NOISE STUDY REPORT

SR 54 from Cypress Creek
to Zephyrhills East Bypass
Pasco County, Florida

Work Program Number: 7125920
State Project Number: 14504-1601
Federal Aid Project Number: RS-7810(4)

This project considers the construction of a new 2- to 6-lane divided rural roadway for SR 54 in southern Pasco County, Florida. Project limits are from Cypress Creek located ¼ mile west of I-75 to the Zephyrhills East Bypass/Chancey Road intersection on the east, a distance of approximately 14 miles. The project includes the construction of a new full directional interchange for I-75 located 2½ miles south of the existing I-75/SR 54A interchange.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

and

FLORIDA DEPARTMENT OF TRANSPORTATION
District Seven Office
Tampa, Florida

September 1989

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

The Florida Department of Transportation (FDOT) is proposing to improve State Road (SR) 54 in southern Pasco County, Florida (Figure 1-1). The proposed project considers the construction of a new 2- to 6-lane rural highway referred to as the SR 54 extension or SR 54 and the improvement of a 0.76 mile segment of U.S. 301. In accordance with the Federal Aid Highway Program Manual, Volume 7, Chapter 7, Section 3 (FHPM 7-7-3), Procedures for Abatement of Highway Traffic Noise and Construction Noise, an assessment of noise impacts was conducted for this project. The purpose of this noise assessment was to determine and compare noise impacts of the proposed project alternatives on noise-sensitive sites and to evaluate measures for attenuation, if necessary.

The proposed roadway will extend from Cypress Creek on the west to the Zephyrhills East Bypass on the east, a distance of approximately 14 miles (Figure 1-2). This distance includes the 0.76 mile segment of U.S. 301 which extends from the proposed SR 54 intersection with U.S. 301 north to the Zephyrhills East Bypass/Chancey Road intersection. U.S. 301 is currently a 2-lane rural roadway located within 100 feet of existing right-of-way. There are no other existing highways in the remaining portion of the alignment except for the north/south roadways which cross the proposed alignment. These roadways include I-75, CR 581, CR 579, and U.S. 301.

Three construction alternatives (Alternative Alignments 1A, 1B, and 1C) and the No-Build Alternative were considered as viable options for the proposed improvements. The approximate alignment of each of the construction alternatives are depicted in Figure 1-3. The three alternatives have a common alignment from Cypress Creek to CR 581 and from CR 579 to U.S. 301. Discussion of the development of these alignments is presented in the Preliminary Engineering Report (PER), produced in June 1989.

The proposed typical sections do not differ among construction alternatives. However, due to differences in projected traffic volumes along the project corridor, several rural typical cross sections within 250 feet of right-of-way are proposed to accommodate the 2010 design year traffic. A 4-lane rural cross section is proposed from SR 54A to I-75 west ramps, from CR 581 to CR

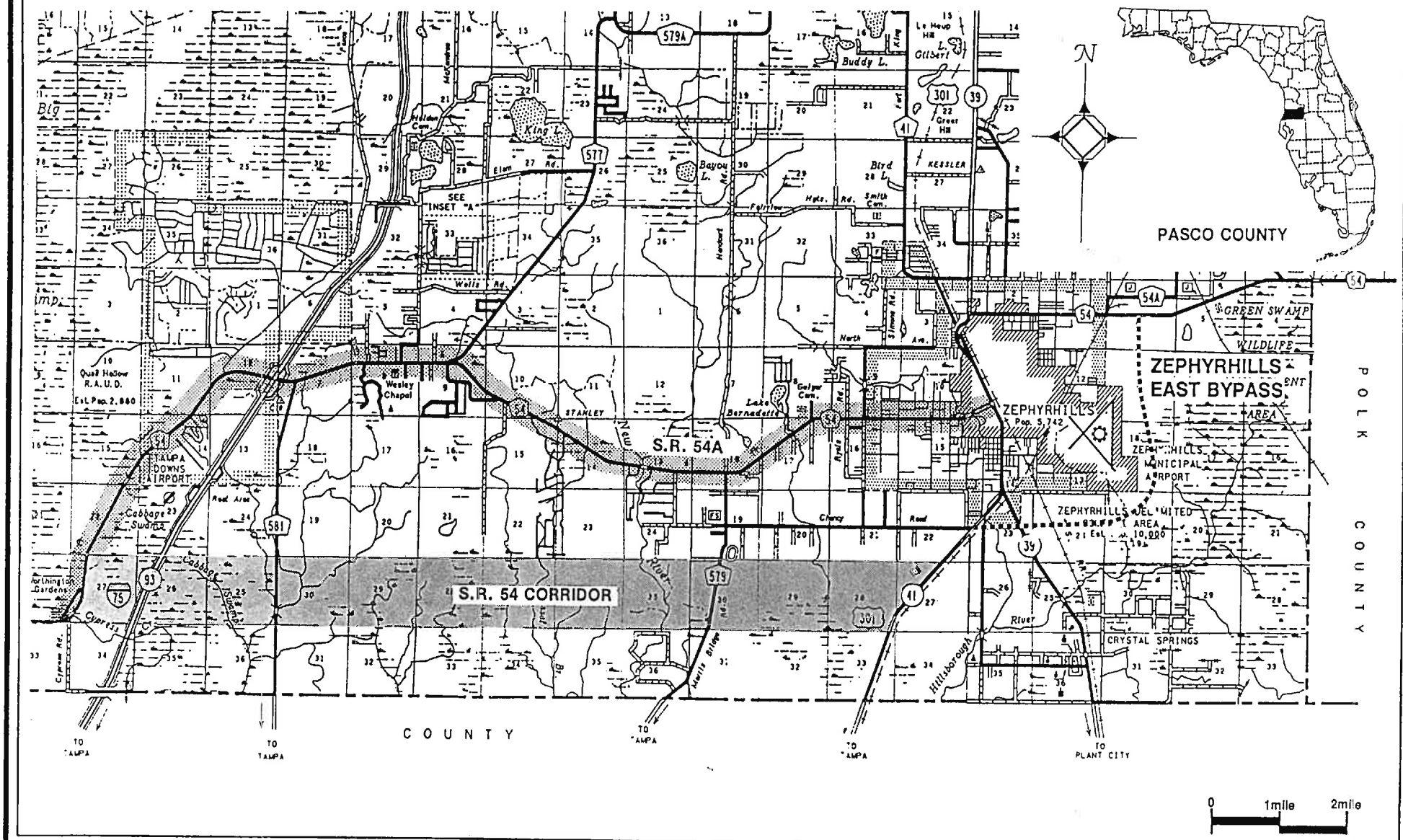


Figure 1-1
AREA LOCATION MAP

SOURCE: HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

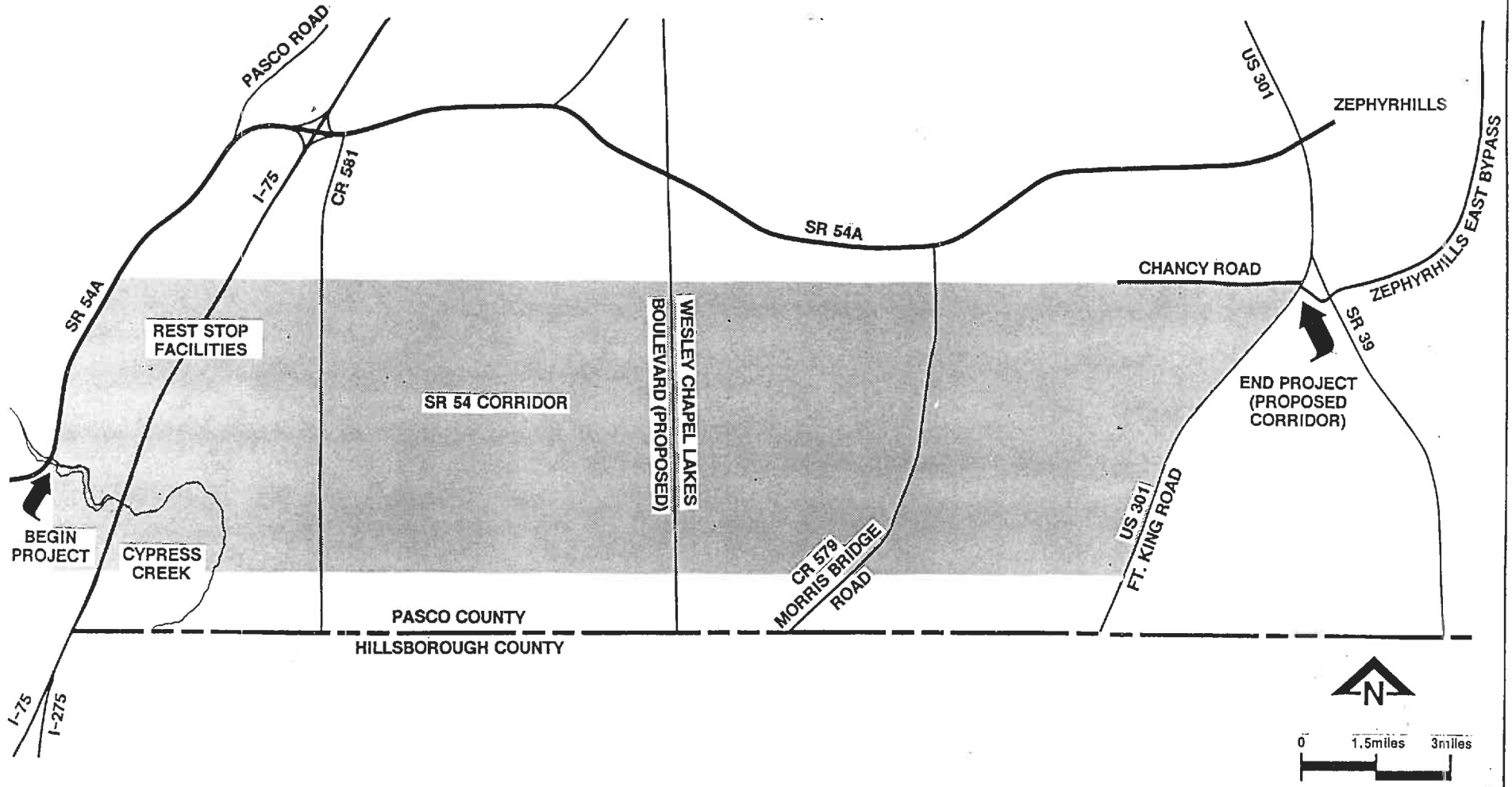


Figure 1-2
STUDY CORRIDOR

SOURCE: HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

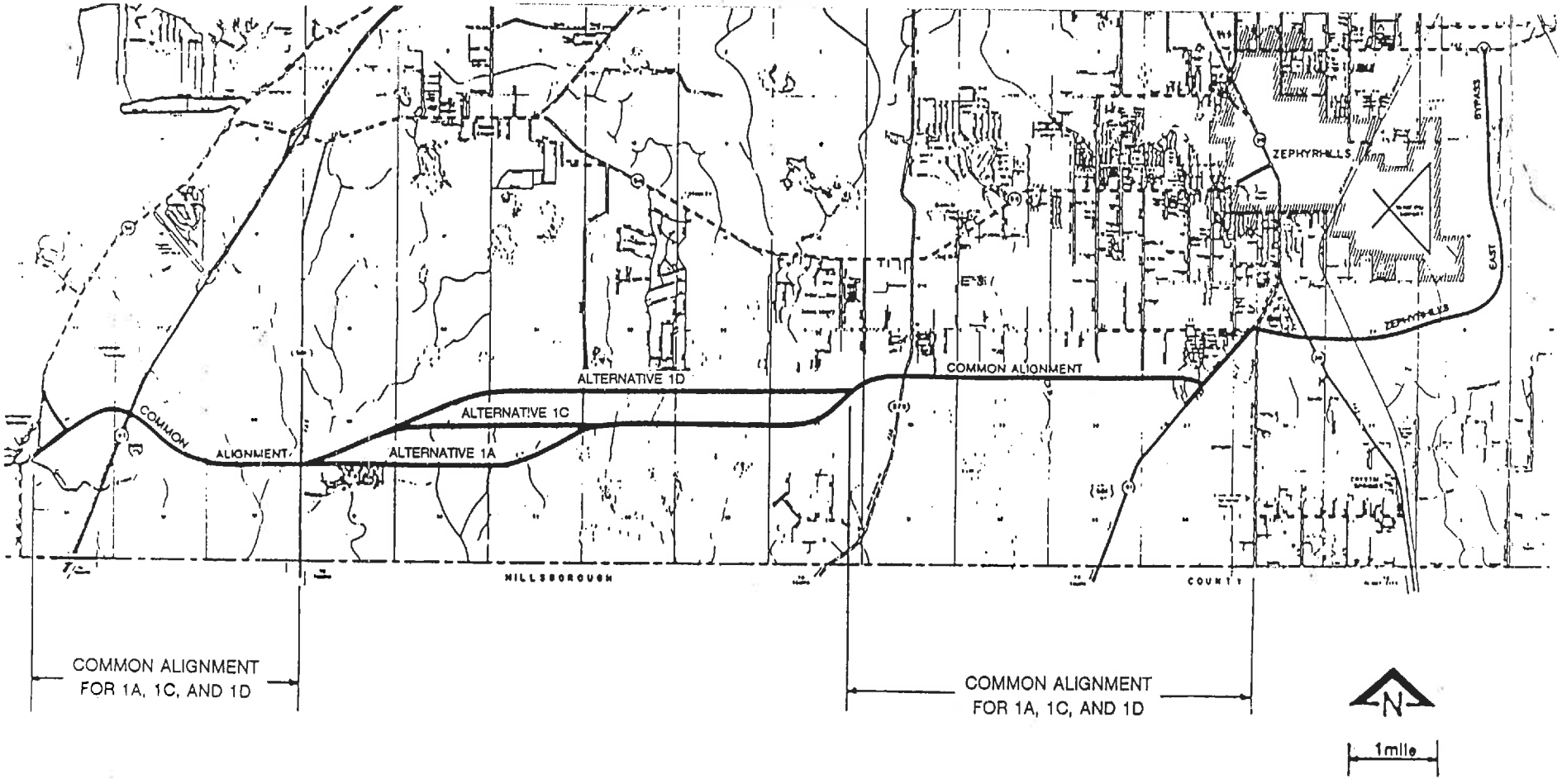


Figure 1-3
ALTERNATIVE ALIGNMENTS 1A, 1C, AND 1D

SOURCE: HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

579, and for U.S. 301 from SR 54 to the Zephyrhills East Bypass (Figure 1-4). A 6-lane rural cross section is proposed from the I-75 west ramps to CR 581 (Figure 1-5). A 2-lane rural cross section is proposed from CR 579 to U.S. 301 (Figure 1-6). The 250-foot right-of-way was selected to ultimately provide for a 6-lane divided highway.

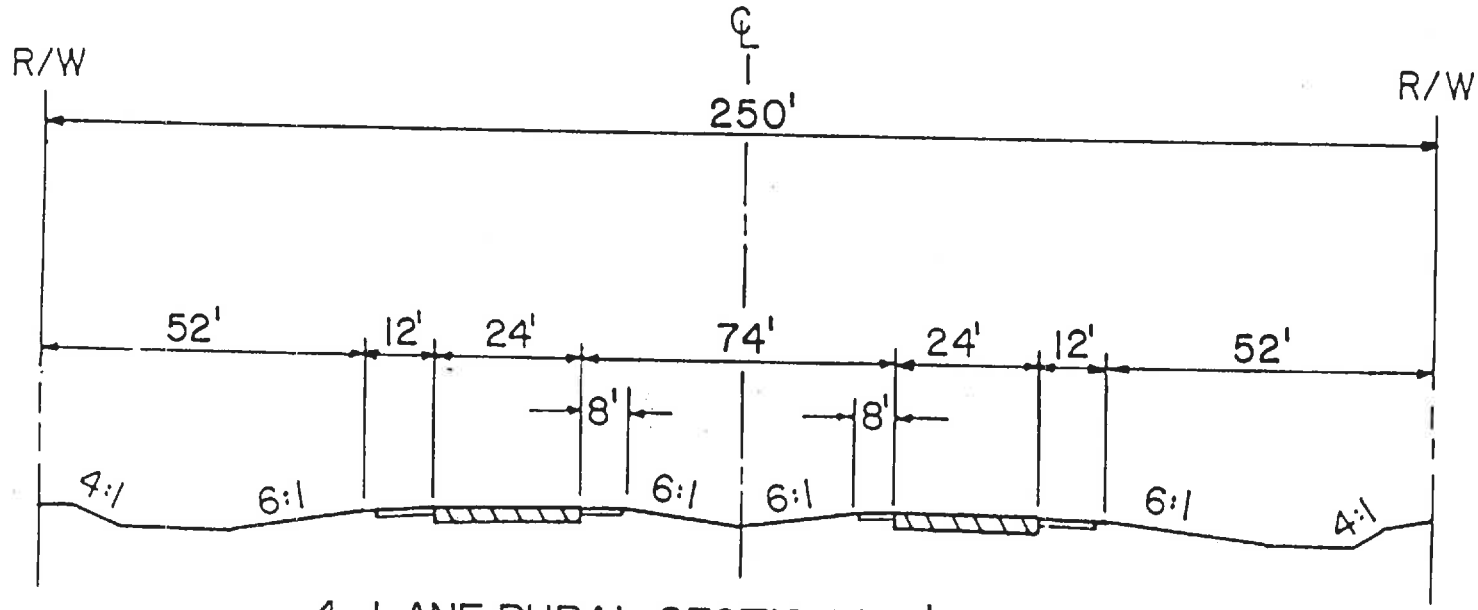
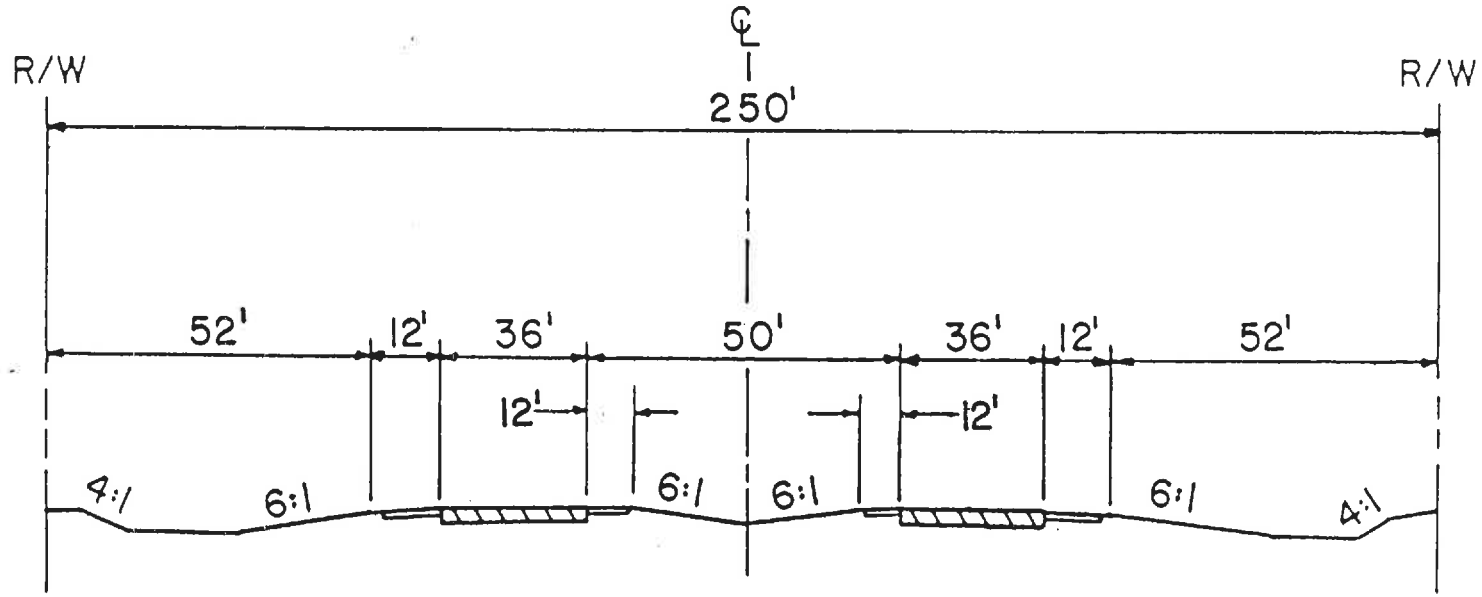


Figure 1-4
PROPOSED 4-LANE RURAL CROSS SECTION: FROM SR 54A TO I-75 WEST RAMPS, FROM CR 581 TO CR 579, AND FROM SR 54 CHANCEY ROAD

SOURCE: HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

PROPOSED TYPICAL CROSS SECTION (250' R/W)



6-LANE RURAL SECTION (50' MEDIAN)

(2010 DESIGN YEAR)

Figure 1-5
PROPOSED 6-LANE RURAL CROSS SECTION: FROM I-75 WEST RAMPS TO CR 581

SOURCE: HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

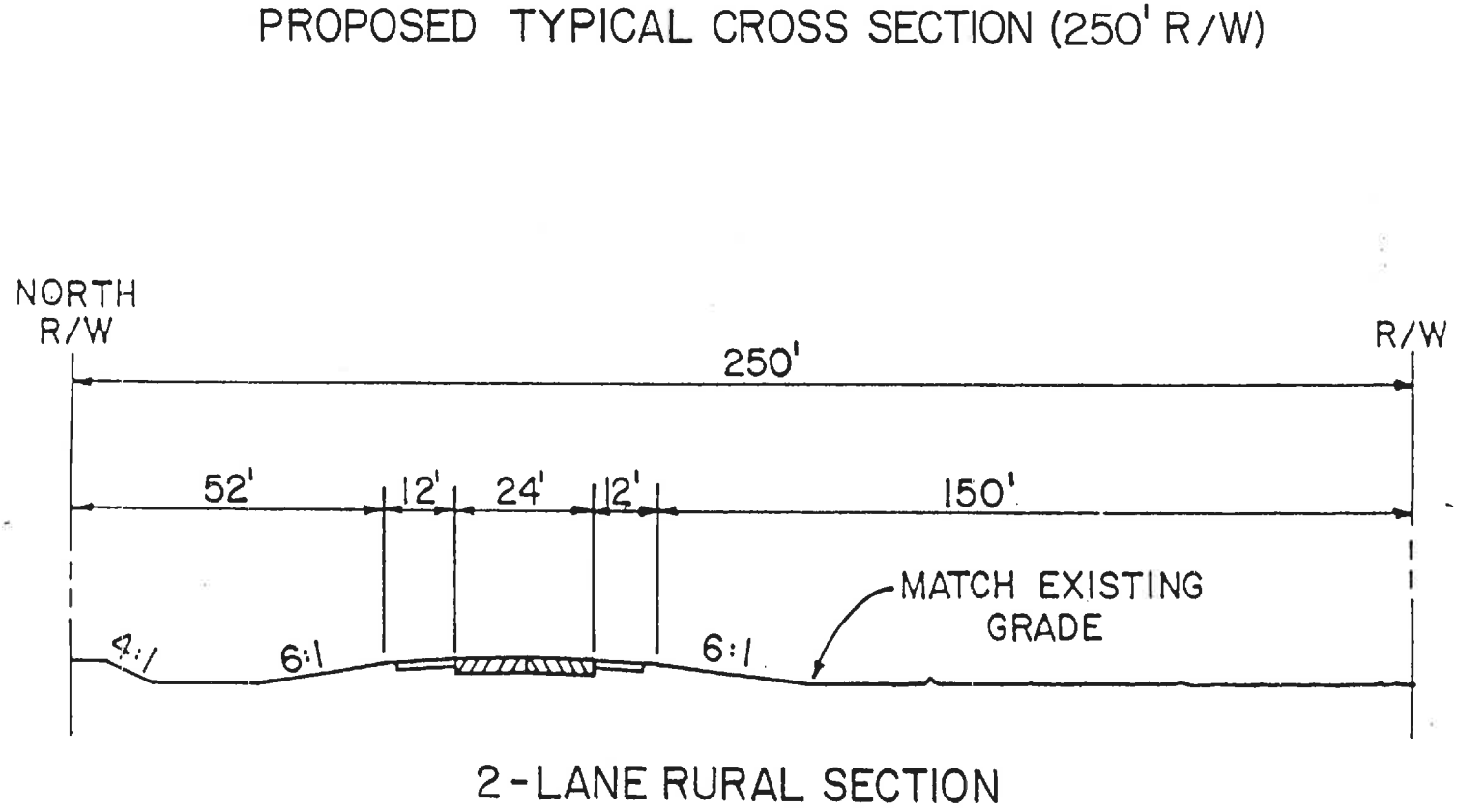


Figure 1-6
PROPOSED 2-LANE RURAL CROSS SECTION: FROM CR 579 TO U.S. 301

SOURCE: HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

2.0 LAND USE

Existing land uses within 200 feet of the proposed SR 54 corridor are mainly agricultural (i.e., pastures and citrus groves) and undeveloped lands. There are also low- to medium-density residential, commercial, and institutional land uses scattered along the project corridor (Figure 2-1). Residential developments and mobile home parks bordering the proposed alignment include the Willamsburg Subdivision, Country Crossings at Foxwood, Fox Ridge Planned Mobile Home Community, Timber Lake Estates, Terrace Park Adult Mobile Homes, Village of Tippecanoe, Riverhaven Mobile Home Park, Tropical Acre Estates, and Palm View Gardens Mobile Home Park. The Zephyrhills Correctional Institution is located southwest of the proposed SR 54/U.S. 301 intersection.

The future land use along the project corridor is toward clustered mixed use communities. Currently, five developments planned for this vicinity will border or intersect the new roadway (Figure 2-2). These developments include Wesley Chapel Lakes, Trout Creek, Oak Lake Village, Northwood, and Saddlebrook Village. The status, scope and size of each development is reported in Table 2-1.

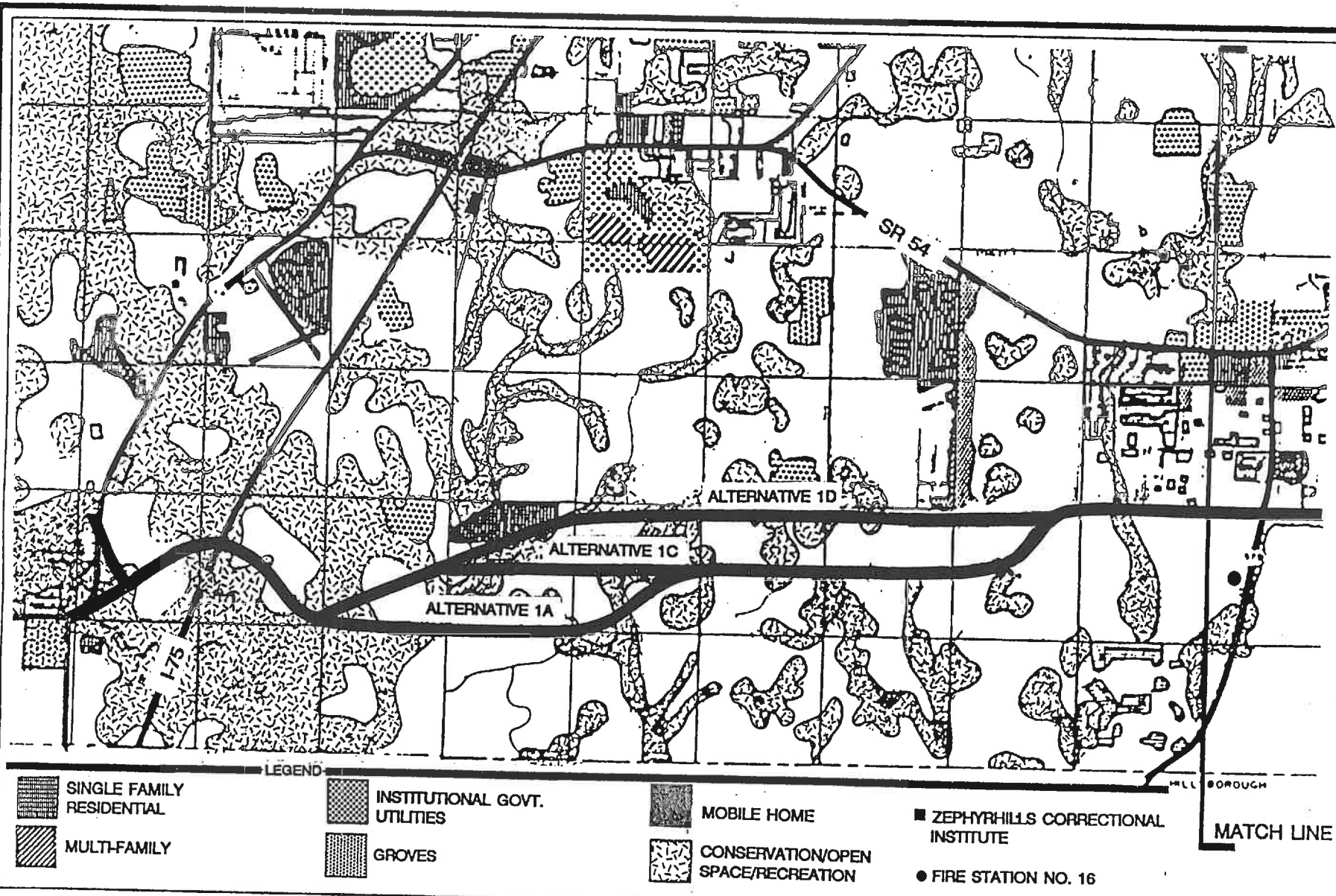


Figure 2-1 (1 of 2)
EXISTING LAND USE

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

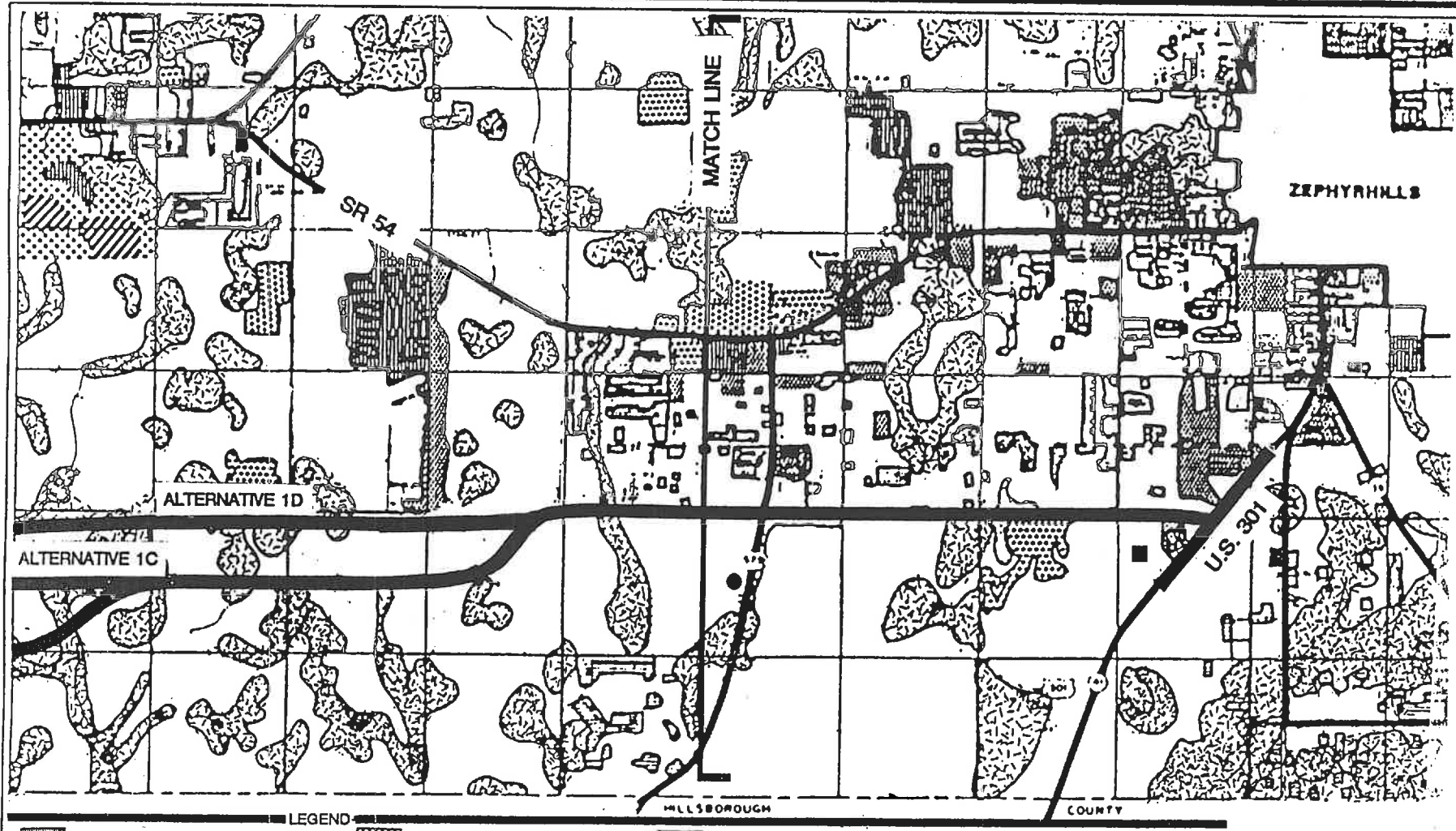


Figure 2-1 (2 of 2)
EXISTING LAND USE

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

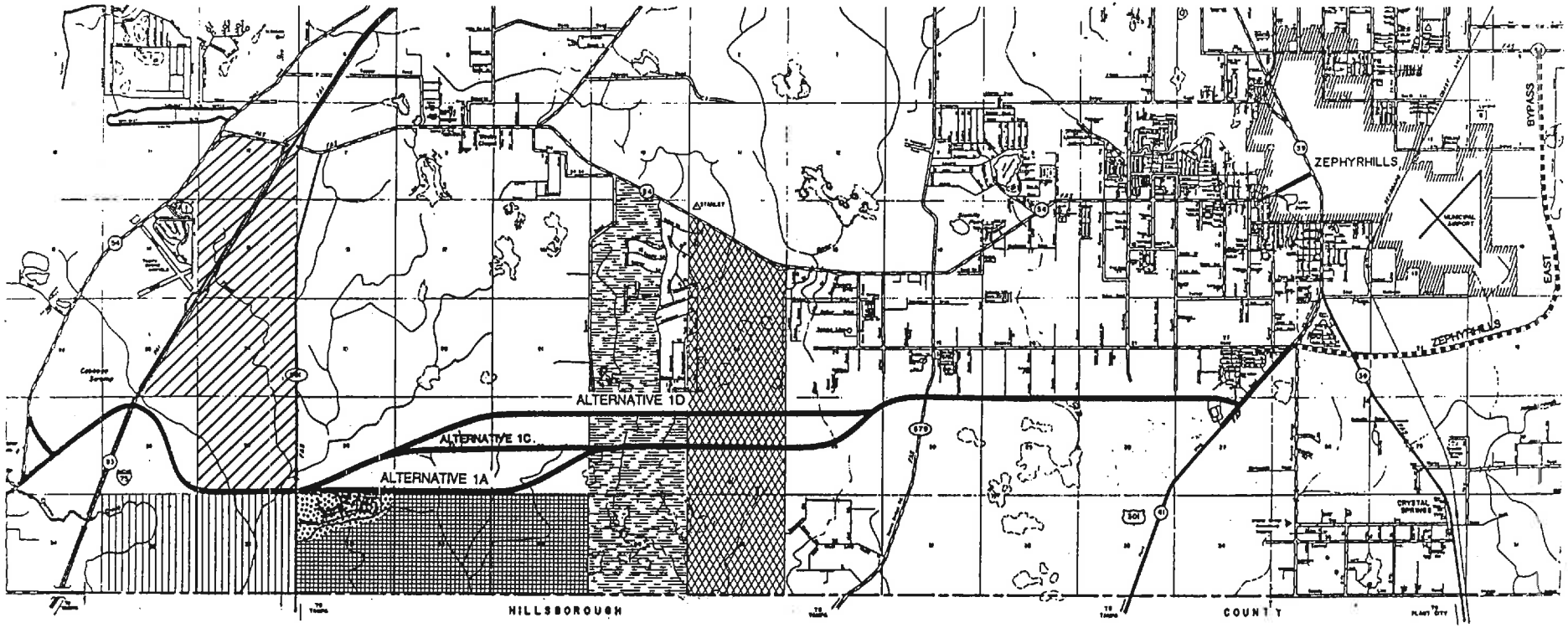


Figure 2-2
PLANNED DEVELOPMENT ADJACENT TO PROPOSED SR 54 CORRIDOR

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

Table 2-1. Planned Developments Adjacent to or Near the Proposed SR 54 Corridor

Name	Status	Scope	Size
Saddlebrook Village	Planned	4,700 homes 3.1 million square-foot industrial park; shopping centers, hotel	2,300 acres
Northwood	Planned	3,400 homes	1,084 acres
Oak Lake Village	Plans Uncertain	Plans Uncertain	1,577 acres
Wesley Chapel Lakes	Planned	5,231 homes	2,100 acres
Trout Creek (formerly Williamsburg)	130 existing homes. 4,000 additional homes planned.	4,130 homes	Approximately 1,920 acres

3.0 METHODOLOGY

The noise impact assessment was conducted in accordance with FHPM 7-7-3. Noise levels were predicted by using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model, STAMINA 2.0 and the FLAMOD interactive contour program PPLENV25. These programs estimate the acoustic intensity impacting a noise-sensitive site (the receiver) from a series of roadway segments (the source). Noise levels are influenced by such variables as vehicle speed and distribution of vehicle types. They are also affected by characteristics of the source-to-receiver path, including the effects of intervening barriers, structures (houses, trees, etc.), ground surface type (hard or soft), and topography. Noise-sensitive sites include exterior areas of frequent use, residences, parks, schools, hospitals, churches, and other places where quiet is important for normal activity.

All projected noise levels expressed herein are Leq(h) sound levels expressed in A-weighted decibels (dBA), which is the decibel (dB) level measured on the A-weighted scale. Of the three scales (A, B, and C-weighted) commonly used in sound level measurement, the A-weighted scale most closely approximates the frequency response of the human ear. Leq(h) is the steady-state sound level which contains the same amount of acoustic energy as the actual time-varying sound level over a 1-hour period.

Existing ambient noise levels were monitored at nine sites along the project corridor on either February 13, 1989, or July 9, 1989. These sites were selected to be representative of the noise-sensitive sites along the project corridor. Noise measurements were taken using a Digital Acoustics 607P sound-level analyzer in accordance with FHWA guidelines contained in Report Number FHWA-DP-45-1R, Sound Procedures for Measuring Highway Noise: Final Report, August, 1981. This meter is a Type 2 (i.e., general purpose sound level meter). The A-weighted frequency scale was used, and the meter was calibrated using the GENRAD 1987 Minical 1kHz sound-level calibrator at 114 dB.

In addition, to validate the noise models for the type of site analyzed in this report, representative sites were monitored along CR 581 west of Williamsburg and along U.S. 301 south of Chancey Road. Traffic information, including number of passenger cars, trucks, and average speeds, was collected

concurrently with the noise monitoring data. The traffic information was used in STAMINA 2.0 and FLAMOD to predict noise levels at the representative sites. The computer-projected noise levels were within 3 dBA of the actual field readings, indicating that traffic is the major noise source along CR 581 and U.S. 301. It also indicates that the model is accurately predicting the noise levels and is acceptable for predicting future noise levels.

The traffic parameters used to project traffic noise levels included the lesser of: 1) the traffic capacity of the roadway at level of service (LOS) C (determined by the number of lanes and the characteristics of the restricting intersection); or 2) the traffic demand on the roadway based on anticipated land use. These parameters produce the noisiest traffic condition expected to occur during the 20-year design life of the facility. Traffic data for the analysis were obtained from the SR 54 Traffic Report dated December 1988. Average annual daily traffic volumes for 1990, 2000, and 2010 for the project corridor are depicted in Figure 3-1. Traffic parameters include a peak-hour factor (K) of 8.5 percent of average daily traffic, a heavy truck mix of 3.25 percent, and a medium truck mix of 3.25 percent. Traffic volumes and running speeds (i.e. the proposed posted speed limit) used in the analysis are provided in Table 3-1.

Thirty-three noise-sensitive receptors representing 196 single-family residences were selected for noise analysis on the basis of noise sensitivity, roadway proximity, anticipated impacts from project alternatives, and homogeneity (i.e. representative of other similar sites in the project corridor). These receptor sites represent the exterior areas of 16 first-row receptor sites, 13 second-row sites and 4 third-row sites. The location of each receptor site is shown in Figure 3-2 and described in Table 3-2. For the first-and second-row residences facing the proposed roadway, receptors were located on a line that is parallel with the front edge of the house or trailer. For the first-row residences with the back door facing the proposed roadway, receptors were located at the back property line.

Receptor Sites R1 through R11 were selected to evaluate noise impacts to the Williamsburg Subdivision. Receptor Sites R14 through R22 were selected to

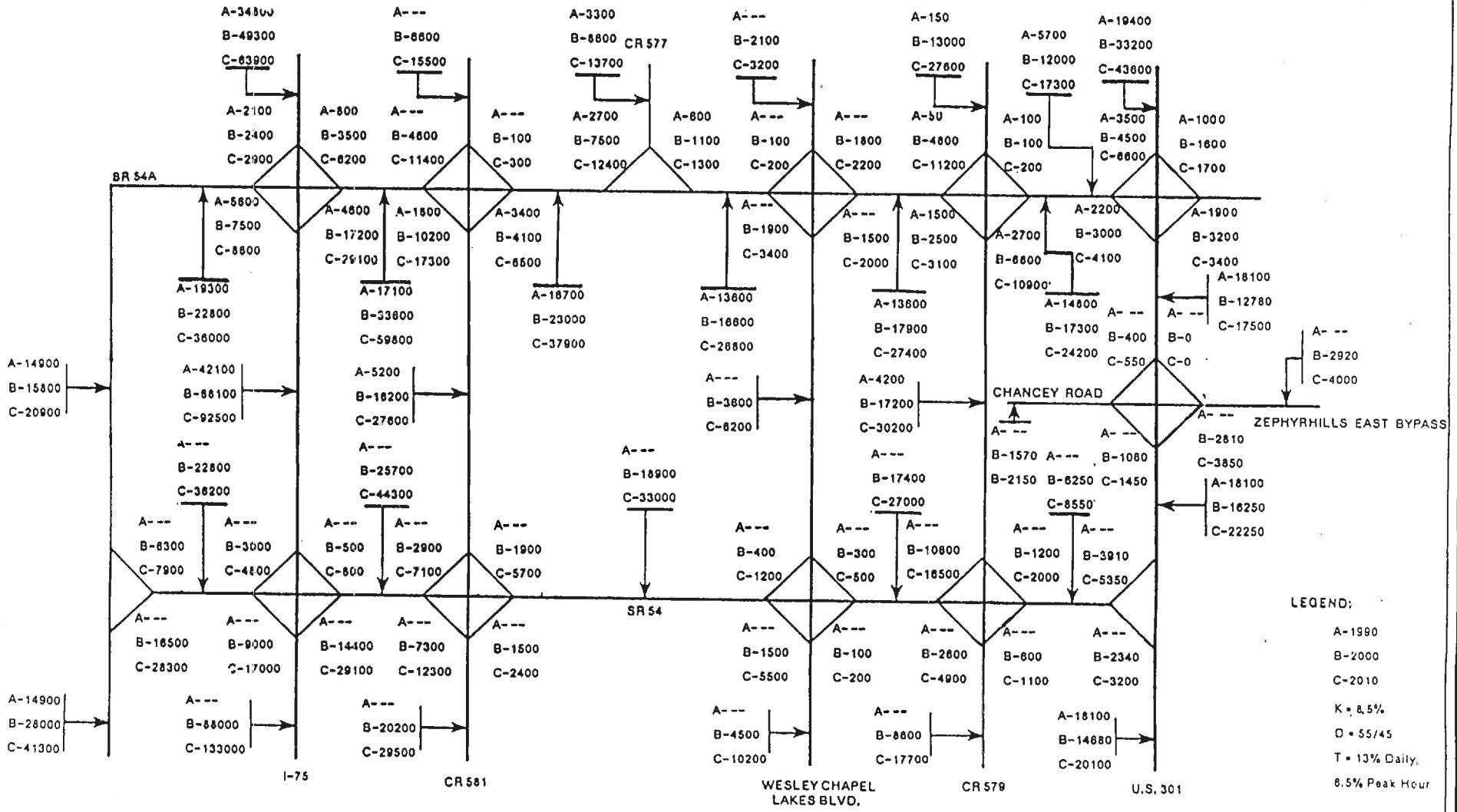


Figure 3-1
AVERAGE ANNUAL DAILY TRAFFIC VOLUMES
FOR 1990, 2000, AND 2010

SOURCES: GRIENER, 1988; HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

Table 3-1. Traffic Volumes and Speeds Used in the SR 54 Noise Analysis

Year	Roadway Segment	Direction	Total Vehicles	Cars	Medium Trucks	Heavy Trucks	Speed (mph)
2010	BUILD ALTERNATIVES						
	SR 54 from CR 581 to Wesley Chapel Lakes Blvd.	EB	1,543	1,443	50	50	55
		WB	1,262	1,180	41	41	55
	SR 54 from Wesley Chapel Lakes Blvd. to CR 579	EB	1,033	966	34	33	55
		WB	1,262	1,180	41	41	55
	SR 54 from CR 579 to U.S. 301	EB & WB	726	678	24	24	55
	U.S. 301 North	SB	1,040	906	67	67	45
		NB	851	741	55	55	45
1990	NO-BUILD ALTERNATIVE						
	U.S. 301 North	SB & NB	743*	647	48	48	55
2010	NO-BUILD ALTERNATIVE						
	U.S. 301 North	SB & NB	743*	647	48	48	55

* LOS C traffic volumes and speeds.

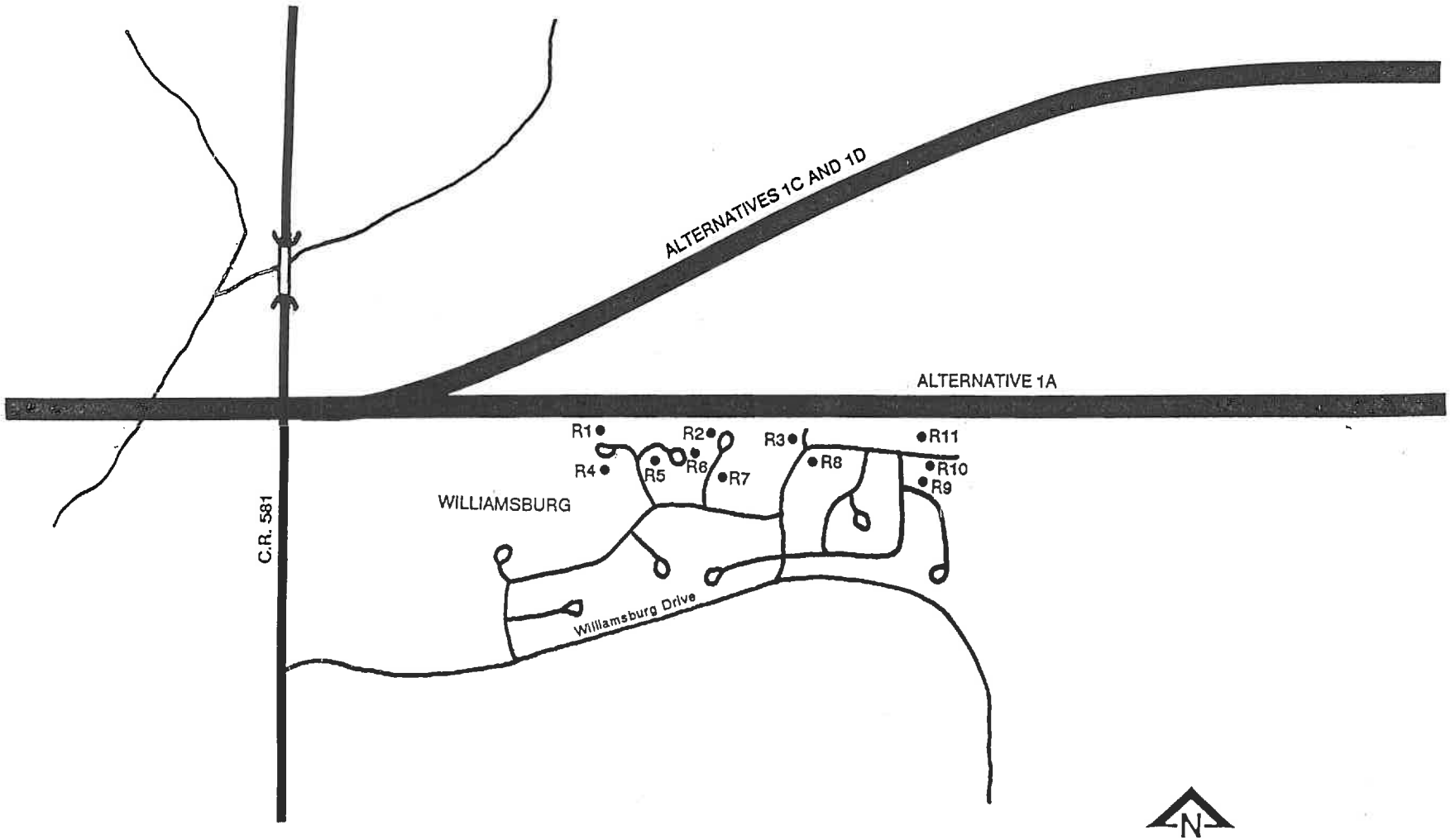


Figure 3-2
NOISE RECEPTOR SITES
(1 OF 4)

SOURCES: USGS; HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

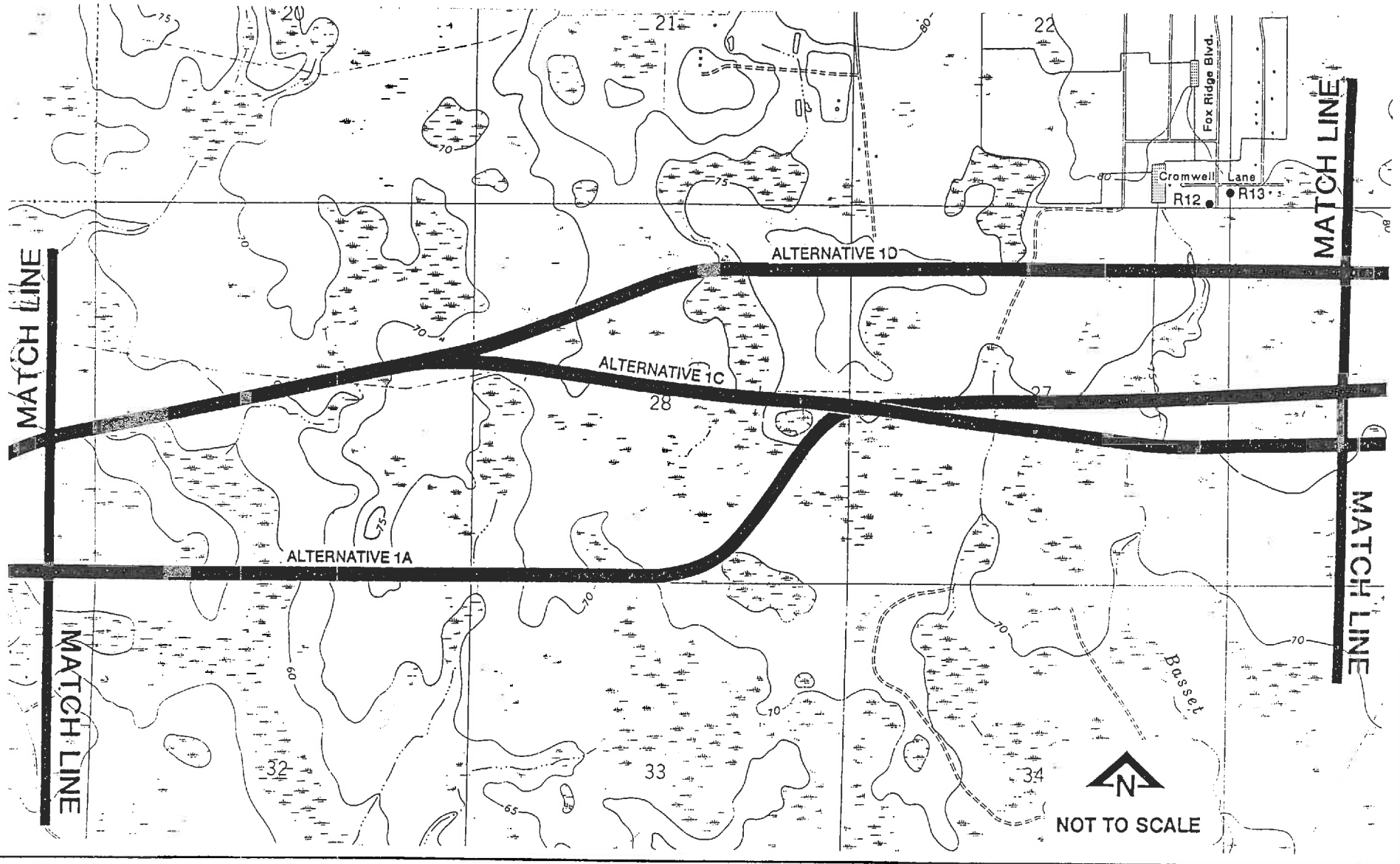


Figure 3-2
NOISE RECEPTOR SITES
(2 OF 4)

SOURCES: USGS; HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

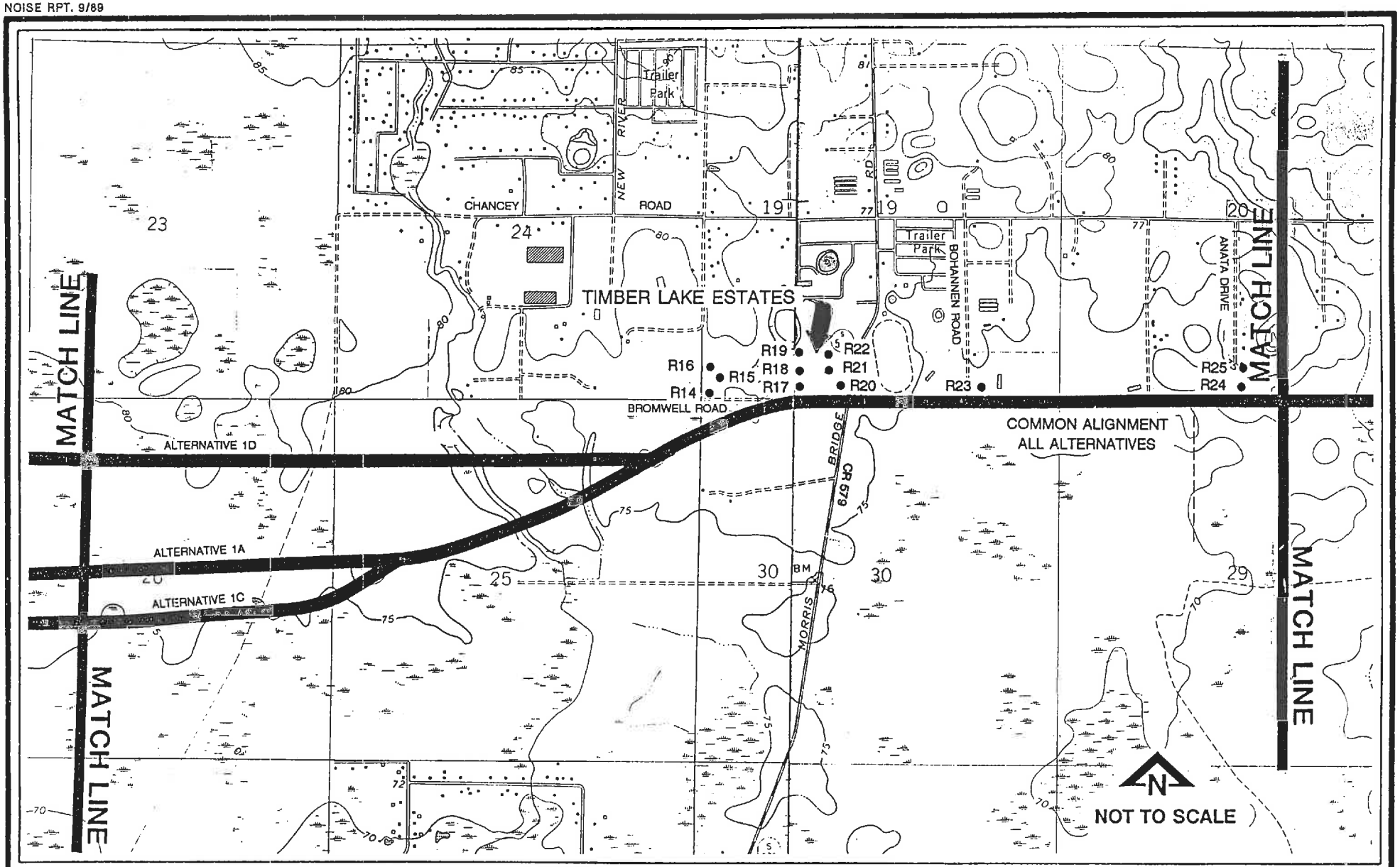


Figure 3-2
NOISE RECEPTOR SITES
(3 OF 4)

SOURCES: USGS; HUNTER, 1989

SR 54/SR 54A
FROM CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

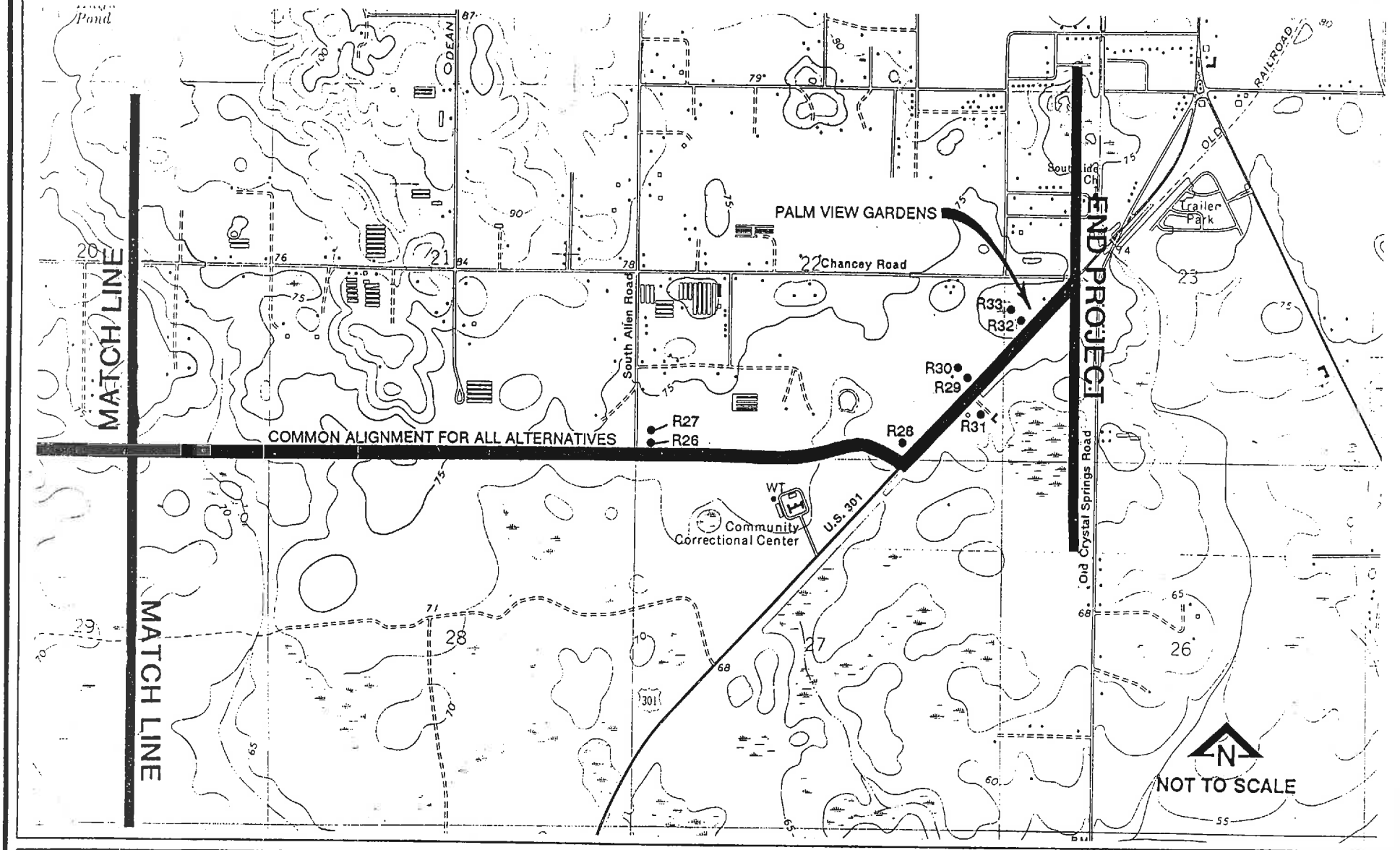


Figure 3-2
NOISE RECEPTOR SITES
(4 OF 4)

SOURCE: HUNTER, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

Table 3-2. Noise Receptor Sites

Receptor Number	Location	Distance to Roadway (feet)*					
		Build Alternative 1A		Build Alternative 1C		Build Alternative 1D	
		Westbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound
R1	Residence located 2,050 feet east of CR 581 and 1,310 feet north of Williamsburg Drive (back property line). Representative of 9 residences for Alternative 1A and 7 residences for Alternatives 1C and 1D.	162	64	512	414	512	414
R2	Residence located 2,750 feet east of CR 581 and 1,120 feet north of Williamsburg Drive (back property line). Representative of 3 residences.	162	64	847	749	847	749
R3	Residence located 3,300 feet east of CR 581 and 1,010 feet north of Williamsburg Drive (back property line). Representative of 3 residences.	162	64	1,112	1,014	1,112	1,014
R4	Residence located 2,090 feet east of CR 581 and 1,110 feet north of Williamsburg Drive. Representative of 4 second-row residences.	392	280	722	624	722	624
R5	Residences located 2,355 feet east of CR 581 and 1,080 feet north of Williamsburg Drive. Representative of 2 second-row residences.	362	250	817	719	817	719
R6	Residence located 2,625 feet east of CR 581 and 1,040 feet north of Williamsburg Drive. Representative of 5 second-row residences.	312	210	922	824	922	824

Table 3-2. Noise Receptor Sites (Continued, Page 2 of 6)

Receptor Number	Location	Distance to Roadway (feet)*					
		Build Alternative 1A		Build Alternative 1C		Build Alternative 1D	
		Westbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound
R7	Residence located 2,850 feet east of CR 581 and 900 feet north of Williamsburg Drive. Representative of 3 second-row residences.	372	274	817	719	817	719
R8	Residence located 3,435 feet east of CR 581 and 810 feet north of Williamsburg Drive. Representative of 6 second-row residences.	367	269	922	824	922	824
R9	Residence located 4,100 feet east of CR 581 and 1,000 feet north of Williamsburg Drive. Representative of 3 third-row residences.	402	304	1,072	974	1,072	974
R10	Residence located 4,230 feet east of CR 581 and 1,050 feet north of Williamsburg Drive. Representative of 2 second-row residences.	362	264	1,732	1,634	1,732	1,634
R11	Residence located 4,130 feet east of CR 581 and 1,200 feet north of Williamsburg Drive (back property line). Representative of 8 residences.	162	64	1,522	1,424	1,522	1,424

Table 3-2. Noise Receptor Sites (Continued, Page 3 of 6)

Receptor Number	Location	Distance to Roadway (feet)*					
		Build Alternative 1A		Build Alternative 1C		Build Alternative 1D	
		Westbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound
R12	Residence located 55 feet west of Fox Ridge Boulevard and 115 feet South of Cromwell Lane (back property line). Representative of 9 residences.	2,574	2,672	3,044	3,142	824	922
R13	Residence located 85 feet east of Fox Ridge Boulevard and 115 feet south of Cromwell Lane. Representative of 4 residences.	2,736	2,834	3,208	3,306	989	1,087
R14	Residence located 2,100 feet west of CR 579 and 10 feet north of Bromwell Drive.	109	207	109	207	109	207
R15	Residence located 1,970 feet west of CR 579 and 190 feet north of Bromwell Drive. Representative of 3 second-row residences.	274	372	274	372	274	372
R16	Residence located 2,000 feet west of CR 579 and 290 feet north of Bromwell Drive. Representative of 7 third-row residences.	374	472	374	472	374	472
R17	Residence located 650 feet west of CR 579 and 10 feet north of Bromwell Road. Representative of 9 residences.	94	192	94	192	94	192

Table 3-2. Noise Receptor Sites (Continued, Page 4 of 6)

Receptor Number	Location	Distance to Roadway (feet)*					
		Build Alternative 1A		Build Alternative 1C		Build Alternative 1D	
		Westbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound
R18	Residence located 650 feet west of CR 579 and 100 feet north of Bromwell Road. Representative of 5 second-row residences.	184	282	184	282	184	282
R19	Third-row residence located 670 feet west of CR 579 and 160 feet west of Bromwell Road.	249	347	249	347	249	347
R20	Residence located 45 feet west of CR 579 and 30 feet north of Bromwell Road (back property line). Representative of 3 residences.	94	192	94	192	94	192
R21	Residence located 80 feet west of CR 579 and 90 feet north of Bromwell Road. Representative of 2 second-row residences.	174	272	174	272	174	272
R22	Residence located 85 feet west of CR 579 and 180 feet north of Bromwell Road. Representative of 5 third-row residences.	264	362	264	362	264	362
R23	Residence located 330 feet east of Bohannen Road and 70 feet north of proposed right-of-way line. Representative of 4 residences.	134	232	134	232	134	232

Table 3-2. Noise Receptor Sites (Continued, Page 5 of 6)

Receptor Number	Location	Distance to Roadway (feet)*					
		Build Alternative 1A		Build Alternative 1C		Build Alternative 1D	
		Westbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound
R24	Residence located 95 feet east of Anata Drive and 180 feet north of proposed right-of-way line. Representative of 3 residences.	254	352	254	352	254	352
R25	Residence located 30 feet east of Anata Drive and 395 feet north of proposed right-of-way line. Representative of 3 second-row residences.	489	587	489	587	489	587
R26	Residence located 160 feet east of South Allen Road and 2,570 feet south of Chancey Road. Representative of 3 residences.	94	192	94	192	94	192
R27	Second-row residence located 170 feet east of South Allen Road and 2,450 feet south of Chancey Road. Representative of 2 second-row residences.	224	322	224	322	224	322
R28	Residence located 270 feet northwest of U.S. 301 and 2,560 feet south of Chancey Road. Representative of 9 residences.	244/334	342/432	244/334	342/432	244/334	342/432
R29	Residence located 100 feet northwest of U.S. 301 and 1,590 feet south of Chancey Road. Representative of 1 residence.	164	262	164	262	164	262

Table 3-2. Noise Receptor Sites (Continued, Page 6 of 6)

Receptor Number	Location	Distance to Roadway (feet)*					
		Build Alternative 1A		Build Alternative 1C		Build Alternative 1D	
		Westbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound
R30	Residence located 200 feet northwest of U.S. 301 and 1,615 feet south of Chancey Road. Representative of 7 second-row residences.	264	362	264	362	264	362
R31	Residence located 300 feet southeast of U.S. 301 and 1,990 feet south of Chancey Road.	164	262	164	262	164	264
R32	Residence located 35 feet northwest of U.S. 301 and 790 feet south of Chancey Road. Representative of 42 residences in Palm View Gardens Trailer Park.	74	172	74	172	74	172
R33	Residence located 150 feet northwest of U.S. 301 and 770 feet south of Chancey Road. Representative of 24 second-row residences in Palm View Gardens Trailer Park.	164	262	164	262	164	262

* Distance measured from nearest pavement edge of proposed roadway or U.S. 301.

evaluate noise impacts to Timber Lake Estates Mobile Home Community. Receptor Sites R32 and R33 were selected to evaluate noise impacts to Palm View Gardens Trailer Park. The remaining receptor sites represent scattered residences along the project corridor. No other types of noise-sensitive sites (i.e. schools, churches, and exterior areas of commercial sites) were identified in the project corridor.

Computer projected noise levels (dBA) were predicted at the 33 noise-sensitive receptor sites for the following existing year (1988) and design year (2010) conditions:

1988 -- No Build for receptor sites along U.S. 301 (R28 through R33),

2010 -- No Build for receptor sites along U.S. 301 (R28 through R33), and

2010 -- Build Alternatives 1A, 1B, and 1C.

To determine the degree of impact of traffic noise on human activity, the Noise Abatement Criteria (NAC), established by FHPM 7-7-3, were used. These criteria represent the upper limit of acceptable traffic noise-level conditions and also represent a balance of that which may be achievable. The NAC are presented in Table 3-3. These criteria apply only to areas of regular human use where lowered noise levels are desirable. FHPM 7-7-3 requires consideration of noise abatement measures when predicted noise levels approach (i.e., within 2 dBA) or exceed the FHWA-NAC. Noise level increases in the design year (2010) may also warrant abatement considerations if the increase is greater than what is established by FDOT as shown in Figure 3-3. Since the 33 receptor sites mentioned above represent exterior areas, they are classified under Activity Category B of the FHWA-NAC, having a criteria level of 67 dBA.

Table 3-3. Hourly A-Weighted Noise Abatement Criteria Levels--Decibels (dBA)

Activity Category	Leq(h)	Description of Activity Category
A	57 (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 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Category A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: FHPM 7-7-3, 1982.

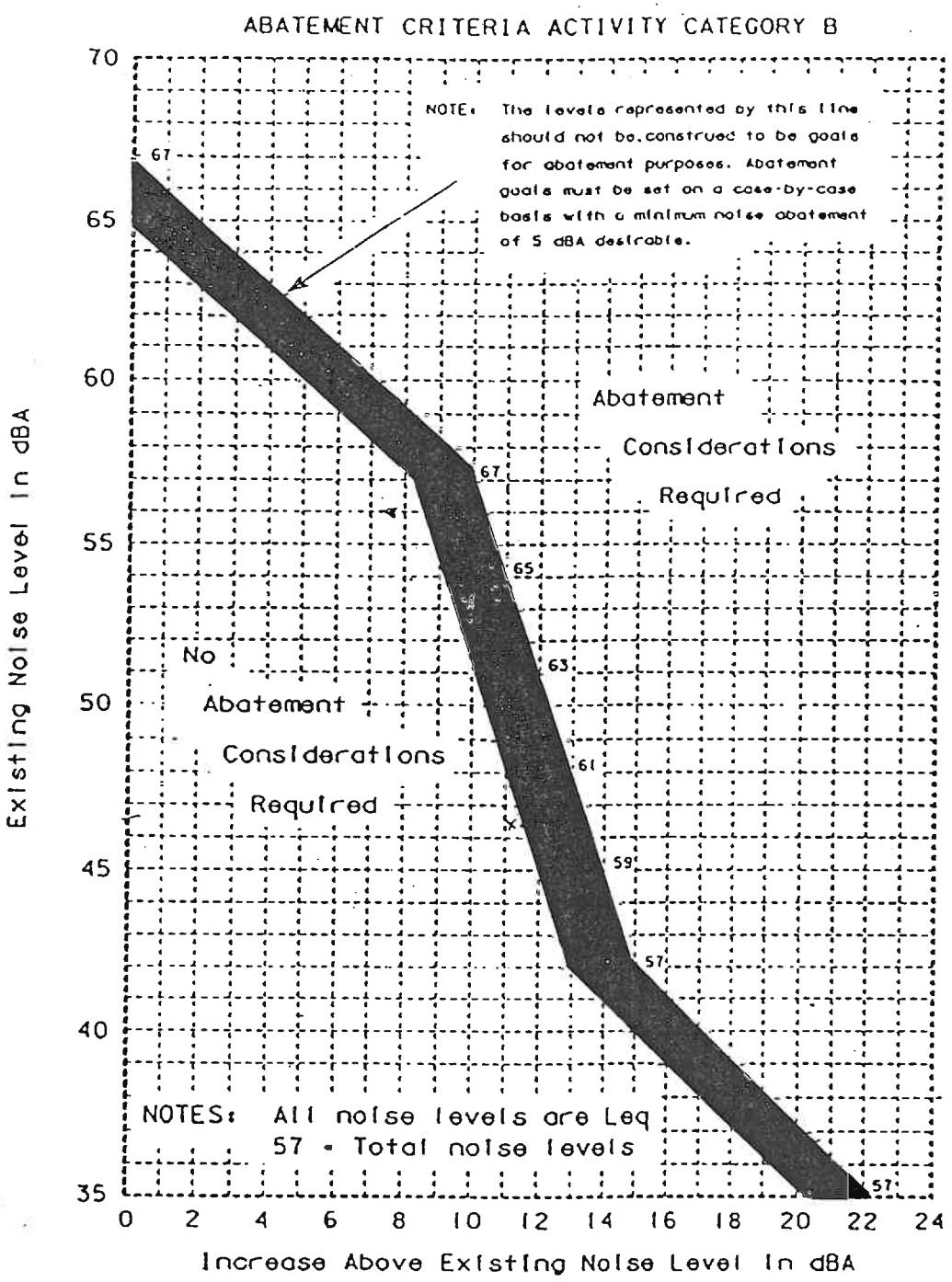


Figure 3-3
NOISE ABATEMENT CRITERIA

SOURCES: FDOT PROJECT DEVELOPMENT AND ENVIRONMENTAL GUIDELINES NOISE 1988; HUNTER/RS7H, 1989.

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

4.0 RESULTS

The results of the noise prediction model for the no-build and build alternatives (1A, 1C, and 1D) and the ambient noise level measurements are presented in Table 4-1. The discussion of the results is divided into four sections which include the noise receptors in the vicinity of CR 581 (Williamsburg Subdivision), Fox Ridge Boulevard, CR 579, and U.S. 301.

4.1 CR 581--RECEPTOR SITES R1 THROUGH R11

For the segment of SR 54 in the vicinity of CR 581, ambient noise levels were monitored at three sites within the Williamsburg Subdivision. The ambient levels ranged from 47 to 50 dBA. The lowest value (47 dBA) was selected to be representative of the existing noise levels monitored at the Williamsburg Subdivision. The ambient noise levels monitored at Williamsburg neither approached (i.e., within 2 dBA of the FHWA-NAC) nor exceeded the FHWA-NAC. With the No-Build Alternative, future noise levels are expected to increase slightly at Williamsburg as the subdivision is expanded and the traffic along CR 581 increases.

Noise impacts varied among the build alternatives for the year 2010. For Alternative 1A, the 70 to 71 dBA projected for Receptor Sites R1, R2, R3, and R11 exceeded the FHWA-NAC of 67 dBA by 3 to 4 dBA. The back property lines of these receptors will be approximately 64 feet from the proposed eastbound traffic lanes of SR 54. Receptor Sites R4 through R10 neither approached nor exceeded the FHWA-NAC. With Build Alternative 1A, noise levels at Receptor Sites R1 through R11 are anticipated to increase from 13 to 24 dBA by the year 2010 in Williamsburg. The noise level increases at Receptor Sites R4 through R10 and the projected noise levels at Receptor Sites R1, R2, R3, and R11 warrant abatement considerations (see Figure 3-3). Noise abatement considerations are discussed in Section 5.0. In the Williamsburg Subdivision, a total of 48 residences (represented by Receptor R1 through R11) would be impacted by Alternative 1A.

For Build Alternatives 1C and 1D, which share a common alignment in the vicinity of Williamsburg, the projected noise levels for the year 2010 at Receptor Sites R1 through R11 neither approached nor exceeded the FHWA-NAC of 67 dBA. The highest noise level (60 dBA) was predicted at Receptor Site R1

Table 4-1. Computer-Projected Noise Levels (dBA) at Noise-Sensitive Sites for the Build Alternatives and FHWA Noise Abatement Criteria (FHWA-NAC)

Site	Dwelling Units Represented	Existing Leq (h)	Build Alternative (Year 2010) 1A	1C	1D	FHWA-NAC
R1	7 - 9+	47	71*	60*	60*	67
R2	3	47	71*	56	56	67
R3	3	47	71*	54	54	67
R4	4	47	61*	54	54	67
R5	2	47	61*	53	53	67
R6	5	47	64*	54	54	67
R7	3	47	61*	51	51	67
R8	6	47	60*	49	49	67
R9	3	47	62*	49	49	67
R10	2	47	63*	49	49	67
R11	8	47	70*	51	51	67
R12	9	43	46	44	56*	67
R13	4	43	45	43	55	67
R14	1	45	68*	68*	68*	67
R15	3	45	62*	62*	62*	67
R16	7	45	60*	60*	60*	67
R17	9	52	69*	69*	69*	67
R18	5	52	64*	64*	64*	67
R19	1	52	61*	61*	61*	67
R20	3	61	73*	73*	73*	67
R21	2	61	71*	71*	71*	67
R22	5	61	70*	70*	70*	67
R23	4	42	63*	63*	63*	67
R24	3	42	59*	59*	59*	67
R25	3	42	55*	55*	55*	67
R26	3	42	65*	65*	65*	67
R27	2	42	60*	60*	60*	67
R28	9	57	60	60	60	67
R29	1	65*	65*	65*	65*	67
R30	7	59	59	59	59	67
R31	1	60	65*	65*	65*	67
R32	42	72*	69*	69*	69*	67
R33	24	62	61	61	61	67
Total No. of Impacts**		43	143	102	111	

+ Representative of nine dwelling units for Alternative 1A and seven dwelling units for Alternatives 1C & 1D.

* Noise levels that approach or exceed the FHWA-WAC of 67 dBA or warrant abatement considerations based on projected noise level increases.

** Total number of dwelling units where noise levels approach or exceed the FHWA-WAC of 67 DBA or warrant abatement considerations based on projected noise level increases.

which will be approximately 465 feet from the proposed eastbound traffic lanes of SR 54. With either Build Alternative 1C or 1D, noise levels are anticipated to increase 2 to 13 dBA by the year 2010 in Williamsburg. The increases (3 to 9 dBA) at Receptor Sites R2 through R11 do not warrant abatement considerations according to the NAC (see Figure 3-3). However, the increase at Receptor Site R1 (13 dBA) does warrant abatement considerations which are discussed in Section 5.0. In the Williamsburg Subdivision, a total of nine residences (represented by Receptor Site R1) will be impacted by Alternatives 1C and 1D.

The noise level increases at Receptor Sites R1 through R11 are attributed to the proximity of the proposed roadway to Williamsburg. Roadway alignment contributes to the differences in projected noise levels between Build Alternatives 1A and 1C/1D (see Section 1.0, Introduction). The alignment for Alternative 1A is 350 feet closer to the Williamsburg Subdivision than Alternatives 1C and 1D.

4.2 FOX RIDGE BOULEVARD--RECEPTOR SITES R12 AND R13

For the segment of SR 54 in the vicinity of Fox Ridge Boulevard, the ambient noise level was 42 dBA. This noise level was considered representative of the existing noise levels in this area. The ambient noise level neither approached nor exceeded the FHWA-NAC of 67 dBA. With the No-Build Alternative, future noise levels are expected to increase slightly as the Fox Ridge Planned Mobile Home Community is developed and traffic along Fox Ridge Boulevard increases.

Noise impacts varied among the build alternatives for the year 2010. For Alternative 1A, the projected noise levels at Receptor Sites R12 and R13 neither approach nor exceeded the FHWA-NAC of 67 dBA. The highest noise level (46 dBA) was predicted at Receptor Site R12 which will be approximately 2,574 feet from the proposed westbound traffic lanes of SR 54. With Build Alternative 1A, noise levels at Receptor Sites R12 and R13 are anticipated to increase 2 to 3 dBA by the year 2010. These increases do not warrant noise abatement considerations. With Alternative 1A, none of the residences of the Fox Ridge Planned Mobile Home Community would be impacted.

For Alternative 1C, the projected noise levels at Receptor Sites R12 and R13 were unchanged or increased by 1 dBA when compared to the 1988 levels. With this alternative, the SR 54 alignment is approximately 3,000 feet from the noise-sensitive sites. As with Alternative 1A, Alternative 1C would not impact any residences of the Fox Ridge Planned Mobile Home Community.

With Alternative 1D, the projected noise levels at Receptor Sites R12 and R13 neither approached nor exceeded the FHWA-NAC of 67 dBA. The highest noise level (56 dBA) was predicted at Receptor Site R12 which will be approximately 824 feet from the proposed westbound traffic lanes of SR 54. With Build Alterative 1D, noise levels are anticipated to increase 12 dBA at Receptor Site R13 and 13 dBA at Receptor Site R12 by the year 2010. The 13 dBA increase at Receptor Site R12 warrants abatement considerations. With Alternative 1D, a total of nine residences will be impacted.

The noise level increases at Receptor Sites R12 and R13 for Alternatives 1A and 1D are attributed to the proximity of the proposed roadway to these receptor sites. The roadway alignment contributes to the differences in projected noise levels among the build alternatives (see Figure 3-2, page 2 of 4).

4.3 CR 579--RECEPTOR SITES R14 THROUGH R25

For the segment of SR 54 in the vicinity of CR 579, the ambient noise levels ranged from 42 to 61 dBA. The monitored noise levels differed between sites due to differences in distance to CR 579 and in background community noise levels. These monitored noise levels were considered representative of the existing noise levels at these sites. The ambient noise levels monitored neither approached nor exceeded the FHWA-NAC of 67 dBA. With the No-Build Alternative, future noise levels are expected to increase slightly as development continues in the area and the traffic along CR 579 increases.

Since Build Alternatives 1A, 1C, and 1D share a common alignment in the vicinity of CR 579, noise impacts were the same among them for the year 2010. The projected noise levels for the build alternatives at Receptor Sites R14, R17, R20, R21, and R22 exceeded the FHWA-NAC of 67 dBA by 1 to 6 dBA. These

receptor sites represent the first-row residences in Timber Lake Estates. The highest projected noise level (73 dBA) occurred at Receptor Site R20, which will be approximately 94 feet from the proposed eastbound traffic lanes of SR 54 and 45 feet from the southbound lanes of CR 579. The remaining Receptors (R15, R16, R18, R19, R23, R24 and R25) neither approached nor exceeded the FHWA-NAC. With the build alternatives, noise levels at Receptor Sites R14 through R25 are anticipated to increase by 9 to 23 dBA by the year 2010. The noise level increases at Receptor Sites R15, R16, R18, R19, R23, R24 and R25 and the projected noise levels at Receptor Sites R14, R17, R20, R21, and R22 warrant abatement considerations. If any of the build alternatives are constructed in this segment of the project, a total of 46 residences (represented by Receptor Sites R14 through R25) will be impacted.

The noise level increases at Receptor Sites R14 through R25 are attributed to the proximity of the proposed roadway and CR 579. The closest receptor sites will be approximately 94 feet from the proposed eastbound traffic lanes of SR 54.

4.4 U.S. 301--RECEPTOR SITES R26 THROUGH R33

For the segment of SR 54 in the vicinity of U.S. 301, and the segment of U.S. 301 from SR 54 to the Zephyrhills East Bypass, the existing noise levels ranged from 42 to 72 dBA. With the exception of Receptor Site R32 (72 dBA) the projected noise levels for the base year (1988) and the design year (2010) neither approached nor exceeded the FHWA-NAC. The noise levels at these receptor sites should remain at current levels in future years since these sites are located along a 2-lane portion of U.S. 301 where the existing demand traffic currently exceeds LOS C capacity. The high noise level (72 dBA) at Receptor Site R32 is attributed to the proximity to U.S. 301; this receptor is approximately 35 feet from the existing southbound lanes of U.S. 301.

Since Build Alternatives 1A, 1C, and 1D share a common alignment in the vicinity of U.S. 301, noise impacts were the same among them for the year 2010. The projected noise levels for the build alternatives at Receptor Sites R26, R29, R31, and R32 either approached or exceeded the FHWA-NAC. The highest projected noise level (69 dBA) occurred at Receptor Site R32 which

will be approximately 74 feet from the proposed southbound lanes of U.S. 301. The remaining Receptor Sites (R27, R28, R30 and R33) neither approached nor exceeded the FHWA-NAC. With the build alternatives, noise levels for the year 2010 are anticipated to decrease by 2 dBA at Receptor Sites R32 and 1 dBA at Receptor Site R33, stay the same at Receptor Sites R29 and R30, and increase by 3 to 23 dBA at Receptor Sites R26, R27, R28, and R31. The noise level increase at Receptor Site R27 and the projected noise levels at Receptor Sites R26, R29, R31 and R32 warrant abatement considerations. If any of the build alternatives are constructed in this segment of the project, a total of 49 residences (represented by Receptor Sites R26, R27, R29, R31, and R32) will be impacted.

The noise level increases at Receptor Sites R26, R27, R28, and R31 are due to the proximity of the proposed SR 54 roadway or U.S. 301. The reduction, or no change, in noise levels at Receptor Sites R29, R30, R32, and R33, which are on the west side of U.S. 301, is attributable to the 60 foot alignment shift proposed for U.S. 301.

5.0 NOISE ABATEMENT CONSIDERATIONS

The feasibility of several noise attenuation measures were considered for the noise receptor sites identified in Section 4.0 that warranted noise abatement considerations. These receptor sites had projected noise levels that approached or exceeded the FHWA-NAC of 67 dBA or warranted abatement considerations as shown in Figure 3-3. For Build Alternative 1A, this included 28 Receptor Sites (R1 through R11, R14 through R27, R29, R31, and R32) representing 143 residences. For Build Alternative 1C, this included 18 Receptor Sites (R1, R14 through R27, R29, R31 and R32) representing 102 residences. For Build Alternative 1D, this included 19 Receptor Sites (R1, R12, R14 through R27, R29, R31 and R32) representing 111 residences. The measures evaluated included structural barriers, vegetative and earth barriers, alignment modification, smooth-type pavement, traffic management, sound proofing, property owner compensation, and land use controls. The evaluation of barriers were divided into four sections according to the location of noise-sensitive sites. These sections include receptor sites in the vicinity of CR 581 (Williamsburg Subdivision), Fox Ridge Boulevard, CR 579, and U.S. 301. To aid in the determination of reasonable cost of the various noise abatement measures, the following formula was used:

$$\text{Reasonable Cost} = \frac{\text{Cost of Abatement}}{\text{Number of Dwelling Units}} \leq \$25{,}000/\text{dwelling unit}$$

A noise abatement measure was considered effective if it reduced noise levels by at least 5 dBA and cost less that $25,000 per dwelling unit. Construction costs of structural and earth barriers were based on $15 per square foot (length times height). Barriers were designed to cost $25,000 per dwelling unit and to maximize noise level reductions (insertion loss).

5.1 STRUCTURAL BARRIERS

The evaluation of structural barriers to reduce noise levels at noise sensitive sites is presented in Sections 5.1.1 through 5.1.4. A summary of the estimated costs and effectiveness of the barriers evaluated are summarized in Table 5.1.

Table 5-1. Summary of Estimated Cost and Effectiveness of the Structural Barriers Evaluated

Location--Receptor Sites Affected/ Alternative	No. of Dwelling Units Affected	Length & Height (feet)	Estimated Cost	No. of Dwelling Units Benefited*	Average Cost per Dwelling Unit**
CR 581--Receptor Sites R1 - R11					
Alternative 1A	24	2700' X 13'	$526,500	24	$21,940
Alternative 1C	7	900' X 13'	$175,500	0	> $175,500
Alternative 1D	7	900' X 13'	$175,500	0	> $175,500
Fox Run Boulevard--Receptor Site R12					
Alternative 1A	-	-	-	-	-
Alternative 1C	-	-	-	-	-
Alternative 1D	9	1876' X 8'	$225,120	0	> $225,120
CR 579--Receptor Sites R14 - R16					
Common Alignment - All Alternatives	11	800' X 14'	$168,000	1	$168,000
CR 579--Receptor Sites R17 - R22					
Common Alignment - All Alternatives	25	770' X 14'	$161,700	11	$14,700
CR 579--Receptor Sites R23					
Common Alignment - All Alternatives	4	200' X 8'	$24,900	0	> $24,900
U.S. 301--Receptor Sites R26 & R27					
Common Alignment - All Alternatives	5	540' X 9'	$72,900	4	$18,225
U.S. 301--Receptor Sites R32					
Common Alignment - All Alternatives	42	650' X 13' and 860' X 13'	$294,450	42	$7,010

- Use of abatement measure was not practical
* The number of dwelling units where noise levels would be reduced by at least 5 dBA.
** Average cost is determined by dividing the estimated cost of noise abatement by the number of dwelling units receiving benefits (i.e., greater than 5 dBA insertion loss)

a:\sr5492-j.1\sr54t51.wk3

5.1.1 CR 581--Receptor Sites R1 through R11

For Build Alternative 1A, a barrier was designed north of Receptor Sites R1 through R11 which represent 48 dwelling units. The approximate location of the proposed barrier (Barrier-A) is presented in Figure 5-1. It was designed to reduce noise levels for 23 first-row residences. The barrier would extend 2,700 feet along the proposed SR 54 south right-of-way line and would be 13 feet high. This barrier would be 35,100 square feet and cost $526,500. With this barrier, the projected noise levels would range from 55 to 62 dBA at Receptor Sites R1 through R11. Twenty-four of the dwelling units had insertion losses between 5 and 14 dBA. The insertion loss for 22 of 24 dwelling units was between 10 and 14 dBA. The average cost per dwelling unit receiving greater than 5 dBA insertion loss is $21,940. Since the insertion loss is greater than 5 dBA at all 23 first-row residences and costs less than $25,000 per dwelling unit, structural barriers are considered a feasible noise abatement technique in the vicinity of Receptor R1 through R11 for Build Alternative 1A.

For Build Alternatives 1C and 1D, the barrier was designed northwest of Receptor R1. These alternatives impact seven of the nine dwelling units represented by Receptor Site R1. This barrier would extend 900 feet along the proposed SR 54 south right-of-way line and would be 13 feet high. The approximate location of the proposed barrier (Barrier-B) is presented in Figure 5-1. This barrier would be 11,700 square feet and cost $175,500 or $25,070 per dwelling unit. The insertion loss at these receptors was 2 dBA. With this barrier, the projected noise levels would range from 51 to 55 dBA. Since the insertion loss is less than 5 dBA, structural barriers are not considered a feasible abatement technique in the vicinity of Receptor Site R1 for Build Alternative 1C.

5.1.2 Fox Run Boulevard--Receptor Site R12

In the vicinity of Fox Run Boulevard, a barrier was designed to reduce noise levels at Receptor Site R12 for Build Alternative 1D. Receptor Site R12 was representative of nine dwelling units. This barrier would be 1,876 feet long and 8 feet high and would be located approximately 760 feet south of Fox Run

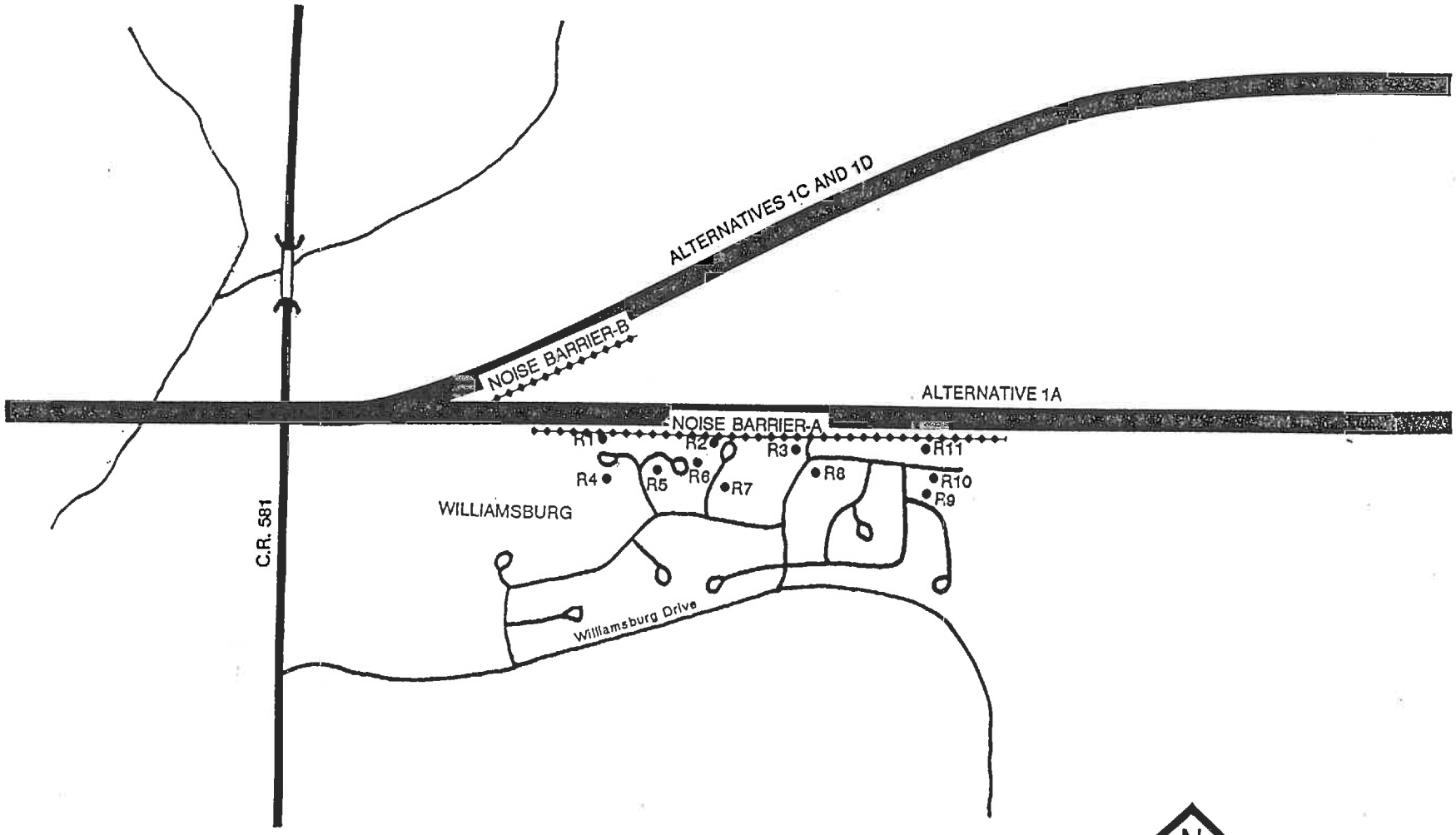


Figure 5-1
LOCATION OF NOISE BARRIERS EVALUATED FOR BUILD ALTERNATIVES 1A, 1C, AND 1D IN THE VICINITY OF CR 581

SOURCE: HUNTER, 1989.

SR 54/SR 54A
FROM CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

Boulevard and extend 938 feet to the east and west along the SR 54 north right-of-way line (see Figure 3-2, page 2 of 4). This barrier would be 15,008 square feet and cost $225,120 or $25,000 per dwelling unit. With this noise barrier, the projected noise level was 52 dBA at Receptor Site 12. The insertion loss with this barrier was 3 dBA. Since the insertion loss is less than 5 dBA and costs were $25,000 per dwelling unit, structural barriers are not considered a feasible noise abatement technique in the vicinity of R12 for Build Alternative 1D.

5.1.3 CR 579--Receptor Sites R14 through R25

In the vicinity of CR 579, the build alternatives share a common alignment (see Figure 3-2, page 3 of 4). Due to the distances between noise-sensitive sites, three barriers were designed. Two barriers were designed for the south side of the Timber Lake Estates: the eastern and western portion of the development. One barrier was designed for the single-family residences to the east of CR 579.

The barrier designed for the eastern portion of Timber Lake Estates was located south of Receptor Sites R14, R15, and R16 on the proposed SR 54 north right-of-way line. These receptor sites represented 11 dwelling units. The east end of the barrier would be 1,800 feet west of CR 579. The barrier would extend 800 feet west and would be 14 feet high. This barrier would be 11,200 square feet and cost $168,000. With this barrier, projected noise levels at the noise-sensitive sites ranged from 55 to 59 dBA. The insertion loss at the 11 dwelling units varied from 1 to 10 dBA. One dwelling unit had an insertion loss greater than 5 dBA. Since the average cost per dwelling unit receiving greater than a 5 dBA insertion loss would be $168,000, structural barriers are not considered a feasible abatement technique in the vicinity of Receptor Sites R14, R15, and R16 for the build alternatives. The ineffectiveness of barriers was due to the distances between the noise barrier and the noise-sensitive sites.

The barrier designed for the western portion of Timber Lake Estates was located south of Receptor Sites R17 through R22 on the proposed SR 54 north right-of-way line. These receptor sites represented 25 dwelling units. The east side of the

barrier would be 15 feet west of CR 579 and would extend 770 feet to the west. The barrier would be 14 feet high. This barrier would be 10,780 square feet and cost $161,700. With this barrier, projected noise levels at the noise-sensitive sites ranged from 58 to 70 dBA. The insertion loss at 11 of the 12 first-row dwelling units ranged from 6 to 9 dBA. The effectiveness of this barrier was limited at Receptors R20, R21, and R22 due to the traffic noise generated from CR 579. The average cost per first-row dwelling unit receiving greater than 5 dBA insertion loss is $14,700. Since the insertion loss is greater than 5 dBA at the noise-sensitive sites and cost less than $25,000 per dwelling unit, structural barriers are considered a feasible noise abatement technique in the vicinity of Receptor Sites R17 through R22 for the build alternatives.

The barrier designed for the residences east of CR 579 was located south of Receptor Site R23 on the proposed north right-of-way line. This receptor was representative of the 4 first-row dwelling units scattered east of CR 579. The barrier was located 200 feet east of Bohannen Road and would extend 200 feet to the east. The barrier would be 8.3 feet high. This barrier would be 1,660 square feet and cost $24,900. With this barrier, projected noise levels at Receptor Site R23 would be 60 dBA. The insertion loss at Receptor Site R23 was 3 dBA. Since the insertion loss at Receptor Site R23 is less than 5 dBA, structural noise barriers are not considered a feasible abatement technique in the vicinity of Receptor Site R23 and at the other three first-row dwelling units represented by Receptor Site R23.

Structural barriers were not considered feasible at Receptor Sites R24 and R25 and at the six dwelling units these sites represented due to opening in barriers that would be needed to provide access. The existing driveways and adjacent roadways would significantly reduce the effectiveness of any noise barriers. Therefore, barriers were not designed for these sites.

5.1.4 U.S. 301--Receptor Sites R26, R27, R29, R31, and R32

In the vicinity of U.S. 301 the build alternatives share a common alignment (see Figure 3-2, page 4 of 4). Due to the distances between noise-sensitive sites

three barriers were designed. One barrier was designed for the single-family residences to the west of U.S. 301 and two in the vicinity of Palm View Gardens Trailer Park.

The barrier designed for the residences to the west of U.S. 301 was located south of Receptor Sites R26 and R27 on the proposed SR 54 north right-of-way line. These receptors represent three first-row dwelling units and two second-row dwelling units. The west end of the barrier was located 300 feet west of South Allen Road. The barrier would extend 540 feet to the east and would be 9 feet high. This barrier would be 4,860 square feet and cost $72,900. With this barrier, projected noise levels at the noise-sensitive sites would range from 58 to 60 dBA. The insertion loss at four of the dwelling units was 6 dBA. The average cost per dwelling unit receiving greater than a 5 dBA insertion loss was $18,225. Since the average cost per dwelling unit would be less than $25,000, and insertion losses would be greater than 5 dBA, structural barriers are considered a feasible noise abatement technique in the vicinity of Receptor Sites R26 and R27.

One of the second-row dwelling units was 1,000 feet west of the other dwelling units. Based on the barrier analysis in the vicinity of Site R23, a noise barrier designed to reduce noise-levels at one receptor site would cost more than $25,000. Therefore, no barrier analysis was considered for this dwelling unit.

Two barriers were designed for noise-sensitive sites in Palm View Gardens Trailer Park. These barriers were located northeast and southwest of the main entrance road. These barriers were east of Receptor Site R32 and located on the proposed U.S. 301 west right-of-way line. Receptor Site R32 represented 42 first-row residences. The barrier to the southwest would extend 650 feet from the entrance and would be 13 feet high. The barrier to the northeast would extend 860 feet from the entrance road and would also be 13 feet high. The entrance road to Palm View Gardens Trailer Park is approximately 1,000 feet from Chancey Road. These two barriers would have a combined area of 19,630 square feet and cost $294,450. With these barriers, projected noise levels at the noise-sensitive sites would

range from 58 to 62 dBA. The insertion loss ranged from 7 to 12 dBA at 42 first-row dwelling units. The insertion loss of the 24 second- row dwelling units represented by Receptor Site R33 was 4 dBA. The average cost per dwelling unit receiving greater than 5 dBA insertion loss was $7,010. Since the average cost per dwelling unit would be less than $25,000 and insertion losses would be greater than 5 dBA, structural barriers are considered a feasible noise abatement technique in the vicinity of Receptor Site R32.

Structural barriers were not considered feasible at Receptor Sites R29 and R31, which represent two single-family residences. This is due to openings in barriers that would be needed to provide access. The existing driveways would reduce the effectiveness of any noise barrier. Therefore, barriers were not designed for these sites for any of the build alternatives.

5.1.5 Property Acquisition for Noise Barriers

Since all of the proposed noise barriers under consideration would be built on the existing or proposed right-of-way lines (See Sections 5.1.1 through 5.1.4), additional property acquisition for noise barriers were not considered necessary. For the new alignment portions of the project, the right-of-way to be acquired would be sufficient to include noise barriers.

5.2 VEGETATIVE AND EARTH BARRIERS

The evaluation of vegetative and earth barriers to reduce noise levels at noise sensitive sites is presented in Sections 5.2.1 through 5.2.4. A summary of the estimated costs and effectiveness of the barriers evaluated are summarized in Table 5.2.

5.2.1 CR 581--Receptor Sites R1 through R11

The effectiveness of vegetative barriers for noise attenuation is dependent upon the width and density of vegetation cover. In general, it takes 100 feet of dense, forested landscaping to reduce noise levels by 5 dBA. The construction of earth berms is dependent upon the availability of right-of-way.

Table 5-2. Summary of Estimated Cost and Effectiveness of the Vegetative and Earth Barriers Evaluated

Location--Receptor Sites Affected/ Alternative	No. of Dwelling Units Affected	Length & Width/ Height (feet)	Estimated Cost	No. of Dwelling Units Benefited*	Average Cost per Dwelling Unit**
CR 581--Receptor Sites R1 - R11 (Vegetative Barrier)					
Alternative 1A	24	-	-	-	-
Common Alignment - Alternatives 1C & 1D	7	1,000' (L) X 200' (W)	$161,000	7	$23,500
CR 581--Receptor Sites R1 - R11 (Earth Barrier)					
Alternative 1A	24	2700' (L) X 10' (H)	$513,500	21	$24,450
Common Alignment - Alternatives 1C & 1D	7	-	-	-	-
Fox Run Boulevard--Receptor Site R12 (Vegetative Barrier)					
Alternative 1A	-	-	-	-	-
Alternative 1C	-	-	-	-	-
Alternative 1D	9	1800' (L) X 150' (W)	$224,000	9	$24,900

- Use of abatement measure was not practical
* The number of dwelling units where noise levels would be reduced by at least 5 dBA.
** Average cost is determined by dividing the estimated cost of noise abatement by the number of dwelling units

a:\sr5492-j.1\sr54t52.wk3

In the vicinity of CR 581, Build Alternative 1A would lie directly on the Williamsburg Subdivision north property line. Therefore, vegetative barriers and earth berms are impossible due to the lack of right-of-way.

For Build Alternatives 1C and 1D, vegetative and earth barriers are possible since the proposed alignment is approximately 350 feet from the closest Receptor Site (R1). A naturally vegetative strip approximately 1,000 feet long and 200 feet wide along the SR 54 south right-of-way line (see Barrier-B in Figure 5-1) would reduce noise levels in the vicinity of Receptor Site R1 which represents seven dwelling units by 5 to 10 dBA. Approximately 4.6 acres of additional right-of-way would need to be acquired. Assuming a cost of $35,000 per acre, the cost would be approximately $161,000 or $23,000 per dwelling unit. Since the cost will be less than $25,000 per dwelling unit and the insertion losses will be greater than 5 dBA at the noise-sensitive sites, vegetative barriers are considered a feasible noise abatement technique in the vicinity of Receptor Site R1 for Build Alternatives 1C and 1D (see Figure 5.1).

An earth barrier for Build Alternative 1C would be ineffective due to the distance between a barrier along the SR 54 right-of-way line and the noise-sensitive receptor sites in the Williamsburg Subdivision (see Section 5.1, Structural Barriers).

Due to concerns by residences in Williamsburg Subdivision, the feasibility of shifting the SR 54 alignment either 50 or 100 feet further north of the proposed Build Alternative 1A alignment and building a berm along the south side of SR 54 right-of-way line were evaluated. To construct an earth berm in the vicinity of Receptor Sites R1 through R11 would require the alignment of Build Alternative 1A to be shifted north at least 50 feet. A 50-foot alignment shift would reduce projected noise levels by 1 to 3 dBA. Projected noise levels would range between 66 to 68 dBA at the first-row residences and 57 to 65 dBA at second-row residences. The projected noise levels would be 10 to 21 dBA higher than the No-Build Alternative. This alignment, as well as the proposed Build Alternative 1A alignment, would impact all 48 dwelling units represented by Receptor Sites R1 through R11.

A berm 2,700 feet long and 10 feet high was designed to reduce noise levels at Receptor Sites R1 through R11. The land costs for the 3.1 acres of additional right-of-way required was $108,500 ($35,000 per acre). Construction costs are estimated to be $405,000. The total cost of the berm would be $513,500. This berm would reduce noise levels by at least 5 dBA at 21 noise-sensitive sites. Insertion losses at these sites ranged from 5 to 7 dBA. With this berm, the projected noise levels for the first-row residences would be approximately 60 dBA. The average cost per dwelling unit receiving greater than 5 dBA insertion loss was $24,450. Since the average cost per dwelling unit would be less than $25,000, and insertion losses would be greater than 5 dBA, an earth berm which requires an alignment shift of 50 feet is considered feasible to reduce noise levels in the vicinity of Receptor R1 through R11 for Build Alternative 1A.

The reduction in noise levels at Receptor Sites R1 through R11, due to an alignment shift of 100 feet, ranged from 1 to 7 dBA. Projected noise levels would range from 63 to 66 dBA at the first-row residences and 56 to 63 dBA at the second-row residences. With this alignment, noise levels would be 10 to 20 dBA greater than the No-Build Alternative. Overall, this alignment would impact 46 of the 48 dwelling units represented by Receptor Sites R1 through R11. This is two units less than the currently proposed SR 54 alignment.

A berm 2,700 feet long and 13 feet high was designed to reduce noise levels at Receptor Sites R1 through R11. The land cost for the 6.2 acres of additional right-of-way required was $217,000 ($35,000 per acre). Construction costs are estimated to be $525,000. The total cost of the berm would be approximately $742,000. This berm would reduce noise levels by 6 dBA at 21 noise-sensitive sites. With this berm, the projected noise levels for the first-row residences would be approximately 60 dBA.

The average cost per dwelling unit receiving greater than a 5 dBA insertion loss was $35,300. Since the average cost per dwelling unit is greater than $25,000,

earth barriers were not considered a feasible noise abatement technique in the vicinity of Receptor Sites R1 through R11 for Build Alternative 1A with the alignment shifted an additional 100 feet to the north. The additional land cost associated with shifting the alignment and the increased distance from noise source and noise-sensitive sites were the main factors contributing to this barrier ineffectiveness.

5.2.2 Fox Run Boulevard--Receptor Site R12

In the vicinity of Fox Run Boulevard, Build Alternative 1D is approximately 760 feet south of Receptor Site R12 (see Figure 3-2, page 2 of 4). Therefore, there is sufficient space for using either vegetative or earth barriers to reduce noise levels at R12. A natural vegetative strip approximately 1,800 feet long and 150 feet wide along the SR 54 north right-of-way line would reduce noise levels between 5 and 7 dBA. Approximately 6.4 acres of additional right-of-way would need to be acquired. Assuming a cost of $35,000 per acre, the cost would be $224,000 or $24,900 per dwelling unit. Since the insertion losses will be greater than 5 dBA at noise-sensitive sites and the costs will be less than $25,000 per dwelling unit, vegetative barriers are considered a feasible noise abatement technique in the vicinity of Receptor Site R12 for Build Alternative 1D.

The effectiveness of earth barriers for Build Alternative 1D would be ineffective due to the distance between a barrier along the SR 54 right-of-way line and the noise-sensitive sites (see Section 5.1, Structural Barriers).

5.2.3 CR 579--Receptor Sites R14 through R25

In the vicinity of CR 579 (see Figure 3-2, page 3 of 4), the alignment of the build alternatives is 30 to 45 feet from the first-row dwelling units (Receptor Sites R14, R17, and R20). Therefore, the use of vegetative barriers or earth berms are not feasible in the vicinity of Receptor Sites R14 through R25 due to the lack of right-of-way.

5.2.4 U.S. 301--Receptor Sites R26, R27, R29, R31, and R32

In the vicinity of U.S. 301 (see Figure 3-2, page 4 of 4), the alignment of the

build alternatives is 10 to 30 feet from Receptor Sites R26 and R32 which are both first-row dwelling units. Therefore, the use of vegetative or earth barriers are not feasible due to the lack of right-of-way at Receptor Sites R26, R27, and R32. At Receptor Sites R29 and R31, access roads would reduce the effectiveness of vegetative or earth barriers and therefore they were not considered feasible.

5.2.5 Property Acquisition for Buffer Zones

The acquisition of property for vegetative buffers or earthen berms were considered feasible in the vicinity of CR 581 -- Receptor Sites R1 through R11 for Alternatives 1A, 1C, and 1D, and in the vicinity of Fox Run Boulevard -- Receptor Site R12 for Alternative 1D (see Sections 5.2.1 through 5.2.3). The cost and reduction in noise levels from vegetative buffers and earth berms were considered reasonable at these sites. The acquisition of property for buffers or earthen berms at Receptor Sites R14 through R32 were not considered feasible. These measures were ineffective due to the closeness of the noise sensitive sites to the roadway.

5.3 ALIGNMENT MODIFICATION

In the vicinity of CR 581, the differences in noise impacts between Build Alternative 1A and 1C/1D (see Table 4-1) indicate that shifting the alignment is a feasible method of reducing noise impacts. However, neither of the proposed alignments eliminate all noise impacts to Williamsburg Subdivision. This is due to the geometry constraints of the CR 581 and SR 54 intersection. The alignment can not be shifted any further north than the alignment proposed for Alternative 1C/1D without compromising roadway safety.

In the vicinity of Fox Run Boulevard, the differences in noise impacts among the build alternatives (see Table 4-1) indicate that shifting the alignment of Alternative 1D is a feasible method of reducing noise impacts at Receptor Site R12. The alignments of Build Alternatives 1A and 1C do not impact Receptor Site R12.

Minor shifts in alignment of Build Alternative 1D in the vicinity of this receptor would increase wetland impacts. Consequently, minor shifts were not considered feasible do to the increased wetland impacts and costs of wetland mitigation (see Permit Coordination Report, September 1989).

In the vicinity of CR 579 and west of U.S. 301, the build alternatives share a common alignment. A portion of the right-of-way required for this alignment has been donated to the state and shifts in this alignment to the south to avoid noise-sensitive sites to the north would increase wetland impacts. Therefore, due to increases in right-of-way costs and wetland impacts, a shift in the proposed alignment to the south in the vicinity of Receptor Sites R14 through R27 is not considered feasible.

In the vicinity of U.S. 301, noise-sensitive sites occur on both sides of the roadway. Shifts in roadway alignment to reduce noise impacts on the west side of U.S. 301 would only increase noise impacts to noise-sensitive sites on the east side. Therefore, a shift in alignment in the vicinity of Receptor Sites R28 through R33 was not considered feasible.

5.4 SMOOTH-TYPE PAVEMENT

The use of smooth-paving materials would reduce noise levels. However, this would reduce road surface friction between tires and pavement, resulting in unsafe stopping conditions, especially when wet. Therefore, this technique is not recommended for any of the Build Alternatives.

5.5 TRAFFIC MANAGEMENT POLICIES

The imposition of a reduced speed limit or restriction on heavy truck traffic would reduce the utility of SR 54 as a principal artery for the movement of east-west traffic between I-75 and U.S. 301. It is essential to maintain a posted speed limit of 55 mph for the timely movement of goods, services, and commuters. In addition, the restriction of large trucks from the traffic stream would only marginally decrease noise levels since truck usage is relatively low. Therefore, since traffic management policies would limit SR 54 utility, this option was dropped from further consideration.

5.6 SOUND PROOFING AND PROPERTY OWNER COMPENSATION

The Florida Department of Transportation is prohibited by Florida Statutes to expend money for sound proofing a building or payment of compensation for traffic noise impacts unless taking of property is involved or property is within the existing right-of-way. Since none of the impacted noise-sensitive sites do not meet the above conditions, these alternatives noise abatement measures were not considered.

5.7 LAND USE CONTROLS

In general, land use controls would not reduce noise levels at existing noise-sensitive sites. However, land use controls are one of the most effective noise abatement measures to minimize future impacts. Therefore, it is recommended that Pasco County through zoning and building codes use the noise isopleths provided in Section 6.0 of this report to limit the growth of noise-sensitive land uses adjacent to the roadway.

5.8 SUMMARY

Noise attenuation measures were evaluated for each of the noise-sensitive sites impacted by the proposed project. This evaluation indicates that structural, vegetative, and earth barriers, and alignment shifts were found feasible and could be provided at a reasonable cost at 119 of the 143 dwelling units impacted by Build Alternative 1A, at 78 of the 102 dwelling units impacted by Build Alternative 1C, and at 87 of the 111 dwelling units impacted by Alternative 1D. The noise abatement measures found feasible for Build Alternative 1A are estimated to cost $1,055,550 which is 30 percent of the $3,575,000 that could be spent on noise abatement. This amount was derived by multiplying the number of dwelling units impacted by $25,000 and represents the amount that can be used on noise abatement and be considered reasonable. The noise abatement measures found feasible for Build Alternative 1C are estimated to cost $690,050, which is 27 percent of the $2,550,000 that could be spent on noise abatement. The noise abatement measures found feasible for Build Alternative 1D are estimated to cost $914,050 which is 33 percent of the $2,775,000 that could be spent on noise abatement.

Noise abatement measures were not found feasible 24 of the 143 dwelling units impacted by Build Alternative 1A, at 24 of the 102 dwelling units impacted by Build Alternative 1C, and at 24 of the 111 dwelling units impacted by Alternative 1D. Therefore, based on the noise analysis performed to date, there appears no apparent solutions available to mitigate the noise impacts at these sites. The impacts to these 24 noise-sensitive sites would be unavoidable consequences of the proposed project.

Build Alternative 1C impacts the least number of noise-sensitive sites (102 dwelling units) and has the lowest abatement costs ($690,050) of the build alternatives. Build Alternative 1A has the highest number of noise impacts (143 dwelling units) and abatement costs ($1,055,550) of the build alternatives. Build Alternative 1D noise impacts (111 dwelling units) and abatement costs ($914,050) are between those of Build Alternatives 1C and 1D. As described above, Alternative 1A, 1C, and 1D would each have unavoidable impacts at 24 noise-sensitive sites.

The Florida Department of Transportation (FDOT) will consider the construction of feasible noise-abatement measures at the noise-impacted locations identified in this analysis contingent upon the following conditions.

- Detailed noise analyses during the final design process;
- Cost-effectiveness analyses based on final design;
- Community input 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.

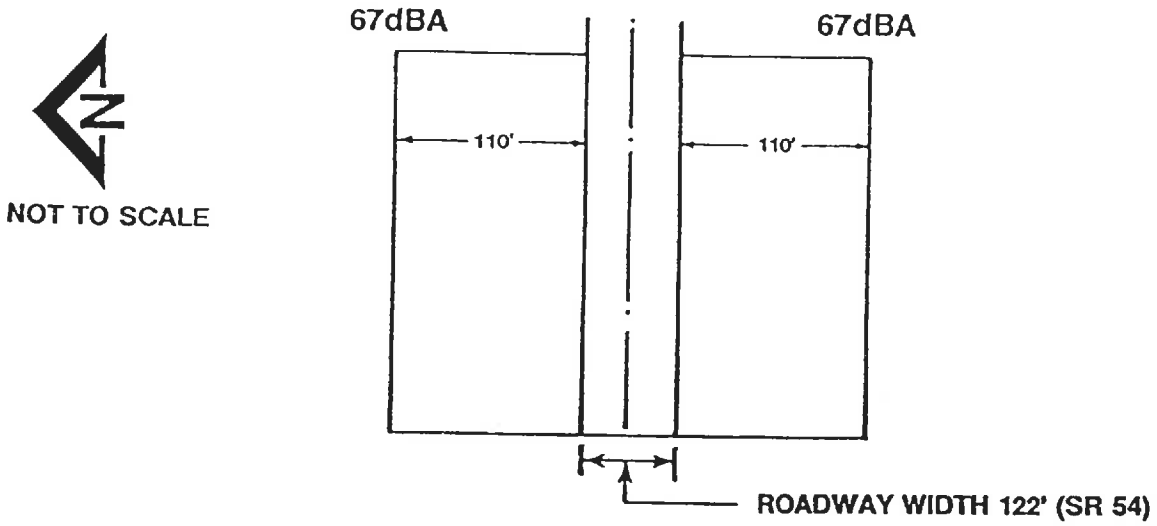
It is likely that the noise-abatement measures for the identified noise-impacted areas will be constructed if found to be feasible based on the contingencies listed above. If, upon evaluation during the final design phase of the contingency conditions listed above, it is determined that noise abatement is not

feasible for a given location(s), such determination(s) will be made prior to granting approval of the reevaluation for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and type (or approved alternatives) will be made before the construction advertisement is approved.

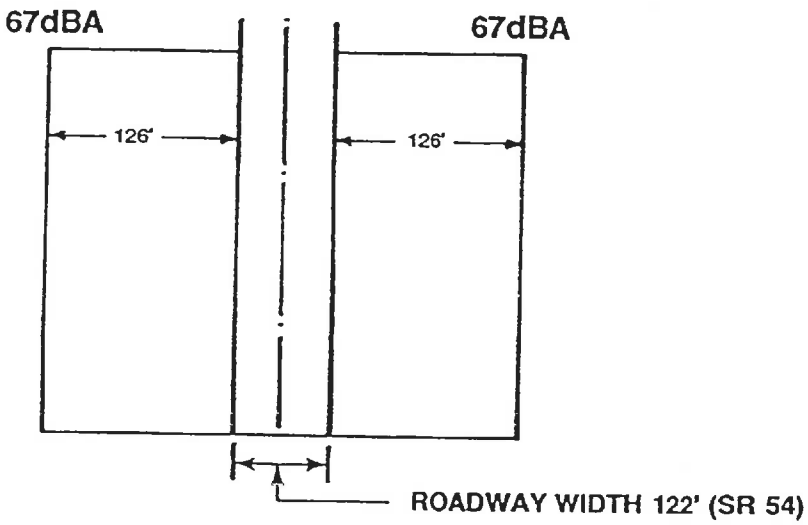
6.0 NOISE ISOPLETHS

Generalized noise isopleths were developed for portions of the project having similar typical cross sections and daily traffic conditions (Figure 6-1). The noise isopleths represent the approximate distance at which FHWA-NAC levels for Activity Category B (67 dBA for parks residences, schools, churches, etc.) will occur for each of the Build Alternatives (1A, 1C, and 1D) for the year 2010. Distances were calculated with the FLAMOD interactive contour program--PPLENV25. These distances can be used to predict impacts to noise-sensitive sites along SR 54 other than those modeled. Local planners can also use this information to ensure that future land uses will be compatible with anticipated highway noise levels.

SR 54A TO I-75



I-75 TO CR 581



NOTE: DISTANCE MEASURED FROM EDGE OF PAVEMENT.

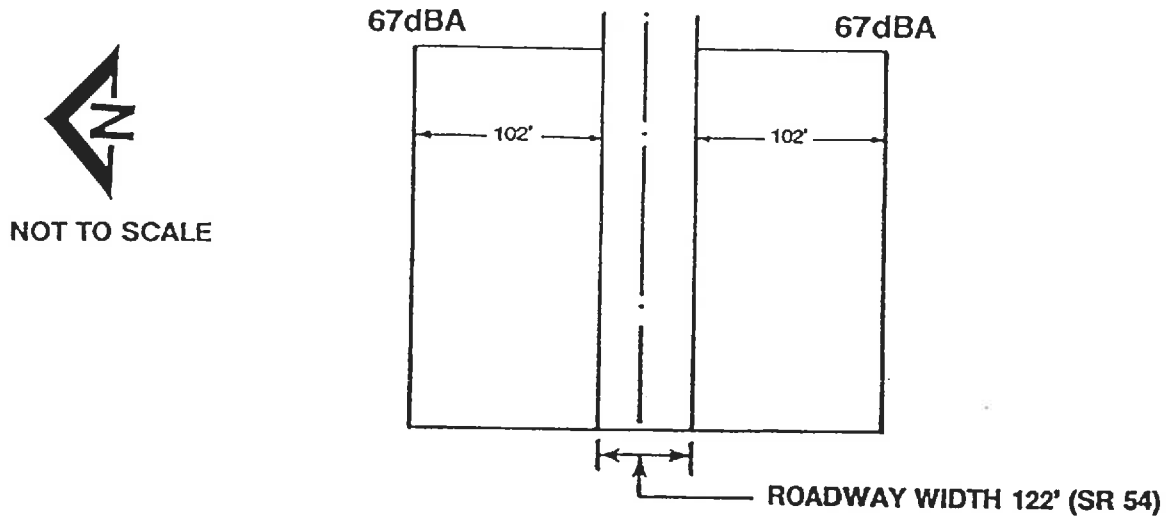
Figure 6-1
YEAR 2010 BUILD ALTERNATIVE NOISE ISOPLETHS FOR 67 dBA

SOURCE: HUNTER, 1989.

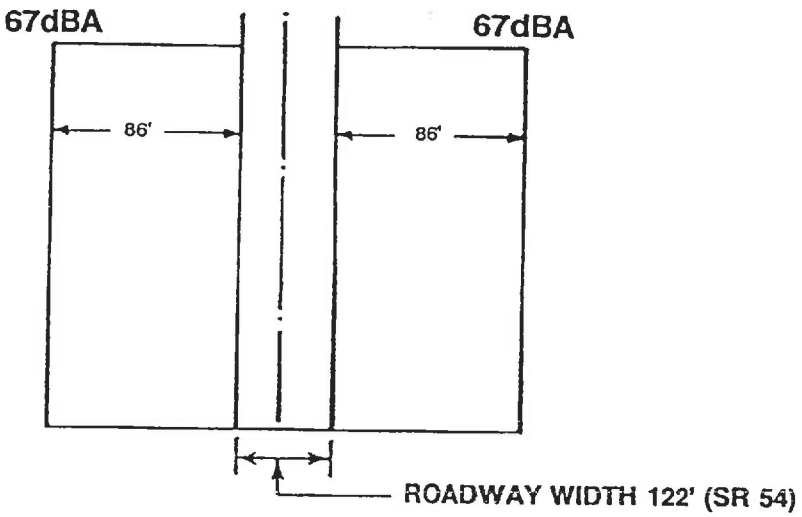
(1 of 3)

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

CR 581 TO WESLEY CHAPEL LAKES BLVD. (PROPOSED)
ALTERNATIVES 1, 1C, 1D



WESLEY CHAPEL LAKES BLVD. (PROPOSED) TO CR 579
ALTERNATIVES 1, 1C, 1D



NOTE: DISTANCE MEASURED FROM EDGE OF PAVEMENT.

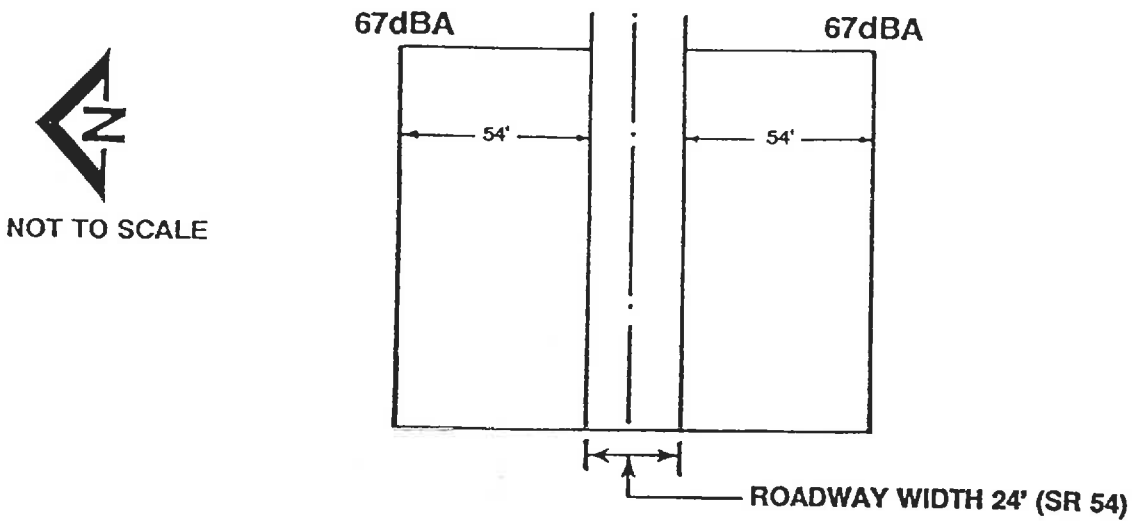
Figure 6-1
YEAR 2010 BUILD ALTERNATIVE NOISE ISOPLETHS FOR 67 dBA

SOURCE: HUNTER, 1989.

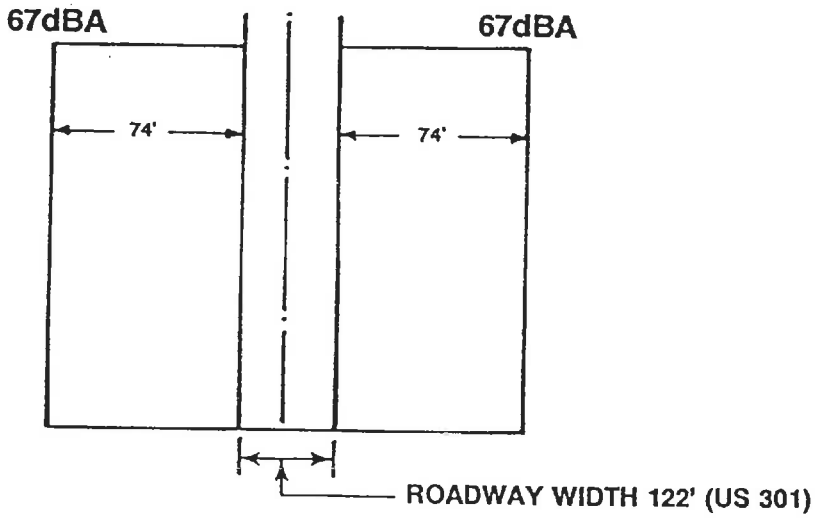
(2 of 3)

SR 54/SR 54A
CYPRESS CREEK TO
ZEPHYRHILLS EAST BYPASS

CR 579 TO US 301



SR 54 TO CHANCEY ROAD



NOTE: DISTANCE MEASURED FROM EDGE OF PAVEMENT.

Figure 6-1
YEAR 2010 BUILD ALTERNATIVE NOISE ISOPLETHS FOR 67 dBA

SOURCE: HUNTER, 1989.

(3 of 3)

SR 54/SR 54A
CYPRESS CREEK TO ZEPHYRHILLS EAST BYPASS

7.0 COORDINATION WITH LOCAL OFFICIALS

FHPM 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. Therefore, FDOT will cooperate with the Pasco County Planning Department and local officials by providing them with a copy of this document.

This Noise Study Report provides generalized future noise levels (for various distances from the highway improvement) for properties in the immediate vicinity of the project (see Figure 6-1). It also provides information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels.

8.0 CONSTRUCTION NOISE

During construction, there is a potential for noise impacts significantly greater than those resulting from normal traffic operations. Construction noise will be minimized by adherence to the controls listed in the 1986 edition of FDOT's Standard Specifications. In addition, all noise-sensitive sites and the following special provisions will be included in the construction contract:

1. The contractor will limit construction activities requiring the use of heavy equipment in the vicinity of residences to the time period between 7:00 AM and 6:00 PM, unless written permission is obtained from the project engineer.
2. The contractor shall not work on Sundays or legal holidays in the vicinity of noise-sensitive sites except to protect the public health and/or safety or by written permission from the project engineer.
3. In the event that the above restrictions are not adequate to keep construction noise at an acceptable level, as determined by the project engineer, he may direct the use of other controls and abatement measures.