NORTHWEST HILLSBOROUGH EXPRESSWAY

MASTER PLAN REPORT (PHASE 1A)

Prepared For:

Tampa-Hillsborough County Expressway Authority

Prepared By:

Greiner, Inc.
Tampa, Florida

JUNE 1989

Greiner, Inc. - Tampa, Florida

Contract Number C1255 Project NW X Way Phase 1A

The attached FINAL REPORT has received quality control review and I recommend this to be submitted to the client as: ☐ Draft ☐ Preliminary ☒ Final ☐

R. W. Gregory Signature 6/22/89 Date

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NORTHWEST HILLSBOROUGH EXPRESSWAY
STATE PROJECT NO. 10270-1518
W.P.I. NO. 7113816

DESIGN SECTION 1
PHASE 1A
MASTER PLAN REPORT

Prepared for:
TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

Prepared by:
GREINER, INC.
TAMPA, FLORIDA

June 1989

TABLE OF CONTENTS

LIST OF TABLES

LIST OF EXHIBITS

LIST OF EXHIBITS
(Continued)

INTRODUCTION

The Tampa-Hillsborough County Expressway Authority is proposing the construction of an improved surface transportation system to service the north and northwest areas of Hillsborough County, Florida. This facility is essential to the provision of safe and fully directional access with Memorial Highway, Interstate 275, Tampa International Airport, the Courtney Campbell Causeway (S.R. 60), Spruce Street, and other existing transportation facilities.

The Tampa-Hillsborough County Expressway Authority selected Greiner, Inc. as the design consultant for Design Section 1. Since the Expressway's precise geometric configuration was not known at that time and the future plans for I-275 were not known, the Expressway Authority elected to have Greiner prepare a Master Plan to guide final design. The Master Plan efforts are designated as "Phase 1A" and final design is designated as Phase 1B activities.

The purpose of this Phase 1A Master Plan Report is to present the Tampa-Hillsborough County Expressway Authority with the documentation to justify the recommended final alternative for the Design Section 1 portion of the Northwest Hillsborough Expressway project. To accomplish this, the report discusses the screening process through which alternatives were developed and the relationship of these alternatives to the area's existing and proposed transportation system. In addition, traffic operations, capacity evaluations, environmental considerations, and costs of the recommended final alternative are discussed.

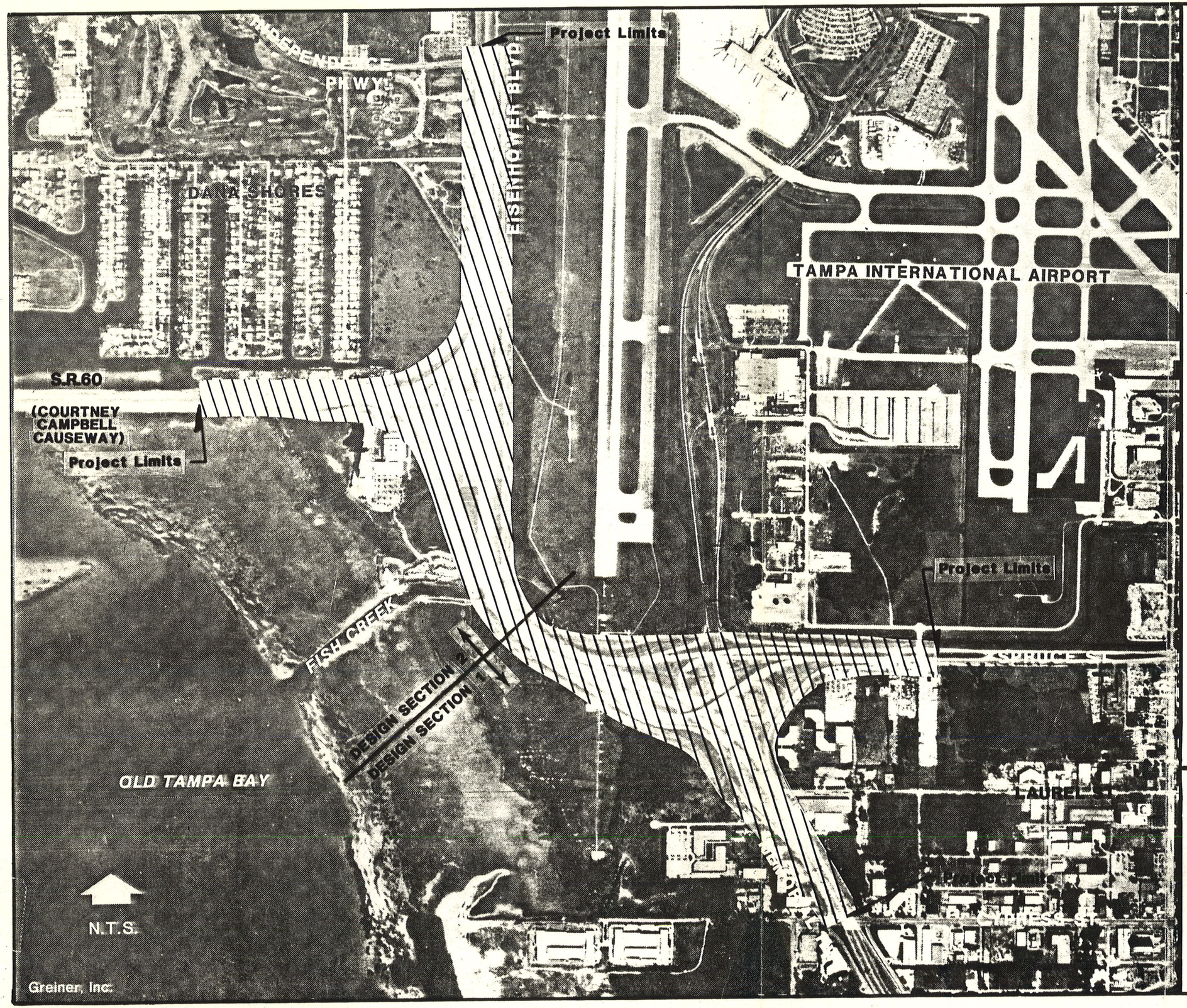
Appended by reference to this document are support documentation for the traffic forecasts, traffic operations analysis, and the complete Master Plan drawings.

History and Background of the Northwest Hillsborough Expressway

The Northwest Hillsborough Expressway is proposed as a major, high-speed, divided, controlled access roadway to serve local traffic in the north and northwest areas of Hillsborough County, Florida. The Northwest Hillsborough Expressway was identified as a needed transportation facility in the original 1971 Tampa Urban Area Transportation Study (TUATS). The TUATS, initiated in 1964, recognized the need for construction of an adequate surface transportation system within Hillsborough County. In addition, the Northwest Hillsborough Expressway has been included in the expanded and updated long range plan for the area's proposed network, and the most recent Tampa Urban Area MPO Adopted Year 2010 Long Range Transportation Plan. The project is being planned for construction by the Tampa-Hillsborough County Expressway Authority.

Description of the Study Area

The general area for the proposed Phase 1A (Design Section 1) portion of the Northwest Hillsborough Expressway project begins at Memorial Highway in the vicinity of Cypress Street on the south, and extends in a northwesterly direction to north of Independence Parkway. The major interchanges located along the project corridor is at Tampa International Airport (TIA) and Courtney Campbell Causeway. The total length of the Phase 1A portion is approximately two miles. Exhibit 1 illustrates the limits of the Master Plan project. This project is also part of the larger 16.9-mile Northwest Hillsborough Expressway alignment which begins at I-275 south of Tampa International Airport (TIA). The Northwest Hillsborough Expressway then proceeds northerly and northeasterly in the northwest quadrant of Hillsborough



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LEGEND

Limits of Master Plan

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

EXPRESSWAY MASTER PLAN LIMITS

EXHIBIT 1

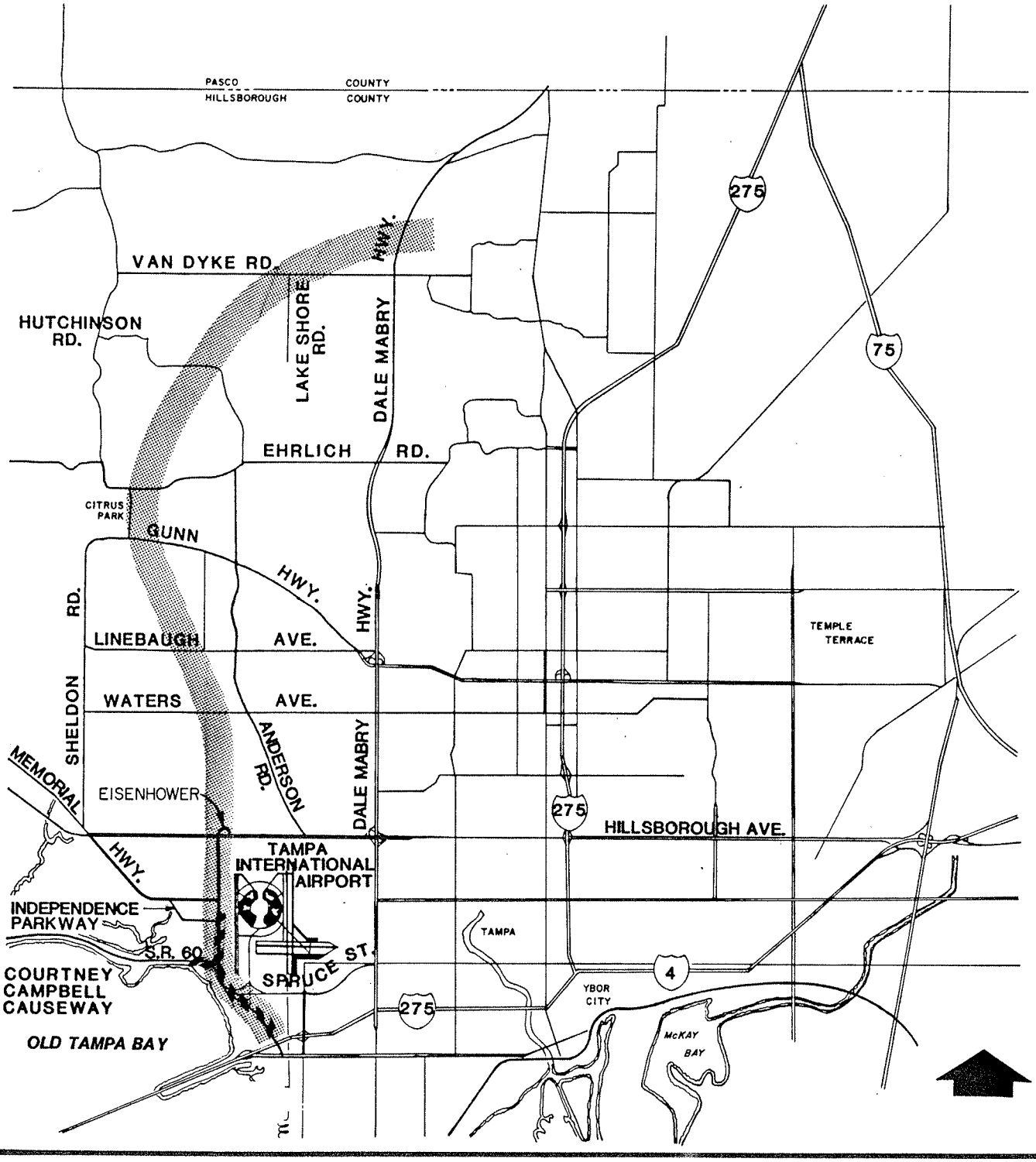
County to a terminus at Dale Mabry Highway (S.R. 597) north of Van Dyke Road. Exhibit 2 shows the Phase 1A portion of the project as part of the overall Northwest Hillsborough Expressway Alignment.

Generalized Existing Land Use

The major existing land use in the Phase 1A portion of the Memorial Highway corridor is commercial/office development. One hundred acres of public land, owned by the Hillsborough County Aviation Authority (HCAA) represents the second major land use. Some light industrial land exists just west of Memorial Highway. Hillsborough County Parklands exist north of Courtney Campbell Causeway (Skyway Park and Veteran's Park). Exhibit 3 illustrates the general land use in the study area from Cypress Street to north of Independence Parkway.

ANALYSIS OF CONCEPTUAL DESIGN ALTERNATIVES

This section of the Northwest Hillsborough Expressway Master Plan Report documents the screening procedures used to evaluate the concept alternatives. The objective of the Phase 1A activities is to develop alternatives which provide an adequate roadway level of service (LOS) while minimizing impact to those natural, economic, and social features involved. The development of concept alternatives followed a structured process (Three-tier Screening Process) by which alternatives were first defined, then developed, evaluated, and refined. This Master Plan Report provides a description of all the proposed concept alternatives and a summary of the evaluation process used to determine which alternative was to be carried into the master plan concept phase.



LEGEND

Northwest Expressway Limits

Phase 1A Master Plan Concept Limits

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

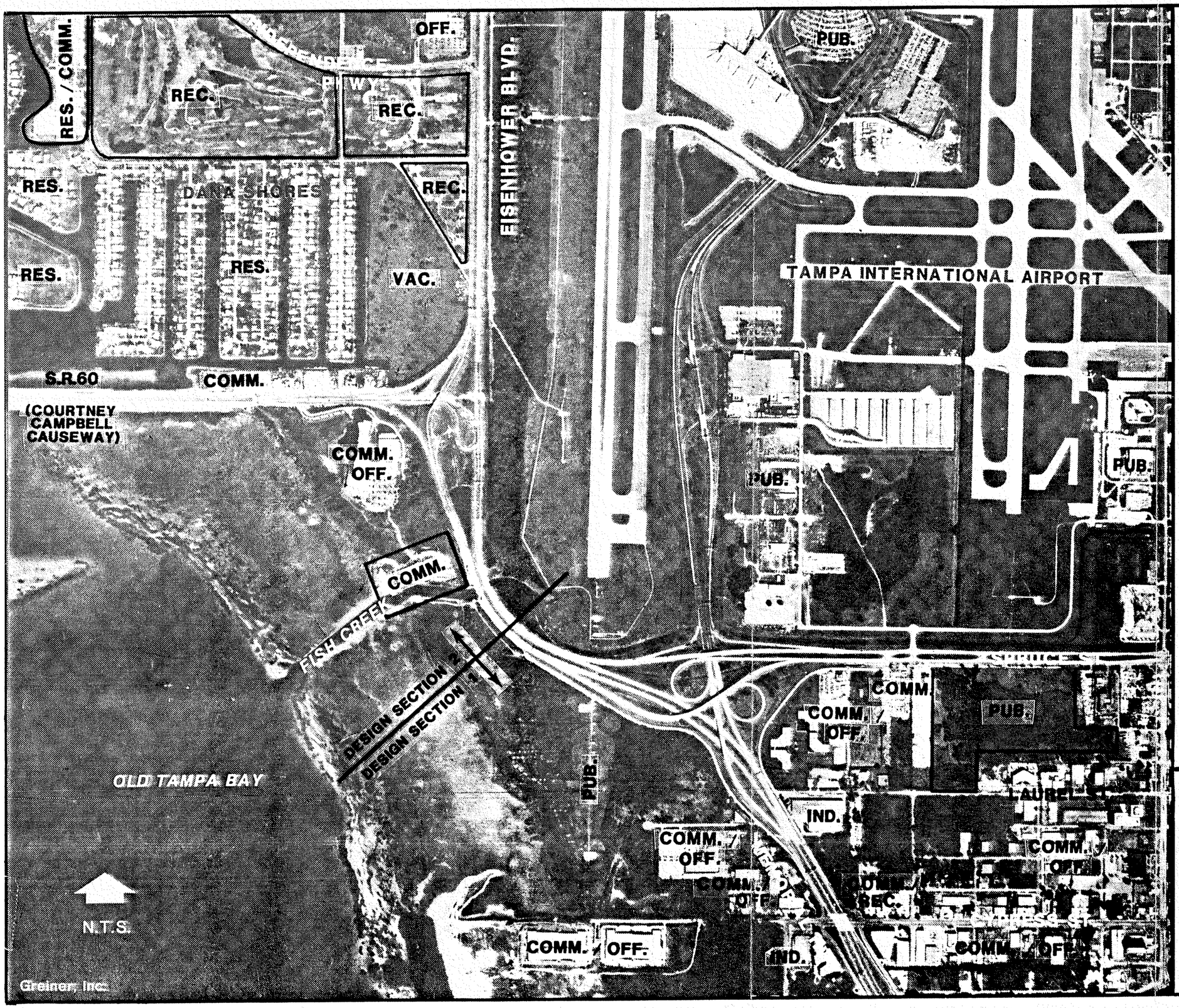
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

NORTHWEST EXPRESSWAY LOCATION MAP

EXHIBIT 2



LEGEND

RES.	Residential
COMM.	Commercial
OFF.	Office
IND.	Industrial
REC.	Recreational
PUB.	Public / Semi-Public
VAC.	Vacant Open Space

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

GENERALIZED EXISTING LAND USE

EXHIBIT 3

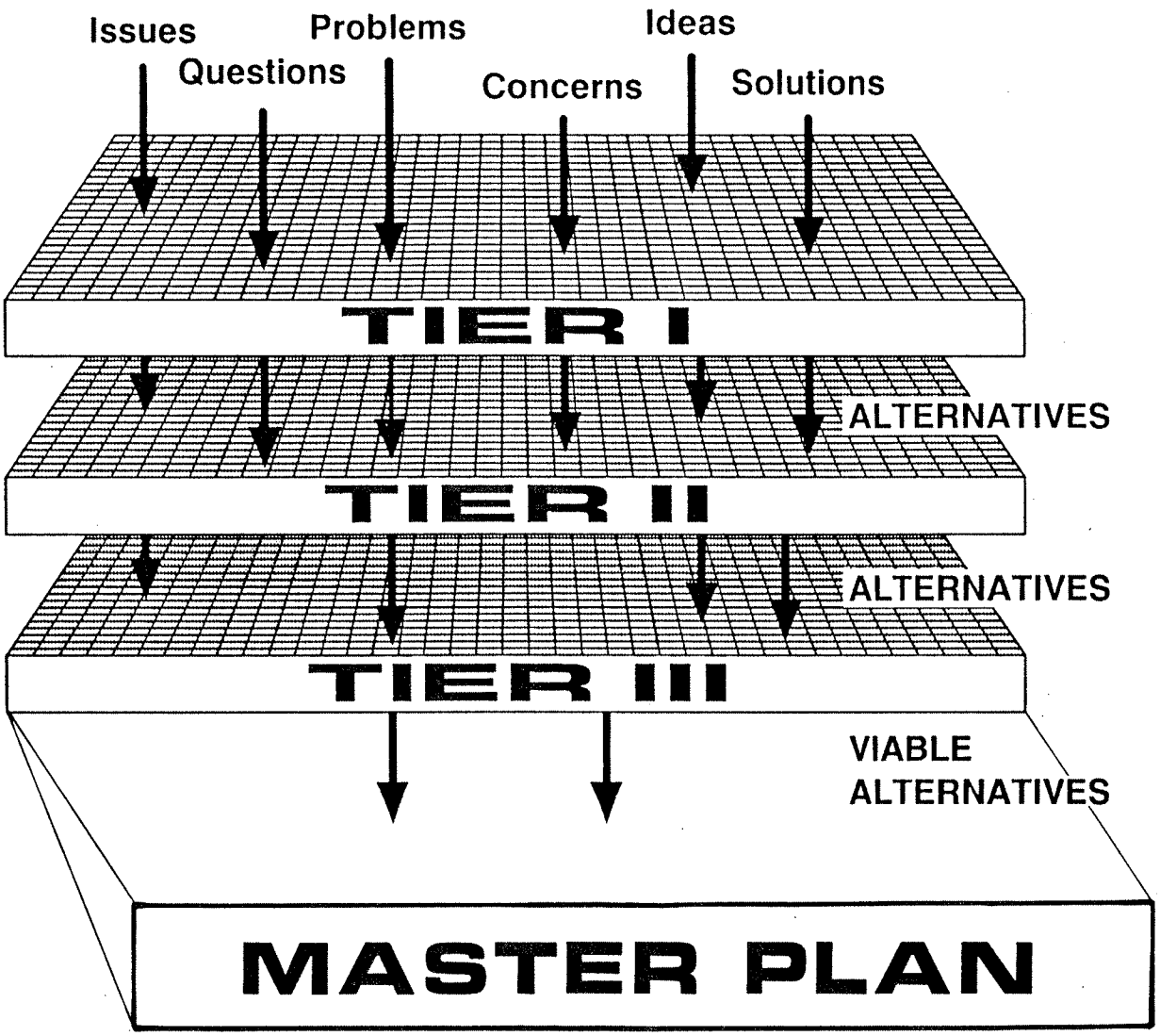
Screening Process Considerations

The comparative analysis technique used to identify the viable alternatives in the Master Plan Report is called Tier Analysis. This screening process allows the design team to assemble a large array of competing design components in an easily understood format for evaluation. Exhibit 4 depicts this process. The key factor in the success of the screening process is its ability to "window down" the vast array of competing designs to a few viable alternative concepts and finally a single concept suitable for application on the Northwest Hillsborough Expressway corridor.

The first level of analysis is on 1"= 200' scale aerial maps and provides a process for using key factors to evaluate impacts of the proposed alignments. This analysis both ranks alternative concepts and identifies any alternative with extreme or obvious detrimental impacts.

The second tier of evaluation examines the alternatives which remain after the "first tier cut," and as in the first tier, a matrix evaluation is prepared. The matrix includes all factors considered relevant by the study team. The matrix includes quantification and estimates of impacts for each of the alternatives by category of impact.

The third and final tier of evaluation for the Conceptual Design Analysis includes geometric layouts of all remaining alternatives at 1"= 100' scale. Those alternatives that survived the second tier evaluation are re-evaluated with more stringent standards and detailed analyses.



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MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER EVALUATION PROCESS

EXHIBIT 4

The refinement and the continuing development of alternatives through this systematic process provides all necessary documentation as to the logical process and selection of the viable alternatives or alternative. This process also provides the necessary documentation as to why alternatives that did not survive the evaluation process were eliminated. In addition, this process also allows the community to better understand and follow a rather complex and technical process in a step-by-step manner until the selection of a reasonable and viable alternative is reached.

Master Plan Matrix Evaluation

Roadway

The identification or selection of alternatives to be carried from the first tier to the second tier of analysis was accomplished through the use of an evaluation matrix. The first tier matrix was composed of generalized and easily measured data or factors available at the time of analysis. The factors are grouped into categories for ease in reference. Table 1 contains a factor definition or description of those measurement units which were used to determine impacts of the alternatives.

A list of categories and their factors used in the Tier 1 analysis is found on Exhibit 5. For each alternative, a rating was assigned to each factor to measure both positive and negative impacts. A value of three (3) was assigned when there were no impacts, minimal negative impacts and/or significant positive impacts. A value of two (2) was assigned when the evaluation indicated moderate negative and/or moderate positive impacts. A value of one (1) was assigned when the alternative had significant negative impact and no or minimal positive impacts. A value was assigned for each factor and for each alternative.

TABLE 1

MATRIX EVALUATION FACTORS AND METHODS OF MEASUREMENT

Physical Environment

1. **Noise Sensitive Sites** - The greater the number of noise sensitive sites within 300 feet of the right-of-way, the greater the negative impact.

2. **Wetlands** - The greater the number of acres of wetlands required for right-of-way, the greater the negative impact.

3. **Permit Difficulty** - The greater the value (based on vegetative type) of the acreage of wetlands required for right-of-way, the greater the negative impact.

Land Use

1. **Major Community Facilities** - The larger the number of major community facilities within the right-of-way the greater the negative impact.

2. **4(f) and Section 106** - The greater the number of park and recreation sites, historical sites or districts, or archaeological sites within the right-of-way, the greater the negative impact.

3. **Accessibility and Circulation** - The larger the number of local streets terminated, the greater the negative impact. The larger the number of frontage roads, additional overpass or interchanges allowing cross corridor travel, the greater the positive impacts.

4. **Relocations** - The greater the number of land use relocations the greater the negative impact.

Roadway

1. **Maintenance of Traffic** - The greater the ability for the alternative to maintain traffic operations during construction, the more positive the rating; the more restrictive the construction is on traffic operations, the more negative the rating. If an alternative does not allow for maintenance of traffic, it is fatally flawed.

2. **Federal Aviation Administration/Hillsborough County Aviation Authority Clearance** - The greater the compatibility of the alternative with FAR Part 77 Surfaces and the HCAA Zoning Ordinances, the more positive the rating.

3. **Operational Characteristics** - The more relief (better LOS) that an alternative provides for system mainline traffic and the immediate access area, the more positive the rating.

TABLE 1

MATRIX EVALUATION FACTORS AND METHODS OF MEASUREMENT (Continued)

Costs

1. **Structural/Construction** - The greater the additive cost for each new or reconstructed typical structure, the greater the negative impacts. The greater the cost per mile of improvement, the greater the negative impact.

2. **Roadway/Transit** - The greater the amount of roadway needed for bus or rail transit the greater the negative impact.

3. **Right-of-way** - The greater the cost for right-of-way acquisition the greater the negative impact.

NORTHWEST EXPRESSWAY
MATRIX EVALUATION FORMAT

FACTORS								
PHYSICAL ENVIRONMENT								
Noise Sensitive Sites								
Wetlands								
Permit Difficulty								
LAND USE								
Major Community Facilities								
"4F" & Section 106								
Accessibility/Circulation								
Relocation								
ROADWAY								
M.O.T.								
Part 77/HCAA Ordinance								
Operational Characteristics								
COSTS								
Structural/Construction								
Roadway/Transit								
Right-of-Way								
TOTAL	0	0	0	0	0	0	0	0
AVERAGE								

Matrix Value of 1 = significant negative impacts and/or minimal positive impacts.
Matrix Value of 2 = moderate negative impacts and/or moderate positive impacts.
Matrix Value of 3 = minimal negative impacts and/or significant positive impacts.

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TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

MATRIX EVALUATION

EXHIBIT 5

For ease of reference, specific concept alternatives are presented separately and include a brief description of the alternative as well as the matrix evaluation for each tier of alternatives.

DESCRIPTION OF PROPOSED CONCEPT ALTERNATIVES

TIER 1 ALTERNATIVES

The following are brief descriptions of each of the Tier 1 concept alternatives:

Alternative 1 - (A schematic of Alternative 1 is provided on Exhibit 6)

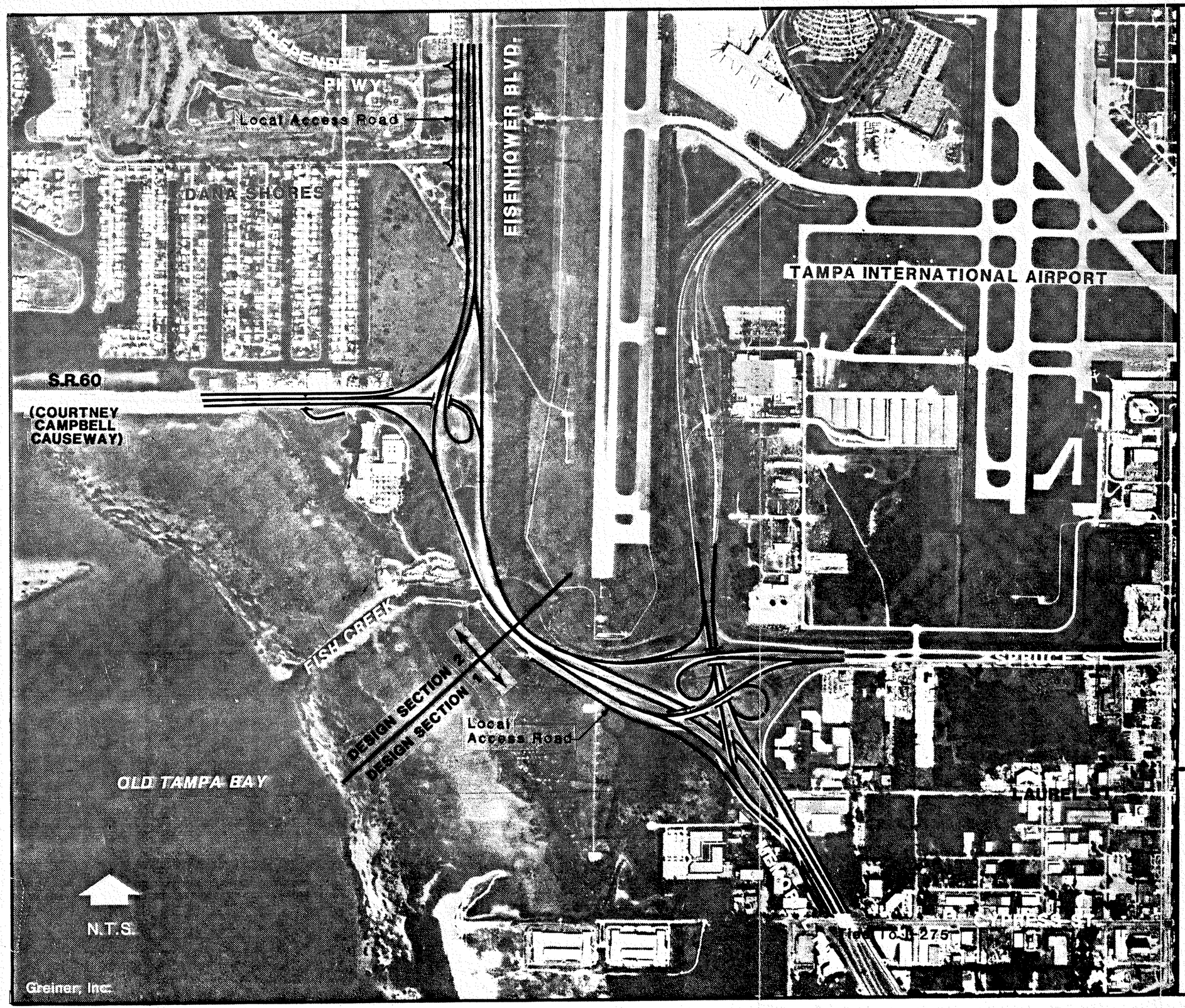
* 2-roadway system from Courtney Campbell Causeway
* 4-roadway system beginning at Cypress Street
* Fully directional interchange to and from TIA
* No direct access to office parks
* No third parallel runway considerations

Alternative 2 - (A schematic of Alternative 2 is provided on Exhibit 7)

* 4-roadway system
* Fully directional interchanges at Courtney Campbell Causeway and I-275 limits
* Fully directional interchange to and from TIA
* No direct access to Northwest Hillsborough Expressway until I-275/S.R. 60 Interchange
* No direct access to office park south of airport interchange

Alternative 3 - (A schematic of Alternative 3 is provided on Exhibit 8)

* 4-roadway system
* Interchange at Courtney Campbell Causeway is fully directional



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

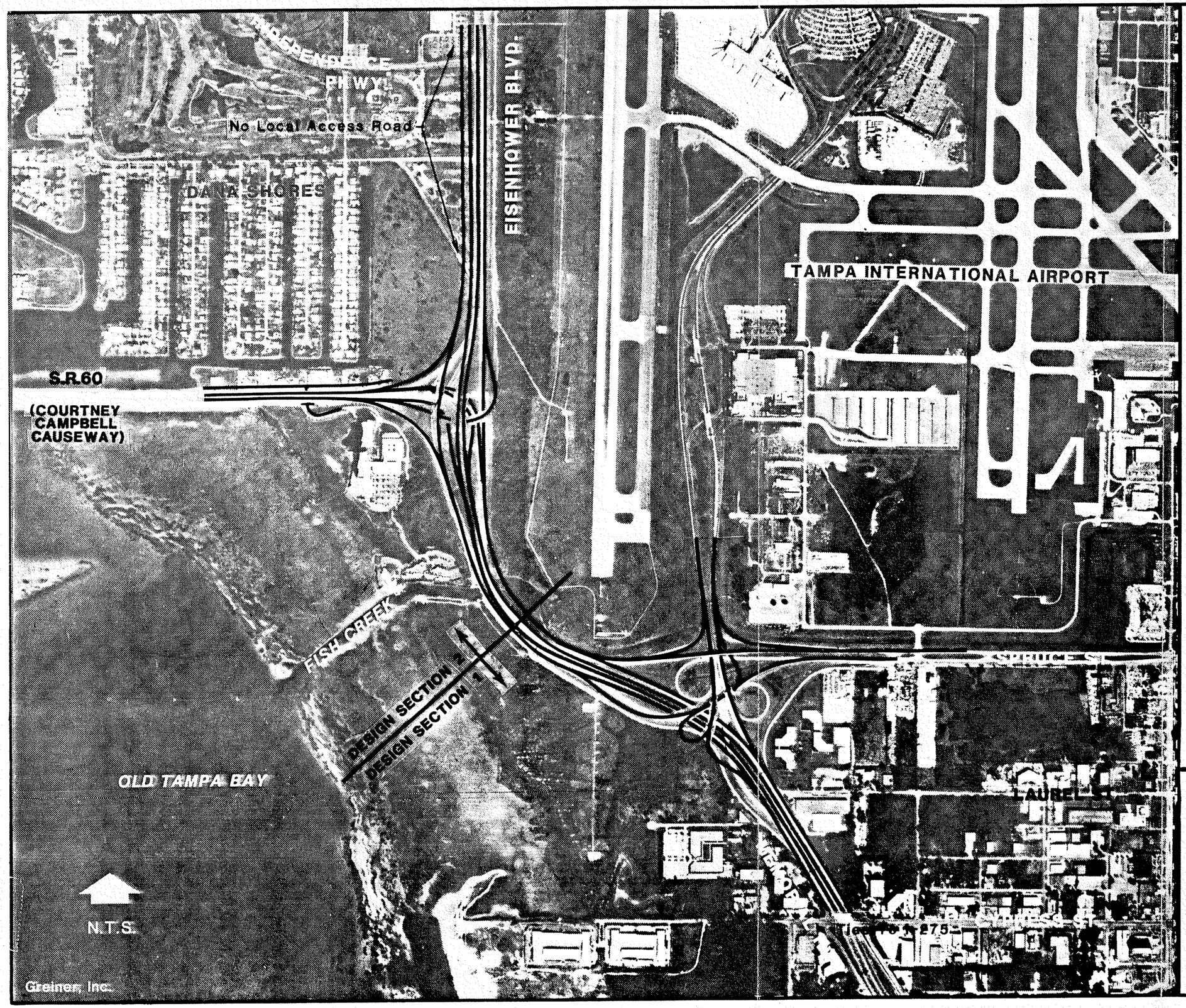
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 1 ALTERNATIVE 1 SCHEMATIC

EXHIBIT 6



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LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

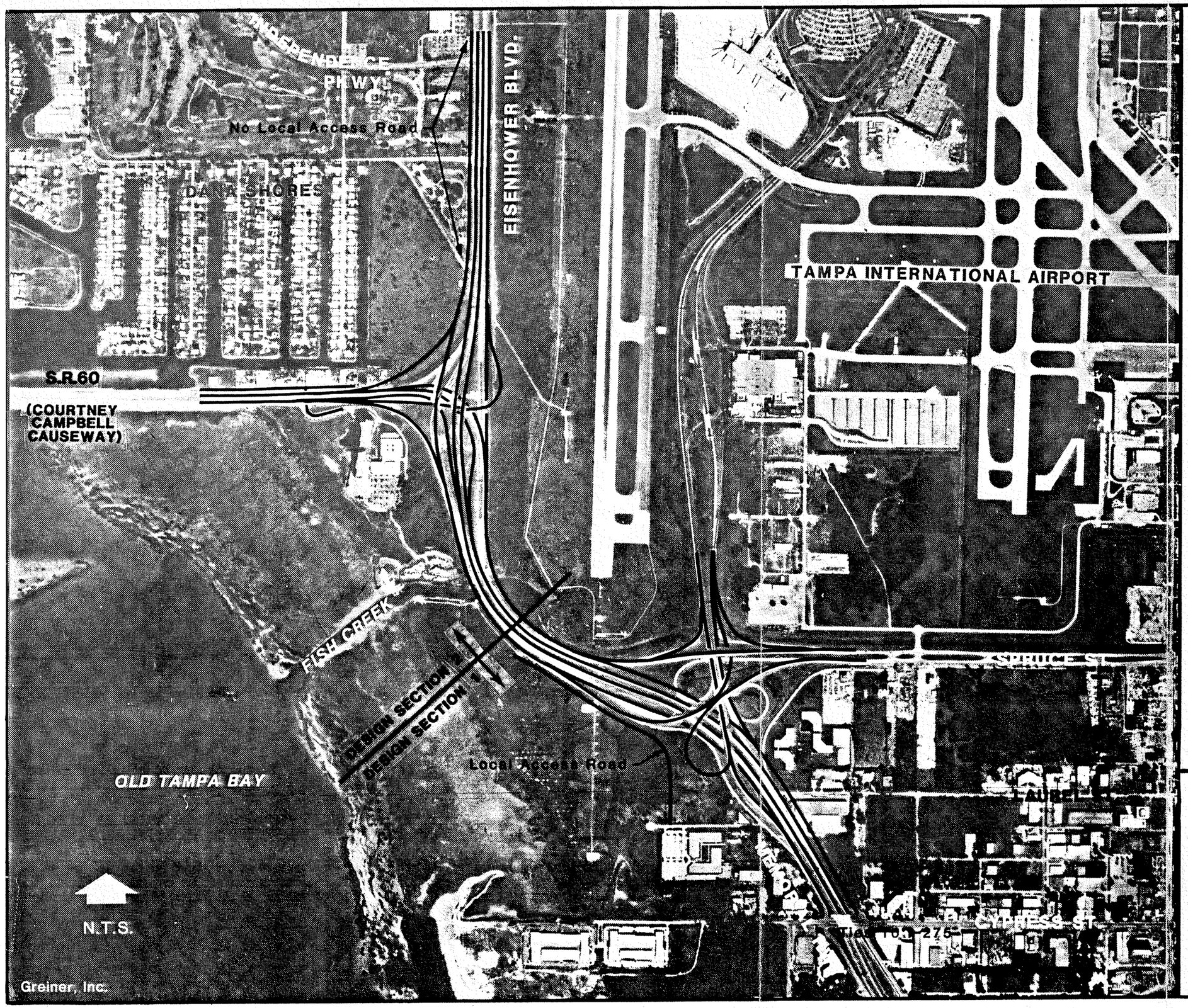
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 1 ALTERNATIVE 2 SCHEMATIC

EXHIBIT 7



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 1 ALTERNATIVE 3 SCHEMATIC

EXHIBIT 8

* Fully directional interchange at TIA with no direct access to Northwest Hillsborough Expressway until I-275 on the south and the Courtney Campbell Causeway Interchange on the north.

* No at-grade intersection at Independence Parkway

* No third parallel runway consideration

Alternative 4 - (A schematic of Alternative 4 is provided on Exhibit 9)

* 4-roadway system

* Fully directional interchange at Courtney Campbell Causeway

* Fully directional interchange at TIA

* Access from TIA to eastbound Spruce Street provided by loop ramps

* Access provided to office park south of airport

* Frontage road provided at Cypress Street

Alternative 5 - (A schematic of Alternative 5 is provided on Exhibit 10).

* Same as Alternative 4 with smaller amount of right-of-way acquisition

Alternative 6 - (A schematic of Alternative 6 is provided on Exhibit 11)

* 4-roadway system

* Fully directional interchange at Courtney Campbell Causeway

* No at-grade intersection at Independence Parkway

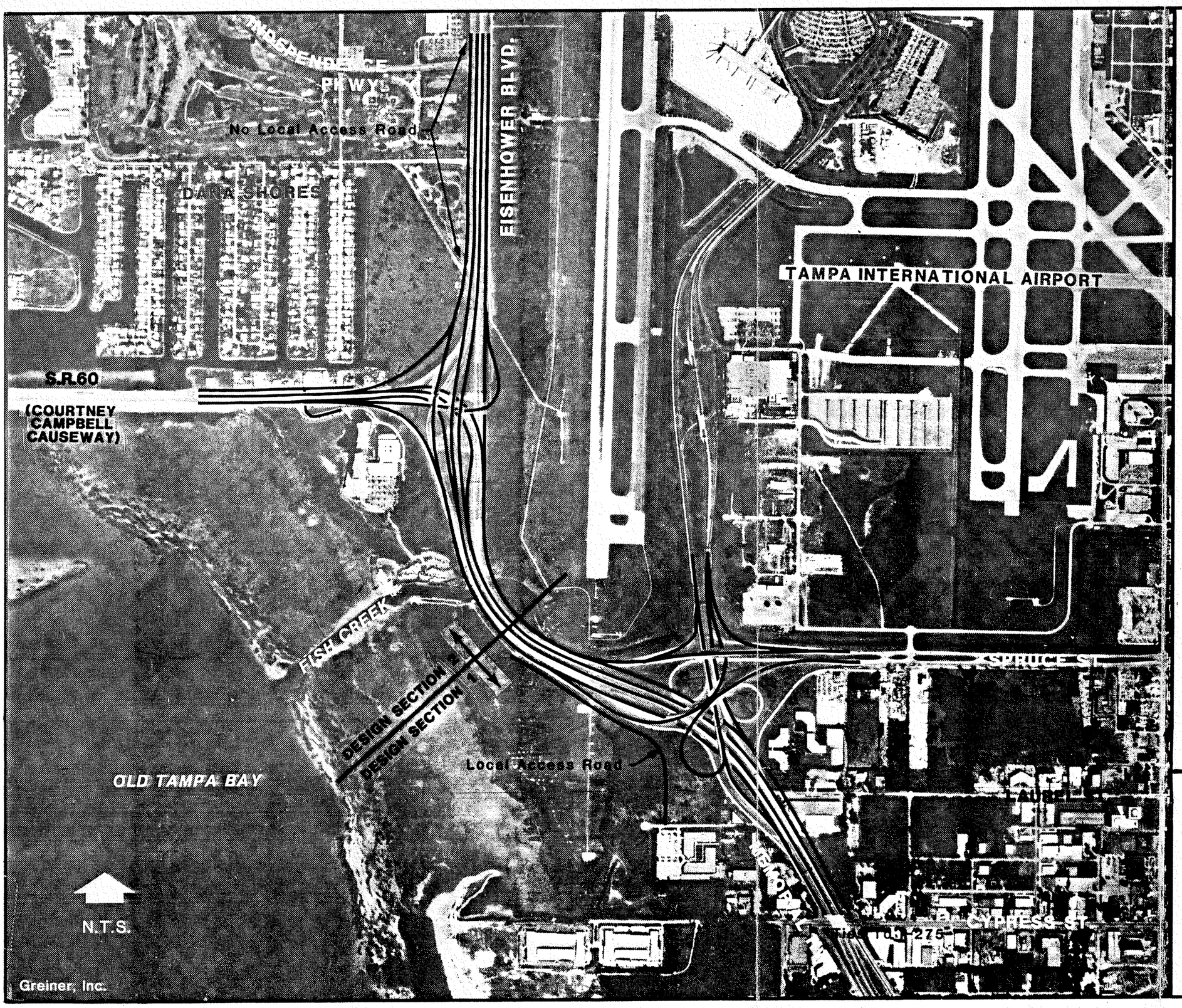
* Smaller amount of right-of-way acquisition

* Ramp leading from Courtney Campbell Causeway heading north pulled in tighter

Alternative 7 - (A schematic of Alternative 7 is provided on Exhibit 12)

* 4-roadway system

* Grade separation at Independence Parkway with access to collector/distributor roadway only



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

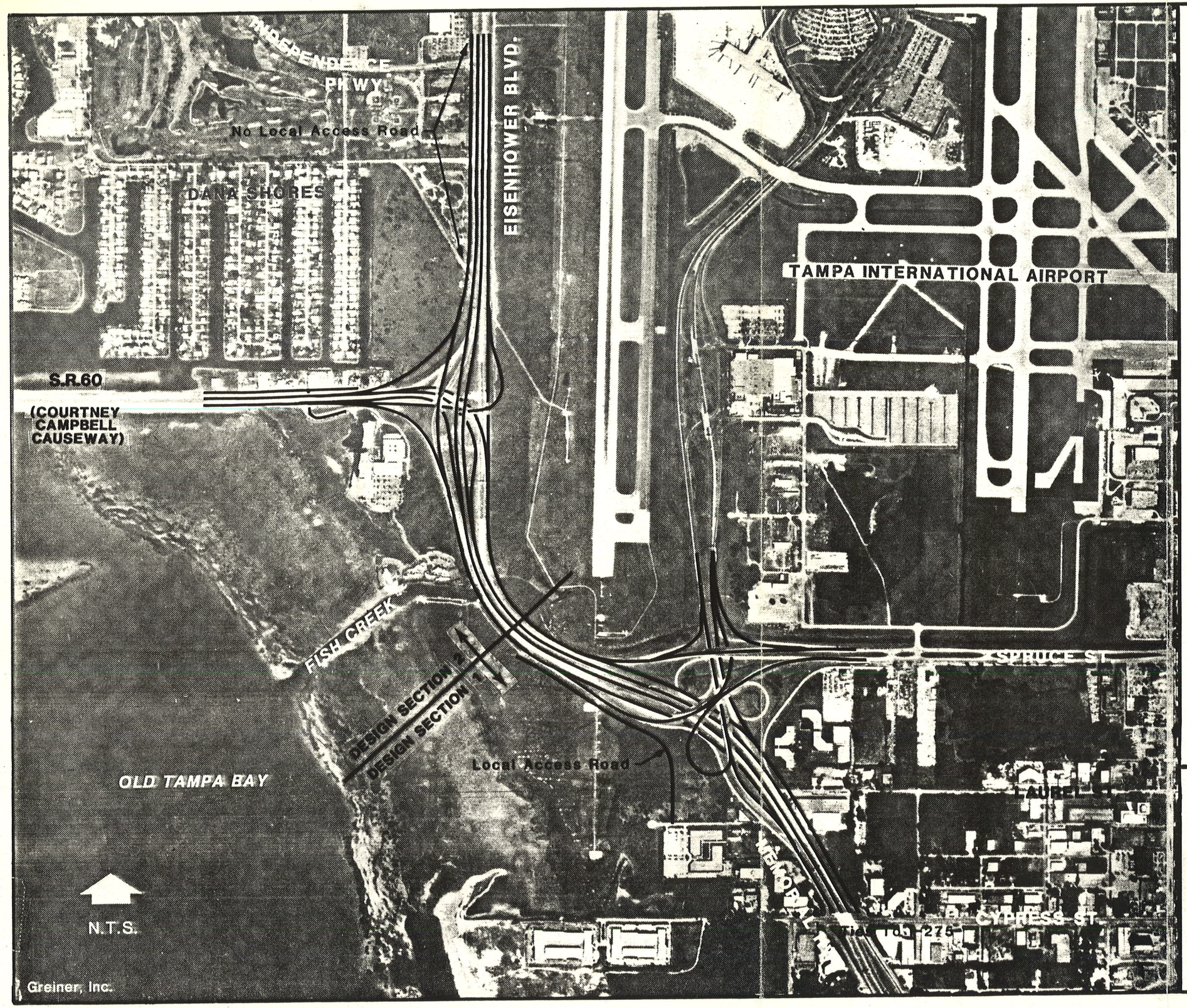
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 1 ALTERNATIVE 4 SCHEMATIC

EXHIBIT 9



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Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

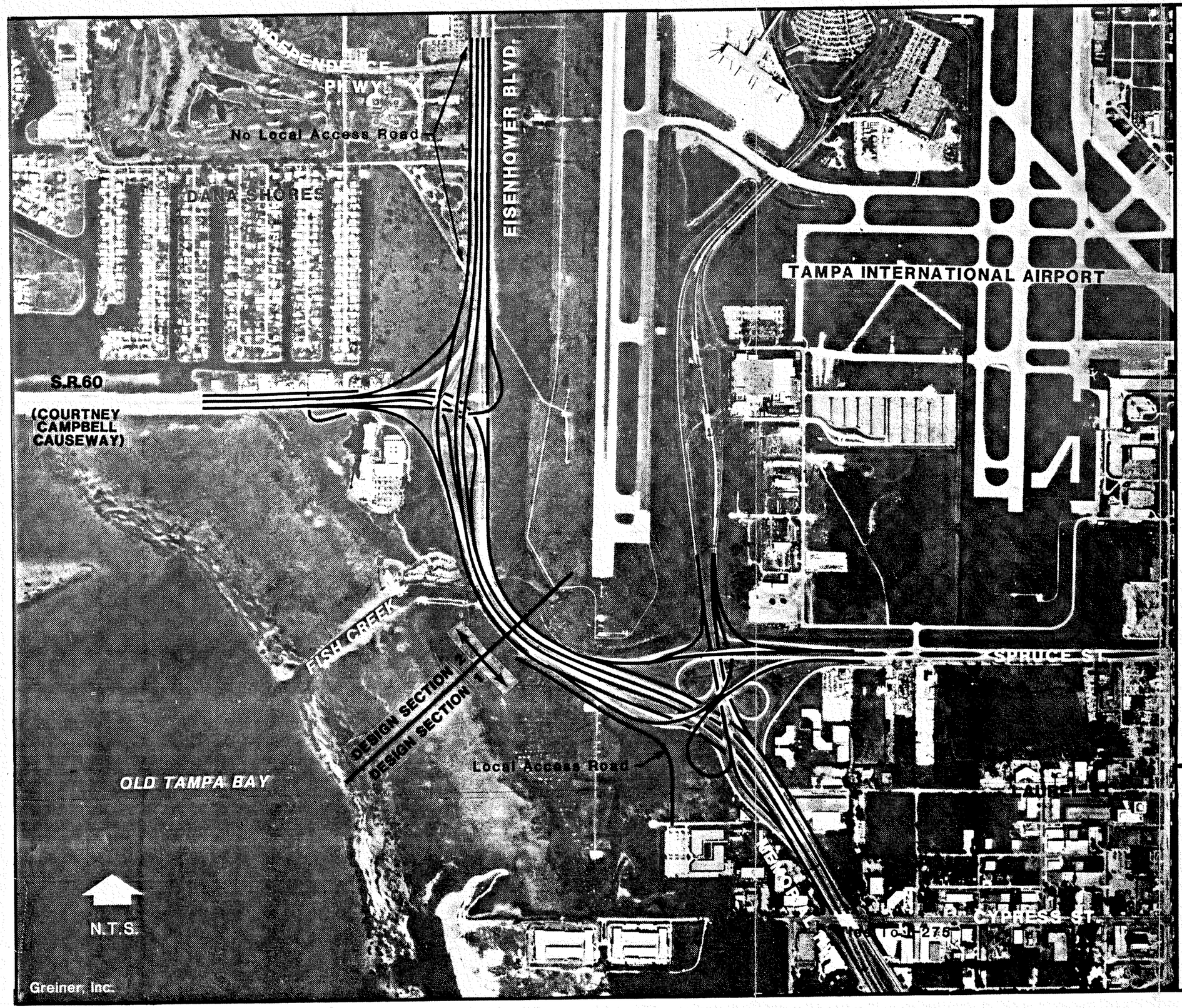
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 1
ALTERNATIVE 5
SCHEMATIC

EXHIBIT 10



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Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

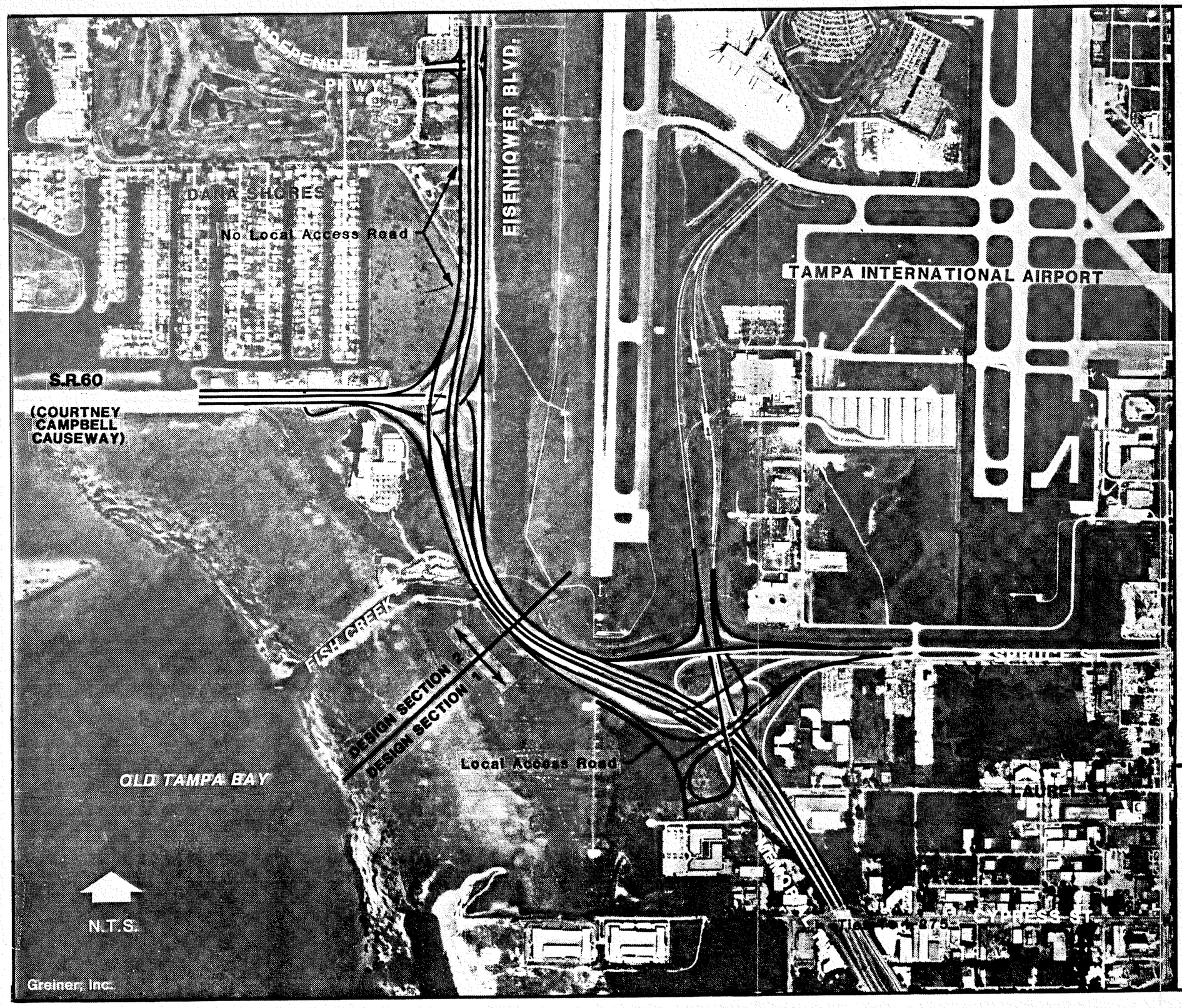
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 1 ALTERNATIVE 6 SCHEMATIC

EXHIBIT 11



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Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 1 ALTERNATIVE 7 SCHEMATIC

EXHIBIT 12

* Fully directional interchange at Courtney Campbell Causeway with at-grade intersection at Hyatt hotel entrance

* Fully directional interchange at TIA with access provided to office park south of TIA

* 3-level interchange at TIA

The evaluation of Tier 1 alternatives is summarized in Table 2. Examination of these tables shows three of the seven alternatives ranked high. No one alternative or alternatives was clearly superior to the others. Rather than continue to carry such a large number of alternatives into the second tier of analysis, the four less superior alternatives were dropped from the evaluation phase. At this point, the three remaining alternatives with specific design modifications were carried into Tier 2 for re-evaluation.

Before the remaining three alternatives were developed for Tier 2, modifications were made to the western portion of project in the vicinity of TIA based on Hillsborough County Aviation Authority future plans. The main concern was to reduce the impact on airport property and facilities by moving the roadway to the west near Courtney Campbell Causeway (S.R. 60), and to increase traffic capacity by improving interchanges in the area by separating airport traffic from expressway traffic.

Several design components were identified for which no determination was made as to the exact positive or negative impacts. It was determined more consideration should be applied to the following design components:

* Height restriction for 3-level structured interchanges

* The location and length of frontage roads

* Type of interchanges at the Courtney Campbell Causeway (S.R. 60) and TIA

TABLE 2
NORTHWEST EXPRESSWAY
SUMMARY EVALUATION MATRIX
TIER 1 ALTERNATIVES

FACTORS	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5	ALT 6	ALT 7
PHYSICAL ENVIRONMENT							
Noise Sensitive Sites	2	2	2	2	2	2	3
Wetlands	2	2	3	3	3	3	3
Permit Difficulty	2	2	3	3	3	3	3
LAND USE							
Major Community Facilities	2	2	3	3	3	3	3
"4F" & Section 106	3	3	3	3	3	3	3
Accessibility/Circulation	2	2	3	3	3	2	2
Relocation	3	2	3	3	3	3	3
ROADWAY							
M.O.T.	2	2	2	3	2	2	3
Part 77/HCAA Ordinance	2	2	2	2	3	3	3
Operational Characteristics	3	2	3	3	3	3	2
COSTS							
Structural/Construction	2	2	2	3	3	3	3
Roadway/Transit	2	2	3	2	3	3	3
Right-of-Way	2	2	2	3	3	3	3
TOTAL	29	27	34	36	37	36	37
AVERAGE	2.2	2.1	2.6	2.8	2.8	2.8	2.8

Matrix Value of 1 = significant negative impacts and/or minimal positive impacts.
Matrix Value of 2 = moderate negative impacts and/or moderate positive impacts.
Matrix Value of 3 = minimal negative impacts and/or significant positive impacts.

* Type of access to Cypress Street area

* Placement of toll facilities

* Location of the westbound Spruce Street on-ramp to the Collector/Distributor (C/D) roadway (south of Fish Creek) to the left

Design components carried forward to Tier 2 were identified as:

* 4-roadway system

* A direct connection from C/D roadway to C/D roadway and from expressway to expressway

* Fully directional interchanges at Courtney Campbell Causeway (S.R. 60) and TIA entrance at Spruce Street

* Grade separated concept at Hyatt hotel entrance on S.R. 60

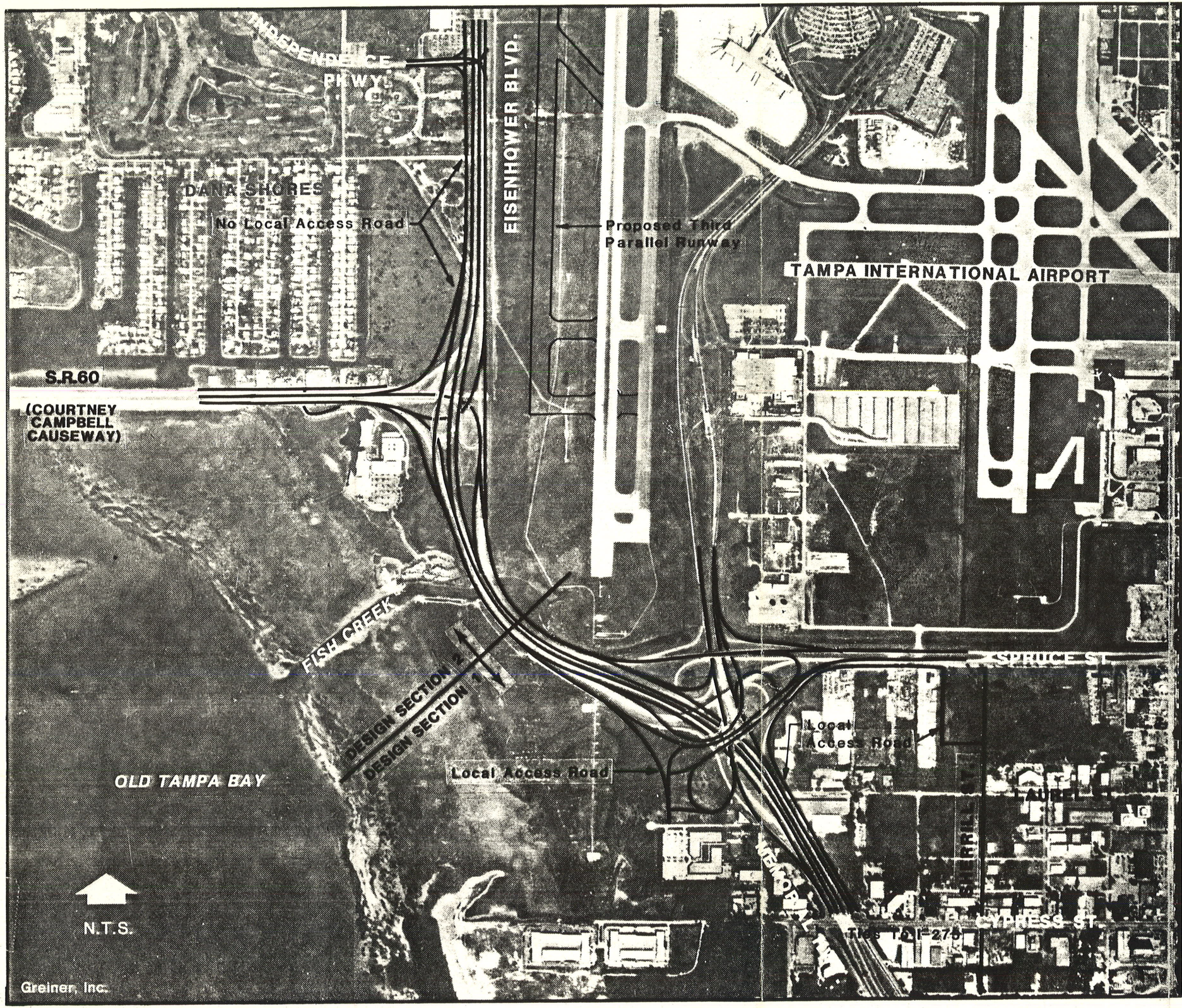
* Minimization of weaving from the northbound Northwest Hillsborough Expressway to westbound Courtney Campbell Causeway (S.R. 60)

The Tier 1 alternatives evaluation resulted in the definition of three new alternatives which included the incorporation of the specific design considerations identified in the screening process. Prior to completion of Tier 2 concepts the HCAA advised the study team and Expressway Authority of its intent to construct a new third parallel north-south runway approximately 700 feet west of the current 36L/18R runway. This TIA revision caused the shift of all Tier 2 horizontal and vertical alignments. The alternatives to be evaluated in Tier 2 were renumbered 1, 2 and 3. These alternatives are modifications of Tier 1 alternatives 1, 2, and 3, respectively. Descriptions of each of the Tier 2 concept alternatives are as follows:

TIER 2 ALTERNATIVES

Alternative 1 - (A schematic of Alternative 1 is provided in Exhibit 13)

* 4-roadway system at Cypress Street



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 2 ALTERNATIVE 1 SCHEMATIC

EXHIBIT 13

* 4-roadway system at Independence Parkway

* Fully directional interchange at TIA entrance at Spruce Street

* Northwest Hillsborough Expressway bridges north and southbound were shifted to west for compliance with FAR Part 77 relating to 3rd runway

* Grade separation at Hyatt hotel entrance on Courtney Campbell Causeway (S.R. 60)

* One-way frontage roads provided on south side of expressway pulling off from Spruce Street exit ramps

Alternative 2 - (A schematic of Alternative 2 is provided in Exhibit 14)

* 4-roadway system at Cypress Street

* 4-roadway system at Independence Parkway

* Fully directional interchange at TIA entrance at Spruce Street

* Grade separation at Hyatt hotel entrance on Courtney Campbell Causeway (S.R. 60)

* Northbound toll plaza located 300 feet north of southbound toll plaza

Alternative 3 - (A schematic of Alternative 3 is provided in Exhibit 15)

* 4-roadway system at Cypress Street

* 4-roadway system at Independence Parkway

* Fully directional interchange to and from TIA

* Fully directional interchange at Courtney Campbell Causeway (S.R. 60)

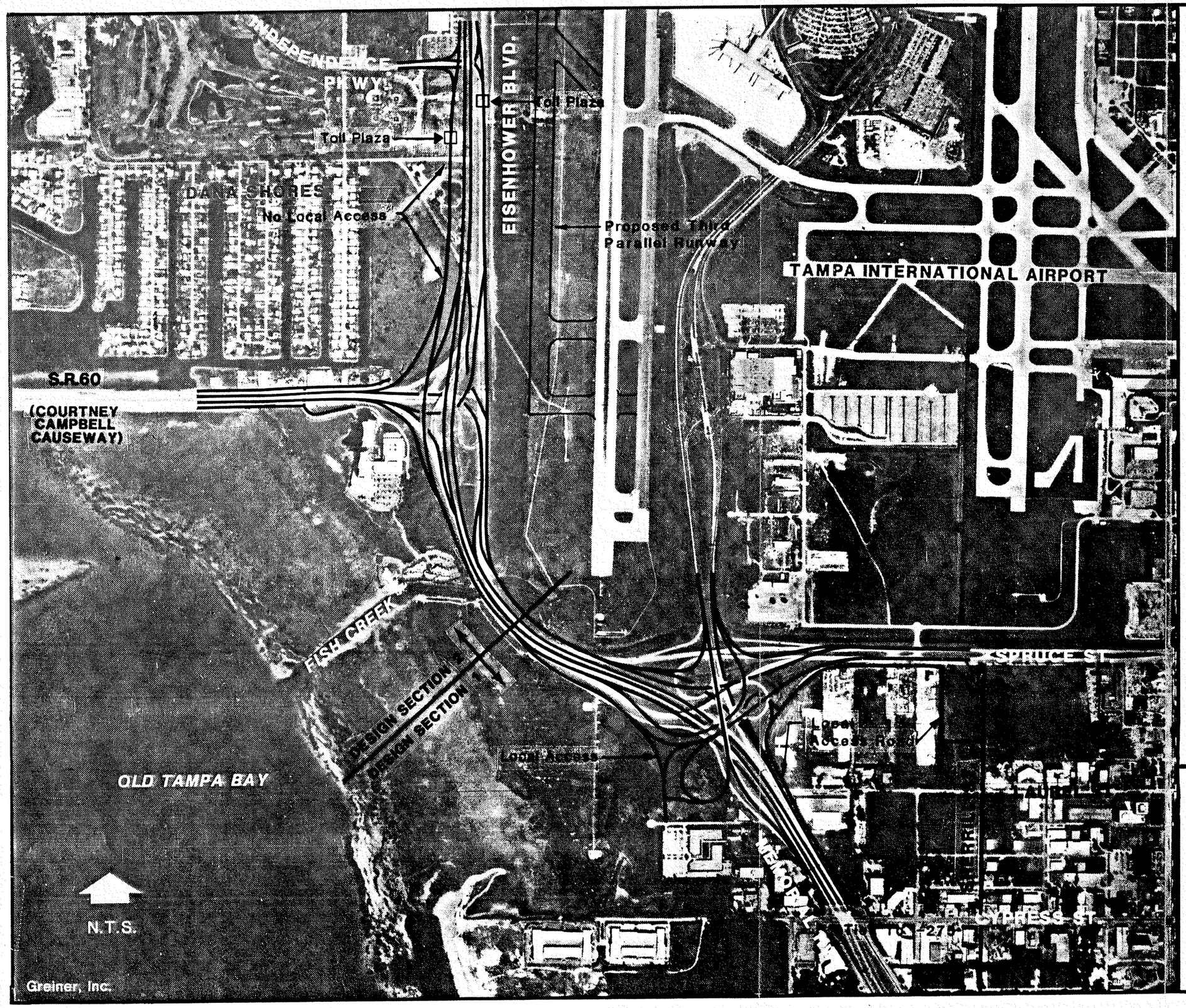
* Access provided to office park area south of TIA interchange to and from the north

* Collector/distributor tolls provided south of Independence Parkway

* Grade separation at Independence Parkway

* Frontage roads not connected at Sherrill Street

* Bridge shifted for compliance with FAR Part 77.



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

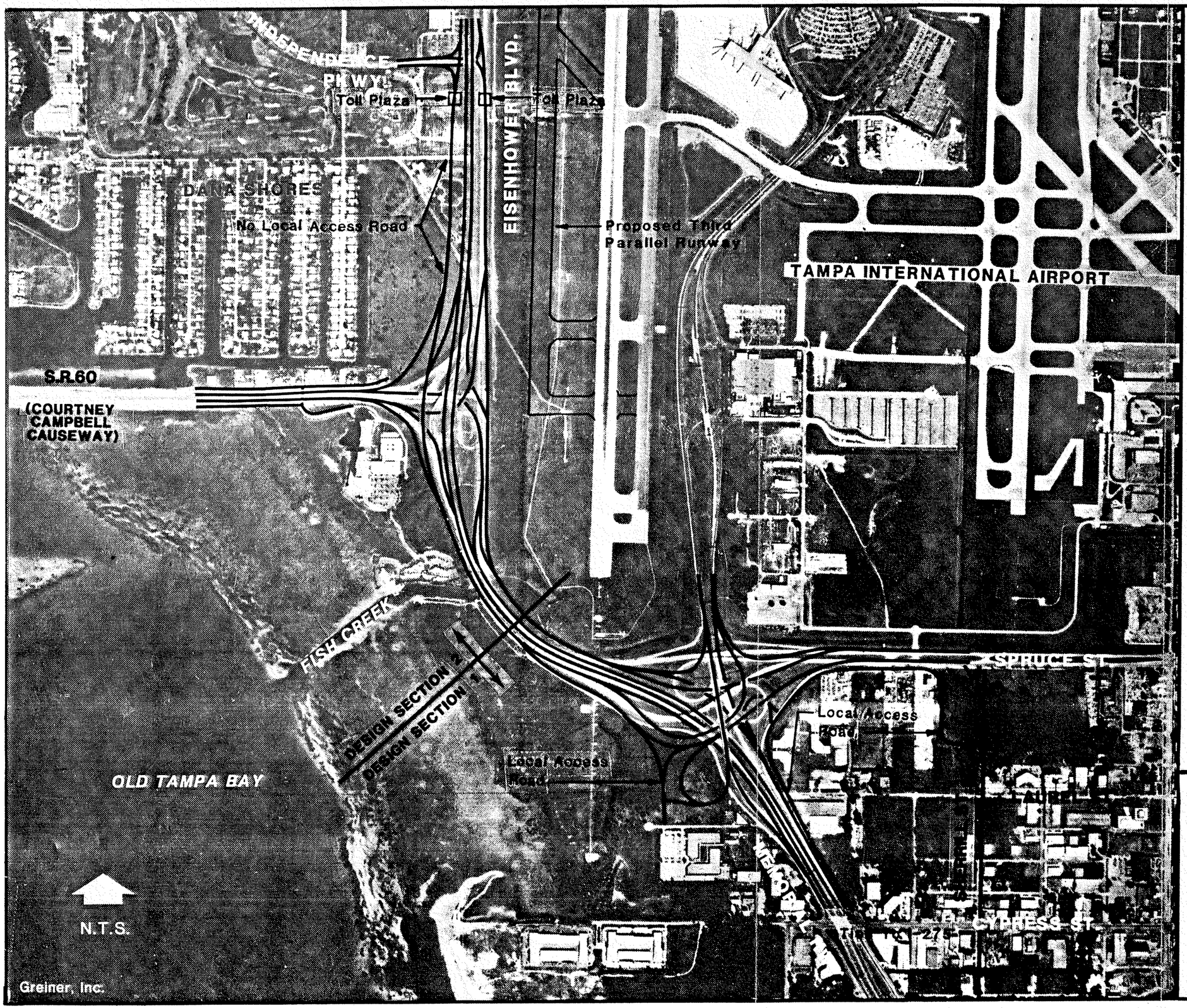
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 2 ALTERNATIVE 2 SCHEMATIC

EXHIBIT 14



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 2 ALTERNATIVE 3 SCHEMATIC

EXHIBIT 15

Examination of Table 3 indicated Alternative 3 had a significantly higher score than the other two alternatives and would be carried forward to the Tier 3 analysis after minor design modifications were made. These modifications included:

* Provision of the right-on scenario to the C/D and Spruce Street with Spruce tying into the C/D on the left at TIA.
* Provision of the right-on scenario to the C/D and Spruce Street with Spruce Street coming in on the right of C/D. This modification will be developed with C/D back up against mainline.
* Reduction of the interchange configurations to minimize right-of-way acquisition.
* Providing return access from office park area north of Northwest Hillsborough Expressway via loop ramps at Sherrill Street Extension.
* Elimination of bridge structure intrusion into third parallel runway FAR Part 77 surface.

Prior to the final definition of Tier 3 alternatives, Greiner was informed by the Expressway Authority Consultant (HNTB) to change the proposed limits of the Phase 1A Master Plan. These limits are as follows:

* Limit to north of Cypress Street to exclude Cypress Street bridge, except straddle bent portion on the west to south of Cypress Street.
* Limit to south of Fish Creek to not include Fish Creek structures.

During the evaluation and development of Tier 3 alternatives, contacts with Tampa Hillsborough County Expressway Authority (THCEA), Florida Department of Transportation (FDOT), Post Buckley Schuh and Jernigan (PBS&J), Howard Needles Tammen & Bergendoff (HNTB), and the Kaiser Engineers were initiated for review and comments. The study team was convinced that the only feasible way to improve traffic flow for the longer distance trip could only be realized through the implementation of a 4-roadway controlled access freeway. Consequently the following

TABLE 3
NORTHWEST EXPRESSWAY
SUMMARY EVALUATION MATRIX
TIER 2 ALTERNATIVES

FACTORS	ALT 1	ALT 2	ALT 3
PHYSICAL ENVIRONMENT			
Noise Sensitive Sites	2	2	2
Wetlands	2	2	3
Permit Difficulty	2	2	3
LAND USE			
Major Community Facilities	2	2	3
"4F" & Section 106	3	3	3
Accessibility/Circulation	2	2	3
Relocation	3	2	3
ROADWAY			
M.O.T.	2	2	2
Part 77/HCAA Ordinance	2	2	2
Operational Characteristics	3	2	3
COSTS			
Structural/Construction	2	2	2
Roadway/Transit	2	2	3
Right-of-Way	2	2	2
TOTAL	29	27	34
AVERAGE	2.2	2.1	2.6

Matrix Value of 1 = significant negative impacts and/or minimal positive impacts.
Matrix Value of 2 = moderate negative impacts and/or moderate positive impacts.
Matrix Value of 3 = minimal negative impacts and/or significant positive impacts.

Tier 3 alternatives were developed based on specific engineering and design component modifications from Tier 2:

TIER 3 ALTERNATIVES

Alternative 1 (A schematic of Alternative 1 is provided in Exhibit 16)

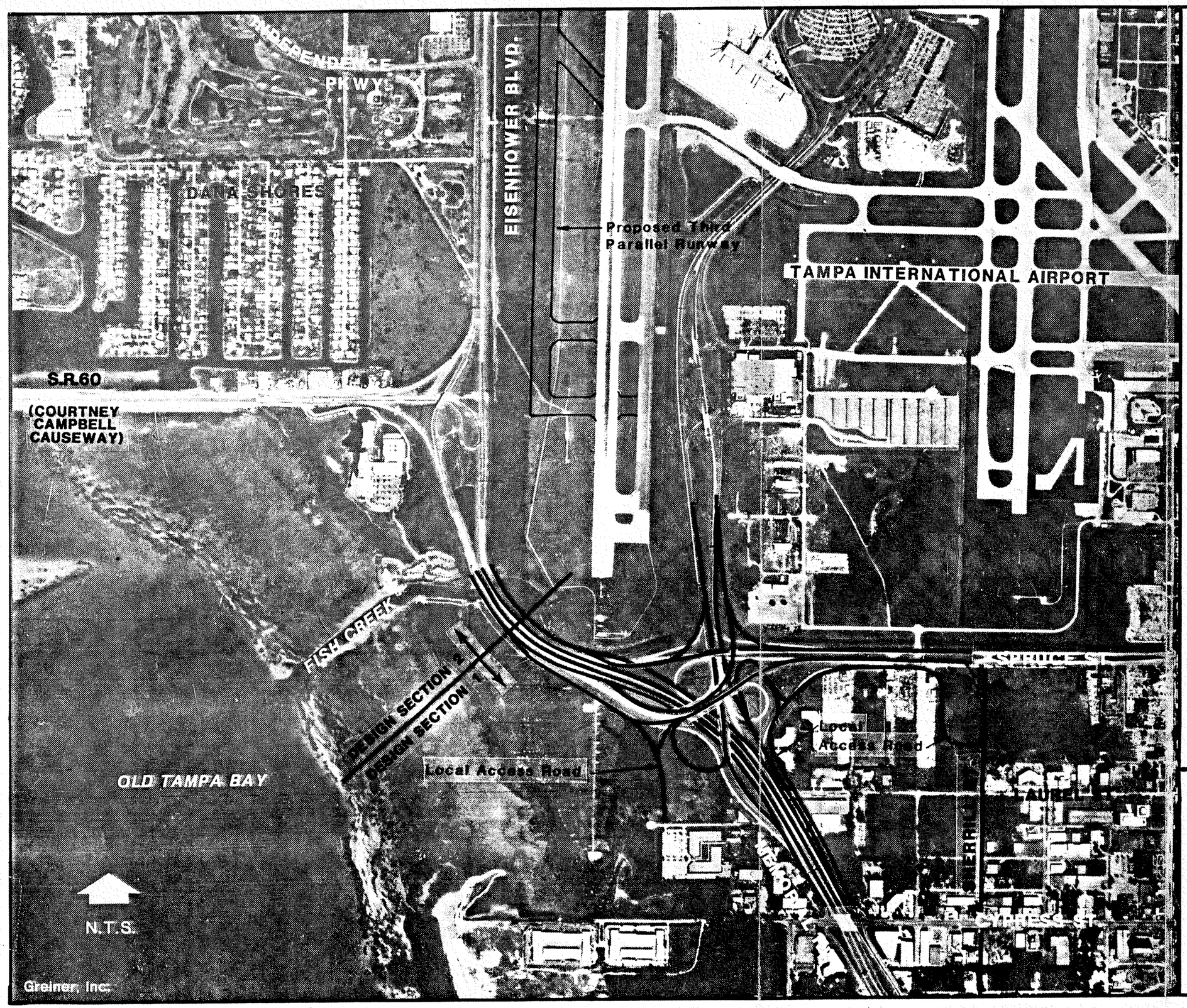
* 4-roadway system at Cypress Street
* Fully directional interchange to and from TIA
* Access provided to office park area south of TIA interchange to and from the north
* Direct access northbound to office park north of Northwest Expressway via loop ramps (Return is provided via Sherrill Street Extension)
* Compliance with FAR Part 77

Alternative 2 (A schematic of Alternative 2 is provided in Exhibit 17)

* 4-roadway system at Cypress Street
* Fully directional interchange to and from TIA
* Access provided to office park area south of TIA interchange to and from the north
* Direct access northbound to office park north of Northwest Expressway via loop ramps (Return is provided via Sherrill Street Extension)
* Compliance with FAR Part 77
* Right-on to the C/D and Spruce Street with Spruce Street coming in on the right of C/D.
* C/D back up against mainline

Alternative 3 (A schematic of Alternative 3 is provided in Exhibit 18)

* 4-roadway system at Cypress Street
* Fully directional interchange to and from TIA
* Access provided to office park area north of TIA interchange to and from the north



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

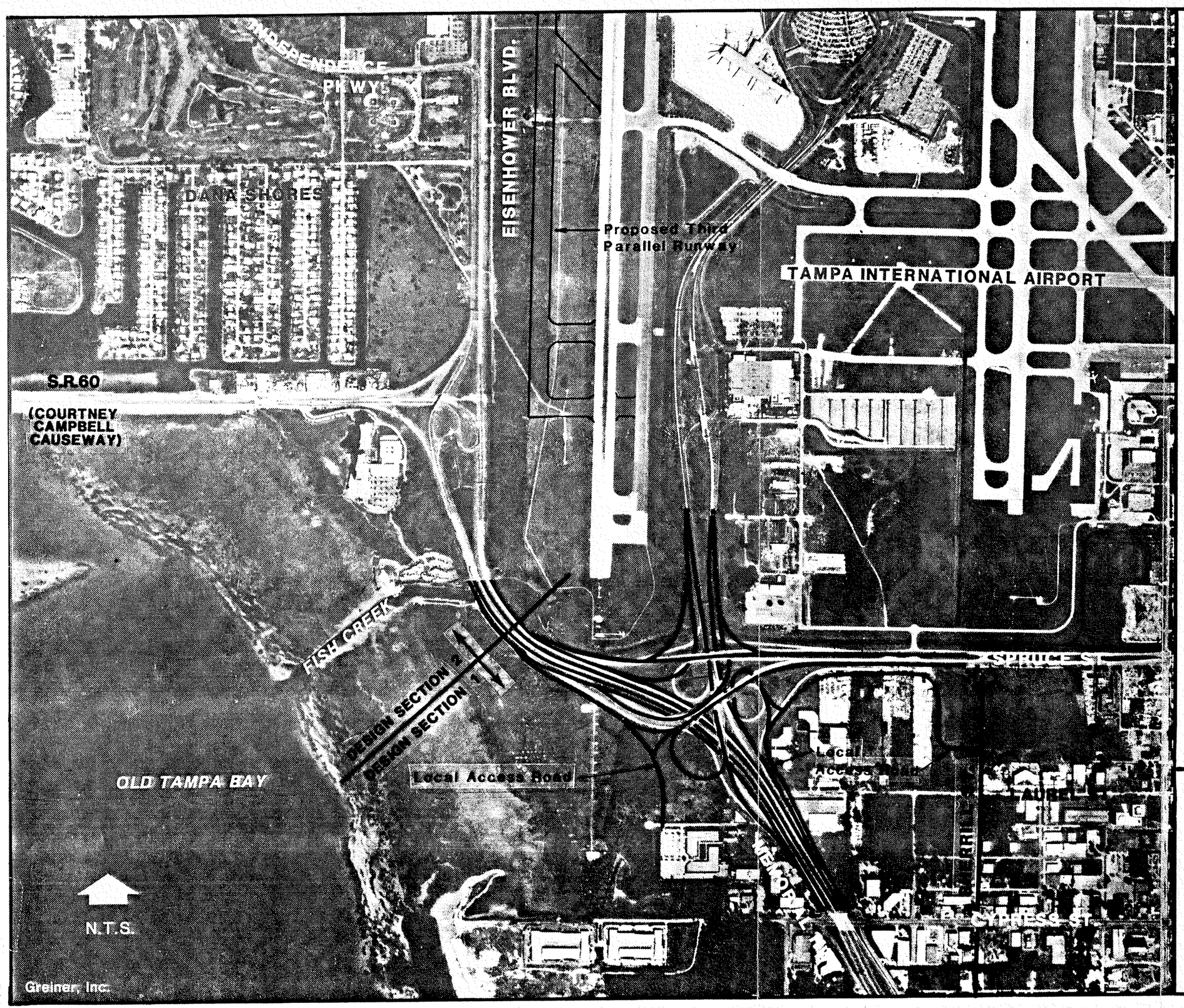
MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 3 ALTERNATIVE 1 SCHEMATIC

EXHIBIT 16



LEGEND

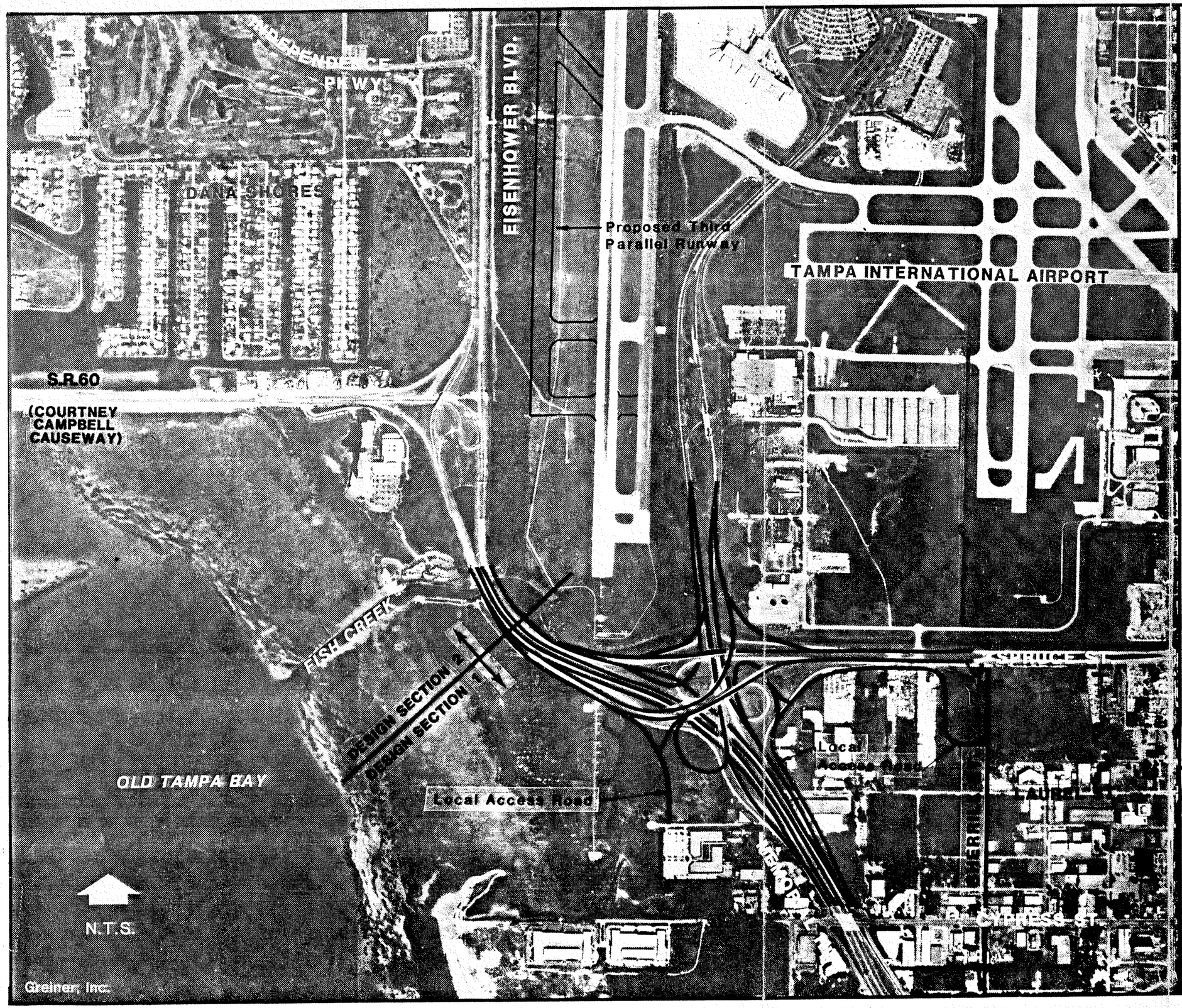
Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)
NORTHWEST EXPRESSWAY
Hillsborough County, Florida

TIER 3 ALTERNATIVE 2 SCHEMATIC

EXHIBIT 17



LEGEND

Proposed Roadway

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

MASTER PLAN REPORT (PHASE 1A)

NORTHWEST EXPRESSWAY

Hillsborough County, Florida

TIER 3 ALTERNATIVE 3 SCHEMATIC

EXHIBIT 18

* Direct access northbound to office park north of Northwest Expressway via loop ramps (Return is provided via Sherrill Street Extension)
* Compliance with FAR Part 77
* Right-on scenario the Spruce Street with left-on at C/D
* Spruce Street ties into C/D on the right

The evaluation of Tier 3 alternatives is summarized in Table 4. Examination of these table found on Page 16, indicates that Alternative 1 ranked higher than the two remaining alternatives.

Due to a series of meetings with PBS&J, Kaiser Engineers, HNTB, FDOT, City of Tampa, and Tampa-Hillsborough County Expressway Authority, Alternative 1 (Tier 3) was refined and identified as the Draft Master Plan Concept. The Draft Master Plan incorporated the following post Tier 3 refinements:

* Six lanes to and from TIA at its Spruce Street interchange
* Three lanes in each direction on the Northwest Expressway mainline
* Split the two-lane TIA exit ramp with the right lanes serving the C/D to Northwest Expressway movement and the left lane serving the C/D to S.R. 60 (Courtney Campbell Causeway) movement.

As a result of feedback and subsequent refinements to the Draft Plan, this concept was identified as the preferred consensus alternative. The evaluation of the Master Plan Concept is summarized in Table 5. The alternative described herein as the Northwest Hillsborough Expressway Master Plan Concept will provide increased roadway capacity and a high level of service. Exhibit 21 provided later in this report, depicts the actual design configuration of the recommended alternative. A brief description of the Phase 1A Master Plan Concept is as follows:

TABLE 4
NORTHWEST EXPRESSWAY
SUMMARY EVALUATION MATRIX
TIER 3 ALTERNATIVES

FACTORS	ALT 1	ALT 2	ALT 3
PHYSICAL ENVIRONMENT			
Noise Sensitive Sites	3	3	3
Wetlands	2	2	2
Permit Difficulty	2	2	2
LAND USE			
Major Community Facilities	3	3	3
"4F" & Section 106	3	3	3
Accessibility/Circulation	3	2	2
Relocation	3	2	2
ROADWAY			
M.O.T.	2	3	2
Part 77/HCAA Ordinance	2	2	2
Operational Characteristics	3	2	2
COSTS			
Structural/Construction	3	3	2
Roadway/Transit	2	2	2
Right-of-Way	2	2	2
TOTAL	33	31	29
AVERAGE	2.5	2.4	2.2

Matrix Value of 1 = significant negative impacts and/or minimal positive impacts.
Matrix Value of 2 = moderate negative impacts and/or moderate positive impacts.
Matrix Value of 3 = minimal negative impacts and/or significant positive impacts.

TABLE 5
NORTHWEST EXPRESSWAY
SUMMARY EVALUATION MATRIX
MASTER PLAN CONCEPT

FACTORS	
PHYSICAL ENVIRONMENT	
Noise Sensitive Sites	2
Wetlands	2
Permit Difficulty	2
LAND USE	
Major Community Facilities	3
"4F" & Section 106	3
Accessibility/Circulation	3
Relocation	2
ROADWAY	
M.O.T.	2
Part 77/HCAA Ordinance	3
Operational Characteristics	3
COSTS	
Structural/Construction	2
Roadway/Transit	2
Right-of-Way	2
TOTAL	31
AVERAGE	2.4

Matrix Value of 1 = significant negative impacts and/or minimal positive impacts.
Matrix Value of 2 = moderate negative impacts and/or moderate positive impacts.
Matrix Value of 3 = minimal negative impacts and/or significant positive impacts.

PHASE 1A MASTER PLAN CONCEPT

* 4-roadway system at Cypress Street
* Fully directional interchange to and from TIA
* Access provided to office park area south of TIA interchange to and from the north
* Direct access northbound to office park north of Northwest Expressway via loop ramps (Return is provided via Sherrill Street Extension)
* Spruce street to Northwest Expressway northbound provides left on
* Six lanes to and from TIA.
* Northwest Expressway mainline has 3 lanes in each direction
* Northwest Expressway C/D maintains 5 lanes each way

ASSESSMENT OF THE MASTER PLAN CONCEPT

The following sections of this report provide a detailed assessment of the factors used to evaluate the recommended Master Plan Concept. These factors include, but are not limited to, traffic operations, capacity impacts, maintenance of traffic, and environmental considerations.

DESIGN YEAR TRAVEL FORECASTS

Year 2010 Average Daily Traffic (ADT) volumes were estimated using the validated standard model (FSUTMS) for Hillsborough County, as supplied by the Florida Department of Transportation (FDOT), and refined as a part of the Department's on-going Tampa Interstate Study. The input data for this model were supplied by the Hillsborough County City-County Planning Commission and by FDOT. This data

consisted of 2010 socio-economic data for the study area and a 2010 highway network. The 2010 highway network was refined by coding distinct links on the Interstate system for each direction of travel.

A comparison of the inter-county traffic assignment results from the Howard Frankland Bridge (HFB) Traffic Study and the external station traffic volumes used in the Tampa Interstate Study Tier 1 simulations was made to evaluate travel on the inter-county routes including the Gandy Bridge, Howard Frankland Bridge and Courtney Campbell Causeway (S.R. 60). This comparison was made at the Hillsborough/Pinellas County Line. Based on the results of the various modeling scenarios and an analysis of the lane requirements for the Courtney Campbell Causeway, the external station volumes for the Tampa Interstate Study model were adjusted to reflect 47,000 ADT one-way on the Courtney Campbell Causeway (S.R. 60). In addition, the Linebaugh Extension (which is included in the current 2010 Transportation Plan) was incorporated in the analysis. The Average Daily Traffic (ADT) volumes shown on Exhibit A are the ADT volumes obtained from the Tier 3 computer simulations of the Tampa Interstate Study and have been rounded to the nearest hundred vehicles. A special generator for the Tampa International Airport was added prior to the Tier 3 simulations to better simulate the travel demand in this area and to reflect the traffic forecasts projected by the Hillsborough County Aviation Authority. See Exhibit 19 for the Year 2010 design traffic assignments for the final Master Plan Concept.

Directional design hour volumes were derived using a K-factor (percentage of daily traffic on the roadway during the peak hour) of 9.0 percent and a directional distribution factor (D-factor) of 55.0 percent. The major direction flow of traffic

OLD TAMPA BAY

S.R. 60

FRONTAGE RD.

INDEPENDENCE PARKWAY

COLLECTOR DISTRIBUTOR FREEWAY

RAMP "A"

RAMP "B"

LASALLE STREET

FISH CREEK

N.W. EXPRESSWAY

RAMP "N"

RAMP "L"

RAMP "K-1"

LOOP "K"

RAMP "D"

RAMP "F"

RAMP "F-1"

RAMP "C"

RAMP "G"

RAMP "E"

LOOP "H"

FRONTAGE RD.

TAMPA INTERNATIONAL AIRPORT ENTRANCE

TIA PERIMETER ROAD

KENNEDY BLVD.

I-275

SHERRILL STREET

CYPRESS ST.

LAUREL ST.

℄ PROPOSED SHERRILL STREET

SPRUCE ST.

45,000 (4,460)
45,000 (4,460)
27,000 (2,680)
18,000 (1,780)
11,600 (1,150)
65,400 (6,470)
34,900 (3,460)
34,900 (3,460)
11,600 (1,150)
29,600 (2,930)
47,400 (4,690)
15,400 (1,530)
13,600 (1,350)
13,600 (1,350)
18,000 (1,780)
47,400 (4,690)
15,400 (1,530)
62,800 (6,220)
23,300 (2,310)
23,300 (2,310)
62,800 (6,220)
9,700 (960)
9,700 (960)
65,400 (6,470)
28,900 (2,860)
30,600 (3,040)
25,400 (2,510)
12,700 (1,260)
27,300 (2,700)
750 (70)
500 (50)
750 (70)
12,800 (1,270)
1500 (150)
17,300 (1,720)
44,600 (4,420)
34,900 (3,460)
34,900 (3,460)
46,100 (4,570)
18,800 (1,870)
27,300 (2,700)
6,300 (630)
4,800 (480)
36,500 (3,610)
9,200 (910)
3,500 (350)
17,300 (1,720)
43,300 (4,300)
43,300 (4,300)
13,300 (1,320)
25,400 (2,510)
1,500 (150)
25,500 (2,530)
38,200 (3,780)
38,200 (3,780)
11,000 (1,090)
11,500 (1,140)

LIMIT OF SEGMENT-PHASE 1A
MASTER PLAN BY GREINER INC.
STATE PROJECT NO. 10000-1531
STA. 322+00

MASTER PLAN BY
POST, BUCKLEY, SCHUH & JERNIGAN
STA. 322+00

TAMPA INTERSTATE
MASTER PLAN BY GREINER INC.
STATE PROJECT NO. 99007-1402
STA. 236+10

LIMIT OF SEGMENT-PHASE 1A
MASTER PLAN BY GREINER INC.
STATE PROJECT NO. 10000-1531
STA. 273+00 AHD.

LIMIT OF SEGMENT-PHASE 1A
MASTER PLAN BY GREINER INC.
STATE PROJECT NO. 10000-1531

0 400 800
Graphic Scale in Feet

LEGEND

65,400 (6,470)

DIRECTIONAL DESIGN HOUR VOLUME
(ROUNDED TO THE NEAREST 10 VEHICLES)

AVERAGE DAILY ONE-WAY TRAFFIC VOLUME
(ROUNDED TO THE NEAREST 100 VEHICLES)

REVISIONS	
DATES	DESCRIPTIONS
3-1-89	FINAL MASTER PLAN CONCEPT

PROJECT NO. C1255.00

	NAME	DATE
DESIGNED BY	MMC	2-15-89
CHECKED BY	RWG	2-22-89
QUANTITIES BY		

GREINER, INC.
CONSULTING ENGINEERS
AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT
DESIGN YEAR 2010 TRAFFIC ASSIGNMENTS

NORTHWEST HILLSBOROUGH EXPRESSWAY PHASE 1-A STUDIES

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

STATE PROJECT NO. 10000-1531 | EXHIBIT 19

during the peak hour was assumed to be southbound and eastbound in the morning peak hour and westbound and northbound in the evening peak hour. The Year 2010 directional design hour volumes (DDHV's) are also shown in Exhibit 19 and have been rounded to the nearest ten vehicles.

BASIC LANE REQUIREMENTS

Prior to determining the lane requirements for each of the segments within the Northwest Hillsborough Expressway Master Plan Study Area, it was necessary to determine the maximum service flow rate that can be accommodated at Level of Service (LOS) D. Based on the results of an extensive analysis of service flow rates and level of service conducted as part of the Tampa Interstate Study, maximum hourly service flow rates for LOS D equal to 1,870 passenger cars per hour per lane (pcphpl) and 1,785 pcphpl were used in the design of facilities with 60 mile per hour (mph) and 50 mph design speeds, respectively. A design hour flow rate of 1,808 pcphpl was used in the design of the Northwest Hillsborough Expressway which is slightly over 80 percent of the 60 mph design speed LOS D range as defined in the Tampa Interstate Study. A design hour flow rate of 1,710 pcphpl was used in the design of the collector-distributor roadway which is slightly over 75 percent of the 50 mph design speed LOS D range as defined in the Tampa Interstate Study.

These maximum flow rates are affected by factors such as lane widths, shoulder widths, grade, percentage of heavy vehicles, driver's familiarity with the system and peak hour factor. For this study, it was assumed that the lane widths and shoulder widths would meet current design standards and hence, would not affect the lane capacities. However, it was assumed that the heavy vehicle volume (i.e., trucks, buses

and RV's) would be 3 percent of the total vehicular volume during the design hour. It was also assumed that the general terrain could be classified as level terrain. These two assumptions resulted in the use of a heavy vehicle adjustment factor (f_{hv}) of 0.98.

To obtain a driver composition for the Northwest Hillsborough Expressway Master Plan study area, it was assumed that most of the drivers using the facility during the design hour would be commuters. However, because of the interchange serving Tampa International Airport and the tourist and recreational nature of the land uses (beaches) that are accessed via the Courtney Campbell Causeway (S.R. 60), there will be enough tourist and/or seasonal traffic to cause a reduction in the maximum service flow rate. For this analysis, a value of 0.98 was used for the driver population adjustment factor to account for the effect that unfamiliar drivers have on maximum service flow rates.

Using these assumptions, along with a peak hour factor (PHF) of 0.95, resulted in the following hourly service flow rates:

* Service Flow Rate at LOS D for 60 mile per hour design speed = 1,650 vehicles per lane
* Service Flow Rate at LOS D for 50 mile per hour design speed = 1,560 vehicles per lane

The number of lanes required to provide LOS D on the Northwest Hillsborough Expressway and the collector/distributor roadway was then determined by dividing the 2010 DDHV's by 1,650 vehicles per lane and 1,560 vehicles per lane, respectively.

TRAFFIC OPERATIONS ANALYSIS

Using the 2010 DDHV's and the methodologies outlined in Chapter Four - Weaving Areas and Chapter Five - Ramps and Ramp Junctions of the 1985 Highway Capacity Manual (HCM), traffic operations analyses were conducted for the Northwest Hillsborough Expressway Master Plan Concept. The maximum recommended merge and diverge volumes and level of service criteria developed previously for use in the Tampa Interstate Study was also used in this study. The results of the ramp merge and diverge analyses are listed in Table 6, and the results of the weaving area analyses are shown in Table 7. As shown in the tables, the Master Plan Concept will operate at an acceptable LOS D or better during peak hours in the design year (2010).

The final conceptual design shown in the Master Plan resulted from a series of geometric design/operational analysis iterations. Originally, a two-roadway concept was considered. The estimated travel demand on this facility, however, would require more than five basic lanes per direction to provide LOS D. As a result, various four-roadway alternative concepts were considered and evaluated.

The ramp locations in the final Master Plan Concept were determined based on both geometric and operational considerations. Several conclusions were reached as a result of operational analyses conducted. The following summarizes these conclusions:

a) The southbound off-ramp to Spruce Street and the southbound off-ramp to TIA are on separate structures to eliminate any weaving between these two traffic flows.

TABLE 6

2010 TRAFFIC OPERATIONS ANALYSIS ON RAMP JUNCTIONS

Location[1]	Direction	Ramp Volume (in vph)	Merge Volume (in pcph)	Merge LOS[2]	Diverge Volume (in pcph)	Diverge LOS[2]
On-Ramp 'F' from TIA to C-D roadway	NB	913	1,001	B	--	--
On-Ramp 'F-1' from TIA to Spruce Street	NB	346	1,452	C	--	--
Loop-Ramp 'K" from TIA exit roadway to Spruce Street	SB	1,319	--	--	1,009/861	B/B
Off-Ramp 'K-1' from Spruce Street Loop Ramp 'K'	SB	1,269	--	--	1,391	C
On-Ramp 'G' from Spruce Street to TIA entrance roadway	NB	1,319	1,446	C	--	--
Loop-Ramp 'K' from TIA exit roadway to Spruce Street	SB	1,269	1,391	C	--	--
Loop-Ramp 'H' from TIA entrance roadway to Frontage Road	NB	150	--	--	981	B

1 See Exhibit 19 (Master Plan) for location of various ramps

2 Merge and Diverge Level of Service based on the following Tampa Interstate Study criteria:

LOS	Merge Volume (pcph)	Diverge Volume (pcph)
A	≤ 660	≤ 715
B	≤ 1,100	≤ 1,155
C	≤ 1,595	≤ 1,650
D	≤ 1,925	≤ 1,980
E	≤ 2,200	≤ 2,200

TABLE 7

2010 TRAFFIC OPERATIONS ANALYSIS ON WEAVING AREAS

Location[1]	Direction	Average Weaving Speed (in mi/hr)	Weaving LOS[2]	Average Non-Weaving Speed (in mi/hr)	Non-Weaving LOS[2]
On C-D roadway between on-ramp from Courtney Campbell Causeway and off-ramp to Spruce Street	SB	37.3 mi/hr	D	45.3 mi/hr	C
On C-D roadway between off-ramp to Spruce Street and off-ramp to TIA	SB	39.2 mi/hr	D	37.7 mi/hr	D
On C-D roadway between on-ramp 'D' from TIA and off-ramp to Eastbound I-275 local freeway	SB	39.5 mi/hr	D	38.4 mi/hr	D
On C-D roadway between on-ramp from Eastbound I-275 local freeway and off-ramp 'E' to TIA	NB	41.9 mi/hr	C	42.7 mi/hr	C
On C-D roadway between on-ramp from Spruce Street and off-ramp to Courtney Campbell Causeway	NB	37.7 mi/hr	D	46.7 mi/hr	C

1 See Exhibit 19 (Master Plan) for location of various roadway weaving sections

2 Weaving and Non-weaving Level of Service on the C-D roadway based on the following Tampa Interstate Study criteria:

LOS	Average Weaving Speed	Average Non-weaving Speed
A	50	54
B	45	48
C	40	42
D	35	35
E	30	30
F	<30	<30

b) The two-lane exit-ramp from TIA to the northbound Collector/Distributor (C/D) roadway bifurcates; one lane should merge as an add lane with the northbound C/D lanes and would be signed for the Northwest Hillsborough Expressway; and the other lane should merge into the two lanes westbound from Spruce Street and be signed for the Courtney Campbell Causeway. Under this design, none of the airport north and westbound traffic would have to weave, and only the traffic on the C/D roadway that is destined for the Courtney Campbell Causeway would have to change one lane. In addition to providing higher speeds within the weaving section and reducing the total number of weaving vehicles, this design only requires a total of five lanes in the northbound weaving section.

c) The northbound off-ramp to the Courtney Campbell Causeway must be on the same side of the C/D roadway as the northbound on-ramp from Spruce Street.

d) Slip ramps to and from the south connecting the Northwest Hillsborough Expressway with the C/D roadway are provided in the vicinity of the I-275 interchange to avoid "overloading" the C/D roadways. These ramps allow traffic originating from Northwest Hillsborough County to access the Westshore area directly via the Northwest Hillsborough Expressway.

e) Additional access to existing and proposed development on both sides of the Northwest Hillsborough Expressway south of TIA are provided via the C/D roadway to alleviate some of the traffic congestion on the adjacent arterial street system and increase the attractiveness of the expressway as a major commuter route.

ROADWAY DESIGN

Existing right-of-way along the Northwest Hillsborough Expressway limits is typically 250 feet with variation in some areas. In most cases, interchange locations and ramp terminals will require additional right-of-way. The design standards for the Northwest Hillsborough Expressway will generally conform to the current high standards in effect for the design and construction of Interstate highways as recommended by the State of Florida Department of Transportation.

Specific design criteria approved by the Tampa-Hillsborough County Expressway Authority, FDOT, HNTB and FHWA are provided in Table 8. Typical sections at Cypress Street and Fish Creek, are shown on Exhibit 20. The lane geometry developed for all design alternatives were based on Year 2010 traffic projections.

CONCEPTUAL DRAINAGE ANALYSIS

A conceptual drainage analysis was conducted for the proposed Northwest Hillsborough Expressway from Dana Shores Boulevard south to the Cypress Street Overpass. Included in the analysis was the widening of Spruce Street from the Northwest Hillsborough Expressway/TIA interchange east to a point approximately 800 feet west of Westshore Boulevard. This report evaluates preliminary pond sizes for the proposed roadway expansion and discusses the analysis of the crossing at Fish Creek. Also discussed in this analysis are the stormwater regulatory issues which should be considered in the design of the stormwater management system.

TABLE 8

RECOMMENDED ROADWAY DESIGN CRITERIA

DESIGN FACTORS	RECOMMENDED CRITERIA	
Speeds	* Expressway -	60 mph Desirable 55 mph Minimum
	* Collector/Distributor -	45 mph Desirable 40 mph Minimum
	* Ramps -	50 mph Desirable 35 mph Minimum
	* Loops -	30 mph Minimum
	* Cross Streets -	45 mph Desirable 30 mph Minimum
Pavement Widths	* Expressway & Collector/Distributor -	12' Standard Lane Width 12' HOV Lanes (w/painted Buffer) 12' Interchange Turning Lanes plus widening for curves
	Ramps -	15' Minimum Single Lane, 24' Minimum Dual Lanes
	Cross Streets -	12' Desirable, 11' Minimum
Shoulder Widths	* Expressway & Collector/Distributor-	12' Outside (10' Paved) 10' Outside (w/Barrier Wall) 6'-10' Outside (If outside lane is auxiliary lane w/Barrier Wall) 10' Inside (w/Barrier Wall) 12' Inside (10' Paved)
	* Ramps -	
	Single Lane -	6' Outside (4' Paved) 6' Outside (w/Barrier Wall) 6' Inside (2' Paved) 6' Inside 9w/Barrier Wall)
	Dual Lane -	10' Outside (8' Paved) 10' Outside (w/Barrier Wall) 8' Inside (4' Paved) 6' Inside (w/Barrier Wall)
Median Widths	22' for 1 lane turning left 34' for 2 lanes turning left	

TABLE 8

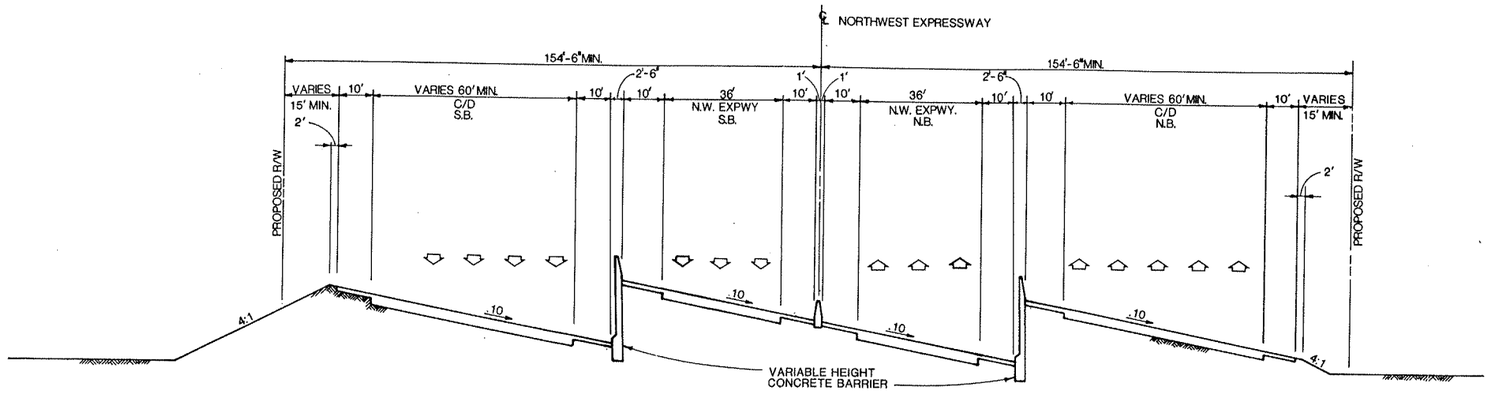
RECOMMENDED ROADWAY DESIGN CRITERIA
(Continued)

DESIGN FACTORS	RECOMMENDED CRITERIA		
Maximum Grades	* Expressway -		3% for 60 mph 4% for 55 mph
	* Collector/Distributor -		4% for 45 mph 5% for 40 mph
	* Ramps - Ascending -		6%
	Descending -		7%
Maximum Degree of Curve	* Expressway & Collector/Distributor -		
		60 mph	5°-15'
		55 mph	6°-30'
		45 mph	10°-15'
		40 mph	13°-15'
	* Ramps -	50 mph	8°-15'
		35 mph	18°-30'
	* Loops -	30 mph	24°-45' (230' R)
Cross Slopes (In curve)	* 0.10 ft. per ft.		
Cross Slopes (In tangent)	* Expressway, Collector/Distributor, and Ramp -		0.02 ft. per ft. minimum 0.03 ft. per ft. maximum
	* Shoulders -		0.06 ft. per ft. outside 0.05 ft. per ft. inside
	* Embankments -		6:1 within clear recovery zone
Vertical Clearances	* 16'6"		Minimum roadway clearance
	17'		For overhead pedestrian crossings and sign trusses

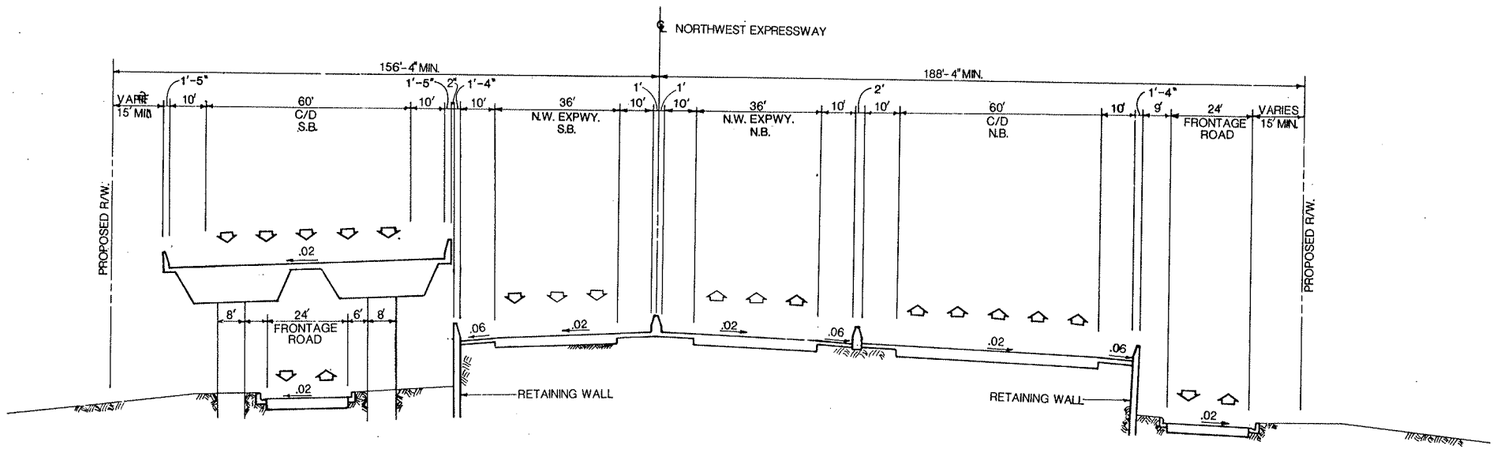
Source: "A Policy on Design of Highways and Streets," AASHTO, 1984

"Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and highways," FDOT, 1986

"Structures Design Guidelines," FDOT, 1987



CROSS SECTION SOUTH OF FISH CREEK
STA. 322+00



CROSS SECTION NORTH OF CYPRESS ST.
STA. 278+00

SCALE: 1"=20'H
1"=10'V

REVISIONS	
DATES	DESCRIPTIONS
6/25/88	MASTER PLAN CONCEPT
7-15-88	REVISED MASTER PLAN CONCEPT
3-1-89	FINAL MASTER PLAN CONCEPT

PROJECT NO. C1255.00

	NAME	DATE
DESIGNED BY	M.M.C.	2-15-89
CHECKED BY	R.W.G.	2-22-89
QUANTITIES BY		

GREINER, INC.
CONSULTING ENGINEERS AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT
CROSS SECTIONS AT CYPRESS ST. AND FISH CREEK

NORTHWEST HILLSBOROUGH EXPRESSWAY PHASE 1-A STUDIES

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

STATE PROJECT NO. 10000-1531 | EXHIBIT 20

Within the limits of the proposed project, the majority of the existing drainage system is presently roadway ditches and swales which discharge either directly or indirectly to Fish Creek. The Cypress Street overpass is drained through a pipe system to the Lemon Street drainage canal.

Pond Design

The Southwest Florida Water Management District's (SWFWMD) regulations, as adopted May 1988 were used as guidelines in evaluating the conceptual drainage plan. The stormwater regulations can be broken down into three categories: Water Quality Treatment, Peak Attenuation, and Floodplain Encroachment Compensation.

The Water Quality criteria require the first one-half inch of runoff be treated to reduce the oils, grease, and other contaminants from the initial first flush runoff from the roadway. This first flush volume will require treatment through filtration or wet detention with drawdown. This volume is usually small when compared to the volume of storage needed for peak attenuation and floodplain storage compensation.

Peak attenuation requires that the post-developed peak flow rate offsite must be less than or equal to the pre-developed peak flow rate for the 25-year 24-hour storm event. Floodplain encroachment compensation requires that the amount of fill placed within the 100-year floodplain be compensated with an equal amount of storage between the seasonal high water elevation and the 100-year floodplain elevation.

Peak flow attenuation and floodplain encroachment compensation are required to minimize flooding impacts downstream of the project. Tampa Bay is considered a more than adequate outfall, and therefore areas of this project which outfall directly to Tampa Bay will not require peak flow attenuation. The objective when designing the stormwater management system is to outfall as much of the project as possible directly to Tampa Bay. This will reduce the amount of stormwater storage required.

Areas not discharging directly to Tampa Bay will outfall to Fish Creek which presently flows through two culvert structures south of the Courtney Campbell Causeway (S.R. 60) and into Tampa Bay. From previous discussions with SWFWMD, these areas may require peak attenuation and floodplain encroachment compensation storage.

Drainage Basin Delineation

The Northwest Hillsborough Expressway Phase 1A project limits were subdivided into four drainage basins. Each basin was evaluated to determine the amount of stormwater storage required and the amount of storage available within the proposed right-of-way.

The Fish Creek Basin is defined as the section of the Northwest Hillsborough Expressway roadway between the Courtney Campbell Causeway interchange and the TIA, Spruce Street and Northwest Hillsborough Expressway interchange. This basin is divided into two parts: north of the Fish Creek crossing and south of the Fish Creek crossing. The north portion will drain to the series of ponds within the Courtney Campbell Causeway interchange. The southern portion will drain to a swale located

on the west side of the proposed roadway. After water quality treatment, both sections will then outfall into Fish Creek west of the Northwest Hillsborough Expressway crossing. A small section of the southern portion may drain east into Fish Creek following water quality treatment in swales. Peak attenuation will need to be mitigated for in other areas for this portion of the project.

The Airport Interchange Road basin is the area where Airport Road and Spruce Street join Northwest Hillsborough Expressway. A section of the interchange will drain to the proposed ditch on the west side of Northwest Hillsborough Expressway which will provide only water quality treatment. The remaining sections of the TIA interchange will drain north through a series of ponds within the interchange right-of-way and outfall to the east into Fish Creek. These areas will require water quality treatment and peak attenuation storage.

The Lemon Street Basin is defined as the Northwest Hillsborough Expressway roadway between the TIA interchange and the Cypress Street overpass. Presently, the southern section of this basin drains south to the Lemon Street drainage canal. In the proposed condition, the entire basin will drain north to the series of ponds located within the airport interchange. This area will require further analysis to evaluate the feasibility of draining a portion of this basin to the proposed ditch located on the west side of Northwest Hillsborough Expressway.

The Spruce Street Basin is defined as the area along Spruce Street from the airport interchange east to a point approximately 800 feet west of Westshore Boulevard. A swale in the median and on the north side of the road, within right-of-way, will be

used for both water quality and quantity storage. These swales will outfall to Fish Creek which flows parallel to Spruce Street. A section of the eastbound lane may drain to a proposed pond being constructed for the proposed roadway connecting Spruce Street and Laurel Street or to the ponds within the airport interchange.

Estimate of Stormwater Storage Requirements and Pond Areas

Using methods established by the Soil Conservation Service (SCS) and a 25-year, 24-hour rainfall event (8 inches), the existing and proposed peak flow rates and total volumes of runoff were calculated for each of the four basins within the Northwest Hillsborough Expressway project limits. SCS Curve Numbers (CN) were calculated for each basin by using the entire area within the proposed right-of-way and the total amount of impervious area for existing and proposed conditions. The proposed condition, as expected, had a higher percentage of impervious area and consequently a higher CN. The required water quality treatment volumes were based upon the first one-half inch of runoff from the entire proposed roadway area.

The floodplain encroachment compensation volumes were determined by estimating the amount of proposed fill to be placed below the 100-year rainfall event flood stage within Fish Creek. Floodplain compensation volumes will only be required for fill placed within the Fish Creek floodplain on the east side of the Northwest Hillsborough Expressway.

The pond volume required for peak attenuation in each basin was calculated using equation 13-1 of the Florida Department of Transportation Drainage Manual (1987) -

Volume 2. The total storage volume required was calculated to be the sum of the peak attenuation, water quality and the floodplain compensation volumes. The total volumes for each basin were then transposed into areas using an estimated pond depth of 2 feet in the Courtney Campbell Causeway interchange and 2.5 feet in the TIA interchange. Using the Northwest Hillsborough Expressway layout, pond areas were included at the airport interchange. The storage volumes required and proposed storage areas within each basin are summarized in Table 9. It should be noted the total stormwater storage volumes indicated in Table 9 are considered "worst-case." It is anticipated that the total storage volumes can be reduced through coordination meetings with the regulatory agencies.

Peak Flows

Peak flows for the 4.12-square-mile Fish Creek basin were obtained from the S.R. 60 Bridge Hydraulics Recommendation Sheet for Fish Creek (State Project Number 10140-3533) approved March 1987. Peak flows for Fish Creek at Northwest Hillsborough Expressway were estimated to be 3,075 cfs for the 50-year and 3,965 cfs for the 100-year storm event, respectively.

The existing structure at Fish Creek and Northwest Hillsborough Expressway consists of four 12-foot by 10-foot box culverts. Headwater elevation for the 100-year peak flow was calculated to be approximately 4.60 feet using a tailwater elevation equivalent to the mean diurnal tide elevation in Tampa Bay of 2.8 ft. NGVD. This corresponds to a headloss of approximately 1.8 feet through the existing structure.

TABLE 9

ESTIMATED STORMWATER STORAGE REQUIREMENTS AND POND AREAS

Basin	Water Quality Volume (AcFt)	Peak Attenuation Volume (AcFt)	100-Yr Floodplain Compensation (AcFt)	Total Volume Required (AcFt)	Total Volume Provided (AcFt)	Pond Area (TOB) (Ac)
Fish Creek	0.56	2.4**	3.4**	6.3	1.2	0
Airport Road	1.37	26.2	0.80	28.4	31.0	11.1
Lemon Street*	0.26	1.2	0	1.5	0	0
Spruce Street*	0.27	1.0	0	1.4	1.0	2.4
				37.6	33.2	

* Total or a portion of the area will drain to the Airport Road Basin.

** Through agency coordination, these requirements may be eliminated due to discharge to a more than adequate outfall (i.e., Tampa Bay)

With the interim improvements to Northwest Hillsborough Expressway, the existing four 12-foot x 10-foot box culverts are currently being replaced with two 24-foot by 10.5-foot Conspan Precast Arch Culverts. From the calculations by Lockwood, Jones & Beals, designers of the two 24-foot by 10.5-foot structures, headloss for the these two structures was 0.95 feet for the 50-year and 1.60 feet for the 100-year storm event, respectively.

The proposed improvements associated with the construction of the Northwest Hillsborough Expressway will require the structures at Fish Creek to be lengthened from approximately 208 feet to approximately 325 feet. Headloss at the lengthened Fish Creek structure will increase by approximately 0.10 feet, which is considered minimal. However, any increase may be considered objectionable by municipalities or local agencies with jurisdiction upstream.

In providing the recommended Northwest Hillsborough Expressway profile elevation, the following factors must be considered:

* suitability as an evacuation route.
* FEMA flood elevation of 10.0 feet based on storm surge from Tampa Bay.
* design geometry at interchanges.
* maximum allowable elevation which will not impact air traffic at TIA.

After evaluating the above factors, it is recommended that the existing road profile be maintained (where applicable). The evacuation route can be maintained by directing traffic from the Courtney Campbell Causeway interchange north to Hillsborough Avenue. If the proposed roadway profile were to be raised to at or above the FEMA

storm surge elevation (10.0 feet), the proposed interchanges at the airport and the Courtney Campbell Causeway could impact the air traffic from TIA.

COMPATIBILITY WITH FAR PART 77 SURFACES AND HCAA ZONING ORDINANCES

The plans and profiles for the Northwest Hillsborough Expressway Master Plan Concept were analyzed for compatibility with Federal Aviation Regulation (FAR) Part 77 and Hillsborough County Aviation Authority (HCAA) height hazard zone regulations. The following assumptions and/or criteria were used:

17 feet clear height above highway
12-foot lanes and 10-foot shoulders
10 percent superelevations

The recommended Master Plan Concept meets both HCAA and FAA height hazard guidelines. No intrusion of these aviation surfaces by the expressway's roadway or structures occurs.

ENVIRONMENTAL CONSIDERATIONS

The recommended alternative was assessed for possible negative impacts along the study area. However, according to information gathered from the Final Environmental Impact Statement conducted during project development, the Phase 1A portion of the Northwest Hillsborough Expressway project will not have significant impact in the project vicinity. However, in cases where some impact might occur, all practicable measures to minimize potential adverse impact will be constructed.

CONSTRUCTION STAGING

After estimating traffic volumes for the Master Plan Concept, phased construction staging and maintenance of traffic schemes were developed. These items were evaluated to further assess the overall constructibility of the recommended alternative. The following section represents Phases I through VI of the construction staging. Tracking Phases I through VI can be done by following Exhibit 21 sheets 1 thru 10.

PHASE I

1. Close the southbound Airport exit to eastbound Spruce Street Loop Ramp, divert this traffic through the Post Office property and onto Westshore Boulevard.

2. Close westbound Spruce Street ramp to the Airport and divert traffic to the same route as described above.

3. Construct Northwest Expressway southbound to the Airport, Ramp "A" from sta. 8+50 to sta. 29+35.

4. Construct 48' of temporary pavement in the vicinity of ramp F-1, west of the existing pavement. Connect temporary pavement back to the existing pavement north of the Spruce Street Bridge carrying traffic over the airport entrance and exit roadways. Shift traffic exiting Airport onto newly constructed temporary pavement and entering airport traffic onto existing exit roadway north of Spruce Street Bridge.

5. Construct retaining walls, bridges and roadways for ramps "A", "E" and "G", north of Spruce Street into the Airport.

6. Reroute, eastbound Spruce Street to Airport to newly constructed ramp "A". Close existing loop ramp.

7. Reroute exit and entrance Airport traffic over ramp "E" structure at sta. 260+00. This structure has 2-10' shoulders and 3-12' lanes for a total of 56'. During construction there would be 4-11' lanes, 2-2' left hand shoulders with a concrete median barrier and 2-3' right hand shoulders. Also construct temporary pavement from sta. 253+00, ramp "E", to existing Airport exit roadway just north of existing exit road bridge.

8. Construct ramp "D" from sta. 70+00 to sta. 41+00.

9. Construct loop "K" and ramp "K-1".

10. Construct temporary pavement connection from ramp "D" at sta. 41+00 to sta. 282+50 on existing Memorial Highway. Ramp "D" would be striped to taper to one (1) lane before entering Memorial Highway which will be three (3) lanes, then continuing southerly across the existing Cypress Street Bridge with four (4) lanes.

11. Shift Airport exiting traffic onto newly constructed ramp "D" and remove roadway and bridge existing southbound Airport exiting traffic.

PHASE II

1. Construct temporary connection from existing southbound Memorial Highway to ramp "B" at sta. 112+00.

2. Construct eastbound Spruce Street ramp "B" from sta. 112+00 to sta. 149+00.

3. Construct ramps "L" and "N".

4. Reroute eastbound Spruce Street Traffic onto newly constructed ramp "B" and Airport exiting traffic destined for Spruce Street, eastbound onto newly constructed loop "K".

5. Remove existing eastbound Spruce Street roadway and bridge.

6. Construct westbound Spruce Street, ramp "C", from sta. 422+00 to sta. 443+00.

7. Reroute westbound Spruce Street traffic onto newly constructed ramp "C".

8. Remove existing roadway and bridge for westbound Spruce Street.

9. Construct ramp "G" from sta. 170+00 to sta. 180+00.

10. Reroute westbound Spruce Street traffic entering Airport onto newly constructed ramp "G" and remove the temporary routing of traffic through the Post Office property.

PHASE III

1. Construct new Frontage Road on the north of the project from Cypress Street to existing Frontage Road to sta. 246+00, ramp "E".

2. Construct northbound C/D from sta. 273+00 to ramp "J" sta. 35+00 and ramp "E" from sta. 242+50 to sta. 259+50.

3. Construct loop "H" from ramp "E" nose to Frontage Road.

4. There will be four (4) lanes existing crossing northbound Cypress Street Bridge, temporarily construct a connection at sta. 280+00 of three (3) lanes to new northbound C/D and two (2) lanes to existing northbound Memorial Highway. The new C/D at sta. 287+00 can be temporarily striped to accommodate two (2) lanes for the northbound C/D and two (2) lanes for the Airport entrance roadway, ramp "E".

5. Reroute northbound Airport traffic onto newly constructed northbound C/D and ramp "E", also, open loop ramp "H" to local Frontage Road traffic.

6. Construct ramp "F-1", north of Airport canal.

7. Construct ramp "F" structure over Airport canal.

8. Construct temporary connection from ramp "F" to existing westbound on ramp to Spruce Street.

9. Reroute Airport exiting traffic westbound onto newly constructed portions of ramp "F" and "F-1".

10. Construct structure for ramp "F-1" over Airport canal and completion of ramp "F-1" to nose with ramp "C".

11. Construct northbound C/D from sta. 35+00, ramp "J", to sta. 53+30.

12. Construct northbound C/D from sta. 309+00 to sta. 322+00.

13. Construct temporary connection for northbound C/D to the existing northbound Memorial Highway south of sta. 322+00.

14. Reroute Airport exiting traffic westbound onto newly constructed ramp "F-1".

15. Construct ramp "F" from sta. 353+30 to sta. 358+70.

16. Reroute northbound Memorial Highway traffic onto newly constructed northbound C/D.

PHASE IV

1. Construct southbound C/D from 322+00 to sta. 315+00.

2. Construct temporary connection from ramp "B" at sta. 118+00 to ramp "A" sta. 6+00 and reroute southbound traffic destined for the Airport onto ramp "A" via this temporary connection.

3. Construct southbound C/D from sta. 314+00 to sta. 285+00.

4. Relocate temporary connection for southbound Memorial Highway traffic onto southbound C/D from sta. 315+00 to sta. 322+00 and reroute traffic.

5. Complete ramp "A" at C/D nose and remove temporary connection.

6. Complete southbound C/D construction at sta. 315+00.

7. Construct temporary connection from southbound C/D to existing southbound Memorial Highway at sta. 285+00.

8. Reroute southbound Memorial Highway traffic onto newly constructed southbound C/D.

PHASE V

1. Construct northbound M/L Northwest Expressway from sta. 282+00 to sta. 322+00.

2. Construct southbound M/L Northwest Expressway from sta. 322+00 to sta. 285+00.

PHASE VI

When a construction contract is let for the Tampa Interstate Interchange with I-275 in the vicinity of Westshore Plaza, the following items will need to be constructed:

1. Portions of the northbound C/D from sta. 273+00 to sta. 280+00.

2. Portions of northbound M/L from sta. 273+00 to sta. 280+00.

3. Portions of southbound C/D from sta. 285+00 to sta. 273+00.

4. Frontage Road south of the project under the southbound C/D from sta. 282+00 to Cypress Street.

5. Portions of southbound M/L from sta. 285+00 to sta. 273+00.

ESTIMATED PROJECT COSTS

One of the primary criteria of evaluating the Master Plan Concepts was cost. For this project, the estimated capital cost of developing the Phase 1A portion of the Northwest Hillsborough Expressway includes right-of-way, engineering and construction costs.

The estimates for right-of-way and relocation costs were provided by Knight Appraisal Services, Inc. The estimates were made based upon inspections of the Phase 1A portion of the project area on a parcel-by-parcel basis. Ownerships were estimated based upon the public records of Hillsborough County, Florida. According to Knight Appraisal's investigation of the market and review of the Master Plan Concept, the recommended alternative will cause the relocation or acquisition of approximately 14 parcels. These 14 parcels include a variety of land uses such as commercial/office, light industrial, and publicly owned land. The Recommended Alignment will cause the relocation or acquisition of approximately ten businesses. The cost estimate which

includes both acquisition and damages for right-of-way is approximately $10,800,000.00.

Preliminary engineering cost estimates for the Northwest Hillsborough Expressway have been developed. These estimates are based upon the engineering design criteria previously presented in this report and the Long Range Estimated (LRE) developed by FDOT. Table 10 has been developed to outline the construction and right-of-way costs for the development of the Northwest Hillsborough Expressway from north of Cypress Street to south of Fish Creek.

RECOMMENDATION OF MASTER PLAN CONCEPT

The Recommended Master Plan Concept was carefully selected from the pool of other Concept Alternatives based on results from the matrix evaluation process. In addition, the Master Plan Concept was chosen for its specific operational and geometric design components, and compatibility with land use and future plans. Input was alsoprovided by the Tampa-Hillsborough County Expressway Authority, Post Buckley Schuh & Jernigan, City of Tampa, Florida Department of Transportation and Howard Needles Tammen & Bergendoff.

The actual Master Plan Concept, shown on Exhibit 21, is comprised of a 4-roadway system from Cypress Street to its terminus south of Fish Creek. The alignment is further enhanced by the added feature of a fully directional interchange at TIA. This alignment was selected because it has the best potential for allowing motorists to travel at a better (LOS) with less delay, while providing access to TIA and recreational land uses (beaches via Courtney Campbell Causeway). The Master Plan

TABLE 10

MASTER PLAN CONCEPT COST ESTIMATE

Roadway	$33,843,154
Bridges	$20,324,375
Subtotal	$54,167,529
Contingency @ 18%	$ 9,750,155
Subtotal	$63,917,684
Engineering @ 10%	$ 6,391,768
Subtotal	$70,309,452
Legal and Administrative @ 5%	$ 3,515,473
Right of Way	$10,800,000
Total	$84,624,925

All costs in 1989 dollars.

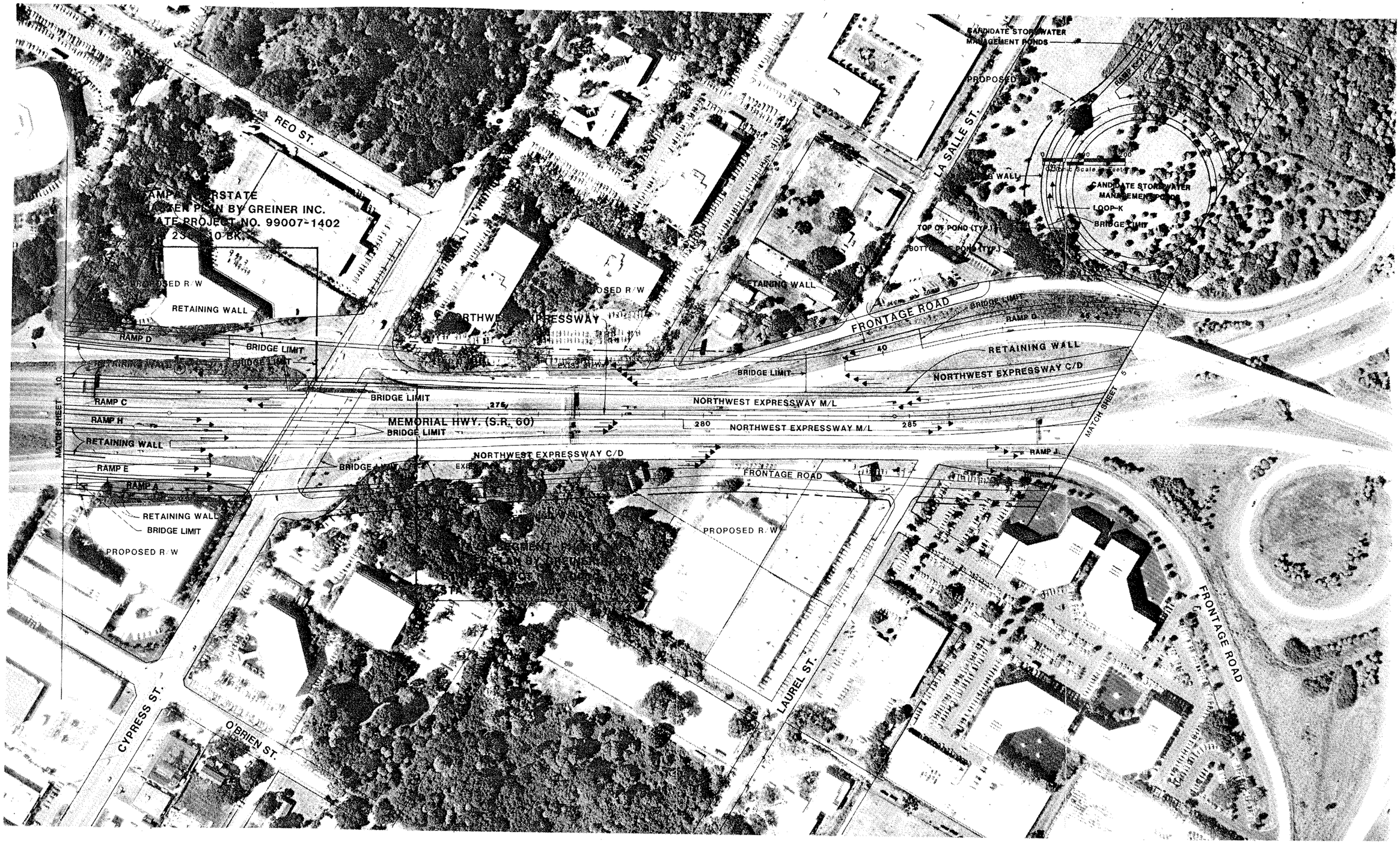


Photo Date: August 1987

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DATES	DESCRIPTIONS			
3-1-89	FINAL MASTER PLAN CONCEPT		NAME	DATE
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		CHECKED BY		2-22-89
		QUANTITIES BY		

GREINER, INC.
CONSULTING ENGINEERS AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT
PLAN SHEET 100 SCALE
CYPRESS ST. TO AIRPORT INTERCHANGE

NORTHWEST HILLSBOROUGH EXPRESSWAY PHASE 1-A STUDIES

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

STATE PROJECT NO. 10000-1531 | EXHIBIT 21 SHEET 1 OF 10

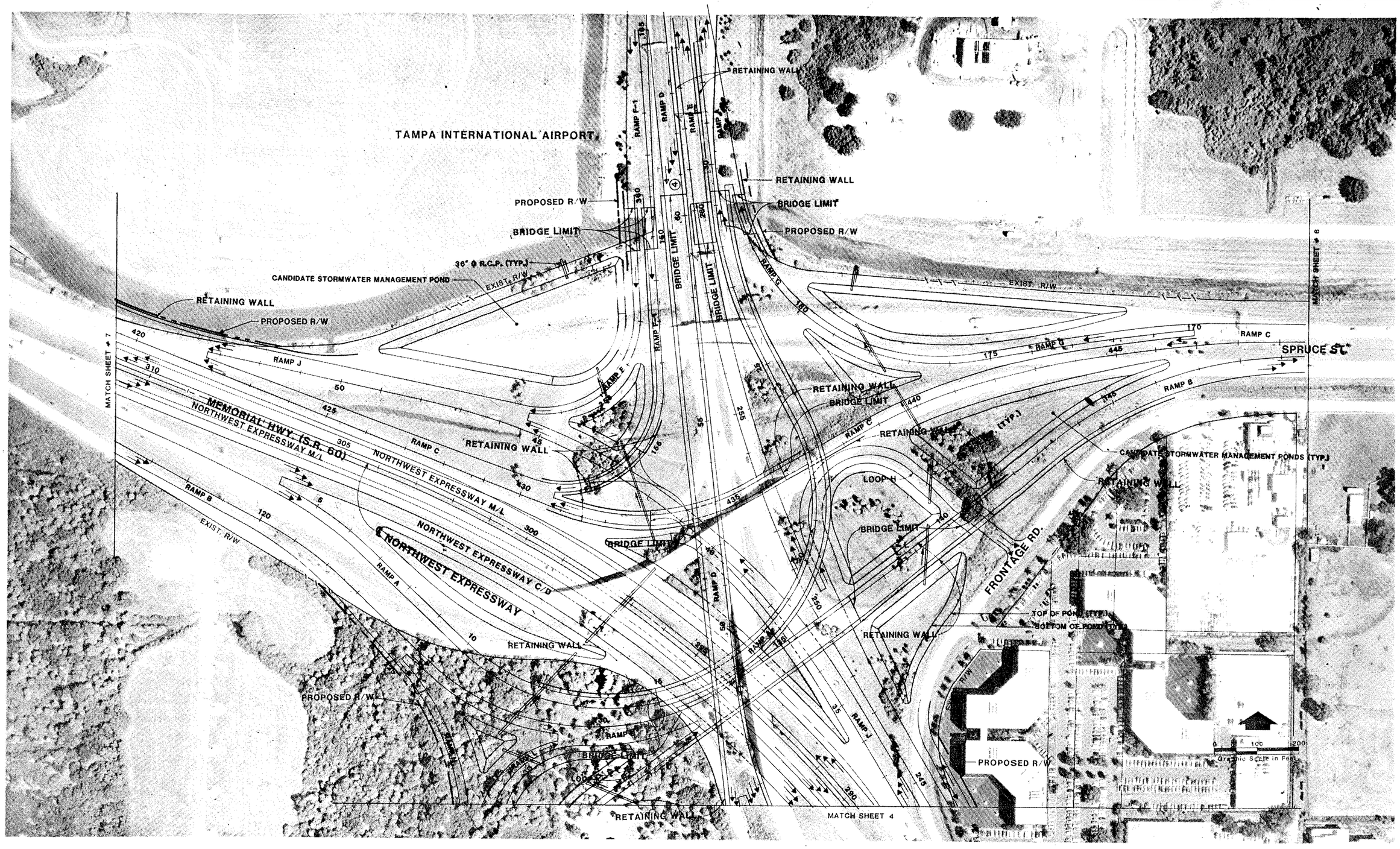

Photo Date: August 1987

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DATES	DESCRIPTIONS
3-1-89	FINAL MASTER PLAN CONCEPT

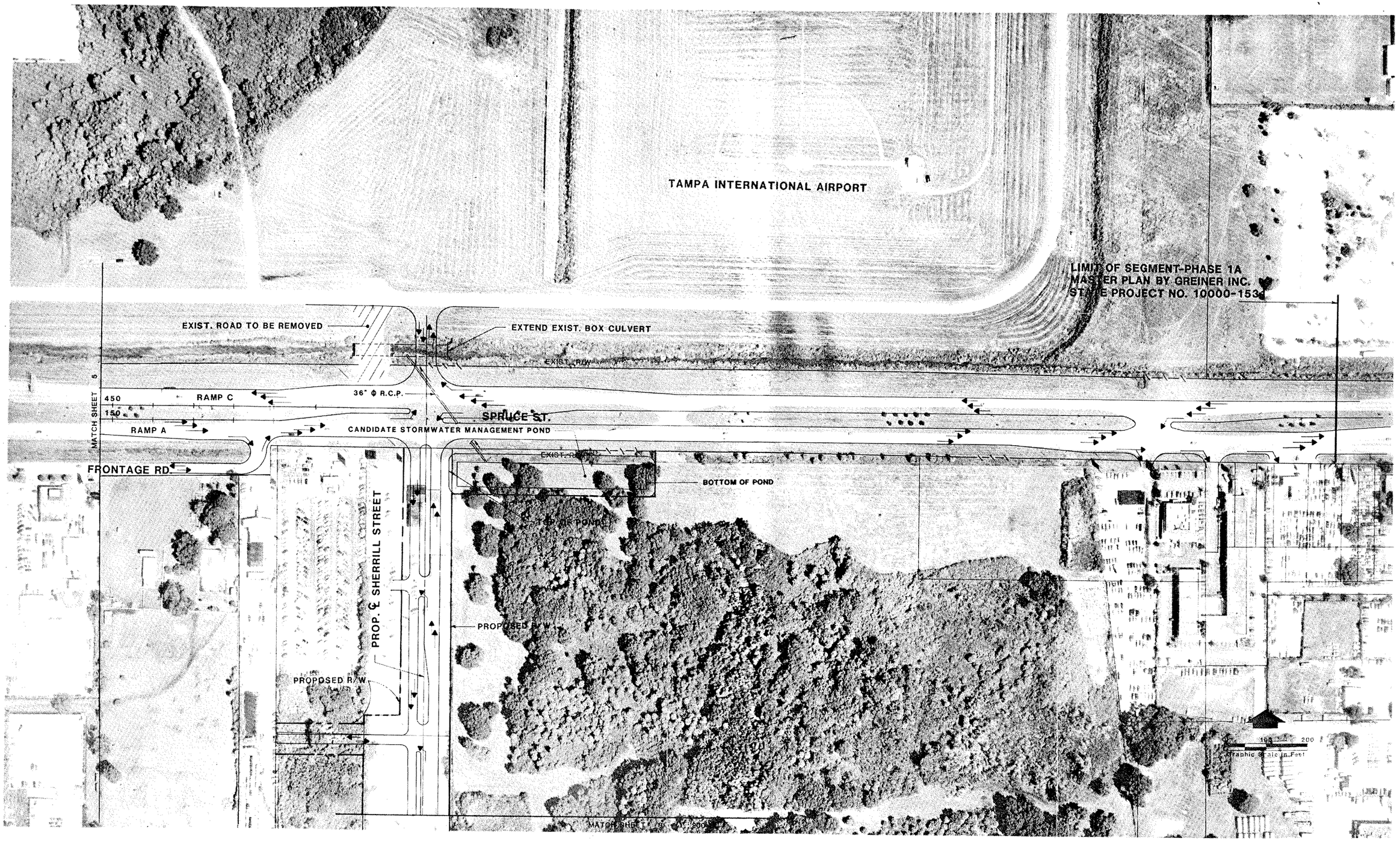
PROJECT NO. C1255.00

	NAME	DATE
DESIGNED BY	-	2-15-89
CHECKED BY		2-22-89
QUANTITIES BY		

GREINER, INC.
CONSULTING ENGINEERS AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT
PLAN SHEET 100 SCALE
AIRPORT INTERCHANGE

NORTHWEST HILLSBOROUGH EXPRESSWAY PHASE 1-A STUDIES
TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY
STATE PROJECT NO. 10000-1531 | EXHIBIT 21 SHEET 2 OF 10



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DATES	DESCRIPTIONS
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PROJECT NO. C1255.00

	NAME	DATE
DESIGNED BY		2-15-89
CHECKED BY		2-22-89
QUANTITIES BY		

GREINER, INC.
CONSULTING ENGINEERS
AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT

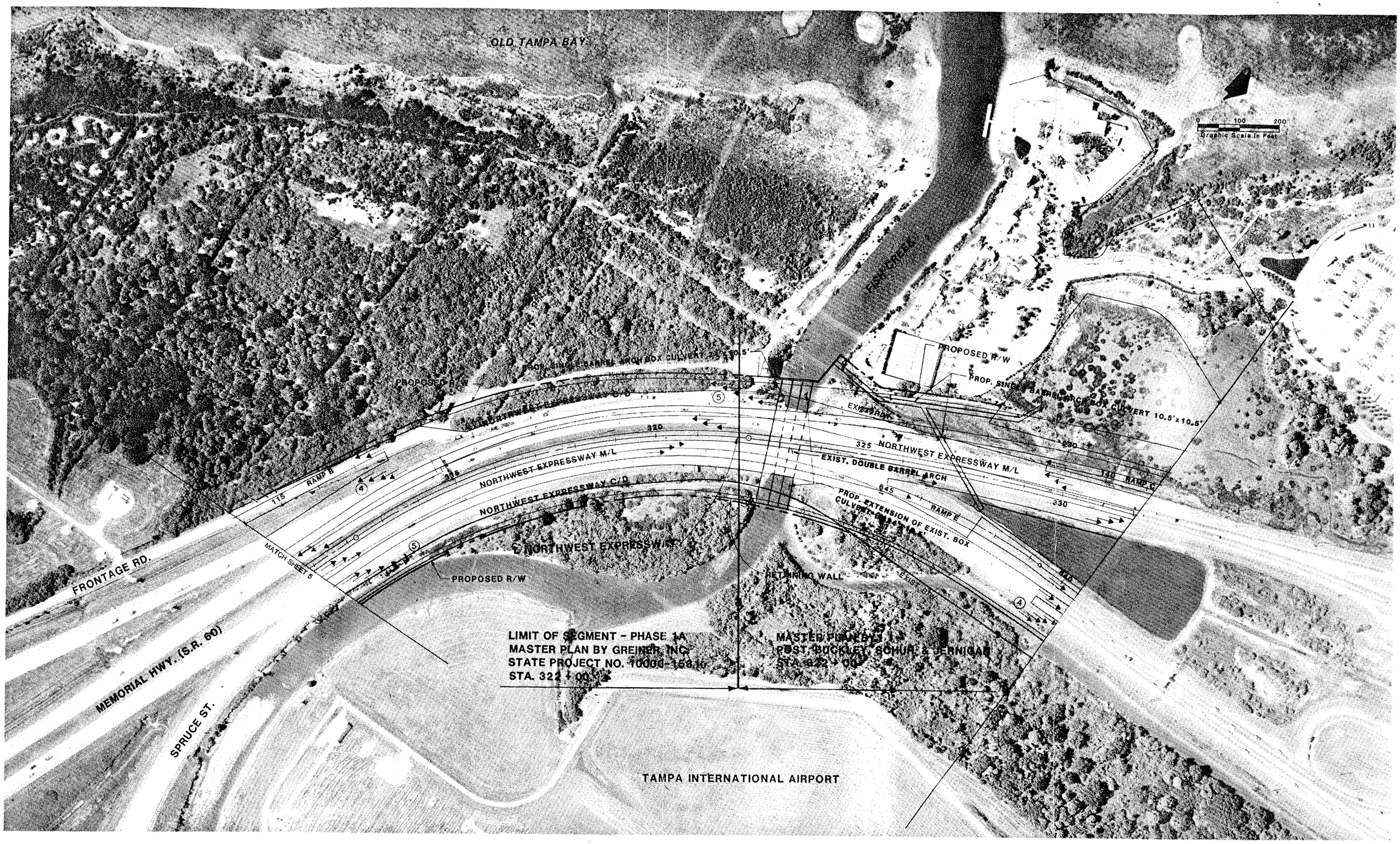
PLAN SHEET 100 SCALE
SPRUCE ST.

NORTHWEST HILLSBOROUGH EXPRESSWAY PHASE 1-A STUDIES

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

STATE PROJECT NO. 10000-1531

EXHIBIT 21 SHEET 3 OF 10



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DATES	DESCRIPTIONS			
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		CHECKED BY		2-22-89
		QUANTITIES BY		

GREINER, INC.
CONSULTING ENGINEERS AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT
PLAN SHEET 100 SCALE
FISH CREEK

NORTHWEST HILLSBOROUGH EXPRESSWAY PHASE 1-A STUDIES

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

STATE PROJECT NO. 10000-1531 | EXHIBIT 21 SHEET 4 OF 10

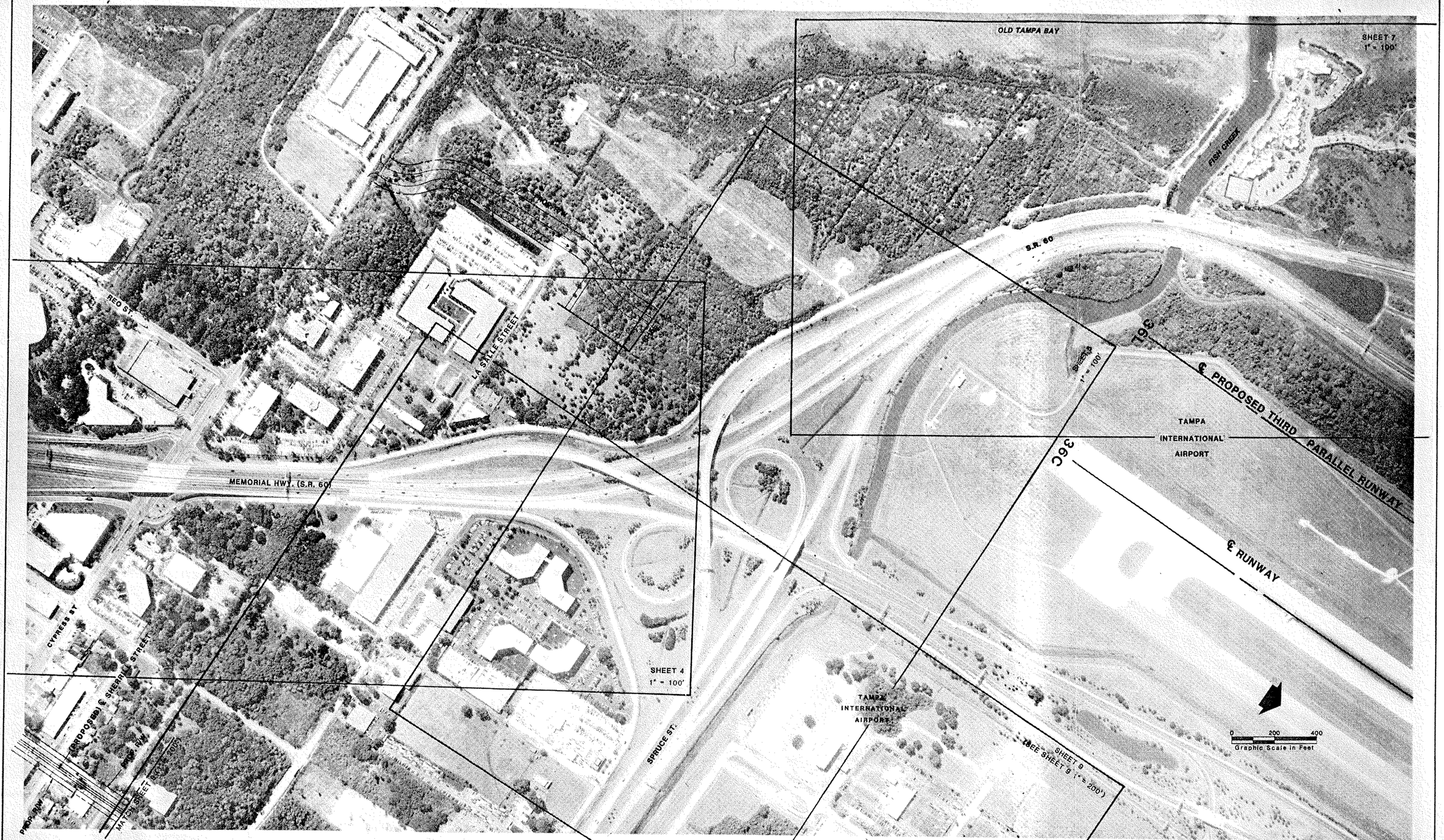

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Photo Date: October 1987

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6-23-88	FINAL GEOMETRY,DRAINAGE AND R/W
6-27-88	MASTER PLAN CONCEPT
7-15-88	REVISED MASTER PLAN CONCEPT
3-1-89	FINAL MASTER PLAN CONCEPT

PROJECT NO. C1255.00

	NAME	DATE
DESIGNED BY	M.M.C.	2-15-89
CHECKED BY	R.W.G.	2-22-89
QUANTITIES BY		

GREINER, INC.
CONSULTING ENGINEERS
AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT
PLAN SHEET 200 SCALE
WEST OF MEMORIAL HIGHWAY

NORTHWEST HILLSBOROUGH EXPRESSWAY
PHASE 1-A STUDIES

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

STATE PROJECT NO. 10000-1531 | EXHIBIT 21 SHEET 5 OF 10

Photo Date: October 1987

REVISIONS		PROJECT NO. C1255.00		
DATES	DESCRIPTIONS			
6-9-88	FINAL GEOMETRY WITHOUT FINAL DRAINAGE AND R/W		NAME	DATE
6-23-88	FINAL GEOMETRY,DRAINAGE AND R/W	DESIGNED BY	M.M.C.	2-15-89
6-27 88	MASTER PLAN CONCEPT	CHECKED BY	R.W.G.	2-22-89
7-15-88	REVISED MASTER PLAN CONCEPT	QUANTITIES BY		
3-1-89	FINAL MASTER PLAN CONCEPT			

GREINER, INC.
CONSULTING ENGINEERS
AND PLANNERS
TAMPA, FLA.

MASTER PLAN CONCEPT
PLAN SHEET 200 SCALE
EAST OF MEMORIAL HIGHWAY

NORTHWEST HILLSBOROUGH EXPRESSWAY PHASE 1-A STUDIES

TAMPA-HILLSBOROUGH COUNTY EXPRESSWAY AUTHORITY

STATE PROJECT NO. 10000-1531 | EXHIBIT 21 SHEET 6 OF 10

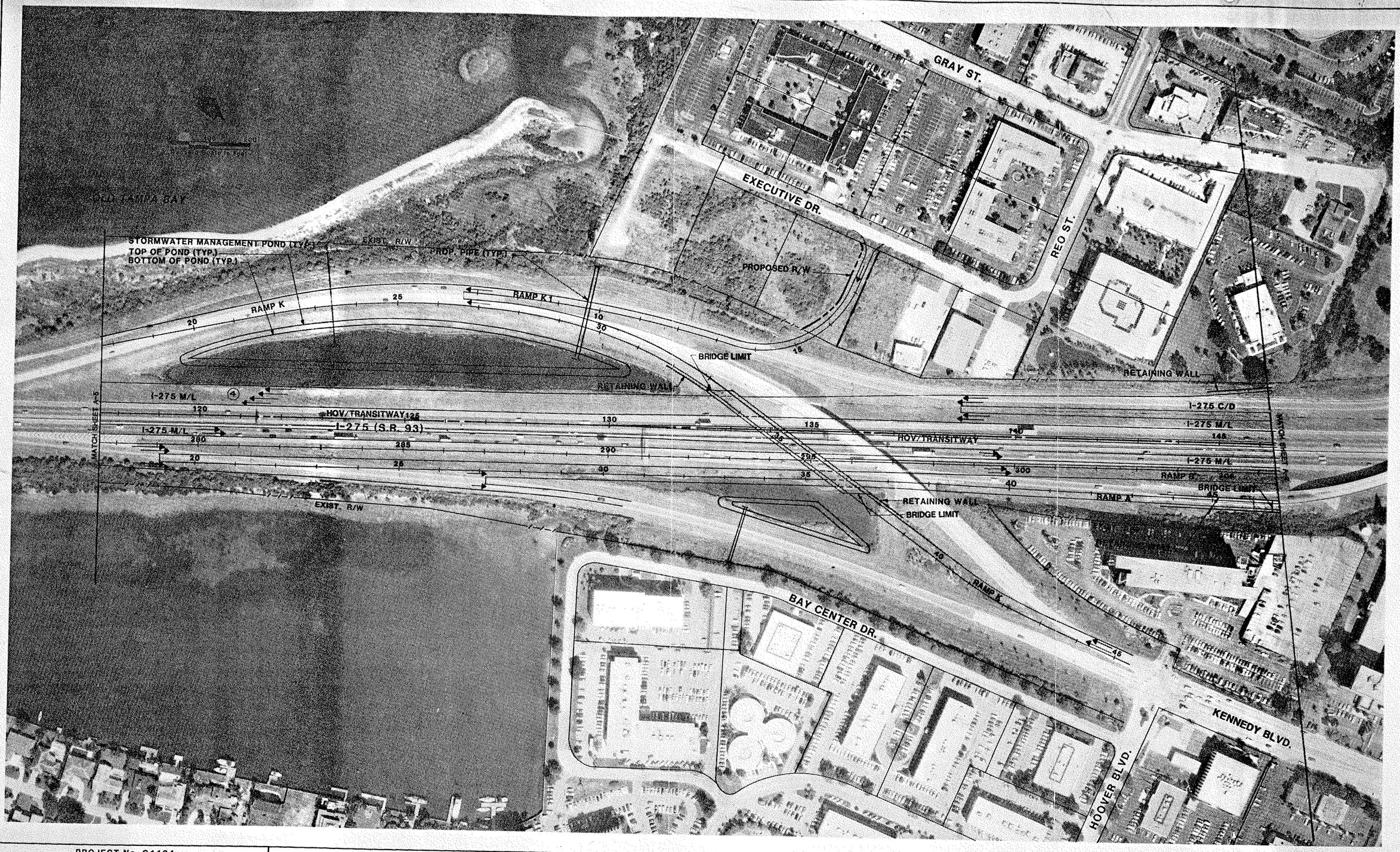

Photo Date: August 1987

PROJECT No. C1104	
PROJECT DATES	
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6-89	FINAL MASTER PLAN CONCEPT

THE GREINER TEAM
GREINER, INC.
GANNETT FLEMING TRANSPORTATION ENGINEERS, INC.
TEXAS TRANSPORTATION INSTITUTE
KNIGHT APPRAISAL SERVICES

MASTER PLAN CONCEPT
DESIGN STUDY SEGMENT 1A
I-275 AT KENNEDY BLVD.

TAMPA INTERSTATE STUDY
FLORIDA DEPARTMENT OF TRANSPORTATION

STATE PROJECT No. 99007-1402 | EXHIBIT 21

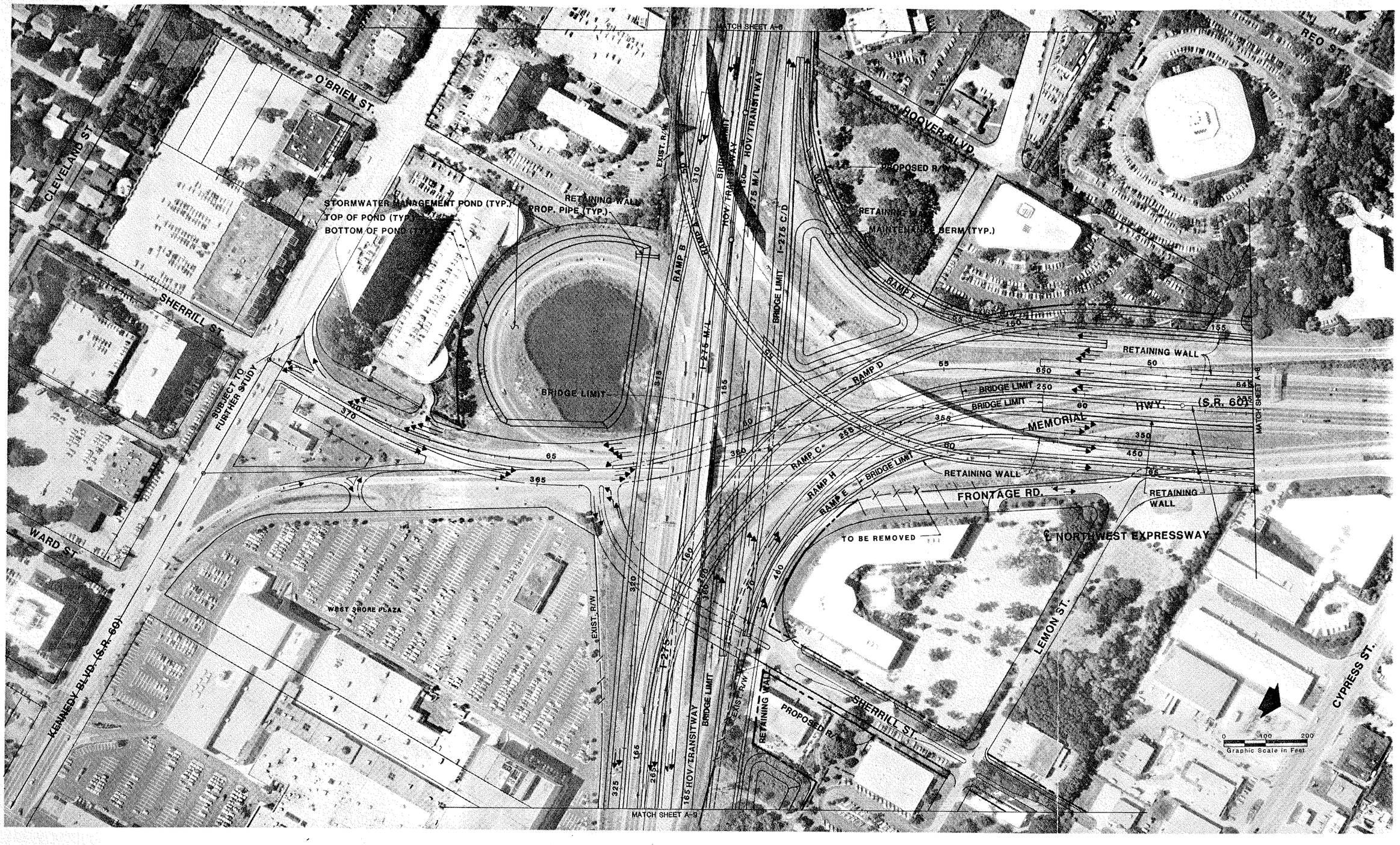


Photo Date: August 1987

EXIST. R/W	LAND USE	SECT. DES. & MP	PROP. R/W	Drain. Noise Wall
7	7	7	7	X

PROJECT No. C1104	
PROJECT DATES	
DATES	DESCRIPTION
3-26-89	DRAFT MASTER PLAN CONCEPT
6-89	FINAL MASTER PLAN CONCEPT

THE GREINER TEAM

GREINER, INC.
GANNETT FLEMING TRANSPORTATION ENGINEERS, INC.
TEXAS TRANSPORTATION INSTITUTE
KNIGHT APPRAISAL SERVICES

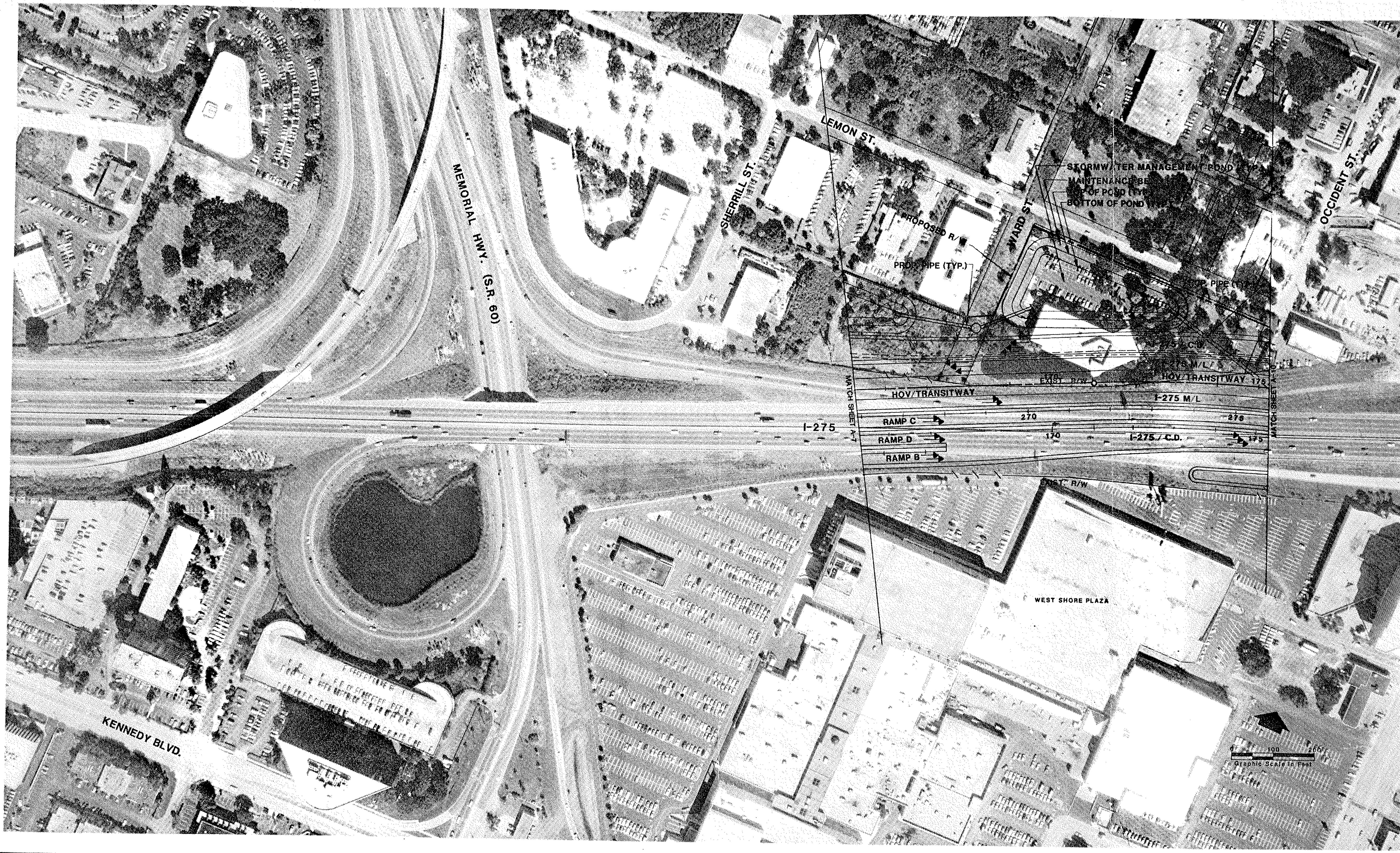
MASTER PLAN CONCEPT

DESIGN STUDY SEGMENT 1A
I-275 AT NORTHWEST EXPRESSWAY INTERCHANGE

TAMPA INTERSTATE STUDY

FLORIDA DEPARTMENT OF TRANSPORTATION

STATE PROJECT No. 99007-1402 | EXHIBIT 21



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PROJECT No. C1104	
PROJECT DATES	
DATES	DESCRIPTION
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6-89	FINAL MASTER PLAN CONCEPT

THE GREINER TEAM

GREINER, INC.
GANNETT FLEMING TRANSPORTATION ENGINEERS, INC.
TEXAS TRANSPORTATION INSTITUTE
KNIGHT APPRAISAL SERVICES

MASTER PLAN CONCEPT

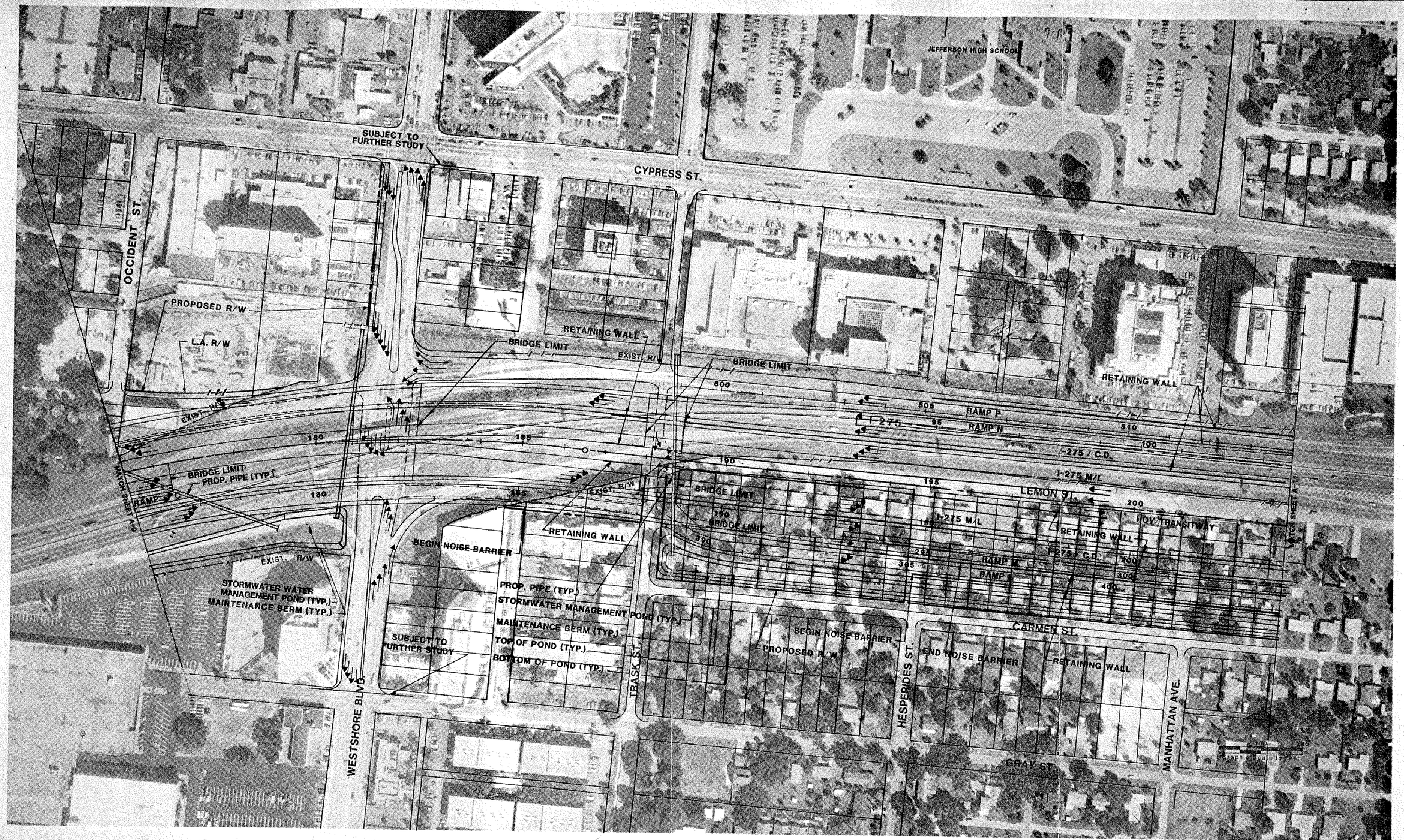
DESIGN STUDY SEGMENT 1A
I-275 AT WARD ST.

TAMPA INTERSTATE STUDY

FLORIDA DEPARTMENT OF TRANSPORTATION

STATE PROJECT No. 99007-1402 | EXHIBIT 21

SHEET 9 OF 10



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6-89	FINAL MASTER PLAN CONCEPT

THE GREINER TEAM
GREINER, INC.
GANNETT FLEMING TRANSPORTATION ENGINEERS, INC.
TEXAS TRANSPORTATION INSTITUTE
KNIGHT APPRAISAL SERVICES

MASTER PLAN CONCEPT
DESIGN STUDY SEGMENT 1A
I-275 AT WESTSHORE BLVD.

TAMPA INTERSTATE STUDY
FLORIDA DEPARTMENT OF TRANSPORTATION
STATE PROJECT No. 99007-1402 | EXHIBIT 21

SHEET 10 OF 10

Concept is compatible with the Hillsborough County Aviation Authority's Master Plan. Also, it was selected because the Master Plan Concept includes a very sound method for maintaining a continuous flow of traffic during construction. The Master Plan Concept is compatible with the Tampa Interstate Study Master Plan Concept for I-275 and the Northwest Hillsborough Expressway to the north.

Modifications to the TIA Entrance Parkway between the existing terminal and Spruce Street were made based on input from the Hillsborough County Aviation Authority. The consistent theme in the comments received echoed a need to plan for the estimated 20 million enplaning passengers to the Bay Area by providing adequate alternative and supplemental vehicle access to TIA. This modification includes providing six lanes inbound and six lanes outbound in the terminal parking area by the design year 2010. This laneage will provide for approximately 86,000 vehicles inbound and outbound for the airport. This capacity will also provide a superior level of traffic service "C" which represents a vast improvement in the traffic access currently experienced by the airport user.

Further modifications were made to a series of ramp connectors to and from the C/D roadway. Such modifications were made at the southbound Spruce Street off-ramp and the southbound airport off-ramp to eliminate any weaving between these two traffic flows. In addition, modifications were made to the northbound slip ramp from the collector/distributor road to the Northwest Hillsborough Expressway. The study team decided that the northbound slip ramp should be located north of the off-ramp from the Northwest Hillsborough Expressway to the Courtney Campbell Causeway (S.R. 60) to preclude weaving on the Northwest Hillsborough Expressway.

In summary, the Northwest Hillsborough Expressway has been evaluated based upon the various engineering, traffic analysis, planning, land use impacts, local access and circulation, and system continuity factors. There is unanimous agreement that the Master Plan Concept will provide tremendous improvements to the existing facility. The improvements to traffic flow will be immediately realized once the Northwest Hillsborough Expressway is constructed. Construction of the Northwest Hillsborough Expressway will result in a number of beneficial impacts. The benefits will include decreased travel time and fuel consumption for motorists on the Expressway. Increased roadway capacity will also provide for an acceptable peak level of traffic service throughout the Expressway in design section one.