STATE PROJECT NO. 10000-1531

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# NOISE ANALYSIS AND STUDY REPORT

## NORTHWEST HILLSBOROUGH EXPRESSWAY

## Interstate - 275

## to

## S.R. 597 (Dale Mabry Highway)

## Hillsborough County, Florida

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FLORIDA DEPARTMENT OF TRANSPORTATION
AND
TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY
COOPERATING AGENCIES

August, 1985

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# I. INTRODUCTION

## A. Purpose of Report

This report has been prepared to identify and, where necessary, investigate possible measures to minimize the noise impacts associated with the construction and operation of the Northwest Hillsborough Expressway in Hillsborough County, Florida. The format and content of this document are based on the procedures established in the Federal-Aid Highway Program Manual, Volume 7, Chapter 7, Section 3, "Procedures for Abatement of Highway Traffic Noise and Construction Noise" (FHPM 7-7-3).

## B. Project Description and Status

The Northwest Hillsborough Expressway is proposed as a major divided, limited access roadway to serve local traffic in the north and northwest areas of Hillsborough County, Florida, in the vicinity of Tampa, as well as to provide a bypass route for I-275 around the City of Tampa. The bypass routing would include the proposed expressway in conjunction with Dale Mabry Highway and State Road 54.

The proposed project consists of upgrading the existing State Road 60/Eisenhower Boulevard corridor from I-275 northward to Hillsborough Avenue and constructing a new corridor from that point northward to intersect with Dale Mabry Highway north of Van Dyke Road.

The proposed facility will be limited access with grade separations throughout. The portion on existing alignment will consist of an urban design (narrow median with concrete barrier wall) with eight travel lanes from I-275 to Courtney Campbell Causeway, six lanes from Courtney Campbell to Independence

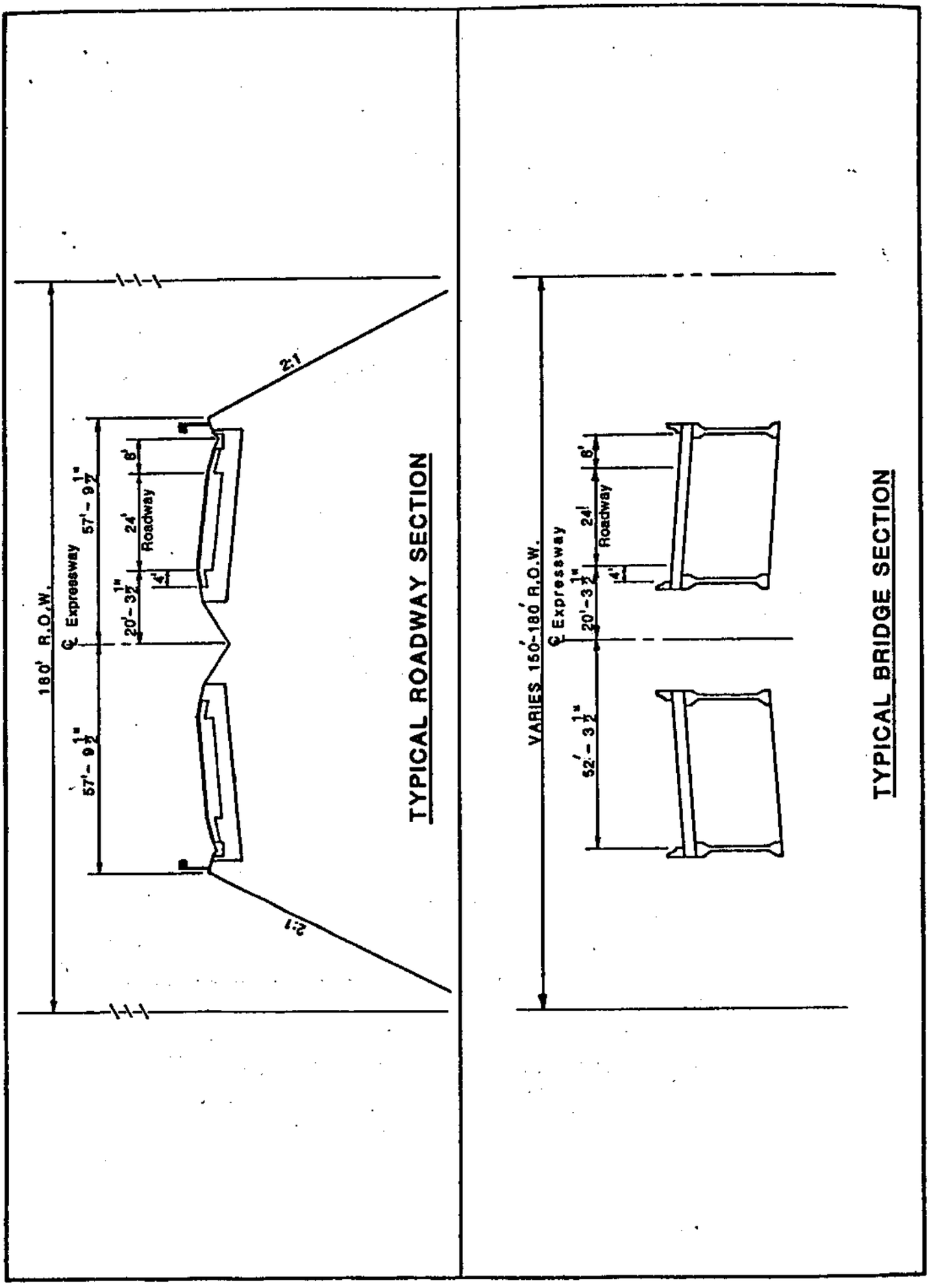
Parkway (0.3 mile south of Memorial Highway), and four lanes from Independence to Hillsborough Avenue. Frontage roads will be provided throughout this section. The new alignment section (Hillsborough Avenue northward) will consist of a rural design (grassed median approximately 40 feet wide) with four travel lanes. Typical sections are shown in Figures 1 and 2.

Currently, this project is in the conceptual engineering design and environmental assessment stage. An Environmental Impact Statement is being prepared pursuant to Federal Highway Administration guidelines.

## C. ALTERNATIVES

The "BUILD" alternatives consist of two major roadway alignments: the Lake LeClare Alignment and the Railroad Alignment. In conjunction with either of these, there are two very short alignment alternatives at the northern project terminus from Van Dyke Road to Dale Mabry Highway. All these alternatives are shown on the project location map, Figure 3. Although the alternates share partial common alignment, the Lake LeClare and Railroad alternatives will effect a small difference in traffic volumes through these sections. The length of the proposed route, which will vary depending on the selected alignment and termini, will be approximately 17 miles. The "BUILD" alternatives also include improvements to or construction of major intersections/interchanges.

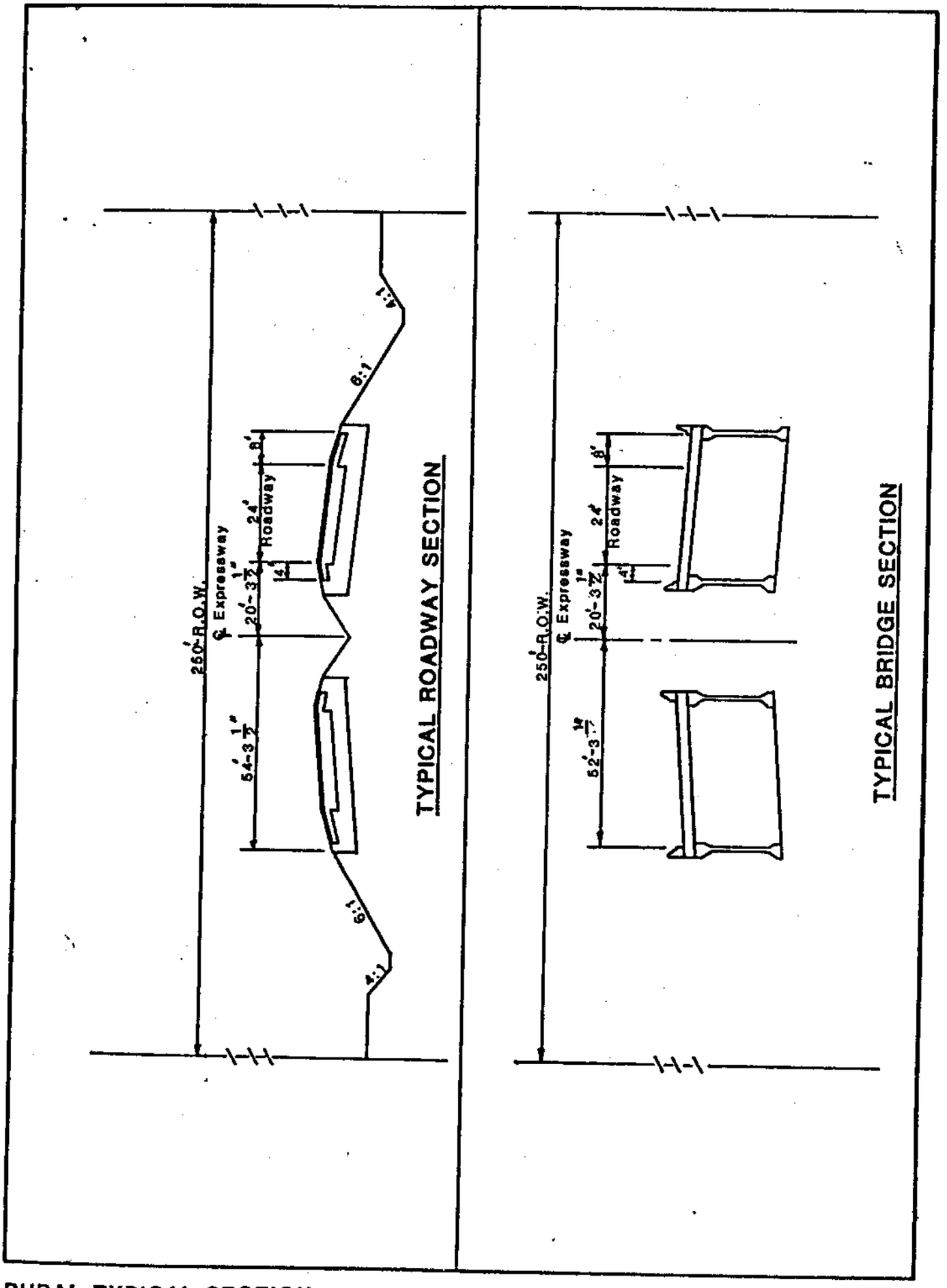
A fifth alternative, "NO-BUILD", includes the existing Eisenhower Boulevard with no modifications. Eisenhower is a four and six-lane, predominantly rural design divided highway.




**URBAN TYPICAL SECTION**



**FIGURE 1**




RURAL TYPICAL SECTION

FIGURE 2

# PROJECT LOCATION MAP

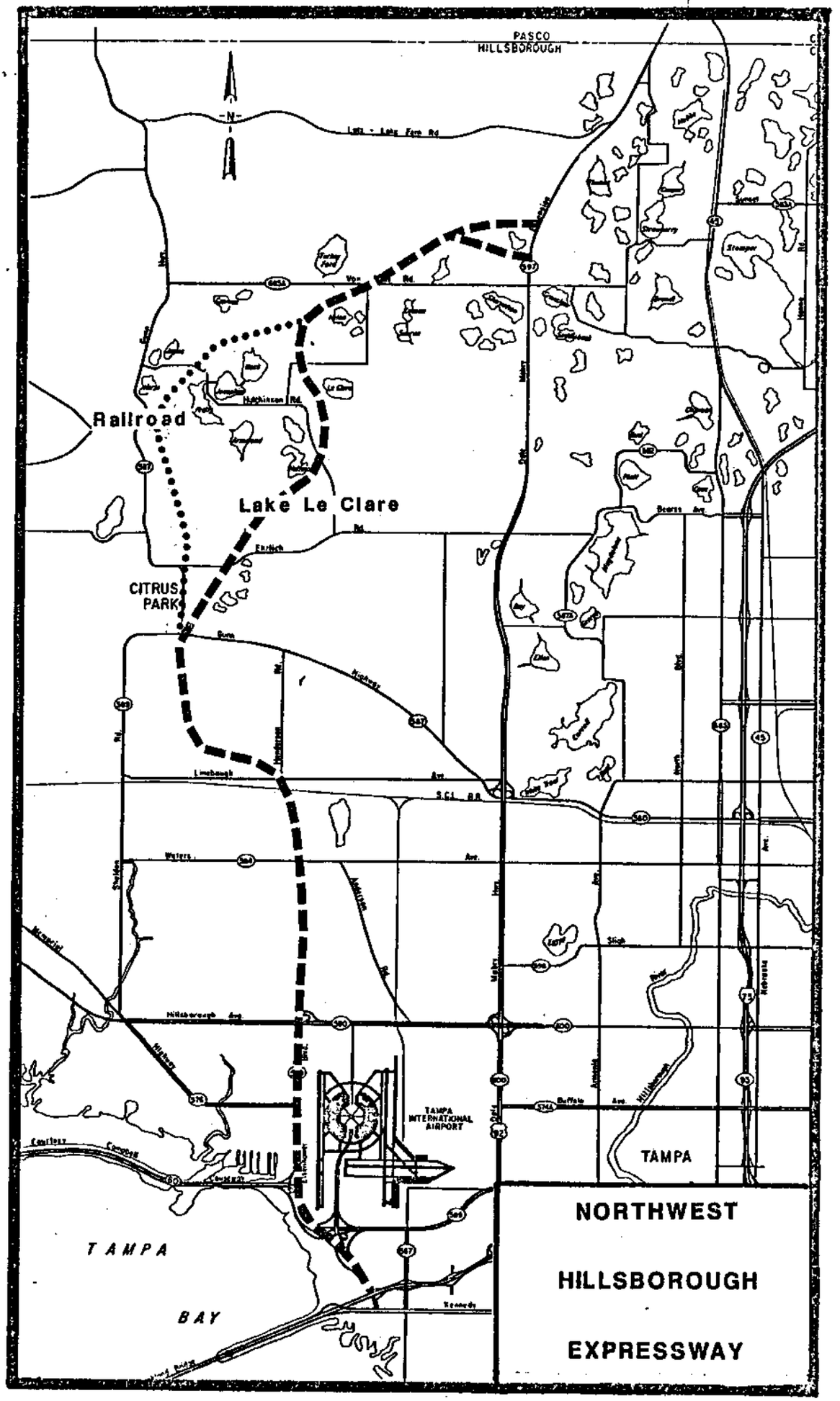





FIGURE 3

## II. ANALYSIS OF TRAFFIC NOISE IMPACTS

### A. LAND USE

Hillsborough County has continued to grow in population at a sustained rate over the past few decades, increasing in population by 132% from 490,300 in 1970 to 647,000 in 1980 (U.S. Census of Population and Housing, 1980). The population has been projected to increase by as much as another 239% by the year 2020, reaching a total of 1,544,000.

Existing land uses were analyzed for this report by use of recent aerial photography and field surveys. The generalized existing land use is shown in Figure 4.

The project corridor varies considerably from south to north in intensity of land use. From I-275 to the Spruce Street/Tampa Airport interchange it consists primarily of commercial development, including light industrial and lodging. Along the east side of the facility from the Spruce Street/Tampa Airport interchange to Hillsborough Avenue the sole activity adjoining the roadway is Tampa International Airport. On the west side between the Spruce/Airport interchange and Courtney Campbell Causeway the land is vacant, consisting of the shoreline of Old Tampa Bay. Also on the west side, between Courtney Campbell Causeway and Independence Parkway, there are a vacant partially cleared tract and a Hillsborough County park (Skyway Park). From there to Hillsborough Avenue the west frontage consists of various commercial activities and a few houses. All of these activities from Courtney Campbell to Hillsborough are backed by residential development. For the first mile north of Hillsborough Avenue the new alignment is adjoined on both sides by primarily residential development ranging from single-family to low-rise multi-family units. A few commercial activities such as warehousing and light industrial

# EXISTING LAND USE

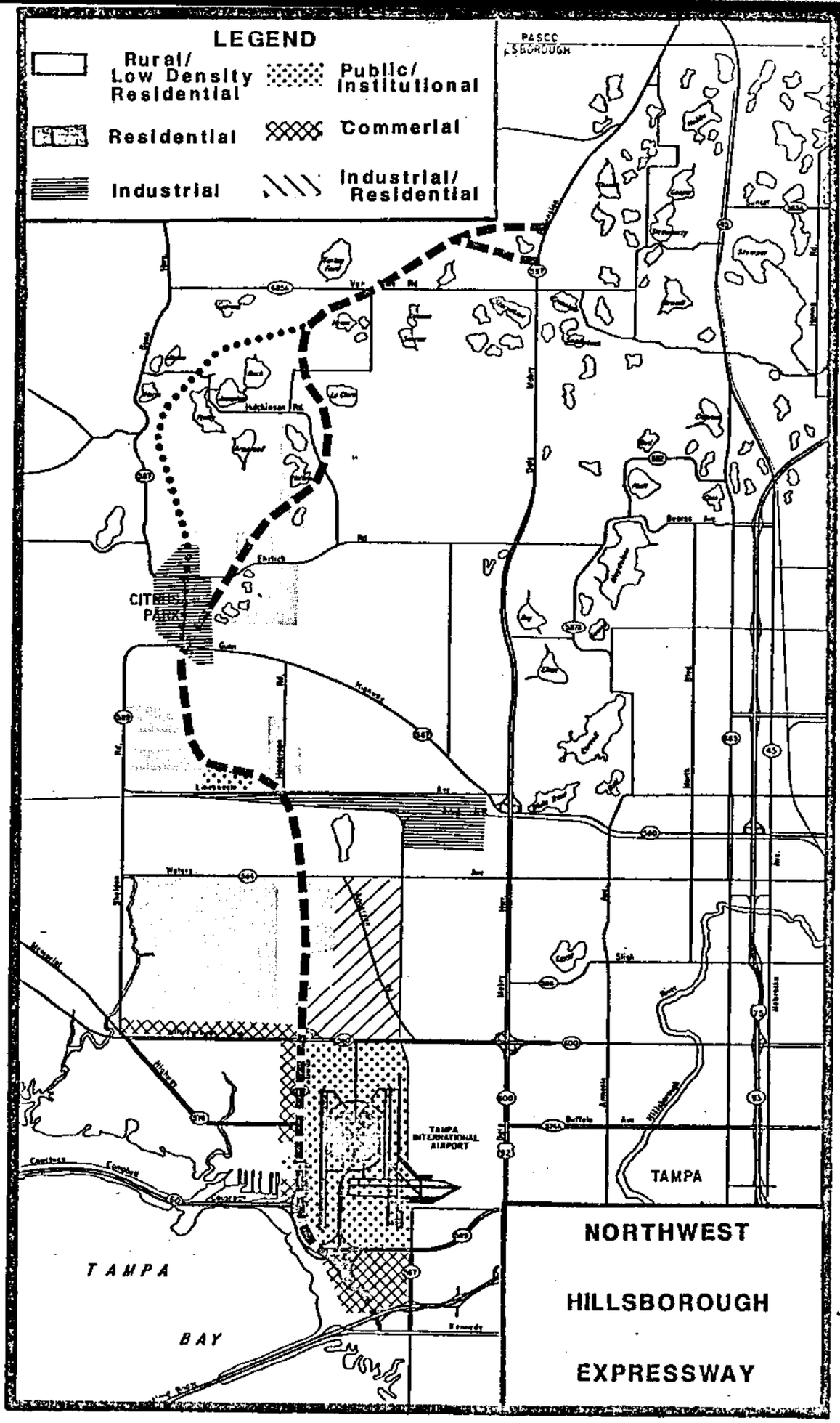



FIGURE 4

are interspersed therein. From this area northward development is discontinuous, consisting of various single-family subdivisions and scattered individual homes. The residential developments are interspersed with vacant tracts, improved pastures, and citrus groves. A concentrated zone of light industrial exists around the Citrus Park area. The residential enclaves become fewer and farther between as the project corridor moves northward, to the extent that the last section, from Van Dyke Road to Dale Mabry Highway, is of sparsely developed rural usage.

In establishing the expressway alignments, efforts were made to avoid conflict with existing residential development commensurate with seeking to provide improved traffic service in the Northwest area of the county. Conflicts with residential development were minimized to the greatest extent possible within the Corridor by seeking alternatives which utilized open space wherever possible.

Both the City and the County have adopted "Land Use Elements" of their Horizon 2000 Growth Management Plans. The portions of these proposed land uses in the Northwest area are shown in Figure 5.

From the southern terminus of the proposed project to Hillsborough Avenue, light industrial, low density residential, and airport (public/semi-public) land uses are projected to border the project. From Hillsborough Avenue to Waters Avenue, light industrial is proposed to dominate the corridor. Future land use north of Waters Avenue will be primarily low density residential and suburban residential with some rural residential north of Hutchinson Road.

The future general land use of the area is not expected to be altered with the building of the Expressway. The Expressway could have the

# PROPOSED LAND USE 2000

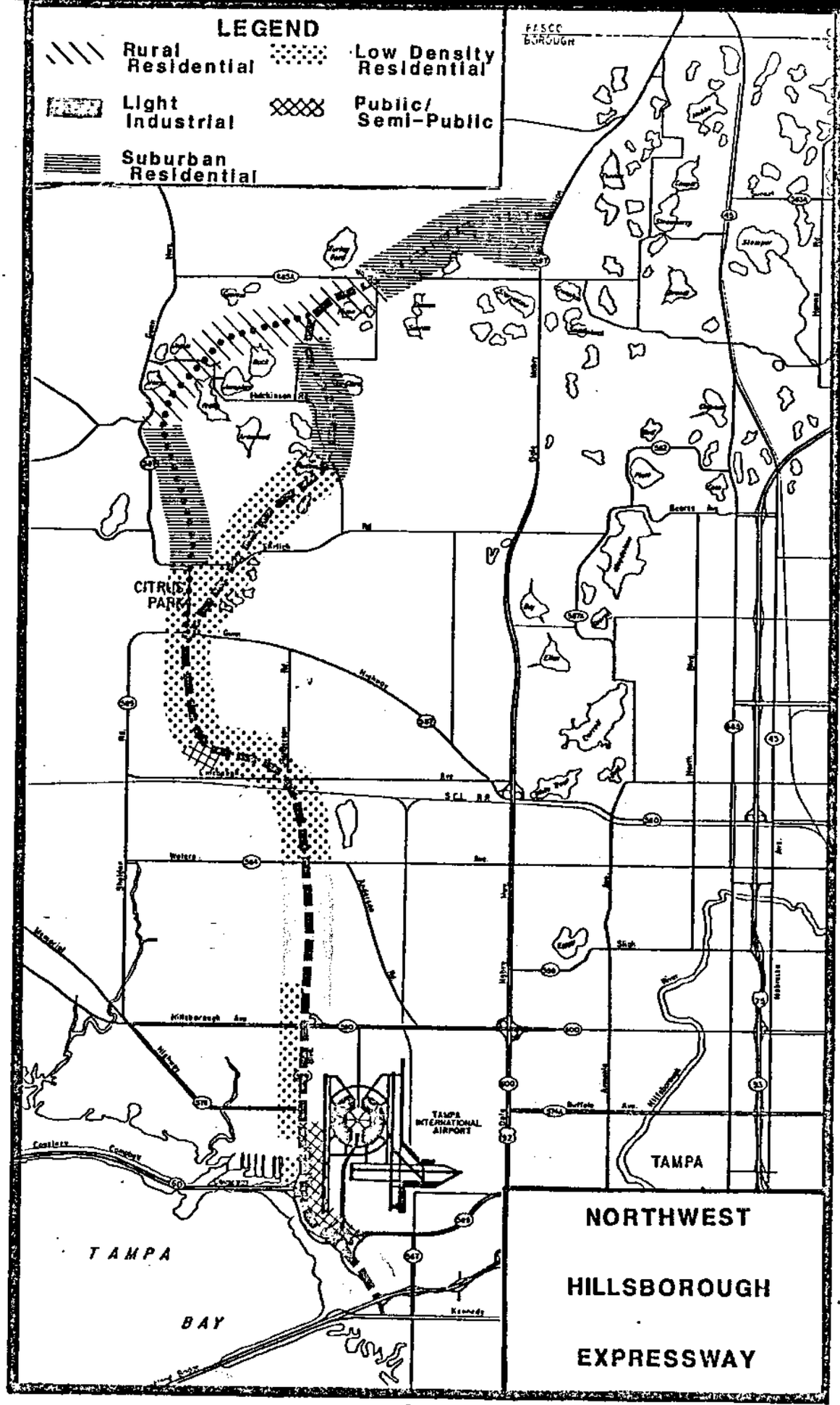





FIGURE 5

effect of accelerating the suburban residential trend already present in the area. The Lake LeClare Alignment could be considered more compatible with the Land Use Element of the County Plan than the Railroad Alignment since it is located more within designated urbanized areas, thereby less likely to accelerate urban sprawl.

The "NO-BUILD" alternate, while compatible with the Land Use Plans, does not adequately address the continued deterioration of traffic service to the Northwest area.

B. Noise Sensitive Sites

The potential impact of the proposed Expressway on noise sensitive sites was evaluated. Recognized noise sensitive sites or areas that could be adversely affected by high noise levels include schools, parks, residences, hospitals, libraries and other similar land uses and activities. Identification of such activities was accomplished by examination of aerial photographs and field reviews. Based on these evaluations, individual sites for acoustical analysis were selected to determine spot impacts as well as representative conditions of adjoining land use activities. When more than one potentially sensitive site existed in an area, the site which appeared to be impacted most significantly was chosen for analysis as representative for that location. Thirty-two sites were selected to represent all of the noise sensitive areas along the project. Table 1 gives a description of these selected locations. These locations are depicted on a map in Figure 6. The receptors represent a total of 113 houses, 18 mobile homes, 1 business, 1 park, and 1 school.

# NOISE RECEPTOR SITES

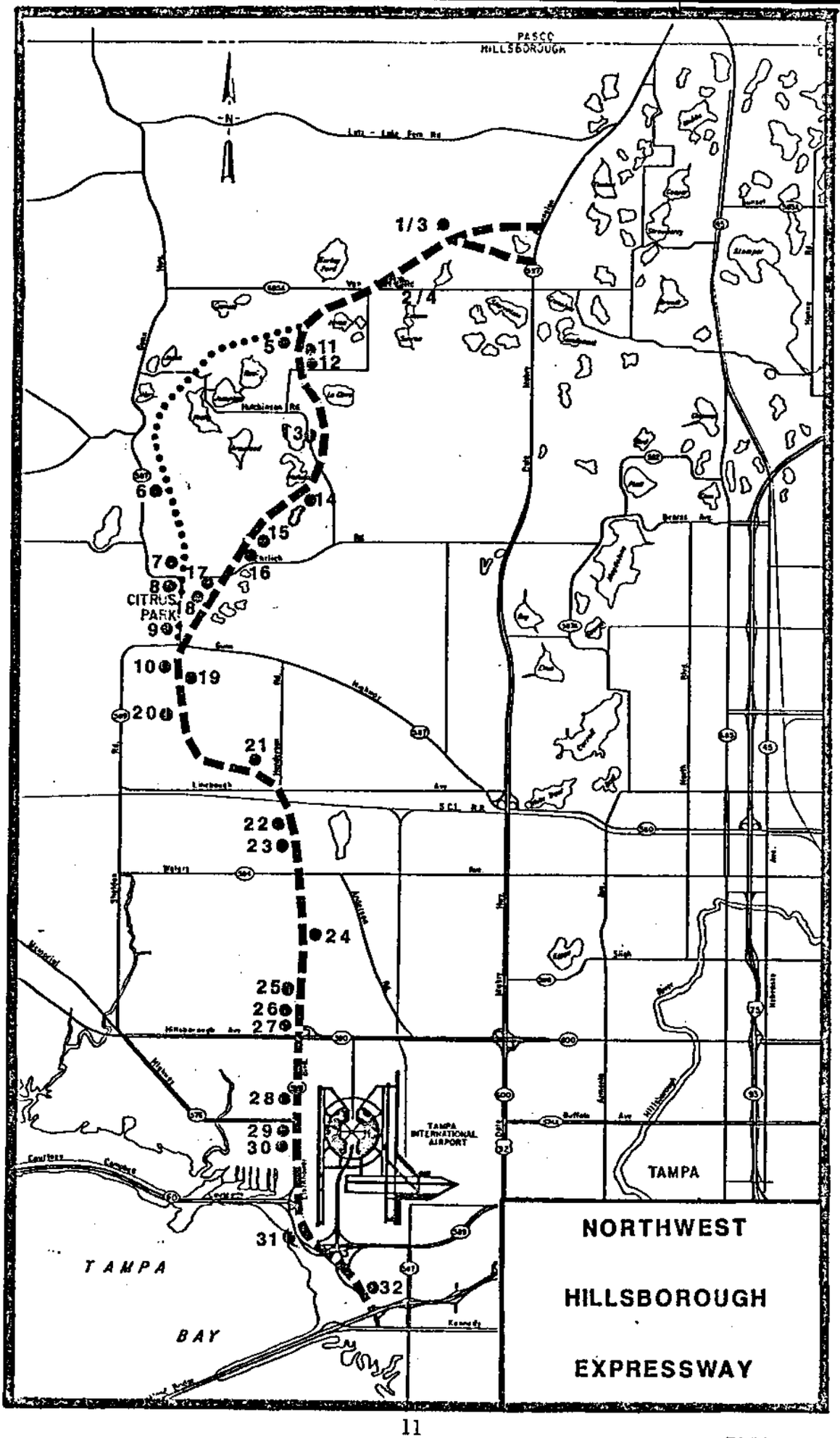





FIGURE 6

TABLE 1

NOISE RECEPTOR DESCRIPTIONS

| | | |
|---|---|---|
| 1 | Isolated Residence | 2935' N of Van Dyke Rd.<br>740' E of Darby Lane |
| 2 | Isolated Residence | 125' N of Van Dyke Rd.<br>450' W of Darby Lane |
| 3 | Isolated Residence | 2935' N of Van Dyke Rd.<br>740' E of Darby Lane |
| 4 | Isolated Residence | 125' N of Van Dyke Rd.<br>450' W of Darby Lane |
| 5 | Isolated Residence | 2025' N of LeClare Rd.<br>60' W of Tobacco Rd. |
| 6 | Mobile Home--representative of 3 mobile homes and 5 residences | 340' N of Peterson Rd.<br>853' E of Gunn Hwy. |
| 7 | Neighborhood Residence--representative of 6 residences | 40' N of Allmark St.<br>20' W of Banberry Ave. |
| 8 | Citrus Park Elementary School | 1100' S of Ehrlich Rd.<br>25' W of Gunn Hwy. |
| 9 | Mobile Home--representative of 3 mobile homes and 2 residences | 1100' N of Sheldon Rd.<br>227' W of Gunn Hwy. |
| 10 | Mobile Home--representative of 2 mobile homes | 1222' S of Sheldon Rd.<br>180' W of abandoned RR |
| 11 | Isolated Residence | 265' S of Storm Rd.<br>1172' E of Tobacco Rd. |
| 12 | Isolated Residence | 55' N of LeClare Rd.<br>950' E of Tobacco Rd. |
| 13 | Isolated Residence | 2720' N of Rawls Rd.<br>260' E of Hutchinson Rd. |
| 14 | Isolated Residence | 100' N of Rawls Rd.<br>1620' E of Willow Dale Rd. |

NOISE RECEPTOR DESCRIPTIONS (cont'd.)

| | | |
|---|---|---|
| 15 | Neighborhood Residence--representative of 4 residences | 1315' N of Ehrlich Rd.<br>690' E of Bellamy Rd. |
| 16 | Isolated Residence--representative of 2 residences | 910' N of Ehrlich Rd.<br>450' W of Bellamy Rd. |
| 17 | Neighborhood Residence--representative of 9 residences | 280' S of Ehrlich Rd.<br>280' E of Briarthorn Dr. |
| 18 | Isolated Residence | 1825' S of Ehrlich Rd.<br>35' E of Briarthorn Dr. |
| 19 | Isolated Residence--representative of 3 residences and 2 mobile homes | 1830' S of Gunn Hwy.<br>230' E of abandoned RR |
| 20 | Mobile Home--representative of 4 mobile homes | 65' N of Gardner Rd.<br>635' W of Timber Ridge Rd. |
| 21 | Isolated Residence--representative of 8 residences | 1320' N of Linebaugh Ave.<br>1830' W of Henderson Rd. |
| 22 | Neighborhood Residence--representative of 20 residences | 260' N of Martinshire Dr.<br>10' E of N. Ascot Ct. |
| 23 | Neighborhood Residence--representative of 18 residences | 1830' N of Waters Ave.<br>8' W of Twelve Oaks Blvd. |
| 24 | Mobile Home-- representative of 3 mobile homes | 254' N of Flora Ave.<br>105' E of Turnmore Dr. |
| 25 | Neighborhood Residence--representative of 7 residences | 40' S of Hanna St.<br>40' E of Southern Comfort Blvd. |
| 26 | Neighborhood Residence--representative of 5 residences | 60' N of W. Larmon St.<br>105' W of Southern Comfort Blvd. |
| 27 | Neighborhood Residence--representative of 15 residences | 485' N. of Hillsborough Ave.<br>40' W of Southern Comfort Blvd. |

| | | |
|---|---|---|
| 28 | Mobile Home--representative of 1 mobile home and 1 business | 70' N of Eleanor Dr.<br>80' W of Eisenhower Blvd. |
| 29 | Representative Receptor--<br>25' from R-O-W | 730' N of Independence Pkwy.<br>105' W of Eisenhower Blvd. |
| 30 | Skyway Park | East end of N tennis court |
| 31 | Representative Receptor--<br>25' from R-O-W | 400' S of Fish Creek Crossing<br>25' W of R-O-W |
| 32 | Representative Receptor--<br>25' from R-O-W | 616' N of Cypress St.<br>25' E of R-O-W |

C. Prediction Methods

Future noise levels at the selected modeling sites were calculated using the federally approved STAMPLOT computer noise prediction model. This model was applied to 1989 (initial year of operation) and 2010 (design year) traffic volumes for all four alternates: Railroad Alignment - North Terminus, Railroad Alignment - South Terminus, Lake LeClare - North Terminus, and Lake LeClare - South Terminus. An analysis of the "NO-BUILD" alternate is also presented.

Field measurements were taken in accordance with FHWA guidelines contained in Report No. DP-45-1R, "Sound Procedures for Measuring Highway Noise: Final Report", to validate the model. Measurements taken excluded airport noise contributions. Existing traffic noise levels were sampled using a General Radio Noise Meter Type 1565-B. Calibration checks were performed before and after each sampling period to assure meter accuracy by using a General Radio Sound-level Calibrator Type 1562-A. The model was found to be consistent with collected field test results with projections within one (1) dBA of actual measurements. Therefore, the STAMPLOT model was determined to be valid for future projections of highway traffic noise levels along this project.

Computer input data for the STAMPLOT noise model included traffic volumes and speeds representing Level of Service "C" or demand traffic, whichever was lower. Level of Service "C" is generally acknowledged as being the noisiest, worst case, traffic condition.

Generalized noise levels along the project were predicted for the year 2010 by means of the CONTOUR subroutine of the FDOT FLAMOD computer program, which has been approved for use in Florida by FHWA. This model

calculates the distance from the roadway at which given noise levels occur and is used to generate contour lines corresponding to given noise levels. These noise contours are presented in Figures 7 a-e and 8 a-e.

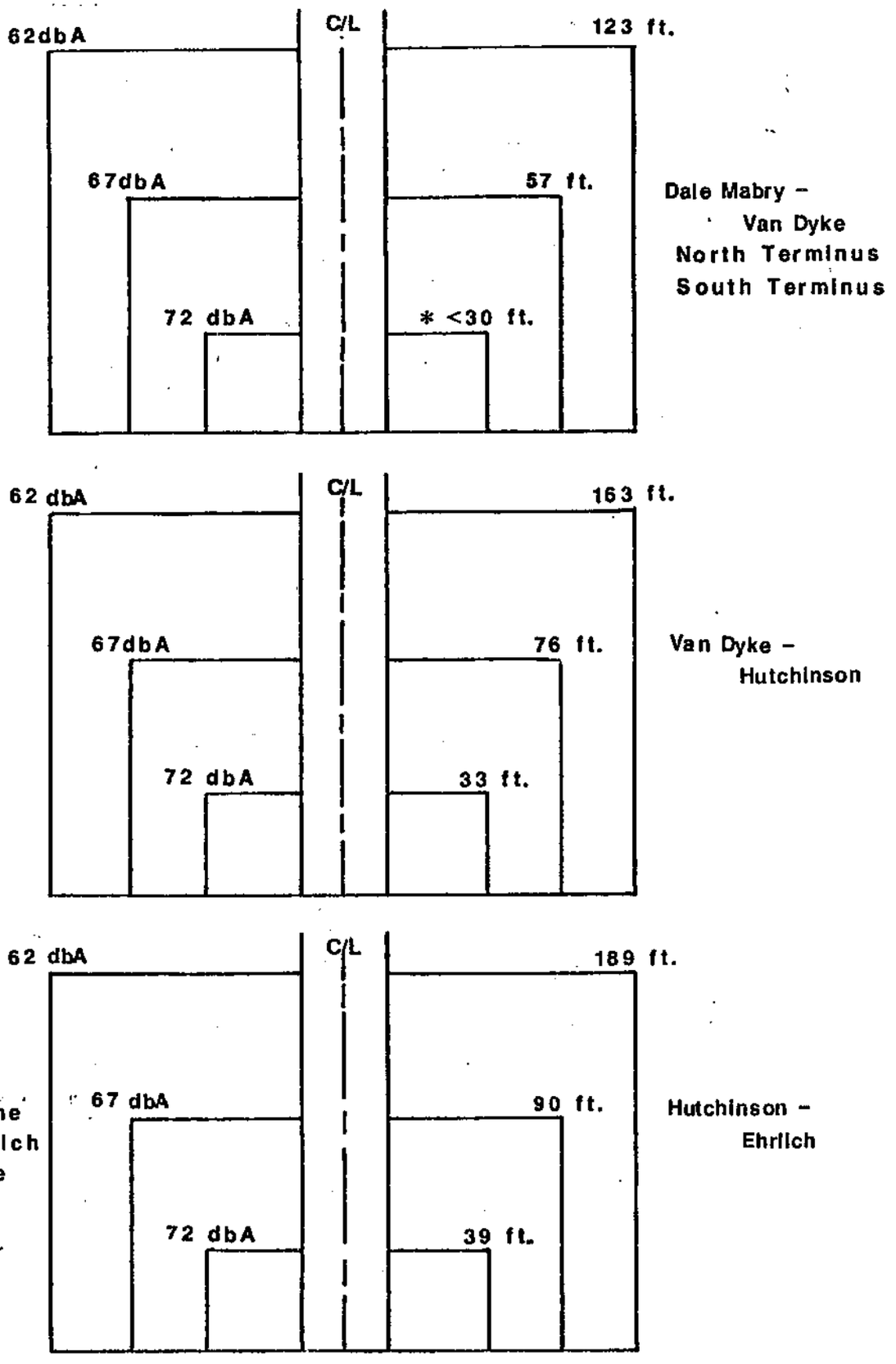
Predicted traffic volumes, traffic mix, and vehicle speeds presented in Figure 9 were utilized in both models. Roadway links were established from intersection to intersection in order to reflect differing traffic parameters.

The Federal Aid Highway Program Manual (FHPM) 7-7-3, "Procedures for Abatement of Highway Traffic Noise", establishes FHWA's guidelines of acceptable noise levels consistent with appropriate land uses. These guidelines are presented in Table 2, Design Noise Level/Activity Category Relationships. When noise abatement criteria are predicted to be approached or exceeded, FHPM 7-7-3 requires consideration of noise abatement measures which might reduce or eliminate the projected noise impacts. The abatement criterion of 67 dBA (Leq) for Activity Category B is applicable to all the noise receptors modeled for this proposed project, with the exception of Receptor 28 which, as a representative of 1 commercial use, has abatement criterion of 72 dBA.

All noise levels in this report are expressed in dBA, which is the decibel (dB) level measured on the A scale. The A scale most closely approximates the frequency response of the human ear. These noise levels are presented as Leq, which is the equivalent steady - state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same period.

An additional measure of assessing potential noise impacts is presented in Figure 10, "Impact Criteria". This FHWA impact rating categorizes noise impacts based on dBA increases over and above existing or ambient noise

LE CLARE ALIGNMENT



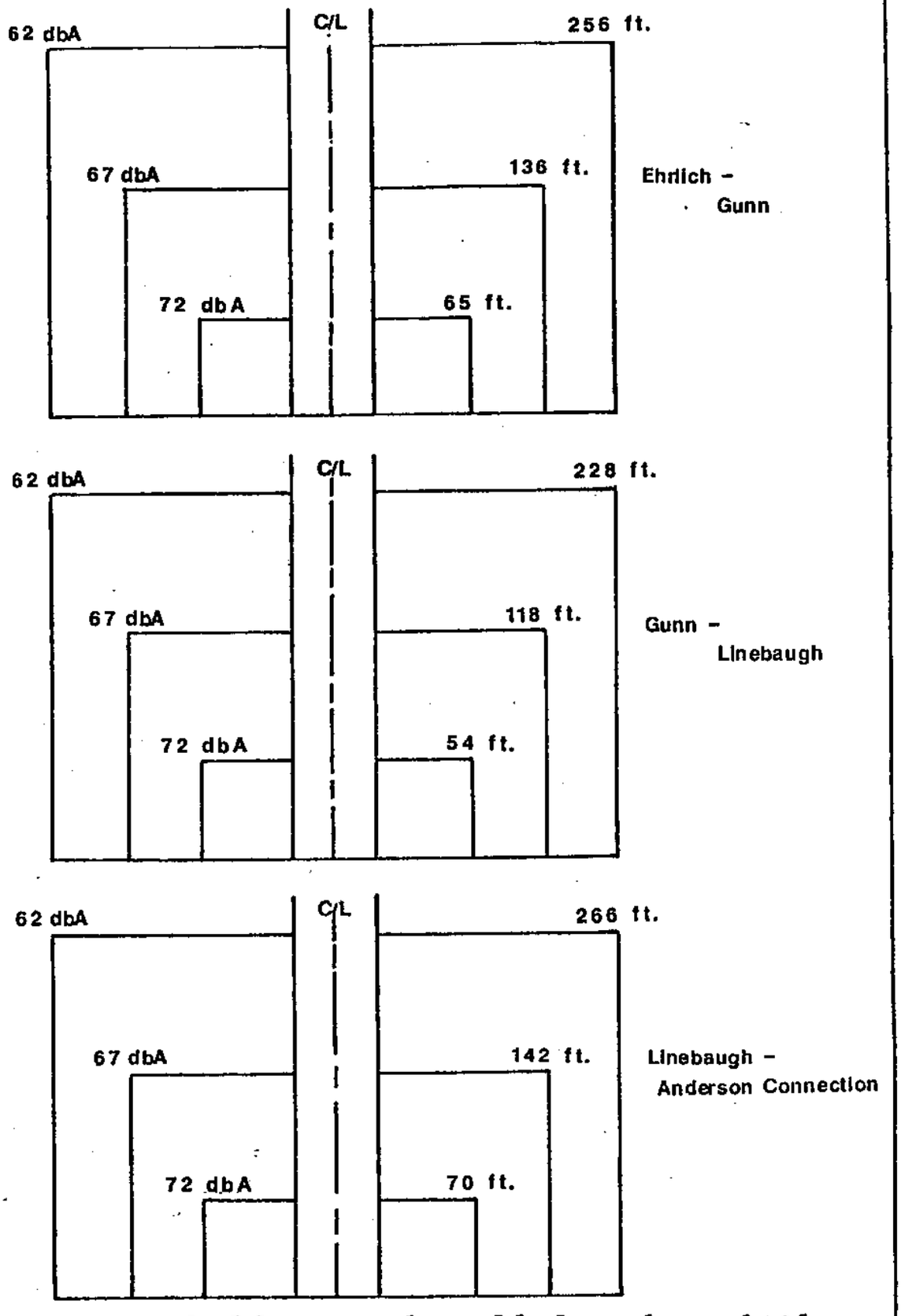

* 30 feet is the minimum at which predictions are valid.

# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 7A

LE CLARE ALIGNMENT

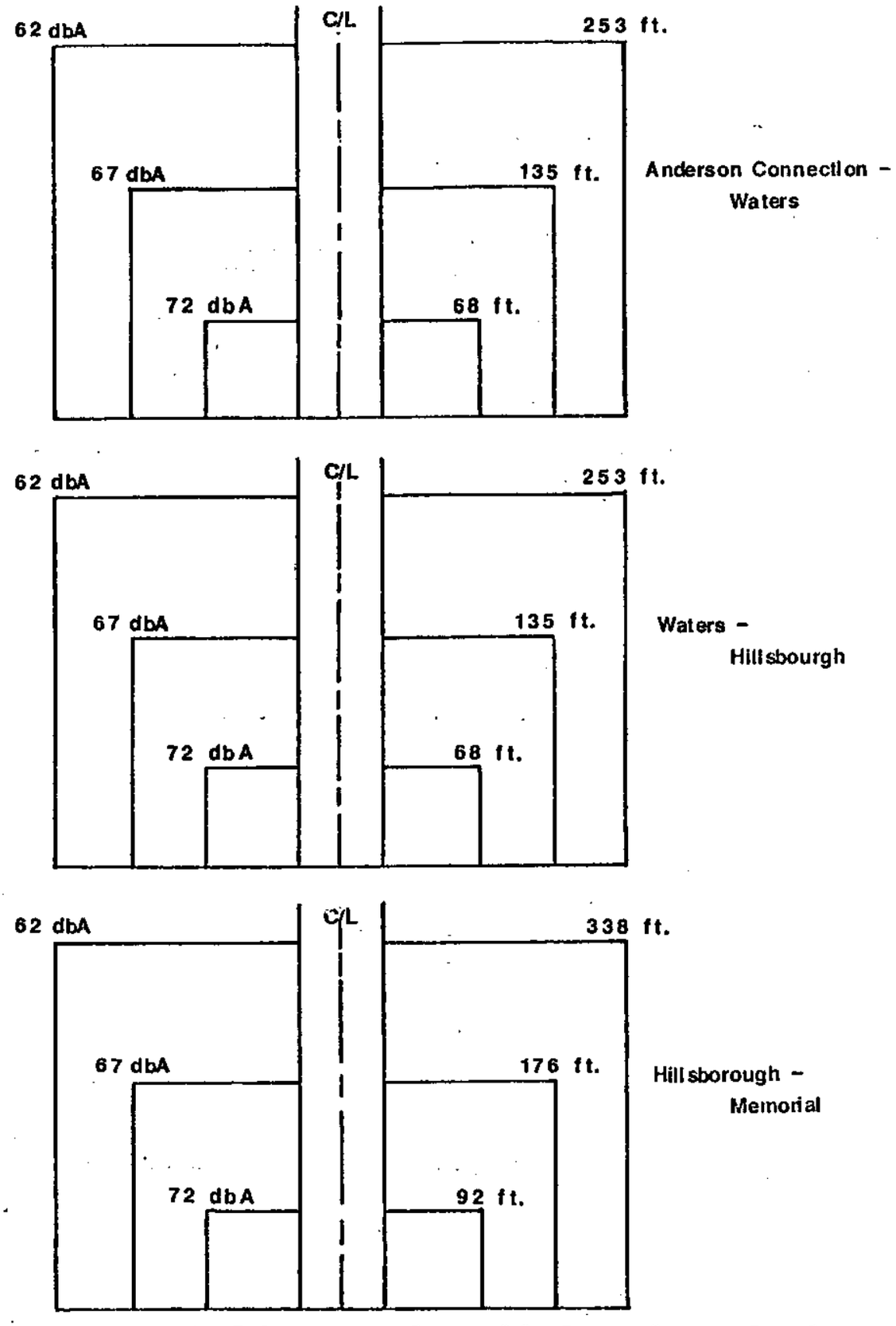



# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 7B

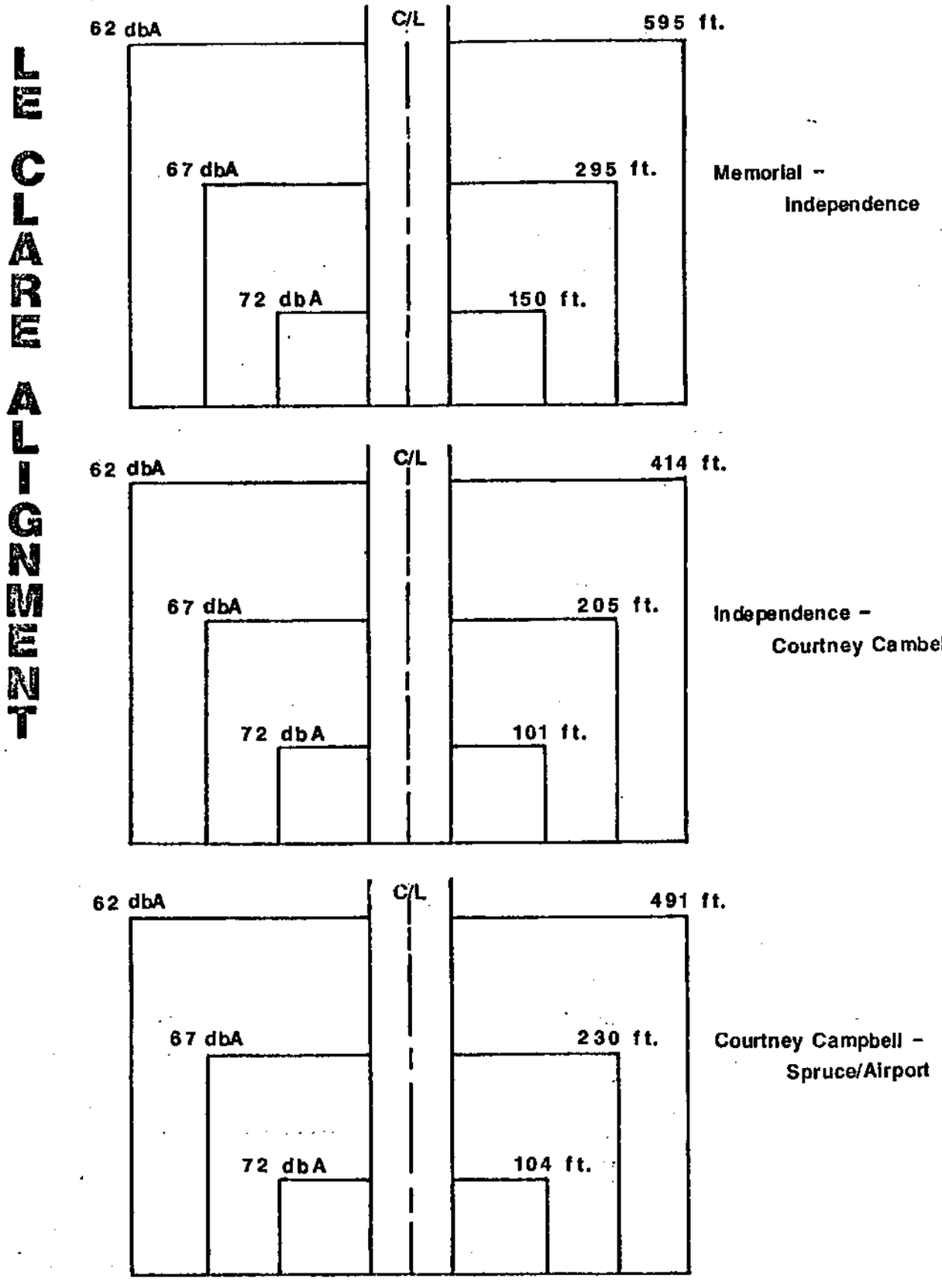
LE CLARE ALIGNMENT




# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 7C

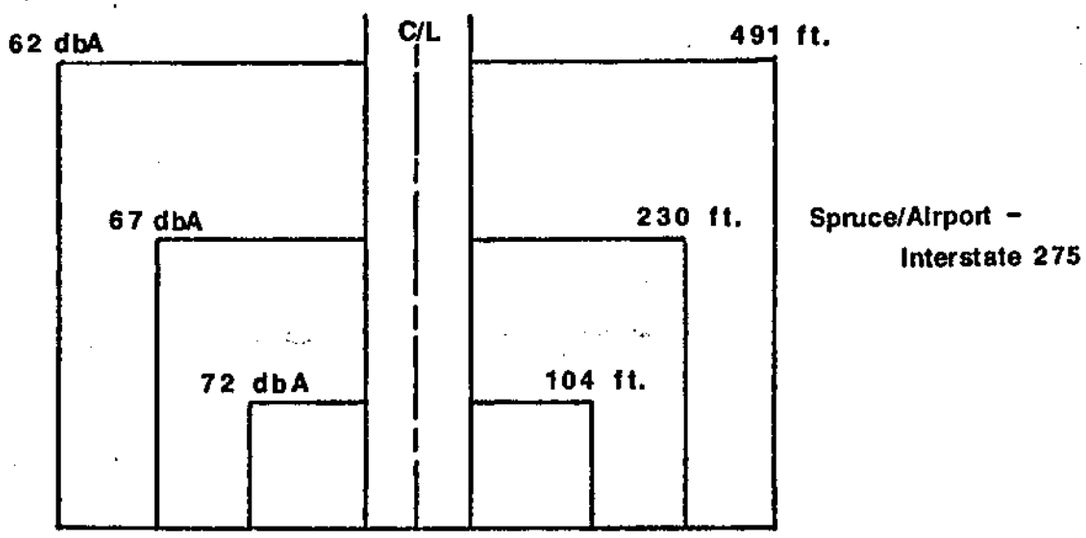



# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 7D

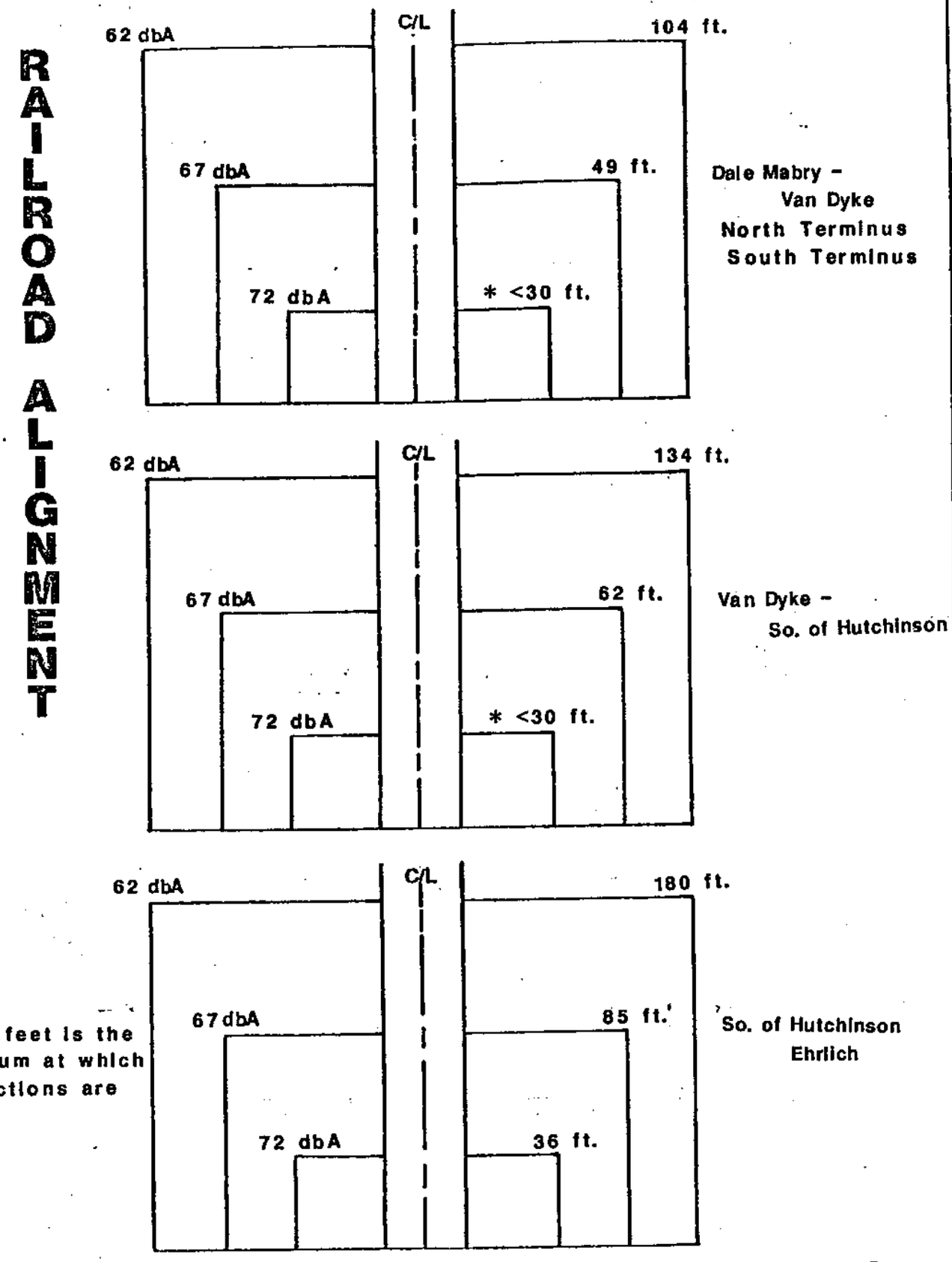
LE CLARE ALIGNMENT




**Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)**



FIGURE 25

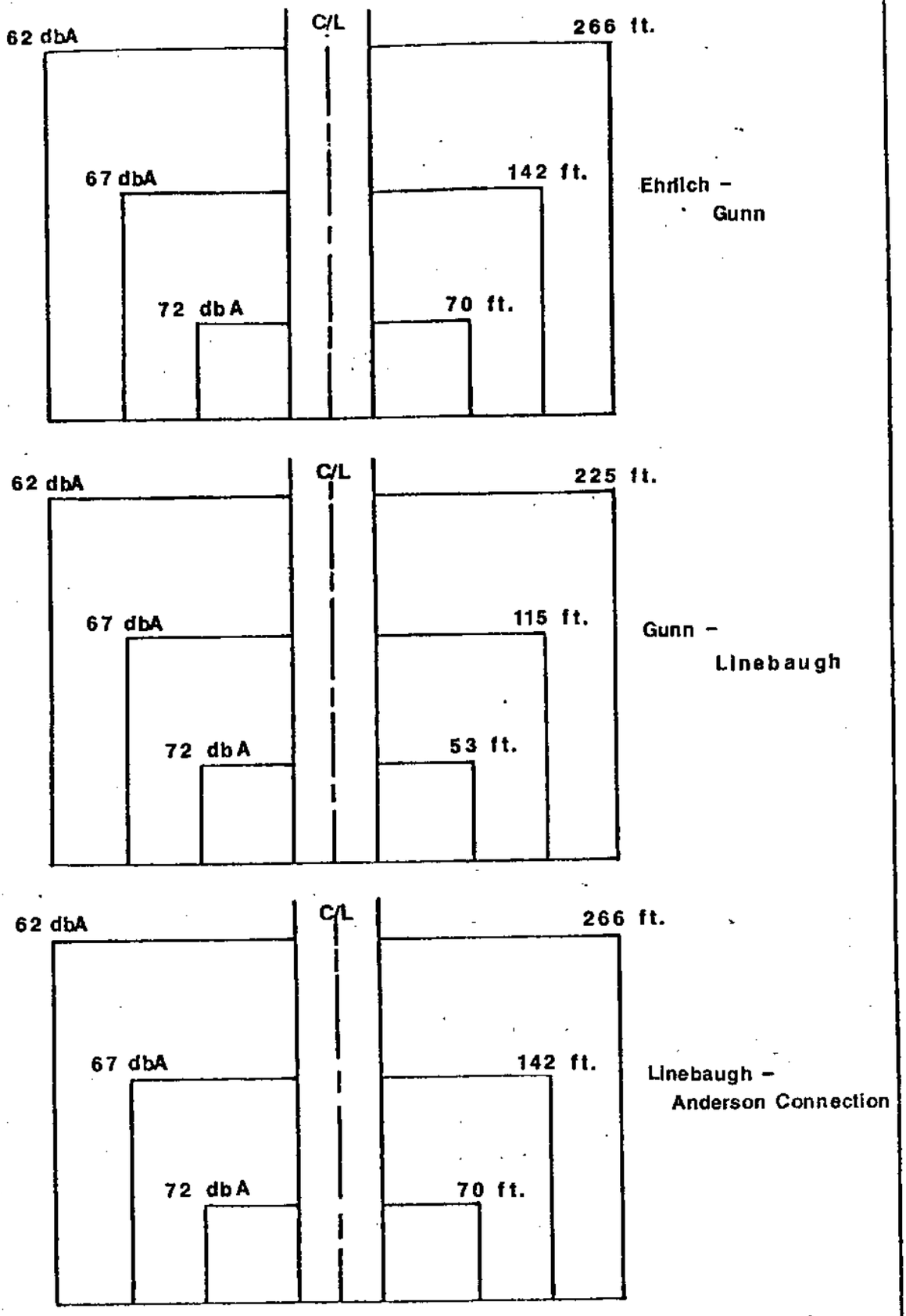



# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 8A

RAILROAD ALIGNMENT

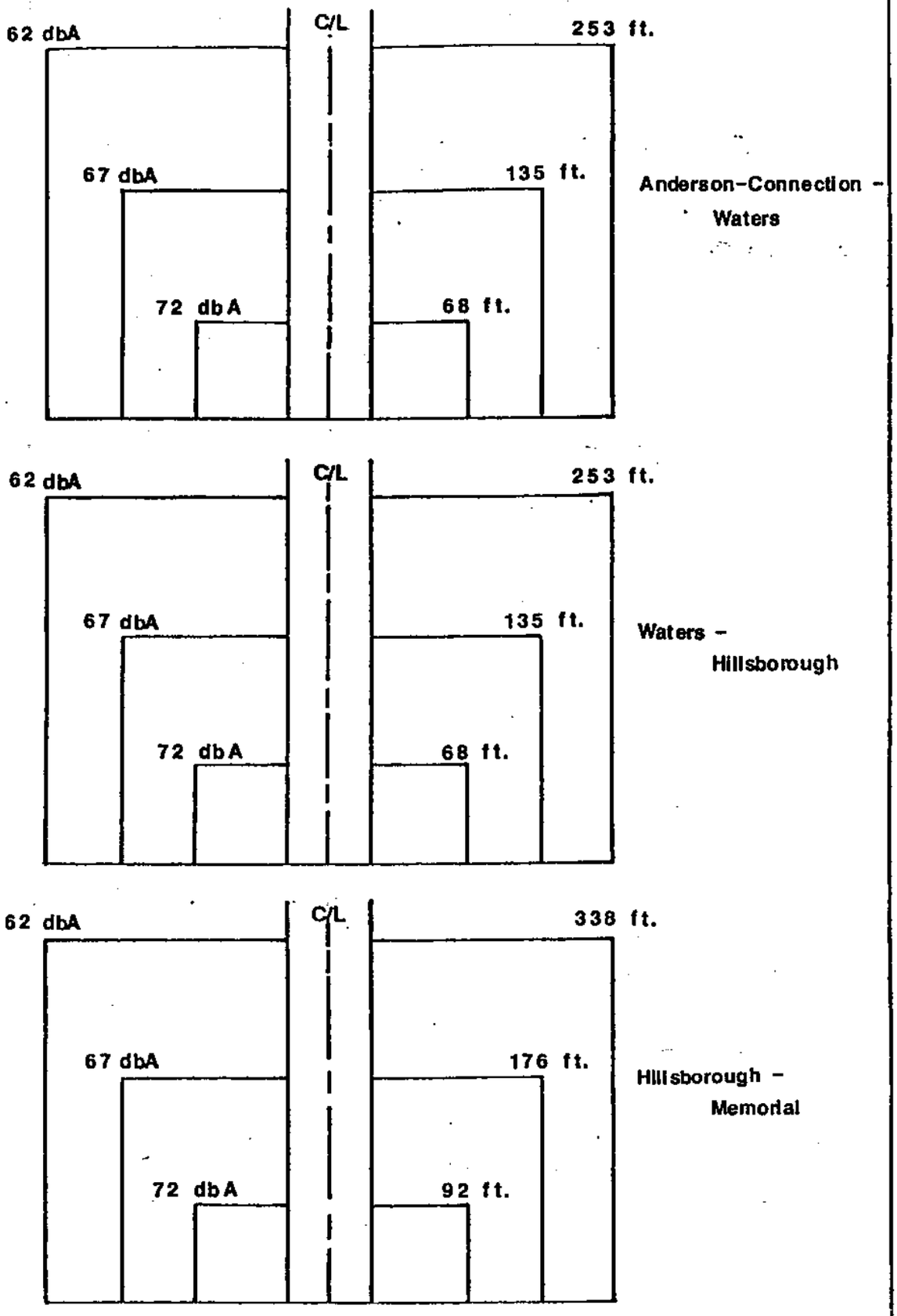



# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 8B

RAILROAD ALIGNMENT

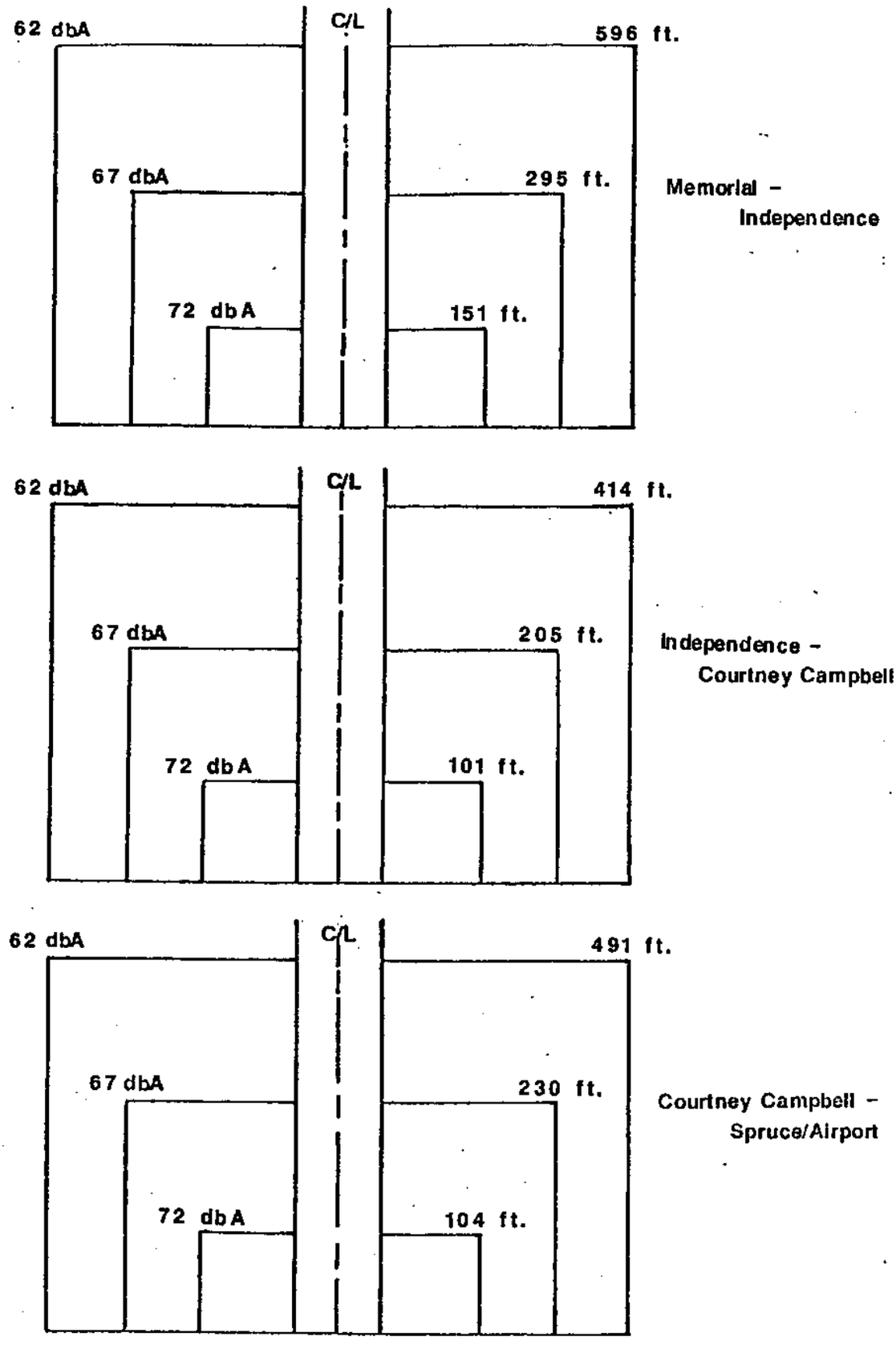



# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 8C

RAILROAD ALIGNMENT

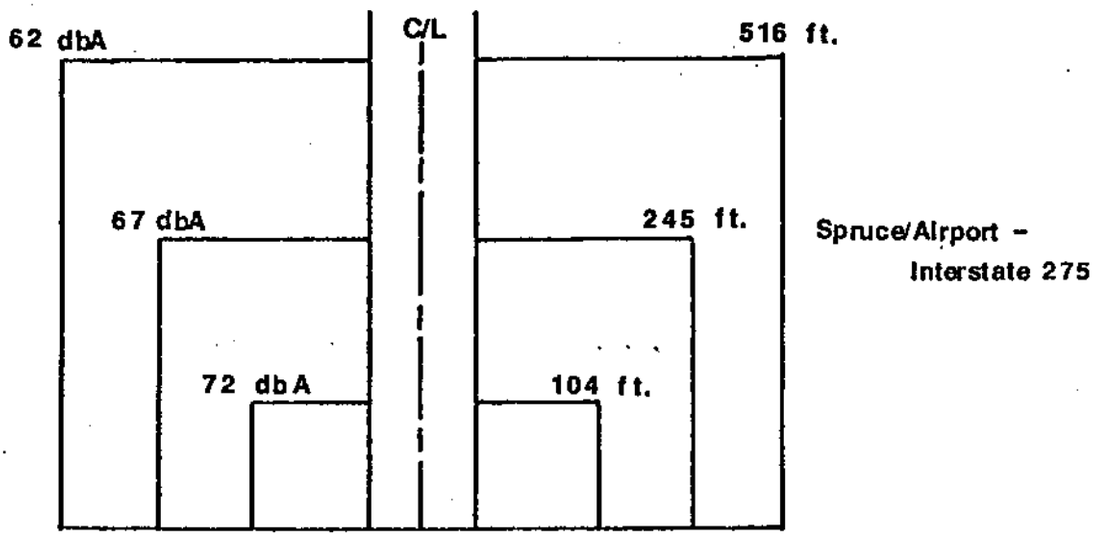



Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 4D

RAILROAD ALIGNMENT

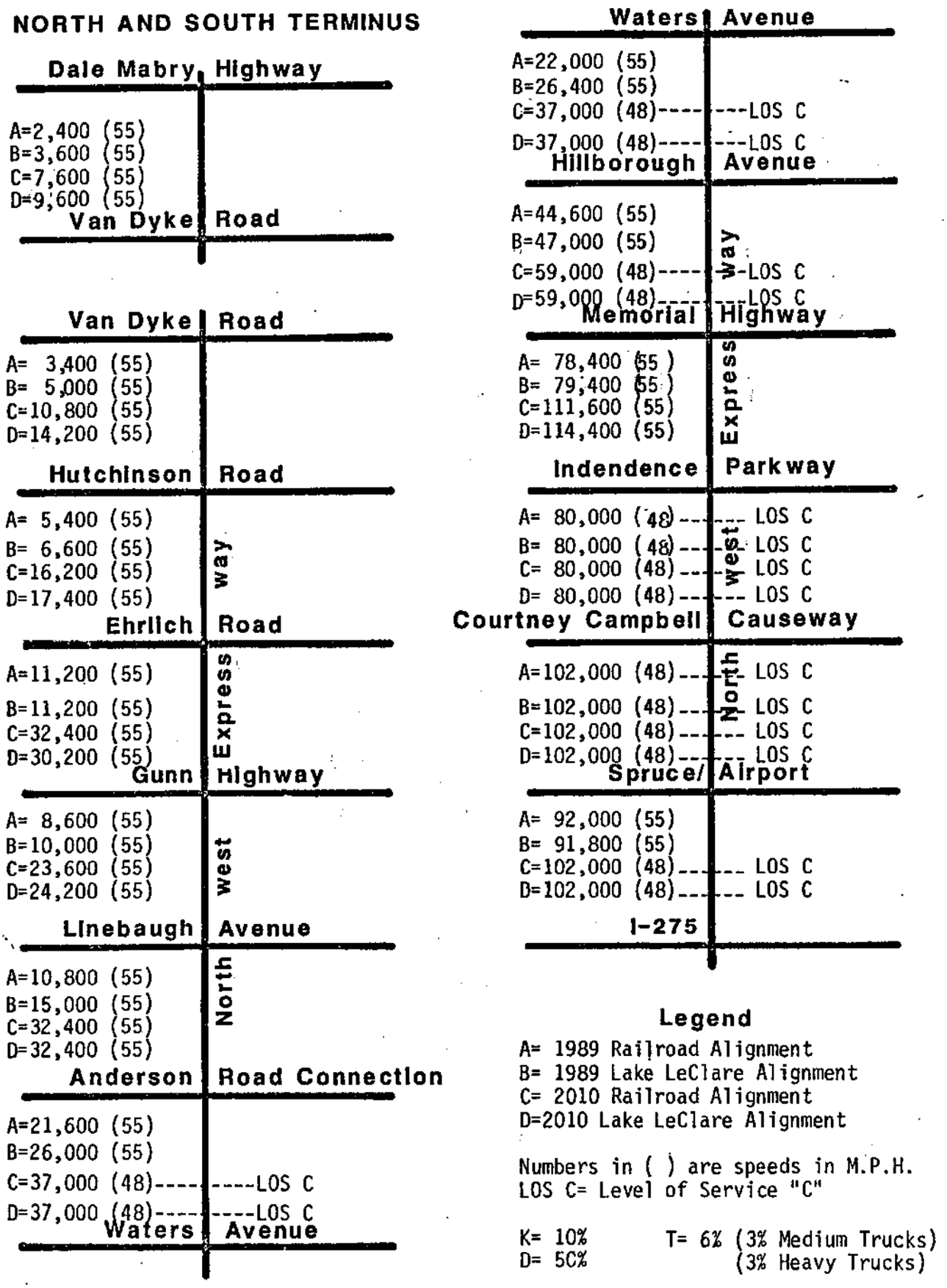



# Year 2010 Build Alternative Noise Isopleths of 62 dbA, 67 dbA and 72 dbA. (Leq)



FIGURE 8E

# A.D.T. TRAFFIC PROJECTIONS




## Legend

A= 1989 Railroad Alignment
B= 1989 Lake LeClare Alignment
C= 2010 Railroad Alignment
D=2010 Lake LeClare Alignment

Numbers in ( ) are speeds in M.P.H.
LOS C= Level of Service "C"

K= 10%
D= 50%
T= 6% (3% Medium Trucks)
(3% Heavy Trucks)



Figure 9

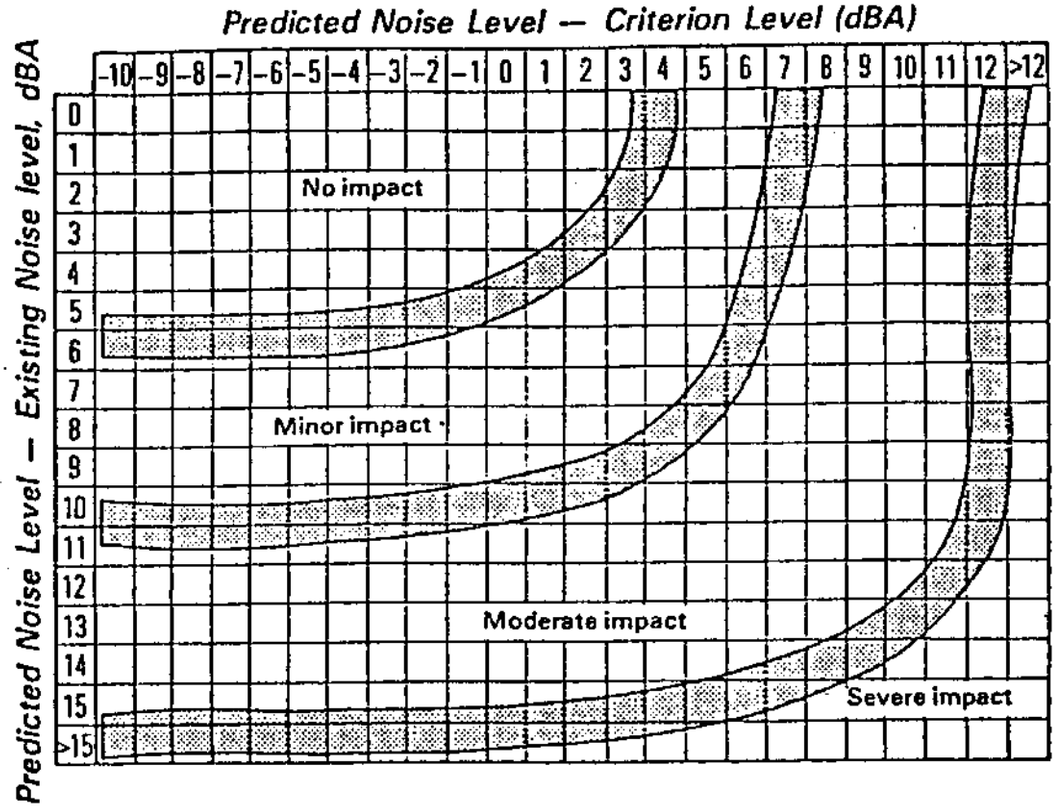
DESIGN NOISE LEVEL/ACTIVITY RELATIONSHIPS

| Activity Category | $L_{eq}$ | Description of Activity Category |
|---|---|---|
| A | 57 dBA (Exterior) | 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 area is to continue to serve its intended purpose. |
| B | 67 dBA (Exterior) | Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals. |
| C | 72 dBA (Exterior) | Developed lands, properties, or activities not included in Categories A or B above. |
| D | --- | Undeveloped lands. |
| E | 52 dBA (Interior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. |

SOURCE: Department of Transportation, Federal Highway Administration Highway Noise Control Standards and Procedures FHPM 7-7-3.

TABLE 2

# Proposed Impact Criteria




Source: FHWA Memorandum, A National Field Review of the Highway Traffic Noise Impact Identification and Mitigation Decisionmaking Processes. June 8, 1982; Figure 4. Jerry A. Reagan.



FIGURE 10

levels as compared to criteria levels. The impact analysis range from "no impact" to "severe impact".

Ambient noise levels for the proposed project north of Linebaugh Avenue were based on 1985 field measured noise levels taken at selected sites along the project corridor to assess the impacts at corresponding receptor locations. The data from 6 representative ambient measuring stations were used to formulate the ambient levels presented in Table 3a. These existing noise levels were measured as representative of "general" ambient noise levels in order to assess the relative magnitude of noise increases imposed by the proposed project. These ambient levels were used only as an "indicator" of impacts on this section of new alignment. In order to be conservative, impact ratings for predicted noise levels were based on the lowest ambient level per receptor location.

The noise environment south of Linebaugh Avenue is dominated by noise levels created by aircraft operations. Airport noise contours generated from a report by the Hillsborough County Airport Authority (HCAA) entitled Tampa International Airport Noise Study, November 1983, are presented in Figure 11. The study concluded that because the background noise levels in the study area were generally low, aircraft noise within the Ldn 65 contour was the most dominant environmental noise factor. Therefore, noise levels were interpolated from the contours in Figure 11 based on receptor locations and used as ambient conditions, as shown in Table 3b, to assess noise impacts. Because of these relatively high ambient noise levels, Table 3b shows an adjusted Leq value for each receptor affected by airport induced noise in order to better assess the additional impacts imposed by highway related activities. Adjusted Leqs were formulated by decibel addition. Ldn values are used as the noise descriptor

# Predicted Leq (dBA) Noise Levels

| Receptors | Distance from Near Lane (Ft.) | 1985 Measured Noise Level | FHWA Criterion | 1989 Noise Levels | | 2010 Noise Levels | |
|---|---|---|---|---|---|---|---|
| | | | | Railroad | Lake LeClare | Railroad | Lake LeClare |
| 1 | 760 | 47-50 | 67 | 46 | 48 | 51 | 52 |
| 2 | 193 | 47-50 | 67 | 54 | 55 | 59 | 60 |
| 3 | 610 | 47-50 | 67 | 47 | 49 | 52 | 53 |
| 4 | 187 | 47-50 | 67 | 54 | 56 | 59 | 60 |
| 5 | 50 | 51-53 | 67 | 59 | - | 64 | - |
| 6 | 65 | 51-53 | 67 | 62 | - | 67 | - |
| 7 | 120 | 51-53 | 67 | 60 | - | 65 | - |
| 8 | 230 | 51-53 | 67 | 60 | - | 64 | - |
| 9 | 180 | 51-53 | 67 | 61 | - | 66 | - |
| 10 | 232 | 51-53 | 67 | 60 | - | 64 | - |
| 11 | 130 | 53-55 | 67 | - | 63 | - | 68 |
| 12 | 95 | 53-55 | 67 | - | 61 | - | 66 |
| 13 | 69 | 53-55 | 67 | - | 61 | - | 65 |
| 14 | 125 | 53-55 | 67 | - | 62 | - | 65 |
| 15 | 385 | 53-55 | 67 | - | 55 | - | 59 |
| 16 | 195 | 53-55 | 67 | - | 53 | - | 58 |
| 17 | 180 | 53-55 | 67 | - | 61 | - | 65 |
| 18 | 110 | 53-55 | 67 | - | 65 | - | 69 |
| 19 | 155 | 55-57 | 67 | 61 | 62 | 66 | 66 |
| 20 | 100 | 55-57 | 67 | 64 | 65 | 68 | 69 |
| 21 | 215 | 60-65 | 67 | 59 | 65 | 64 | 68 |
| 22 | 655 | 60-65 | 67 | 51 | 52 | 56 | 56 |
| 23 | 842 | 60-65 | 67 | 52 | 52 | 53 | 53 |



Table 3a

# Predicted Leq (dBA) Noise Levels

| Receptors | Distance from Near Lane (Ft.) | FHWA Criterion | 1985 Noise Level with Airport Contribu-tions | 1989 Noise Levels | | | | 2010 Noise Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Railroad | Railroad* Adjusted | Lake LeClare | Lake LeClare* Adjusted | Railroad | Railroad* Adjusted | Lake LeClare | Lake LeClare* Adjusted |
| 24 | 222 | 67 | 72 | 64 | 73 | 65 | 73 | 65 | 73 | 65 | 73 |
| 25 | 102 | 67 | 72 | 75 | 77 | 76 | 78 | 75 | 77 | 76 | 78 |
| 26 | 120 | 67 | 73 | 67 | 74 | 68 | 74 | 67 | 74 | 68 | 74 |
| 27 | 144 | 67 | 73 | 66 | 74 | 67 | 74 | 67 | 74 | 67 | 74 |
| 28 | 154 | 67,72 | 73 | 73 | 76 | 73 | 76 | 73 | 76 | 73 | 76 |
| 29 | 190 | 72 | 69 | 75 | 76 | 75 | 76 | 76 | 77 | 76 | 77 |
| 30 | 150 | 67 | 69 | 72 | 74 | 72 | 74 | 72 | 74 | 72 | 74 |
| 31 | 135 | 72 | 75 | 74 | 78 | 74 | 78 | 74 | 78 | 74 | 78 |
| 32 | 125 | 72 | 69 | 76 | 77 | 76 | 77 | 75 | 76 | 75 | 76 |

* Adjusted due to Airport Noise Contribution

Table 3b

# TPA AIRPORT NOISE CONTOURS 1982

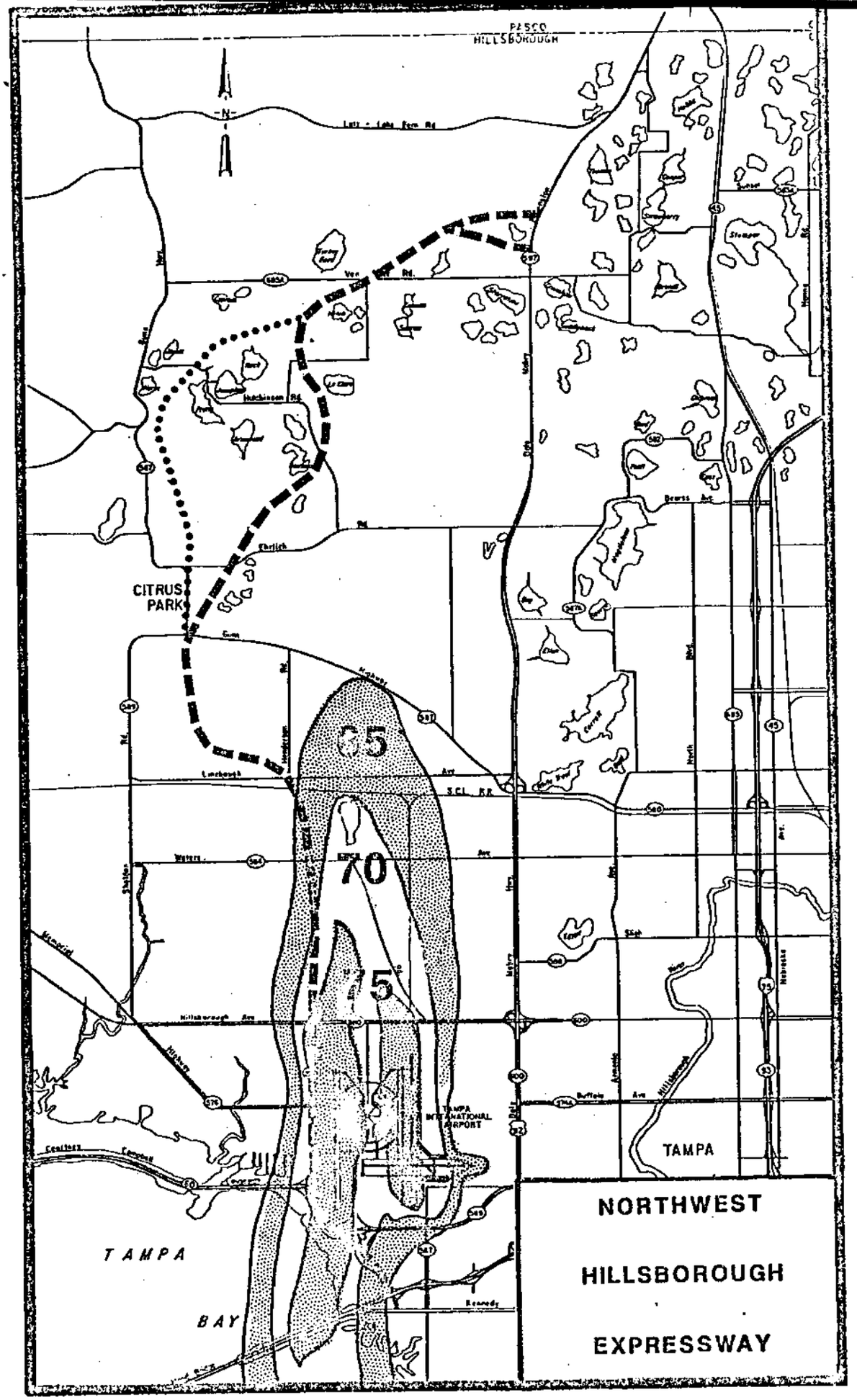



FIGURE 11

for the airport noise contours. Ldn is a logarithmic average of sound levels in dBA based upon a 24-hour Equivalent Sound Level (Leq) and is weighted to account for increased noise sensitivity between 10:00 p.m. and 7:00 a.m., with a 10 dBA penalty applied to noise events during the nighttime period. By application of reduced traffic volumes during these same hours to the logarithmic effect that traffic volumes have upon noise levels, it is possible to use the Leq values projected by the STAMPLOT model as the equivalent Ldn levels provided in the Airport Noise Study and to compare the values directly.

D. Results of Noise Analysis

Computer output data is presented in Table 3a and 3b. Receptors 5-10 refer exclusively to the railroad alignment while receptors 11-18 refer exclusively to the Lake LeClare alignment. All other receptors are common to both alignments but with varying impacts based on the applied traffic parameters of either the Railroad Alignment or Lake LeClare Alignment.

In regard to planned, designed, and programmed developments, both alignments pass a proposed site for a senior high school at Van Dyke and Tobacco Roads. No noise impacts or criteria exceedances are expected to occur at this location based on the noise contours presented in Figures 7a and 8a. Criteria exceedance of 67 dBA Leq will occur within a 62 foot distance from the center of near lane for the Railroad Alignment and within 76 feet for the Lake LeClare Alignment. Both these distances will be within the proposed right-of-way of either alignment.

1. Present vs."NO-BUILD" Alternative

The "NO-BUILD" alternative includes the existing Eisenhower Boulevard with no modifications. Eisenhower Boulevard is a 4 and 6-lane

predominantly rural design divided highway. Under a "NO-BUILD" condition, noise levels will increase 4 dBA by the year 2007 on this roadway due to normal traffic growth. This prediction is based on a preliminary noise assessment presented in the Northwest Hillsborough Expressway Phase 1 - Corridor Report, January 1982. Based on the measured existing noise level presented in the report, 70 dBA, this increase of 4 dBA will have a minor-moderate noise impact.

2. North Terminus vs. South Terminus

Noise level differences between the north terminus alignment, receptors 1 and 2, and south terminus alignment, receptors 3 and 4, for both the Railroad and Lake LeClare Alignments, 1989 and 2010 predictions, only reflect a variance of 0-1 dBA. No criterion exceedences will be encountered on either alignment or justifying one favorable alignment over the other based solely on noise impacts. Noise levels are 1-2 dBA higher overall for the Lake LeClare Alignment due to differing traffic parameters. Receptors are predicted to experience "no impact-minor impact" on either alignment in 1989 based on ambient noise levels. In 2010, receptors 1 and 3 will continue to have "no impact-minor impact", while receptors 2 and 4 will experience a "moderate impact" on both alignments due to increased traffic growth.

3. Railroad Alignment

Exclusive Railroad Alignment receptors 5-10 are predicted to experience "minor impact-moderate impact" in both 1989 and 2010, with the exception of receptors 6 and 9 in 2010. Receptor 7, a neighborhood residence representative of 6 residences, will approach criterion within 2 dBA in 2010. Receptor 6 will reach criterion level of 67 dBA in 2010 and account for a "moderate/severe impact." This receptor is a mobile home representative of 3 mobile homes and 5 residences. Receptor 9, a mobile home representative of 3

mobile homes and 2 residences, will approach criterion within 1 dBA in 2010 and also account for a "moderate/severe impact. However, by 2010 the rapid urbanization presently occuring within this area of Tampa urban limits will increase existing ambient noise levels and lessen the severity of future noise impacts. All other receptors are below criterion level.

4. Lake LeClare Alignment

Exclusive Lake LeClare Alignment receptors 11-18 are predicted to have "no impact-moderate impact" in 1989. The only criterion approachment will occur at receptor 18, which will be within 2 dBA of criterion.

In 2010, receptors 12-17 will encounter a "minor impact to moderate impact". Receptors 13 and 14, isolated residences, and 17, a neighborhood residence representative of 9 residences will approach criterion within 2dBA. Receptor 12, an isolated residence, will approach within 1 dBA. Receptors 15 and 16 will not approach criterion level. Receptor 11 will exceed criterion by 1dBA and receptor 18 will exceed by 2 dBA in 2010. Both receptors are isolated residences. Noise impacts will be "moderate/severe" at both locations due to increased traffic volumes. However, as stated earlier, the present urbanization trend will mask the severity of impacts by 2010.

5. Railroad/Lake LeClare Common Alignment

South of Gunn Highway all receptors, 19-32, are located on common alignment with only traffic parameters differentiating noise impacts.

Predicted noise levels for receptors 19 and 20 will be considered a "minor impact to moderate impact" on both alignments in 1989 and 2010. Receptor 19 will approach criterion by 1 dBA on both alignments in 2010. Receptor 20 will approach criterion by 2 dBA in 1989 on the Lake LeClare Alignment and will exceed criterion in 2010 by 1 dBA on the R.R. Alignment and by 2 dBA on the LeClare Alignment.

Receptor 21 is predicted to encounter "no-impact" and will not approach or exceed criterion on the R.R. Alignment in both years. On the Lake LeClare Alignment, receptor 21 will approach criterion by 2 dBA in 1989 and exceed criterion by 1 dBA in 2010. This will be a "minor impact" in both years based on ambient levels.

Receptors 22 and 23 will encounter "no impact" and no criterion exceedences on either alignment for 1989 and 2010.

Receptors 24-32 reflect an adjusted Leq value for predicted noise levels due to the addition of significant airport noise contributions. All these receptors currently have an ambient noise level in excess of FHWA criterion. With these adjusted values, all receptors exceed criterion by 6-11 dBA on both alignments in 1989 and 2010. However, these impacts are not considered "severe" based on higher ambient levels of 69-73 dBA from airport operations.

All adjusted Leq noise levels are identical for both alignments with the exception of receptor 25 which is 1 dBA higher on the Lake LeClare Alignment.

Receptor 24, which is representative of 3 mobile homes, will experience a "minor impact" in 1989 and 2010. Receptors 26, 27, and 30 will encounter a "minor-moderate impact" in both years. Receptors 26 and 27 represent 20 neighborhood residences. Receptor 30 is Skyway Park. Receptors 25, 28, 29, 31, and 32 are predicted to have "moderate" noise impacts. Receptors 25 and 28 represent 7 neighborhood residences, 1 mobile home, and 1 business. Due to lack of development along the corresponding roadway links, receptors 29, 31, and 32 are "representative receptors" set at 25 feet from proposed right-of-way.

## III. ANALYSIS OF ALTERNATIVE NOISE ABATEMENT MEASURES

In accordance with 23 CFR Part 772, alternative noise abatement measures for reducing or eliminating noise impacts were evaluated. Abatement measures considered included traffic management, change in alignment, land use and zoning, roadside plantings, and structural barriers.

### A. Traffic Management

The elimination or restriction of heavy truck traffic would reduce the overall Leq noise levels. However, the restriction of truck traffic on the Expressway would be an impractical alternative as this facility is a proposed major north-south connector serving as a bypass route for I-275 around the City of Tampa.

Lowering the operating speeds would achieve a reduction of noise levels. In order to attain a significant effect, such low travel speeds would be needed that the speed would be unacceptable to roadway users and impractical to enforce. However, as the area develops more urban character, posted speeds may be less than presently assumed for this facility.

### B. Change in Alignment

To achieve a 3-4 dBA reduction, the distance between the source and receiver must be doubled. Consequently, slight shifts in alignment generally would result in only negligible reductions in noise levels.

Shifting the alignment of the proposed Expressway, if not precluded by other conditions, would generally shift the noise impact from one location to another due to the encroachment of existing land uses on both the east and west sides of the right-of-way.

C. Land Use and Zoning

The proposed action is located in an area that is rapidly suburbanizing. Therefore, to be effective, land use and zoning controls based on the results of this study would have to be initiated in the near future. Land use control measures could include the establishment of noise buffer areas and zoning to restrict land use development to that which is compatible with the Expressway. Predicted "design year" traffic-generated noise levels are presented in Figures 8 a-e. These may be used as a guide for establishing noise buffer zones or minimum setback lines through zoning and new construction restrictions. Land use and zoning controls would have to be initiated by the local planning agencies.

In urban areas, many residences and commercial establishments are in close proximity to the Expressway Alignment and may have only limited possibilities for land use and zoning controls.

D. Vegetative Barriers

To achieve a significant reduction in noise levels through use of vegetative barriers requires dense foliage at least 100 feet thick. While sufficient space exists in rural areas for such plantings, relocation of residences and businesses would be required in urban areas. Vegetative barriers would not be much more efficient than a new construction setback line in reducing future noise levels and would not provide abatement in urban areas due to lack of space.

E. Structural Barriers

A significant reduction in noise levels can be achieved through uses of structural barriers. To be effective, a barrier must be as continuous as possible. Breaks in the barrier for driveways, crossroads and other points of access severely limit noise attenuation. Because the proposed Expressway will be limited access, structural barriers could be effectively utilized along selected roadway sections.

In accordance with FHPM 7-7-3, the Florida Department of Transportation is committed to the construction of feasible noise abatement measures in the areas of receptors 6, 9, 11, 18 and where the potential for severe noise impacts exist and approachment or exceedences of criterion occurs, contingent upon the following conditions:

---Detailed noise analyses during the final design process;

---Cost-effectiveness analyses;

---Community impact regarding desires, types, heights, and locations;

---Preferences regarding compatibility with adjacent land uses, particularly as addressed by officials having jurisdiction over such land uses; and

---Safety and engineering aspects as related to the roadway user and

---the adjacent property owner.

---It is likely that the noise abatement measures for the identified noise impacted areas will be constructed if found to be feasible based on the contingencies listed above.

Receptor sites located south of Linebaugh Avenue, with a potential for severe noise impacts and noise levels in exceedences of FHWA criterion, were not considered for noise abatement due to dominant airport noise contributions.

Based on the noise analysis performed to date, there appear to be no apparent solutions available using structural barriers to mitigate the noise impacts, if any, along receptor areas 11 and 18 on the Lake LeClare Alignment. These receptors represent isolated residences and would not be feasible due to cost-effectiveness. If, upon evaluation during the final design phase of the contingency conditions listed above, it is determined that noise abatement is not feasible for a given location(s), such determination(s) will be made prior to granting approval of the reevaluation for construction advertisement. Committments regarding the exact abatement measure locations, heights, and type (or approved alternatives) will be made before the construction advertisement is approved.

## IV. CONSTRUCTION NOISE

Noise generated by construction of the proposed action may affect some land uses during the construction period. In addition to the noise control measures contained in FDOT's Standard Specifications for Road and Bridge Construction, it is recommended that the construction noise be attenuated to the extent practical by incorporating the following measures into the special provisions of the construction contract:

1. The contractor will limit construction activities requiring the use of heavy or noisy equipment to the time period between the hours of 7:00 a.m. to 6:00 p.m., unless written permission is obtained from the engineer.

2. The contractor shall not work on Sundays or legal holidays unless written permission is obtained from the engineer.

3. In the event the above restrictions are not adequate to keep construction noise to an acceptable level (as determined by the engineer), he may direct the use of other controls and abatement measures.

4. The contractor shall be informed of its responsibility for complying with local, state, and federal noise regulations and ordinances.

## V. COOPERATION WITH LOCAL OFFICIALS

Federal-Aid Highway Program Manual 7-7-1 (Process Guidelines), FHPM 7-7-5 (Public Hearing and Location/Design Approval), and FHPM 7-7-3 delegate to highway agencies the responsibility for taking measures that are prudent and feasible to assure that the location and design of highways are compatible with existing and planned land uses. The agency responsible for this project is the Florida Department of Transportation. The Department will promote compatibility between land development and the operation of the proposed

facility. To accomplish this goal, the Department will cooperate with the Metropolitan Planning Organizations and with local officials by furnishing:

(1) appropriate generalized future noise levels (for various distances from the highway improvement) for both developed and undeveloped lands or properties in the immediate vicinity of the project (Figures 7 a-e and 8 a-e)

(2) information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels (Tables 3a and 3b) and,

(3) the FHWA policy regarding land use development or changes which are initiated after issuance of FHPM 7-7-3 (described in paragraph 12c (2) of that document).

Continued coordination with local agencies and officials has been accomplished during the development of this study and a copy of this report will be provided to the Hillsborough County Planning Commission to assist them in developing compatible future land use criteria.

## 6.3 ENVIRONMENTAL IMPACT FACTORS

### 6.3.1 Air Quality

In accordance with 23 CFR 770, the project was evaluated for air quality impacts. Vehicular carbon monoxide (CO) emission factors were derived by means of EPA's Mobile 3 computer program. The Caline 3 computer program was used to project CO concentrations at specified receptors. This program was developed by the California Department of Transportation in cooperation with the Federal Highway Administration (FHWA). Caline 3 input data included site-related traffic, roadway and meteorological parameters plus the emission factors derived from Mobile 3.

Caline 3 traffic input parameters included vehicular volumes and speeds derived from a level of service "E" capacity analysis using the "Highway Capacity Manual" 1965. Demand volumes and appropriate speeds were used in those cases where traffic demand was less than the capacity of the roadway.

Meteorological parameters included a temperature of 52 degrees F and a wind speed of 1 mps and the worst wind angle. A Pasquill-Gifford stability class of 4(d) was used for peak hour projections. To account for meteorological variability over an eight-hour period, the Caline 3 model multiplies the eight-hour results by a persistence factor of 0.6 (Guidelines for Air Quality Maintenance Planning Analysis, Volume 9: Evaluating Indirect Sources, USEPA (EPA-450/475-001), Jan. 1975, p. 32).

Four possible worst case intersections were modeled. These four intersections are: the I-275 interchange (a completely free-flow interchange), the Independence Drive and Memorial Highway interchanges (tight-diamond interchanges), and the project terminus at Dale Mabry Highway.

The only existing activity adjoining the Memorial Highway interchange which would serve as a valid receptor site is a self-service gas station in the northwest quadrant.

The background CO concentration of 2.0 ppm was derived from Hillsborough County Environmental Protection Commission CO monitoring results.

The worst case intersection was also modeled for the no-build condition. All modeling results are shown in the Table 6-7.

TABLE 6-7

CARBON MONOXIDE RESULTS IN PARTS PER MILLION (PPM)

| Receptor* | One Hour | | Eight Hour | |
|---|---|---|---|---|
| | 1989 | 2010 | 1989 | 2010 |
| | NO BUILD ALTERNATE | | | |
| B | 6.0 | 5.9 | 3.8 | 3.8 |
| | EISENHOWER/WEST - LAKE LECLARE ALTERNATE | | | |
| B | 5.6 | 6.5 | 3.6 | 4.0 |
| | EISENHOWER/WEST - RAILROAD ALTERNATE | | | |
| B | 5.6 | 6.3 | 3.6 | 3.9 |

* Description of Air Receptor Sites

Receptor B: A self-service gas station in the northwest quadrant of the Memorial Highway interchange, 62 feet north of Memorial Highway and 90 feet west of Eisenhower Boulevard.

Results for all alternatives and both years are well within the National Ambient Air Quality Standards for 35 ppm for a one hour exposure and 9 ppm for an eight hour exposure. Within the existing alignment section CO concentrations will be slightly higher for the build condition than for the no build condition. This is due to the increased traffic capacity of the proposed facility, which will slightly outweigh the beneficial air quality effect of smoother traffic flow. Of course, the portion on new alignment will receive a greater impact relative to the no build condition since no build levels would be essentially nothing but background CO. However, the total CO concentration for the build condition will be considerably less in the new alignment section than along the existing alignment.

Slight increases in the pollutant level of particulates may occur during construction. This effect will be minimized by adherence to the FDOT's Standard Specifications for Road and Bridge Construction and through adherence to open burning regulations prescribed by the Florida Department of Environmental Regulation.

This project is an area where the State Implementation Plan (SIP) does not contain any transportation control measures, therefore the conformity procedures of 23 CFR 770 do not apply. Based on this air quality analysis it is concluded that this project is consistent with the SIP.

### 6.3.2 Noise

A separate report for this project entitled Noise Analysis and Study Report, dated August 1985, was prepared by the Florida Department of Transportation and is available from the District 1 Office, FDOT, Bartow, Florida. The following discussion includes summaries from the Noise Analysis and Study Report and, therefore, the Figure and Table numbers referred to therein and included herewith correspond to the content of the original report.

The noise analysis for the Recommended Alignment Alternative is discussed in a supplement (dated September 1986) to the original report and in Subsection 10.3.4.

#### 6.3.2.1 Analysis of Traffic Noise Impacts

Individual sites for acoustical and analysis were selected to determine spot impacts as well as representative conditions of adjoining land use activities. When more than one potentially sensitive site existed in an area, the site which appeared to be impacted most significantly was chosen for analysis as representative for that location. Thirty-two sites were selected to represent all of the noise sensitive areas along the project. Table 1 gives a description of these selected locations. These locations are depicted on a map in Figure 6. The receptors represent a total of 113 houses, 18 mobile homes, 1 business, 1 park, and 1 school.

# NOISE RECEPTOR SITES

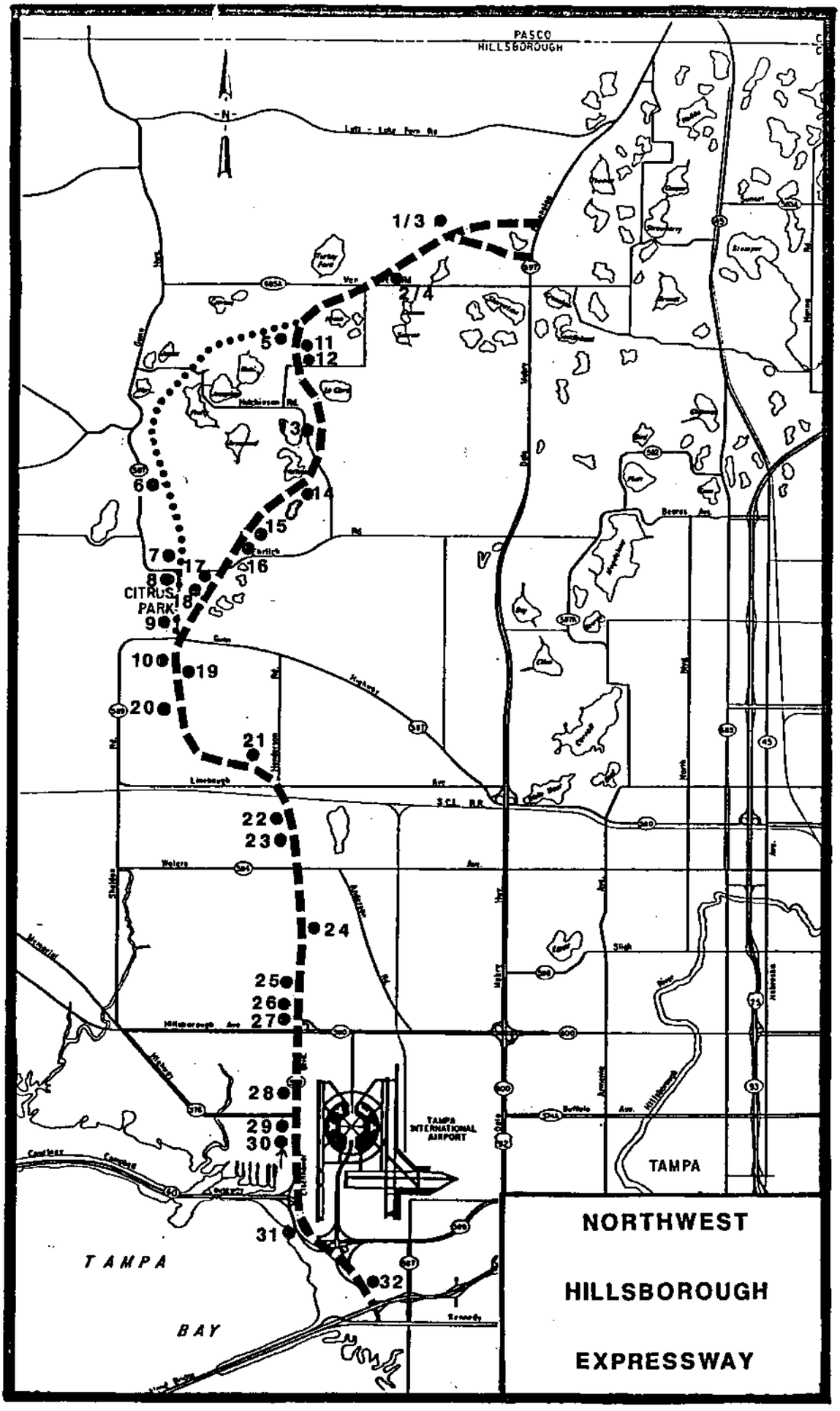





FIGURE 6

TABLE 1

NOISE RECEPTOR DESCRIPTIONS

| | | |
|---|---|---|
| 1 | Isolated Residence | 2935' N of Van Dyke Rd.<br>740' E of Darby Lane |
| 2 | Isolated Residence | 125' N of Van Dyke Rd.<br>450' W of Darby Lane |
| 3 | Isolated Residence | 2935' N of Van Dyke Rd.<br>740' E of Darby Lane |
| 4 | Isolated Residence | 125' N of Van Dyke Rd.<br>450' W of Darby Lane |
| 5 | Isolated Residence | 2025' N of LeClare Rd.<br>60' W of Tobacco Rd. |
| 6 | Mobile Home--representative of 3 mobile homes and 5 residences | 340' N of Peterson Rd.<br>853' E of Gunn Hwy. |
| 7 | Neighborhood Residence--representative of 6 residences | 40' N of Allmark St.<br>20' W of Banberry Ave. |
| 8 | Citrus Park Elementary School | 1100' S of Ehrlich Rd.<br>25' W of Gunn Hwy. |
| 9 | Mobile Home--representative of 3 mobile homes and 2 residences | 1100' N of Sheldon Rd.<br>227' W of Gunn Hwy. |
| 10 | Mobile Home--representative of 2 mobile homes | 1222' S of Sheldon Rd.<br>180' W of abandoned RR |
| 11 | Isolated Residence | 265' S of Storm Rd.<br>1172' E of Tobacco Rd. |
| 12 | Isolated Residence | 55' N of LeClare Rd.<br>950' E of Tobacco Rd. |
| 13 | Isolated Residence | 2720' N of Rawls Rd.<br>260' E of Hutchinson Rd. |
| 14 | Isolated Residence | 100' N of Rawls Rd.<br>1620' E of Willow Dale Rd. |

NOISE RECEPTOR DESCRIPTIONS (cont'd.)

| | | |
|---|---|---|
| 15 | Neighborhood Residence--representative of 4 residences | 1315' N of Ehrlich Rd.<br>690' E of Bellamy Rd. |
| 16 | Isolated Residence--representative of 2 residences | 910' N of Ehrlich Rd.<br>450' W of Bellamy Rd. |
| 17 | Neighborhood Residence--representative of 9 residences | 280' S of Ehrlich Rd.<br>280' E of Briarthorn Dr. |
| 18 | Isolated Residence | 1825' S of Ehrlich Rd.<br>35' E of Briarthorn Dr. |
| 19 | Isolated Residence--representative of 3 residences and 2 mobile homes | 1830' S of Gunn Hwy.<br>230' E of abandoned RR |
| 20 | Mobile Home--representative of 4 mobile homes | 65' N of Gardner Rd.<br>635' W of Timber Ridge Rd. |
| 21 | Isolated Residence--representative of 8 residences | 1320' N of Linebaugh Ave.<br>1830' W of Henderson Rd. |
| 22 | Neighborhood Residence--representative of 20 residences | 260' N of Martinshire Dr.<br>10' E of N. Ascot Ct. |
| 23 | Neighborhood Residence--representative of 18 residences | 1830' N of Waters Ave.<br>8' W of Twelve Oaks Blvd. |
| 24 | Mobile Home-- representative of 3 mobile homes | 254' N of Flora Ave.<br>105' E of Turnmore Dr. |
| 25 | Neighborhood Residence--representative of 7 residences | 40' S of Hanna St.<br>40' E of Southern Comfort Blvd. |
| 26 | Neighborhood Residence--representative of 5 residences | 60' N of W. Larmon St.<br>105' W of Southern Comfort Blvd. |
| 27 | Neighborhood Residence--representative of 15 residences | 485' N. of Hillsborough Ave.<br>40' W of Southern Comfort Blvd. |

NOISE RECEPTOR DESCRIPTIONS (cont'd.)

| | | |
|---|---|---|
| 28 | Mobile Home--representative of 1 mobile home and 1 business | 70' N of Eleanor Dr.<br>80' W of Eisenhower Blvd. |
| 29 | Representative Receptor--<br>25' from R-O-W | 730' N of Independence Pkwy.<br>105' W of Eisenhower Blvd. |
| 30 | Skyway Park | East end of N tennis court |
| 31 | Representative Receptor--<br>25' from R-O-W | 400' S of Fish Creek Crossing<br>25' W of R-O-W |
| 32 | Representative Receptor--<br>25' from R-O-W | 616' N of Cypress St.<br>25' E of R-O-W |

6.3.2.1.1 Prediction Methods

Future noise levels at the selected modeling sites were calculated using the Federally approved STAMPLOT computer noise prediction model. This model was applied to 1989 (initial year of operation) and 2010 (design year) traffic volumes for all four alternates; Railroad Alignment - North Terminus, Railroad Alignment - South Terminus, Lake LeClare - North Terminus, and Lake LeClare - South Terminus. An analysis of the "NO-BUILD" alternate is also presented.

All noise levels in this report are expressed in dBA, which is the decible (dB) level measured on the A scale. The A scale most closely approximates the frequency response of the human ear. These noise levels are presented as Leq, which is the equivalent steady - state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same period.

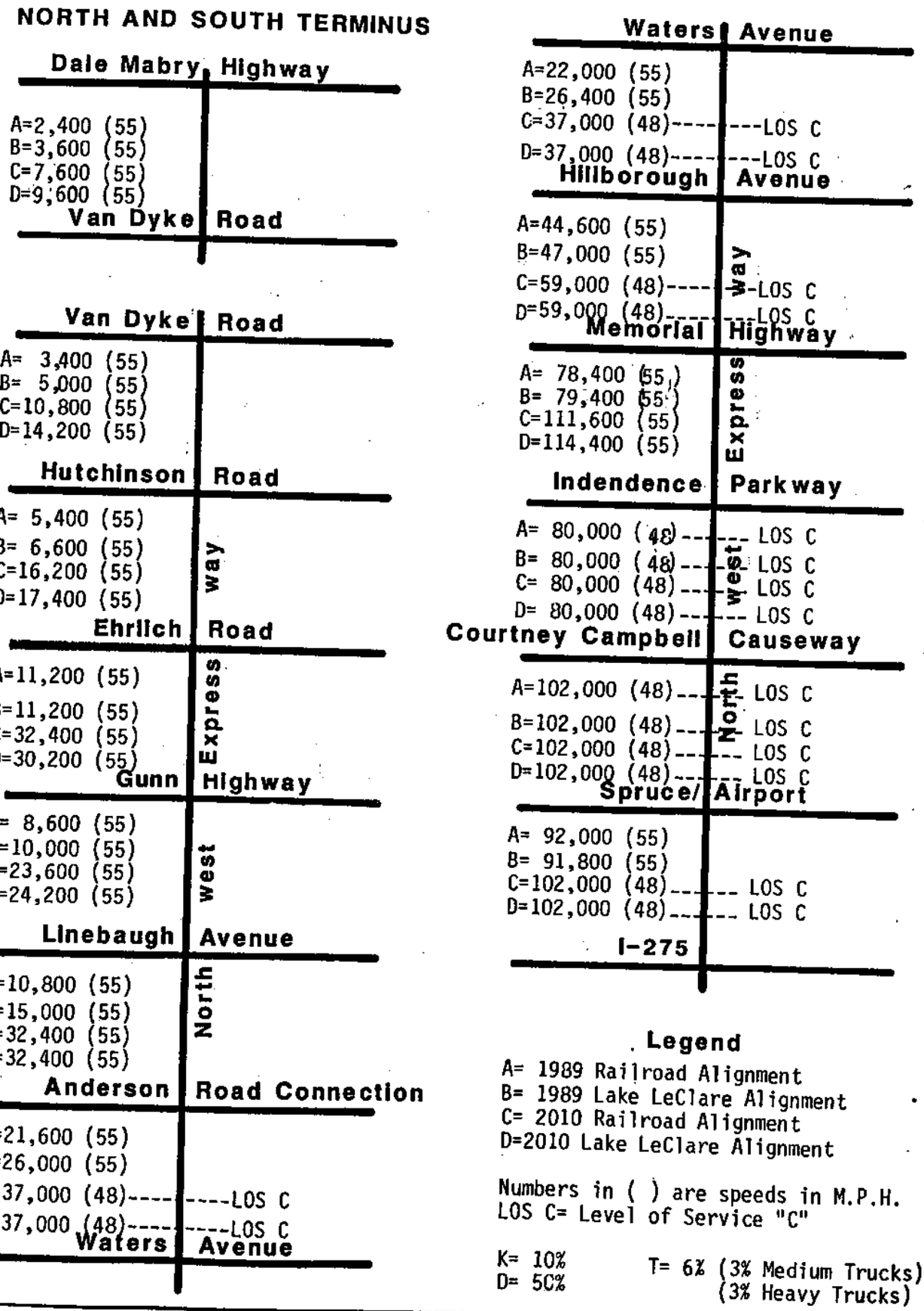
Field measurements were taken in accordance with FHWA guidelines contained in Report No. DP-45-1R, "Sound Procedures for Measuring Highway Noise: Final Report", to validate the model. Measurements taken excluded airport noise contributions. Existing traffic noise levels were sampled using a General Radio Noise Meter Type 1565-B. Calibration checks were performed before and after each sampling period to assure meter accuracy by using a General Radio Sound-level Calibrator Type 1562-A. The model was found to be consistent with collected field test results with projections within one (1) dBA of actual measurements. Therefore, the STAMPLOT model was determined to be valid for future projections of highway traffic noise levels along this project.

Computer input data for the STAMPLOT noise model included traffic volumes and speeds representing Level of Service "C" or demand traffic, whichever was lower. Level of Service "C" is generally acknowledged as being the noisiest, worst case, traffic condition.

Predicted traffic volumes, traffic, mix, and vehicle speeds presented in Figure 9 were utilized in the models. Roadway links were established from intersection to intersection in order to reflect differing traffic parameters.

The Federal Aid Highway Program Manual (FHPM) 7-7-3, "Procedures for Abatement of Highway Traffic Noise", establishes FHWA's guidelines for the use of abatement consistent with appropriate land uses. These guidelines are presented in Table 2, Noise Abatement Criteria. When noise abatement criteria are predicted to be approached or exceeded, FHPM 7-7-3 requires consideration of noise abatement measures which might reduce or eliminate the projected noise impacts. The abatement criterion of 67 dBA (Leq)

# A.D.T. TRAFFIC PROJECTIONS




**Legend**

A= 1989 Railroad Alignment
B= 1989 Lake LeClare Alignment
C= 2010 Railroad Alignment
D=2010 Lake LeClare Alignment

Numbers in ( ) are speeds in M.P.H.
LOS C= Level of Service "C"

K= 10%
D= 50%

T= 6% (3% Medium Trucks)
(3% Heavy Trucks)



Figure 9

NOISE ABATEMENT CRITERIA

| Activity Category | $L_{eq}$ | Description of Activity Category |
|---|---|---|
| A | 57 dBA (Exterior) | 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 area is to continue to serve its intended purpose. |
| B | 67 dBA (Exterior) | Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals. |
| C | 72 dBA (Exterior) | Developed lands, properties, or activities not included in Categories A or B above. |
| D | --- | Undeveloped lands. |
| E | 52 dBA (Interior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. |

SOURCE: Department of Transportation, Federal Highway Administration Highway Noise Control Standards and Procedures FHPM 7-7-3.

TABLE 2

for Activity Category B is applicable to all the noise receptors modeled for this proposed project, with the exception of Receptor #28 which, as a representative of 1 commercial use, has abatement criterion of 72, dBA.

Ambient noise levels for the proposed project north of Linebaugh Avenue were based on 1985 field measured noise levels taken at selected sites along the project corridor to assess the impacts at corresponding receptor locations. The data from 6 representative ambient measuring stations were used to formulate the ambient levels presented in Table 3a. These existing noise levels were measured as representative of "general" ambient noise levels in order to assess the relative magnitude of noise increases imposed by the proposed project. These ambient levels were used only as an "indicator" of impacts on this section of new alignment. In order to be conservative, impact ratings for predicted noise levels were based on the lowest ambient level per receptor location.

The noise abatement south of Linebaugh Avenue is dominated by noise levels created by aircraft operations. Airport noise contours generated from a report by the Hillsborough County Airport Authority (HCAA) entitled Tampa International Airport Noise Study, November 1983, are presented in Figure 11. The study concluded that because the background noise levels in the study area were generally low, aircraft noise within the Ldn 65 contour was the most dominant environmental noise factor. Therefore, noise levels were interpolated from the contours in Figure 11 based on receptor locations and used as ambient conditions, as shown in Table 3b, to assess noise impacts. Because of these relatively high ambient noise levels, Table 3b shown an adjusted Leq value for each receptor affected by airport induced noise in order to better assess the additional impacts imposed by highway related activities. Adjusted Leqs were formulated by decibel addition. Ldn values are used as the noise descriptor for the airport noise contours. Ldn is a logarithmic average of sound levels in dBA based upon a 24-hour Equivalent Sound Level (Leq) and is weighted to account for increased noise sensitivity between 10:00 p.m. and 7:00 a.m., with a 10 dBA penalty applied to noise events during the nighttime period. By application of reduced traffic volumes during these same hours to the logarithmic effect that traffic volumes have upon noise levels, it is possible to use the Leq values projected by the STAMPLOT model as the equivalent Ldn levels provided in the Airport Noise Study and to compare the values directly.

# Ldn AIRPORT NOISE CONTOURS 1982

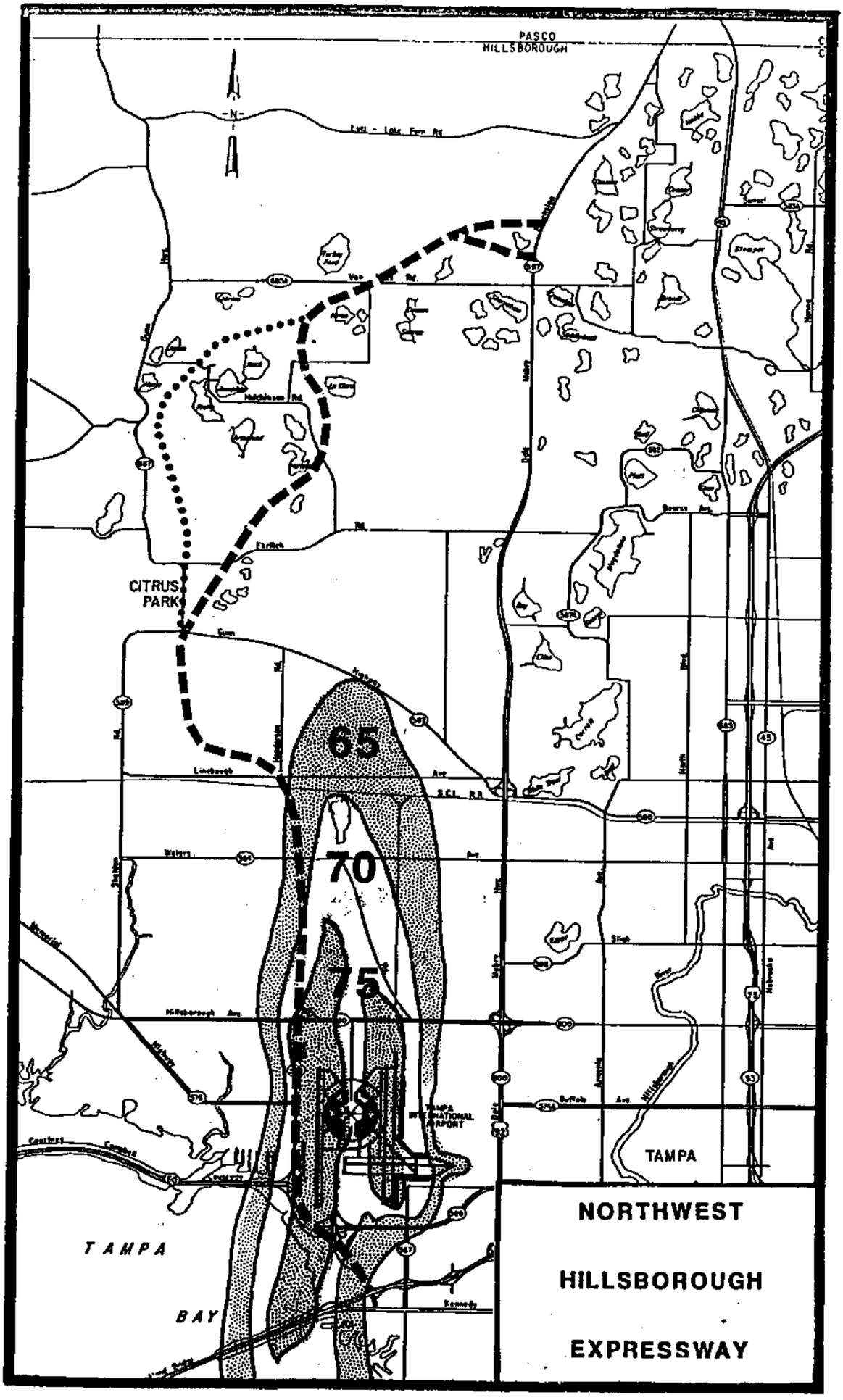





FIGURE 11

# Predicted Leq (dBA) Noise Levels

| Receptors | Distance from Near Lane (Ft.) | 1985 Measured Noise Level | FHWA Criterion | 1989 Noise Levels | | 2010 Noise Levels | |
|---|---|---|---|---|---|---|---|
| | | | | Railroad | Lake LeClare | Railroad | Lake LeClare |
| 1 | 760 | 47-50 | 67 | 46 | 48 | 51 | 52 |
| 2 | 193 | 47-50 | 67 | 54 | 55 | 59 | 60 |
| 3 | 610 | 47-50 | 67 | 47 | 49 | 52 | 53 |
| 4 | 187 | 47-50 | 67 | 54 | 56 | 59 | 60 |
| 5 | 50 | 51-53 | 67 | 59 | - | 64 | - |
| 6 | 65 | 51-53 | 67 | 62 | - | 67 | - |
| 7 | 120 | 51-53 | 67 | 60 | - | 65 | - |
| 8 | 230 | 51-53 | 67 | 60 | - | 64 | - |
| 9 | 180 | 51-53 | 67 | 61 | - | 66 | - |
| 10 | 232 | 51-53 | 67 | 60 | - | 64 | - |
| 11 | 130 | 53-55 | 67 | - | 63 | - | 68 |
| 12 | 95 | 53-55 | 67 | - | 61 | - | 66 |
| 13 | 69 | 53-55 | 67 | - | 61 | - | 65 |
| 14 | 125 | 53-55 | 67 | - | 62 | - | 65 |
| 15 | 385 | 53-55 | 67 | - | 55 | - | 59 |
| 16 | 195 | 53-55 | 67 | - | 53 | - | 58 |
| 17 | 180 | 53-55 | 67 | - | 61 | - | 65 |
| 18 | 110 | 53-55 | 67 | - | 65 | - | 69 |
| 19 | 155 | 55-57 | 67 | 61 | 62 | 66 | 66 |
| 20 | 100 | 55-57 | 67 | 64 | 65 | 68 | 69 |
| 21 | 215 | 60-65 | 67 | 59 | 65 | 64 | 68 |
| 22 | 655 | 60-65 | 67 | 51 | 52 | 56 | 56 |
| 23 | 842 | 60-65 | 67 | 52 | 52 | 53 | 53 |



Table 3a

Table 3b

# Predicted Leq (dBA) Noise Levels

| Receptors | Distance from Near Lane (Ft.) | FHWA Criterion | 1985 Noise Level with Airport Contribu-tions | 1989 Noise Levels | | | | 2010 Noise Levels | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Railroad | Railroad* Adjusted | Lake LeClare | Lake* LeClare Adjusted | Railroad | Railroad* Adjusted | Lake LeClare | Lake* LeClare Adjusted |
| 24 | 222 | 67 | 72 | 64 | 73 | 65 | 73 | 65 | 73 | 65 | 73 |
| 25 | 102 | 67 | 72 | 75 | 77 | 76 | 78 | 75 | 77 | 76 | 78 |
| 26 | 120 | 67 | 73 | 67 | 74 | 68 | 74 | 67 | 74 | 68 | 74 |
| 27 | 144 | 67 | 73 | 66 | 74 | 67 | 74 | 67 | 74 | 67 | 74 |
| 28 | 154 | 67,72 | 73 | 73 | 76 | 73 | 76 | 73 | 76 | 73 | 76 |
| 29 | 190 | 72 | 69 | 75 | 76 | 75 | 76 | 76 | 77 | 76 | 77 |
| 30 | 150 | 67 | 69 | 72 | 74 | 72 | 74 | 72 | 74 | 72 | 74 |
| 31 | 135 | 72 | 75 | 74 | 78 | 74 | 78 | 74 | 78 | 74 | 78 |
| 32 | 125 | 72 | 69 | 76 | 77 | 76 | 77 | 75 | 76 | 75 | 76 |

* Adjusted due to Airport Noise Contribution

6.3.2.1.2 Results of Noise Analysis

Computer output data is presented in Table 3a and 3b. Receptors 5-10 refer exclusively to the Railroad Alignment while receptors 11-18 refer exclusively to the Lake LeClare Alignment. All other receptors are common to both alignments but with varying impacts based on the applied traffic parameters of either the Railroad Alignment or Lake LeClare Alignment.

In regard to planned, designed, and programmed developments, both alignments pass a proposed site for a senior high school at Van Dyke and Tobacco Roads. No noise impacts or criteria exceedances are expected to occur at this location based on the noise contours. Criteria exceedance of 67 dBA Leq will occur within a 62 foot distance from the center of near lane for the Railroad Alignment and within 76 feet for the Lake LeClare Alignment. Both these distances will be within the proposed right-of-way of either alignment.

1. Present vs. "NO-BUILD" Alternative

The "NO-BUILD" alternative includes the existing Eisenhower Boulevard with no modifications. Eisenhower Boulevard is a 4 and 6-lane predominently rural design divided highway. Under a "NO-BUILD" condition, noise levels will increase 4 dBA by the year 2007 on this roadway due to normal traffic growth. This prediction is based on a preliminary noise assessment presented in the Northwest Hillsborough Expressway Phase 1 - Corridor Report, January 1982. Based on the measured existing noise level presented in the report, 70 dBA, this increase of 4 dBA will have a minor noise impact.

2. North Terminus vs. South Terminus

Noise level differences between the north terminus alignment, receptors 1 and 2, and south terminus alignment, receptors 3 and 4, for both the Railroad and Lake LeClare Alignments, 1989 and 2010 predictions, only reflect a variance of 0-1 dBA. No criterion exceedences will be encountered on either alignment or justifying one favorable alignment over the other based solely on noise impacts. Noise levels are 1-2 dBA higher overall for the Lake LeClare Alignment due to differing traffic parameters. Based on ambient noise levels, receptors 1-4 are predicted to experience a minor impact on either alignment in 1989 and 2010 due to increased traffic growth.

3. Railroad Alignment

Exclusive Railroad Alignment receptors 5-10 are predicted to experience minor impact in both 1989 and 2010, with the exception of receptors 6 and 9 in 2010. Receptor 6 will reach criterion level of 67 dBA in 2010 and account for a substantial impact. This receptor is a mobile home representative of 3 mobile homes and 5 residences. Receptor 9, a mobile home representative of 3 mobile homes and 2 residences, will approach criterion within 1 dBA in 2010 and also account for a substantial impact. However, by 2010 the rapid urbanization presently occuring within this area of Tampa urban limits will increase existing ambient noise levels and lessen the relative severity of future traffic noise impacts. All other receptors are below criterion level.

4. Lake LeClare Alignment

Exclusive Lake LeClare alignment receptors 11-18 are predicted to experience minor impact in 1989. The only criterion approachment will occur at receptor 18, which will be within 2 dBA of criterion. In 2010, receptor 12-17 will receive minor impact. Receptor 13 and 14, isolated residences, and 17, a neighborhood residence representative of a residence will approach criterion within 2 dBA. Receptor 12, an isolated residence, will approach within 1 dBA. Receptor 15 and 16 will not approach criterion level. Receptor 11 will exceed criterion by 1 dBA and receptor 18 will exceed by 2 dBA in 2010. Both receptors are isolated residences. Noise impacts will be substantial at both locations due to increased traffic volumes. However, as stated earlier, the present urbanization trend will mask the severity of impacts by 2010.

5. Railroad/Lake LeClare Common Alignment

South of Gunn Highway all receptors, 19-32, are located on common alignment with only traffic parameters differentiating noise impacts.

Predicted noise levels for receptor 19 will be considered a minor impact on both alignments in 1989 and 2010. Receptor 19 will approach criterion by 1 dBA on both alignments in 2010. Receptor 20 will approach criterion by 2 dBA in 1989 on the Lake LeClare Alignment and will exceed criterion in 2010 by 1 dBA on the R.R. Alignment and by 2 dBA on the LeClare Alignment. This is considered a substantial impact.

Receptor 21 is predicted to encounter no-impact and will not approach or exceed criterion on the Railroad Alignment in both years. On the Lake LeClare Alignment, receptor 21 will approach criterion by 2 dBA in 1989 and exceed criterion by 1 dBA in 2010. This will be a minor impact in both years based on ambient levels.

Receptors 22 and 23 will encounter no impact and no criterion exceedences on either alignment for 1989 and 2010.

Receptors 24-32 reflect an adjusted Leq value for predicted noise levels due to the addition of significant airport noise contributions. All these receptors currently have an ambient noise level in excess of FHWA criterion. With these adjusted values, all receptors exceed criterion by 6-11 dBA on both alignments in 1989 and 2010. However, these impacts are not considered substantial based on higher ambient levels of 69-73 dBA from airport operations.

All adjusted Leq noise levels are identical for both alignments with the exceptiton of receptor 25 which is 1 dBA higher on the Lake LeClare Alignment.

Receptor 24, which is representative of 3 mobile homes, will experience a minor impact in 1989 and 2010. Receptors 26, 27, and 30 will encounter a minor impact in both years. Receptors 26 and 27 represent 20 neighborhood residents. Receptor 30 is Skyway Park. Although receptors 25, 28, 29, 31, and 32 are predicted to receive greater noise impacts than receptors 24, 26, 27, and 30, the roadway related impact is still considered minor due to the substantial noise contribution from aircraft operations. Receptors 25 and 28 represent 7 neighborhood residences, 1 mobile home, and 1 business. Due to lack of development along the corresponding roadway links, receptors 29, 31, and 32 are "representative receptors" set at 25 feet from proposed right-of-way.

6.3.2.2 Analysis of Alternative Noise Abatement Measures

In accordance with FHPM 7-7-3, alternative noise abatement measures for reducing or eliminating noise impacts were evaluated. Abatement measures considered included traffic management, change in alignment, land use and zoning, roadside plantings, and structural barriers.

A. Traffic Management

The elimination or restriction of heavy truck traffic would reduce the overall Leq noise levels. However, the restriction of truck traffic on the Expressway would be an impractical alternative as this facility is a proposed major north-south connector serving as a bypass route for I-275 around the City of Tampa.

Lowering the operating speeds would achieve a reduction of noise levels. In order to attain a significant effect, such low travel speeds would be needed that the speed would be unacceptable to roadway users and impractical to enforce. However, as the area develops more urban character, posted speeds may be less than presently assumed for this facility.

B. Change in Alignment

To achieve a 3-4 dBA reduction, the distance between the source and receiver must be doubled. Consequently, slight shifts in alignment generally would result in only negligible reductions in noise levels.

Shifting the alignment of the proposed Expressway, if not precluded by other conditions, would generally shift the noise impact from one location to another due to the encroachment of existing land uses on both the east and west sides of the right-of-way.

C. Land Use and Zoning

The proposed action is located in an area that is rapidly suburbanizing. Therefore, to be effective, land use and zoning controls based on the results of this study would have to be initiated in the near future. Land use control measures could include the establishment of noise buffer areas and zoning to restrict land use development to that which is compatible with the Expressway. Land use and zoning controls would have to be initiated by the local planning agencies. To aid this process, FDOT will send a copy of the final noise study report to the local planning agencies.

In urban areas, many residences and commercial establishments are in close proximity to the Expressway Alignment and may have only limited possibilities for land use and zoning controls.

D. Vegetative Barriers

To achieve a substantial reduction in noise levels through use of vegetative barriers requires dense foliage at least 100 feet thick. While sufficient space exists in rural areas for such plantings, relocation of residences and businesses would be required in urban areas. Vegetative barriers would not be much more efficient than a new construction setback line in reducing future noise levels and would not provide abatement in urban areas due to lack of space.

E. Structural Barriers

A substantial reduction in noise levels can be achieved through uses of structural barriers. To be effective, a barrier must be as continuous as possible. Breaks in the barrier for driveways, crossroads and other points of access severely limit noise attenuation. Because the proposed Expressway will be limited access, structural barriers could be effectively utilized along selected roadway sections.

In accordance with FHPM 7-7-3, the Florida Department of Transportation is committed to the construction of feasible noise abatement measures where the potential for severe noise impacts exist and approachment or exceedences of criterion occurs, contingent upon the following conditions:

Detailed noise analyses performed prior to final approval;

Cost-effectiveness analyses;

Community impact regarding desires, types, heights, and locations;

Preferences regarding compatibility with adjacent land uses, particularly as addressed by officials having jurisdiction over such land uses; and

Safety and engineering aspects as related to the roadway user and the adjacent property owner.

It is likely that noise barriers will be constructed if found to be feasible based on the contingencies listed above.

Receptor sites located south of Linebaugh Avenue, with a potential for substantial noise impacts and noise levels in exceedences of FHWA criterion were not considered for noise abatement due to dominant noise contributions. The only sites with substantial roadway related noise impacts are sites 6, 9, 11, 18, and 20.

Based on the noise analysis performed to date, there appear to be no practicable solutions available using structural barriers to mitigate the noise impacts along receptor areas 11 and 18 on the Lake LeClare Alignment. Because these receptors represent isolated residences, noise barriers would not be cost-effective. Therefore, it is likely that noise barriers will be constructed only at sites 6, 9, and 20. Commitments regarding the eaxct abatement measure locations, heights, and type (or approved alternatives) will be made before the construction advertisement is approved.

6.3.2.3 Construction Noise

Noise generated by construction of the proposed action may affect some land uses during the construction period. In addition to the noise control measures contained in FDOT's Standard Specifications for Road and Bridge Construction, it is recommended that the construction noise be attenuated to the extent practical by incorporating the following measures into the special provisions of the construction contract:

1. The contractor will limit construction activities requiring the use of heavy or noisy equipment to the time period between the hours of 7:00 a.m. to 6:00 p.m., unless written permission is obtained from the engineer.

2. The contractor shall not work on Sundays or legal holidays unless written permission is obtained from the engineer.

3. In the event the above restrictions are not adequate to keep construction noise to an acceptable level (as determined by the engineer), he may direct the use of other controls and abatement measures.

6.3.2.4 Cooperation with Local Officials

The agency responsible for taking measures that are prudent and feasible to assure that the location and design of highways are compatible with existing and planned land uses for this project is the Florida Department of Transportation. The Department will promote compatibility between land development and the operation of the proposed facility. To accomplish this goal, the Department will cooperate with the Metropolitan Planning Organization and with local officials by furnishing:

(1) appropriate generalized future noise levels (for various distances from the highway improvement) for both developed and undeveloped lands or properties in the immediate vicinity of the project,

(2) information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels and,

(3) the FHWA policy regarding land use development or changes which are initiated after issuance of FHPM 7-7-3.

Continued coordination with local agencies and officials has been accomplished during the development of this study and a copy of the noise study will be provided to the Hillsborough County Planning Commission to assist them in developing compatible future land use criteria.

## 6.3.3 Wild and Scenic Rivers

There are no designated wild or scenic rivers in the area impacted by the proposed project.

## 6.3.4 Farmlands

Through coordination with the Soil Conservation Service, it has been determined that no farmlands as defined by 7 CFR 658 are located in the project vicinity.

process when more detailed plans for the project are available it is anticipated that discussions of design consideration, including mitigation plans, will be conducted with each of the agencies listed above so that a single mitigation plan will be coordinated to satisfy all agency concerns.

### 10.3.4 Noise

A supplement to the Noise Analysis and Study Report, dated August 1985, was prepared by the Florida Department of Transportation and is available from the District 1 Office, FDOT, Bartow, Florida. The document is entitled Supplemental Noise Analysis and Study Report, dated September 1986. The following discussion includes summaries from the supplemental report and, therefore, the Figure and Table numbers referred to therein and included in this report correspond to the content of the original report.

#### 10.3.4.1 Noise Sensitive Sites

The potential impact of the proposed Recommended Alignment on noise sensitive sites was reevaluated due to minor shifts in alignment. Because of this shifting, some of the original noise sensitive sites which were chosen for analyses are now displaced. One receiver, Receptor #21, is no longer considered a valid receptor because of the shift in alignment away from its location. In these instances, the next closest receptors along this altered alignment, which would expect to experience the greatest noise impacts, were chosen for analyses. The remaining original receivers, which still are valid noise sensitive sites, may or may not reflect a change in decibel impact based on their proximity to alignment changes. Table 1 gives a description of all receptors chosen for analyses and their location. Numeric descriptors for receptors represent the same receptor presented in the original Noise Study Report. Alphanumeric descriptors for receptors represent new receptors which will be impacted or receptors adjacent to original receptors which are now being displaced. For example, Receptor 14A represents an adjacent receptor to the original Receptor 14 which is now to be displaced by a minor alignment shift. Receptors modeled in the original report which are being displaced include receptors 14, 18, 25, 26, and 27.

The noise receptor sites depicted on the map in the original Noise Study Report can still be referenced for alphanumerically described receptors since they are located in the immediate vicinity of the original numerically described receptors.

Receptors 29, 31 and 32 have dropped from further analyses since they were arbitrary representative receptors set at 25 feet from the right-of-way line and based on information to date, no noise sensitive sites are expected to be constructed at their locations.

10.3.4.2 Results of Noise Analysis

Computer output data is presented in Tables 2 and 2a. Table 2a exhibits receptor noise impacts influenced by airport operations from the Tampa International Airport. Wherever possible, in order to establish ambient conditions, computer predicted 1985 noise levels are presented (Receptors 4, 17, 17A, 28 and 30) where modeled receptors lie adjacent to the existing alignment or adjacent to an existing roadway within the project corridor. All other receptors, which do not receive significant noise contributions from an adjacent roadway, exhibit ambient levels based on 1985 field measured noises levels to represent "general" ambient conditions.

Abatement criteria for these receptors are presented in Figure 1. Receptors which warrant abatement consideration based on noise level increases in 2010 above existing 1985 noise levels (Receptors 13, 15, 17, 18A, 19, 20 and 20A) were considered for structural barrier feasibility. Also, receivers which either appraoched or exceeded FHWA abatement criterion of 67 dBA in 2010 (Receptors 24, 24A, 24B, 25A, 26A 27A, 28 and 30) but are predicted to experience only a 0-4 dBA noise level increase from the proposed Expressway were considered for structural barrier feasibility.

Of these receivers to be analyzed, Receptors 13, 19, 24A and 24B are isolated residences. Since structural barriers are rarely cost effective for individual receivers, the receptor with the greatest impact, Receptor 13, was chosen for initial feasibility. Receptor 13 is predicted to exceed criterion by 1 dB in 2010 and experience a noise level increase of 13 dB. Since this receiver had the gratest potential for beneficial noise abatement and cost effectiveness, initial barrier feasibility was limited to this receiver.

Of the receivers influenced by airport noise levels, Receptors 24, 25A, 26A, 27A, 28 and 30, none were chosen for barrier design. The existing noise levels at these receivers were substantially high enough, 72-74 dB, that they would negate any significant abatement benefits derived from a structural barrier designed to lessen roadway contributions. Based on airport noise contribution, the best insertion loss obtainable would be 3 dB at Receptor 30 and this would not warrant the construction of a barrier wall.

10.3.4.3 Structural Barriers

Structural barrier feasibility was investigated for receivers represented by Receptors 13, 15, 17, 18A, 20 and 20A. All barrier walls investigated were modeled to be constructed of concrete and cost estimates presented are based on approximate 1985 cost figures.

Table 1

Noise Receptor Descriptions

| | | |
|---|---|---|
| 3 | Isolated Residence | 2935' N. of Van Dyke Road<br>740' E of Darby Lane |
| 4 | Isolated Residence | 125' N of Van Dyke Road<br>450' W of Darby Lane |
| 11 | Isolated Residence | 265' S of Storm Road<br>1172' E of Tobacco Rd. |
| 12 | Isolated Residence | 55' N of LeClare Road<br>950' E of Tobacco Rd. |
| 13 | Isolated Residence | 2720' N of Rawls Road<br>260' E of Hutchinson Rd. |
| 14A | Isolated Residences | 2850' E of Ballamy Road<br>2400' N of Ehrlich Road |
| 15 | Neighborhood Residence representative of 7 residences | 1315' N of Ehrlich Road<br>690' E of Bellamy Road |
| 16 | Isolated Residence-- representative of 2 residences | 910' N of Ehrlich Road<br>450' W of Bellamy Road |
| 17 | Neighborhood Residence-- representative of 5 residences | 280' S of Ehrlich Road<br>280' E of Briarthorn Dr. |
| 17A | Neighborhood Residences representative of 3 residences | 160' S of Ehrlich Road<br>990' E of Briarthorn Dr. |
| 18A | Neighborhood Residences representative of 3 residences and 2 mobile homes | 480' N of Gunn Highway<br>180' of Pulitzer Road |
| 18B | Neighborhood Residence- representative of 9 residences | 1280' S of Ehrlich Road<br>135' E of Briarthorn Dr. |
| 19 | Isolated Residence | 1830' S of Gunn Highway<br>230' E of abandoned RR |

| | | |
|---|---|---|
| 20 | Mobile Home--representative of 4 mobile homes and 3 residences | 65' N of Gardner Road<br>635' W of Timber Ridge Rd. |
| 20A | Mobile Home-representative of 4 mobile homes | 430' N of Gardner Road<br>360' W of Timber Ridge Rd. |
| 21A | Mobile Home-representative of 2 mobile homes | 1270' N of Linebaugh Ave.<br>650' E of Wilsky Road |
| 22 | Neighborhood Residence--representative of 20 residences | 260' N of Martinshire Dr.<br>10' E of N. Ascott Ct. |
| 23 | Neighborhood Residence--representative of 18 residences | 1830' N of Waters Ave.<br>8' W of Twelve Oaks Blvd. |
| 24 | Mobile Home-- representative of 2 mobile homes | 254' N of Flora Ave.<br>105' E of Turnmore Drive |
| 24A | Isolated Residence | 850' S of Waters<br>390' E of Patterson Road |
| 24B | Isolated Residence | 100' S of Sitha Road<br>35' W of Patterson Road |
| 25A | Neighborhood Residence--representative of 6 residences | 805' S of Johns Road<br>110' E of Southern Comfort Blvd. |
| 26A | Neighborhood Residence--representative of 9 residences | 60' N of Larman Street<br>175' W of Southern Comfort Blvd. |
| 27A | Neighborhood Residences--representative of 4 residences | 800' N of Hillsborough Ave.<br>185' W of Southern Comfort Blvd. |
| 28 | Mobile Home - representative of 1 Mobile Home and 1 business | 70' N of Eleanor Dr.<br>80' W of Eisenhower Blvd. |
| 30 | SKYWAY PARK | East End of Tennis Court |

TABLE 2

Predicted Leg (dBA) Noise Levels

| Receptor | Distance From Near Lane (Ft.) | 1985 Measured Noise level | Computer 1985 Pred. Noise level | 1989 Noise level | 2010 Noise level | FHWA Criterion |
|---|---|---|---|---|---|---|
| 3 | 610 | 47-50 | | 49 | 53 | 67 |
| 4 | 172 | | 58 | 56 | 60 | 67 |
| 11 | 127 | 53-55 | | 60 | 64 | 67 |
| 12 | 181 | 55-57 | | 57 | 62 | 67 |
| 13 | 130 | 55-57 | | 63 | 68 | 67 |
| 14A | 163 | 53-55 | | 60 | 64 | 67 |
| 15 | 130 | 53-55 | | 65 | 69 | 67 |
| 16 | 155 | 53-55 | | 60 | 64 | 67 |
| 17 | 100 | | 56 | 68 | 72 | 67 |
| 17A | 460 | | 59 | 59 | 63 | 67 |
| 18A | 195 | 55-57 | | 65 | 69 | 67 |
| 18B | 190 | 53-55 | | 58 | 63 | 67 |
| 19 | 110 | 53-55 | | 64 | 67 | 67 |
| 20 | 105 | 55-57 | | 67 | 71 | 67 |
| 20A | 55 | 55-57 | | 70 | 73 | 67 |
| 21A | 404 | 60-65 | | 52 | 56 | 67 |
| 22 | 700 | 60-65 | | 61 | 64 | 67 |
| 23 | 1840 | 60-65 | | 50 | 51 | 67 |

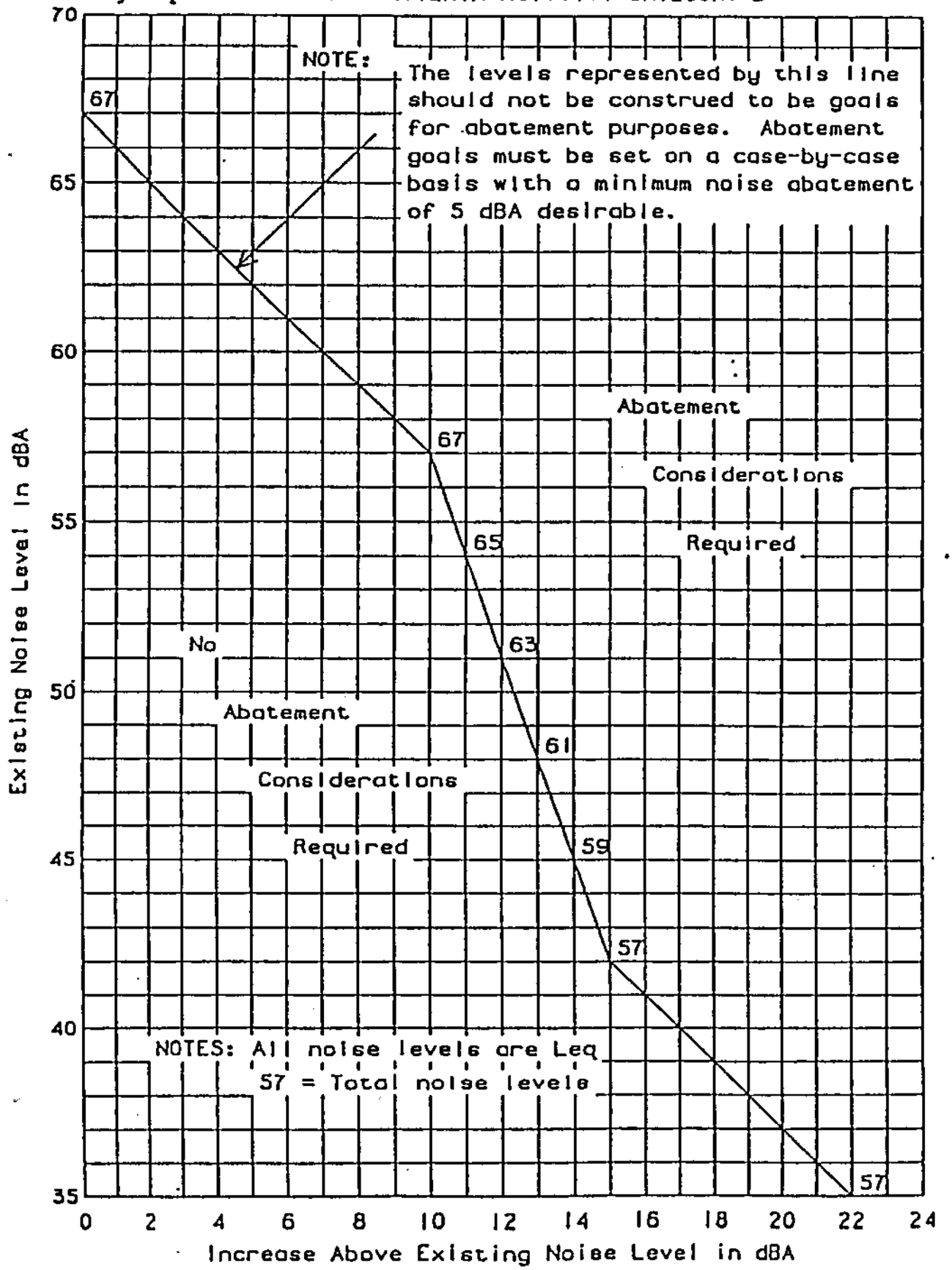
TABLE 2A

Predicted Leq (dBA) Noise Levels

| Receptor | Distance from near lane | Airport Contour noise level | 1985 Computer predicted noise level | 1989 Noise level | ADJ* | 2010 Noise level | ADJ* | FHWA Criterion |
|---|---|---|---|---|---|---|---|---|
| 24 | 190 | 72 | | 69 | 74 | 69 | 74 | 67 |
| 24A | 130 | 69 | | 67 | 71 | 67 | 71 | 67 |
| 24B | 55 | 68 | | 70 | 72 | 70 | 72 | 67 |
| 25A | 70 | 72 | | 70 | 74 | 70 | 74 | 67 |
| 26A | 140 | 73 | | 67 | 74 | 67 | 74 | 67 |
| 27A | 203 | 74 | | 61 | 74 | 61 | 74 | 67 |
| 28 | 130 | 73 | 67 | 69 | 74 | 69 | 74 | 67, 72 |
| 30 | 140 | 74 | 68 | 74 | 77 | 74 | 77 | 67 |

*Adjusted due to Airport Noise Contribution

Figure 1: ABATEMENT CRITERIA ACTIVITY CATEGORY B



Barrier Cost Summary

| Receptor | Total # Receiver Requiring Abatement Consideration | Cost | Cost/Receiver |
|---|---|---|---|
| 13 | 1 | $ 50,000 | $50,000 |
| 15 | 5 | $172,500 | $34,500 |
| 17 | 5 | $162,000 | $32,400 |
| 18A | 5 | $135,000 | $27,000 |
| 20 | 6 | $172,000 | $28,700 |
| 20A | 4 | $138,000 | $34,500 |

Cost effectiveness for barrier feasibility were based on the following formula:

$$\text{Cost Effectiveness} = \frac{\text{Cost of Abatement}}{\text{Number of Dwelling Units}} = \frac{\$25,000}{\text{Dwelling Unit}}$$

Barriers at this time do not appear to be cost effective for receivers located at Receptors 13, 15, 17, 18A, 20 and 20A. The receivers at these locations are either too spread out for feasible barrier design or, as in the case of Receptor 17, effective barrier design conflicts with the configuration of the roadway.

Based on the noise analyses performed to date there appear to be no apparent solutions available to mitigate the noise impacts at the locations identified, if any exist.