bypass hwy should be prioritized immediately for  
numerous reasons 1) offers emergency tsunami evacuation relief 2) Energy  
saver 3) costs less 4) is step in right direction  
It’s time to make responsible choices! That serves the needs of the  
entire public. To evaluate the options and prioritize best. Using the Value  
Engineering approach.  

Alternative to Piihali re-striping  
1. New 2 lane road with pull off shoulders & bike lane same as Piihali  
   present with a first phase 3—5 mile bypass that starts at top end of  
   Lipa—and meets at firebreak road and concrete plant road that comes  
   out at animal shelter on Mokulele.  

Alternative bypass Rd offers:  
1. A true tsunami evacuation route for Keha and Makana  
2. Cheaper to build by far than Mokulele and nonexistent re-striping Piihali  
3. Shorter distance for vehicles to travel=saves time and ENERGY  
4. Savings in fuel to each vehicle adds up to thousands of $ per day  
5. No stop and go traffic alternative Rd offers steady movement with no  
   traffic lights  
6. Need for no bridges, Terrain is relatively flat with wasteland.  
7. With this alternative bypass segment in place Piihali re-striping 5  
   million plus will never need done & Mokulele Hwy widening will  
   also not be needed  
8. An alternative Rd is the only sensible solution to Keha areas traffic  
    dilemma. Because during the construction there will be no delays to  
    the public, throughout its development and building to completion and  
    opening for travel. Enjoy, ETC.  

Sincerely, Arnold Pratt, 808-879-3269
Mr. Arnold Pratt  
1153 Lau'l Place  
Kihei, Hawaii 96753  

Dear Mr. Pratt:  

SUBJECT: Draft Environmental Assessment – Interim Pilani Highway Improvements, Mokuleia Highway to Kilohana Drive  

Thank you for your March 28, 2002, comments regarding the above subject matter.  

We acknowledge your comments with respect to cost efficiencies of and alternatives to the proposed project. We note that the proposed project is interim to immediately address capacity and near capacity conditions on Pilani Highway. The restriping of the highway from two lanes to four lanes was identified by the Mayor's Transportation Action Committee after extensive community consultation as a short term solution to address traffic issues. Given the overall cost estimate of the project and improvements to the Level of Service over the section of roadway, the Department of Transportation considers the proposed project to be a very effective solution. As mentioned in the Draft EA, Chapter III.B.1., the proposed project will also result in the more efficient movement of people and goods throughout the Kihei-Wailea-Makena region.  

The identification of alternatives were developed within context of the Kihei Traffic Master Plan, October 1998, and Maui Long Range Transportation Plan, February 1997. Alternatives noted in your comments, including a new highway mauka of the existing Pilani Highway were not considered in these regional planning processes. Notwithstanding the findings of the Kihei Traffic Master Plan and the Maui Long Range Transportation Plan, the Final EA will address other options which may be deemed appropriate as longer range solutions.  

We note your comments with respect to the advantages an alternative bypass route will offer and will consider these points in evaluating longer range alternatives. In this context, we consider the Mokuleia Highway widening project to be a critical capital project for Maui. Delerral of this project until a long-term alternative is implemented is not considered an appropriate option given the current capacity issues on Mokuleia Highway.  

Again, thank you for your comments.  

Very truly yours,  

[Signature]  
FERDINAND CAJIGAL  
District Engineer, Maui  

FC:dmf
Mr. Cejail, I believe quality living comes at a price and that price is time. I've lived above the Pali for 10 years. I am against building the Pali Wall. They only destroy our lifestyle with ugly walls. Do not be the cause of our businesses losing more money. I get stuck in traffic like everyone else but I am willing to wait for something more appropriate to our island style of living. Your intentions are well-meant. I ask you to please listen to our concerns on building another two-lane road across the Pali. Everyone will have to decide what to do from here on. Thank you.

Wenda Ng & John Miller, and son, Che and Jo
333 Hale Kai St.
Kailua, HI 96733
877-0104

---

Ms. Wenda Ng and Mr. John Miller
321 Hale Kai Street
Kailua, Hawaii 96733

Dear Ms. Ng and Mr. Miller:

SUBJECT: Draft Environmental Assessment — Interim Pali Highway Improvements, Mokuleia Highway to Kaoha Drive

Thank you for your comments on the subject matter.

We would like to clarify that sound attenuation walls are not part of this project. Modeled increases in the acoustical environment following the proposed project are well below the State’s criteria for significant change. Regarding the resurfacing of the highway, the Mayor’s Transportation Action Committee identified the resurfacing from two to four lanes as an interim action to address present and near capacity conditions on Pali Highway.

We acknowledge your comment with respect to an alternation new alignment curious of the present highway. The identification of transportation alternatives is developed within the context of the Oahu Traffic Master Plan, October 1995, and the Maui Long Range Transportation Plan, February 1997. A new highway alignment of the existing highway was not considered in these regional planning processes. Nonetheless the findings of the Oahu Traffic Master Plan and the Maui Long Range Transportation Plan, the Final EA will address other options deemed to be appropriate as long-range solutions.

Again, thank you for your comments.

Very truly yours,

FERDINAND CAIJO
District Engineer, Maui
FC/aml
21 March 2002

COMMENTS REGARDING PLANNING FOR SOUTH MAUI TRAFFIC-

The County of Maui has the unique opportunity to truly plan for the future, not merely reach out 3 to 5 years or within a single administration.

With land available (undeveloped and unimproved) the County of Maui should secure the right-of-way for a traffic corridor mauka of the present Pi'ilani "Highway".

While re-stripping and widening will "ease" the pain for a couple of years, the opportunity should be seized to plan for the future. Widening will do little more than the earlier plan for four lanes at each signaled intersection. Enforcement of the speed limit will help and calibration of the signals and posting the speed at which they are calibrated should help. (posting the speed which, if maintained, will result in reaching each light on a green signal)

True planning might include:

- An effective transportation link between south Maui and Maui's "business, financial, government and transportation center (are we going to build another airport or harbor??)"
- Plan for future right-of-way links for light rail or other mass transit options, "Y" connection to upcountry.
- Plan for a Maui Symbol at the intersection of the "Y" road.
- Recognize future needs will exceed any modifications of the existing traffic grid.
- Other future options to allow for their integration.

Even back then - 65-8 BC - Homer, Odes, was wise enough to recognize "Carpe diem, quam minimum credula postera" - "Seize the day, put no trust in the morrow."

I believe it is a valid interpretation of our present situation (opportunity)

Let's seize the opportunity ("day") - it may not be available tomorrow.

Patrick Ryan
Kiihi

Mr. Patrick Ryan
552 Kalihi Street
Kiihi, Hawaii 96753

Dear Mr. Ryan:

SUBJECT: Draft Environmental Assessment -- Interim Pi'ilani Highway Improvements, Mahalele Highway to Kilohana Drive, Island of Maui

Thank you for your comments regarding planning for South Maui traffic.

With respect to the need for long term transportation planning, the Maui Long Range Transportation Plan looks at transportation issues and planning in a 20-year time frame and is updated regularly. Public input is encouraged and your comments may be considered during the review of the MLRTP. Notices will be published when meetings are scheduled for this purpose.

Again, thank you for your comments and interest in the transportation needs affecting the County of Maui.

Very truly yours,

[Signature]

FERDINAND CAJIGAL
District Engineer, Maui

PC009
February 26, 2002

VIA FAX (808)373-1344

Mr. Ferdinand Cjaljal
District Engineer, Maui
State of Hawaii
Department of Transportation
Highways Division
650 Pawai Drive
Kahului, HI 96732

Re: Draft Environmental Assessment—Interim Pilana Highway Improvements, Maluaka Highway to Kihana Drive, Island of Maui

Dear Mr. Cjaljal:

As a member of the Maui Meadows Neighborhood Association Board of Directors, I have been asked to respond to the draft EIS. Our neighborhood is south of the northern terminus of the Pilana Highway.

The immediate question in reading the EIS is why the study stopped at Kihana Drive, 1.3 miles short of the Pilana Drive, the terminus of the Pilana. While the document states that "the project in itself is not a master planned component of the Wailuku and Maluaka project references in Appendix A indicate these projects, which will use the 1.3 miles to Wailuku High for access. To wit, Appendix A—Traffic Assessment Report, page 7 notes "the increase in traffic volumes are from projects already approved in Kihana as well as additional developments proposed in the overall County Master Plan." Further, Appendix A, page 10, Table 8, "Future Conditions, Signalized Intersections," shows that Kihana-Mala Drive would add 0.45 eac. in 2006. These conditions would respectively ask that the EIS be expanded to measure the impacts all the way to the terminus of the Pilana Highway. We believe that this project will have substantial impact on our community.

Page 74

"The proposed action does not affect public health..."

I do not believe this statement is accurate. The health impacts of traffic noise levels above 65 dBA in residential areas are well documented and have been noted in this report. The noise study indicates that 72 residential structures will be impacted to a noise level of 65 dBA or more. It would be better stated to say "72 families will be significantly affected. The likelihood of traffic, estimated at 1.5 per year without any new development will result in detrimental living conditions related to noise in housing areas adjacent to the Pilana. The project is a dummy for noise abatement due to substantial social investment in highway noise mitigation measures. Unfortunaltly in the engine of the car and will suffer the detrimental effects of ambient noise levels as well as economic impacts to their homes.

Page 76

"The proposed action does not involve a commitment to longer action, etc. traffic volumes are generated by new developments within the Wailuku and Maluaka project areas will be affected by the proposed highway improvements. However, the project itself is not a master planned component of the Wailuku and Maluaka projects."

On the official record, these projects have been approved by the Maui County Council (314/3 of May) with no changes to construction of the Pilana Highway. The project between Kihana Drive and Wailuku has been approved for the inclusion of Kihana Drive. This is further verification of the need for the future development of "engineering" and "planning."

Page 76

"Air quality, water quality, or ambient noise levels would not be determinedly affected by the proposed project. (Last paragraph), the projected increase in future traffic levels at the "West End Interchange" for the project is an increase in traffic levels over the ten-year period between 2000 and 2035 that is generally less than 1.5 to 2.0. This increase is not considered to have a significant impact on noise levels."

While the project itself, the actual construction and re-striping, will increase the traffic levels, the study determined that the increased growth impacts with the completion of this project are less than 1.5 dB. I would agree that ambient noise levels in some areas adjacent to the Pilana already exceed 65 dBA, but in some instances even less. A 1.5 dB increase (logarithmic noise) in those areas is substantial.
Appendix A

"Page 7-Table 6 Historic Traffic on Pali Hwy-The increase in traffic volume on this road is due to development approved in the Waiau and Makaha areas. "Waiau" is minor. This table indicates "a.m." for data from 6:00 a.m. to 9:00 a.m. and "p.m." for data from 3:00 p.m. to 6:00 p.m. The peak hour traffic data is for Pali Hwy. The table shows the traffic in this 1.2 mile stretch as if it simply disappeared. This is further reason to include the area in the EIS.

Appendix A

"Page 7-8- Left turns at signalized side streets will not be permitted. This will create additional traffic on residential streets adjacent to signalized intersections.

Appendix A

Page 13-Table 2 Future Conditions, etc.
This table shows Kikiaha/Makaha peak a.m. and p.m. traffic exceeding the 100.00 carrying capacity. How were these numbers arrived at if there were no estimates available for Table 6?

Appendix C

"Page 8-9- These conclusions are valid as long as the future vehicle miles and average speeds do not differ from the estimated values. This study uses a 40 mph free flow average vehicle speed. This EIS states that the current lane configuration has a free flow average speed of 55 mph despite posted limits of 45 mph. Shouldn't there be different speed scenarios calculated as it relates to noise generation? What traffic impact would there be if the free flow was at 55 mph? Was 40 mph speed used in the Traffic Noise Model? Not, what speed was used? Do the assumptions used in the noise studies include the proposed build out numbers in Waiau and Makaha which the traffic studies used? Was any consideration given to study without these proposed build out numbers? If the widening does not include the 1.2 mile stretch, no development can take place in Waiau 670 or Makaha.

Appendix C

"Page 9- Table 2 Traffic Noise Measurement Results" Referencing the K-2 (just north of Kikiaha/Makaha) location reading range from 68.6 to 70.2 dB conducted in early July 2001. The Waiau 670 Appendix contains a Noise Study done by Y. Edio which shows a similar location, identified as Location A (near Kikiaha/Makaha) measured data in 1993, which shows a range of 60.9 to 62.6 dB. Based on this comparison, there has been a huge jump in noise levels. In another nine years at 1.5 dB per year the noise will be unbearable! What are the health implications for those living within 150 feet of the centerline?
Dear Ms. Scheerer:

SUBJECT: Draft Environmental Assessment - Interim Pillani Highway Improvements (Mokulele Highway to Kilohana Drive), Kihei, Maui, Hawaii

Thank you for your letter of February 8, 2002 submitted on behalf of the Maui Meadows Neighborhood Association on the above subject. We offer the following information in response to the comments provided therein.

Response to Opening General Comments

We wish to clarify that the subject report has been prepared as a Draft Environmental Assessment (EA). The Department anticipates filing the final EA as a Findings of No Significant Impact or FONSI.

The project limits were defined as Mokulele Highway to Kilohana Drive. The proposed project seeks to improve those portions of the highway that have the greatest need. As indicated in the Draft EA, Appendix A, Table 1, existing traffic volumes on the segment from Mokulele Highway to Lipoa Street are about 25 percent greater than traffic volumes on the segment from Lipoa Street to Kilohana Drive. Traffic volumes on the segment between Kilohana Drive and Waiula Iki Drive are about 55 percent of those on the segment from Lipoa Street to Kilohana Drive. The updated Traffic Assessment Report, by Julian Ng, Inc. March 2002 which will be included in Appendix A of the final EA assessed the level of service south of Kilohana Drive for the future 2011 condition and concluded that the Pillani Highway would service traffic at Level of Service C or better without improvements through this roadway segment.

Response to Item 1: Findings and Conclusions

The "health" impacts (i.e., causing sickness or disease of some kind) of traffic noise levels above 65 dB in residential areas are not well documented. However, Federal agencies have determined that there are potential adverse "health and welfare" effects of noise above 65 dB (i.e., 14-hour average measurement with a night time peak). These possible effects and health under the same conditions, for highway noise and this study, a regulatory threshold of 66 dB was used in place of 65 dB to define levels above which potential noise impacts occur, which may not be "healed" related.

Based on the updated Acoustic Study (April 2002) it should be noted that 81 (changed from 82, January 2001) single-family residences represent those which are currently exposed to traffic noise levels above the 66 dB threshold. With a 16-mile speed reduction, the number of residences whose noise levels exceed 66 dB local 65 or 6 more than the existing conditions (i.e., the difference between "existing" column and "future" column in Table 6 for those single-family residences whose noise levels exceed 66 dB).

Response to Item 2: Commitment to Larger Actions

The 1 percent increase in traffic volume used in the Traffic Assessment Report was based on historical traffic patterns, data from the Kihei Traffic Master Plan (October 1995) and the Maui Long Range Transportation Plan (February 1997), and an assessment of future development based on the Kihei-Maunalei Community Plan. Much of the increase in traffic is due to new growth in the region. This growth is represented by future development in the Kihei-Wailea-Maunakea region which will come on stream up to the year 2011. The approved and future projects are not broken down in specific numbers but are captured by the generalized increase in volume up to the year 2011.

Response to Item 3: Noise Levels

Our technical analysis confirms that the 1.6 dB increase over a 10 year period will be difficult to perceive or measure (at 0.15 dB per year) and is not considered to be significant for traffic noise analysis. We note that the current State Department of Transportation criteria for substantial increase is defined as a 3.5 dB increase.

Response to Item 4, Appendix 4

See response to Item 2, above.

Response to Item 5: Restricting Left Turns at Un-signalized Intersections

The restrictions on movements onto or off of the highway will affect traffic volumes on the local streets. There will be increased traffic on streets that connect to Pillani Highway at signalized intersections, which generally are wider and increased traffic on the other streets. The traffic assignments in Exhibits 5 and 6, Traffic Assessment Report (Draft EA, Appendix A) reflect the proposed turn prohibitions. The net effect of the left turn restrictions in any segment of South Kihei Road has been estimated to be less than 100 vehicles per hour, and less than 25 vehicles per hour for left turn movements at signalized intersections.
Response to Item 4, Table 8 Traffic Assessment Report. Future Conditions

The traffic assignments used in the analyses of the Kilohana/Mau intersection were based on the increases in traffic shown for the segment to the north. Volumes to the south were assumed to increase by a similar amount. We also note that a V/C ratio of 1.00, rather than .85, indicates "carrying capacity" in the current analysis procedure.

Response to Item 7, Appendix C. Page 3

Different speeds ranging from 40 to 55 mph were used for the various highway segments as shown in the "SPEED (MPH)" column of Tables 4, 5, and 7A. Appendix C, Draft EA. In addition, a condition with 5 mph reduction of speeds on selected roadway segments was also modeled and shown in Table 7B, Appendix C, Draft EA.

With regard to noise impacts for a free flow speed of 55 mph, in general, the sections of Kilohana Highway with the highest average speeds tend to be the south sections where the traffic volumes are lowest. An average speed of 55 mph was used to model the traffic noise in the segment II (Monreal Road to Kilohana Drive) and the results for that speed condition are shown in Tables 4, 5, 6, and 7A. Appendix C. Draft EA.

The noise study used traffic projections for the year 2011 provided by the Traffic Assessment Report. Also refer to Response to Item 1, above.

Response to Item 8, Traffic Noise Measurements Results

The 1993 sound level measurements at location A were obtained at 100 feet from the centerline of Kilohana Highway, while the 2001 sound level measurements at location H-2 were obtained at 50 feet from the centerline. The different setback distances account for 4 dBA of the 6.4 dB difference between the 1991 and 1993 measurements. The measured traffic noise level difference (not associated with measurement setback distances) over the year period associated with the increase in traffic volume is approximately 3.4 dBA or 0.32 dB increase per year.

Response to Item 9, Appendix C. Table 4

Table 4 provides the calculated traffic noise levels at receptor locations identified in the first column as "Receivers...", with associated V/C ratio of the lot. The lists are shown in Figures 2 through 9. The receptor locations are at the setback location of the building on each lot, and were determined from aerial photos. The AM peak hour was used to calculate existing and future traffic noise levels at each receptor (or receiver) location, and the results are shown in the columns labeled "Existing", "Future H- Build", "Future Build", and "Future -SM MPH". In each of the four columns, the calculated noise level for the existing, 2011 H Build, 2011 Build, and 2011 Build with 5 mph speed reduction scenarios are shown. In addition, the...
RESPONSES TO ORAL TESTIMONY
RECEIVED AT MARCH 21, 2002
INFORMATION OPEN HOUSE
Mr. Charles P. Plunkett  
251 Kailua Place  
Kihei, Hawaii 96753

Dear Mr. Plunkett:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

We wish to thank you for taking the time to participate in the Informational Open House on March 21, 2002. Your comments and concern in this matter are appreciated.

If you have any questions, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAUGAL  
District Engineer, Maui  

FC:dmf
Mr. Arnold Pratt
1283 Lauil Place
Kihei, Hawaii 96753

Dear Mr. Pratt:

SUBJECT: Informational Open House - Interim Pilani Highway Improvement Project

We wish to thank you for taking the time to participate in the Informational Open House on March 21, 2002. Your comments and concern in this matter are appreciated.

If you have any questions, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf
April 8, 2002

Ms. Juanita Kawamoto  
1747A Hull Street  
Honolulu, Hawaii 96817

Dear Ms. Kawamoto:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAJIGAL  
District Engineer, Maui

FC:dmf
Ms. Eugenia Smith
1747A Hull Street
Honolulu, Hawaii 96817

Dear Ms. Smith:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAUGAL
District Engineer, Maui

FC:dmf
April 8, 2002

Mr. Jack Cropper
2653 South Kihei Road
Kihei, Hawaii 96753

Dear Mr. Cropper:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at 873-3535.

Very truly yours,

Ferdinand Cajigas
District Engineer, Maui

FC:dmf
April 8, 2002

Mr. Kenny Barr
P. O. Box 1469
Kihei, Hawaii 96753

Dear Mr. Barr:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your continued interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf
PETITION RECEIVED DURING 30-DAY PUBLIC COMMENT PERIOD
South Kīhei, 2/24/08

To Whom It May Concern: ARE YOU JOKING?!

We, neighbors of Kīhei Heights and surrounding areas want to express our deep concern about the Pāli Highway and its increasing noise pollution which we have been experiencing in the last few years. We do recognize that there is a traffic problem but the question is: "What is the solution, which will enhance the quality of our community, not diminish it?"

We think the County should immediately consider different options to control this noise nuisance, and under no circumstances we want more lines, more traffic, and therefore more noise pollution without a proper solution to this problem: SOUNDBARRIERS NOT VERY NICE FOR A BEAUTIFUL ISLAND!

BUILT A NEW BUS MARKET OF MĀLALI!!

Sincerely yours,

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexandra Kalua</td>
<td>123 Iliwai Loop</td>
<td>874-9404</td>
</tr>
<tr>
<td>Chaim Kozinski</td>
<td>152 Iliwai Loop</td>
<td>874-9404</td>
</tr>
<tr>
<td>Alicia Molina</td>
<td>145 Iliwai Loop</td>
<td>874-0369</td>
</tr>
<tr>
<td>Le shine Kinoa</td>
<td>155 Iliwai Loop</td>
<td>871-0389</td>
</tr>
<tr>
<td>Eileen Enger</td>
<td>151 Iliwai Loop</td>
<td>874-3586</td>
</tr>
<tr>
<td>Beth Waddell</td>
<td>152 Iliwai Loop</td>
<td>874-3586</td>
</tr>
<tr>
<td>Robert DeSain</td>
<td>172 Iliwai Loop</td>
<td>871-2016</td>
</tr>
<tr>
<td>Peter Bach</td>
<td>173 Iliwai Loop</td>
<td>891-9132</td>
</tr>
<tr>
<td>Shelly Edmonds</td>
<td>1200 Kekahaikaua 871-4572</td>
<td></td>
</tr>
<tr>
<td>Trent Colton</td>
<td>1200 Kekahaikaua 871-0497</td>
<td></td>
</tr>
<tr>
<td>M. Nobin</td>
<td>159 Iliwai Loop</td>
<td>877-3526</td>
</tr>
<tr>
<td>Steve Torrey</td>
<td>157 Iliwai Loop</td>
<td>877-3526</td>
</tr>
<tr>
<td>Annie Quintero</td>
<td>113 Iliwai Loop</td>
<td>871-1795</td>
</tr>
<tr>
<td>Sue Ann LeCarré</td>
<td>116 Iliwai Loop</td>
<td>871-8916</td>
</tr>
<tr>
<td>Gwenda Haunani</td>
<td>124 Iliwai Loop</td>
<td>874-0808</td>
</tr>
<tr>
<td>Nadiya Hunter</td>
<td>137 Iliwai Loop</td>
<td>871-3526</td>
</tr>
<tr>
<td>Sandra C.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
South Kailua, 2/26/02

To Whom It May Concern:

Mr. Cazical?

We, neighbors of Kamekaha Heights and surrounding areas, went to express our deep concern about the Pali Highway and its increasing noise pollution which we have been experiencing in the last few years. We do recognize that there is a traffic problem but the question is: "what is the solution, which will enhance the quality of our community, not diminish it?"

We think the County should immediately consider different options to control this noise nuisance, and under no circumstances we want more lanes, more traffic, and therefore more noise pollution without a proper solution to this problem.

Sincerely yours,

[Signatures]

[Names and addresses of neighbors]
South Kihei, 2/25/02

To Whom It May Concern: Mr. Caijgal, 21!

We, neighbors of Kamaole Heights and surrounding areas, want to express our deep concern about the Pillicol Highway and its increasing noise pollution which we have been experiencing in the last few years. We do recognize that there is a traffic problem but the question is: "What is the solution, which will enhance the quality of our community, not diminish it?"

We think the County should immediately consider different options to control this noise nuisance, and under no circumstances we want more buses, more traffic, and therefore more noise pollution without a proper solution to this problem.

Sincerely yours,

Name: [signature]
Address: [signature]
Phone: [signature]
Signature: [signature]

161 Ilimi Loop Kihei 808-896 [signature]

James [signature] 16 Ilimi Loop Kihei [signature]

Pamela [signature] 16 Ilimi Loop Kihei [signature]

Lani Makawae 272 Palima Pl. Kihei [signature]

Gwen [signature] 271 Palima Pl.

Ed Menez 2741 Pauopo St. Kihei [signature]

Susan Menez 2741 Pauopo St. Kihei [signature]

Pam [signature] 2766 Pauopo St. Kihei

Sandra Aicher 2772 Pauopo St. Kihei [signature]

Sabe de Recht 2782 Pauopo St. Kihei [signature]

Mandy de Recht 2782 Pauopo St. Kihei [signature]

Carol Peggino 1350 Pauopo St. Kihei [signature]

Karen Norman 2812 Pauopo St. Kihei [signature]

Barbara C. Carter 2715 Pauopo St. Kihei [signature]

Wendy Ching 147 Ilimi Loop Kihei 283-9657 [signature]
References
References

County of Maui, Department of Planning, Kihei-Makena Community Plan, 1998.


County of Maui, Maui County General Plan, 1990.

Cultural Surveys Hawaii, Inc., Archaeological Assessment of the Proposed Sandwich Isles Communication Fiber optic Cable Project within Approximately 96 Miles (154.8 Kilometers) of Road Corridor on the Island of Maui, January 2001.


Mayor's Bikeways Advisory Committee, November 1991, Maui Bikeways Capital Improvement Plan.


State of Hawaii, Department of Transportation, County of Maui, Department of Public Works and Waste Management and County of Maui, Department of Planning, *Kihei Traffic Master Plan*, October 1996.


U.S. Census Bureau, 2000.


Appendices
Appendix A

Traffic Assessment Report - Piilani Highway Interim Widening Mokulele Highway to Kilohana Drive, March 2002
TRAFFIC ANALYSIS REPORT
PIILANI HIGHWAY INTERIM WIDENING
Mokulele Highway to Kilohana Drive

March 2002

Prepared for:
R. M. Towill Corporation
and Makena Resort Corp.

Prepared by:
Julian Ng, Incorporated
P. O. Box 816
Kaneohe, Hawaii
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<td>6 – Design Year (2011) Traffic Assignments</td>
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<tr>
<td>7 – Future Lane Configurations and LOS</td>
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<tr>
<td>8 – Design Year (2011) Traffic Assignments (with Upcountry Road)</td>
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Traffic Analysis Report
Piilani Highway Interim Widening
Mokulele Highway to Kilohana Drive
March 2002

Introduction

The widening of Piilani Highway, an undivided two-lane highway providing access to Kihei, Wailea, and Makena in the South Maui area, has been identified as a needed improvement in various studies. However, many highway improvements throughout the State of Hawaii are needed and the public funding available for highway improvements has not been able to meet all of the needs. As an interim measure for Piilani Highway, conversion of the existing roadway shoulder to a second traffic lane in each direction has been proposed. This report summarizes the traffic analyses done for these improvements.

Existing traffic volumes were identified for several critical intersections using information from the Wailea 670 Traffic Report\textsuperscript{1} and the State Highways Division’s Traffic Summary\textsuperscript{2} report. Design year (2011) traffic assignments were developed from future segment volumes on Piilani Highway provided by the State of Hawaii Department of Transportation.

Traffic analyses for the highway and at signalized intersections were based on the concepts described in the Highway Capacity Manual\textsuperscript{3}. Traffic conditions are described by “Levels of Service” (LOS), which range from LOS A (good conditions) to LOS E (poor conditions). Level of Service F describes over capacity conditions or very long delays. Normally, LOS C is considered acceptable in rural areas and LOS D is considered acceptable for urban conditions. The project is considered to be in an urban area.

The Highway Capacity Manual procedure for the analysis of signalized intersections was applied to the signalized intersections within the project limits. In this analysis, delays are computed for each lane group based on intersection layout, saturation flow, and the timing of the traffic signal. An average delay for all vehicles using the intersection is also computed. The computed delays are related to levels of service.

\begin{itemize}
  \item \textsuperscript{1} Parsons Brinkerhoff Quade & Douglas, Inc., \textit{Wailea 670 Traffic Report} 2001.
  \item \textsuperscript{2} State of Hawaii, Department of Transportation, Highways Division, \textit{Traffic Summary- Islands of Maui, Molokai & Lanai} 1999.
  \item \textsuperscript{3} Transportation Research Board, National Research Council, \textit{Highway Capacity Manual}, 2000.
\end{itemize}
The Highway Capacity Manual provides an analysis for extended stretches of two-lane highways in which the highway's level of service is related to a driver's ability to pass a slow-moving vehicle, so that delays to the traveler can be minimized. This analysis, however, does not provide a good indicator of conditions on short segments of highway such as on Piilani Highway; traffic densities are used instead to compare conditions on the highway.

Criteria for levels of service at intersections and on the highway are:

<table>
<thead>
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<th>LOS</th>
<th>General Description of Estimated Delay</th>
<th>Intersection Delay (seconds/vehicle)</th>
<th>Traffic Density (vehicles/lane/mile)</th>
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<td>A</td>
<td>Little or no delay</td>
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<td>≤ 11</td>
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<td>B</td>
<td>Short traffic delays</td>
<td>&gt; 10 and ≤ 20</td>
<td>&gt; 15 and ≤ 18</td>
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<tr>
<td>C</td>
<td>Average traffic delays</td>
<td>&gt; 20 and ≤ 35</td>
<td>&gt; 18 and ≤ 25</td>
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<tr>
<td>D</td>
<td>Long traffic delays</td>
<td>&gt; 35 and ≤ 55</td>
<td>&gt; 25 and ≤ 35</td>
</tr>
<tr>
<td>E</td>
<td>Very long traffic delays</td>
<td>&gt; 55 and ≤ 80</td>
<td>&gt; 35 and ≤ 45</td>
</tr>
<tr>
<td>F</td>
<td>Very long traffic delays</td>
<td>&gt; 80</td>
<td>&gt; 45</td>
</tr>
</tbody>
</table>

Existing Conditions

The proposed project is located in south Maui (Exhibit 1). The existing highway consists of two lanes and shoulders; one lane is provided for traffic in each direction. Each lane is twelve feet wide and shoulders varying in width from six to ten feet wide are provided on each side. The shoulders are also used by bicyclists as Piilani Highway is designated a bike route. The highway is posted with a speed limit 45 miles per hour.

The State Highways Division conducts traffic counts on the island of Maui during odd-numbered years. These traffic counts are used to develop estimates of average daily traffic (ADT) volumes, "K" factors that indicate the peak hour volume as a percentage of the daily volume, and "D" factors that show the directional distribution of the peak hour volumes for defined segments of all highways. This information is reported in biennial reports published by the State Highways Division. The ADTs and the computed peak hour traffic volumes on Piilani Highway for 1999 based on this information are shown in Table 1.
Table 1
1999 Traffic Volumes
Piilani Highway

<table>
<thead>
<tr>
<th>Mokulele Highway to Lipoa Street</th>
<th>Lipoa Street to Kiholana Drive</th>
<th>Kiholana Drive to Wailen Ike Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999 Average Daily Traffic</td>
<td>25,852</td>
<td>20,731</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>1,065</td>
<td>650</td>
</tr>
<tr>
<td>Southbound</td>
<td>875</td>
<td>800</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northbound</td>
<td>1,100</td>
<td>970</td>
</tr>
<tr>
<td>Southbound</td>
<td>1,100</td>
<td>790</td>
</tr>
</tbody>
</table>

Existing daily volume in the highway segment north of Lipoa Street is more than twice that for the segment south of Kiholana Drive. Table 2 shows traffic densities over these long segments of the highway at a speed of 45 miles per hour and the corresponding highway levels of service.

Table 2
Existing (1999) Conditions
Piilani Highway

<table>
<thead>
<tr>
<th>Traffic Density (vehicles per mile) and Highway Level of Service</th>
<th>Mokulele Highway to Lipoa Street</th>
<th>Lipoa Street to Kiholana Drive</th>
<th>Kiholana Drive to Wailen Ike Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Peak Hour</td>
<td>24.1 C</td>
<td>18.1 C</td>
<td>5.2 A</td>
</tr>
<tr>
<td>Northbound</td>
<td>19.8 C</td>
<td>14.7 B</td>
<td>12.2 B</td>
</tr>
<tr>
<td>Southbound</td>
<td>24.8 C</td>
<td>17.8 B</td>
<td>8.9 A</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>24.8 C</td>
<td>21.9 B</td>
<td>13.4 B</td>
</tr>
</tbody>
</table>

Exhibits 2 and 3 show traffic estimates for year 2001 at the intersections within the project limits. These estimates are from various traffic studies done for projects in the area. Traffic densities and highway levels of service at various locations along the highway are shown in Table 3.
<table>
<thead>
<tr>
<th>Traffic Density (vehicles per mile) and Highway Level of Service</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Southbound</td>
<td>Northbound</td>
</tr>
<tr>
<td>North of Mokulele Highway</td>
<td>5.9 A</td>
<td>15.0 B</td>
</tr>
<tr>
<td>North of Uwapo Road</td>
<td>18.0 C</td>
<td>31.9 D</td>
</tr>
<tr>
<td>North of Ohukai Road</td>
<td>20.5 C</td>
<td>26.3 D</td>
</tr>
<tr>
<td>South of Ohukai Road</td>
<td>20.7 C</td>
<td>24.4 C</td>
</tr>
<tr>
<td>South of Kaonoulu Street</td>
<td>23.7 C</td>
<td>26.1 D</td>
</tr>
<tr>
<td>South of Piikea Avenue</td>
<td>25.0 C</td>
<td>23.8 C</td>
</tr>
<tr>
<td>South of Lipoa Street</td>
<td>20.6 C</td>
<td>21.4 C</td>
</tr>
<tr>
<td>South of Welakahao Road</td>
<td>19.9 C</td>
<td>20.3 C</td>
</tr>
<tr>
<td>South of Kanani Road</td>
<td>18.5 C</td>
<td>19.0 C</td>
</tr>
<tr>
<td>South of Keonekai Street</td>
<td>15.5 B</td>
<td>12.7 B</td>
</tr>
<tr>
<td>South of Kilohana Drive</td>
<td>13.6 B</td>
<td>8.3 A</td>
</tr>
</tbody>
</table>

The levels of service shown in Table 3 indicate that most of the existing two-lane highway is adequate for existing traffic volumes. Between Mokulele Highway and Welakahao Road, peak hour traffic volumes are high and unstable flow (Level of Service D) occurs. Other segments of the highway have adequate capacity for Level of Service C or better conditions during peak hours. Congestion, however, occurs on the highway as traffic flow is affected by traffic signals. The existing signalized intersections were analyzed to determine intersection levels of service.

Table 4 shows the average delay and overall levels of service for each of the signalized intersections. The greatest delays occur at the intersections with Ohukai Road, Piikea Avenue, and Lipoa Street in the afternoon peak hour. Average delay at many of the other intersections were within the criteria for Level of Service D or better; however, left turn lanes and side street movements typically had greater delays. In most cases, there were very long delays (Level of Service E or F) for turning movements and for minor street movements. The higher volume through movements on the highway typically had less delay and operated at Level of Service D. From Lipoa Street to Mokulele Highway, the intersections were near-capacity (volume-to-capacity ratios of 0.85 or greater) or over theoretical capacity (ratio greater than 1.0) during the peak hours. Exhibit 4 shows the lane configurations at the signalized intersections and the results of the intersection analyses.
Table 4
Existing Conditions
Signalized Intersections Along Piilani Highway

<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour</th>
<th></th>
<th></th>
<th></th>
<th>PM Peak Hour</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c ratio</td>
<td>AD (sec.)</td>
<td>LOS</td>
<td></td>
<td>v/c ratio</td>
<td>AD (sec.)</td>
<td>LOS</td>
</tr>
<tr>
<td>Mokulele Highway</td>
<td>0.95</td>
<td>40.6</td>
<td>D</td>
<td></td>
<td>0.99</td>
<td>46.8</td>
<td>D</td>
</tr>
<tr>
<td>Uwapo Road</td>
<td>1.00</td>
<td>45.0</td>
<td>D</td>
<td></td>
<td>0.89</td>
<td>37.6</td>
<td>D</td>
</tr>
<tr>
<td>Ohukai Road</td>
<td>0.96</td>
<td>45.2</td>
<td>D</td>
<td></td>
<td>1.03</td>
<td>56.7</td>
<td>E</td>
</tr>
<tr>
<td>Piikea Avenue</td>
<td>0.92</td>
<td>38.1</td>
<td>D</td>
<td></td>
<td>1.06</td>
<td>53.7</td>
<td>D</td>
</tr>
<tr>
<td>Lipa Street/Parkway</td>
<td>0.93</td>
<td>42.4</td>
<td>D</td>
<td></td>
<td>1.03</td>
<td>56.9</td>
<td>E</td>
</tr>
<tr>
<td>Ke Alii Alanui</td>
<td>0.61</td>
<td>20.7</td>
<td>C</td>
<td></td>
<td>0.76</td>
<td>26.6</td>
<td>C</td>
</tr>
<tr>
<td>Kilohana Drive</td>
<td>0.56</td>
<td>21.6</td>
<td>C</td>
<td></td>
<td>0.61</td>
<td>27.0</td>
<td>C</td>
</tr>
</tbody>
</table>

AD = Average delay (seconds per vehicle)

At the unsignalized intersections, levels of service were determined for left turns from the highway and side street traffic that is controlled by stop or yield signs. For each intersection, capacities were computed for these movements based on the geometry and other traffic using the intersection. While there were adequate capacities for each movement, some delays were in the range of Level of Service E or F. The volume-to-capacity ratios, computed delays, and levels of service for each controlled movement are shown in Table 5.
Table 5
Existing Conditions
Unsignalized Intersections Along Piilani Highway

<table>
<thead>
<tr>
<th>Location</th>
<th>AM Peak Hour</th>
<th></th>
<th></th>
<th>PM Peak Hour</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c ratio</td>
<td>AD (sec.)</td>
<td>LOS</td>
<td>v/c ratio</td>
<td>AD (sec.)</td>
<td>LOS</td>
</tr>
<tr>
<td>Moi Place</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>westbound approach</td>
<td>0.24</td>
<td>27.3</td>
<td>D</td>
<td>0.10</td>
<td>30.3</td>
<td>D</td>
</tr>
<tr>
<td>eastbound approach</td>
<td>0.02</td>
<td>16.2</td>
<td>C</td>
<td>0.25</td>
<td>30.6</td>
<td>D</td>
</tr>
<tr>
<td>Kaonoulu Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>northbound left turn</td>
<td>0.12</td>
<td>10.6</td>
<td>B</td>
<td>0.19</td>
<td>13.6</td>
<td>B</td>
</tr>
<tr>
<td>eastbound left turn</td>
<td>0.23</td>
<td>112.5</td>
<td>F</td>
<td>0.43</td>
<td>250.7</td>
<td>F</td>
</tr>
<tr>
<td>eastbound right turn</td>
<td>0.48</td>
<td>25.7</td>
<td>D</td>
<td>0.42</td>
<td>35.7</td>
<td>E</td>
</tr>
<tr>
<td>Kulanihakoi Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>northbound left turn</td>
<td>0.02</td>
<td>10.7</td>
<td>B</td>
<td>0.04</td>
<td>12.5</td>
<td>B</td>
</tr>
<tr>
<td>eastbound left turn</td>
<td>0.12</td>
<td>99.4</td>
<td>F</td>
<td>0.19</td>
<td>159.7</td>
<td>F</td>
</tr>
<tr>
<td>eastbound right turn</td>
<td>0.08</td>
<td>19.6</td>
<td>C</td>
<td>0.17</td>
<td>28.5</td>
<td>D</td>
</tr>
<tr>
<td>Welakahao Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>northbound left turn</td>
<td>0.02</td>
<td>10.0</td>
<td>B</td>
<td>0.07</td>
<td>12.1</td>
<td>B</td>
</tr>
<tr>
<td>eastbound left turn</td>
<td>0.77</td>
<td>130.5</td>
<td>F</td>
<td>0.65</td>
<td>168.1</td>
<td>F</td>
</tr>
<tr>
<td>eastbound right turn</td>
<td>0.03</td>
<td>15.9</td>
<td>C</td>
<td>0.06</td>
<td>21.1</td>
<td>C</td>
</tr>
<tr>
<td>Old Welakahao Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>southbound left turn</td>
<td>0.01</td>
<td>9.9</td>
<td>A</td>
<td>0.01</td>
<td>10.2</td>
<td>B</td>
</tr>
<tr>
<td>westbound shared lane</td>
<td>0.11</td>
<td>48.3</td>
<td>E</td>
<td>0.11</td>
<td>35.2</td>
<td>E</td>
</tr>
<tr>
<td>eastbound shared lane</td>
<td>0.17</td>
<td>53.5</td>
<td>F</td>
<td>0.10</td>
<td>88.5</td>
<td>F</td>
</tr>
<tr>
<td>Kanani Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>northbound left turn</td>
<td>0.01</td>
<td>9.8</td>
<td>A</td>
<td>0.01</td>
<td>11.0</td>
<td>B</td>
</tr>
<tr>
<td>southbound left turn</td>
<td>0.01</td>
<td>9.6</td>
<td>A</td>
<td>0.01</td>
<td>9.9</td>
<td>A</td>
</tr>
<tr>
<td>westbound approach</td>
<td>0.03</td>
<td>15.3</td>
<td>C</td>
<td>0.05</td>
<td>16.4</td>
<td>C</td>
</tr>
<tr>
<td>eastbound approach</td>
<td>0.89</td>
<td>116.9</td>
<td>F</td>
<td>0.95</td>
<td>161.9</td>
<td>F</td>
</tr>
<tr>
<td>Keonekeakai Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>northbound left turn</td>
<td>0.02</td>
<td>8.9</td>
<td>A</td>
<td>0.02</td>
<td>10.1</td>
<td>B</td>
</tr>
<tr>
<td>eastbound left turn</td>
<td>0.56</td>
<td>45.5</td>
<td>E</td>
<td>0.11</td>
<td>47.3</td>
<td>E</td>
</tr>
<tr>
<td>eastbound right turn</td>
<td>0.11</td>
<td>13.7</td>
<td>B</td>
<td>0.11</td>
<td>17.8</td>
<td>C</td>
</tr>
</tbody>
</table>

AD = Average delay (seconds per vehicle)
Future Conditions

Traffic volumes on Piilani Highway have been increasing. The State Highways Division has projected that traffic volumes will continue to increase, at an average rate of approximately three percent per year. The average daily traffic on Piilani Highway for the odd-numbered years 1991-1999 and the projections for 2001, 2011, and 2021 are shown in Table 6.

Table 6
Historic Daily Traffic on Piilani Highway

<table>
<thead>
<tr>
<th>Year</th>
<th>Mokulele Highway to Lipa Street</th>
<th>Lipa Street to Kilohana Drive</th>
<th>Kilohana Drive to Wailea Ike Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>20,639</td>
<td>15,627</td>
<td>7,285</td>
</tr>
<tr>
<td>1993</td>
<td>20,757</td>
<td>16,682</td>
<td>9,163</td>
</tr>
<tr>
<td>1995</td>
<td>23,036</td>
<td>18,385</td>
<td>10,079</td>
</tr>
<tr>
<td>1997</td>
<td>25,613</td>
<td>19,622</td>
<td>10,335</td>
</tr>
<tr>
<td>1999</td>
<td>25,852</td>
<td>20,731</td>
<td>10,987</td>
</tr>
<tr>
<td>2001</td>
<td>27,900</td>
<td>22,400</td>
<td>n.a.</td>
</tr>
<tr>
<td>2011</td>
<td>38,100</td>
<td>30,500</td>
<td>n.a.</td>
</tr>
<tr>
<td>2021</td>
<td>48,200</td>
<td>38,700</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

n.a. = not available


The proposed project is an interim project being designed for traffic volumes expected in year 2011. With the widening of the highway to four lanes, left turns onto the highway at unsignalized intersections would become even more difficult and projected demands will exceed available capacities. New traffic signals at two intersections, Kaonoulu Street and Welakahao Road, are expected to be completed before 2011 to support approved development. At other intersections, however, the side street volumes will not be high enough to warrant traffic signals. Left turns at unsignalized intersections, therefore, will not be permitted at Kulanihakoi Street, Waipili Lane, and Keonekai Street.

Improvements to Mokulele Highway, including a realignment of the intersection of Mokulele Highway and Piilani Highway, are also being proposed and expected to be completed before the future analysis year (2011). The analyses of future conditions, therefore, begin at the Uwapo Road intersection. Exhibits 5 and 6 show the traffic
assignments for the design year, reflecting the turn prohibitions and the relocation of the movements to nearby signalized intersections. Table 7 compares the highway levels of service during the future peak hours on a two-lane highway and on a four-lane highway.

Table 7
Future (2011) Conditions
Pilani Highway

<table>
<thead>
<tr>
<th>Traffic Density (vehicles per mile)</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>and Highway Level of Service</td>
<td>Southbound</td>
<td>Northbound</td>
</tr>
<tr>
<td>Two-lane highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North of Uwapo Road</td>
<td>27.6 D</td>
<td>42.9 F</td>
</tr>
<tr>
<td>North of Ohukai Road</td>
<td>30.3 D</td>
<td>37.4 E</td>
</tr>
<tr>
<td>South of Ohukai Road</td>
<td>31.2 D</td>
<td>35.8 E</td>
</tr>
<tr>
<td>South of Kaanoulu Street</td>
<td>28.5 D</td>
<td>34.4 D</td>
</tr>
<tr>
<td>South of Piikea Avenue</td>
<td>30.7 D</td>
<td>30.7 D</td>
</tr>
<tr>
<td>South of Lipoa Street</td>
<td>27.8 D</td>
<td>30.0 D</td>
</tr>
<tr>
<td>South of Welakahao Road</td>
<td>25.8 C</td>
<td>25.8 C</td>
</tr>
<tr>
<td>South of Kanani Road</td>
<td>24.8 C</td>
<td>25.8 C</td>
</tr>
<tr>
<td>South of Keonekai Street</td>
<td>22.6 C</td>
<td>20.3 C</td>
</tr>
<tr>
<td>South of Kilohana Drive</td>
<td>20.8 C</td>
<td>15.0 B</td>
</tr>
<tr>
<td>Four-lane highway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North of Uwapo Road</td>
<td>15.5 B</td>
<td>24.1 C</td>
</tr>
<tr>
<td>North of Ohukai Road</td>
<td>17.0 B</td>
<td>21.1 C</td>
</tr>
<tr>
<td>South of Ohukai Road</td>
<td>17.6 B</td>
<td>20.2 C</td>
</tr>
<tr>
<td>South of Kaanoulu Street</td>
<td>16.1 B</td>
<td>19.4 C</td>
</tr>
<tr>
<td>South of Piikea Avenue</td>
<td>17.3 B</td>
<td>17.3 B</td>
</tr>
<tr>
<td>South of Lipoa Street</td>
<td>15.7 B</td>
<td>16.9 B</td>
</tr>
<tr>
<td>South of Welakahao Road</td>
<td>14.5 B</td>
<td>14.5 B</td>
</tr>
<tr>
<td>South of Kanani Road</td>
<td>14.0 B</td>
<td>14.5 B</td>
</tr>
</tbody>
</table>

As indicated in Table 7, highway traffic densities generally decrease to the south. As a two-lane highway, traffic densities would be in the congested range (Level of Service E or F) as far south as Welakahao Road. Unstable flow (Level of Service D) would occur as far south as Kilohana Drive. South of Kilohana Drive the two-lane Pilani Highway would serve traffic at Level of Service C or better without any improvements.

A "contraflow" alternative would include restriping the highway to three lanes and reversing the flow in the third lane during peak period. This alternative would require that the added lane be provided northbound in the AM peak period and southbound in the PM peak.
period. Widening to provide two through lanes across each signalized intersection would still be required and merging areas would be needed. Adequate traffic control through merging areas during contraflow operations would be difficult to achieve. With this alternative, densities between Uwapo Road and Kaonoulu Street would remain at Level of Service E.

An additional lane in each direction as proposed between Mokulele Highway and Kilohana Drive will mitigate the high densities on the highway. A four-lane Piilani Highway would carry peak hour traffic at highway Level of Service C or better. Between Kanani Road and Kilohana Drive, conditions would be Level of Service B with a four-lane highway.

The *Highway Capacity Manual* procedures recognize that lanes narrower than twelve feet will reduce travel speeds, as would any obstructions within six feet of the travel lanes. For the proposed roadway cross-section with two lanes and a shoulder over twenty-four feet of width in each direction on an undivided highway at the existing bridges, a reduction of 3 to 5 miles per hour would apply. Therefore, the densities and levels of service for the four-lane highway were determined using a lower speed. The proposed lower speed limit of 40 miles per hour is consistent with the geometry of the proposed roadway.

The proposed project would convert the existing shoulder into a travel lane in each direction. At intersections, modifications will be made to existing traffic islands, traffic signal systems, and other physical elements so that the second lane in each direction can carry traffic through the intersections. The widening of the highway to four lanes, not only at signalized intersections, is needed to provide acceptable (Level of Service D or better) conditions, as shown above in Table 7. If the highway were widened only at the signalized intersections, traffic must merge causing fluctuations in the flow. Even without the effects of merging, traffic densities in the two-lane sections will result in poor levels of service. Without the widening to form a continuous four-lane highway, Level of Service E would describe conditions between Welakahao Road and Mokulele Highway. With the highway widened to four lanes, highway conditions would be Level of Service C or better during the peak hours.

Development that has been proposed near Piilani Highway would increase turning traffic and could warrant new traffic signals at the Kaonoulu Street and the Welakahao Road intersections. Exhibit 7 shows the lane configurations and lane group levels of service that were analyzed for the future condition. As shown in Table 8, the overall delay and levels of service for signalized intersections are acceptable (Level of Service D or better).
Table 8  
Future Conditions  
Signalized Intersections, 4-Lane Piilani Highway

<table>
<thead>
<tr>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>w/c ratio</td>
<td>AD (sec.)</td>
</tr>
<tr>
<td>Uwapo Road</td>
<td>0.82</td>
</tr>
<tr>
<td>Ohukai Road</td>
<td>0.82</td>
</tr>
<tr>
<td>Kaonoulu Street</td>
<td>0.77</td>
</tr>
<tr>
<td>Piikea Avenue</td>
<td>0.77</td>
</tr>
<tr>
<td>Lipoa Street/Parkway</td>
<td>0.84</td>
</tr>
<tr>
<td>Welakahao Road</td>
<td>0.60</td>
</tr>
<tr>
<td>Ke Alii Alanai</td>
<td>0.62</td>
</tr>
<tr>
<td>Kilohana Drive</td>
<td>0.79</td>
</tr>
</tbody>
</table>

AD = Average delay (seconds per vehicle)

Due to the high volume of traffic on Piilani Highway, the delays at the intersections, and the proximity with other signalized intersections, the signals at the Mokulele Highway, Uwapo Road, and Ohukai Road should be interconnected so that they can be coordinated. The Piikea Street and Lipoa Street signals are understood to already be interconnected. Other signals are farther apart and interconnection would not be necessary since interconnection would not significantly improve conditions.

At the unsignalized intersections, turning movements will be restricted to right turns from and onto the highway. The stop controls on the right turns will result in acceptable delays (Level of Service D or better) at all intersections. Table 9 shows the results of the unsignalized intersection analyses of future peak hour volumes at these intersections.
Table 9
Future Conditions
Unsignalized Intersections Along Piilani Highway

<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour</th>
<th></th>
<th></th>
<th></th>
<th>PM Peak Hour</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c ratio</td>
<td>AD (sec.)</td>
<td>LOS</td>
<td></td>
<td>v/c ratio</td>
<td>AD (sec.)</td>
<td>LOS</td>
</tr>
<tr>
<td>Moi Place, southbound left</td>
<td>0.01</td>
<td>14.9</td>
<td>B</td>
<td></td>
<td>0.01</td>
<td>14.1</td>
<td>B</td>
</tr>
<tr>
<td>westbound</td>
<td>0.16</td>
<td>19.1</td>
<td>C</td>
<td></td>
<td>0.10</td>
<td>32.0</td>
<td>D</td>
</tr>
<tr>
<td>eastbound</td>
<td>0.01</td>
<td>14.4</td>
<td>B</td>
<td></td>
<td>0.20</td>
<td>22.4</td>
<td>C</td>
</tr>
<tr>
<td>Kulanihakoi Street</td>
<td>0.08</td>
<td>14.6</td>
<td>B</td>
<td></td>
<td>0.13</td>
<td>19.3</td>
<td>C</td>
</tr>
<tr>
<td>Waipuilani Street</td>
<td>0.06</td>
<td>14.5</td>
<td>B</td>
<td></td>
<td>0.09</td>
<td>18.9</td>
<td>C</td>
</tr>
<tr>
<td>Old Welakahao Road</td>
<td>0.01</td>
<td>11.3</td>
<td>B</td>
<td></td>
<td>0.01</td>
<td>14.0</td>
<td>B</td>
</tr>
<tr>
<td>Kanani Road, westbound</td>
<td>0.02</td>
<td>13.3</td>
<td>B</td>
<td></td>
<td>0.04</td>
<td>14.2</td>
<td>B</td>
</tr>
<tr>
<td>eastbound</td>
<td>0.13</td>
<td>13.6</td>
<td>B</td>
<td></td>
<td>0.13</td>
<td>16.1</td>
<td>C</td>
</tr>
<tr>
<td>Keonekai Street</td>
<td>0.14</td>
<td>12.9</td>
<td>B</td>
<td></td>
<td>0.11</td>
<td>15.2</td>
<td>C</td>
</tr>
</tbody>
</table>

Effects on Other Streets in the Area

Peak hour traffic volumes along South Kihei Road will be affected by the restriction of left turn movements onto and off of Piilani Highway at unsignalized intersections. The restrictions are expected to cause the diversion of these movements to adjacent signalized intersections. The streets that intersect Piilani Highway at signalized intersections, therefore, are expected to carry more traffic while less traffic will use those streets that have restricted movements onto or off of the highway. The widening of the highway will allow for modifications to the signal timing at signalized intersections to increase the capacity of the side street approaches.

The effect on other streets would be less. For example, left turns that would be prohibited at Keonekai Street would be made instead at Kilohana Drive or at Ke Alii Alanui. The impact to traffic demand on South Kihei Road would include added traffic on some segments caused by traffic diverting from Keonekai Street (for trips between the highway and origins or destinations along Keonekai Street). The impact also includes a reduction in turns onto or off of Keonekai Street (for those trips between the highway and origins or destinations along South Kihei Road). Similar effects can be expected at the other South Kihei Road intersections affected by left turn restrictions along Piilani Highway. The analyses of the unsignalized intersections along Piilani Highway indicates that the capacities for left turns onto the highway would decrease as highway volume increases resulting in increased delays.
to drivers wishing to make left turns onto the highway. With this condition, some drivers would opt for an alternative path to the highway, in effect partially implementing the left turn restriction. The net effect of the left turn restriction has been estimated to be less than 100 vehicles per hour in any segment of South Kihei Road, and less than 35 vehicles per hour for left turn movements, which are most affected by increased traffic volumes, at any intersection. The effect of the prohibition of left turns at the Piilani Highway intersection will be small in comparison with the change that occurs over time.

In more general terms, increases in traffic volumes on South Kihei Road will be greater if Piilani Highway is not widened. If improvements are not made on Piilani Highway resulting in increased peak hour congestion, some of the traffic that would be otherwise use Piilani Highway would seek an alternative path, in this case South Kihei Road. Additional discussion of impacts to other streets in the Kihei area are being addressed in the update to the Kihei traffic master plan that is currently being prepared for the County of Maui.

Effects of Upcountry Road

Environmental documentation of a proposal to build a new roadway from the Kihei area to Upcountry Maui is currently being processed; however, the timing of construction of this new roadway is uncertain. If this "Upcountry Road" is constructed and connected to Piilani Highway opposite Kaonoulu Street, traffic volumes north of Kaonoulu Street will be affected. Exhibit 8 shows the traffic assignments for the design year with the effects of the Upcountry Road for the segment north of Piikea Avenue (south of Piikea Avenue, traffic assignments would be as shown in Exhibit 6). Traffic densities on Piilani Highway with the interim improvements and the Upcountry Road are Level of Service C or better as shown in Table 10.

Table 10
Future (2011) Conditions
Piilani Highway with Upcountry Road

<table>
<thead>
<tr>
<th>Traffic Density (vehicles per mile) and Highway Level of Service</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Southbound</td>
<td>Northbound</td>
</tr>
<tr>
<td>North of Uwapo Road</td>
<td>11.1 B</td>
<td>25.9 C</td>
</tr>
<tr>
<td>North of Ohukai Road</td>
<td>12.7 B</td>
<td>23.0 C</td>
</tr>
<tr>
<td>South of Ohukai Road</td>
<td>13.5 B</td>
<td>22.4 C</td>
</tr>
<tr>
<td>South of Kaonoulu Street</td>
<td>16.1 B</td>
<td>19.4 C</td>
</tr>
<tr>
<td>South of Piikea Avenue</td>
<td>17.3 B</td>
<td>17.3 B</td>
</tr>
</tbody>
</table>
At the intersections, conditions in the AM Peak Hour would not be significantly different than if the Upcountry Road were not built. Similar layouts with adjustments in signal timing would provide adequate service at the Mokulele Highway, Uwapo Road, and Ohukai Street intersections. At Kaonoulu Street, modifications in signal phasing would be necessary to maintain acceptable conditions at the intersection. Table 11 summarizes the findings of operational analyses of these intersections with the volumes shown in Exhibit 8.

Table 11
Future Conditions With Upcountry Road
Signalized Intersections, 4-Lane Piilani Highway

<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour</th>
<th></th>
<th>PM Peak Hour</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c ratio</td>
<td>AD (sec.)</td>
<td>LOS</td>
<td>v/c ratio</td>
</tr>
<tr>
<td>Uwapo Road</td>
<td>0.80</td>
<td>29.9</td>
<td>C</td>
<td>0.71</td>
</tr>
<tr>
<td>Ohukai Road</td>
<td>0.88</td>
<td>38.6</td>
<td>D</td>
<td>0.86</td>
</tr>
<tr>
<td>Kaonoulu Street</td>
<td>0.92</td>
<td>52.6</td>
<td>D</td>
<td>0.88</td>
</tr>
</tbody>
</table>

AD = Average delay (seconds per vehicle)

Conclusions and Recommendations

The widening of Piilani Highway to four lanes at signalized intersections between Mokulele Highway and Lipa Street is necessary to address existing delays at the signalized intersections. Traffic volumes on Piilani Highway are expected to continue to increase, at an average rate of approximately three percent per year. Widening of the highway between Mokulele Highway and Kilohana Drive will be needed to provide acceptable levels of service. The conversion to use the existing highway shoulders as additional lanes is considered an interim improvement and are being designed for traffic volumes projected for year 2011.

The interim improvement to Piilani Highway would utilize the existing shoulders as additional lanes for traffic in the northbound and southbound directions. The project also proposes to reduce the posted speed limit on the highway from 45 miles per hour to 40 miles per hour, consistent with the decrease in free flow speed expected with the narrowing of the travel lanes and the reduction of the lateral distance between the travelway and roadside obstructions. The traffic analyses confirm that widening to four lanes would be necessary to achieve Level of Service D or better conditions on the highway.

* * *
Exhibit 2

Piliw Highway: Interim Widening Traffic Analysis Report

Existing (2001) Traffic Assignments

Prepared by: Julian Ng, Inc.
March 2002