

**REPORT OF THE
VIRGINIA DEPARTMENT OF TRANSPORTATION ON THE**

**Feasibility of Providing Noise
Abatement at the Intersection of I-66
and I-495 and Along I-66 from I-495 to
the Fairfax County Parkway**

**TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA**



HOUSE DOCUMENT NO. 93

**COMMONWEALTH OF VIRGINIA
RICHMOND
1994**

PREFACE

The Virginia Department of Transportation (VDOT) under the direction of Ray D. Pethel, Commonwealth Transportation Commissioner, was requested by the 1993 General Assembly through House Joint Resolution 576 (HJR 576) to study the desirability and feasibility of providing noise abatement at the intersection of I-66 and I-495 and along I-66 from I-495 to the Fairfax County Parkway.

The report was prepared by Cary Adkins with technical assistance from Robert Gibson, both of the VDOT Environmental Division.

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EXECUTIVE SUMMARY

House Joint Resolution 576 (HJR 576) requested the Virginia Department of Transportation (VDOT) to study the desirability and feasibility of providing noise abatement at the intersection of I-66 and I-495 and along I-66 from I-495 to the Fairfax County Parkway. Sound barriers have previously been provided at many of the noise-sensitive locations along the study corridor. However, there still remain 11 residential areas and a proposed park that experience traffic noise impacts from I-66 and the I-66/I-495 interchange.

Noise levels will reach the Federal Highway Administration (FHWA) impact criteria at each of these 12 locations and effective sound barriers can be constructed to eliminate all of the impacts. Public input received previously at public hearings and other public meetings and in written correspondence indicate that the affected residents desire noise protection.

Because VDOT does not have a retrofit noise abatement program, barriers to protect these noise-sensitive areas can be provided only in conjunction with qualifying highway construction projects or when funded by a third party. A retrofit program would involve the installation of noise abatement features along existing highways in the absence of qualifying projects. In the I-66/I-495 study area, qualifying projects would significantly change the roadway alignment or would increase the number of through-traffic lanes. The only such projects in the study area included in VDOT's current Six-Year Improvement Program involve the widening of I-495. A sound barrier that would protect one of the unprotected areas in the study corridor is likely to be constructed in conjunction with the Beltway widening and should not be included in a third party funding abatement package. It is also not recommended that a barrier to protect the proposed park be included in an abatement package for the study area. Constructing this barrier is not considered reasonable due to the nature of the activity in the park and the excessive cost required to protect it.

The estimated cost of a package to protect the other 10 impacted areas is \$2,722,000 for barrier materials and installation only and \$3,787,550 for all costs related to barrier construction.

It is possible to establish a retrofit noise abatement program. However, such a program would have to be applied statewide at a cost of \$500 million to \$750 million.

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BACKGROUND

House Joint Resolution 576 (HJR 576) requested the Virginia Department of Transportation (VDOT) to study the desirability and feasibility of providing noise abatement at the intersection of I-66 and I-495 and along I-66 from I-495 to the Fairfax County Parkway. This report documents the findings of that study.

Noise abatement measures have previously been provided at many of the noise-sensitive locations along the study corridor. However, there still remain several residential areas and a proposed park that experience traffic noise impacts from I-66 and the I-66/I-495 interchange. This study has concentrated on those unprotected areas.

STUDY METHODOLOGY

In accordance with the Federal Highway Administration (FHWA) noise standards and the state Noise Abatement Policy, a traffic noise impact occurs when noise levels at a noise-sensitive location reach criteria established by the FHWA for various land use categories. These criteria represent the upper limit of acceptable traffic noise conditions and also a balancing of that which may be desirable with that which may be achievable. They apply to areas having regular human use and where lowered noise levels are desired. The criteria are given in terms of hourly equivalent sound levels in decibels. The exterior criterion for residential areas and parks is 67 decibels.

At all noise-sensitive locations within the study corridor where noise levels are expected to reach 67 decibels, the construction of sound barriers has been thoroughly evaluated. Other noise abatement measures, such as alignment shifts and traffic management measures, have also been considered, but the construction of barriers is the only effective and feasible option in this situation. A shift in the alignment of an existing highway would be cost prohibitive, and traffic management measures, such as lowering speed limits and restricting truck traffic, would not be practical on interstate facilities. In accordance with the state policy, an abatement measure is not considered to be effective if the amount of noise reduction is less than five decibels.

When noise levels reaching 67 decibels are associated with a proposed Type I federal-aid highway project, noise abatement measures must be considered. When such measures are found to be reasonable and feasible, they must be incorporated as features of the project. A reasonable and feasible abatement measure must effectively eliminate or reduce the noise impacts as discussed above, and for residential areas, must not cost more than \$20,000 per protected residence. The \$20,000 ceiling, set forth in the state policy with the concurrence of the FHWA, reflects only the costs for barrier materials and installation in the case of sound barriers. A Type I project involves the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the vertical or horizontal alignment or increases the number of through-traffic lanes.

Discussion of the findings of the impact assessment and barrier evaluation has been divided into three sections, the I-66/I-495 interchange, I-66 from Gallows Road to Route 50, and I-66 from Route 50 to the Fairfax County Parkway. Existing barrier designations, referred to in locating unprotected areas, are derived from the highway improvement projects to which the barriers are associated.

I-66/I-495 Interchange

The assessment has indicated that noise impacts occur in both the northwest and southwest quadrants of the interchange. The affected locations are shown in Figure 1. In the northwest quadrant, noise levels will reach 72 decibels in the Woodcroft subdivision and at the Iliff Nursing Home. In the Dunn Loring Woods and Stenwood communities, levels will reach 74 decibels. Overall in this quadrant, six homes in Woodcroft, six in Dunn Loring Woods, and four in Stenwood and a portion of the nursing home property will receive noise levels reaching 67 decibels.

Two barriers separated by a 800-foot gap could eliminate all of the impacts in these communities and at the nursing home, reducing levels to 66 decibels and below. Barrier 1A would protect Woodcroft and the nursing home and would cost \$370,000 (\$648,500) or \$52,800 per property. Barrier 1B, costing \$393,000 (\$500,600) or \$43,700 per residence, would protect Dunn Loring Woods and Stenwood. These costs and all other individual barrier costs included in this report are estimates. Those in parenthesis represent total barrier and related costs such as for engineering and contingencies, mobilization, etc. Figures not in parenthesis represent costs for barrier materials and installation only. Costs and all other barrier information are summarized in Table 1.

In the southwest quadrant of the interchange, 31 residential units in the Merrifield Village apartment complex will receive noise levels of 67 to 72 decibels. Barrier 2, costing \$548,000 (\$717,900) or \$17,700 per apartment unit, would reduce levels to less than 65 decibels.

I-66 (Gallows Road to Route 50)

The recently completed I-66 High Occupancy Vehicle (HOV) project from Gallows Road to Route 50 was considered interim in nature and thus, did not qualify as Type I and was not eligible for the consideration of noise abatement. However, under the state Noise Abatement Policy, abatement can be provided with third party funding on VDOT right of way as long as the state specifications are met. It was through this element of the state policy that sound barriers were constructed on the HOV project using demonstration funds authorized by Congress.

These funds were sufficient to provide noise protection to 96 percent of the impacted properties along the project corridor. Barriers were considered for all impacted areas and were constructed at those locations receiving the most severe impacts, in terms of both the number of affected residences and the absolute noise levels. At some locations, barriers were found not to be effective for engineering reasons. This study has given careful consideration to those unprotected and noise-sensitive areas where effective barriers could be constructed. These areas are shown in Figure 2.

VDOT has received requests for sound barriers from most of the unprotected areas along this section of I-66. Several such requests have been received to close a 400-foot gap between a sound barrier constructed in conjunction with the Nutley Street interchange project and Barrier 5 constructed with demonstration funds. These barriers are along the westbound lanes of I-66 between Cedar Lane and Nutley Street. Noise levels in this area are already below 67 decibels as a result of the two existing barriers, and therefore, closing the gap would not protect any additional impacted properties, although the amount of noise reduction to some properties would be slightly increased. Connecting the existing barriers would cost \$115,000 (\$173,500).

Opposite the gap along the westbound lanes is a 600-foot gap adjacent to the eastbound lanes of I-66 between another Nutley Street project barrier and HOV project Barrier 6. The existing barriers have eliminated noise impacts at all but two residential properties in the Briarwood Farms and Shady Knolls communities, although one of the two residences is receiving five decibels of reduction even though the impact has not been totally eliminated. The noise levels at the two properties, both of which are in Shady Knolls, reach 68 to 69 decibels. Closing this gap would cost \$211,000 (\$309,000) and would effectively reduce (by five decibels) noise levels at only the unprotected residence. The other impacted property would receive an imperceptible amount (less than three decibels) of additional reduction.

One residence in the Poplar Terrace neighborhood, located south of I-66 and east of Blake Lane, is receiving noise levels that reach 67 decibels. HOV project Barrier 9 has eliminated all other impacts in Poplar Terrace. This barrier could be extended 600 feet to the east to effectively eliminate the remaining impact at a cost of \$154,000 (\$201,800).

One residence, located just east of Blake Lane between Oakton High School and the westbound lanes of I-66, is receiving noise levels reaching 69 decibels. A sound barrier costing \$108,000 (\$181,000) would reduce the levels to 64 decibels.

While most areas along this section of I-66 contain sound barriers, none have been constructed along the westbound lanes between Jermantown Road and Waples Mill Road. Few residential properties exist in this area, and only three (one is located just west of Waples Mill Road) are receiving noise impacts. One property, located just west of Jermantown Road, is receiving levels reaching 71 decibels. A barrier costing \$67,000 (\$87,800) could be constructed to effectively eliminate the impact by reducing levels to 66 decibels.

The second impacted residence is located just east of Waples Mill Road and is receiving noise levels reaching 68 decibels, while levels at the impacted property west of Waples Mill Road reach 67 decibels. Barriers adjacent to the westbound lanes of I-66 on both sides of Waples Mill Road would be required to effectively eliminate the impacts at both residences. The two barriers would cost \$535,000 (\$700,850) or \$267,500 per residence and would reduce noise levels to less than 64 decibels.

I-66 (Route 50 to the Fairfax County Parkway)

The section of I-66 between Route 50 and the Fairfax County Parkway contains five impacted areas, one of which (the Post Forest apartment complex) will be protected by a sound barrier to be constructed in conjunction with the HOV project from Route 50 to Route 234. Of the remaining affected areas, one will contain a park, and residential properties are located on the other three. The impacted areas for this section of I-66 are shown in Figure 3.

Four residences located south of I-66 on Random Hills Road between Route 50 and Monument Drive will receive traffic noise impacts from I-66, with levels reaching 69 decibels. A sound barrier adjacent to the eastbound lanes of I-66 and costing \$484,000 (\$634,000) or \$121,000 per residence would eliminate all impacts by reducing levels to no higher than 64 decibels.

Impacts will also occur north of I-66 and just east of Monument Drive at two residential properties on Legato Road. Noise levels reaching 69 decibels could be effectively reduced by five to six decibels by a sound barrier costing \$257,000 (\$336,700) or \$128,500 per residence.

One residence on Post Forest Drive, south of I-66 and just east of West Ox Road, will receive noise levels reaching 71 decibels. A barrier that would effectively eliminate the impact could be constructed along the eastbound lanes of I-66 for \$143,000 (\$187,300).

The study has determined that portions of the proposed West Ox Road Park, located south of I-66 between West Ox Road and the Fairfax County Parkway, will also be impacted by traffic noise from the interstate highway. The impacted areas, where noise levels will reach 69 decibels, will include a fitness trail and softball and baseball fields. Because the park will be located on a landfill and will be elevated well above I-66, a barrier with the necessary height and length to effectively protect the affected areas would cost \$1,417,000 (\$1,856,300).

CONCLUSIONS

The options for funding the sound barriers discussed in the preceding paragraphs appear to be limited. FHWA funding can only be utilized in conjunction with a Type I project or for a Type II or retrofit project. Or, third party funding will be acceptable, as was the case with the I-66 HOV project from Gallows Road to Route 50.

VDOT's current Six-Year Improvement Program for fiscal years 1993-94 through 1998-99 includes I-495 widening projects on both sides of the interchange with I-66.

These projects, scheduled for advertisement in the 1995-96 fiscal year, will both be classified as Type I, and based on the results of this study, it appears likely that interchange Barrier 2 will be included as a feature of the applicable project. Barriers 1A and 1B will also receive serious consideration but are not likely to be found reasonable and feasible unless additional impacts are created by the widening.

No further Type I improvements for I-66 between Gallows Road and the Fairfax County Parkway are included in the Six-Year Improvement Program. Even if a Type I project were implemented, however, it is not likely that it would include sound barriers without significant residential development (additional impacts) occurring. The findings of this study indicate that barrier costs along this section of I-66 far exceed the \$20,000 per residence ceiling.

The Type II project funding option does not appear to be feasible, since VDOT does not have a retrofit program. Such a program could be initiated, and VDOT receives frequent requests to do so. However, if implemented, the program would have to be applied statewide at a cost of \$500 million to \$750 million. In light of VDOT's fiscal commitment to the mandatory Type I abatement program, the cost of a retrofit program is prohibitive at the current time.

Given the limited application of the Type I program in the study area and VDOT's lack of a retrofit program, constructing additional sound barriers in the study corridor with third party money appears to be the only realistic funding option. In developing a potential barrier package, it is recommended that the following not be included:

- Constructing interchange Barrier 2. This barrier is likely to be constructed in conjunction with the Beltway widening.
- Closing the gap adjacent to the westbound lanes of I-66 between Nutley Street and Cedar Lane. No impacts currently exist.
- Constructing the barrier to protect the proposed West Ox Road Park. Constructing this barrier is not considered reasonable due to the nature of the activity in the park and the excessive cost required to protect it.

The estimated cost of constructing the remaining barriers is \$2,722,000 (\$3,787,550). Of the remaining group, the most severely impacted are interchange Barriers 1A and 1B. Again, as a comparison, the cost of a statewide retrofit program would be \$500 million to \$750 million.

APPENDICES

GENERAL ASSEMBLY OF VIRGINIA--1993 SESSION

HOUSE JOINT RESOLUTION NO. 576

Requesting the Virginia Department of Transportation to study certain noise attenuation measures.

Agreed to by the House of Delegates, February 4, 1993

Agreed to by the Senate, February 16, 1993

WHEREAS, the construction and maintenance of an adequate highway transportation system are of vital importance to the citizens of Virginia, their quality of life, and their economic prosperity; and

WHEREAS, it is equally important that in constructing these highways the greatest possible care be taken to ensure minimum degradation of the environment; and

WHEREAS, appropriately increased attention is being paid in constructing highways and other transportation facilities to minimization and mitigation of pollution and other environmental degradations; and

WHEREAS, in guarding against other forms of pollution and environmental degradation, it is important not to overlook the need to guard against noise pollution caused or likely to be caused by use of the highways and other transportation facilities; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Virginia Department of Transportation be hereby requested to study the desirability and feasibility of undertaking noise attenuation measures (i) at the intersection of Interstate Route 66 and Interstate Route 495 and (ii) along Interstate Route 66 between Interstate Route 495 and the Fairfax Parkway.

The Department shall complete its work in time to submit its findings and recommendations to the Governor and the 1994 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

TABLE 1 - I-66 NOISE ABATEMENT FEASIBILITY STUDY

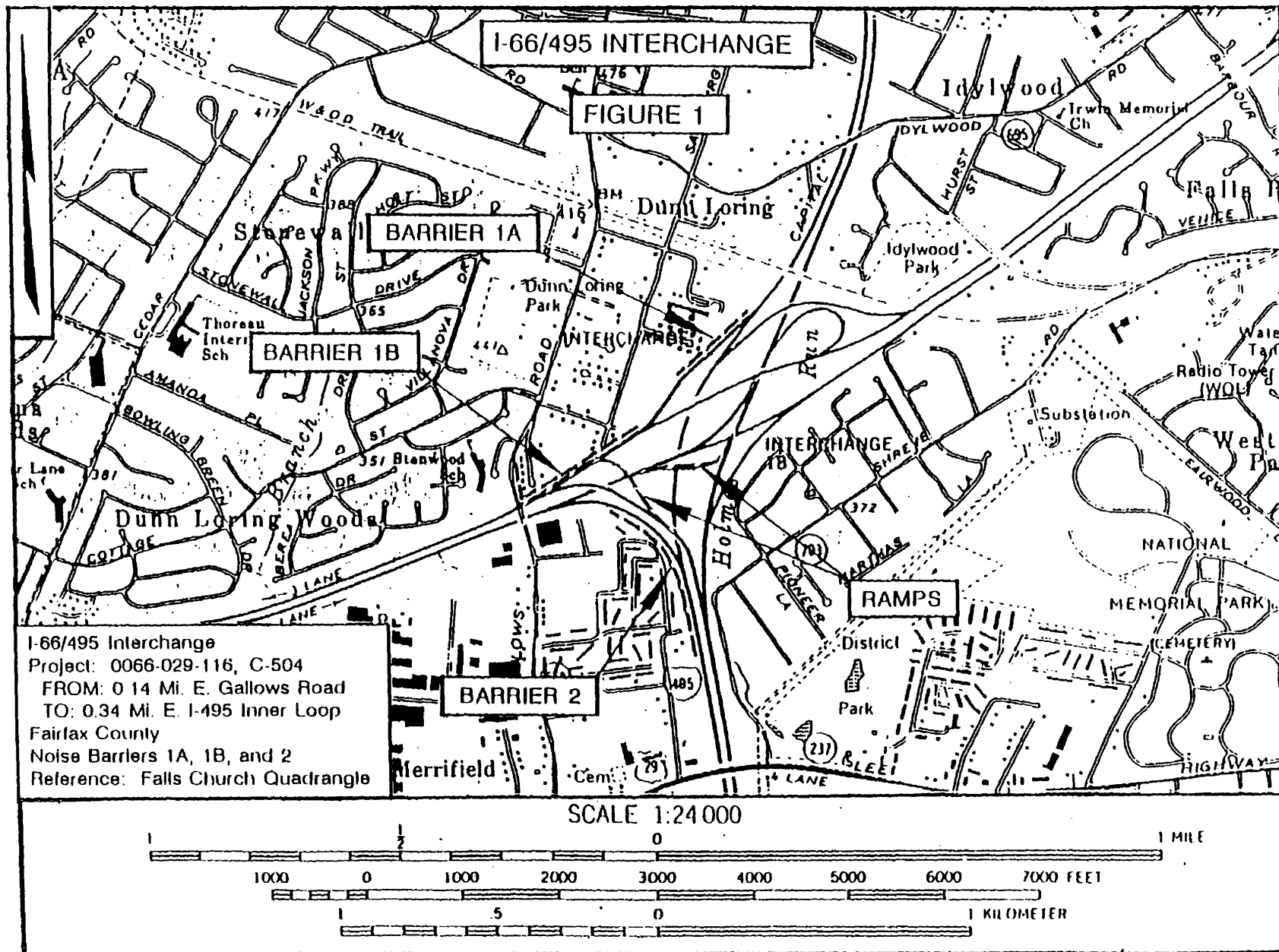
BARRIER	BARRIER INFORMATION				
	NOISE LEVELS	IMPACTS ELIMINATED	BARRIER COST ¹	COST PER RESIDENCE	TOTAL COST ²
1A	72	7	\$370,000	\$52,800	\$648,500
1B	74	10 ³	\$393,000	\$43,700	\$500,600
2	72	31	\$548,000	\$17,700	\$717,900
WB GAP	66	0	\$115,000	NA	\$173,500
EB GAP	69	2 ⁴	\$211,000	\$211,000	\$309,000
9 EXT	67	1	\$154,000	\$154,000	\$201,800
BLAKE LANE	69	1	\$108,000	\$108,000	\$181,000
JERMANTOWN	71	1	\$67,000	\$67,000	\$87,800
WAPLES MILL	68	2	\$535,000	\$267,500	\$700,850
RANDOM HILLS	69	4	\$484,000	\$121,000	\$634,000
LEGATO ROAD	69	2	\$257,000	\$128,500	\$336,700
POST FOREST	71	1	\$143,000	\$143,000	\$187,300
PROP. PARK	69	1	\$1,417,000	NA	\$1,856,300

¹ FIGURE INCLUDES COSTS FOR BARRIER MATERIALS AND INSTALLATION ONLY

² FIGURE INCLUDES ALL COSTS RELATED TO BARRIER

³ WHILE IMPACTS WOULD BE ELIMINATED AT ALL TEN RESIDENCES, ONLY NINE WOULD RECEIVE FIVE DECIBEL MINIMUM REDUCTION

⁴ WHILE IMPACTS WOULD BE ELIMINATED AT BOTH RESIDENCES, ONLY ONE WOULD RECEIVE FIVE DECIBEL MINIMUM REDUCTION

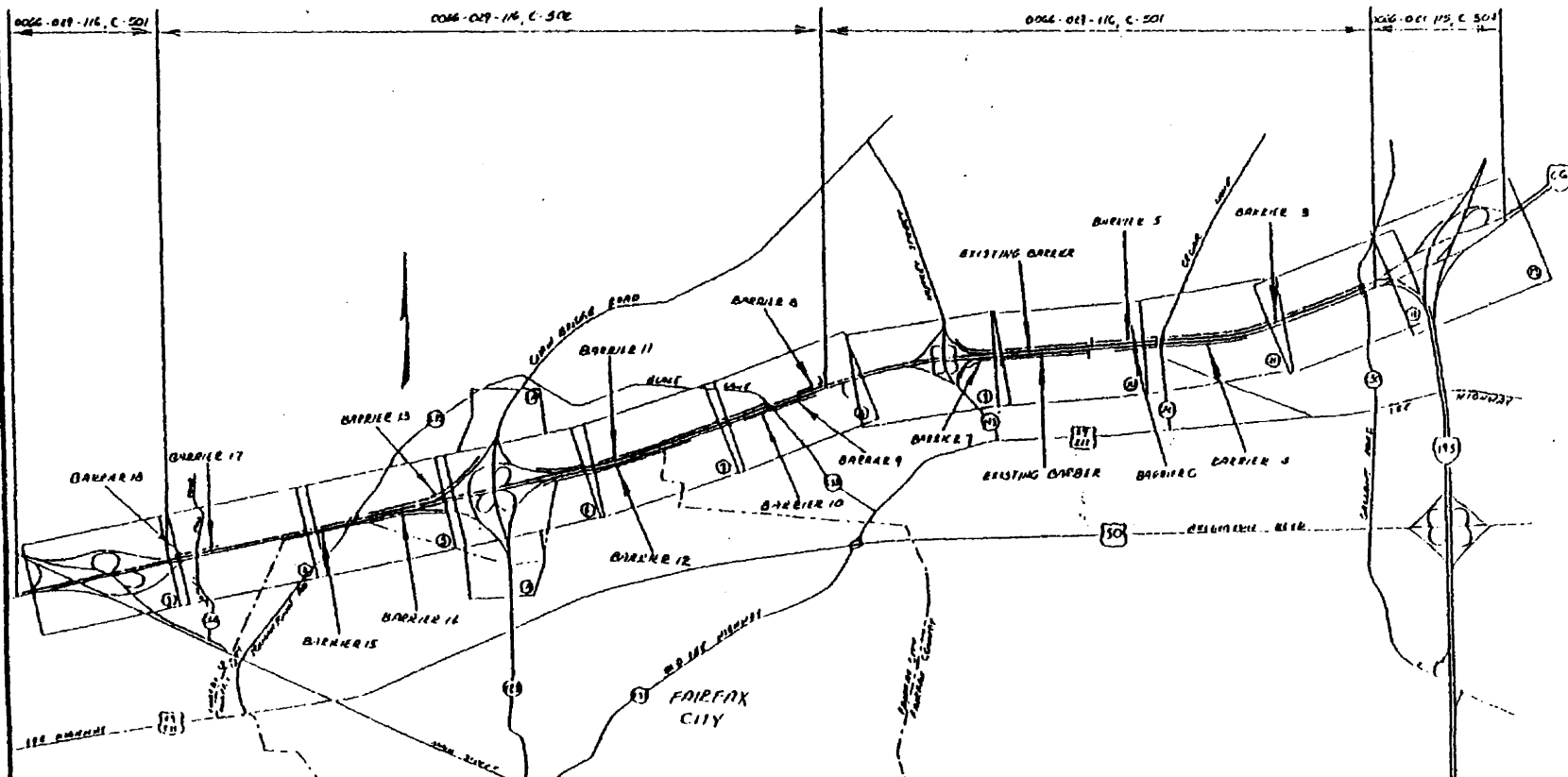


I-66/495 Interchange
 Project: 0066-029-116, C-504
 FROM: 0.14 Mi. E. Gallows Road
 TO: 0.34 Mi. E. I-495 Inner Loop
 Fairfax County
 Noise Barriers 1A, 1B, and 2
 Reference: Falls Church Quadrangle

17

FIGURE 2

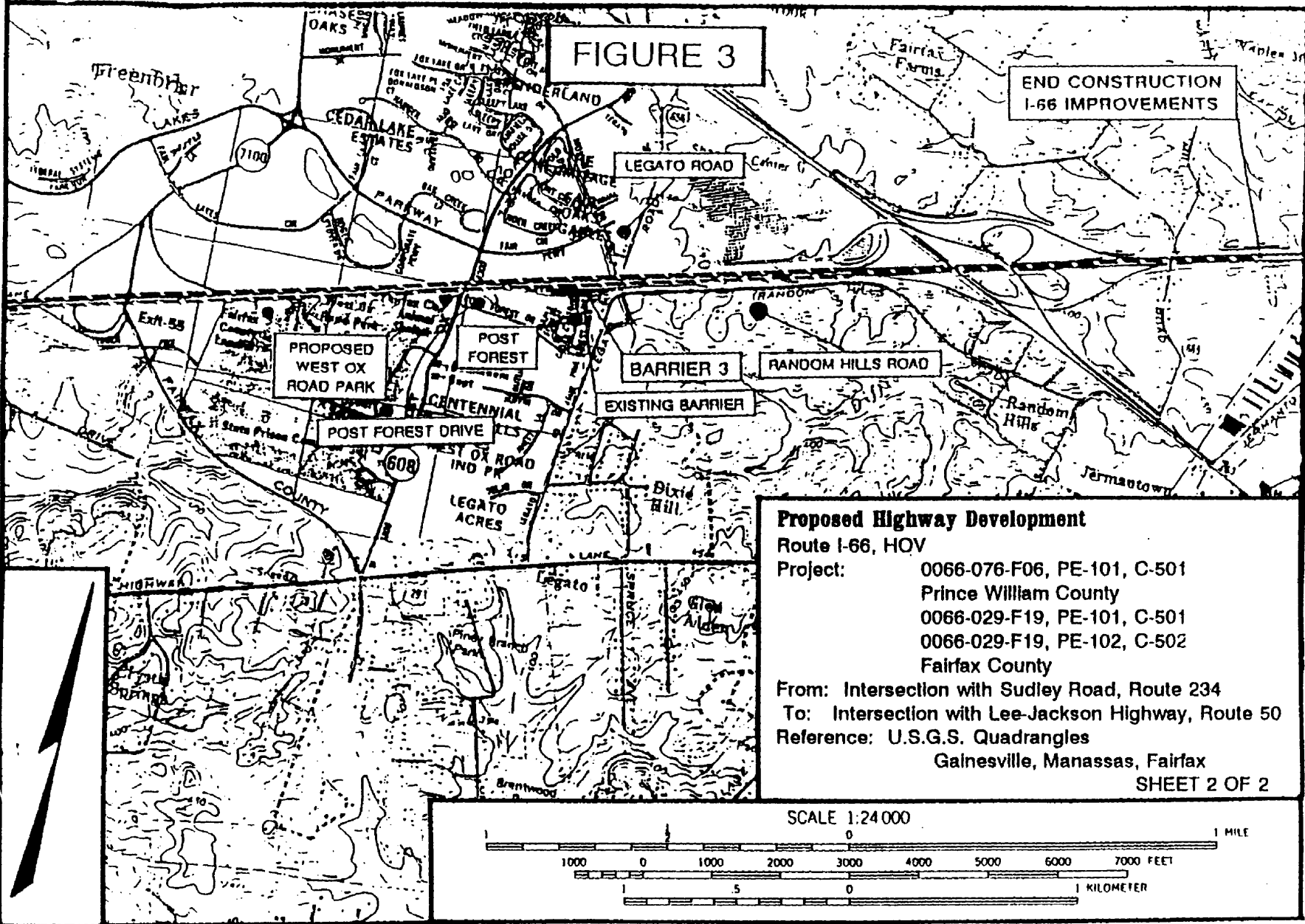
I-66 HOV
FAIRFAX COUNTY



DATE PROJECT NO	SECTION	FIDING NO PORT NO	FUND TYPE	EQUIPMENT FEET	LIMIT MAXIMUM CHANGES OF BAR CURVES		LIMIT MINIMUM CHANGES OF BAR CURVES		TYPE WALL PROFILE	DESCRIPTION
					FEET	PERCENT	FEET	PERCENT		
	C-501	1400-A(1)		0	1,845.00	0.75	1,845.00	0.60	I	EXISTING BARRIER ON GRASSY AREA TO BE RELOCATED TO THE NORTH SIDE OF THE HOV LANE OF EXISTING I-66 (RHS) TO BE RELOCATED TO BARRIER 10-12
	C-501	1400-A(1)	100C	164.13	15,790.01	2.93	15,790.01	2.93	II	EXISTING BARRIER ON GRASSY AREA TO BE RELOCATED TO THE NORTH SIDE OF THE HOV LANE OF EXISTING I-66 (RHS) TO BE RELOCATED TO BARRIER 10-12
	C-502	1400-A(2)	100C	14.83	16,000.12	3.11	16,000.12	3.11	II	EXISTING BARRIER ON GRASSY AREA TO BE RELOCATED TO THE NORTH SIDE OF THE HOV LANE OF EXISTING I-66 (RHS) TO BE RELOCATED TO BARRIER 10-12
	C-503	1400-A(3)	100C	---	3,007.50	0.75	3,007.50	0.75	II	EXISTING BARRIER ON GRASSY AREA TO BE RELOCATED TO THE NORTH SIDE OF THE HOV LANE OF EXISTING I-66 (RHS) TO BE RELOCATED TO BARRIER 10-12

FIGURE 3

END CONSTRUCTION
I-66 IMPROVEMENTS



Proposed Highway Development
 Route I-66, HOV
 Project: 0066-076-F06, PE-101, C-501
 Prince William County
 0066-029-F19, PE-101, C-501
 0066-029-F19, PE-102, C-502
 Fairfax County
 From: Intersection with Sudley Road, Route 234
 To: Intersection with Lee-Jackson Highway, Route 50
 Reference: U.S.G.S. Quadrangles
 Gainesville, Manassas, Fairfax
 SHEET 2 OF 2