ROUTE 31 STUDY

JAMES RIVER CROSSING

DRAFT ENVIRONMENTAL IMPACT

SUMMARY

A. PROPOSED ACTION AND INFORMATION CONTACTS

Federal Highway Administration

Administrative Action Environmental Statement

(X) Draft

( ) Final

(X) Section 4(f) Evaluation

The following persons may be contacted for additional information concerning the proposed project and this document:

- Mr. R. L. Hundley
  Environmental Engineer
  Virginia Department of Transportation
  1401 E. Broad Street, Annex 1114
  Richmond, VA 23219
  Phone: (804) 786-4304

- Mr. James M. Tumlin, Division Administrator
  Federal Highway Administration
  400 N. Eighth Street
  Richmond, VA 23240
  Phone: (804) 771-2371

B. PROJECT DESCRIPTION

The proposed project is an improvement of the existing Route 31 crossing of the James River between James City and Surry Counties. The existing river

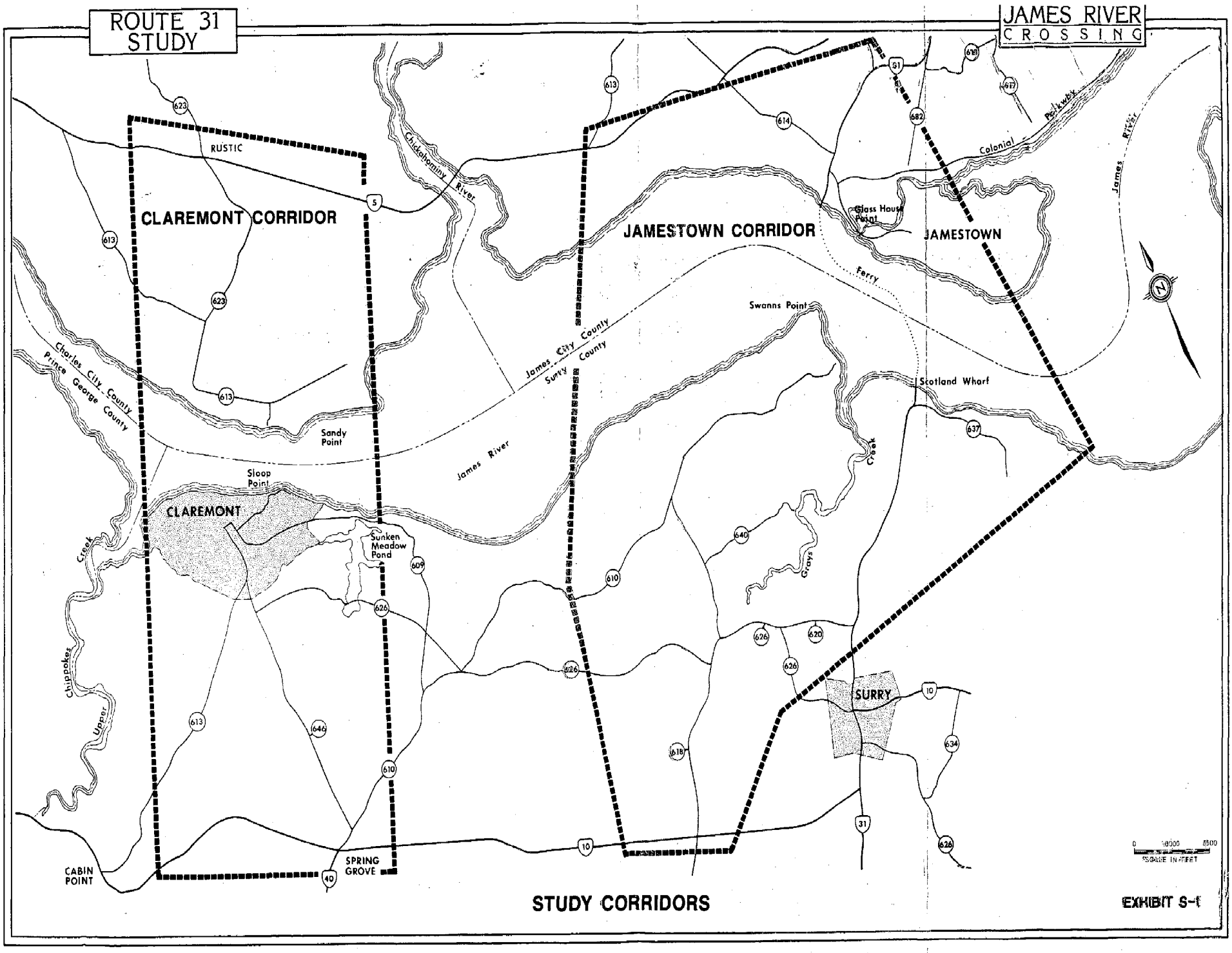
crossing facility is the Jamestown-Scotland Wharf Ferry System operated by the Virginia Department of Transportation. Corridor windows within which improvements are being considered are delineated on Exhibit S-1. The purpose of the project is to improve current and future traffic service in the corridor served by Route 31.

Alternatives under consideration include bridge or tunnel crossings of the river and new or improved approach roadways. These alternates would involve construction of two-lane facilities to modern design standards and would utilize portions of existing right-of-way as well as require some new right-of-way. Alternates under consideration range in length from 6.7 to 9.2 miles.

C. OTHER RELEVANT GOVERNMENT ACTIONS

Several transportation system improvements are in various stages of planning in the project study area portion of Charles City, James City and Surry Counties. With the exception of one project which is scheduled for construction, these projects are not currently scheduled for funding and their implementation is considered to be a long range proposition.

- ROUTE 620. This rural gravel road in Surry County is scheduled for paving and straightening of the existing alignment. This project is soon to be let for construction.
- ROUTE 31. The James City County Major Thoroughfare Plan includes a proposal to widen this major collector from a two-lane facility to four lanes. The proposed improvements are planned along Route 31, from Route 359 to the Williamsburg City Limits.


ROUTE 31 STUDY
JAMES RIVER CROSSING
CLAREMONT CORRIDOR
JAMESTOWN CORRIDOR
JAMESTOWN
CLAREMONT
SURRY
RUSTIC
Chickahominy River
Colonial Pkwy
James River
Glass House Point
Ferry
Swanns Point
Scotland Wharf
James City County
Surry County
Charles City County
Prince George County
Sandy Point
Sloop Point
James River
Sunken Meadow Pond
Gravs Creek
Chippokes Creek
Upper
CABIN POINT
SPRING GROVE
0 10000 20000
SCALE IN FEET
STUDY CORRIDORS
EXHIBIT S-1

- ROUTE 5. The James City County Major Thoroughfare Plan includes a proposal to improve the minor arterial segment of Route 5, from Route 614 to Route 615 (Ironbound Road). The proposed improvement involves widening the existing road to a rural four-lane facility. There are also improvements proposed for the urban principal arterial segment of Route 5, from Route 615 to Route 199. These improvements involve widening the existing roadway to an urban four-lane facility.

D. MAJOR ALTERNATIVES UNDER CONSIDERATION

Alternatives under consideration include the following:

- No-Build Alternative
- Improved Ferry Alternative
- Build Alternative

During the course of the study, a Transportation System Management Alternative and a Mass Transit Alternative were defined and evaluated. They were eliminated from further consideration when it was determined that neither would meet project objectives.

1. NO-BUILD ALTERNATIVE

The No-Build Alternative would consist of continued ferry operations similar to the existing service. The alternative assumes that the ferry system would continue with four boats operating on a two-boat schedule. Existing ferry boats would be replaced as needed. This system would maintain the current level of ferry service.

2. IMPROVED FERRY ALTERNATIVE

The Improved Ferry Alternative involves proposed improvements to the existing ferry service including additional boats and scheduled trips to improve the level of service being provided. The current four-boat fleet would be expanded to six. The operations would be increased for the peak period from a two-boat to a four-boat schedule at 15 minute headways. During future peak seasonal periods, a fifth boat would be needed.

3. BUILD ALTERNATIVE

Four build alternates are under consideration in conjunction with three river crossing options. The build alternates are shown in Section II, Exhibit II-2.

a. Alternate A

Alternate A, in the Claremont Corridor, extends from Route 10 east of Spring Grove to Route 5 in Charles City County north of the river. Alternate A is approximately 9.2 miles in length and utilizes extensive lengths of existing roads to minimize impacts.

b. Alternates B, C, and D

Alternates B, C, and D in the Jamestown Corridor all begin at a point on Route 31 north of the Town of Surry. Alternates B and D follow different locations to an area west of Swanns Point then both cross the James River at the same location before connecting to Route 5, about 2.3 miles east of the Route 5 crossing of the Chickahominy River. Alternates B and D are approximately 8.6 miles and 8.0 miles in length, respectively. Alternate C

follows Route 31 in a northeasterly direction and then swings westerly and northerly on a curvilinear alignment. The alignment continues to curve as it crosses the river to a connection to Route 31 immediately east of the ferry slip at Glass House Point. Alternate C is approximately 6.7 miles in length.

c. River Crossing Options

River crossing options under consideration include tunnels, low-level movable-span bridges, and high-level fixed-span bridges. Considering initial cost along with operating and maintenance costs, the high-level fixed-span type bridge is most cost effective. Consideration of the tunnel and the low-level movable-span type bridge reflects concern for the impact upon the view of the riverscape from Jamestown Island (Colonial National Historical Park). All three options are under consideration in conjunction with alternates in the Jamestown Corridor. Only the high-level fixed-span bridge is under consideration with Alternate A, in the Claremont Corridor, and is much further from Jamestown Island. Channel clearance requirements for bridges on the project, as specified by the U. S. Coast Guard, are 145 feet vertical and 300 feet horizontal.

E. SUMMARY OF IMPACTS

The various impacts of the No-Build Alternative, Improved Ferry Alternative, and four build alternates are summarized in this section and in Table S-1. Qualitative and, where feasible, quantitative evaluations of the alternatives have been presented.

1. LAND USE

Between 77 and 138 acres of land would be directly converted from its present land use to roadway right-of-way under the build alternates. Alternate A would require the most land. This is followed by Alternates B, D, and C in decreasing order of impact. No new right-of-way would be required for the No-Build or Improved Ferry Alternatives.

Except for the right-of-way under the build alternates, the use of land in Charles City and James City Counties is not expected to be influenced to any great extent by this project. However the potential exists in Surry County for increased development pressure depending on the alternative considered. The No-Build and Improved Ferry Alternatives would have very little impact. Alternate A would only increase the potential for development slightly. The remaining build alternates (B, C, D) would have the largest potential for increased growth pressure.

2. ECONOMICS AND EMPLOYMENT

The acquisition of right-of-way for the build alternates would result in an immediate loss of property taxes ranging from $2,000 to $3,900 per year. This factor is directly related to the amount of taxable land converted to highway purposes. No businesses would be required to relocate as the result of the build alternates. Access to employment opportunities would be increased the most by the permanent river crossing alternates in the Jamestown Corridor. These would be followed by Alternate A, the Improved Ferry Alternative, and the No-Build Alternative, in order of decreasing improvement in accessibility.

TABLE S-1
COMPARATIVE SUMMARY

ALTERNATE	LAND USE		ECONOMICS AND EMPLOYMENT			SOCIAL AND COMMUNITY			CULTURAL RESOURCES			TERRESTRIAL ECOLOGY AND AGRICULTURE					AIR QUALITY		NOISE		ENERGY			TRAFFIC AND SAFETY	
	INCREASED PRESSURE FOR DEVELOPMENT	ACRES REQUIRED FOR RIGHT-OF-WAY	BUSINESSES DISPLACED	INCREASED ACCESS TO EMPLOYMENT AREAS	ANNUAL LOSS IN LOCAL REAL ESTATE TAXES($)	HOUSHOLDS DISPLACED	IMPACT ON EXISTING COMMUNITY COHESION	INCREASED ACCESS TO MEDICAL, CULTURAL, AND EDUCATIONAL SERVICES	PREHISTORIC SITES *	HISTORIC SITES *	STANDING HISTORIC STRUCTURES **	AGRICULTURAL (ACRES)*	PRIME FARMLAND (ACRES)*	FORESTED (ACRES)	TOTAL TERRESTRIAL IMPACT (ACRES)	ENDANGERED SPECIES	CARBON MONOXIDE CONCENTRATIONS (PPM *) 1 HOUR	CARBON MONOXIDE CONCENTRATIONS (PPM *) 8 HOUR	PROPERTIES IMPACTED *	FEASIBLE NOISE BARRIER PROTECTION	BILLIONS BTU'S * DIRECT	BILLIONS BTU'S * INDIRECT	BILLIONS BTU'S * TOTAL	LEVEL OF SERVICE *	YEAR 2010 AVERAGE DAILY TRAFFIC
A	LOW	138	0	MODERATE	3900	1	LOW	MODERATE	1	2	0	46	33	74	120	0	6.5	3.4	SINGLE HOMES 19	NONE	374	467	841	C	5800
B	MODERATE	103	0	HIGH	3500	0	LOW	HIGH	5	12	0	34	22	46	80	0	6.2	3.2	SINGLE HOMES 12	NONE	205	233	438	C	6300
C	MODERATE	77	0	HIGH	2000	1	LOW	HIGH	6	3	1	40	36	31	71	0	6.2	3.1	JAMES-TOWN FESTIVAL PARK; SINGLE HOMES 5	NONE	131	153	284	C	6600
D	MODERATE	94	0	HIGH	3200	1	LOW	HIGH	6	3	1	34	24	42	76	0	6.1	3.1	SINGLE HOMES 3	NONE	205	232	437	C	6300
IMPROVED FERRY	VERY LOW	0	0	LOW	0	0	LOW	LOW	0	0	0	0	0	0	0	0	6.1	3.1	0	N/A	577	471	1048	N/A	2500
NO-BUILD	VERY LOW	0	0	LOW	0	0	LOW	LOW	0	0	0	0	0	0	0	0	6.1	3.1	0	N/A	530	467	997	N/A	2500
NOTES									*SITES RECOMMENDED FOR PHASE II STUDY. **SITES/ STRUCTURES DIRECTLY IMPACTED.			*ACRES IN AGRICULTURE ARE NOT ALL CONSIDERED PRIME FARMLAND.					* PARTS PER MILLION IN YEAR 2010 AT WORST CASE RECEPTOR.		*NOISE LEVELS EITHER MEET OR EXCEED NAC, OR SUBSTANTIALLY INCREASE.		* AVERAGE ANNUAL ENERGY CONSUMPTION- 2000 TO 2010.			*YEAR 2010 AT EACH RIVER CROSSING.	

TABLE S-1 (CONT'D)
COMPARATIVE SUMMARY

ALTERNATE		AESTHETICS		WATER QUALITY AND AQUATIC ECOLOGY							DESIGN ELEMENTS AND COSTS				
												1987-$MILLIONS			
		RIVERSCAPE IMPACT	LANDSCAPE IMPACT	WATER QUALITY	STREAM/WETLANDS CROSSINGS	WETLANDS (ACRES)	MACROBENTHIC CONDITIONS	ANADROMOUS FISH STREAMS CROSSED	POTENTIAL FOR KEPONE DISTURBANCE	FLOODPLAIN ENCROACHMENTS	LENGTH (MILES)	RIGHT-OF-WAY*	ROADWAY	BRIDGE, TUNNEL, FERRY BOATS	TOTAL COST
A	HIGH-LEVEL	HIGH	LOW	FAIR	12	7.5	FAIR	1	HIGH	2	9.2	1.1	8.7	35.5	45.3
B	HIGH-LEVEL	HIGH	LOW	FAIR	6	7.1	FAIR	3	LOW	3	8.6	1.0	5.4	68.7	75.1
	LOW-LEVEL	HIGH	LOW	FAIR	6	7.1	FAIR	3	LOW	3	8.6	1.0	5.4	66.2	72.6
	TUNNEL	LOW	LOW	FAIR	6	7.1	FAIR	3	MODERATE	3	8.6	1.0	5.1	346.0	352.1
C	HIGH-LEVEL	HIGH	LOW	FAIR	4	6.0	FAIR	1	MODERATE	2	6.7	0.7	4.0	54.5	59.2
	LOW-LEVEL	HIGH	LOW	FAIR	4	6.0	FAIR	1	MODERATE	2	6.7	0.7	3.9	52.1	56.7
	TUNNEL	LOW	LOW	FAIR	4	6.0	FAIR	1	HIGH	2	6.7	0.7	3.6	277.6	281.9
D	HIGH-LEVEL	HIGH	LOW	FAIR	5	8.5	FAIR	1	LOW	2	8.0	1.0	4.3	68.7	74.0
	LOW-LEVEL	HIGH	LOW	FAIR	5	8.5	FAIR	1	LOW	2	8.0	1.0	4.3	66.2	71.5
	TUNNEL	LOW	LOW	FAIR	5	8.5	FAIR	1	MODERATE	2	8.0	1.0	4.0	346.0	351.0
IMPROVED FERRY		MODERATE	LOW	FAIR	0	0	FAIR	0	LOW	0	N/A	0	0	29.5	*** 29.5
NO-BUILD		MODERATE	LOW	FAIR	0	0	FAIR	0	LOW	0	N/A	0	0	17.7	** 17.7
NOTES											*INCLUDES R/W, RELOCATION AND UTILITY ADJUSTMENTS **INCLUDES REPLACEMENT OF THREE BOATS. ***INCLUDES REPLACEMENT OF THREE BOATS AND PURCHASE OF TWO BOATS.				

3. SOCIAL AND COMMUNITY

Construction of either Alternates A, C, or D would result in the displacement of one household. Alternate B would not require any relocations. The study area is generally rural and is sparsely developed. None of the alternatives would directly affect existing neighborhoods, overall community cohesion, or current community facilities and services. Improved access across the river would provide expanded opportunities for medical services, cultural events, educational training, and employment for residents of Surry County.

4. CULTURAL RESOURCES

The study area includes several prehistoric and historic archaeological sites. To date 47 archaeological sites have been identified along the various build alternates. Of these sites, 20 have the potential for containing important archaeological resources. Current research indicates that any of these sites that would be impacted by the project could be mitigated by data retrieval.

There are eight existing National Register archaeological or historic sites located in the vicinity of the various build alternates. Two historic structures have been determined to be eligible for listing on the National Register. Alternate C or D would require property acquisition from one National Register listed site, thereby creating a Section 4 (f) involvement.

5. TERRESTRIAL ECOLOGY AND AGRICULTURE

Of the land that would be converted to right-of-way under the build alternates, between 34 and 46 acres are farmland and between 31 and 74 acres

are forested. Approximately 22 to 36 acres of the agricultural acreage are classified as prime farmland. The portion of Alternate C in Surry County received a score of 161 from the Soil Conservation Service on its Farmland Conversion Impact Rating. Selection of Alternate C would require a higher level of consideration for protection under the Farmland Protection Policy Act. These land conversions would result in permanent loss of habitat for wildlife in the area. None of the alternatives would directly impact any known endangered or threatened species.

6. AIR QUALITY

This project is in compliance with the Virginia State Implementation Plan. Each of the build alternates complies with the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO) and would result in CO levels only marginally higher than the No-Build or Improved Ferry Alternatives. Minor short term impacts during construction would result from dust and smoke due to earthwork and possible open burning of debris.

7. NOISE

Existing noise levels would increase in the vicinity of each build alternate and would impact 3 to 19 residences along with Jamestown Festival Park. Alternate A impacts the most residences while Alternate D affects the fewest. The only locations where a sound barrier would be potentially feasible is at Jamestown Festival Park at the northern terminus of Alternate C. However, a sound barrier at this location has not been recommended on the basis of the following factors: the cost of the barrier wall; the

tourist-oriented nature of the activity on the property; and the noise levels in all areas of the park are predicted to be below the Noise Abatement Criteria levels without the wall.

8. ENERGY

The two alternatives that maintain the ferry operation would consume twice the average annual energy levels of any build alternates in the Jamestown Corridor. Of the build alternates, Alternate C would consume the least energy and Alternate A the most.

9. TRAFFIC AND SAFETY

This project is intended to serve existing and future cross river travel demands. The current ferry operation is incapable of serving the traffic desiring to cross the river. Substantial motorist delay is the result. Expansion of the ferry system (Improved Ferry Alternative) would improve the service provided, but it would still be unable to meet future travel demands. Overall, the build alternates would substantially improve the safety, efficiency, and convenience of the transportation system in the area. Alternate C would provide the best and most direct cross river connection compared to existing travel patterns. This would be closely followed by Alternates B and D. While Alternate A would provide a reliable means of crossing the river, it would not serve travel demand in the area as well due to its location.

10. AESTHETICS

The major aesthetic impacts will result at the river crossing. The tunnel options along Alternates B, C, and D will have the least impact. The bridge crossing options would have the most impact. The ferry alternatives would involve continuation of the moderate visual intrusion associated with the ferry operations.

11. WATER QUALITY AND AQUATIC ECOLOGY

Construction of any build alternate would result in both short and long-term impacts to the aquatic ecosystem. Short-term impacts to water quality would generally be construction related and involve increased sedimentation and turbidity. The long term water quality is expected to remain fair for all alternatives. Between 4 and 12 stream crossings would be involved with the various build alternates with Alternate A having the highest number and Alternate C the lowest. Alternate B would cross the most streams used by anadromous fish and would involve the most floodplain encroachments.

There are numerous wetlands sites in the study area. The build alternates would impact between 6.0 and 8.5 acres of wetlands. Alternate C would impact the fewest acres while Alternate D would impact the most. Any wetlands impacts would be mitigated as part of this project.

Construction of the various river crossings would disturb kepone that is deposited in the sediments of the James River in the study area. The highest concentrations of kepone occur at the Alternate A crossing in the Claremont Corridor. While kepone levels are less in the Jamestown Corridor, tunnel construction along Alternates B, C, and D would disturb substantially more sediment than the bridge crossings at the same location. Dredging

activities would be conducted in accordance with measures prescribed by the U.S. Army, Corps of Engineers. Disposal of dredged materials would be accomplished in accordance with measures as prescribed by the State Water Control Board.

12. DESIGN ELEMENTS AND COST

The cost to implement this project ranges from $17.7 million for the No-Build Alternative to $352.1 million for Alternate B with a tunnel. The ferry alternatives include costs of replacement boats and the purchase of new boats (Improved Ferry Alternative) to improve the service provided. Of the build alternates, the bridge options would be least expensive and among these, Alternate A would be the least costly at approximately $45 million. Alternate C would cost less than $60 million while Alternates B and D are estimated to cost more than $70 million. The tunnel crossings of Alternates B, C, and D would cost approximately five times more than the bridge crossings at the same location.

F. AREAS OF CONTROVERSY

1. NEED FOR THE PROPOSED PROJECT

Some persons attending the various public meetings have expressed opposition to any build alternate on the basis that a permanent river crossing is neither needed nor wanted. Information provided in this document and supporting technical reports and memorandums indicate a need for some action to improve the Route 31 river crossing.

2. TRANSPORTATION ISSUES

Key issues raised under this category have been the economic feasibility of the project and the question of whether or not this project is part of a master regional transportation corridor. The economic feasibility of this project has been documented in a supplemental technical report and is discussed herein. The project involves improvement of an existing transportation corridor within the overall highway system of Virginia. Other key issues raised have been the effect of increased traffic on Routes 5, 10 and 31, as well as the effect on the aged Chickahominy River Bridge on Route 5.

3. SOCIOECONOMIC CONCERNS

Those who view the prospect of a permanent river crossing favorably tend to be concerned with such things as improving employment opportunities, improved traffic service to meet daily needs for necessary travel, and improved opportunity for economic development. Others express concern that a permanent river crossing would adversely impact their way of life in a desirable environment. They favor maintaining the existing ferry system or, at most, improving the system and feel that this would maintain the status quo which they find very satisfactory.

4. ENVIRONMENTAL IMPACTS

Many citizens have expressed concerns with impacts they perceive as being associated with build alternates. These range from noise impacts to degradation of water quality, particularly as a result of disturbing kepone

sediments in the James River. These environmental matters are addressed in this document along with the effect on cultural resources of alternative courses of action.

5. AESTHETICS

The visual impact to the riverscape of a bridge over the James River in the study area is a source of concern to many. The National Park Service has indicated an objective to keep the view from Jamestown Island similar to that which existed when the first settlers touched the shore.

G. FEDERAL ACTIONS AND PERMITS REQUIRED

The construction of any build alternate would result in several actions requiring permits. These include U. S. Army Corps of Engineers (COE) permits for work in navigable waters (Section 10 of the Rivers and Harbors Act), U. S. Coast Guard permit for crossings on navigable waterways (CFR 33, Part 199), COE and Virginia Marine Resources Commission (VMRC) permits for work in wetlands (Section 404 of the Clean Water Act), and U. S. Coast Guard permits pertaining to bridge construction. Following the selection of a final alignment (if a build alternate is selected), an interagency coordination meeting would be held to present permit applications.

SECTION I

PURPOSE AND PROJECT NEED

I. PURPOSE AND PROJECT NEED

A. PROJECT PURPOSE AND DEFINITION

The Virginia Department of Transportation, in conjunction with the Federal Highway Administration, proposes to improve the existing Route 31 crossing of the James River between James City and Surry Counties. The existing Route 31 crossing is the Jamestown-Scotland Wharf Ferry System, operated by the Virginia Department of Transportation as part of the state's Primary Highway System. The purpose of the proposed project is to improve current and future traffic service in the corridor served by Route 31. The project location is shown in Exhibit I-1.

B. BACKGROUND

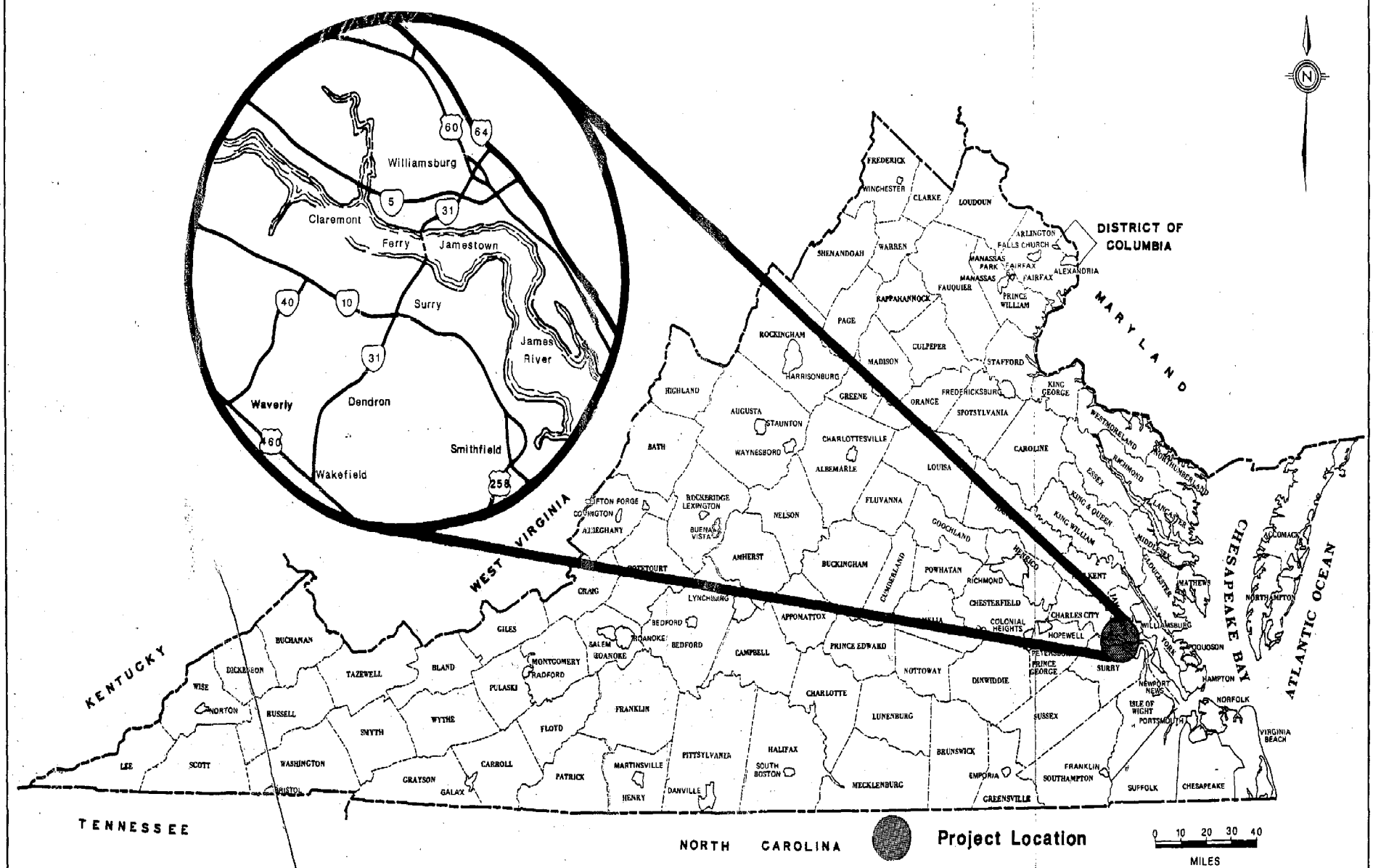
The Jamestown-Scotland Wharf Ferry service on the James River is an essential part of the transportation system between Surry and James City Counties. Route 31 is designated as a primary route in the Virginia State Highway System. It extends from its intersection with U. S. 460 in Wakefield (Sussex County) northward through Surry County and terminates in Williamsburg, to the north of the James River. Route 31 primarily serves as a thoroughfare for the local areas surrounding the route. However, a portion of the traffic utilizing Route 31 between Route 10 in Surry County and Williamsburg consists of regional and tourist traffic.

Vehicular ferry service across the James River was begun in February 1925. Initially, the service consisted of one boat, the Captain John Smith, which operated between terminals at Scotland Wharf on the south side of the river, and Jamestown Island directly across on the north side of the river. Ferry operations have continued since 1925, but have changed over the years for various reasons, including increasing demand for access across the river. The ferry system was obtained by the Virginia Department of Transportation in 1945 and has since been operated by the Department. Today, four ferry boats, the Williamsburg, the Surry, the Jamestown, and the Virginia, operate on a two-boat regular schedule. A third boat is added during seasonal periods of peak travel across the river. The fourth boat is held in reserve for replacement when needed.

The north terminal and approach roadway were originally located on lands which are now within Jamestown Colonial National Historical Park. In the 1950's, a cooperative effort between the Department and the National Park Service resulted in the relocation of the north ferry slip and approach roadway from the park at Jamestown Island to the present location at Glass House Point, as shown in Exhibit I-2. This action was requested by the National Park Service, and they participated in the cost of the ferry slip relocation. The reason for the move was to enhance the amenities of the historical resource, but it had a negative influence on ferry service since the distance between terminals was increased from approximately 1.3 miles to 2.7 miles. At the time, the Department declared its intention to relocate the south terminal and approaches to Swanns Point, opposite the new north terminal

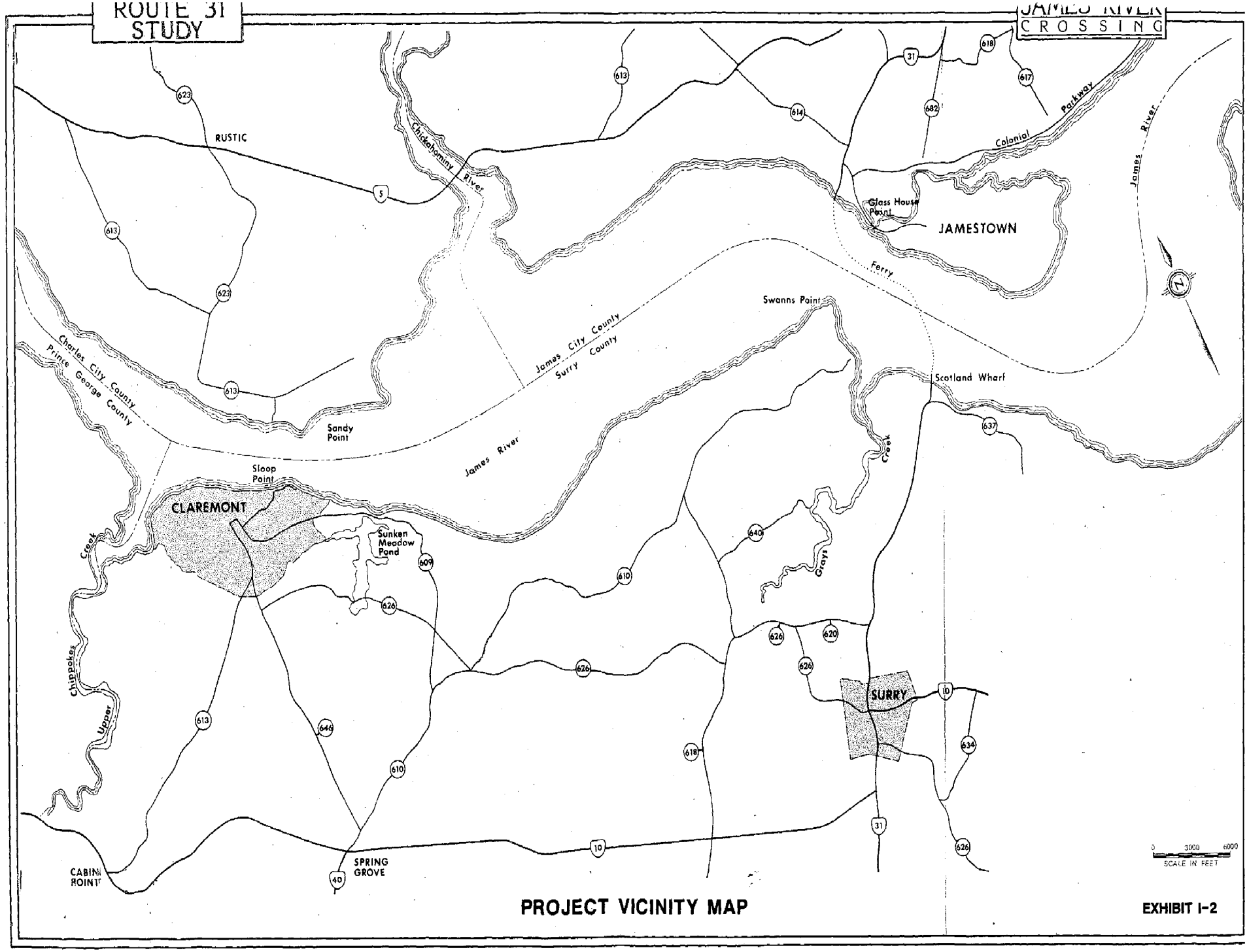
ROUTE 31 STUDY

JAMES RIVER CROSSING



LOCATION MAP

EXHIBIT I-1



PROJECT VICINITY MAP

EXHIBIT I-2

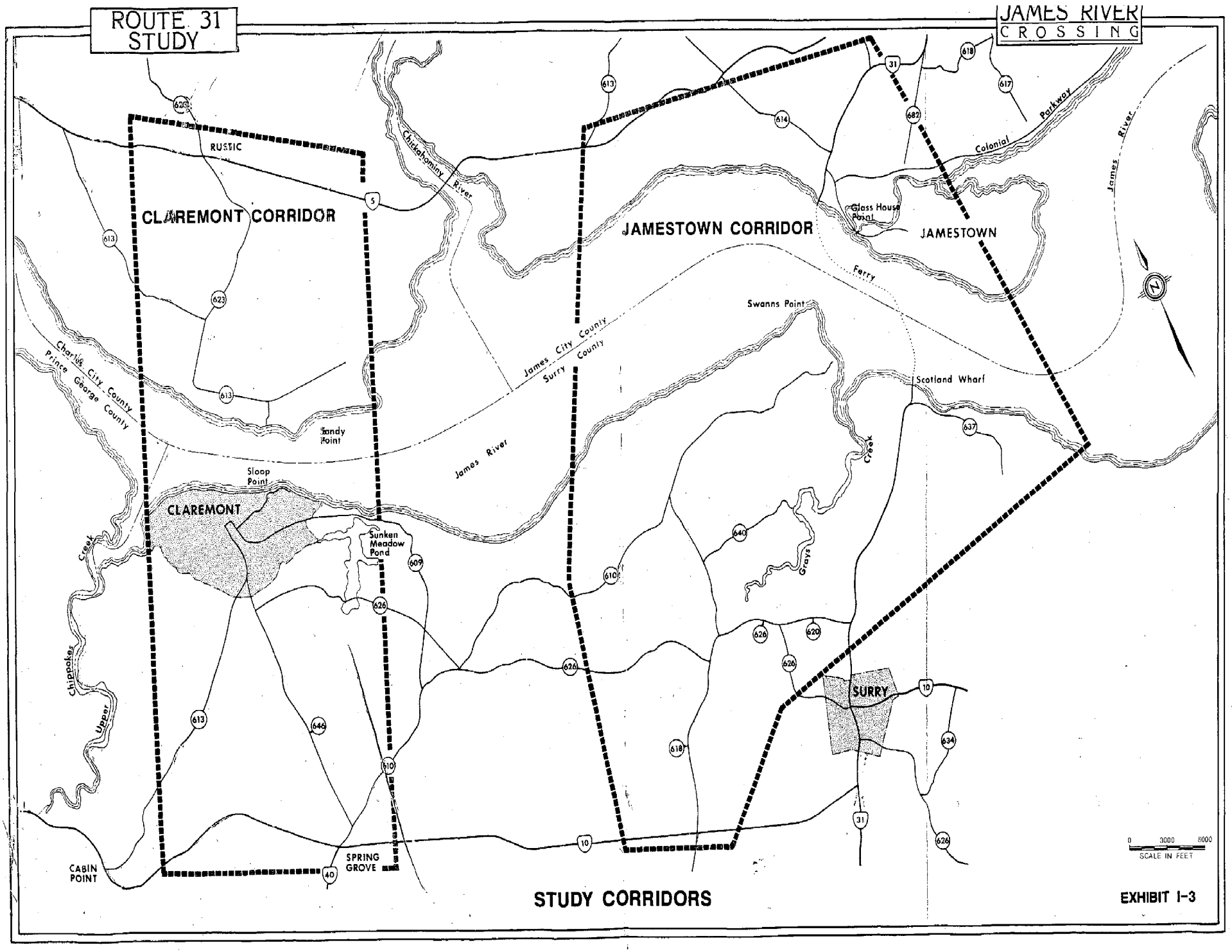
at Glass House Point. The timing was to be dependent on the availability of funds and the Department's consideration of eventually constructing a bridge over the river, between Swanns Point and Glass House Point. In the late 1970's, the owner of the lands at Swanns Point gave the property to the U. S. Department of Interior National Park Service along with a scenic easement to an adjacent parcel of land to the west. Irrespective of previous arrangements with the Department, the National Park Service accepted this land as a natural area. The deed conveying the land to the National Park Service contains restrictions which prohibit the construction of any structures except those necessary for control of erosion. This effectively precludes the use of this land for transportation purposes.

Inasmuch as access across the river is important to the economic well-being and life-styles of many in the area served by the ferry system, the issue of the adequacy of such access is a matter of continuing concern in the local communities and to the Department. Studies have been conducted periodically by the Department since 1940 to evaluate the need for improved ferry service and/or the feasibility of constructing a bridge to replace the ferry system. A study in 1979 provided a comprehensive review of the ferry service and the potential for a bridge crossing. In 1985, a travel study was conducted by the Department. Both of these recent studies found traffic service deficiencies and recommended continued monitoring of conditions relative to possible improvements for the river crossing. In 1987, the Department initiated this study to review previous reports, to update data, and to evaluate alternatives to enhance cross river access.

Based on the results of the 1979 study, two study windows were established for this project, the Claremont Corridor and Jamestown Corridor, as shown in Exhibit I-3. The Claremont Corridor extends from Route 10 on the south in Surry County to Route 5 on the north in Charles City County. The Jamestown Corridor extends from Route 31 in Surry County north of the town of Surry, to Route 31 just north of the James River in James City County. The area between the two study windows is not included in this project because previous studies have concluded that crossing the river at this location is not feasible due to the width of the river and the environmentally sensitive lands associated with the confluence of the Chickahominy and James Rivers.

C. PROJECT NEED

The need for improvements to the existing ferry service is based on a combination of transportation demands, social demands, and economic considerations. Studies have been conducted periodically over the past 45 years evaluating each of these factors. To date, each study has recommended that access across the river be improved. The resultant actions have typically been to improve ferry service. It has been nearly 10 years since the last comprehensive study of this subject was conducted. Within this period, the Department has added two new, larger capacity boats to the ferry system, increased the number of scheduled trips during peak periods of travel demand, and raised certain fares. Despite these changes, the existing ferry service is unable to accommodate peak periods of travel demand and the Department's annual subsidy of operations reached approximately $2,000,000 in 1987.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Sloop Point
CLAREMONT
Sunken Meadow Pond
Creek
Grays Creek
Chippokes Creek
Upper
SURRY
CABIN POINT
SPRING GROVE
0 3000 6000
SCALE IN FEET
STUDY CORRIDORS
EXHIBIT I-3

1. TRANSPORTATION DEMANDS

a. Existing Traffic

The existing ferry system is capable of handling off-peak traffic volumes. However, it is not capable of handling current peak period travel demand. Traffic volumes have escalated to the level that extensive delays are resulting due to lack of adequate system capacity during peak periods. In response to these delays, changes in travel patterns have resulted.

The average daily traffic using the ferry during the first full year of operation by the Department in 1946 was 101 vehicles. The usage has steadily increased over the past 40 years. In 1987, the average daily traffic was 1,582 vehicles per day. Daily ferry traffic on the ferry has grown in recent years at a rate of approximately 5.5 percent annually.

b. Existing Capacity

The capacity of the existing ferry service is a function of the size of the vessel being used to carry vehicles and the frequency of trips across the river. Currently, the ferry system is operated on winter and summer two-boat schedules, with 54 daily river crossings on the winter schedule and 64 daily river crossings on the summer schedule. Based on the approximate capacity of 52 to 58 automobiles for the two newest boats, the current absolute capacity of the ferry system is about 2,950 vehicles per day using the winter schedule and 3,500 vehicles per day for the summer schedule. In order to achieve these capacities, each ferry would have to be loaded to full capacity for each crossing.

These are not practical daily capacities due to peaking characteristics and directionality of travel demand. The effective average daily peak hour capacity of the current system, with two boats operating, is approximately 170 vehicles. This is based on four trips across the river being made during the peak hour. The utilization of more vessels during the peak hours increases the peak hour capacity. This is currently done during the summer months as three boats are used during the peak periods of the day to increase the effective system capacity to approximately 240 vehicles per hour. Current travel demand exceeds these capacities during peak hours for several months of the year.

c. Existing Service

The level of service provided can also be addressed by examining the volumes and frequency of vehicles left at the dock due to a full ferry. The ferry boat captains maintain logs for each trip made across the river. The log indicates the exact number of vehicles being transported and the approximate number of vehicles left at the dock. The latter figure is approximate because often the captain is unable to see all of the vehicles left waiting at the dock due to weather conditions, time of day, and visual obstructions. During extremely heavy travel demand, the line of vehicles left at the dock extends out of view. In these cases, the number of visible vehicles is counted and an indication is added to the record to note that there are more vehicles waiting than counted.

The captains' logs for 1987 were reviewed to study the magnitude of travel demand and the deficiencies with the current ferry operation. The daily logs were studied for a sample week in each month. Based on this review, the following patterns were noted:

- During April and May, the system shows signs of being unable to accommodate increased traffic volumes on Fridays and Saturdays.
- During the months of June through November, the greatest number of vehicles are left behind. This occurs both on weekdays and weekends.
- Substantial delays occur during the morning peak period at Scotland Wharf and evening peak period at Jamestown. These delays vary on a seasonal basis, depending on the traffic demand, the number of ferry boats operating, and unanticipated schedule variations. The estimated average delay time is approximately 25 minutes for waiting, loading, and unloading. However, this delay can be as great as 45 minutes to an hour or more. Furthermore, the ferry crossing itself involves an additional period of approximately 15 to 20 minutes to cross the river.
- During the peak travel month of July, an average of approximately 130 vehicles per day were left unserved when the ferry departed during the afternoon hours at Jamestown. Almost all of these were during the afternoon peak hour.

Although two larger capacity ferries have been added to the system and a peak period expanded schedule of ferry trips has been put into effect, the existing ferry service is still unable to meet increasing traffic demands

during peak morning, evening, and weekend periods. In 1987, the ferry service was unable to meet traffic demands during peak periods for the months of April through November.

The ferry crossing is an obstacle to direct travel across the river along Route 31 because of the required time to wait for the ferry, the loading time, the crossing time, the unloading time, as well as the potential for extended waiting time due to missing a trip because of a full ferry. Some persons desiring to cross the river alter their travel patterns to avoid the ferry and potential delays. As travel demand increases at the Jamestown-Scotland ferry, travel patterns have changed by the following means:

- Persons on a fixed time schedule attempt to make the ferry prior to the one that best meets their schedule, in order to insure arriving on time.
- Trips previously made across the river are no longer made or are restricted to one side of the river.
- Another location is chosen for crossing the river.
- Another time of day is chosen for making the trip across the river.
- Vehicle occupancy is increased to reduce demand and delays. This is particularly true for work trips.
- Travel across the river is restricted to those trips that are absolutely necessary, and several trip purposes are accomplished with one crossing.

d. Origin-Destination Survey

An origin-destination survey was conducted to determine cross-river travel patterns within the study windows and surrounding areas. Questionnaires were distributed at three crossing locations: on the ferry, at the Benjamin Harrison Bridge near Hopewell, and at the James River Bridge near Newport News. The results of the survey revealed that trips were being made via the Benjamin Harrison or James River Bridge in order to avoid the ferry. If a permanent river crossing were in existence in 1987 instead of the ferry, it is estimated, based on the origin-destination survey, that average total traffic demand would be approximately 4,200 vehicles per day. This figure includes 1,600 trips made on the ferry plus 2,600 trips that avoid the ferry.

These ferry avoidance trips were determined by detailed analysis of origin and destination locations for those persons using either of the alternate bridge crossings that stated on the survey questionnaire that they were avoiding using the ferry. Some of the avoidance responses were eliminated because of impractical origin and destination locations for using the ferry. The remaining responses had origins and destinations that could be better served by a river crossing within the study corridors. These responses were factored based on the average volumes of traffic at each bridge crossing and seasonal adjustments to determine the 2,600 average daily ferry avoidance trips.

The traffic volume estimate of 4,200 vehicles per day in 1987 if a permanent river crossing were in existence is consistent with previous studies for this area. The 1979 study of this same subject estimated that a free bridge in 1984 would carry 3,830 vehicles per day. A 1967 traffic report for this project estimated a bridge volume of 4,620 for the year 1987.

e. Future Traffic

Traffic volumes along Route 31 are estimated to continue to grow in the future. Forecasts completed for this study indicate that by the year 2010 cross river travel demand in the vicinity of the ferry crossing will be approximately 6,600 vehicles per day (vpd). With the ferry operational in 2010, the number of avoidance trips would increase to 4,100 vpd while the demand for ferry service would escalate to 2,500 vpd. Since the ferry system is currently incapable of handling peak period demand, this growth in traffic will only serve to further degrade the level of service provided.

2. SOCIAL DEMANDS

The ferry currently operates between the hours of 5:00 a.m. and 1:00 a.m. Should someone need to cross the river when the service is not operating, it would be necessary to cross either the Benjamin Harrison Bridge or the James River Bridge. This would substantially increase the trip travel distance, travel time, and cost.

Commuting to work via the ferry has caused problems for local residents because, during peak morning, evening, and weekend periods, workers are often delayed getting to work due to increased traffic. Most commuters try to get to the ferry dock earlier than needed to insure that they arrive at work on time, or they utilize one of the alternate river crossings.

To encourage ride-sharing and accommodate increasing traffic demand, the Department provides a small commuter parking area near the southern terminal of the ferry. However, this lot has not been used fully due to the

difficulty in finding riders who work the same shifts and live or work within close proximity of other ride-sharers.

Law enforcement and rescue officials on both sides of the river are slowed by the ferry crossing and are unable to work with each other when the ferry ceases operation at night. If a medical emergency arises, Surry County residents must use the ferry to gain access to medical facilities in James City County/Williamsburg or drive to facilities in either Hopewell or Suffolk.

In the event of an emergency at the Surry nuclear power plant, the current evacuation plan for Surry County is to the south and west. However, should a northward evacuation be necessary, the ferry is a constraint to evacuation due to capacity and operational limitations. Also, if an emergency were to occur during nonoperating hours for the ferry, the area would be left without the main northward transportation link.

3. ECONOMIC CONSIDERATIONS

Economic development and growth in Surry County is influenced by the lack of primary transportation facilities to I-64 and to adjacent urbanized areas. The County has retained its rural character in recent decades, in part, due to this isolated position. Depending on individual perspective, the improvement of access across the river could be seen as a needed impetus for increased development of the County. Currently, Surry County's Department of Economic Development is actively engaged in promoting industrial development within the County.

The James City County area is a major employment area and has many available jobs. Some of these positions are filled by Surry County residents who use the ferry to commute. This is particularly true of seasonal workers

in the tourist industry. Because some of the available jobs entail work shifts when the ferry is not operating, some Surry residents are unable to fill these positions due to lack of access.

D. LOCAL TRANSPORTATION PLANS

Both Surry and James City Counties acknowledge the importance of adequate cross river transportation along Route 31 between the counties. Each of the counties has adopted a Comprehensive Plan containing various transportation goals, objectives, and recommendations.

One of the goals of the 1981 Revised Surry County Comprehensive Plan is to "promote a transportation system that will provide an economical, safe, and efficient means for movement of people and goods within the county and between the county and other parts of the region." With respect to the ferry, the Comprehensive Plan indicates that through continued growth and economic development in the county, the need for a permanent river crossing or ferry improvement alternatives could be necessary.

James City County, in its 1982 Transportation Element Comprehensive Plan Update, identifies several factors that warrant investigation of improvements to the ferry service. Developed under the assumption that a bridge crossing would not immediately be constructed, the Plan Update recommended the following ferry service modifications:

- The ferry operate on a 24-hour schedule.
- The frequency of ferry trips be increased during peak hours.
- Tolls be removed from the ferry.

Both County Comprehensive Plans emphasize the role of the Virginia Department of Transportation in determining the larger issue of continued ferry operations or permanent river crossing construction. Neither Comprehensive Plan endorses nor rejects the possibility of a permanent river crossing.

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SECTION II

ALTERNATIVES CONSIDERED

II. ALTERNATIVES CONSIDERED

This section presents the alternatives considered for the proposed improved river crossing. First, the process through which the alternatives were developed is presented. This is followed by a description of alternatives that have been eliminated. Finally, the alternatives retained for detailed evaluation and comparison are identified. At this time, the Department has not determined a preferred alternative. A decision with regard to the proposed action will not be made until the results of the circulation of this report and the information received through the Location Public Hearing process have been fully evaluated.

A. DEVELOPMENT OF ALTERNATIVES

At the initiation of this project, five broad ranged alternatives were established for development and consideration. The alternatives included: the No-Build Alternative of maintaining the existing ferry service; the Improved Ferry Alternative; a Mass Transit Alternative; a Transportation Systems Management (TSM) Alternative; and the Build Alternative involving a permanent river crossing with new or improved approach roadways.

1. PRELIMINARY RESEARCH AND INVESTIGATIONS

Prior to developing specifics for any of the alternatives, existing data files and previously completed studies were reviewed. Because of the continual evaluation of a possible permanent river crossing over the past 40 years, the Department has an extensive collection of data for this project. These files were reviewed and pertinent information was extracted for use in

updating this study. This information provided the basis for development of the alternatives and identification of additional data requirements to fully evaluate the various possibilities being studied.

2. TOLLS

As part of the development of alternatives, an evaluation was made with respect to potential revenues that could be generated from tolls or user fees for each alternative. While a detailed traffic and revenue or toll feasibility study was not included as a part of this study, generalized evaluations of revenue potential were determined.

The current toll for passenger cars on the ferry is $2.00. However, commuter tickets can be purchased which reduce this cost to $0.25 per vehicle per trip. Today, about 20 percent of the total annual operating costs of the ferry are paid by user tolls. In 1987, the average cost to transport a vehicle across the river was approximately $4.30 per trip.

In order to make the ferry operation self sufficient, a major adjustment of the toll schedule would be required. Such a change would not be practical from a social, economic, or political standpoint. While some additional revenue could be generated by lesser toll rate changes, the net effect of these changes would be minimal. Therefore, tolls do not appear to be a major factor for any of the ferry based alternatives.

Similar results were obtained for the permanent river crossing alternatives. Based on average toll rates of $0.50, $1.00, and $1.50, only modest annual revenues would be generated.

B. ALTERNATIVES CONSIDERED BUT ELIMINATED

Several alternatives have been considered but eliminated because they do not serve the purpose of and need for the project. Alternatives eliminated from further consideration include transportation systems management and mass transit.

1. TRANSPORTATION SYSTEMS MANAGEMENT (TSM)

TSM options include such measures as lower cost improvements to, or changes in, the existing ferry service designed to improve efficiency and safety. Previous TSM improvements have included providing commuter parking facilities and increasing ferry service during current peak hours of operation. Even with these TSM improvements, the existing ferry service is still not capable of meeting the current travel demand during peak hours. Additional TSM measures that have been previously studied include increased tolls for non-commuters, preferential loading for commuters, and improved operating techniques to reduce loading and unloading times. Each of these methodologies may have some applicability to improve ferry operations on a short-term or interim basis. However, they cannot provide sufficient improvements to meet the long-term travel demands of the study area. Therefore, the TSM alternative is not considered a viable solution in conjunction with the proposed action.

2. MASS TRANSIT ALTERNATIVE

There is no existing transit service being provided in Surry County. The rural character of this area does not lend itself to a mass transit operation. On the north side of the river, the James City County Transit

Authority operates several bus routes. However, none of these routes serve the area around the north ferry landing. For both sides of the river, the private automobile is the primary form of transportation.

Periodically the ideas of extending bus service to the north ferry slip or instituting van shuttle service to major employment areas around Williamsburg from the ferry have been suggested. Several problems are associated with these concepts:

- Limited space at or on the north ferry slip for bus or van access and maneuvering.
- Limited amount of sheltered pedestrian space on the new ferries.
- Lack of concentrations of workers in the Williamsburg area.
- Pricing incentives to make transit an attractive option.

Assuming that these problems could be solved and that transit usage would optimistically reach five percent of the total peak hour travel demand, the resulting reduction in vehicular demand on the ferry would not be sufficient to offset growth in demand. Therefore, this option is not practical for the long-term but may have some short-term applicability to reduce current peak travel demands.

C. ALTERNATIVES CONSIDERED FOR ADDITIONAL STUDY

With two of the five basic alternatives eliminated, three have been retained for further evaluation and study. These include the No-Build Alternative, the Improved Ferry Alternative, and the Build Alternative.

1. NO-BUILD ALTERNATIVE

This alternative would consist of continued ferry operations similar to the existing service provided. This alternative assumes that the ferry system would continue to be operated with four boats, operating on a two-boat schedule except during peak periods when a third boat would be used. Current ferry boats would be replaced as needed with boats comparable in size to the Williamsburg and the Surry. Peak period service would not exceed a three-boat schedule in order to provide a spare boat in the event of emergencies or repairs.

2. IMPROVED FERRY ALTERNATIVE

Sarah Bird Wright in her guide book on ferry systems in America reports, "A ferry service does not begin in the drafting room of engineers nor in the swank offices of financiers. It begins, rather, in the imagination of men who want to get from one land base to another, across a body of water, in as straight a line as possible and as quickly as possible." Such a statement could hold true for the Improved Ferry Alternative since various proposals for improving the existing ferry service have been suggested by local citizens as part of this study. These suggestions have included: purchase of new and faster ferry boats, utilization of hydrofoils or hovercraft, purchase of larger ferry boats, utilization of more boats in the schedule, expansion of the dock facilities to handle added boats, and expansion of the schedule to 24 hour-a-day service. Each of these options was evaluated for practical application at the Jamestown-Scotland Ferry.

Currently, the ferry system operates relatively modern ferry equipment. Technological innovations in ferry building since the Williamsburg

and the Surry boats were added to the system would result in only marginally reduced cross river travel time. Therefore, only modest improvements could be anticipated by replacing older boats with newer boats.

Hydrofoils and hovercraft type boats are sometimes used in ferry service. They are typically used where passenger service is more important than vehicle transport and where speed is an asset over longer distances. These characteristics do not apply to the situation at the Jamestown-Scotland Wharf crossing. These types of boats would neither be economical nor efficient in application across the James River. As such, hydrofoils and hovercraft are not included as part of the Improved Ferry Alternative.

Utilization of larger conventional ferry boats on the James River is also difficult and more inefficient than the current system. Because of the depth of water at the docking facilities, the size of the boat is limited. The current Williamsburg and Surry class of boats is about the practical limit for use at this facility without dredging a channel from the docks to the main river shipping channel. This dredging operation would be a periodic maintenance activity in order to insure the proper channel depth. Larger boats would carry more vehicles across the river when full during peak hours, but would require added loading and unloading time. Finally, the efficiency of a larger boat during non-peak hours is questionable due to the added fuel and operating costs with a less than full load. In effect, except during peak hours, the efficiency of the system would be decreased and system costs would be increased. For these reasons, this option does not appear practical and is not being considered further.

The utilization of more boats in the ferry system does appear to be practical. However, there is a limit to the number of boats that can be

efficiently operated. Because the James River is a navigable stream for ocean going vessels and because the ferry route utilizes a portion of the shipping channel, the maximum feasible number of boats operating on the system is six. Any more boats would congest the shipping channel and thus increase the potential for hazardous operation.

Since the practical boat size is limited to the current largest boat, and since a six boat system is the maximum operational system, there is no need to expand the boat docking facilities. The current twin slips on each side of the river would be adequate to handle the expanded system.

The expansion of the service schedule to 24 hours-a-day would remove the current early morning isolation due to lack of service. The implementation of this service would increase operating costs with only marginal return due to limited ferry utilization. While this may be a desirable ferry improvement, it would not relieve the ferry system of its peak period congestion problems.

Based on the evaluations made of the various possible ferry system improvement options, the proposed Improved Ferry Alternative for this study includes additional boats and scheduled trips to improve the level of service being provided. The current four-boat fleet would be expanded to six. During peak periods, operations would be increased such that four boats would be operating on 15-minute headways. During future peak periods, a fifth boat may be needed to adequately handle the demand for travel. This would still leave one boat for emergency use or replacement during times of repair and/or inspections. By using more frequent trips instead of larger boats, the waiting time to board a ferry is greatly improved and the level of service enhanced.

3. DEVELOPMENT OF BUILD ALTERNATIVE

The process for determination of possible permanent river crossing alternates involved a series of studies and evaluations. The final build alternates were determined based on evaluations of numerous possible alignment segments within the study corridors. This process resulted in the elimination of some segments and the retention of other segments for consideration in conjunction with build alternates.

a. Base Studies

Preliminary investigations were conducted within the study corridors to obtain information which could influence delineation of potential alignments. Additionally, available data was gathered and researched both to provide information of value in the initial alignment studies and to identify data gaps which indicated the need for supplemental studies and investigations. All members of the study team visited the corridor windows to become familiar with the project area and to initiate field investigations as appropriate. Field investigations were conducted to aid in defining natural and man-made features that would be considered in the conceptual design of roadway alignments. Where appropriate, information gathered was graphically depicted or annotated on maps. Public meetings were held to describe the nature and scope of the project and related studies and to provide an opportunity for persons to discuss their interests and concerns with study team members.

b. Delineation of Preliminary Alignments

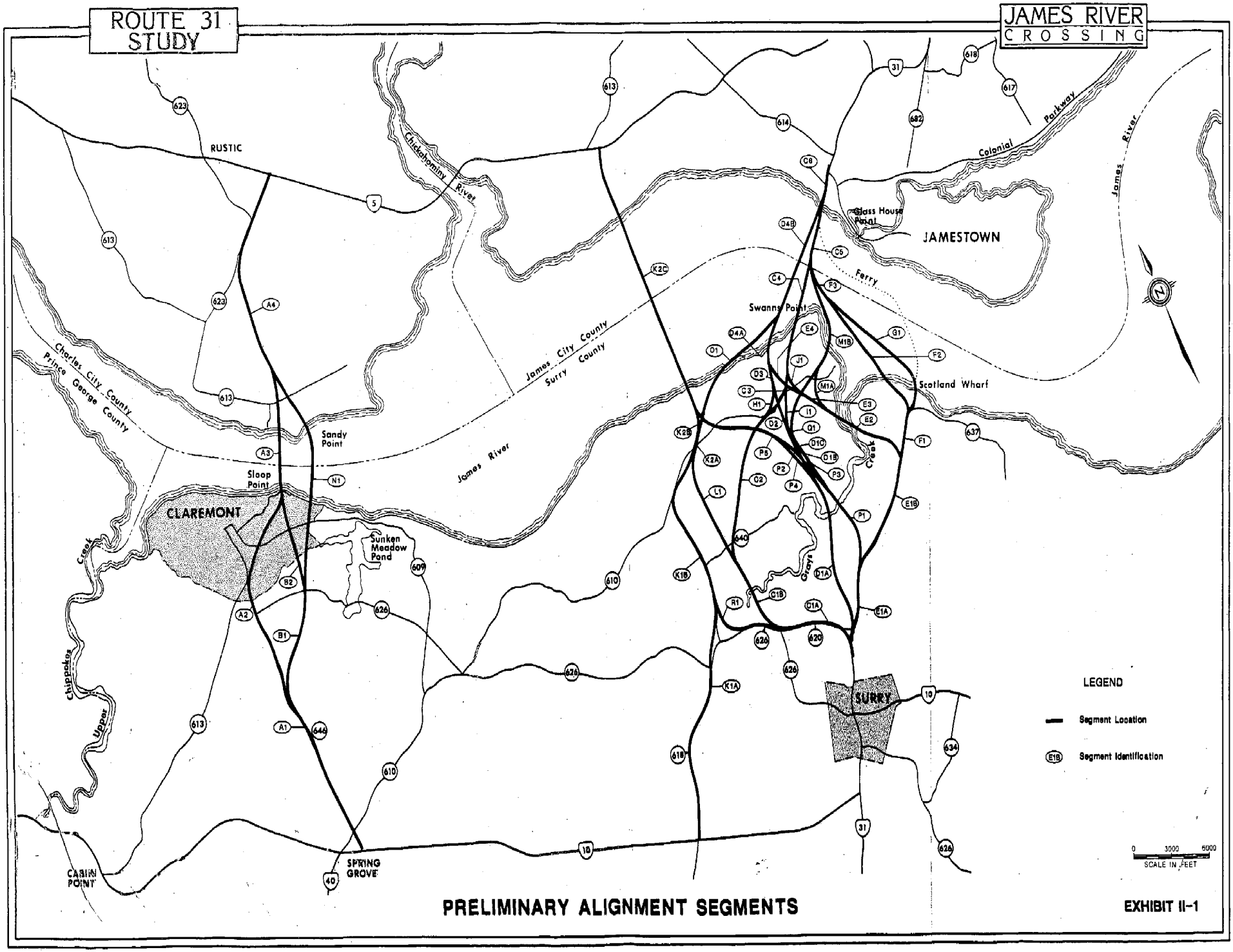
Initial preliminary engineering effort involved the identification of apparently feasible and practicable roadway alignments for the project within the two study windows. In identifying logical alignments, the work done in previous studies was considered along with the results of the preliminary historical, archaeological, and environmental research and investigations. The alignments were plotted on large scale maps and a wide variety emerged. Some alignments were common with others for portions of their length. The separate portions or segments which made up various alignments could be combined in different ways to form other complete alternate locations for the project. In order to facilitate the development of the most satisfactory build alternates, the various segments were isolated and identified. In this way individual segments could be evaluated and, where appropriate, compared with other segments. The alignment segments thus developed are depicted on Exhibit II-1. They can be combined in different ways to form 23 unique or partially unique alternate alignments.

c. Elimination of Segments

The elimination of some of the preliminary segments, as depicted on Exhibit II-1, was based on a set of generalized criteria covering factors related to engineering, the human environment, and the natural environment. This set of criteria was developed to aid in evaluating the features and impacts expected to be associated with each alignment segment. The criteria and factors are listed in Table II-1. The criteria and associated factors were not weighted relative to each other since each is an important indicator and relative importance can vary under different situations. The purpose of the criteria was to provide a means of evaluating individual alignment

TABLE II-1
EVALUATION CRITERIA

CRITERIA	FACTORS
ENGINEERING	
- Costs	Anticipated relative construction and right-of-way costs compared to average conditions.
- Safety	Number of potential traffic flow conflicts due to abutting properties, intersecting roadways, and developments.
- Traffic	Degree of conformity with existing travel patterns.
- Transportation	Compatibility with overall transportation system.
- Energy	Effect on travel distances and construction costs.
- Design	Compatibility with desirable geometric design standards.
HUMAN ENVIRONMENT	
- Socio-Economic	Degree of direct impact to communities and/or commercial areas.
- Land Use/Relocation	Relationship to existing and planned land uses and estimated number of displacements.
- Air Quality	Estimated number of human activity areas within 500 feet of the alignment.
- Noise	Estimated number of noise sensitive sites within 150 feet of the alignment.
- Cultural Resources	Proximity to National Register sites or potential cultural resources.
- Recreation	Number of potential impacts to recreational facilities.
NATURAL ENVIRONMENT	
- Water Quality	Number of stream crossings.
- Aquatic Ecology	Degree of potential impact.
- Wetlands	Estimated area of wetlands directly impacted.
- Terrestrial Ecology	Estimated area of new construction through agricultural and forested land.
- Endangered Species	Proximity to known populations, particularly active bald eagle nests.



PRELIMINARY ALIGNMENT SEGMENTS

EXHIBIT II-1

TABLE II-2

EVALUATION OF ELIMINATED SEGMENTS

SEGMENTS ELIMINATED	CRITERIA AND FACTORS
C4, D4A	Human Environment - Negative impacts to cultural resources, including Section 4(f) involvement.
L1	Natural Environment - Negative water quality, aquatic ecology, and wetland impacts.
C1B	Human and Natural Environment - Negative impacts on water quality, aquatic ecology, wetlands, and cultural resources.
A3, D4B, F2, G1, K1A, O1	Engineering and Human Environment - Negative impacts on traffic service, excessive costs, travel patterns, residential displacement, cultural resources, air quality, and noise.
A2, B2, D1A, E2	Engineering, Human and Natural Environment - Excessive costs, negative impacts on travel patterns and safety, air quality, noise, recreation, cultural resources, residential displacements, terrestrial ecology, aquatic ecology, water quality, and wetlands.
C2, D1B, D2, D3, E1B, E3, E4, F1, F3, M1A, P4, H1, I1, J1	These segments have been eliminated on the basis that they are uniquely associated with previously eliminated segments and are therefore invalid.

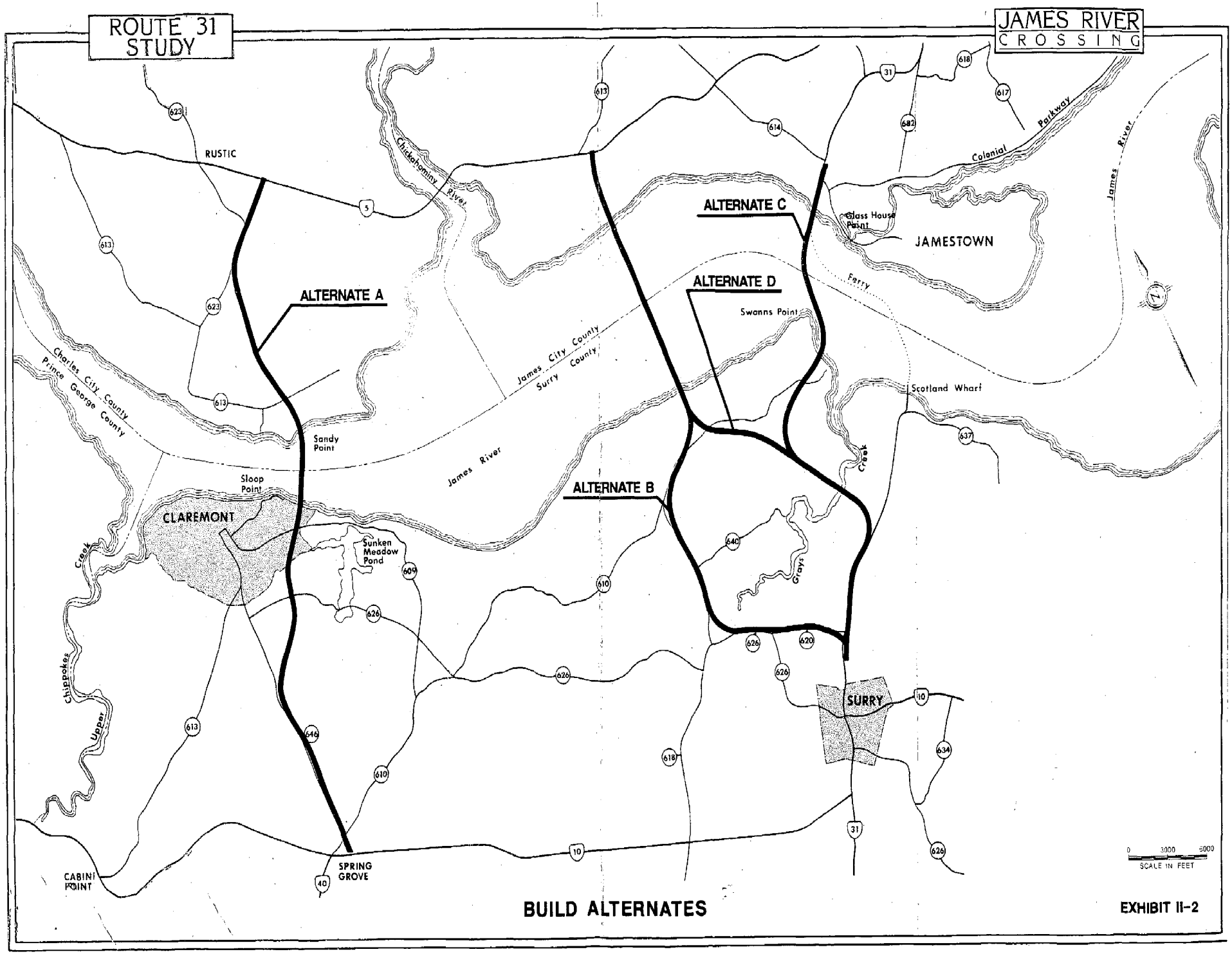
segments and a means of comparing the relative merits of two or more comparable segments. The focus of the evaluation was to identify and eliminate those segments which would likely involve unacceptable high costs or serious social, environmental, or cultural resource impacts. What follows in Table II-2 are those segments eliminated based on the criteria set forth in Table II-1.

4. BUILD ALTERNATES

The alignment segments retained for further study can be combined to form four build alternates which provide three different river crossing locations. The four alternates are depicted on Exhibit II-2.

a. Alternate A

Alternate A is in the Claremont Corridor and begins at an intersection with Route 10 east of Spring Grove. Alternate A extends to the north and follows existing Route 646 for approximately 2.3 miles before swinging in a northeasterly direction on new location. It crosses Route 626 and Route 609 and passes through the eastern portion of the Town of Claremont before crossing the James River. Alternate A passes east of Sandy Point on the north side of the river and swings in a more northerly direction before following a portion of Route 623 in a northeasterly direction for approximately 0.8 mile. It then runs on new location to an intersection with Route 5 southeast of Rustic. Alternate A is approximately 9.2 miles in length.



BUILD ALTERNATES

EXHIBIT II-2

b. Alternate B

Alternate B begins at a connection to Route 31 approximately 0.5 mile north of the north limits of the Town of Surry. It extends in a westerly direction for approximately 1.9 miles following existing Routes 620 and 626. Then the alternate swings in a northerly direction following Route 618 for approximately 1.6 miles. It then follows Route 610 in a northeasterly direction for approximately 0.9 mile before swinging to the north and crossing the James River. It intersects Route 5 north of the river at a point approximately 2.3 miles east of the Route 5 crossing of the Chickahominy River. Alternate B is approximately 8.6 miles in length.

c. Alternate C

Alternate C begins at a point on Route 31 in the vicinity of its intersection with Route 620 north of the Town of Surry. It follows Route 31 in a northeasterly direction for approximately 1.3 miles and then swings northwesterly on new location. It crosses Grays Creek and then swings in a northeasterly direction on a curvilinear alignment which avoids the National Park Service land at Swanns Point and crosses the James River. Alternate C connects to existing Route 31 on the north side of the river just downstream of the ferry pier. There is existing right-of-way available in this area. Alternate C is approximately 6.7 miles in length.

d. Alternate D

Alternate D is composed of portions of Alternates B and C and a connecting link between them. It begins, as Alternate C does, at a point on Route 31 near its intersection with Route 620 and follows Alternate C to

beyond the Grays Creek crossing. Alternate D then continues on new location in a northerly direction and follows the Alternate B crossing of the James River to a connection to Route 5. Alternate D is approximately 8.0 miles in length.

e. River Crossing Options

Three river crossing options are being evaluated: tunnel, low-level movable-span bridge, and high-level fixed-span bridge. The high-level fixed-span bridge typically offers the best long term economy of the three. However, the tunnel and low-level movable-span bridge options are being evaluated primarily due to the consideration of visual impacts to the viewscape as seen from the Colonial National Historical Park. All three river crossing options are under consideration in the Jamestown Corridor in conjunction with Alternates B, C, and D. However, with Alternate A in the Claremont Corridor, only the high-level fixed-span bridge is under consideration due to the intervening distance and line of sight obstructions between the national park and the river crossing location.

The James River in the study area is a broad, tidally influenced, relatively shallow water body. In order to maintain ocean going river traffic, the U. S. Army Corps of Engineers periodically dredges a navigation and shipping channel.

For each of the bridge crossing options, minimum horizontal and vertical clearances at the shipping channel of 300 feet and 145 feet, respectively, are proposed. The low-level movable-span bridge in the lowered or closed position would have 50 feet of vertical clearance.

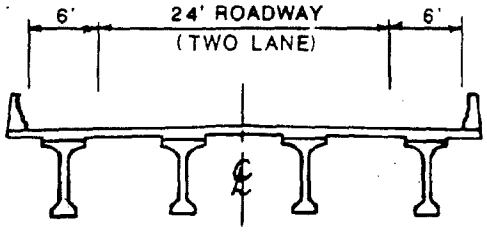
For low-level movable-span crossings, there are three general types of movable bridges: a swing span, a lift span, and a bascule span. The bascule span is not economically feasible due to the 300-foot horizontal clearance requirement.

For the tunnel crossings, a sunken tube concept appears to be practical based on currently known geological conditions. The tunnel is constructed by sinking sections of a tube into an excavated trench at the bottom of the river, fastening the tube sections together, dewatering the tubes and finishing off the tubes to complete the tunnel.

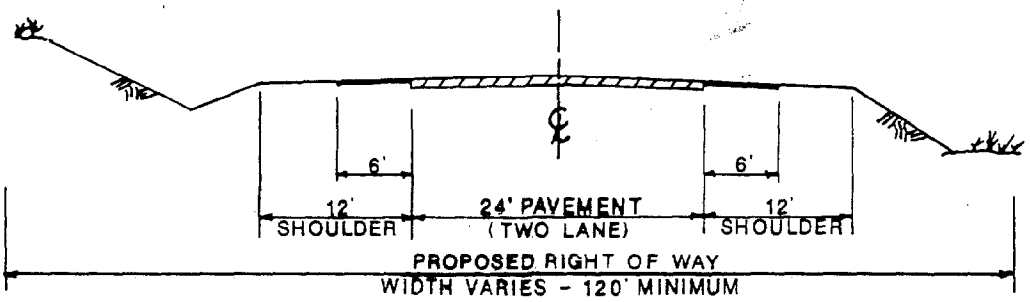
The length of crossing at the various locations would depend upon the type of structure. Based on the high-level fixed-span bridge, the approximate lengths of the river crossings would be 6,100 feet for Alternate A, 14,000 feet for Alternates B or D, and 10,800 feet for Alternate C. The lengths of low-level movable-span bridges and the tunnels would be in the same order of magnitude for the crossings in the Jamestown Corridor as the high level bridges.

f. Typical Features

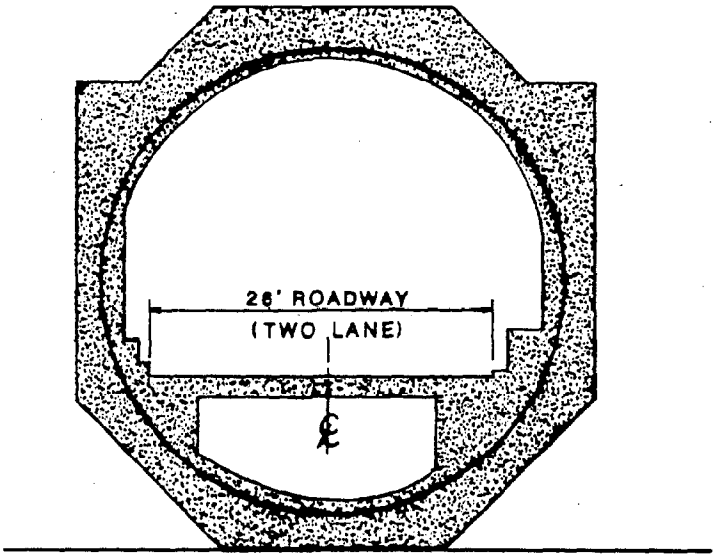
The build alternates are each composed of roadway and river crossing elements. Traffic studies completed for this project indicate a requirement for a two-lane roadway to serve project needs in the design year (2010). Typical sections for the roadway, bridge, and tunnel are shown in Exhibit II-3. The typical sections and dimensions shown are preliminary and are subject to revision. These typical sections are based on the department's design standards for a facility with a rural minor arterial functional classification. The standards indicate a need for a 24-foot wide pavement and



PROPOSED TYPICAL BRIDGE SECTION



PROPOSED TYPICAL ROADWAY SECTION



PROPOSED TYPICAL TUNNEL SECTION

PROPOSED TYPICAL SECTIONS

EXHIBIT II-3

12-foot wide shoulders on each side, all within a minimum right-of-way width of 120 feet.

It is proposed that where existing roads are incorporated as part of an alternate, the existing road would be upgraded to meet the typical section being utilized for the project. Also, horizontal alignment and grade revisions necessary to bring such a road up to current standards would be included.

REFERENCES

Virginia Department of Transportation, Travel Study: Jamestown-Scotland Ferry - Final Report, September 1985.

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