UNITED STATES COAST GUARD

PRELIMINARY ENGINEERING REPORT

Work Program Item Number: 7116989

State Project Number: 15200-1546

Federal Aid Project Number: M-1258(1)

S.R. 682 (Bayway Bridge)
From the West Toll Booth to 41st Street South
Pinellas County, Florida

This project considers the reevaluation of a previously approved Finding of No Significant Impact (FONSI) which covered the segment of S.R. 682 from the west toll booth to 41st Street South, a distance of approximately 3.7 miles. This project recommends the replacement of the Pinellas Bayway bascule bridge with a 65' vertical clearance fixed span bridge located on the south alignment, upgrade the approaches from a two lane undivided facility to a four lane divided facility, and construct dual left turn lanes for westbound traffic on S.R. 682 turning to S.R. 679.

September 1995
(Revised)

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SUMMARY

1.0 SUMMARY

1.1 RECOMMENDATIONS

This project was prepared to reevaluate the findings of a previously prepared Environmental Assessment/Finding of No Significant Impact (EA/FONSI) which was approved in 1983. The EA/FONSI covered the section of S.R. 682 (Pinellas Bayway) from the west toll booth to 41st Street South. The improvements recommended in the EA/FONSI were to multilane S.R. 682 within the project limits. These improvements have been completed between S.R. 679 (Bayway) and 41st Street South.

The reevaluation therefore, concentrated on the segment of S.R. 682 from the west toll booth to S.R. 679. The EA/FONSI recommended that a four lane divided roadway be constructed. Additionally, it recommended that "when the design plans for the second stage are begun, the bridge type (fixed or bascule) at Structure "C" should be analyzed to determine which best meets the criteria at the time". Structure "C" spans the Gulf Coast Intracoastal Waterway and is located between the west toll booth and S.R. 679.

Six Build Alternatives were developed and analyzed in this reevaluation. The Build Alternatives include two low level bascule bridge alternatives, two mid level bascule bridge alternatives, and two high level fixed bridge alternatives. The low, mid and high level configurations considered an alternative north and south of the existing structure. Each of the alternatives also included an improvement at the S.R. 682 and S.R. 679 intersection to add a second westbound left turn lane.

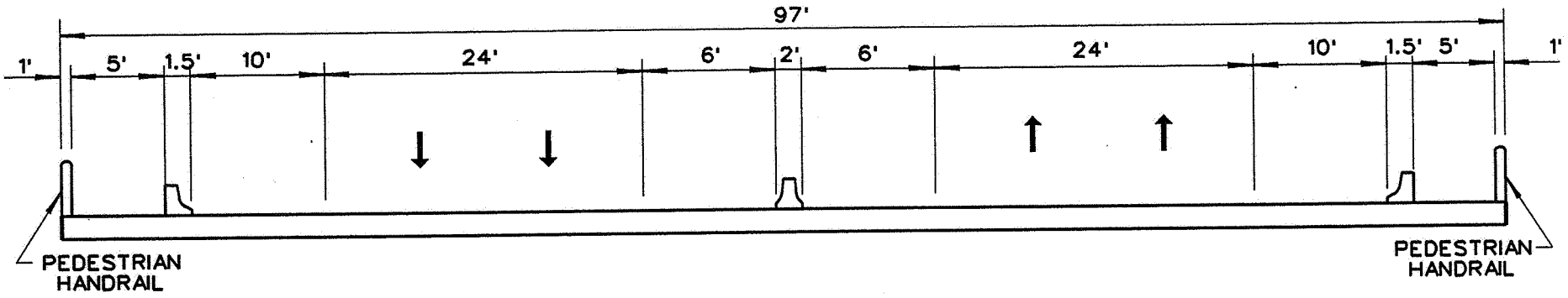
After a life cycle cost analysis and evaluation of the social, economic, and environmental effects of the project, Alternative 5, the high level fixed bridge with 65 foot vertical clearance was selected as the Preferred Alternative. The recommended improvements for S.R. 682 from the west toll booth to S.R. 679 include a four lane, 65 foot vertical clearance fixed bridge, widening the bridge approaches to a four lane divided roadway, and improvement of the S.R. 682 and S.R. 679 intersection to add a second westbound left turn lane. Typical sections showing the recommended bridge and roadway geometry are provided in Figure 1-1.

A reevaluation of a study's recommendations is required if a significant amount of time elapses between the end of one phase and the beginning of another phase. This document is being prepared at the conclusion of the Project Development and Environment Phase. Funding is currently not available to allow this project to proceed to the design and construction phases. Consequently, a reevaluation will be required before this project can enter the design phase.

1.2 COMMITMENTS

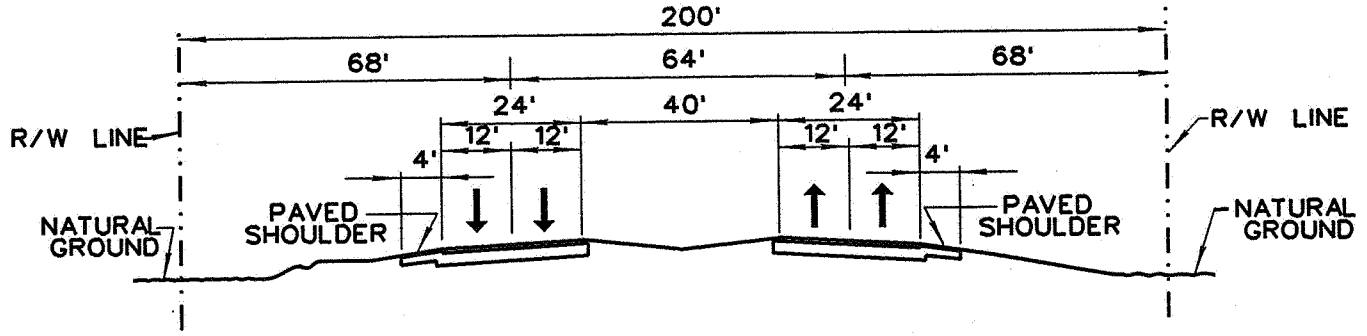
Bridge Reevaluation

The FDOT shall complete a reevaluation of improvements for the Pinellas Bayway Bridge at the time funding becomes available to construct the improvements.



HIGH LEVEL FIXED BRIDGE

N.T.S.



4-LANE ROADWAY

N.T.S.

FIGURE 1-1
BWSEC1.DGN

PREFERRED TYPICAL SECTIONS

S.R. 682 (BAYWAY BRIDGE)

The FDOT shall re-open the environmental document and reconsider the bascule option.

The FDOT shall consider staged construction as well as initially constructing four lanes.

The FDOT shall conduct a public involvement program which will start with the formation of a new bridge committee at the beginning of the reevaluation and continue until the study is complete.

The FDOT shall put the members of the existing bridge committee on the mailing list for the new study as part of the public involvement program.

Maintenance of Traffic Flow

FDOT is committed to maintaining traffic flow during the construction of the new bridge. A maintenance of traffic plan for the segment between the west toll booth and S.R. 679 will be prepared prior to the construction activities. The traffic plan will be based on the latest edition of FDOT "Roadway and Traffic Design Standards" and "Manual of Uniform Traffic Control Devices".

Utilities Relocation

All affected public utilities shall be given the opportunity to relocate/renovate facilities during construction. FDOT is committed to providing public utilities an opportunity to relocate or renovate their facilities during the construction of the segment between the West Toll Booth and S.R. 679.

Water Quality

The appropriate Best Management Practices will be used during the reconstruction phase for erosion control and water quality considerations. If practicable, hay bales, temporary slope drains and silt curtains will be used during construction to avoid siltation of area wetlands. All scalped lands will be revegetated as quickly as possible in an effort to minimize water quality degradations. FDOT is committed to using Best Management Practices during the construction phase between the West Toll Booth and S.R. 679 for erosion control and water quality considerations.

Endangered and Threatened Species

Precautions to protect the manatee and sea turtles will be adhered to during the construction of this project. FDOT will comply with these measures during bridge construction activities for the segment between the West Toll Booth and S.R. 679. The latest protection measures developed by FDOT and FHWA with the help of the U.S. Fish and Wildlife Service for manatees and sea turtles will be followed by the contractor chosen to work on the proposed project.

Wetlands

To minimize impacts to seagrasses located at the western end of bridge Structure "C" one of the following alternate construction methods will be employed: (1) The new bridge will be built from east to west up to the edge of the grass bed. Then, pile driving equipment will reach from both the

completed portion of the bridge and the existing touchdown point on Long Key to drive the remaining piles and (2) The contractor will use shallow-draft barges which can navigate over the grass bed without a dredged channel. FDOT is committed to minimizing impacts to seagrasses in the study area by using all reasonable measures, including Best Management Practices, to reduce any impacts to these wetlands. In addition, FDOT is committed to consider all reasonable levels of wetland compensation to ameliorate the impacts of he proposed project and to obtain the necessary regulatory permits during the design phase of the project.

Construction Noise

There is the potential for noise impacts significantly greater than those resulting from normal traffic operation to occur during construction or the improvement. To minimize this potential, the following requirements will be included in the special provisions of the construction contract:

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

2. The contractor shall not work on Sundays or legal holidays except to protect the public health and/or safety or by written permission from the engineer.

3. The contractor shall establish haul routes which will avoid developed areas when feasible and ensure noise from hauling operations is kept to a minimum. The engineer will be advised in writing of all proposed haul routes.

4. The contractor is responsible for complying with any federal, state, or local laws, regulations or ordinances pertaining to noise.

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

In addition to the above provisions, the identification of all noise-sensitive sites will appear in the special provisions.

FDOT is committed to minimizing construction noise impacts associated with the proposed project. Noise generated by bridge demolition and construction, haul trucks, and other heavy equipment used in paving is anticipated. Construction noise will be minimized on this project by the contractor's adherence to measures discussed in the FDOT's "Standard Specifications for Road and Bridge Construction", as amended.

TWO
INTRODUCTION

2.0 INTRODUCTION

2.1 PURPOSE

The purpose of this report is to document the engineering decisions and the design criteria used in the development of proposed improvements to S.R. 682, Pinellas Bayway, from the west toll booth to 41st Street South. This report contains information regarding the identification and evaluation of potential corridors, the development of typical sections and the evaluation of alignment alternatives developed to provide improvements adequate to the 2015 design year. Also included is the economic evaluation of the alternatives considered and the recommended improvements. This report documents the process and rationale for selecting a preferred alternative.

2.2 PROJECT DESCRIPTION

S.R. 682 (Pinellas Bayway) extends from S.R. 699 (Gulf Boulevard) to I-275 in southern Pinellas County, Florida. Figure 2-1 is a project location map for the study. S.R. 682 connects the City of St. Petersburg Beach located west of the Gulf Coast Intracoastal Waterway (GCICW) with the City of St. Petersburg located east of the GCICW. S.R. 682 is classified as a minor arterial under the jurisdiction of the Florida Department of Transportation. The roadway is operated as a toll facility between the west toll booth which is located approximately 0.25 mile east of S.R. 699 and the east toll booth located approximately 0.50 mile west of 41st Street South.

The Pinellas Bayway Bridge crosses over the GCICW. This portion of the GCICW connects boat traffic from the mouth of Tampa Bay just west of the Sunshine Skyway Bridge on I-275 to Tarpon Springs along the Pinellas County coast. Exits to the Gulf of Mexico are provided at Pass-A-Grille, Johns Pass, Clearwater Pass, and south of Anclote Key located opposite Tarpon Springs. The Pass-A-Grille inlet is located approximately 2 nautical miles south of S.R. 682 and Johns Pass is located approximately 6 nautical miles north of S.R. 682.

S.R. 682 within the study limits is a two lane roadway from the west toll booth to west of S.R. 679, a four lane divided roadway from west of S.R. 679 to the east toll booth, and a six lane divided roadway form the east toll booth to 41st Street South. A two lane bascule bridge carries S.R. 682 over the GCICW.

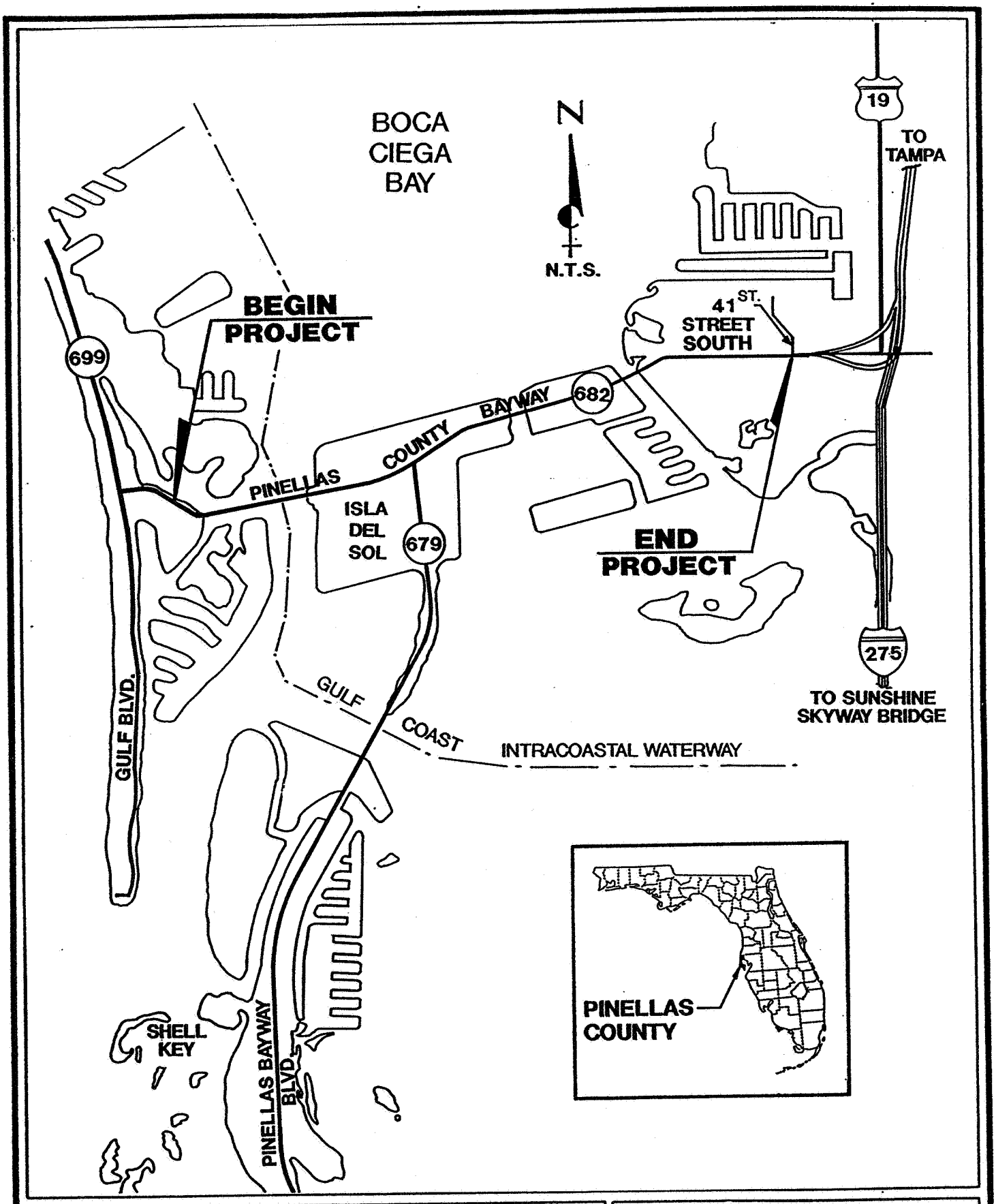


FIGURE 2-1

PROJECT LOCATION MAP

SR 682 (BAYWAY BRIDGE)
WEST TOLL BOOTH TO
41 st. STREET SOUTH

2.3 BACKGROUND

On November 30, 1983, the United States Coast Guard signed a Finding of No Significant Impact (FONSI) based upon an Environmental Assessment (EA) prepared by the Florida Department of Transportation (Work Program Item Number: 1116843). The EA/FONSI approved upgrading the existing two lane facility to a four lane divided highway with improvements to three bridge structures located within the study limits. The initial construction of S.R. 682 provided two travel lanes (one in each direction) within 200 feet of right of way. The facility was offset to the north to provide for future expansion to four lanes separated by an 18 foot to 40 foot wide median.

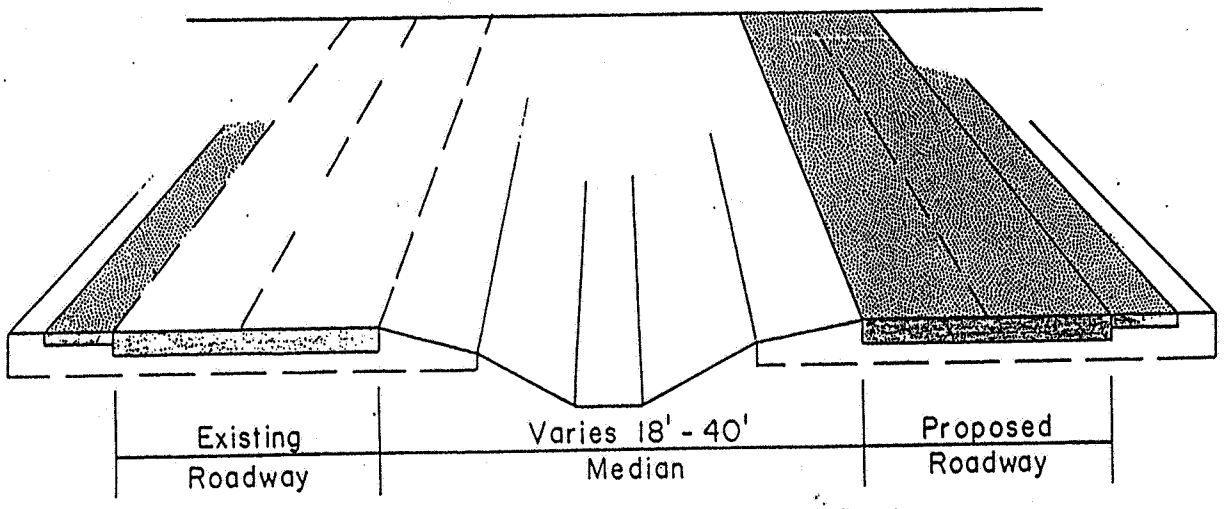
The EA/FONSI recommended adding two travel lanes to the south and resurfacing the existing two lanes. The travel lanes would be separated by an 18 foot to 40 foot wide median. A six foot wide paved shoulder adjacent to the outside of the proposed roadway would be provided for use as a refuge lane for disabled vehicles. 1The paved shoulder would also be provided as an area for biking enthusiasts. Figure 2-2 shows the roadway typical section approved under the EA/FONSI.

The EA/FONSI recommended the construction of new two lane structures south of the existing bridges and widening of all three exiting bridge structures. The navigational clearances (vertical and horizontal) for the proposed bridge structures would match the existing clearances. A bascule bridge with the same vertical clearance as the existing structure was recommended at the GCICW crossing. Figure 2-3 shows the bridge typical section approved in the EA/FONSI.

Portions of the improvements recommended in the November 30, 1983
EA/FONSI have been constructed. S.R. 682 from west of S.R. 679 to the east toll booth has been widened to four lanes. Both bridge structures within these limits have been widened and a new bridge structure has been constructed to the south. The roadway has been widened to six lanes from the east toll booth to 41st Street South.

Proposed Roadway Improvements

The proposed roadway improvements will consist of adding two new lanes (located to the south) and resurfacing the existing two lanes separated by a 18'-40' median. A 6' paved shoulder will be provided for use as a refuge lane for disabled vehicles adjacent to the outside of the proposed roadway. This paved shoulder could also provide an area for biking enthusiasts, separate from the vehicular traffic.



DESIGN SPEED 45 M.P.H.

N.T.S.

FIGURE 2-2
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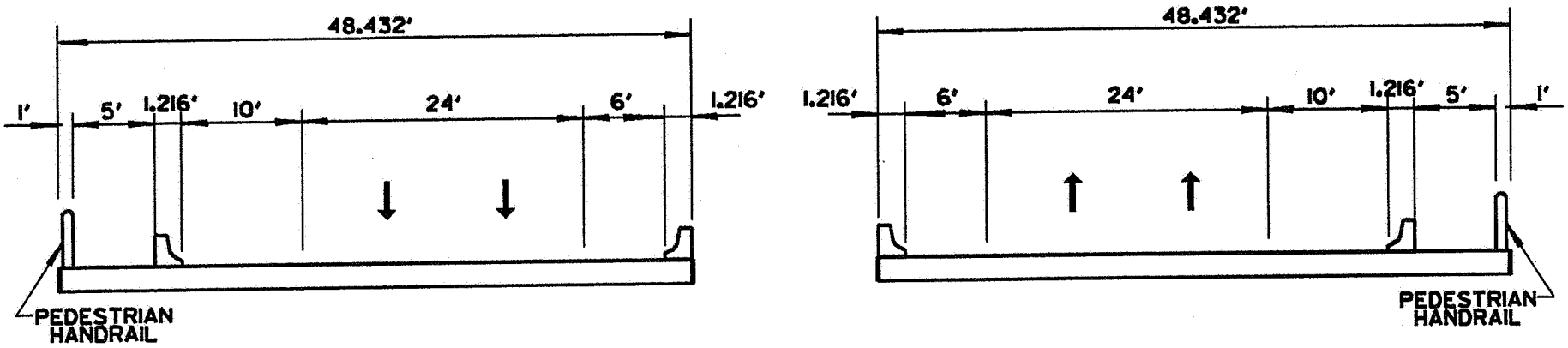
1983 EA/FONSI RECOMMENDED ROADWAY TYPICAL SECTION

S.R. 682 (BAYWAY BRIDGE)



FIXED OR HIGH LEVEL BRIDGE

N.T.S.

FIGURE 2-3
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1983 EA/FONSI RECOMMENDED BRIDGE TYPICAL SECTION

S.R. 682 (BAYWAY BRIDGE)

THREE
NEED FOR IMPROVEMENT

3.0 NEED FOR IMPROVEMENT

The following section identifies the need for the proposed improvement. The deficiencies and improvements for the proposed project are discussed with respect to local and regional planning efforts.

3.1 DEFICIENCIES OF THE EXISTING FACILITIES

3.1.1 Capacity

A traffic study was completed to determine the Level of Service (LOS) to be provided at the signalized intersection of S.R. 682 with S.R. 679 and along the highway links under review. The signalized intersection is projected to operate at LOS E in the PM peak hour in the 2015 design year. If a second west bound left turn lane is constructed at the intersection, LOS C operation could be attained.

The highway link on S.R. 682 from the west toll booth to S.R. 679 will operate at LOS F in the AM and PM peak hours in 1995 and 2015 design year. Improvement of this roadway segment to a four lane divided facility would provide LOS C or better operation through the 2015 design year. S.R. 682 from S.R. 679 to the east toll booth was found to operate at an acceptable LOS through the 2015 design year.

In order to achieve acceptable LOS D or better operation on S.R. 682 through the 2015 design year, it will be necessary to provide the following improvements:

1. Widen S.R. 682 from the west toll booth to S.R. 679 to a four-lane divided facility, and

2. Provide a second westbound left turn lane at the intersection of S.R. 682 and S.R. 679.

A Technical Memorandum/Project Traffic Report (dated October, 1992) was prepared for this study and provides additional detailed information regarding the methodology used in developing the traffic projections. Additional information regarding the traffic analysis and results is contained in Section 6.0 of this report.

3.1.2 Evacuation Routes and Emergency Services

According to the 1992 Tampa Bay Region Hurricane Evacuation Study prepared by the Tampa Bay Regional Planning Council for the Florida Department of Community Affairs, Division of Emergency Management, S.R. 682 (Bayway) is a designated evacuation route for Pinellas County. S.R. 682 is one of six corridors identified within Pinellas County. Pinellas County has been divided into 136

evacuation zones. The evacuation zones were delineated based on common levels of overland storm surge, clusters of traffic analysis zones that have a common roadway access to non-vulnerable areas, and familiar physical features (roadways) as boundaries for an understandable public information program. Residents within the study area are located within Zone 1 (Evacuation Level A).

The 1992 Tampa Bay Region Hurricane Evacuation Study utilized five categories to classify hurricanes [Category 1 (least) to Category 5 (worst)] and one tropical storm. Zones were analyzed to identify a plan of action regarding the order zones should be evacuated based upon the category of the hurricane or tropical storm. Residents located within Zone 1 (Evacuation Level A) are the first to be evacuated for all categories and tropical storms.

The existing bascule bridge could restrict the flow of evacuees for a number of reasons. Only one lane would be available for evacuees. The remaining lane would be used for emergency vehicles. In addition, the existing bridge does not have adequate shoulders to accommodate disabled vehicles. The replacement of the bascule bridge with a fixed span bridge will aid the flow by increasing the carrying capacity of the evacuation route during a crisis or emergency.

Services provided by the Pinellas County Sheriff's Department and the City of St. Petersburg Fire Department will be improved. The replacement of the bascule bridge with a fixed span bridge will eliminate bridge openings and provide better emergency services to residents located within the project area.

3.2 SAFETY

Accident data was obtained from the Florida Department of Transportation, District 7 and was summarized for a five year period from 1986 to 1990. Accidents were grouped according to roadway segments and for major at-grade intersections along the project. By far the greatest number of accidents occurred at the intersection of S.R. 682 and S.R. 679 with an average of 10.4 accidents and 17.6 injuries per year. Sixty-nine percent of these accidents involved collisions with drivers turning left on to SR 679.

The bascule bridge itself was the location of 6.6 accidents and 6.8 injuries per year, of which eight-five percent were rear end collisions. The opening of the bascule bridge and stopping traffic intermittently is the most likely cause of these accidents. Most of the remaining accidents are vehicles hitting fixed objects such as the bridge structure, signs, and utility poles.

3.3 CONSISTENCY WITH TRANSPORTATION PLAN

The proposed improvement, consisting of replacing the existing two lane bascule bridge with a four lane, high level, fixed span bridge, has been determined to be consistent with the State Transportation Plan, the Pinellas County Comprehensive Plan, the City of St. Petersburg's Comprehensive Plan, and the City of St. Petersburg Beach Comprehensive Plan.

3.4 SYSTEM LINKAGE

S.R. 682, west of the west toll booth, is a four lane divided highway. From west of S.R. 679 to the east toll booth, the roadway is a four lane roadway and expands to six lanes east of the toll booth. The replacement of the Bayway Bridge with a four (4) lane typical section will provide consistency between the existing roadway sections and will remove the funneling effect caused by the change in typical sections.

FOUR
EXISTING CONDITIONS

4.0 EXISTING CONDITIONS

4.1 EXISTING ROADWAY CHARACTERISTICS

4.1.1 Functional Classification

S.R. 682 (Pinellas Bayway) is classified by the Florida Department of Transportation as a minor arterial.

4.1.2 Typical Sections

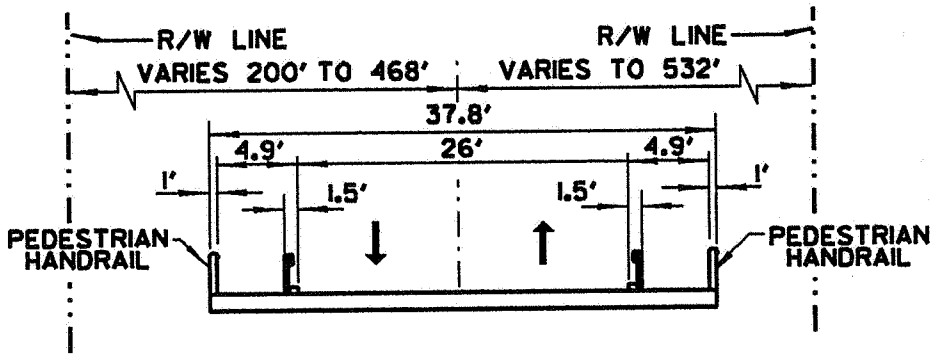
The typical section of S.R. 682 (Pinellas Bayway) varies along the project alignment. The study begins at the toll booth just west of the bascule bridge. The roadway at the toll booth is three lanes wide in the eastbound direction and one lane wide in the westbound direction. Pavement on the westbound side is 32 feet wide with the outside 12 feet striped for parking authorized vehicles only. A six foot wide grassed median with curb separates the travel lanes. As the roadway approaches the bridge, the eastbound travel lanes merge to one lane. The median ends at the beginning of a superelevated curve, which continues on to the first fifty feet of the bascule bridge.

The bascule bridge has two 13 foot wide travel lanes over 26 feet of pavement. Figure 4-1 shows the existing bridge typical section. A six inch high by one foot wide concrete curb lies along the edge of pavement and there is a guardrail immediately outside, protecting a four foot wide sidewalk with a three foot high concrete railing to the edge of the bridge. Runoff drains to either side of the bridge through slots in the curb, with the exception of the curve on the west end where runoff is drained to the north side only, and is directly discharged to the water below via scuppers.

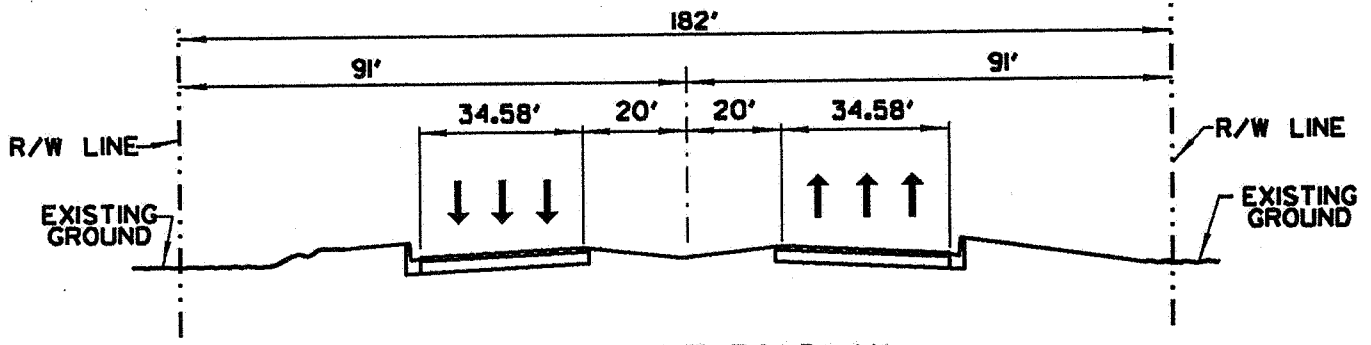
The typical section continues to be two lanes east of the bridge to a point west of the intersection of S.R. 682 and S.R. 679. An at grade unsignalized intersection is provided at Bahia Del Mar Boulevard, just east of the bascule bridge on Isle Del Sol. A path for golf carts to pass under the east end of the bridge is also provided to allow golf carts to cross S.R. 682. At a point ,approximately 1300 feet west of the intersection, the typical section expands to four lanes. Within this area, the median varies from 0 to 30 feet in width. This section of the roadway is rural, with open swales to collect stormwater runoff. Left and right turn lanes are provided at the intersection.

The roadway continues to be a four-lane divided highway to the east toll booth. Figure 4-2 shows the four lane typical section. At the east toll booth, the roadway typical section changes to a six lane urban section. Figure 4-2 show the six lane typical section.

Two identical fixed span bridges exist between Leeland Street South and 41st Street South. The bridges are divided and each side is 36 feet wide with two travel lanes and a shoulder. A four feet wide sidewalk is protected by a concrete barrier, thirty inches high, on the inside and a metal railing on the outside.



EXISTING BRIDGE



EXISTING 6-LANE ROADWAY
FROM THE EAST END OF THE BRIDGE
TO WEST OF S.R. 679

N.T.S.

FIGURE 4-1
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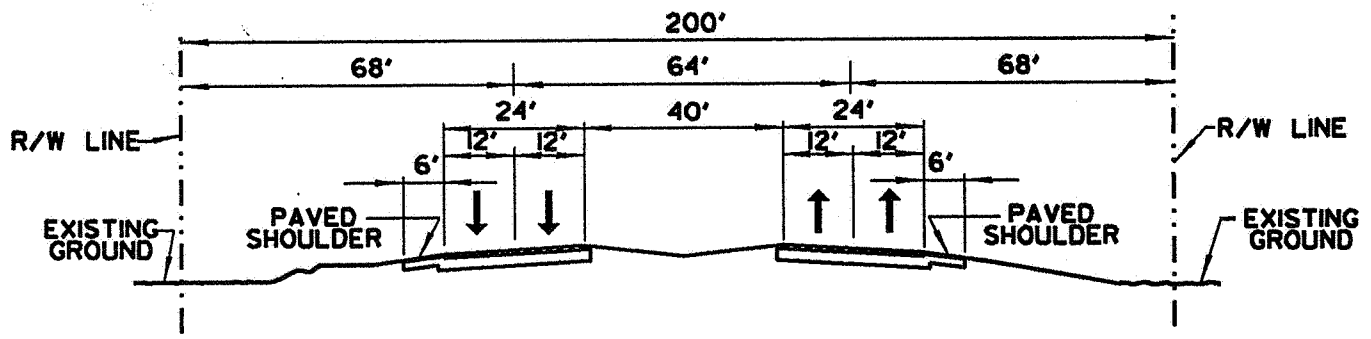
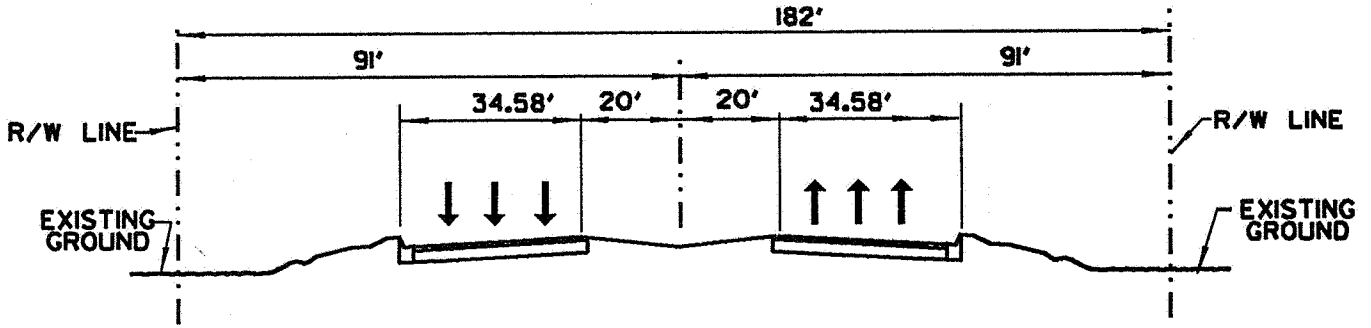
EXISTING TYPICAL SECTIONS

S.R. 682 (BAYWAY BRIDGE)



EXISTING 4-LANE ROADWAY

FROM S.R. 679 TO THE EAST TOLL BOOTH



EXISTING 6-LANE ROADWAY

FROM EAST TOLL BOOTH TO 41ST. STREET SOUTH

N.T.S.

FIGURE 4-2
BWSEC.DGN

EXISTING TYPICAL SECTIONS

S.R. 682 (BAYWAY BRIDGE)

4.1.3 Pedestrian and Bicycle Facilities

Pedestrian sidewalks have been provided on all three of the existing bridge structures. A sidewalk is provided only on the north side of the bascule bridge. Sidewalks are provided on both sides of the remaining two bridge structures. Pedestrians use the wide grassy right of way along the roadway section.

Bicyclists share the travel lane with vehicular traffic on the bascule bridge and are warned to walk their bicycles across. For the remaining two bridge structures, bicyclists can use the ten foot wide outside shoulder. A six foot wide paved shoulder is available for bicyclists from S.R. 679 to 41st Street South.

4.1.4 Right of Way

The existing right of way on S.R. 682 varies within the limits of the study. The right of way at the west toll booth is 164 feet. From the west toll booth to the east end of the bascule bridge, the right of way envelope varies from 500 to 1000 feet across the Intracoastal Waterway. From the east end of the bascule bridge to the east toll booth, the right of way width is 200 feet with an expanded right of way envelope at the intersection of S.R. 682 and S.R. 679. The right of way envelope from the east toll booth to 41st Street South is 182 feet.

4.1.5 Horizontal Alignment

S.R. 682 within the limits of the study area generally runs in a east-northeast direction. Five horizontal curves are used to change the direction of the alignment. At the west toll plaza, the alignment lies in a east-southeast direction. Between the west toll booth and the west end of the bridge, a three degree curve is used to change the alignment to the east-northeast. The second alignment change occurs just west of S.R. 679 with a 1 degree 15 minute curve. The third alignment change occurs at S.R. 682 and S.R. 679 with a 1 degree 30 minute curve to the east-northeast. The two remaining alignment changes occur just west of the east toll booth with a 1 degree 15 minute curve and a 2 degree curve. From the east toll booth to 41st Street South, the alignment continues in a east-northeast direction.

4.1.6 Vertical Alignment

The existing vertical alignment for S.R. 682 is relatively flat, with the exception of the vertical curves on each of the three bridges. At the bascule bridge location, a 400 foot long sag vertical curve is used to change the vertical alignment from 0.00 percent grade to +3.00 percent grade. A 900 foot long crest vertical curve is used to change the vertical alignment from +3.00 percent to -3.00 percent grade. The second sag vertical curve at the east end of the bascule bridge changes the vertical alignment from -3.00 percent to 0.00 percent.

The second bridge structure located to the east of S.R. 679 requires a 323.34 foot long sag vertical curve to change the vertical alignment from 0.00 percent to +2.40 percent. A 1,100 foot long crest vertical curve is used to change the vertical alignment from +2.40 percent to -2.40 percent grade. A 365.64 foot long sag vertical curve is used to change the vertical alignment from -2.40 percent to 0.00 percent.

The third bridge structure located to the west of the west toll booth requires 400 foot long sag vertical curves on both bridge approaches to change the vertical alignment from 0.00 percent to +3.00 percent on the west and -3.00 percent to -0.20 percent on the east. The crest vertical curve is 1,300 feet long with +3.00 percent and -3.00 percent grade.

4.1.7 Drainage

Stormwater drainage within the study limits is conveyed by a combination of open swales and curb and gutter sections. From the west toll booth to the beginning of the west end of the bridge, stormwater drains off the westbound lane to the grassed area on the north side. On the eastbound side, stormwater drains to the median curb and into a curb inlet which carries the stormwater runoff under the roadway to an outfall. Stormwater runoff from the bridge is collected along the curb and gutter and allowed to discharge into the bay. Stormwater runoff from the roadway from the east end of the bridge to the east toll booth is conveyed to open grassed swales along both sides of the roadway. Starting at the east toll booth and continuing east to 41st Street South, stormwater runoff is collected by a curb and gutter section and conveyed to outfall points along the roadway.

4.1.8 Accident Data

Accident data was obtained from the Florida Department of Transportation, District 7 and is summarized for a five year period from 1986 to 1990. Accidents were grouped according to roadway segments and for major at-grade intersections along the project. Two roadway segments, one bridge segment and one intersection were identified for accident tabulation. Table 4-1 provides a summary by accident type and Table 4-2 provides a summary of accident data by number of accidents, monetary damages and injury. By far the greatest number of accidents occur at the intersection of S.R. 682 and S.R. 679 with an average of 10.4 accidents and 17.6 injuries per year. Sixty-nine percent of these accidents involved collisions with drivers turning left on to S.R. 679.

The bascule bridge itself is the location of 6.6 accidents and 6.8 injuries per year of which eight-five percent are rear end collisions. The opening of the bascule bridge and stopping traffic intermittently is the most likely cause of these accidents. Most of the remaining accidents are vehicles hitting fixed objects such as the bridge structure, signs, and utility poles.

4.1.9 Traffic Signals, Locations and Intersection Design

There are two signalized intersections located within the study limits. They are located at S.R. 682 and S.R. 679 and S.R. 682 and Leeland Street South. Figure 4-3 illustrates the existing lane configuration for these intersections.

4.1.10 Lighting

Street lighting is provided for the entire study limits along the roadway section. Lighting is provided on the south side of the bascule bridge.

4.1.11 Utilities

Utility companies were contacted to determine existing utility systems within the S.R. 682 corridor. The results of this coordination are described as follows:

Electric:
Electric service is provided by the Florida Power Company. Overhead electrical lines are located on the north side of the roadway from the west toll booth to 41st Street South. The lines are buried within the limits of the bascule bridge. High voltage lines are located on the south side of S.R. 682 from S.R. 679 to 41st Street South. A large substation is located just south of S.R. 682 on S.R. 679.

Telephone:
General Telephone and Electric (GTE) Company maintains buried conduits and several switching boxes along the north side of S.R. 682 within the project limits. GTE maintains a submerged telephone cable on the north side of the bridge.

Intermedia Communications of Florida, Inc. does not have facilities in the project area and does not anticipate any in the future.

Cable Television:
Cable television is provided by Paragon Cable. Underground cables are located within the residential areas located within the western limits of the project. No cables are located within the existing right-of-way of the project.

Gas:
Peoples Gas Systems, Inc. indicated by letter that the company does have facilities in this area and there is a potential for conflict. However, specific locations of these facilities was not provided. Peoples Gas requested that the Engineering Department be contacted prior to construction at (813) 894-2560.

Sewer and Water:
Pinellas County Water Systems Department provides water services within the corridor. A 2" and 4" water main is located on the south side of S.R. 682 from Casablanca to the west end of the bridge. Information regarding sewer system was not provided.

Utility responses are contained in the project files.

TABLE 4–1 Summary By Accident Types for S.R. 682 From 1986–1990

DESCRIPTION	Milepost	TYPES				
		Accidents	Rear End	Left Turn	Fixed Obj.*	Other
From Toll Booth To West End of Bridge	0.311 0.428	13	4	0	5	4
From West End of Bridge To East End of Bridge	0.429 0.905	33	28	1	2	2
From East End of Bridge To 500' West of SR 679	0.906 1.326	10	7	0	1	2
From 500' West of SR 679 To 500' East of SR 679	1.327 1.517	52	7	36	3	6

* Fixed Objects include bridge structure, utility/light poles, signs/sign posts, and trees/shrubbery

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TABLE 4–2 Summary of Accident Data by Accidents, Monetary Damages, and Injury for S.R. 682
From 1986–1990

Description	Five Year Totals					Annual Average			
	Milepost	Accidents	No. Cars	Damage($)	Injuries	Accidents	No. Cars	Damage($)	Injuries
From Toll Booth To West End of Bridge	0.311 0.428	13	21	$27,425	2	2.6	4.2	$5,485	0.4
From West End of Bridge To East End of Bridge	0.429 0.905	33	71	$99,560	34	6.6	14.2	$19,912	6.8
From East End of Bridge To 500' West of SR 679	0.906 1.326	10	23	$31,200	8	2	4.6	$6,240	1.6
From 500' West of SR 679 To 500' East of SR 679	1.327 1.517	52	96	$277,235	88	10.4	19.2	$55,447	17.6
Totals		108	211	$435,420	132	21.6	42.2	$87,084	26.4

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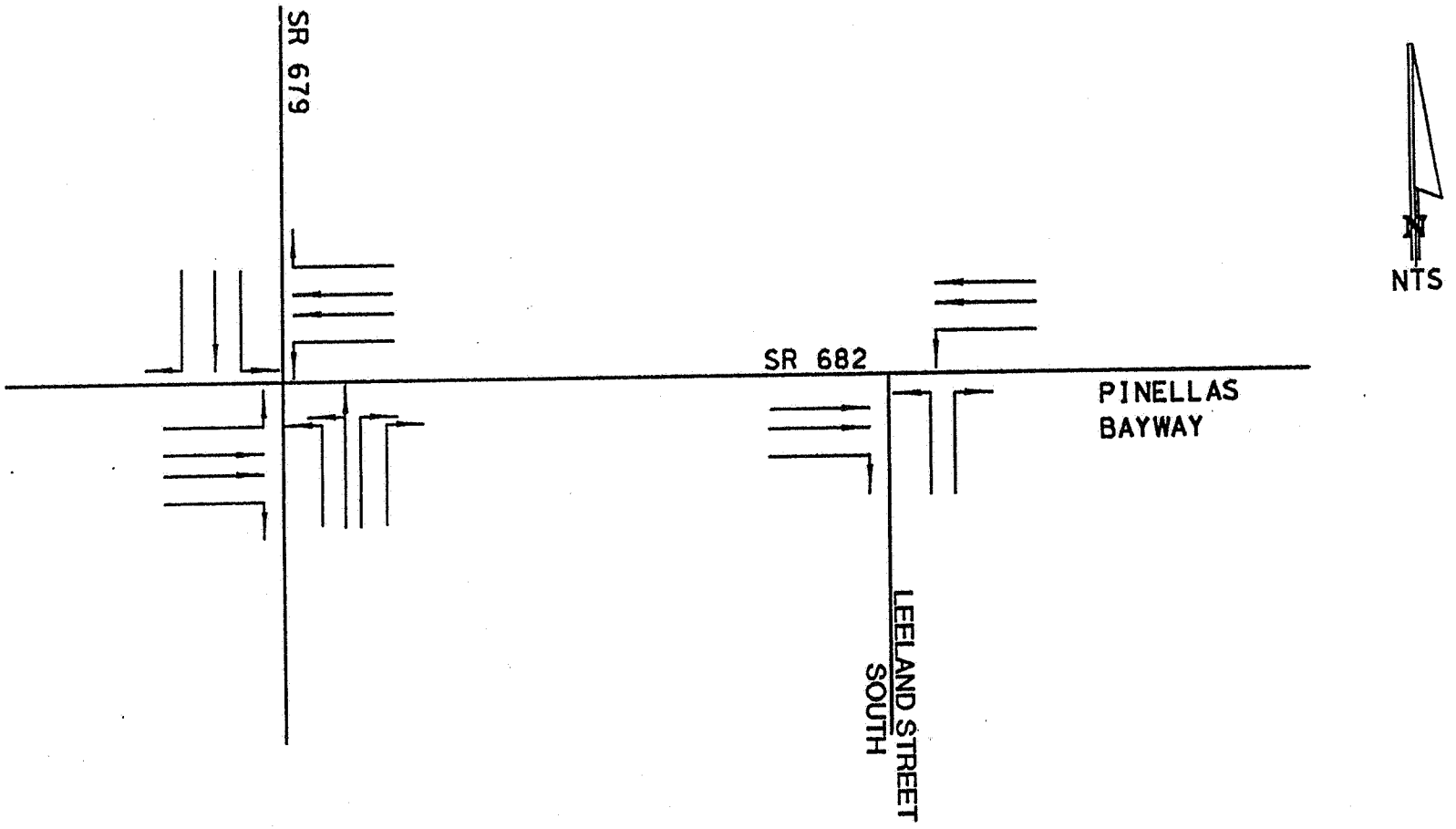

FIGURE 4-3

EXISTING LANE CONFIGURATION

(SIGNALIZED INTERSECTION)

SR 682 (BAYWAY BRIDGE)
WEST TOLL BOOTH TO
41 st. STREET SOUTH

4.1.12 Structural and Operational Conditions

S.R. 682 roadway is in good structural condition along the project alignment. Operational problems occur in and around the bascule bridge because of bridge openings and the lack of sufficient capacity on the bridge to handle the traffic demand.

4.2 EXISTING BRIDGES

S.R. 682 crosses the Gulf Coast Intracoastal Waterway. The existing bridge (Bayway Structure "C") is a two lane bascule bridge (Bridge No. 150050) and was built in 1962. The bridge is 37.8 feet wide (outside to outside) and has two 13 foot wide travel lanes. The structure is 2,552 feet long. FDOT is responsible for maintenance of the existing Bayway Structure "C".

4.2.1 Type of Structure

The bridge is a prestressed concrete structure. The bridge has a concrete wearing surface with a design load of H20-44. The moveable span portion is steel grate.

4.2.2 Condition (Structural Rating) and Year of Construction

The bridge currently has a sufficiency (structural) rating of 58.2. The bridge was constructed in 1962. The estimated remaining life is 19 years as of 1993.

4.2.3 Horizontal and Vertical Alignment

The bridge was constructed along a tangent section and runs in an east-northeast direction. Two sag vertical curves and one crest vertical curve are used to change the vertical grade of the bridge. Each sag vertical curve is 400 feet long. The crest vertical curve is 900 feet long. The vertical alignment for the west approach to the bridge is changed from 0.00 percent to +3.00 percent. The change in grade for the crest vertical curve is +3.00 percent to -3.00 percent. The change in grade for the sag vertical curve located at the east end of the bridge is -3.00 percent to 0.00 percent.

4.2.4 Span Arrangement - Number and Length of Spans

This is a 46 span concrete and steel structure. The maximum span length is 48 feet for an overall bridge length of 2,552 feet. Horizontal clearance (navigational) at the main span is 90.0 feet. The bridge has a concrete superstructure and substructure with the exception of the steel bascule portion over the channel.

4.2.5 Channel Data

The Gulf Coast Intracoastal Waterway is approximately 100 feet wide at the Pinellas Bayway bridge crossing. The configuration of the channel is trapezoidal with a 50 foot wide bottom and 2:1 side slopes. The channel is restricted to a width of 90 feet due to the existing bridge structure. Depth of

the waterway at Mean High Tide is 17.9 feet and 16.3 feet at Mean Low Tide. Navigation is not limited by the vertical clearance since the existing bridge is a bascule structure. In the closed position, the bascule portion has a 21 foot vertical clearance.

4.2.6 Bridge Openings

The bascule bridge opens for boat traffic on the hour and every 20 minutes thereafter as required. Bridge opening logs have been reviewed and summarized for the years 1988 through 1991 and the first five months of 1992. This data is summarized in Table 4-3.

This is a busy location with an average of 10,724 openings per year for the years from 1988 through 1991. There were an average of 1.8 vessels passing under the bridge for each opening and an average of 30 openings per day. For the first five months of 1992 there were an average of 23 openings per day with 2.1 vessels per opening. The reduced number of openings likely resulted from the limits on openings of three per hour and reductions in the number of vessels passing through the bridge due to poor economic conditions.

4.3 EXISTING ENVIRONMENTAL CHARACTERISTICS

4.3.1 Land Use Data

The existing land uses for the study area are depicted in Figure 4-4. This land use evaluation addresses only the portion of
S.R. 682 west of the S.R. 679 intersection, because improvements to S.R. 682 east of S.R. 679 were already completed, under conditions described in the 1983 Environmental Assessment. The project traverses property within the Cities of St. Petersburg and St. Petersburg Beach. The study area encompasses residential, recreational, commercial, and utilities land uses.

The west end of the project alignment lies within St. Petersburg Beach. This portion of the project area, from the east end of the existing Pinellas Bayway Bridge to the intersection of S.R. 682 and Gulf Boulevard, consists of low density (single family) residential development and marine embayment. Residential land use is the predominant land application in St. Petersburg Beach, accounting for approximately 62.4 percent (City of St. Petersburg Beach Comprehensive Plan). As there is little available space in the project area for future development, new development in the area can take place only on the vacant lots in the Mangrove Pointe development, located approximately 1100 feet north of the west end of the existing Pinellas Bayway Bridge.

Table 4-3 Summary of Mail Out Boat Survey

		OVERALL HEIGHT FROM WATERLINE			
Time Period		Less than 55′	55′ to 60′	60′ to 65′	>65′*
1991	Number of Boats	11	4	10	5
	Average Number of Trips through Bridge	15	10	15	12
July,1992	Number of Boats	11	4	10	5
	Average Number of Trips through Bridge	7	0	2	4

* 1@66′,2@67′,1@68′,1@70′

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The remainder of the project is within St. Petersburg and crosses two man-made islands called Isla Del Sol and Point Brittany. Isla Del Sol occupies the east portion of the project area from 300 feet east of the intersection of S.R. 682 and S.R. 679 to the east end of the existing Pinellas Bayway Bridge. Isla Del Sol includes medium density residential developments (low and high-rise condominiums), the Isla Del Sol Golf Course, and a small retail shopping center at the northeast corner of the intersection of S.R. 682 and S.R. 679. Point Brittany Island is mainly medium density residential development (high rise condominiums).

No new development is planned in or adjacent to the project limits, according to the future land use element of the Pinellas County Comprehensive Plan and the land use map.

The City of St. Petersburg Comprehensive Plan, future land use element shows no future development for the project area due to the lack of undeveloped land. The City of St. Petersburg Beach can be classified as a built-out community, according to the Future Land Use element of the St. Petersburg Beach Comprehensive Plan, October 1989. Of the 1303 acres making up the community, only 33.4 acres or 2.5 percent is vacant or undeveloped. In the project vicinity, the only available area suitable for development consists of the single family residential lots located in Mangrove Pointe, described above. Because the study area has essentially reached buildout, future land use is expected to continue in the same pattern as existing land uses. Therefore, future land use maps are not included in this document.

4.3.2 Cultural Features and Community Services

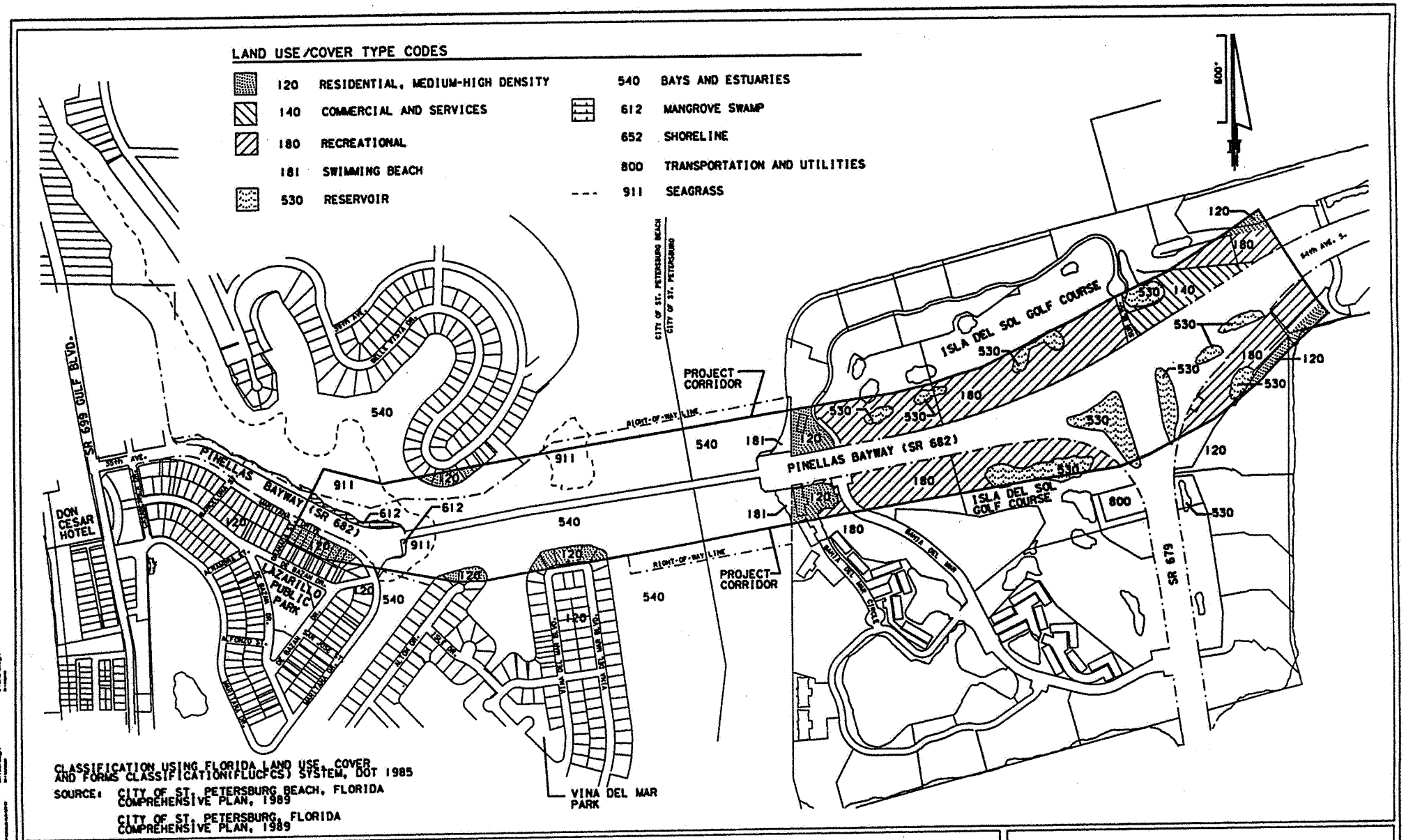
The cultural features and community service facilities within or adjacent to the project area were identified. The locations of the community facilities were determined by field surveys, from the St. Petersburg Comprehensive Plan, Pinellas County Comprehensive Plan, and through coordination with the City of St. Petersburg Beach and are described below.

4.3.2.1 Medical Facilities

No medical facilities occur within the project corridor. The closest hospital is the Humana Hospital Sun Bay located in St. Petersburg on 6th Street S., 1.5 mile north of S.R. 682. Blind Pass Nursing Home lies approximately 2.5 miles north of the west project terminus. Based on the St. Petersburg Comprehensive Plan, and conversations with the City of St. Petersburg Beach planning department, no new medical facilities are scheduled to be built in or adjacent to the project area.

4.3.2.2 Fire and Police Protection

No Fire or Police stations occur within the project corridor. Fire protection for the study area is provided by Pinellas County. The nearest station, Fire Station No. 22, is located on 20th Avenue in St. Petersburg Beach, which is less than 1 mile southwest of the west project terminus.



CLASSIFICATION USING FLORIDA LAND USE, COVER AND FORMS CLASSIFICATION(FLUCFCS) SYSTEM, DOT 1985

SOURCE: CITY OF ST. PETERSBURG BEACH, FLORIDA COMPREHENSIVE PLAN, 1989

CITY OF ST. PETERSBURG, FLORIDA COMPREHENSIVE PLAN, 1989

FIGURE 4-4

EXISTING LAND USE / COVER TYPE MAP

S.R. 682
BAYWAY BRIDGE

Police protection is provided by St. Petersburg and St. Petersburg Beach. The nearest police station to the project area lies over two miles to the north, on 77th Avenue in the City of St. Petersburg Beach. Based on the St. Petersburg Comprehensive plan and conversations with the City of St. Petersburg Beach planning department, no fire or police stations are planned for construction in the project limits.

4.3.2.3 Educational Facilities

No schools are found within the project corridor. The closest school to the project area is Eckerd College, located approximately 1.5 miles east of the eastern project boundary. Two other elementary schools, Gulf Beaches and St. John's lie over 3 miles north of the project area. Based on the St. Petersburg Comprehensive Plan and conversations with the Pinellas County School Board and the City of St. Petersburg Beach planning department personnel, no new schools are scheduled for the project area or adjacent lands.

4.3.2.4 Religious Institutions and Cemeteries

No churches or cemeteries are located within the study area. The closest church, Pass-A-Grille Community Church, lies more than 0.5 mile south of the project area. Other churches lie 2 to 3 miles north of the project area. Based on the St. Petersburg comprehensive plan and conversations with the City of St. Petersburg Beach planning department personnel, no new churches or cemeteries are scheduled in or adjacent to the project area.

4.3.2.5 Public and Civic Buildings

A post office is located adjacent to the shopping center at the intersection of S.R. 682 and S.R. 679. In addition, the Bininger Center for the Performing Arts lies on the west side of the Eckerd College campus.

4.3.2.6 Recreational Facilities

The recreational facilities within the project area consist of a private golf course and community parks. Isla Del Sol Golf Course serves the Isla Del Sol developments. Lazarillo Public Park is a small neighborhood park located in the Don Cesar Place subdivision. This park contains tennis and basketball courts, and playgrounds. Another neighborhood public park, Vina Del Mar Park, serves the Vina Del Mar subdivision. Only the Isla Del Sol Golf Course is within the Bayway Bridge project area. There is a public beach access located less than 1 mile north of the project area on S.R. 699 (Gulf Boulevard). Based on the St. Petersburg Comprehensive Plan and conversations with the City of St. Petersburg Beach planning department, no new recreational areas or parks are currently proposed within the study area.

4.3.2.7 Archaeological and Historical Resources

No historical or archaeological sites are known to occur within or adjacent to the existing right-of-way. The closest National Register site, the Don Cesar Hotel, is located at the intersection of S.R. 682 and S.R. 699, approximately 0.25 mile west of the western project limit (See Figure 4-4). The closest known archaeological site is located at Maximo Park, approximately 0.5 mile south of the S.R. 682 and US 19 intersection.

4.3.2.8 Social Service Agencies

There are no social service agencies in the project corridor. The closest to the project site is the Neighborhood Senior Services Dining Hall in the Warren Webster Community Center located on 16th Avenue in St. Petersburg Beach, which is less than one mile from the project area. Conversations with St. Petersburg Beach planning department personnel indicate that no new social services agencies are planned for the project area.

4.3.3 Natural and Biological Features

The project area was surveyed for natural and biological communities. The primary issues will involve wetlands (mangrove communities and seagrass beds), and federally protected species. The mangroves consist of a littoral fringe on the north side of the west causeway on Long Key. The mangrove tree fringe is dominated by red and black mangrove (Rhizophora mangle and Avicennia germinans, respectively). Sea grape (Coccoloba uvifera) and saltwort (Batis maritima) are also prominent species in this shore vegetation.

Seagrass beds are located north and to a lesser extent, south, of the existing Bayway Bridge, adjacent to the Long Key causeway. The seagrass beds are dominated by manatee grass (Syringodium filiforme), and contain turtle grass (Thalassia testudinum) and shoal grass (Halodule wrightii). The west end of the existing bridge traverses the southeast tip of a 12 acre seagrass bed. Both of these types of plant communities will be considered jurisdictional by Florida Department of Environmental Protection (DEP, formerly known as DER) and the other regulatory agencies.

Other wetlands in the project corridor consist of manmade ponds (water hazards) at the Isla del Sol golf course. Because these are artificial ponds in upland fill soil, they will not be considered jurisdictional by the agencies requiring permits for this project.

The presence of federal and state listed endangered and threatened species within the study area has been evaluated. Listed wildlife found in the study area include the West Indian manatee, five species of sea turtles, and birds. The manatee (Trichechus manatus latirostris) is federally and state listed as Endangered, and is known to inhabit Boca Ciega Bay. The former Florida Department of Natural Resources, now merged into DEP, recorded many sightings of manatees in Boca Ciega Bay during aerial surveys from 1987 to 1992.

The waters in the project vicinity are suitable habitat for five federally listed species of sea turtles including the green turtle (Chelonia mydas mydas), leatherback turtle (Dermochelys coriacea), Kemp's ridley turtle (Lepidochelys kempi), hawksbill turtle (Eretmochelys imbricata), and loggerhead turtle (Caretta caretta caretta). The loggerhead turtle is designated Threatened, and the other four turtle species are Endangered, according to U.S. Fish and Wildlife Service (FWS) and Florida Game and Freshwater Fish Commission (FGFWFC). These species, especially the loggerhead, frequently inhabit the Gulf of Mexico and occasionally enter the lower reaches of Boca Ciega Bay for feeding, shelter, and rarely, nesting.

A monthly field survey for listed birds was conducted at the Bayway site from December 1992 through March 1993. The survey found 35 bird species of which three are designated Species of Special Concern by the FGFWFC: little blue heron (Egretta cerulea), brown pelican (Pelecanus occidentalis), and snowy egret (Egretta thula). No rookeries or nests were observed, and no threatened or endangered species were observed.

A literature review for listed plant species was also conducted. Of listed species known to occur in Pinellas County, only the Florida golden aster (Chrysopsis floridana, Endangered, FGFWFC and FWS) may occur in the range and habitat associated with this project. A site review on June 30, 1993 indicated that this species probably does not occur in the project corridor.

FIVE
DESIGN CRITERIA

5.0 DESIGN CRITERIA

Engineering design criteria includes such items as lane and median widths, bridge and roadway shoulders widths, horizontal curvature, superelevation, horizontal clearances, grades, and vertical clearances. Operational criteria consist of design speeds and levels of service.

Design criteria for this study is based upon current design standard established by the Florida Department of Transportation, American Association of State Highway and Transportation Officials, and the Federal Highway Administration. The following documents were among the principal references used in establishing the design criteria for this study:

Manual of uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways, State of Florida, Florida Department of Transportation (FDOT), 1989

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 1990

Manual of Uniform Traffic Control Devices for Streets and Highways, Federal Highway Administration (FHWA), 1988

Table 5-1 presents the roadway design criteria which were used to develop alternatives for the proposed improvements.

Table 5-1 Roadway Design Criteria

ROADWAY TYPE	DESIGN ELEMENTS	DESIGN STANDARDS
Rural	Design Speed	50 mph
	Level of Service	D
	Lane Width	12 feet
	Roadway Shoulder Width	12 feet
	Bridge Shoulder Width	10 ft Outside, 6 ft Inside
	Median Width	30 ft.
	Horizontal Curvature	8°15'
	Superelevation Rate	0.10'/ft.
	Maximum Grades	4.0 %
	Stopping Sight Distance	400 to 475 ft.
	Vertical Clearance	16.5 ft.

SIX
TRAFFIC

6.0 TRAFFIC

The following sections identify existing and projected traffic volumes within the project limits. Much of this information was summarized from the "Technical Memorandum, Project Traffic Report," dated October, 1992, and should be consulted if more information is desired.

6.1 EXISTING CONDITIONS

Existing intersection and link operating conditions were analyzed. The intersections of S.R. 682 with S.R. 679 and Leeland Street South are currently signalized and the intersection of S.R. 682 and 41st Street South is currently unsignalized. The AM and PM peak hour of operation at each of these intersections was determined and converted to an annual average operating condition by dividing the directional volumes by the seasonal adjustment factor of 1.01. These volumes, as indicated in Figure 6-1, were then analyzed using the computerized Highway Capacity Software (HCS) which is based on 1985 Highway Capacity Manual methodology. The results of this analysis are summarized in Table 6-1. As is indicated, S.R. 682 at the signalized intersections with S.R. 679 and Leeland Street South operate at Level of Service B (LOS B) for both the AM and PM peak hours. The unsignalized intersection of S.R. 682 at 41st Street South operates at LOS F in the AM peak hour and LOS E in the PM peak hour. Since this intersection is currently unsignalized, the delay affects the southbound left turn only. Improvement of this turning movement to acceptable LOS D or better operation would require the installation of a traffic control signal, however signal warrants would need to be met before a signal should be installed.

The existing operation of the highway links within the project limits are summarized in Table 6-2. The traffic volumes indicated have been adjusted to annual averages by dividing the traffic count by the seasonal adjustment factor of 1.01. The maximum service volumes for the various levels of service have been determined using the Florida Department of Transportation Arterial Level of Service Tables, ART_TAB Version 1.1 software. As indicated in Table 6-2, S.R. 682 currently operates at LOS F from the west toll booth to S.R. 679. All other segments operate at acceptable LOS A conditions.

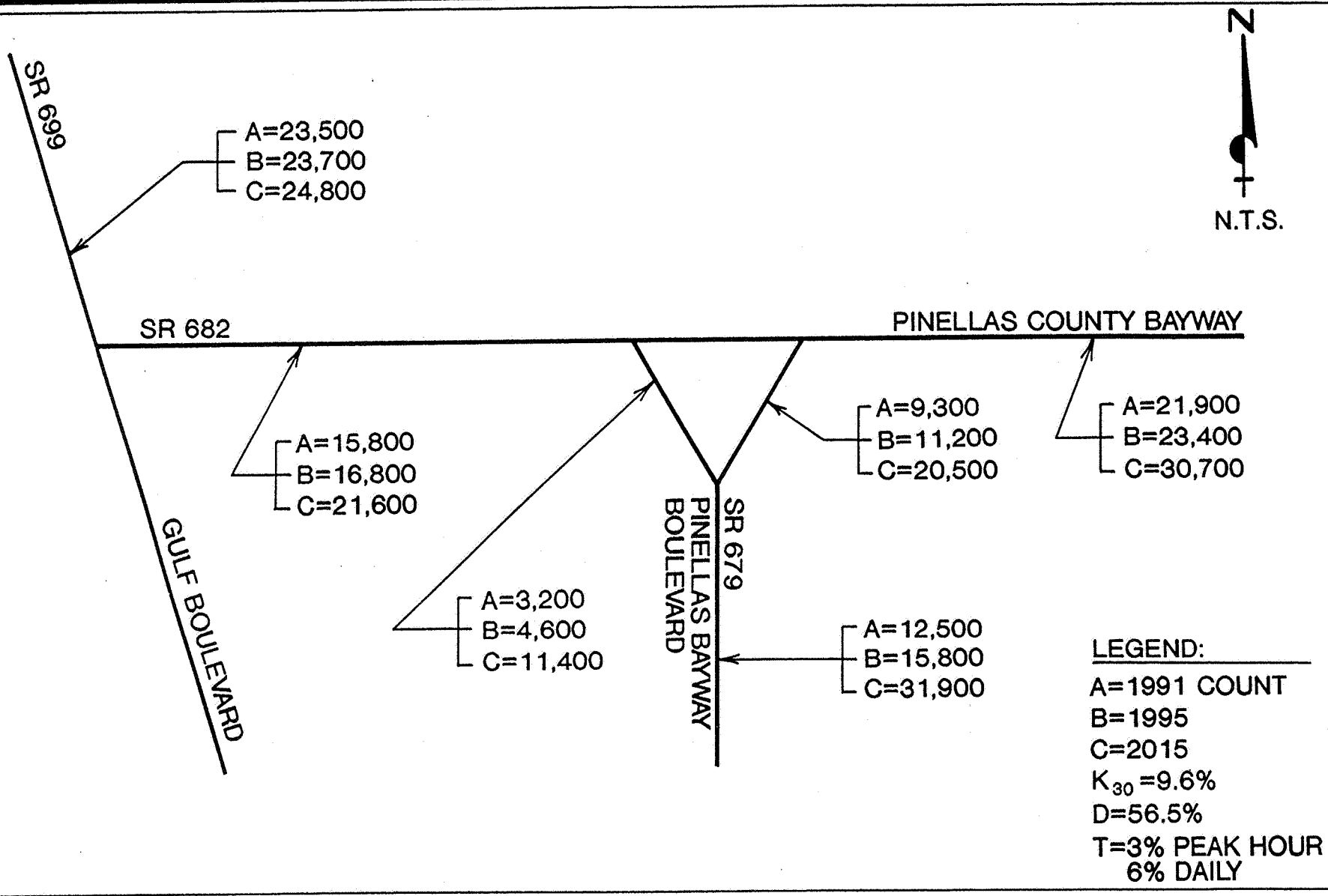


FIGURE 6-1

EXISTING AND PROJECTED TRAFFIC VOLUMES

SR 682 (BAYWAY BRIDGE)
WEST TOLL BOOTH TO
41 st. STREET SOUTH

TABLE 6-1 EXISTING INTERSECTION OPERATION

INTERSECTION	CONTROL TYPE	EXISTING LEVEL OF SERVICE	
		AM PEAK HOUR	PM PEAK HOUR
SR 682 at SR 679	Signalized	B	B
SR 682 at Leeland St. S.	Signalized	B	B
SR 682 at 41st St. S.	Unsignalized	F	E

Date: 07-20-92

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TABLE 6-2. PROJECTED LINK OPERATING CONDITIONS ON S.R. 682

SEGMENT	EXISTING LANEAGE	ANALYSIS YEAR	PEAK HOUR	PROJECTED TRAFFIC VOLUMES EASTBOUND	PROJECTED TRAFFIC VOLUMES WESTBOUND	MAXIMUM SERVICE VOLUME FOR LOS D	LEVEL OF SERVICE EASTBOUND	LEVEL OF SERVICE WESTBOUND
West Toll Booth to S.R. 679	2 LU	1995	AM	911	702	590	F	F
			PM	702	911	590	F	F
		2015	AM	1172	902	590	F*	F*
			PM	902	1172	590	F*	F*
S.R. 679 to East Toll Booth	4 LD	1995	AM	1269	977	1850	B	A
			PM	977	1269	1850	A	B
		2015	AM	1665	1282	1850	B	B
			PM	1282	1665	1850	B	B

LU = lane, undivided
LD = lane, divided

* Would improve to LOS C if widened to 4 LD.

Date: 09-04-92

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6.2 MULTIMODAL TRANSPORTATION SYSTEM CONSIDERATIONS

6.2.1 Bus Service

There is currently no mass transit service operating along Bayway Boulevard from U.S. 19 west to Gulf Boulevard. Pinellas Transit Authority (PSTA) currently provides service to portions of Pinellas County and St. Petersburg adjacent to the project area. However, PSTA has no plans to provide service to Bayway Boulevard, at least, until 2000.

6.2.2 Railroad Crossings

There are no existing railroad crossings within the project limits.

6.2.3 Airports

The closest airport to the project is Albert Whitted Municipal Airport south of downtown St. Petersburg over five miles away.

6.3 TRAFFIC ANALYSIS ASSUMPTIONS

Future traffic along S.R. 682 has been estimated using the FSUTMS computer program. This program has been used to establish Year 2015 traffic volumes and has been interpolated to determine Year 1995 volumes which represent the first year the new facility would be open to traffic. The output from the model identifies peak season daily volumes. Daily turning movements were calculated using the mainline volumes and actual turning movement counts, in accordance with the Department's procedures.

6.4 EXISTING TRAFFIC VOLUMES

Existing daily traffic volumes on S.R. 682 within the study limits vary between 15,800 vehicles on the west end to 21,900 vehicles on the east end. The existing traffic volumes are indicated in Figure 6-1.

6.5 TRAFFIC VOLUME PROJECTIONS

Future traffic along S.R. 682 has been estimated using the FSUTMS computer program. This program has been used to establish 2015 traffic volumes and has been interpolated to determine 1995 volumes which represent the first year the new facility would be open to traffic. The output from the model identifies peak season daily volumes. Figure 6-1 summarizes the 1995 and 2015 projected traffic volumes. The existing daily traffic volume of 15,800 vehicles traveling on the segment of S.R.

682 between the west toll booth and S.R. 679 is projected to increase to 16,800 vehicles by 1995 and 21,600 vehicles by 2015. These volumes have been reduced to the 30th highest hour for design purposes using a design hour factor (K-Factor) of 9.6% and a direction factor (D-Factor) of 56.5%. Trucks have been assumed to constitute 3% of the peak hour traffic stream and 6% of the daily total.

6.6 LEVEL OF SERVICE

Analysis has been completed to determine the LOS to be provided at the signalized intersection of S.R. 682 with S.R. 679 and along the highway links under review. The operation of the signalized intersection is summarized in Table 6-3. The signalized intersection is projected to operate at LOS E in the PM peak hour in the 2015 design year. If a second westbound left turn would be constructed at the intersection, LOS C operation could be attained.

The highway link on S.R. 682 from the west toll booth to S.R. 679 will operate at LOS F in the AM and PM peak hours in 1995 and the 2015 design year. Improvement of this roadway segment to a four lane divided facility would provide LOS C or better operation through the 2015 design year. S.R. 682 from S.R. 679 to the east toll booth was found to operate at an acceptable level of service through the design year. Table 6-2 provides a summary of the link operating conditions.

TABLE 6-3 1995 AND 2015 INTERSECTION OPERATING CONDITION AT S.R. 682 AND S.R. 679

YEAR OF ANALYSIS	ANALYSIS PERIOD	LEVEL OF SERVICE
1995	AM Peak Hour	B
	PM Peak Hour	C
2015	AM Peak Hour	D
	PM Peak Hour	E
2015	AM Peak Hour With Improvement*	C
	PM Peak Hour With Improvement*	C

* Improvement = add second westbound left turn lane.

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SEVEN
CORRIDOR ANALYSIS

7.0 CORRIDOR ANALYSIS

The purpose of this Reevaluation is to assess the approved Environmental Assessment/Finding of No Significant Impact which was approved by the U.S. Coast Guard on November 30, 1983. The 1983 study recommended making the improvements within the existing right of way. The study determined that "The only corridor considered feasible for the proposed improvement is the corridor which encompasses the existing right of way. The existing facility was constructed with four lane expansion planned for in the future. Any other corridor would be significantly more costly and environmentally damaging."

This reevaluation concurs with the finding of the 1983 document and recommends that the proposed improvements be constructed within the corridor which encompasses the existing right of way.

EIGHT
ALTERNATIVE ALIGNMENT ANALYSIS

8.0 ALTERNATIVES ALIGNMENT ANALYSIS

The Environmental Assessment/Finding of No Significant Impact (EA/FONSI) which was approved by the U.S. Coast Guard in November 1983 recommended that the existing bascule bridge be widened and a new two lane structure be constructed to the south. The study also recommended that the bridge type (fixed or bascule) should be analyzed at the time of design to determine which best meets current design needs. Therefore, the EA/FONSI did not specifically address what type of structure should be constructed to the south. The Florida Department of Transportation decided to reevaluate the recommendations of the previous study for adding additional capacity to the segment of S.R. 682 from the west toll booth to S.R. 679. This decision was based upon a higher number of motor vehicles and boat traffic using the existing bascule bridge. Alternatives which were reviewed included a low level bascule bridge, a mid level bascule bridge, and a high level fixed span bridge. The following section discusses in detail the alternative design analysis performed during this reevaluation.

8.1 NO PROJECT ALTERNATIVE

The No Project Alternative would allow the existing facility to remain without substantial improvements. This alternative would save the cost of construction improvements. This alternative would eliminate any short term disruption to the community that would be experienced during construction and would not have any impacts to the environment.

The No Project Alternative would have no provisions to accommodate the anticipated growth in traffic volumes. Based upon the information contained in Section 6, the existing two lane roadway between the west toll booth and S.R. 679 will operate at LOS F in to the 2015 design year.

The No Project Alternative will remain under consideration until after the public hearing when a final recommendation will be made.

8.2 TRANSPORTATION SYSTEM MANAGEMENT (TSM) ALTERNATIVE

Transportation System Management (TSM) alternatives have been reviewed for the project area. These alternatives such as mass transit, fringe parking, and ride-sharing would have little or no impact on reducing the traffic volumes along S.R. 682 from west of the toll booth to the intersection of S.R. 679. The primary transportation mode within the study area is the automobile. No other means of land transit are presently available to replace, or supplement, the existing highway proposed for improvement.

8.3 STUDY ALTERNATIVES

8.3.1 Bridge Considerations

8.3.1.1 Minimum Vertical Clearance Requirements

The U.S. Coast Guard was contacted to determine the requirements for minimum vertical clearance for both a fixed span bridge and a bascule bridge. The minimum vertical clearance for a high level fixed span bridge is 65 feet and for a bascule bridge (closed position) is 21 feet. A 25 foot vertical clearance for the bascule bridge option was selected to provide slightly higher clearance for boats. A minimum vertical clearance of 45 feet was selected for the mid-level bascule bridge alternatives. This height was selected since it was halfway between the low level and high level clearances and was projected to reduce the number of bridge openings by 50 percent over the low level alternative.

8.3.1.2 Horizontal Clearance Requirements

The Existing bascule bridge has a horizontal clearance for the navigable waterway of 90 feet. The U.S. Coast Guard is requiring wider navigable clearances than were allowed at the time the existing bridge was constructed. At this time, a 115 foot wide navigable clearance is required for structures on the GCICW in Pinellas County. Therefore all alternatives developed include 115 foot wide navigable clearances.

8.3.1.3 Boat Survey

Information regarding the height and type of vessel using the existing bascule bridge was not available. In order to obtain information regarding the height of vessels currently using the Intracoastal Waterway through the existing bascule bridge, a mail out boat survey was conducted. This survey was targeted to Pinellas County boaters who have sailboats of 40 feet or greater in length. Forms were mailed out to all boaters in the county who had a Florida registered sailboat 40 feet or greater in length. Additionally, survey forms were sent to local marinas and boat clubs to be reviewed by interested boaters. Thirty responses to the survey were received and are summarized in Table 4-3 in Section 4.2.6, Bridge Openings. The results of the survey were based upon the overall height of the boat from the waterline and were grouped into boats less than 55 feet, 55 to 60 feet, 60 to 65 feet and greater than 65 feet. Only five responses were received from boat owners which indicated a vessel height greater than 65 feet. In addition, information concerning boat frequency traveling through the bascule bridge in all of calendar year 1991 and the month of July 1992 was collected. The survey determined that the five vessels with a height of 65 feet or greater passed through the bascule bridge an average of 12 times during 1991 and four times during the month of July 1992.

8.3.1.4 Vertical Height Restriction on the GCICW

Information regarding the type of bridge structures located north and south of the S.R. 682 bascule bridge was obtained. This information was used to determine if there are bridge height restrictions north and south of the bascule bridge along the GCICW. Vessels traveling on the Intracoastal Waterway within the study area can access the Gulf of Mexico at two points. They are North Channel (Pass-a-Grille) to the south and Johns Pass to the north. Vessels traveling the GCICW to Tampa Bay use the main channel and pass through the S.R. 679 bridge at Tierra Verde. The S.R. 679 bridge is located to the south of S.R. 682.

There are three bridge structures located to the north of S.R. 682. They are St. Petersburg Beach Causeway, Treasure Island Causeway and Johns Pass. All three structures are bascule bridges which provides unrestricted vertical clearance. The Tierra Verde bridge structure is also a bascule bridge which provides unrestricted vertical clearance. The North Channel (Pass-a-Grille) does not have a bridge structure. This information indicates that vessels with a height requirement greater than 65 feet can access the Gulf of Mexico through other locations along the GCICW.

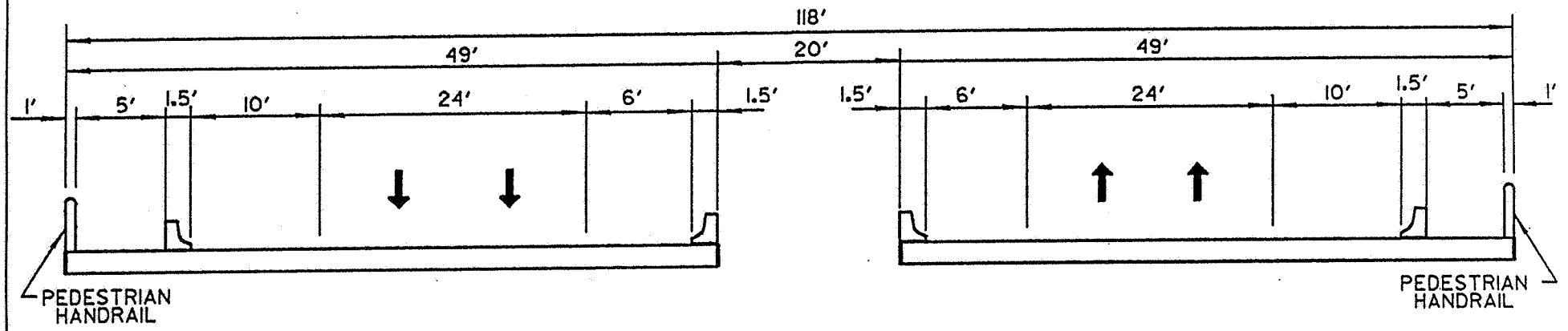
Based upon the information obtained from the boat height survey and the unrestricted vertical clearance of the bridge structure located north and south, it was decided to evaluate the feasibility of a 65 foot vertical clearance fixed bridge as one of the alternatives.

8.3.1.5 Bridge Opening Restrictions

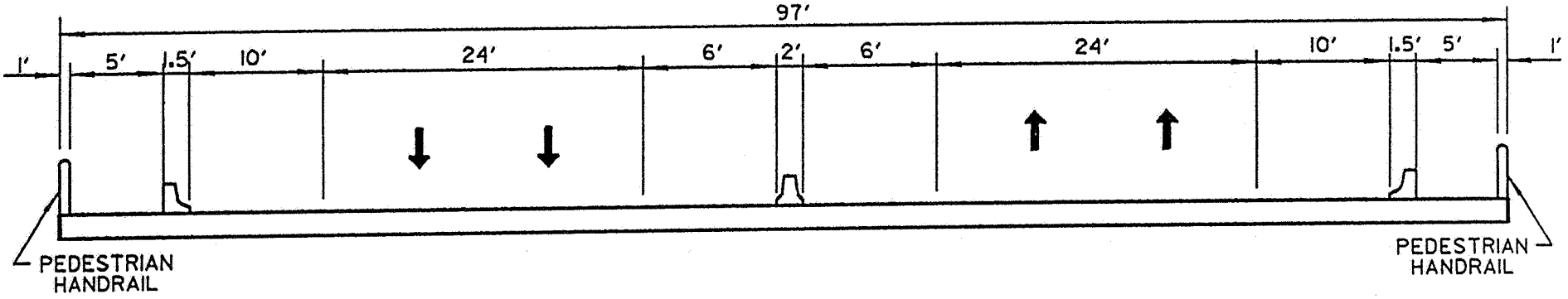
The U.S. Coast Guard has a requirement that all new bascule bridges shall open promptly and fully for the passage of vessels when a request to open is given by a vessel (on-demand). The U.S. Coast Guard will therefore require any new bascule bridges placed over the navigable waterway to open on demand for boat traffic. This would increase the number of openings which currently occur since the bridge is currently restricted to openings on the hour and every 20 minutes thereafter.

8.3.2 Existing Corridor Alternatives

Six alternatives were developed to evaluate the feasibility of adding two lanes of capacity to S.R. 682 from the west toll booth to S.R. 679. Alternatives 1 and 2 considered a low-level, 25 foot vertical clearance bascule bridge. Alternatives 3 and 4 evaluated a mid-level, 45 foot vertical clearance bascule bridge. Alternatives 5 and 6 considered a 65 foot high level fixed span bridge. Two bridge typical sections were developed. Figure 8-1 shows the proposed bascule bridge typical section and high level fixed bridge typical section.



BASCULE BRIDGE



HIGH LEVEL FIXED BRIDGE

N.T.S.

FIGURE 8-1
BWSEC.DGN

PROPOSED TYPICAL SECTIONS

S.R. 682 (BAYWAY BRIDGE)

8.3.2.1 Alternatives 1 and 2

Alternatives 1 and 2 consider the feasibility of adding a second low level (25 foot vertical clearance, closed position) bascule bridge structure to provide two additional lanes of capacity. In addition, the existing bascule bridge structure would be widened from 37.8 feet to 49 feet and the mechanical portion of the bridge would be replaced. The path of golf carts under the east end of the bridge would be maintained with this alternative. The at grade intersection with Bahia Del Mar Boulevard would also be maintained.

Alternative 1 considers the feasibility of constructing the additional two lane bridge structure to the south of the existing bridge. For this alternative, there are no business or residential relocations. No additional right of way is required. The total construction cost including preliminary engineering cost is estimated to be $16,796,000. The additional cost to operate and maintain the bascule bridge was estimated to be $12,204,000. The total estimated cost for Alternative 1 is $29,000,000.

Alternative 2 considers the feasibility of constructing the additional two lane bridge structure to the north of the existing bridge. For this alternative, there are no business or residential relocations. The right of way cost is estimated to be $1,659,000. The total construction cost including preliminary engineering cost is estimated to be $18,455,000 (which includes right of way cost). The additional operating cost for the bascule bridge was estimated to be $12,204,000. The total estimated cost for Alternative 2 is $30,659,000.

8.3.2.2 Alternatives 3 and 4

Alternatives 3 and 4 consider the feasibility of constructing twin 45 foot vertical clearance bascule bridges. The bridges would be stage constructed. Initially, a two lane bridge would be constructed and traffic would be rerouted to the new structure. The existing bascule bridge would be removed and replaced with a new bridge structure according to the typical section shown in Figure 8-1. The golf cart path under the east end of the bridge would be maintained with this alternative. The intersection of S.R. 682 with Bahia Del Mar Boulevard would be closed with this alternative with cul-de-sacs constructed for Bahia Del Mar Boulevard north and south of S.R. 682.

Alternative 3 considers the feasibility of constructing the new bridge structure to the south of the existing bridge. There are no business or residential relocations. The improvements will be constructed within the existing right of way. The total construction cost including preliminary engineering cost is estimated to be $24,857,000. The additional operating cost for the mid level bascule bridge is estimated to be $6,003,000. The total estimated cost for Alternative 3 is $30,860,000.

Alternative 4 considers the feasibility of constructing the new bridge structure to the north of the existing bridge. There are no business or residential relocations. The improvements will require the acquisition of right of way at an estimated cost of $1,058,000. The total construction cost including preliminary engineering cost is estimated to be $25,915,000. The additional operating cost for the mid level bascule bridge is estimated to be $6,003,000. The total estimated cost for Alternative 4 is $31,918,000.

8.3.2.3 Alternatives 5 and 6

Alternatives 5 and 6 consider the feasibility of constructing a new high level (65 foot vertical clearance) fixed span bridge. The bridge would be stage constructed with the first two travel lanes being constructed. The traffic would be rerouted to the new structure and the existing bascule bridge would be removed. The remaining two lanes would be constructed in accordance with the proposed high level bridge typical section shown in Figure 8-1.

Due to the elevation of the new high level structure, Bahia Del Mar Boulevard would pass under S.R. 682. Connection to S.R. 682 for motor vehicle traffic would be via S.R. 679. The golf cart crossing would pass under S.R. 682 adjacent to Bahia Del Mar Boulevard.

Alternative 5 considers the feasibility of constructing a new high level fixed span bridge south of the existing structure. There are no business or residential relocations. The improvements will be constructed within the existing right of way. The total construction cost including preliminary engineering cost is estimated to be $27,859,000. Since this is a fixed span bridge, there are no additional operating costs associated with this alternative. The total estimated cost for Alterative 5 is $28,917,000.

Alternative 6 considers the feasibility of constructing a new high level (65 foot vertical clearance) fixed span bridge north of the existing structure. There are no business or residential relocations. The improvements would require the acquisition of right of way at an estimated cost of $838,000. The total construction cost including preliminary engineering cost is estimated to be $28,697,000. Since this is a fixed span bridge, there are no additional operating costs associated with this alternative. The total estimated cost for Alternative 6 is $29,755,000.

8.4 Alternatives Evaluation Matrix

In order to provide a comparison between the alternatives which were developed for this project, an evaluation matrix was prepared. This evaluation matrix, presented in Table 8-1, identifies socioeconomic impacts, right of way cost, construction cost, preliminary engineering cost, and the additional bascule bridge cost. This matrix was developed to compare the respective alternatives.

Table 8-1 Alternatives Evaluation Matrix

	Alt. 1 Low Level South	Alt. 2 Low Level North	Alt. 3 Mid Level South	Alt. 4 Mid Level North	Alt. 5 High Level South	Alt. 6 High Level North
Relocations						
Business	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Socioeconomic Impact	Minimal	Moderate	Minimal	Moderate	Minimal	Moderate
Right-of-Way Cost	0	$1,659,000	0	$ 1,058,000	0	$ 838,000
Construction Cost						
Roadway	$1,221,000	$1,221,000	$1,583,000	$1,583,000	$1,332,000	$1,332,000
Bridge	12,776,000	12,776,000	19,131,000	19,131,000	21,884,000	21,884,000
Total Construction Cost	13,997,000	13,997,000	20,714,000	20,714,000	23,216,000	23,216,000
Preliminary Engineering (20%)	2,799,000	2,799,000	4,143,000	4,143,000	4,643,000	4,643,000
Total	16,796,000	18,455,000	24,857,000	25,915,000	27,859,000	28,697,000
Additional Bridge Costs						
Low Level Replacement Bridge	2,958,000	2,958,000	0	0	0	0
Operating and Maintenance	2,760,000	2,760,000	2,760,000	2,760,000	0	0
User Delay	6,486,000	6,486,000	3,243,000	3,243,000	0	0
Change in Travel Distance	0	0	0	0	1,058,000	1,058,000
Total Add. Bascule Costs	12,204,000	12,204,000	6,003,000	6,003,000	0	0
TOTAL COST	$29,000,000	$30,659,000	$30,860,000	$31,918,000	$28,917,000	$29,755,000

8/16/95

I:\bayway\tables\table8-1

8.4.1 Relocations

There are no anticipated business, residential or non-profit relocations for any of the six alternatives being evaluated for the proposed improvements.

8.4.2 Socioeconomic Impact

The socioeconomic impact of each of the alternatives was reviewed. Alternatives 1, 3, and 5 do not require additional right of way acquisition and the existing travel patterns for residential and business properties adjacent to the project remain unchanged. These alternatives were determined to have minimal socioeconomic impacts.

Alternatives 2, 4, and 6 require additional right of way acquisition on the north side. A community golf course is located between the east end of the bascule bridge and S.R. 679 on the north side. This is a privately owned and operated golf course. Acquisition of right of way from the golf course may potentially require modification to the fairway/green located adjacent to S.R. 682. Because of these potential impacts to the activity of the golf course, socioeconomic impacts for Alternatives 2, 4, and 6 are considered moderate.

8.4.3 Right of Way and Construction Costs

Right of way and construction cost estimates were developed for each alternative. These cost are described below.

8.4.3.1 Right of Way Cost

The right of way cost estimates indicated in Table 8-1 include the amounts to purchase the right of way plus the amount needed for legal fees, and support costs. Alternatives 2, 4, and 6 require the acquisition of additional right of way. However, these alternatives do not impact businesses or residents. Therefore, no relocation costs are required.

8.4.3.2 Construction Cost

Construction costs were developed using FDOT long range estimates for each of the alternatives. Separate costs for roadway and bridge construction were developed as indicated in Table 8-1. A Preliminary Engineering cost estimate of 20 percent was added to the construction costs to account for design and construction engineering inspection of the proposed improvement.

8.4.3.3 Additional Bascule Bridge Costs

In order to evaluate the alternatives which were developed, a life-cycle cost analysis was prepared. Significant costs that would accrue to the alternatives over the 50 year design life were identified. A 50 year life was used since bridges are reviewed based on that life expectancy.

The existing two lane bascule bridge was constructed in 1962 and assuming the new bridge will be open for traffic in 1995, there will be a 17 year remaining life for the existing structure. It will therefore be necessary to replace the old bridge in the year 2012. The present worth value of placing a second low level bascule bridge to replace the existing one was therefore determined and the costs are identified in Table 8-2. The cost to construct the new bridge in 2012 would be $9,654,000. The present worth of this dollar expenditure was calculated using a 7% discount rate. The 7% discount rate was used since that is the rate recommended in the FDOT Office of Value Engineering Report Life-Cycle Cost Analysis for Transportation Projects dated July, 1990 which was used to determine methodology for the analysis.

Since a new low level bridge will be constructed in year 17 of the 50 year life cycle analysis, there will be a salvage value available at the end of the 50 year time period for the replacement bridge. This bridge would have 17 years of its useful life remaining. The salvage value was calculated to have a present worth value of $98,000. This was subtracted from the $3,056,000 cost for the replacement bridge to obtain a net present worth cost for the two lane replacement bridge of $2,958,000. This cost would accrue to both of the low level alternatives.

The existing bascule bridge has an operating cost of $100,000 per year. This cost consists primarily of the amount needed to have the bascule manned for openings to boat traffic as required 24 hours per day, 365 days per year. This cost will not change for a four lane bridge, therefore this operating cost was projected to continue annually over the 50 year design life. A present worth value to operate the bridge over the 50 year life cycle time frame was calculated at $1,380,000, and it would apply to the low level and mid level bascule alternatives.

Additionally, there would be an annual maintenance cost for the bascule bridges due to their movable mechanisms which is estimated at $100,000 per year. This maintenance cost was brought back to present worth values using the appropriate adjustment factors and results in a present worth value of $1,380,000. This results in a total operating and maintenance cost for each of the bascule bridges of $2,760,000.

Another significant cost that would accrue to the alternatives is that resulting from motor vehicle usage. Costs would accrue to motor vehicles as they travel across each of the alternatives. Since the distance would be the same for each of the alternatives, the cost associated with traveling over the roadway segment would be the same. These costs were therefore not identified. For the mid level and high level alternatives, vehicles would be required to climb a grade to get to the top of the bridge and then descend on the other side. The increased cost to travel up the grade would be roughly equated with the cost to travel down the grade. These costs were therefore not included in the analysis.

Table 8-2. Present Worth of Additional Bascule Bridge Costs

1.	Low Level Bascule Bridge	
	A. Replace old bridge in 2012* Present worth = $9,654,000 x 0.31657** =	$3,056,000
	B. Salvage Value of Replacement Bridge after 33 years Present worth = 8,461,000 x 17/50 x 0.03395 =	- 98,000
	Additional Cost for new 2 lane bascule bridge =	$2,958,000
2.	Operating and Maintenance Cost	
	A. Bascule Bridge Operating Cost (for 50 years) Present Worth = $100,000/year x 13.801 =	$1,380,000
	B. Maintenance	
	Present Worth = $100,000/year x 13.801 =	$1,380,000
	Total Operating and Maintenance Cost	$2,760,000
3.	User Delay	
	A. Low Level Bascule = $470,000 x 13.801 =	$6,486,000
	B. Mid Level Bascule = $235,000 x 13.801 =	$3,243,000

* Existing bridge constructed in 1962. Remaining life assuming new bridge open in 1995 = 17 years.

** Present Worth Factor based upon 7% discount rate.

Significant differences in costs due to motor vehicle delay while the bascule bridges are open for boats to pass through would occur and have been identified. The following procedure was used to establish the vehicle delay cost for bascule bridge interruptions to the motor vehicle flow. First, the average hourly traffic which would be stopped by bridge openings was determined. The Year 2015 traffic projected for this portion of the Pinellas County Bayway as indicated in the project traffic report is 21,600 vehicles per day. It was assumed that this same average daily traffic would represent the average traffic on the facility throughout the 50 year design life. To obtain the average number of vehicles per hour, it was assumed the K factor would be 6.3% and the average heavy truck factor would be 2%. This results in 1,334 autos and 27 trucks in the average hour crossing in both directions on the bridge. These calculations are detailed in Table 8-3.

The average delay cost per opening was calculated next. This was determined by multiplying the average number of autos in the peak hour by the average time vehicles are stopped per hour, by the average delay per vehicle, and by the average hourly cost for automobile delay. Based upon a review of the bridge opening logs from July, 1992 to June, 1992 it was estimated that the average opening time was 4 minutes each time the bridge is opened. The average time for each vehicle being stopped would therefore be one half of the total time the gates are down. (The first vehicle in the queue would be stopped for the entire 4 minute period and the last vehicle in the queue would arrive at the time the gates would be opened and would suffer 0 minutes delay.) The value of time per vehicle hour was obtained from the Life-Cycle Cost Analysis for Transportation Projects report which identified a cost of $11.14 in 1987 dollars for passenger cars. The 1987 dollars were updated to 1992 dollars. This resulted in an average hourly cost of $13.91 for autos and $28.00 for trucks. A cost of $41.24 for automobiles being stopped at each bridge opening was determined. Similarly a truck cost was calculated at $1.68 per bridge opening. This results in a total average cost per bridge opening of $42.92.

Next the average number of openings per day for each of the bascule bridges was determined. The total openings for each year from 1988 through 1991 were reviewed. It was determined that the average number of openings per year was 10,724. This yearly average was divided by 365 days to obtain a daily average of 30 openings per day for the existing low level bascule bridge. A vessel height survey was conducted for a similar bascule bridge and it was determined that a mid level bridge would have approximately one half the openings of a low level bascule bridge. Therefore a mid level bascule bridge was assumed to have 15 openings per day. These daily openings were multiplied by 365 days per year and the appropriate average cost per opening to determine the yearly opening cost. This results in an annual cost of $470,000 for the low level bascule bridge and $235,000 for the mid level bascule bridge as indicated on Table 8-3. These yearly costs were calculated into a net present worth value as indicated in Table 8-2 of $6,486,000 for the low level bridge and $3,243,000 for the mid level bascule bridge. These additional bascule bridge costs have been identified according to the appropriate alternative on Table 8-1. Alternatives 1 and 2 have an estimated additional cost of $12,204,000. Alternatives 3 and 4 have an estimated additional cost of $6,003,000.

Table 8-3 Bascule Bridge Vehicle Delay Cost

1.	Average hourly trucks and autos	
	A. Average daily traffic over 50 year life of facility =	21,600
	B. Assume K =6.3% T (heavy) = 2%	
	Average hourly traffic = 21,600 x 6.3% =	1,361
	Autos = 1,361 x 98% =	1,334
	Trucks (heavy) = 1,361 x 2% =	27
2.	Average Delay Cost Per Opening	
	A. Autos = 1,334 vehicles x 4 min./60 min. Avg. opening time x 2 min./60 min. Avg. stop delay x $13.91/hr.* =	$41.24
	B. Trucks = 27 vehicles x 4 min./60 min. Avg. opening time x 2 min./60 min. Avg. stop x 28.00/hr. =	$ 1.68
	Avg. Cost/opening =	$42.92
3.	Average Cost Per Year for Openings	
	A. Low Level Bascule 30 openings/day** x 365 days/yr x $42.92 =	$470,000
	B. Mid Level Bascule 15 openings/day x 365 days/yr x $42.92 =	$235,000

* Average hourly costs from Life-Cycle Cost Analysis for Transportation Projects, Florida Department of Transportation, Office of Value Engineering, July 1990, adjusted for change in Consumer Price Index as follows: 1987 CPI = 113.6, October 1992 CPI = 141.8, Ratio 141.8/113.6 = 1.25

Autos = $11.14 x 1.25 = $13.91
Trucks = $22.43 x 1.25 = $28.00

** Low Level Bridge Average Number openings per day = 10,724/year/365 days/yr. = 30/day

Mid Level Bridge = 1/2 openings of low level = 15/day

8.4.3.4 Costs Related to Changes in Travel Patterns

The low level bascule bridge currently allows an at grade intersection of S.R. 682, Pinellas Bayway, with Sun Boulevard/Bahia Del Mar Boulevard. The high level brige would require construction of the Pinellas Bayway over Sun Boulevard. This would eliminate any turning movements from these roads to the Pinellas Bayway, however, it would allow the through movement from Sun Boulevard to Bahia Del Mar Boulevard to continue and would also eliminate the stop required at the current at grade intersection. This change in access will affect the travel patterns of some vehicles traveling to and from destinations along Sun Boulevard and Bahia Del Mar Boulevard.

Changes in travel patterns along the public roads, S.R. 682 and S.R. 679 are considered as additional costs for the Pinellas Bayway Bridge project. Since Sun Boulevard and Bahia Del Mar Boulevard are private roads, changes in travel patterns are not considered part of this public improvement project.

A twelve hour turning movement count was conducted from 7:00 a.m. to 7:00 p.m. on January 4, 1995 at intersections which would be impacted. Travel patterns will change for vehicles which currently use the S.R. 682 at Sun Boulevard/Bahia Del Mar Boulevard intersection. Since the condominiums which are served by these two roads have a fluctuation in occupancy based upon the season, with the winter months being the peak season, it was necessary to adjust the traffic count to reflect average trip generation.

In order to define average trip generation for the condominium units, it was necessary to first estimate low season occupancy. Information from the Pinellas County Property Appraiser's Office was obtained to determine the percentage of condominiums which have homestead exemptions and would therefore be likely to be year round residents. Only 414 of the 2,326 condominium units located west of S.R. 679 on Isla Del Sol have homestead exemptions (17.8%). This 17.8% was considered the base occupancy. Low season occupancy is expected to consist of the base occupancy plus approximately 50% of the non-homestead units which results in approximately 60% of the units being occupied, (see Table 8-4). The peak season occupancy is estimated to consist of the base occupancy plus approximately 75% of the non-homestead units which results in approximately 80% of the total units being occupied during the peak season. The average ratio would be 1.14 Therefore, to convert from the traffic count, which was taken in the peak season, it is necessary to divide by 1.14.

The traffic counts which were taken covered a 12 hour period. In order to convert to a 24 hour period, the following procedure was used. Since Sun Boulevard to the north of S.R. 682 provides access to the marina, golf course parking, condominiums, and commercial uses, estimating the number of trips to the generated with access to Sun Boulevard would be difficult. Bahia Del Mar Boulevard provides access to condominium units only, south of S.R. 682 and west of S.R. 679. Trip generation rates found in the Institute of Transportation Engineers (ITE) informational report, Trip Generation, Fifth Edition were used for comparison with traffic counted on Bahia Del Mar Boulevard. There are a total of 1,414 condominium units located on Bahia Del Mar

Table 8-4 Peak Season to Annual Average Comparison for Isla Del Sol

Base Occupancy = $\frac{\text{Units with Homestead Exemption}}{\text{Total Number of Units}}$

= $\frac{414}{2,326}$

= 17.8%

Non-Homestead Units = 100 - 17.8 = 82.2%

Low Season Occupancy = Base Occupancy + Approx. 50% Non-Homestead =60%

Peak Season Occupancy = Base Occupancy + Approx. 75% Non-Homestead =80%

Average Occupancy = $\frac{60\% + 80\%}{2} = 70$

Peak Season/Average Annual = $\frac{80}{70} = 1.14$

Boulevard. The ITE Trip Generation report indicates that this number of condominium units (Land Use Code 230) should generate 546 p.m. peak hour trips. Data collected indicates peak hour turning movements in and out of the Bahia Del Mar Boulevard intersections with S.R. 682 and S.R. 679 as 313 vehicles in the pm peak hour, 57% of those projected using the ITE information. Daily traffic was assumed to represent trips generated by 57% of the 1,212 units or 806 units. ITE trip generation for 806 condominium units totals 3,840 daily trips. Turning movements into and out of Bahia Del Mar Boulevard in a 12 hour period were 3,617 vehicles. Therefore, daily trips should be 6.2% (3,840/3,617) higher than the 12 hour count. The trips counted were therefore increased by 6.2 percent to estimate 24 hour Annual Average Daily Trips. The 24 hour Annual Average Daily Trips are indicated in Figure 8-2. These trips estimates are based upon the 1995 traffic count, however, the portion of Isla Del Sol under review is fully developed, therefore, traffic estimates were assumed to remain the same for the length of the life cycle cost study.

The distance on S.R. 682 between the Sun Boulevard/Bahia Del Mar Boulevard intersection and S.R. 679 is approximately 2,200 feet. The distance from S.R. 682 to Bahia Del Mar Boulevard/Palma Del Mar Boulevard on S.R. 679 is also approximately 2,200 feet. The posted speed limit on both of these roads is 45 mph. The calculation of user costs for this change in travel distance is illustrated in Table 8-5. As indicated, the 50 year life cycle cost of this additional travel would be $1,058,000 and would apply to the high level bridge alternatives.

8.4.3.5 Total Cost

All of the above indicated costs were added to determine the total cost for each alternative as indicated in Table 8-1. The low level bascule bridge costs range from $29,000,000 to $30,659,000. The mid level bascule bridge costs range from $30,860,000 to $31,918,000. The high level fixed bridge alternatives range from $28,917,000 to $29,755,000.

8.5 Environmental Considerations

The primary environmental issues associated with the project west of S.R. 679 are impacts to federally protected species, sea grass, and fringe mangrove communities. Both the West Indian Manatee and five species of sea turtles are known to pass through the study area. The seawalls located on both ends of the bridge were designed to allow for a second bridge to be located south of the existing structure. No transitional or emergent vegetation occurs along the seawall. No fringe mangrove communities occur within the proposed alignment. Small stands of mangroves occur along the causeway on the northwest side of the bridge.

The impacts to seagrass and mangrove communities depends upon whether the bridge is located north or south of the existing bridge. The alternative alignments to the north of the existing bridge would impact at least 0.5 acre of seagrass and approximately 0.3 acre of mangroves. The new bridge would also be within 10 to 20 feet of a 4.0 acre seagrasses bed located directly north of the existing structure.

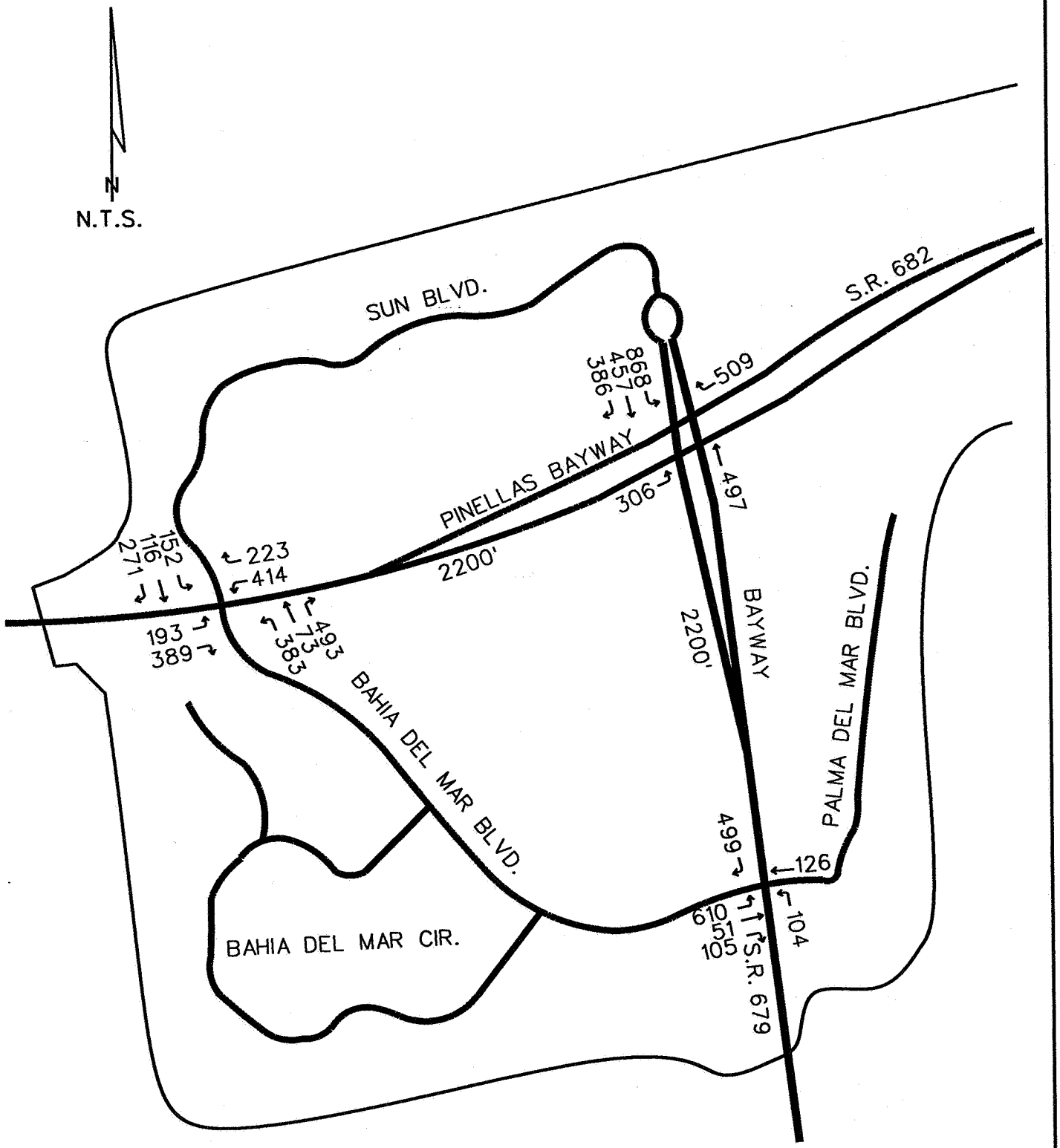


FIGURE 8-2
24-HOUR ANNUAL AVERAGE
TURNING MOVEMENTS.

S.R. 682 (BAYWAY BRIDGE)
WEST TOLL BOOTH TO
41 st STREET SOUTH

Table 8-5 Change in Travel Distance along S.R. 682 and S.R. 679

LOCATION	TO/FROM	TRAFFIC	ROAD LENGTH	TRAVEL TIME (SEC/VEH)	TOTAL TRAVEL TIME (VEH HRS)
A. Low Level Bridge					
Sun Boulevard	West	193+271	0	0	0
	East	152+223	2200	33.3	3.47
Bahia Del Mar Blvd.	West	389+383	0	0	0
	East	414+493	2200	33.3	8.39
					11.86
B. High Level Bridge					
Sun Boulevard	West	193+271	2200	33.3	4.29
	East	152+223	0	0	0
Bahia Del Mar Blvd.	West	389+383	4400	66.6	14.28
	East	414+493	2200	33.3	8.39
					26.96

Increased Daily Travel Time = 26.96 - 11.86 = 15.10 hours

Annual Travel Time Increase = 15.10 hours x 365 days =5,512 hours/year

Annual User Cost = 5,512 hours x $13.91/hr = $76,671.92/year

50 Year Life Cycle Cost = $76,671.92 x 13.801 = $1,058,000

The alternative alignments to the south of the existing bridge would impact approximately 0.3 acres of seagrass and would not impact any mangroves. Any of the proposed bridge types constructed to the south of the existing structure would minimize impacts to seagrass and mangrove communities.

8.6 Preferred Alternative

A comparison of alternatives was completed. Since the mid level bascule bridge alternatives (Alternatives 3 and 4) have the highest cost, it was concluded that these alternatives should be dropped from further consideration. The low level bascule bridge (Alternative 2) and the high level fixed bridge (Alternative 6) on the north alignment both require additional right of way, while the south alternatives (Alternatives 1 and 5) do not require additional right of way. The north alternatives, therefore, have higher cost and greater socioeconomic and environmental impacts than the south alternatives and were dropped from additional consideration.

Alternative 1 (low level bascule, south alignment) has a life cycle cost of $29,000,000. Alternative 5 (high level fixed bridge, south alignment) has a cost of $28,917,000. Due to the minor cost differential and the non quantified benefits of a high level fixed bridge (freedom for emergency services vehicles to cross the bridge unimpeded, unblocked hurricane evacuation route, elimination of delay to the boating public waiting for a bascule bridge to open, and reduced driver frustration waiting for open bascule bridges to close), it is concluded that Alternative 5 (high level fixed bridge with 65 foot vertical clearance) should be used to replace the existing bascule bridge.

It is recommended to replace the S.R. 682 (Bayway) bascule bridge with a 65 foot vertical clearance fixed span bridge located on the south alignment, upgrade the approaches from a two lane undivided facility to a four lane divided facility, and construct dual left turn lanes for westbound traffic on S.R. 682 turning to S.R. 679. Alternative 5 was selected as the Preferred Build Alternative.

NINE
PRELIMINARY DESIGN ANALYSIS

9.0 PRELIMINARY DESIGN ANALYSIS

9.1 Design Traffic Volumes

Existing traffic volumes along S.R. 682 within the study limits range from 15,900 AADT at the west end of the bascule bridge and 21,300 AADT on the east side of S.R. 679. It is anticipated that by the 2015 design year, traffic volumes will increase to an estimated 21,600 vehicles between the west toll booth and S.R. 679. East of S.R. 679, it is anticipated that traffic volumes will increase to an estimated 30,700 vehicles by 2015. Without roadway improvements, these anticipated traffic volumes will create Level of Service F operating conditions on the two lane section by the 2015 design year. Improvements of the highway link on S.R. 682 from the west toll booth to S.R. 679 will operate at LOS C or better through the 2015 design year. A Technical Memorandum/Project Traffic Report (dated October, 1992) was prepared for this study and provides additional detailed information regarding the methodology used in developing the traffic projections.

9.2 Typical Sections

The typical section for the preferred alternative, Alternative 5, recommends a four lane roadway section to be constructed within 200 feet of right of way. Figure 8-1 shows the dimensions of the roadway typical section. This typical section will be used from the west toll booth to the west end of the bridge and from the east end of the bridge to the intersection of S.R. 679.

The proposed bridge typical section for the preferred alternative is shown on Figure 8-2. The new four lane bridge would be 97 feet wide, outside to outside, with five foot wide sidewalks constructed on both sides. Inside shoulder width would be six feet wide with the outside shoulder width at ten (10) feet. The outside shoulder width can accommodate bicyclists.

9.3 Intersection Concepts and Signal Analysis

Alternative 5 recommends improvements be made at the signalized intersection of S.R. 682 and S.R. 679. The intersection analysis at this location indicated that the intersection would function at a LOS D in the AM peak hour and E in the PM peak hour in the 2015 design year. With the recommended construction of an additional westbound left turn lane, the intersection will operated at LOS C in both the AM and PM peak hour in the 2015 design year.

9.4 Alignment and Right of Way Needs

Alternative 5 recommends that a new, four lane, high level, fixed- span bridge be constructed south of the existing bascule bridge. The recommended alternative will be constructed within the existing right of way. No additional right of way will be acquired.

9.5 Relocation

Alternative 5 will be constructed within the existing right of way. There are no anticipated business, residential, or non-profit relocations for this alternative.

9.6 Right of Way Costs

Alternative 5 will be constructed within the existing right of way. There are no right of way costs associated with this alternative.

9.7 Construction Costs

FDOT Long Range Estimates were prepared for the recommended alternative. The construction cost is estimated to be $23,216,000.

9.8 Preliminary Engineering Costs

The preliminary engineering cost was estimated for Alternative 5 using a rate of 20 percent of the estimated construction cost. Preliminary engineering cost of $4,643,000 was estimated for the preferred alternative.

9.9 Additional Bridge Costs

The high level fixed bridge will eliminate the current non signalized intersection of Pinellas Bayway with Sun Boulevard/Bahia Del Mar Boulevard. Additional vehicle travel will be required on the adjacent state highways which will have a present worth cost of $1,058,000 over the 50 year life of the new bridge.

9.10 Recycling of Salvageable Material

Salvaging the existing pavement was not considered to be a viable alternative due to the extent of the proposed improvement. Alternative 5 recommends that the existing bridge structure be removed upon completion of the construction of the westbound lanes of the new bridge. The eastbound lanes will be constructed on the alignment of the existing bridge. Therefore, the existing structure will not be salvaged.

9.11 User Benefits

Alternative 5 recommends replacing the existing bascule bridge by constructing a high level fixed span bridge within the existing right of way. The high level fixed span bridge will allow freedom for emergency service vehicles to cross the bridge unimpeded. The new bridge will provide an unblocked hurricane evacuation route, eliminate delay to the boating public, and reduce driver frustration waiting for the opening of the bascule bridge.

9.12 Pedestrian and Bicycle Facilities

The bridge typical sections have been developed to include a five (5) foot wide sidewalk on both sides of the roadway. Pedestrians will be required to use the paved shoulders along the roadway and approaches. Bicyclists will be able to use the ten (10) foot wide outside shoulders on the proposed bridge. Bicyclists will be allowed to use the four (4) foot wide paved shoulders.

9.13 Safety

The bascule bridge is the location of 6.6 accidents and 6.8 injuries per year, of which eighty-five percent are rear end collisions. The opening of the bascule bridge and stopping traffic intermittently is the most likely cause of these accidents. Alternative 5 recommends that the existing bascule bridge be replaced with a high level fixed span bridge. This will eliminate the bridge opening and potentially reduce the number of accidents, especially rear end collisions.

The greatest number of accidents occur at the intersection of S.R. 682 and S.R. 679, with an average of 10.4 accidents and 17.6 injuries per year. Sixty-nine percent of these accidents involve collisions with drivers turning left onto S.R. 679. Alternative 5 recommends that an additional left turn lane be added to improve the operation of the intersection. It is anticipated that the proposed improvements will help reduce the number of accidents at this intersection.

9.14 Economic and Community Development

Socioeconomic impacts for Alternative 5 are considered to be minimal. This alternative does not require the acquisition of additional right of way and does not involve any relocations. Therefore, the existing tax base for the study area is not affected.

9.15 Environmental Impacts

The environmental impacts of the preferred alternative were evaluated with respect to social, cultural, natural environment, and physical aspects. Impacts of the preferred alternative in each of these categories are summarized below.

9.15.1 Social Impacts

The preferred alternative will not impact community cohesion or churches and schools, and will not require any business or residential relocations. No minority families will be displaced by the preferred alternative, and no one was denied an opportunity to comment on the proposed project alternatives.

The proposed project will have a positive impact on energy use. The replacement of the two-lane bascule bridge with a four-lane fixed-span bridge will alleviate the traffic delays associated with bridge openings, bridge failures, bridge maintenance, and the congestion resulting from merging from a four-lane roadway to a two-lane roadway. Although energy will be expended to construct and maintain

the facility, more energy will be saved by increased fuel economy due to improved travel conditions.

9.15.2 Cultural Impacts

The proposed action will have no involvement regarding Section 4(f) lands, archaeological sites, or recreation areas. As indicated in Section 9.11, the proposed improvements will enhance pedestrian and bicycle access.

9.15.3 Natural Environment

Potential wetland impacts for the preferred alternative will result in shading 0.3 acre of seagrass habitat, and pile driving within seagrass habitat. These wetland impacts are considered minor, given the fact that the action is proposed to occur within the FDOT right of way, and the quantity of wetland area proposed to be impacted is a small fraction of Boca Ciega Bay. All practical measures will be taken to avoid and minimize wetland impacts during the design and construction phases. Wetland impacts will be minimized or avoided if possible, by careful alignment positioning during preliminary design. FDOT is committed to consider reasonable levels of wetland compensation to ameliorate the impacts of the proposed project. FDOT will obtain necessary regulatory permits during the design phase of the project. Conceptual mitigation strategies include wetland creation by planting seagrass and shoreline stabilization by planting emergent wetland species in lower energy areas.

Boca Ciega Bay, which the project traverses, is designated as Boca Ciega Bay Aquatic Preserve and therefore also Outstanding Florida Waters (OFW) pursuant to Florida Administrative Code (F.A.C.) Chapter 17-302.700(9)(h). Minimal wetland impacts associated with shading 0.3 acre of seagrass and discharge of stormwater would occur in Boca Ciega Bay Aquatic Preserve as a result of the proposed action. FDOT has coordinated with the Florida Department of Environmental Protection (DEP), the agency which retains jurisdiction over the Aquatic Preserve. The necessary wetland permits will be obtained during the project design phase. F.A.C. 17-25.025 prohibits any stormwater discharge facility from causing a violation of applicable water quality standards. Therefore, to prevent any degradation of water quality, this project will provide an equivalent treatment volume for untreated existing impervious areas within the same drainage basin.

As described above, the project traverses waters designated OFW. Therefore, stormwater discharge criteria stipulated in F.A.C. 17-25.025(9) require a treatment volume equal to an additional fifty percent (the first 1 1/2 inch of rainfall instead of the first 1 inch for wet detention). FDOT will coordinate with DEP and the Southwest Florida Water Management District (SWFWMD) in developing a stormwater treatment system to ensure compliance with Chapter 17-25, F.A.C.

The preferred alternative does not impact any of the coastal barrier islands protected under the Governor's Executive Order 81-105 and the Coastal Barrier Resources Act of 1982.

Potential wildlife and habitat impacts associated with the project were evaluated. Field surveys

conducted at the Bayway site from December 1992 through March 1993 did not reveal the presence of any threatened or endangered species of plants or wildlife. The manatee, which is federally and state-listed as Endangered, is known to inhabit Boca Ciega Bay and can be expected to enter the project corridor during construction. In order to protect manatees and the seagrass beds which provide manatee habitat, the project alignment was designed to minimize seagrass impacts to the greatest degree possible. In addition, five federally listed marine turtle species may enter Boca Ciega Bay. To protect any manatees and sea turtles swimming in the project corridor, the "Special Provisions for Protection of Manatees and Sea Turtles" developed by FDOT and FHWA with FWS assistance, will be adhered to by the project construction contractor. Because these provisions will be implemented to protect manatees and sea turtles, the preferred alternative is not expected to impact any threatened or endangered species potentially occurring in the project vicinity. FWS correspondence dated October 22, 1993 concurred that "the project is not likely to adversely affect federally listed threatened or endangered species".

9.15.4 Physical Impacts

Noise impacts were evaluated in July 1993. The noise study determined that the project is not anticipated to impact any noise sensitive sites in the study area, and would actually lower traffic noise levels at those residences adjacent to the bridge.

Therefore, no noise abatement measures were proposed. Construction noise will be minimized by adherence to the FDOT Standard Specifications for Road and Bridge Construction, as amended.

An air quality analysis for the S.R. 682 project was conducted in August 1993. The project passed FDOT's air quality screening test. Thus, it was determined that the preferred alternative would not adversely impact the air sensitive sites or land uses within the project study area.

Potential contamination was evaluated in July 1993. The evaluation identified no sites within or adjacent to the project right of way as a potential concern, and none of the sites requires a more detailed risk evaluation. Based on the evaluation, no further contamination investigation has been recommended during subsequent project development.

9.16 Utility Impacts

All companies maintaining utility lines within the study area were contacted to determine potential impacts to both existing and future facilities. Section 4.1.12 of this report identifies both public and private existing utilities. Based on the location of these utilities, impacts and relocations were identified for all alternatives. It is anticipated that utility impacts caused by the new roadway will be minimal.

9.17 Traffic Control Plan

The new high level fixed bridge will be stage constructed initially, the south half of the new structure will be constructed while two-way traffic is maintained on the existing bascule bridge. The two lanes provided on the first half of the new structure will then be striped for two-way traffic and traffic from

the existing bascule bridge will be rerouted over it. The existing bascule bridge will be removed and the north half of the high level fixed bridge will be constructed. Once completed, traffic will be routed to allow two lanes for each direction of travel.

9.18 Results of Public Involvement Plan

(This section will be completed at a later date. At the time of this update, assessment of information obtained from the Public Information Workshop had not been completed.)

9.19 Drainage

Drainage from the proposed bridge and roadway improvements will be treated prior to discharge through proper stormwater retention. The first one-half inch of increased impervious surface runoff from the new construction will be treated within the right of way. Water quantity storage may not be required becuae of a direct discharge into the Intracoastal Waterway. It may not be possible or feasible to construct stormwater managemetn facilties in the area of the project; therefore, it may be possible to treat in areas located within the watershed. This will be determined during the design phase of the project. The Location Hydraulics Report prepared for this project is contained in the Appendix A.

9.20 Special Features

A golf cart path will be constructed under S.R. 682 at Bahia Del Mar Boulevard to replace the existing one that crosses under the existing bascule bridge.

9.21 Access Management

Access to S.R. 682 from the west toll booth to S.R. 679 will be allowed at the signalized S.R. 679 intersection. Due to the height of structure, the existing at grade intersection at Bahia Del Mar Boulevard will be eliminated. Bahia Del Mar Boulevard will, however, be constructed under S.R. 682 to allow traffic to move between the north and south portions of Isla Del Sol.

9.22 Aesthetics and Landscaping

The replacement of the existing bascule bridge with a 65-foot vertical clearance fixed span bridge will change the visual impacts and aesthetic characteristics of the surrounding area. The recommended fixed span bridge will be approximately 69 to 71 feet above the surrounding land at the highest point of the bridge as compared to the existing bridge which is 22 to 25 feet above the surrounding land. The existing bridge is 2552 feet long with a 3.00 percent grade. The preferred alternative envisions the proposed bridge to be approximately 5000 feet long with a 3.73 to 4.00 percent grade. Architectural design features will be considered during the design phase in order to minimize visual impacts.

APPENDIX A

LOCATION HYDRAULIC REPORT

SR 682 (BAYWAY BRIDGE)
FROM THE WEST TOLL BOOTH TO 41ST STREET

PINELLAS COUNTY, FLORIDA

Work Program Item Number: 7116989
State Project Number: 15200-1546
Federal Aid Project Number: M-1258(1)

This project considers the reevaluation of a previously approved Finding of No Significant Impact (FONSI) which covered the segment of SR 682 from the west toll booth to 41st Street, a distance of approximately 3.7 miles. This project recommends the replacement of the Pinellas Bayway bascule bridge with a 65' vertical clearance fixed span bridge located on the south alignment, upgrade the approaches to four lane divided facility, and construct dual left turn lanes for westbound traffic on SR 682 turning to SR 679.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

and

FLORIDA DEPARTMENT OF TRANSPORTATION
District Seven Office
Tampa, Florida

October 1993

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INTRODUCTION

PURPOSE

This report was completed in accordance with the requirements set forth in Executive Order 11988 "Floodplain Management" and Federal-Aid Highway Program Manual (FHPM) 6-7-3-2, Paragraph 7. It provides preliminary information on the existing cross drain structures, floodplains, and soils which may be impacted due to the construction of the proposed improvements to S.R. 682.

PROJECT DESCRIPTION

State Road 682, Pinellas Bayway, extends from S.R. 699, Gulf Boulevard to I-275 in Southern Pinellas County, Florida (see Figure 1, Project Location Map). S.R. 682 connects the City of St. Petersburg Beach, located west of the Gulf Coastal Intracoastal Waterway, to the City of St. Petersburg, located east of the Gulf Coast Intracoastal Waterway. The project limits extend along SR 682 from the west toll booth to 41st Street.

S.R. 682 is a minor arterial under the jurisdiction of the Florida Department of Transportation. The roadway operates as a toll facility between the west toll booth, which is approximately 0.25 miles east of Gulf Boulevard, and the east toll booth, which is located approximately 0.50 miles west of 41st Street.

This portion of the Gulf Coast Intracoastal Waterway connects from the mouth of Tampa Bay, along I-275, the Sunshine Skyway Bridge, up the Pinellas County Coast to Tarpon Springs. Exits to the Gulf of Mexico are provided at Pass-A-Grille, John Pass, Clearwater Pass, and south of Anclote Key located opposite Tarpon Springs. The Pass-A-Grille inlet is located approximately two nautical miles south of S.R. 682 and John Pass is approximately six nautical miles north of S.R. 682.

S.R. 682 has a two lane roadway from the west toll booth to west of S.R. 679, a four lane divided roadway from west of S.R. 679 to the east toll

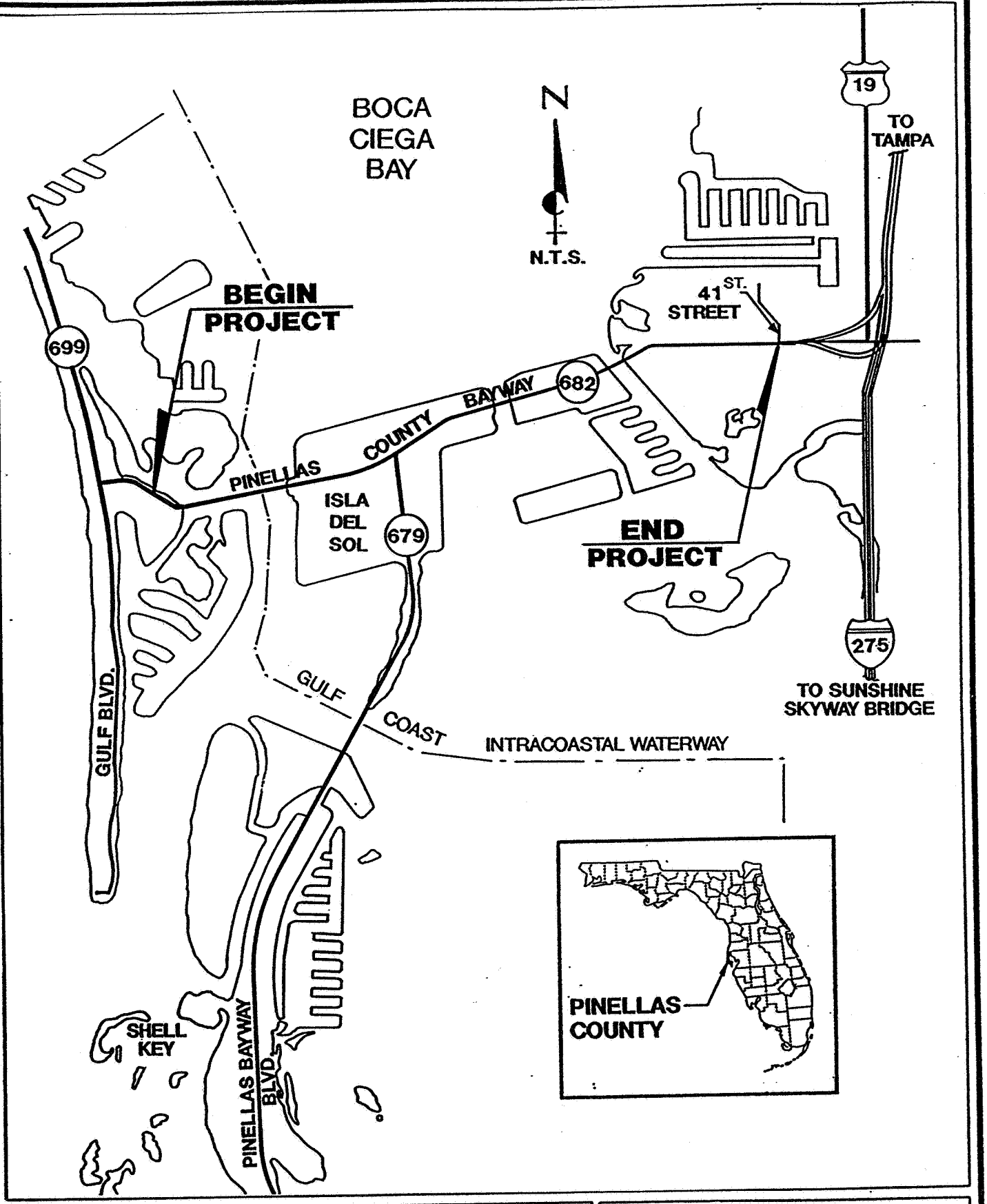


FIGURE 1

PROJECT LOCATION MAP

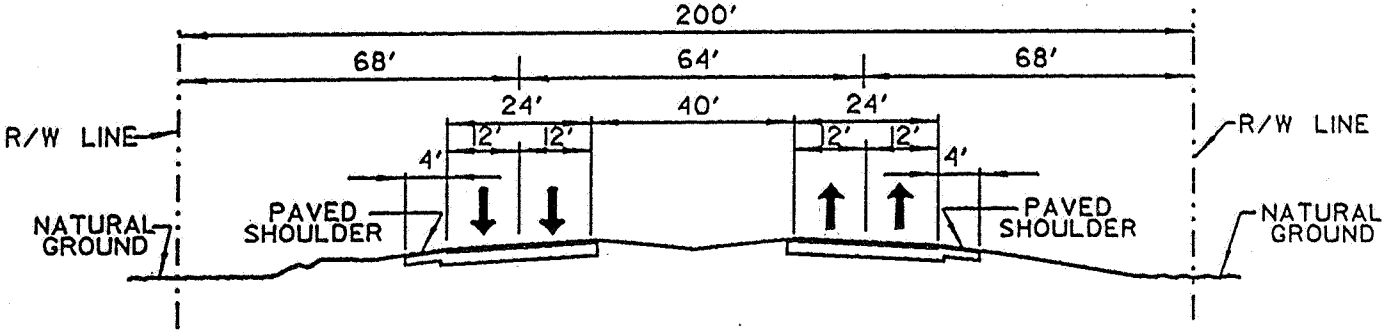
SR 682 (BAYWAY BRIDGE)
WEST TOLL BOOTH TO
41 ST. STREET

booth, and a six lane divided roadway from the east toll booth to 41st Street. A two lane bascule bridge carries S.R. 682 over the Gulf Coast Intracoastal Waterway. The proposed improvement is to widen the two lane segment of S.R. 682 to a four lane divided roadway and replace the existing two lane bridge with a four lane bridge (the proposed typical roadway section and bridge section are shown in Figures 2 and 3). While the overall project limits on SR 682 run from the west toll booth to 41st Street, improvements are planned only from the west toll booth to just east of SR 679. The remaining discussion will concentrate only on the areas where improvements are planned.

The existing on-site Stormwater Management System consists of swales, ponds and storm sewers that ultimately outfall into the open water of the Boca Ciega Bay of the Gulf of Mexico. During our research and field visits, it was evident that several improvements for drainage and landscape took place to convey runoff into swales and ponds where they ultimately outfall into the Boca Ciega Bay. The only available drawings on this project are the as-built plans for the bridge and roadway segment from S.R. 679 interchange to the end of the project, which is approximately 0.25 miles east of the interchange with I-275. The remainder of the project drainage data for the cross drains and culverts were field located since as-builts drawings are not available (see Appendix A for field inspection report). Most of the field located structures were filled with water, therefore some of the culvert sizes could not be identified. Surveying of these culverts will be required for the design phase of the project.

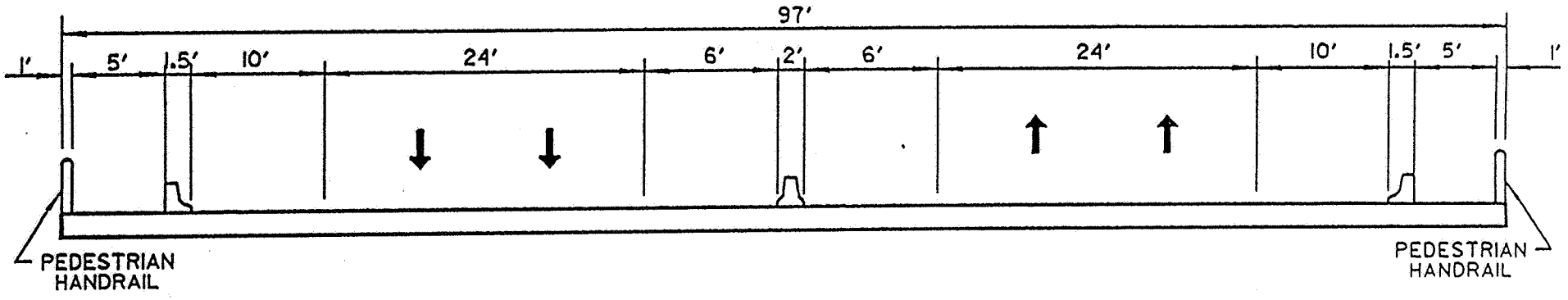
The sources of information used in the preparation of this location hydraulic report include the following:

1. U.S.G.S. Quadrangle Map (Figure 4);
2. Southwest Florida Water Management District Contour Maps (dated 1979);



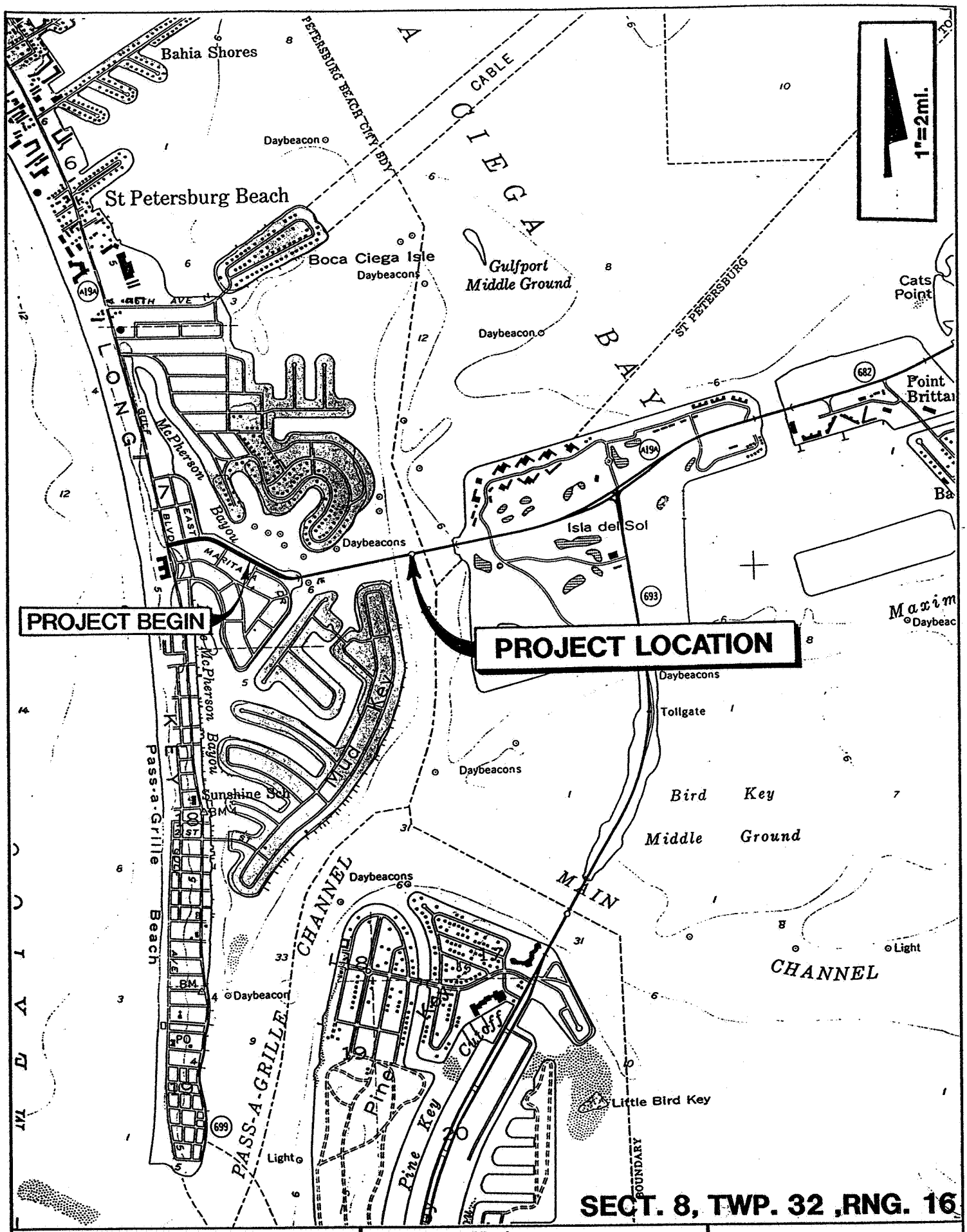
PROPOSED 4-LANE ROADWAY

BAYWAY BRIDGE (SR 682) **LOCATION HYDRAULIC REPORT** **PINELLAS COUNTY, FLORIDA**	FIGURE NO. 2 **PROPOSED TYPICAL SECTION** SOURCE: R9&H PROJECT DEVELOPMENT SUMMARY 2-96	



HIGH LEVEL FIXED BRIDGE

BAYWAY BRIDGE (SR 682) LOCATION HYDRAULIC REPORT PINELLAS COUNTY, FLORIDA	FIGURE NO. 3 PROPOSED TYPICAL SECTION SOURCE: RS&H PROJECT DEVELOPMENT SUMMARY 2-92	



BAYWAY BRIDGE (SR 682)
LOCATION HYDRAULIC REPORT
PINELLAS COUNTY, FLORIDA

FIGURE NO. 4
U S G S QUAD MAP
SOURCE: PASS-A-GRILL QUAD MAP 1981

3. F.E.M.A. Flood Insurance Rate Maps and Flood Insurance Studies for Pinellas County, and the City of St. Petersburg Beach, Florida;

4. Soil conservation Services, Soil Survey of Pinellas County.

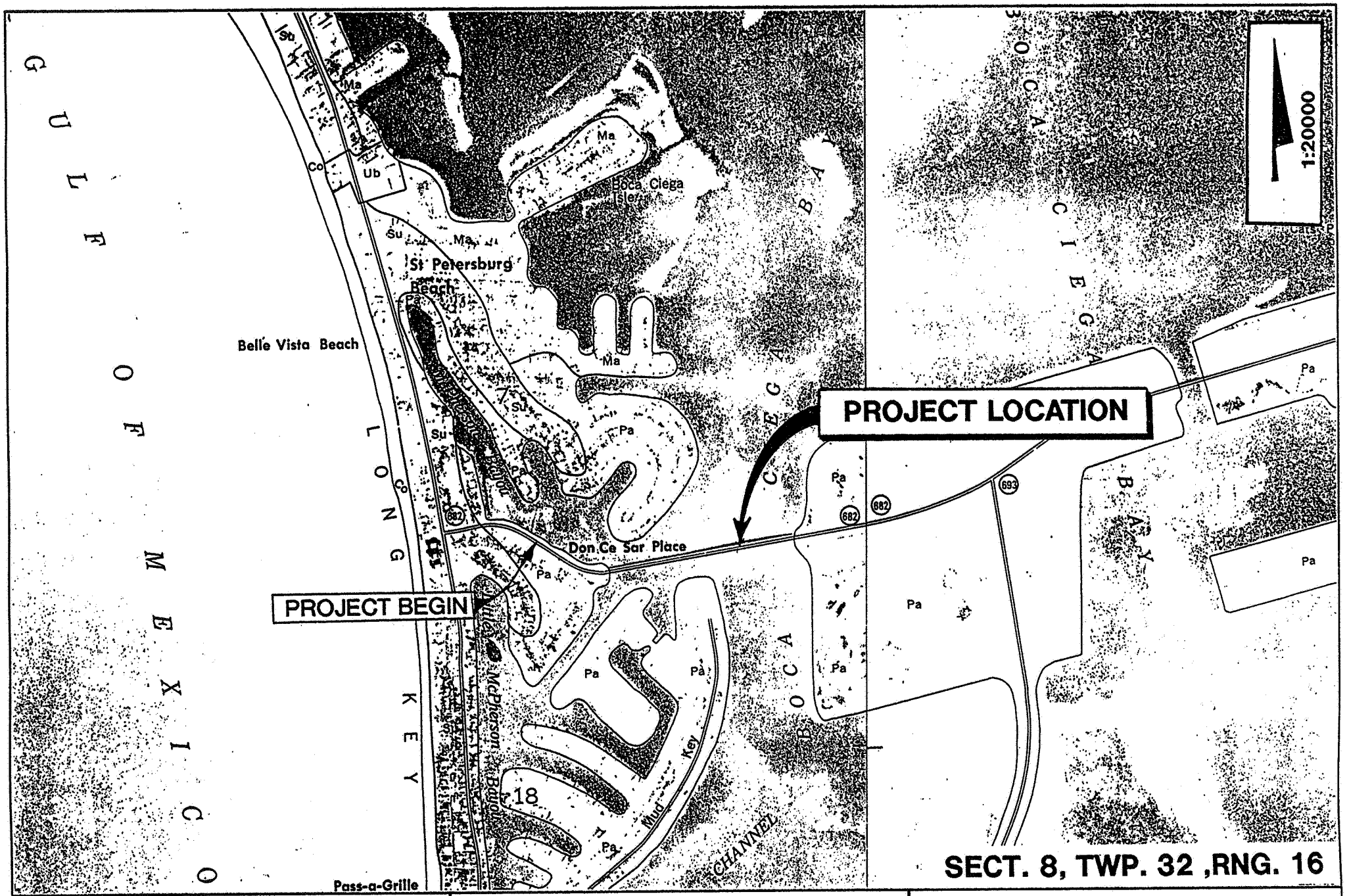
Existing data was provided by the Florida Department of Transportation and utilized for the project development and environmental study for the corridor. Further investigation and data collection are required for the design phase of this project. This information is provided for the understanding of the drainage boundary conditions of the project.

SOIL CLASSIFICATION

In accordance with the Soil Conservation Service (SCS) of Pinellas County (1972), the project is located on one soil type. The Palm Beach soil type series consists of nearly level, well drained shelly sands near the coast, on the main land, and on isolated coastal islands. These soils consist of recent deposits of shelly sand material that has undergone little or no weathering. The Palm Beach sand (Pa) is a nearly level, well drained sand mixed with shells and fine shell fragments. It consists mainly of material dredged from nearby shallow water to fill dikes. This material has been reworked and leveled (see Figure 5 for soil type). The Water Table is below a depth of 40 inches most of the time but it is within 40 inches during heavy rains.

This soil is a Woodland Group 9 which consist of organic soils that are very poorly drained in coastal areas affected by salt water and exist in areas generally reworked and leveled with sand, shell fragments, and rocky clayey material.

The suitability of the soil to use as a source of roadfill is good, but the soil in its natural condition (not compacted or stabilized) is loose erodible and unstable for the use of highway and drainage unless subgrade preparations are provided.



BAYWAY BRIDGE (SR 682)
LOCATION HYDRAULIC REPORT
PINELLAS COUNTY, FLORIDA

FIGURE NO. 5
S C S SOIL SURVEY
SOURCE: SOIL CONSERVATION SERVICE 1972

FLOOD MANAGEMENT

Flooding in Pinellas County results primarily from two major sources: heavy rainfall, which can affect the many areas in the County that have a high water table and are subject to ponding and tidal surge caused by tropical storms and hurricanes. The City of St. Petersburg Beach which is greatly affected by tidal surge flooding has a subtropical climate characterized by mild, dry winters and warm, wet summers. The wet season extends from June through September and coincides with the hurricane season. Storms passing in the vicinity of the City of St. Petersburg Beach have produced flooding and structural damage. An example of some significant tropical storms, which also provides historical information to which coastal flood hazards and the projected flood depths can be compared are:

October 21 - 31, 1921

This storm originated in the Western Caribbean Sea and entered Florida north of Tarpon Springs. Flooding conditions were prolonged because of the slow forward movement of the storm. Minimum barometric pressure at Dunedin was 28.34 inches; wind speed at Tarpon Springs was estimated at 70 to 90 knots. The coast from Tarpon Springs south to Fort Myers experienced tides of 7 to 10 feet. The keys from Anna Maria to Clearwater Beach were severely damaged. Haven Beach and Indian Rocks Beach sustained damage; the seawall at Haven Beach was washed away; many cottages at Clearwater Beach were damaged, and 500 feet of bridge were destroyed. Clearwater sustained damage to houses, piers, and boats. Tides at St. Petersburg reached an elevation of 6.7 feet. The north end of Old Tampa Bay was badly damaged by a bore described as being 7 to 10 feet high.

June 15 - 22, 1972

Hurricane Agnes originated on the northeastern tip of the Yucatan Peninsula and traveled westward. The storm was of large diameter and, although the center of the storm passed approximately 150 miles west of the Florida Peninsula, it produced a high tidal surge. In Pinellas County, tides averaged 3 to 6 feet above normal in the coastal areas, and beaches and causeways were flooded. In St. Petersburg, tides reached an elevation of 4.83 feet.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community Panel Number 125149 0005B dated March, 1983 (Figures 6 and 7), the project is located in Flood Zone A12 with a Flood Base Elevation of 11 NGVD on the west side of the Bayway Bridge, and Flood Zone A12 with a Flood Base Elevation of 12 NGVD on the east side of the Bayway Bridge. The Flood Insurance Study (FIS) for Pinellas County Unincorporated Areas (December, 1982) and the FIS for the City of St. Petersburg Beach, were utilized in this report to provide flood information for the project.

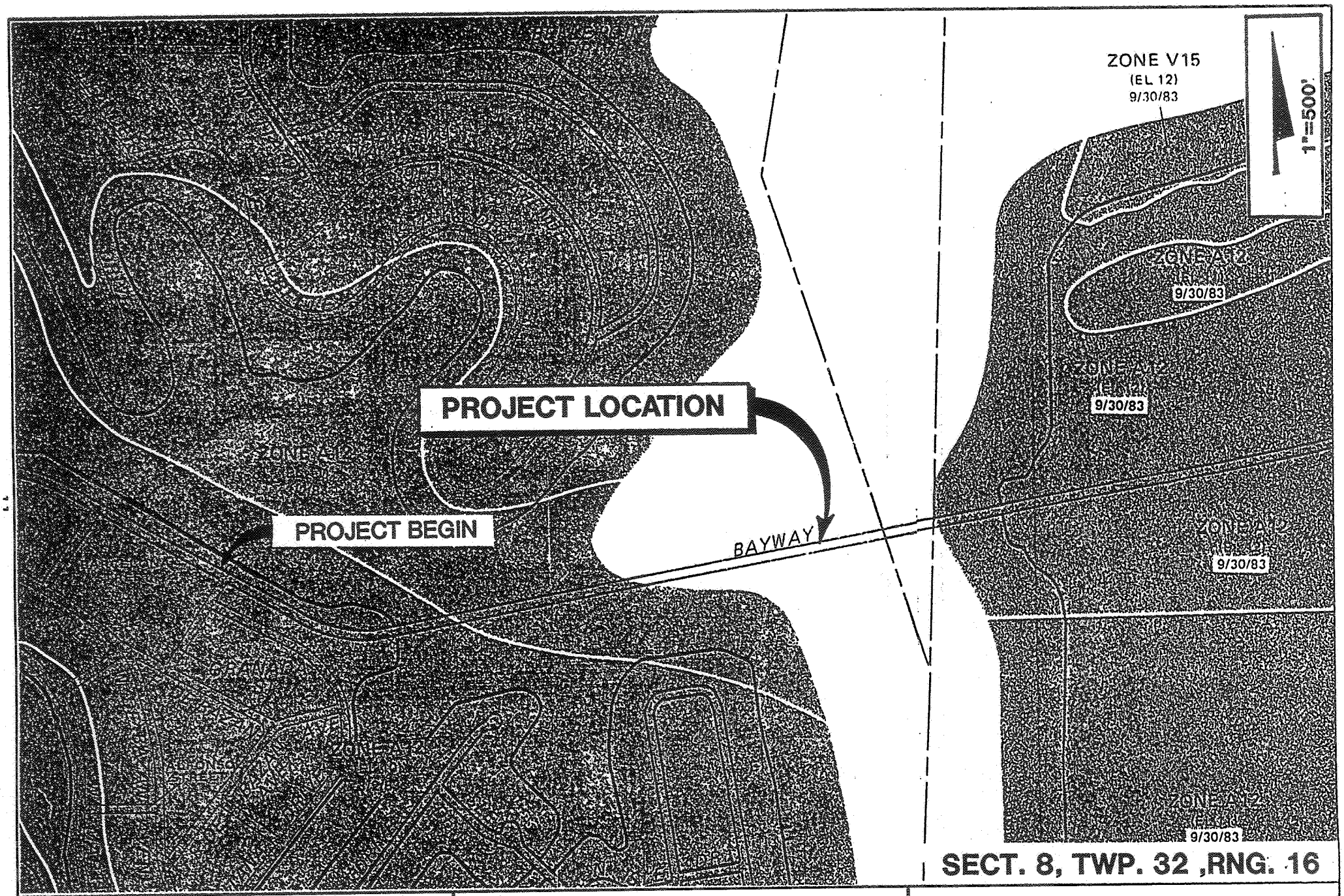
The existing alignment and profile of S.R. 682 represents a transverse encroachment to the flood plain associated with the waterways which the roadway crosses. Since no waterways flow parallel to the roadway, no significant longitudinal encroachments upon the flood plain occur along the project corridor. The still water flood elevations for the various storms for the project and surrounding areas are shown in Tables 1 thru 3.

DESCRIPTION OF DRAINAGE STRUCTURES

The proposed project follows the existing alignment of SR 682. Drainage modifications primarily involve extension or replacement of existing cross drain structures. Analyses of the structures for the existing conditions west of SR 679 would require further field and surveying investigation since there are no as built plans available for this segment of the road (not available at FDOT office). The culverts information west of 679 to Gulf Boulevard were field inspected to determine the location and drainage boundaries, and in most cases pipe sizes were not determined due to the presence of high water in the structures (Appendix A documents the Preliminary Field Investigation Report). The analyses and calculations of the structures are based on several assumptions including:

1. Southwest Florida Water Management Districts Contour Maps (1979).

2. U.S.G.S Quadrangle Maps

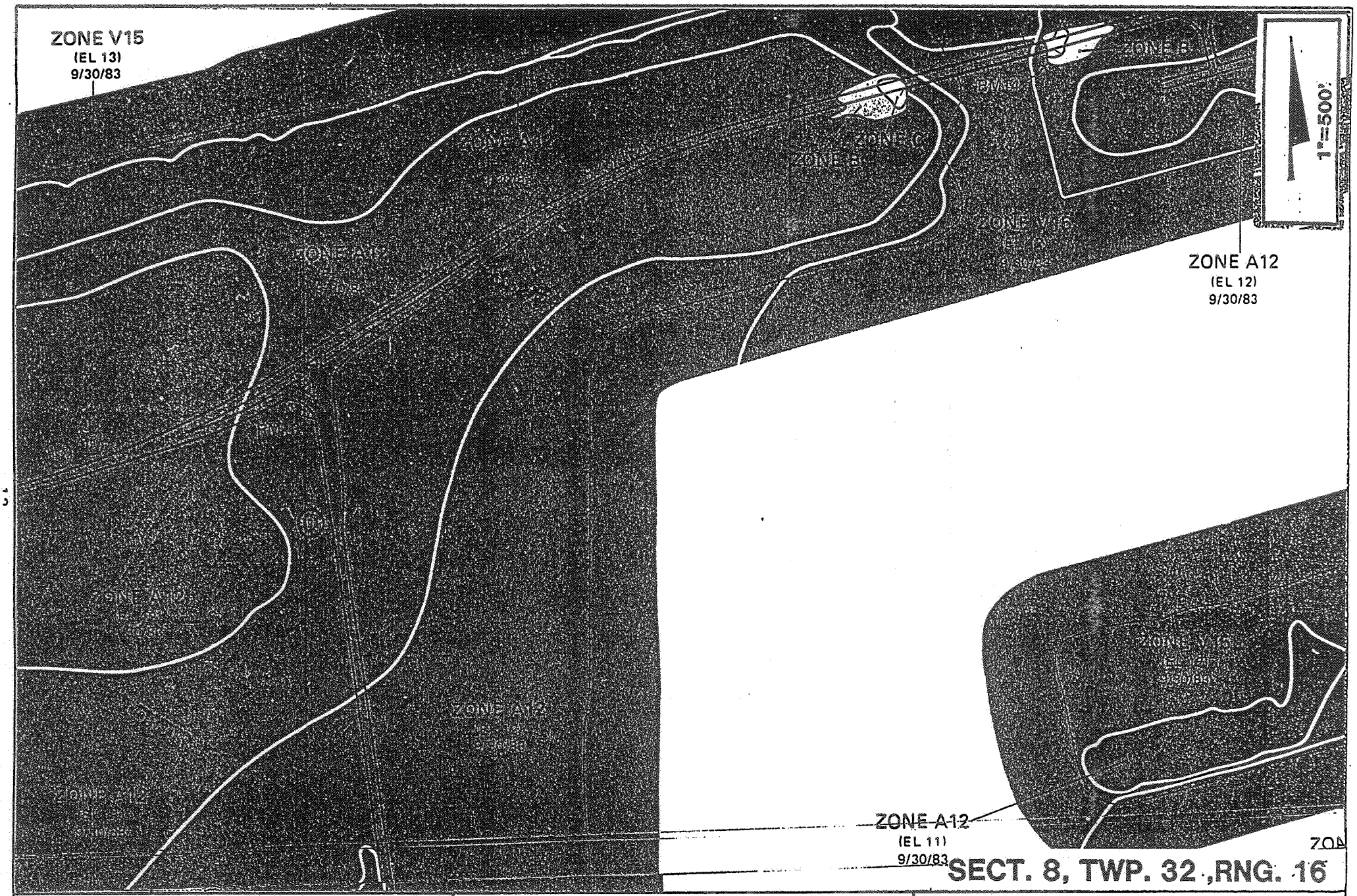


BAYWAY BRIDGE (SR 682)
LOCATION HYDRAULIC REPORT
PINELLAS COUNTY, FLORIDA

FIGURE NO. 6

FEMA FLOOD MAP

SOURCE: FLOOD EMERGENCY MANAGEMENT AGENCY 2-4-1983



BAYWAY BRIDGE (SR 682)
LOCATION HYDRAULIC REPORT
PINELLAS COUNTY, FLORIDA

FIGURE NO. 7

FEMA FLOOD MAP

SOURCE: FLOOD EMERGENCY MANAGEMENT AGENCY 9-8-1983

Table 5B. Flood Insurance Zone Data

Flooding Source	Stillwater Elevation* 10-Year	Stillwater Elevation* 100-Year	FHF	Zone	Base Flood Elevation (Feet NGVD)**
Boca Ciega Bay					
South of Conch Key to East of Redington Beach	5.2	10.1	075	V15	12-13
			060	A12	10-12
East of Redington Beach to East of Boca Ciega Isle	5.5	10.8	080	V16	12-14
			060	A12	11-13
			050	A10	11
Lake Seminole	5.6	10.8	050	A10	11
East of Boca Ciega Isle to Pinellas Bayway	5.0	9.8	075	V15	12-13
			060	A12	11-12
Gulf of Mexico					
Open Coast and St. Joseph Sound From Northern County Limits to South Coast of Smith Bayou	5.9	11.1	080	V16	13-17
			060	A12	11-13
Open Coast North-Northwest of Honeymoon Island	5.9	10.9	075	V15	15-16
St. Joseph Sound at South Coast of Smith Bayou	5.4	10.4	075	V15	13-15
Clearwater Harbor at Stevenson Creek	5.7	10.6	050	A10	11
Clearwater Harbor South of Belleair Causeway to the Narrows South of Conch Key	5.1	9.7	070	V14	12
			055	A11	10-12
			045	A9	10
Open Coast at Pass-a-Grille Channel	5.1	9.6	070	V14	12-15
			055	A11	10-12
			045	V9	9-10
Open Coast From South of Pass-a-Grille Channel to South of Mullet Key	4.5	9.0	070	V14	11-14
			055	A11	9-11
			045	V9	9

*Sample elevations given, variation may occur within the area cited.
**Due to map scale limitations, base flood elevations shown on the FIRM may represent average elevations for the zones depicted

TABLE 1

Table 3. Flood Insurance Zone Data

Flooding Source	Stillwater Elevation* 10-Year	Stillwater Elevation* 100-Year	FHF	Zone	Base Flood Elevation (Feet NGVD)**
Gulf of Mexico					
Open Coast and Boca Ciega Bay From Northern Corporate Limits to 44th Avenue	5.5	10.7	080 060	V16 A12	13 to 16 11 to 13
Open Coast and Boca Ciega Bay From 44th Avenue to 27th Avenue	5.0	9.8	075 060	V15 A12	12 to 15 10 to 12
Open Coast and Pass-a-Grille Channel From 27th Avenue to Southern Corporate Limits	5.1	9.6	070 055	V14 A11	12 to 15 10 to 12

*Sample elevations given; variation may occur within the area cited.
**Due to map scale limitations, base flood elevations shown on the FIRM may represent average elevations for the zones depicted.

TABLE 2

Table 3. Summary of Flood Elevations

Flooding Source and Location	Stillwater Flood Elevation (Feet) 10-Year	50-Year	100-Year	500-Year
Lake Tarpon				
At Mouth	4.2	6.2	7.0	7.9
Tampa Bay				
At Booth Point	5.5	8.7	10.1	13.2
At Safety Harbor Boulevard	5.6	8.6	9.9	12.8
At Courtney Campbell Causeway	5.3	8.3	9.6	12.5
At Bunker Hill Island	5.2	8.2	9.6	12.6
At Weedons Island	5.0	8.0	9.4	12.2
At South Yacht Basin	5.0	7.9	9.2	12.0
At Little Bayou	4.7	7.4	8.7	11.2
At Bird Key	4.7	7.8	9.4	12.9
At Mullet Key	4.3	7.2	8.5	11.2
Gulf of Mexico				
At Pass-a-Grille Beach	5.1	8.1	9.6	12.7
At Indian Rocks Beach	5.2	8.3	9.9	12.8
At Belleair Beach	5.1	8.2	9.7	13.6
At Sunset Drive (in Clearwater)	5.7	9.0	10.6	13.5
At Clearwater Beach	5.4	8.7	10.4	13.4
At Palm Harbor	5.9	9.4	11.1	14.2
At Rabbit Key	6.1	9.8	11.4	14.6
Boca Ciega Bay				
At 36th Avenue (in St. Petersburg)	5.5	9.0	10.8	13.5
At North Redington Beach	5.2	8.5	10.1	12.9

TABLE 3

3. Field reconnaissance to determine location and drainage basin boundaries for the structures.

4. Pinellas County Aerial Maps

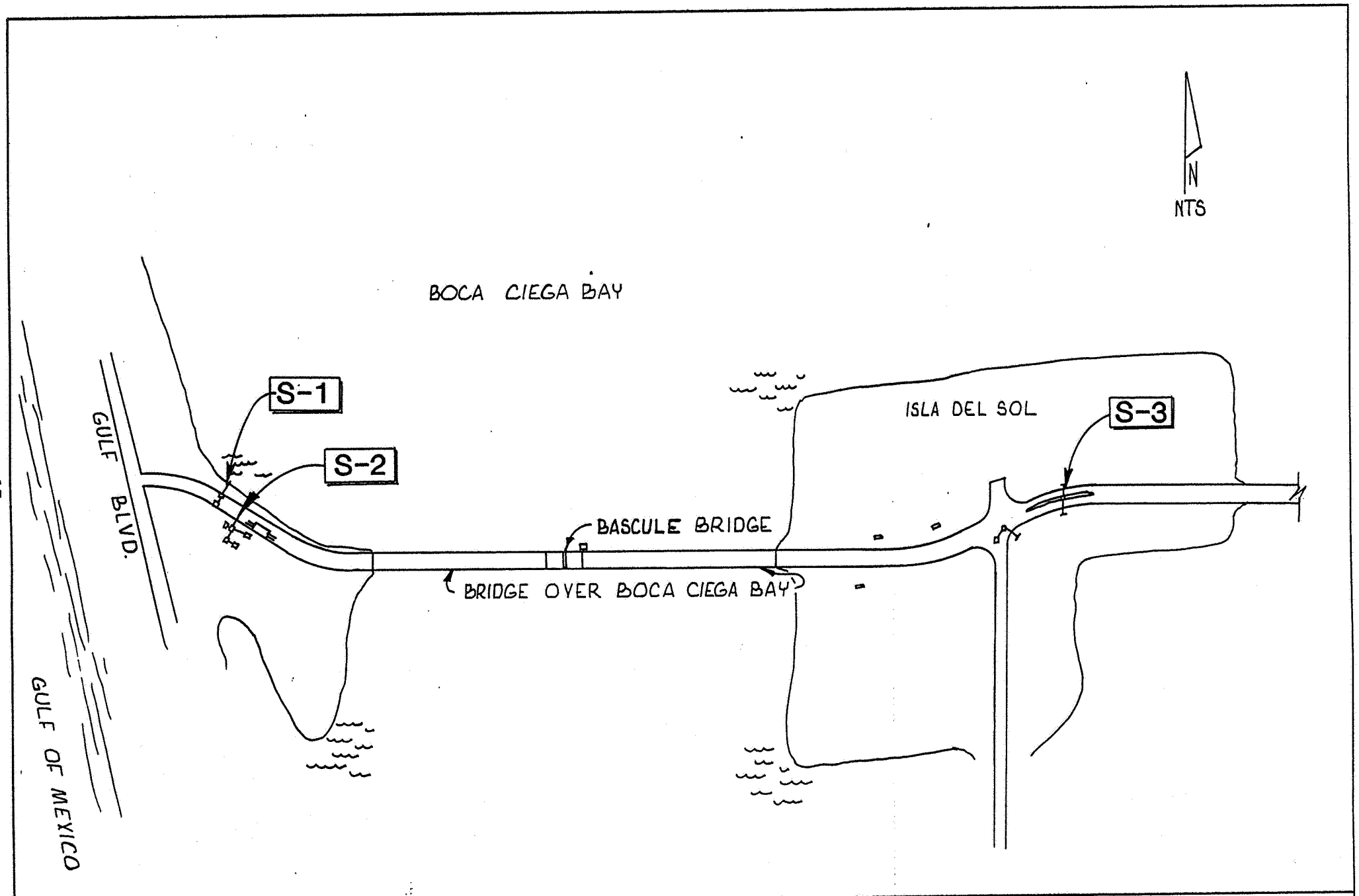
Therefore, this information should be used for planning purposes only.

An analyses of the structures to include a preliminary calculation for the 50 year and 100 year runoff rates has been prepared to provide an understanding of the drainage basin runoff generated for these cross drains. The location of the significant cross drains are shown on Figure 8.

The analysis of the cross drains and structures starting from the beginning of the project are as follows:

Structure No. 1 (S-1):

Per our field reconnaissance and SWFWMD Topographic Aerial Photography it was assumed that structure S1 is not a cross drain, but due the lack of survey information and the possibility that the Granada Street drainage system and/or the existing ponds south of roadway tie into structure no. S1, this system must be further evaluated to confirm the area contributing to this system. This system consists of two curb inlets located along SR 682 (Gulf Blvd) 315 ft west of the west toll booth with a pipe connecting the two inlets (assumed direction of flow from south to north was based on drainage flow pattern) and outfalls into the Intracoastal Waterway of Boca Ciega Bay (see Figure 8 for approximate location). The drainage basin area contributing to this system is 0.57 acres, with peak rate of runoff for the 50 year and 100 year storm events of 3.4 cfs, and 3.5 cfs. This system must be re-evaluated during design to determine the pipe size, and outfall location in order to calculate the flooding and over topping elevations for this system, and to check whether extension or replacement of the structure is needed.



S.R. 688 PROPOSED INTRACOASTAL WATERWAY BASCULE BRIDGE PINELLAS COUNTY, FLORIDA

FIGURE NO. 8

CROSS DRAIN LOCATION

SOURCE FDOT PLANS & SITE VISIT

Cross Drain Structure No. 2 (S-2):

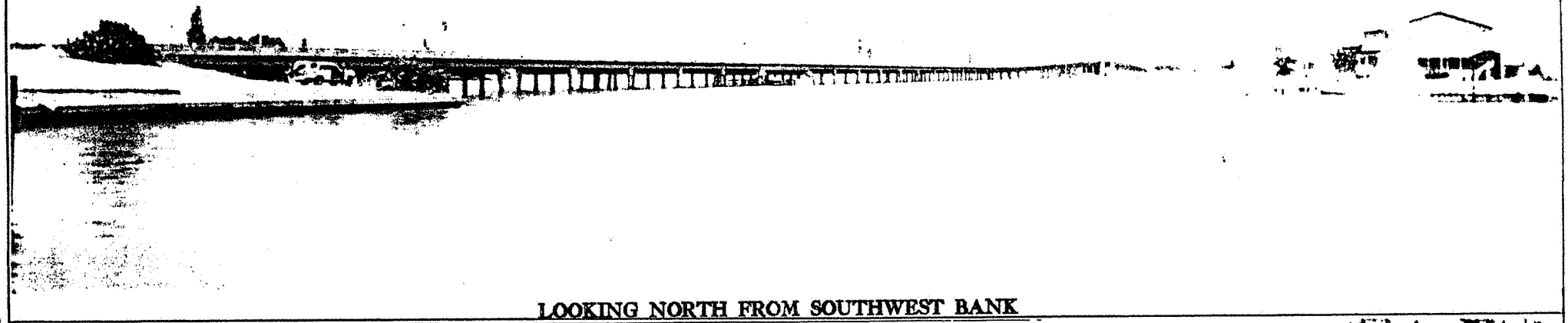
Based on the drainage basin contours (SWFWMD Aerials) and the field visits, this system which is located 100 feet west of the west toll booth consists of 4 curb inlets and one ditch bottom inlet which collect runoff from Granada Street, the adjacent residential community, and the roadway pavement. The drainage system crosses under SR 682 and outfalls into the Boca Ciega Bay at the north side of SR 682 (assumed direction of flow, south to north, was based upon topography).

The total drainage basin area contributing to this crossing is approximately 3.14 acres with a peak rate of runoff for the 50 year and 100 year storms of 15.3 cfs, and 16.0 cfs respectively. This cross drain will also require investigation during design to determine the flooding and overtopping parameters for design purposes.

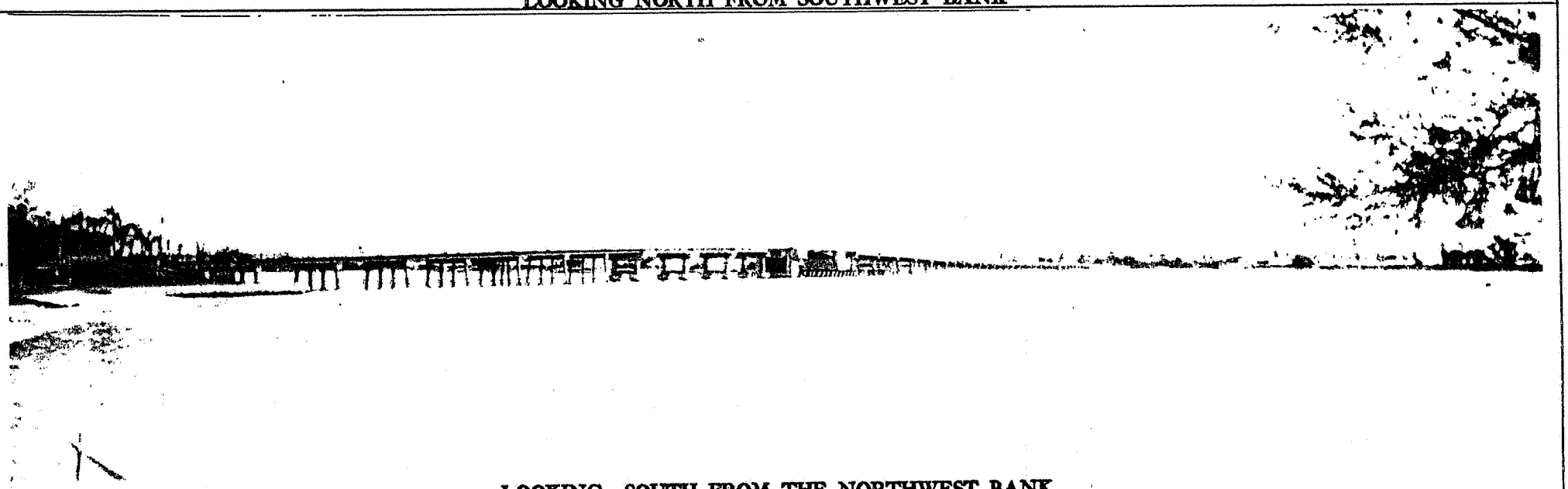
Major Cross Drain (Bayway Bridge)

The existing Bayway Bridge/SR 682 crossing of the Intracoastal Waterway was constructed in 1962 (see Figure No. 9). The structure is a two lane bridge. Proposed roadway improvements include constructing a new four lane 65' vertical clearance fixed bridge south of and parallel to the existing bridge over the Intracoastal Waterway (see Figure 3). The Intracoastal Waterway is a tidally influenced, navigable waterway.

The vertical clearance for the Bayway Bridge will be determined based upon several design criteria. The bridge will consist of a high level fixed portion and lower level approaches. The U.S. Coast Guard guide clearances for bascule structures over the Gulf Intracoastal Waterway are 21 feet. The proposed bridge clearance for the navigable portion of this bridge is 65 feet. To meet drainage considerations, the minimum vertical clearance needs to conform to the FDOT Drainage Manual, Volume 1 - Standards, latest edition. For a high use roadway such as SR 682, the design storm is the 50 year event. The 50 year storm surge event as found in the Federal Emergency



LOOKING NORTH FROM SOUTHWEST BANK



LOOKING SOUTH FROM THE NORTHWEST BANK

S.R. 688 PROPOSED INTRACOASTAL WATERWAY BASCULE BRIDGE PINELLAS COUNTY, FLORIDA	FIGURE NO. 9 BAYWAY DRAWBRIDGE	

Management Agency (FEMA) Flood Insurance study for Pinellas County dated December 1982 is 8.1 feet NGVD (see Table 3).

FDOT requires bridge structures to provide clearance for the design storm event plus an additional 2 to 3 feet of clearance below the low member for floating debris and wave action. Navigational clearances required at the center span will require a sufficient vertical curve in the roadway on the fixed portions of the bridge to place the bridge above the normal drift clearance for a majority of the bridge length.

To account for the affects of the environment where the structure is located, the following considerations need to be taken into account:

1. For concrete, superstructures classified as slightly aggressive, the desirable vertical clearance is six (6) feet minimum over the mean annual flood or control water elevation.

2. For concrete superstructures classified as moderately aggressive, or extremely aggressive, the desirable vertical clearance is twelve (12), feet minimum over the mean annual flood, control water elevation or spring tide, as applicable.

3. For steel superstructures, the desirable minimum vertical clearance shall be obtained from the District Maintenance Engineer.

The type of environment, slightly aggressive, moderately aggressive, or extremely aggressive as well as minimum requirements for steel superstructures will need to be determined at a later date.

The proposed Bayway Bridge crossing of the Intracoastal Waterway should be designed to the following minimum criteria:

The bridge low member elevation of 21 feet NGVD for the bascule span if used and 8.1 feet NGVD for the remaining fixed sections of the bridge. Minimum requirements for the environment, will also need to be established at a later date.

Structure No. 3 (S-3):

Based on the as built plans provided by the Florida Department of Transportation, State Project No. 15200-3526, sheet no. 6, dated January 1984, this system is not a cross drain. It consists of a median inlet that discharges through two 18" RCP pipes into the north and south of the roadway (SR 682) (see Figure 8 for location) into the Intracoastal Waterway of Boca Ciega Bay. This structure is located 800 feet east of the Intersection of SR 679 and SR 682 and has a drainage basin area of 1.38 acres. The 50 year and 100 year peak rate of runoff for this crossing are 3.7 cfs and 3.9 cfs respectively. Flooding on this system may occur from tidal flood elevation fluctuation and not due to roadway runoff since it only drains the median green area of the roadway.

REGULATORY AGENCIES COORDINATION

The proposed improvements for SR 682 project fall under the jurisdiction of several permitting agencies such as the Florida Department of Natural Resources (FDNR) for any crossing of state-owned lands, Southwest Florida Water Management District (SWFWMD) for water quality pursuant to Chapter 17-25 F.A.C., and water quantity pursuant to Chapter 40D-40, F.A.C., U.S. Coast Guard for clearance requirements for bridges on navigational streams in the Intracoastal Waterway, and U.S. Corps of Engineers (COE) for all activities in waters of the United States (COE, Section 404). Appendix B include the minutes of the preliminary meetings with some of the agencies.

BRIDGE WATER QUALITY

The proposed Bayway Bridge is approximately 97 feet wide and 2552 feet in length over Boca Ciega Bay, the bridge proposed clearance elevation is 65 feet which will reduce stormwater runoff pollutant due to the limitation of

vehicles stopping on the bridge. The proposed bridge runoff will directly outfall into the Intracoastal Waterway of the Boca Ciega Bay without any water quality treatment prior to discharge.

The bridge will be located in the Outstanding Florida Water (OFW) classification per the Florida Department of Environmental Regulation (FDER). Therefore, since the bridge will not provide water quality treatment on site, an equivalent treatment volume should be provided for untreated existing impervious areas within the same drainage basin. The required equivalent treatment volume should further be evaluated during the design phase of the project.

CONCLUSION

The SR 682 (Bayway) project limits begin at the west toll booth, approximately 0.25 miles east of Gulf Boulevard (SR 699), and ends at 41st Street.

The proposed roadway project should not significantly contribute to an increase in the flood zone area since the flood zone designations are a result of coastal flooding due to tidal surge, or an inherent in the topography of the surrounding area. The transverse encroachment upon the flood plain by the roadway should not be significantly affected since profile elevations should remain at or near existing levels. The proposed improvements to the road will require the extension or replacement of the existing cross drains. A detail surveying and analysis will be required to determine the available sizes and capacities of these culverts for design. Modifications to the roadway width and drainage structures should improve the use of the facility for emergency services and evacuation purposes.

REFERENCES

1. U.S. Department of Agriculture Soil Conservation Service; Soil Survey for Pinellas County, Florida September 1972

2. U.S. Geological Survey; City of St. Petersburg Beach Topographic Quadrangles Pinellas County, Florida, 1974

3. Federal Emergency Management Agency; Flood Insurance Rate Maps for the following areas in Pinellas County, Florida: City of St. Petersburg Beach March 1983, and Pinellas County Unincorporated Area, December 1982.

4. Federal Emergency Management Agency; Flood Insurance Studies for the following areas in Pinellas County, Florida: City of St. Petersburg, September 1982; Pinellas County Unincorporated Area, December 1982.

5. Florida Department of Transportation, State Road No. 682 Pinellas County, Florida State Highway Final Plans FDOT Projects Nos. 15200-3526 and 15200-3501.

APPENDIX A

SITE RECONNAISSANCE REPORT

STATE ROAD 682 (BAYWAY)
FDOT PROJECT NO. 15200-1546
PRELIMINARY SITE RECONNAISSANCE REPORT

The following list is a description of an approximate location structure and cross drains for the project which does not have asbuilt drawings available.

* 462' West of west toll booth on Pinellas Bayway a curb inlet on the South side of the road filled with water could not determine the direction of pipe that connects it to the other structures.

* 484' west of tool plaza on Pinellas Bayway a curb inlet on the North side of road filled with water. Unable to determine direction of pipe laid to structure.

Cross Drain #1 (S-1)

* 315' curb inlets North and South sides of roadway filled with water. Pipe to structure unknown.

Cross Drain #2 (S-2)

* Approximately 100' from the toll booth West and South, a drainage system consisting of one 3 x 3 DBI and 4 curb inlets exists (Granda St.). Pipe directions unknown. All structures filled with water.

* On the immediate South East corner of the toll plaza exists a flume that discharges onto East Maritana Dr.

* On "Isla del Sole" the West side of island "Bahia Del Mar Blvd." The North West shoulder of the bridge approach has no cross drains. Sheet flow drains into the bay directly via Swale along golf cart path.

* The South-West shoulder of the bridge approach drains directly into the bay via swale along golf cart path.

* 736' from intersection of Pinellas Bayway and Bahia Del Mar Blvd. North-East along Pinellas Bayway the roadway and swale empties into a 15" pipe (conc.) and then into a pond.

* 600' North-West of the intersection of SR 679 and Pinellas Bayway along Pinellas Bayway there is a 4'x4' grate inlet that receives runoff from the roadway and tennis courts into the swale and then into a pond.

* 800' North-East of the intersection of Pinellas Bayway and SR 679 along Pinellas Bayway exist is a 15" conc. pipe that receives runoff from the roadway and swale. Also a grate inlet located in the East end of the parking lot of "shopping village" also receives runoff from the parking lot. A 3'x3'

grate inlet past the golf cart path receives runoff from golf course then outfalls into a pond then into a large pipe that discharges into the Bay.

Cross Drain #3 (S-3)

* A cross drain exists 800' East of the intersection of SR 679 and SR 682, along Pinellas Bayway with a median swale inlet and a head wall North, and a M.E.S. South (direction of flow is unclear). The head wall intersects the swale on the North side of roadway and the M.E.S. connects over land to a pond on the South side of the roadway.

* At the intersection of SR 679 and Pinellas Bayway exists a drainage system consisting of medial inlets and a M.E.S. that discharges into a pond that discharges along SR 679 South of the Isle Del Sol via ditch into the bay.

* South-West of the intersection of Pinellas Bayway and SR 679 sheet flows off the road into the lake and then the lake discharges into ditch at the South end of the pond then into the bay along SR 679.

* 500' South-West along Pinellas Bayway from the intersection of Bahia Del Mar Blvd. East, exists a head wall 112' South of the edge of pavement that collects all runoff from golf course and pavement areas.

This list is provided for informational purposes only for the Hydraulic Location Report.

APPENDIX B

AGENCIES PRELIMINARY MEETING MINUTES

MEETING NOTES

COPIES TO:	All Attendees	DATE: April 20, 1993
PROJECT:	SR 682 (BAYWAY BRIDGE) WEST TOLL BOOTH TO 41ST STREET PINELLAS COUNTY	PROJECT NO.: WPA NO. 71163989 SP NO. 15200-1546 FAP NO. M-1258(1) AEP NO. 4930001000
MEETING PLACE:	SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT OFFICE 7601 HIGHWAY 301 NORTH TAMPA, FL 33637-9544	MEETING DATE: April 19, 1993
PARTICIPANTS:	SHELLY ALLEN, DNR JOHN EMERY, SWFWMD ALBA EVANS, SWFWMD TODD MECKLENBERG, FDOT DON SKELTON, FDOT SANDY SCHEDA, SEA JIM MYKYTKA, RS&H ROY CHAPMAN, RS&H	

The following are the Minutes of this Meeting which began at approximately 10:30 a.m.:

This meeting was held to provide preliminary agency coordination with SWFWMD and DNR concerning the above captioned project.

Mr. Skelton provided an overview of the project status to date. He indicated that a FONSI was approved in the early 80's to improve SR 682, Pinellas Bayway. Mr. Skelton indicated that the current project is to reevaluate the findings of the original FONSI to determine whether a high level fixed bridge should be used. He indicated that the current bridge crosses an aquatic preserve. He indicated that Roy Chapman is the project manager for Reynolds, Smith and Hills who is conducting the study for FDOT. He then turned the presentation over to Mr. Chapman.

Mr. Chapman indicated that the project limits for the Pinellas Bayway run from the West Toll Booth to 41st Street. He indicated that the portion from the East Toll Booth to 41st street has been improved to a six lane divided facility and from SR 679 to the East Toll Booth has been improved to a four lane divided roadway. Improvements that are being considered with this project are from the West Toll Booth to SR 679 to provide for a four lane cross section with a second left turn lane being provided for westbound traffic on the Pinellas Bayway to turn south on SR 679. Mr. Chapman indicated that the existing approved FONSI calls for the construction of a second bascule bridge south of the existing facility and improvement to four lanes along SR 682 from the West Toll Booth to SR 679. While the existing bridge over the intracoastal waterway is 37.8 feet wide, the bridge typical approved in the 1983

FONSI would provide for two bridges at 48.432 feet wide. Alternatives being considered for this reevaluation include two bridges for the bascule bridge option with each bridge being 49 feet wide and a single high level fixed bridge of 97 feet wide.

Mr. Chapman indicated that the low level alternative would have a new bridge constructed south of the existing bridge and that the existing bridge would be rehabilitated and widened to 49 feet wide with the movable span being replaced. The new bridge would be constructed with a 25 foot vertical clearance whereas the existing one has a 21 foot vertical clearance. Mr. Chapman presented a series of drawings which identified the alignment for the low level bascule bridge alternative. Concerning the high level fixed bridge it was indicated that the bridge would be constructed in stages. First one half of the bridge would be built south of the existing bascule bridge, then the existing bridge would be removed and the second half of the bridge would be constructed in approximately the same location as the existing bridge. The high level bridge would have a 65 foot vertical clearance and would remain fixed at all times. This would eliminate the need for the bridge to be opened to allow boats to pass through it.

Mr. Mykytka provided information concerning the review conducted to determine whether the best location for the new bridge would be north or south of the existing. Using a map provided by Sandy Sheda, Mr. Mykytka indicated that a field survey had been conducted that identified seagrass beds on both sides of the bridge. He indicated that the seagrass beds on the south side of the bridge at the west end were smaller than those found to the north side of the bridge at the west end. Additionally, it was pointed out that there is a substantial seagrass bed located on the north side of the bridge about a third of the way east of the west end of the bridge. He also indicated that there were some mangroves located along the north causeway on the west end of the bridge. He indicated that no seagrasses were found on the east end of the bridge. He speculates that the reason for this was that the current is substantially greater at that location than at the west end of the bridge. Sandy Sheda indicated that the quality of seagrasses to the north of the bridge appeared better than the quality south of the bridge.

Concerning mitigation, it was indicated that wetland impacts need to be treated on a type four basis or the mitigation rates would be much higher. It was indicated that the best place to replace seagrass impact would be on the west side. It was indicated that no conceptual mitigation plans have been developed to date.

Mr. Emery questioned how the runoff would be handled from the bridge. Mr. Chapman indicated that it is likely that scuppers would allow stormwater runoff from the bridge to direct discharge into the water. Mr. Emery stated that equivalent treatment of the water would be acceptable. This would require an equivalent treatment of the same amount of runoff and equivalent pollution loading as would be created by the runoff from the new bridge. This would have to be treatment of a currently untreated source of water which is going into the same drainage basin. Since this is an outstanding Florida water, the treatment will require one and one half inches over the project area if wet detention is used and three quarter of an inch over the project area if dry detention is used.

Concerning the amount of pollution coming from either bridge alternative, it was concluded that the high level bridge would have less pollution coming from it than the low level alternative. This was due from the fact that motorists will not stop on the high level bridge while they would stop for boats to pass with the low level alternative. The quantity of runoff should be determined for both of the proposed bridge

alternatives during the permitting phase. Mr. Emery indicated that we should try to obtain water quality information from the Pinellas County Department of Environmental Management. He also indicated that he would check with the DER in Tallahassee to determine how they have dealt with seagrass bed impacts in the past. He indicated that a new four lane bridge must treat all of the runoff, whereas if a second two lane bascule bridge is added, then only the new two lane bridge would need treatment.

Ms. Allen indicated that she would like to have a seagrass assessment prepared. She indicated that she would provide a list of information that would be required. It was also indicated that the standard manatee and sea turtle provisions should be included for this project. Mr Mykytka indicated that a wetlands Evaluation Report will be prepared and submitted to SWFWMD and DNR for their review and comment.

Mr. Skelton requested that Ms. Allen provide a letter which identifies the conceptual mitigation alternatives to be used. He requested that they identify the potential improvements which would be acceptable to result in no net impact.

The meeting concluded at approximately 11:40 a.m..

Respectfully Submitted,

Roy Chapman

Roy B. Chapman, P.E.
Vice President
FL Cert. No. PE0034438

April/0420-3/Design

Virginia B. Wetherell
Executive Director

FLORIDA DEPARTMENT OF NATURAL RESOURCES

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399

October 1, 1992

Ms. Janice L. Alcott, Director
State Clearinghouse
Office of Planning and Budgeting
Executive Office of the Governor
The Capitol
Tallahassee, Florida 32399-0001

SUBJECT: SAI # FL9209211578C, DOT Upgrade of SR 682 (Bayway Bridge), Pinellas County

Dear Ms. Alcott:

Our Division of Marine Resources has reviewed the subject SAI and would like to offer the following comments: .

The applicant, Florida Department of Transportation, proposes improvement of an existing two-lane bridge to a four-lane facility. We recommend that the following conditions be incorporated into the lease and adhered to by the applicant:

1. The standard manatee protection construction conditions are met;

2. There be no significant impact to habitat resources, such as seagrasses;

3. If blasting is to occur while removing the existing bridge, the blasting conditions should also be incorporated as part of the permit. The applicant should contact the Division of Marine Resources for additional criteria/conditions.

If you have questions, please contact Ms. Mary Duncan, Environmental Specialist with the Office of Protected Species Management at (904) 922-4330.

Sincerely,

B J White

B. J. White
Environmental Administrator
Office of Policy and Planning

BJW/jp

Virginia B. Wetherell
Executive Director

FLORIDA DEPARTMENT OF NATURAL RESOURCES

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399

June 22, 1993

Reynolds, Smith and Hills, Inc.
Attn: Mr. Roy Chapman
1715 N. Westshore Blvd., Suite 500
Tampa, Florida 33607-3999

RE: SR 682 (Bayway Bridge) West Toll Booth to 41st St
WPA No. 7116989

Dear Mr. Chapman,

Regarding the proposed expansion of the above referenced bridge facility, I am of the following understanding:

- No fill of submerged lands, other than the placement of the pilings, will be required for this project.
- The project will take place within the confines of an existing FDOT easement.

Pursuant to our meeting on April 19th, construction to the south of the existing bridge would have the least amount of impact on existing resources. Two design options are availabe: an additional bascule bridge with in-kind replacement of existing bascule at a later date; or replacement of existing bascule bridge with a high level fixed bridge. With either of the construction options, 0.3 acres of seagrass will be directly impacted.

I would prefer the high level fixed bridge option for the following reasons:

- Decreased amount of pollution caused by cars waiting for drawbridge
- Affords greater treatment of stormwater runoff
- One time impact

To offset impacts caused by bridge construction, the following is recommended:

- Treatment of all bridge runoff or equivalent treatment of the same amount of currently untreated runoff into the same drainage basin
- Removal of all exotic species within DOT right-of-way between SR 699 and 41st Street
- 2:1 replacement ratio of impacted vegetation, i.e. 0.6 acres of plantings. Replacement vegetation does not necessarily have to be the same as impacted vegetation, nor does replacement have to occur on-site.

These recommendations may be met in conjunction with requirements from other agencies. If these recommendations are met, aquatic preserve staff is of the opinion that no net impact will occur to the aquatic preserve. Further comments and recommendations may be made upon receipt of a formal DER application.

Should you have any questions, please feel free to contact me at the DSL West Central Florida District Office, 8402 Laurel Fair Circle, Suite 212, Tampa, Florida 33610 or at (813)744-6168.

Sincerely,

Shelly Allen, Manager
Pinellas County Aquatic Preserves

sa/

cc: Todd Vande Berg, FDNR
Don Skelton, FDOT

APPENDIX C

CALCULATIONS

SUBJECT BAYWAY BRIDGE PROJECT — AEP NO
SHEET 1 OF 6
DESIGNER KV — DATE 7/2/93
CHECKER CH — DATE 7/2/93

S1:

$AREA_{TOT} = 0.56$ ac. (0.21 ac. Pervious & 0.35 ac. Impervious)

Average slope of terrain = $\frac{5-3}{150} = 1.33\%$

WT. $C = (0.21)(0.3) + (0.35)(0.9) = 0.67$

Ref. Fig. 5.19 VELOCITY = 96 ft/min

Calculated T_c was less than 10-min, therefor used 10-min.

Ref. Fig C-11 $\Rightarrow$ $I = 9$ in/hr (50 YR) & 9.4 in/hr (100 YR)

$Q = CIA \Rightarrow Q = (0.67)(9 \text{ in/hr})(0.56 \text{ AC})(1/12)(1/3600) =$ **3.39 cfs** (50-YR) *

$Q = (0.67)(9.4 \text{ in/hr})(0.56 \text{ ac})(1/12)(1/3600) =$ **3.55 cfs.** (100-YR)

S2:

$AREA_{TOT} = 3.13$ ac (1.25 ac imp. & 1.88 ac. Per.)

Slope = $\frac{2.5}{200} = 1.25\%$

WT. $C = (1.25)(0.9) + (1.88)(0.3) = 0.539$

Ref. Fig. 5.19 velocity = 50 ft/min, T_c less than 10 min $\Rightarrow$ used 10 min.

Ref. Fig C-11 $\Rightarrow$ $I = 9$ in/hr (50 YR) & $I = 9.4$ in/hr (100 YR)

$Q = CIA \Rightarrow Q = (0.539)(9.0)(3.13)(1/12)(1/3600) =$ **15.3 cfs** 50-YR *

$Q = (0.539)(9.4)(3.13)(1/12)(1/3600) =$ **15.97 cfs** 100-YR

S3:

$Area_{TOT} = 1.38$ ac (all Pervious) $C = 0.3$

Slope = $\frac{7.5-5}{100} = 2.5\%$

Ref. Fig. 5.19 velocity = 46 ft/min, $T_c = 10$ min. $\Rightarrow$ Ref Fig C-11 $\Rightarrow I = 9$ in/hr (50 YR) & $I = 9.4$ in/hr (100YR)

$Q = 3.75$	cfs	50YR
$Q = 3.92$	cfs	100YR

* (have already been multiplied by 43560 to convert Ac to ft²).

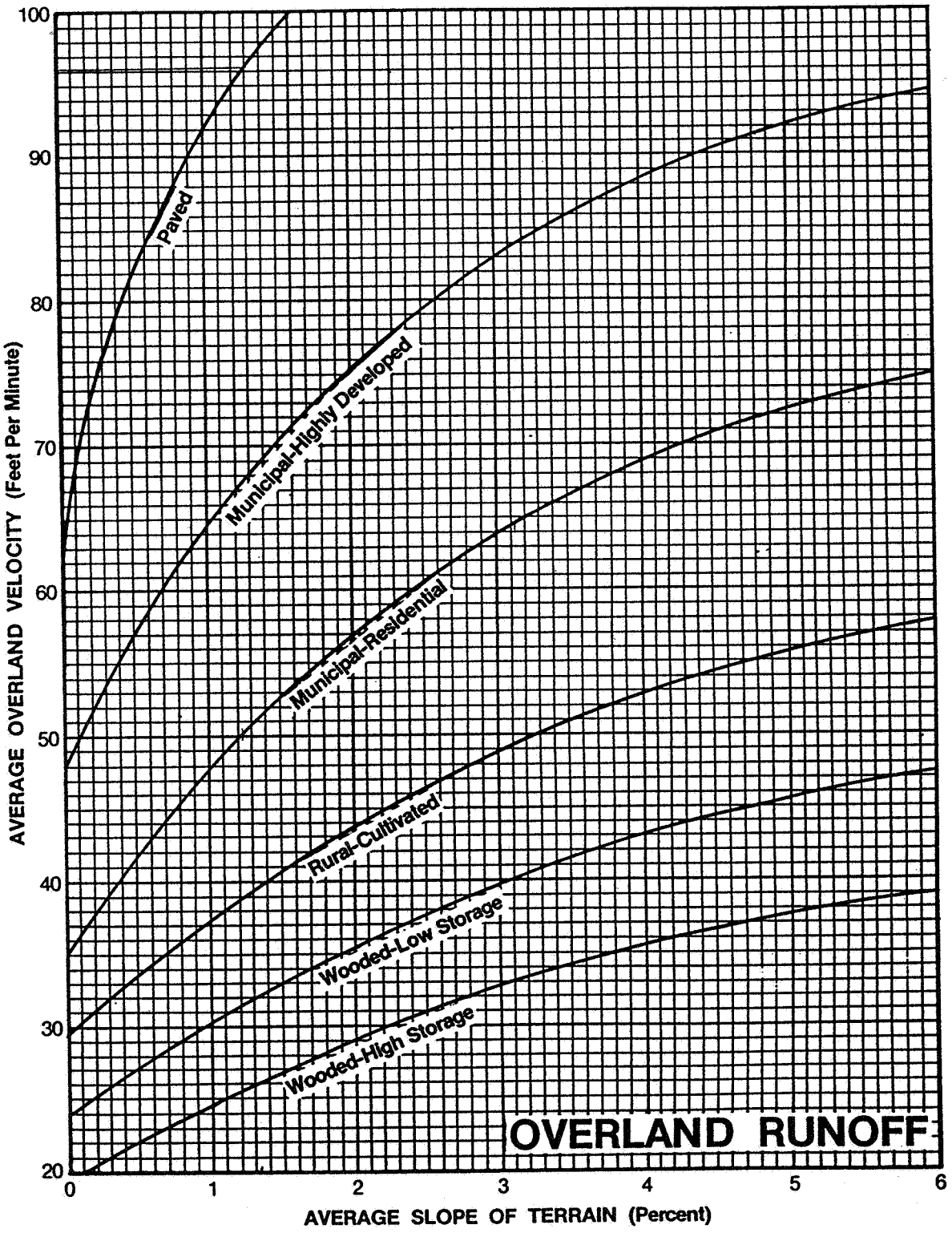
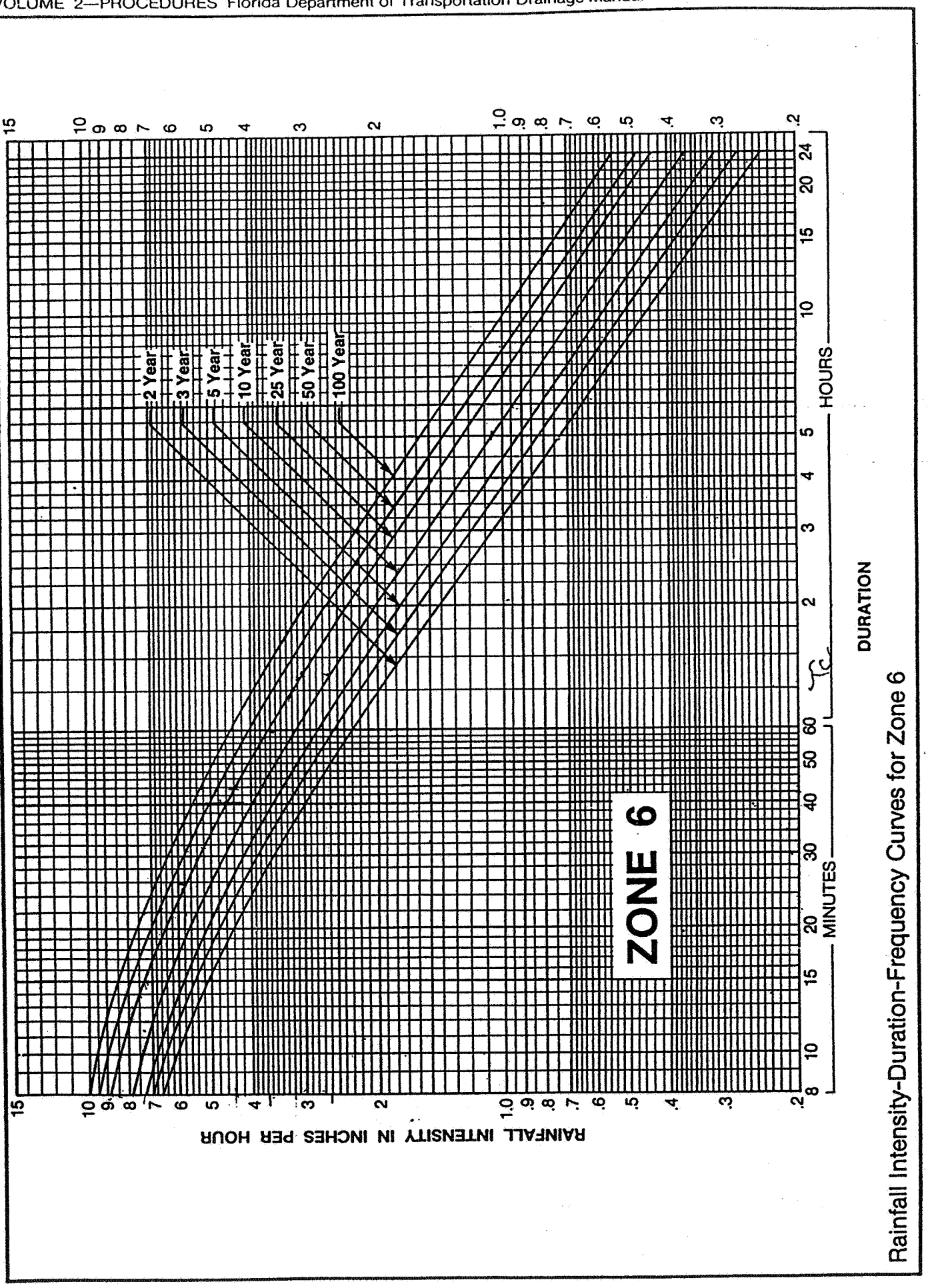


FIGURE 5-19
Overland Flow Velocities for Various Land Use Types



Rainfall Intensity-Duration-Frequency Curves for Zone 6

FIGURE C-11