

Location Hydraulics Report

February 2024

FM No. 449007-1-22-01

Bridge No. 870083;-549;-084;-550

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration and FDOT.

Location Hydraulics Report

Florida Department of Transportation

District 6

State Road 934/NE 79th St (John F. Kennedy Causeway),
Project Development and Environment Study

Limits of Project: From West of Pelican Harbor Drive (MP 1.077) and East of Adventure Avenue
(MP 1.947)
Miami-Dade County, Florida

Financial Management Number: 449007-1-22-01

ETDM Number: 14484

Date: February 2024

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CONTENTS

1	Introduction	1
1.1	Project Background	1
1.2	Project Description	2
1.2.1	Logical Termini	2
1.3	Purpose and Need.....	3
1.3.1	Purpose	3
1.3.2	Need.....	3
2	Existing Conditions	3
2.1	Existing Typical Section.....	3
2.2	Existing Drainage	4
2.3	Soils.....	5
2.4	Existing Land Use.....	5
2.5	Cross Drains.....	5
2.6	Floodplains and Floodways	5
2.7	Flooding History.....	6
3	Proposed Conditions	6
3.1	Proposed Typical Section	6
3.2	Proposed Drainage.....	6
3.3	Future Land Use.....	7
3.4	Proposed Cross Drains	7
3.5	Floodplains and Floodways	7
3.6	Project Classification	7
3.7	Risk Evaluation.....	8
3.8	Coordination with Local Agencies	8
3.9	PD&E Manual Requirement's with No Encroachment.....	8
4	Recommendation and Conclusions	8
5	References	8

FIGURES

Figure 1 – Study Area	3
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TABLES

Table 1 – Summary of Cross Drains	5
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APPENDICES

Appendix A	USGS Regional Project Location Map
Appendix B	FEMA FIRM Maps of Miami Dade County
Appendix C	Natural Resource Conservative Service Soil Map
Appendix D	Miami-Dade County Land Use Map
Appendix E	Existing and Proposed Typical Sections
Appendix F	Cross Drain Maps

ACRONYMS AND ABBREVIATIONS

FDEM	Florida Division of Emergency Management
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FM	Financial Management
MP	Milepost
NBI	National Bridge Inventory
PD&E	Project Development and Environment
SLD	Straight Line Diagram
SFWMD	South Florida Water Management District
SR	State Road
USGS	United States Geological Survey

1 Introduction

The Florida Department of Transportation (FDOT) District Six is preparing a Project Development and Environment (PD&E) Study to evaluate the replacement of four bridges (two bridge pairs) located along NE 79th Street between Pelican Harbor Drive and Adventure Avenue in the incorporated municipalities of the City of Miami and North Bay Village within Miami-Dade County. The NE 79th Street corridor is also designated as State Road (SR) 934, NE 79th Street Causeway, and John F. Kennedy Causeway within the project limits in Miami-Dade County. NE 79th Street is an east-west regional thoroughfare that has a western terminus at Florida's Turnpike (SR 821) and an eastern terminus at SR A1A. The project corridor carries traffic from the City of Miami to the barrier islands of North Bay Village and Miami Beach.

1.1 Project Background

Based on the most recent bridge inspections performed in October 2020, which included routine inspections, all four bridges are structurally deficient. The National Bridge Inventory (NBI) structural conditions ratings for the bridge decks and superstructures are poor (NBI rating of 4). The bridges west of North Bay Island, Bridge No. 870083 (westbound) and Bridge No. 870549 (eastbound), were built in 1971 and 1973, respectively, and have an overall sufficiency rating of 48.7 and health indexes of 96.44 and 82.36, respectively. The bridges east of North Bay Island, Bridge No. 870084 (westbound) and Bridge No. 870550 (eastbound), were built in 1971 and have an overall sufficiency rating of 48.7 and health indexes of 98.14 and 98.77, respectively. None of the bridges are navigable.

In 2015, NE 79th Street was milled and resurfaced from east of North Bayshore Drive to Bay Drive West as part of Financial Management (FM) No. 431180-1-52-01 and included repairs to the bridges. The bridge abutment approaches and bridge decks west of North Bay Island (Bridge Nos. 870083 and 870549) were paved with new asphalt concrete overlay, and all bridge joints were rehabilitated. The eastern bridge decks and approaches (Bridge Nos. 870084 and 870550) were also repaved, and new bicycle and pedestrian safety railings were installed adjacent to the outside travel lanes.

To address impacts related to Hurricane Irma, an emergency roadway embankment stabilization safety project was performed in 2019 along a 0.25-mile-long segment of NE 79th Street from east of Pelican Harbor Park to just west of the western bridges (FM No. 443966-1-52-01). The project included the placement of bedding stone and rubble riprap behind the existing endwall along the south side of NE 79th Street. The roadway shoulder was severely eroded during Hurricane Irma, and the repairs rehabilitated the slope to the original design specifications.

North Bay Village published a visioning Master Plan, NBV100 Report, in April 2020. This Master Plan includes transforming NE 79th Street within the municipal limits of North Bay Village to a Complete Streets design that would reduce the number of existing travel lanes from six to four. Potential improvements include repurposing the outside travel lanes on NE 79th Street to on-street parking, with designated buffer space separating the bicycle lane from the proposed

adjacent parking lane. The outside travel lanes on the project's eastern bridges (Bridge Nos. 870084 and 870550) are proposed as 10-foot-wide bicycle lanes. The Master Plan states that, since NE 79th Street is an emergency evacuation route, all six lanes (three lanes westbound and three lanes eastbound) would be available for emergency evacuation. The Master Plan notes that several meetings took place with FDOT District Six regional leadership during the plan development.

1.2 Project Description

This project involves the potential replacement of four prestressed concrete slab (Sonovoid) bridges (two bridge pairs) connecting three islands within the Cities of Miami and North Bay Village in Miami-Dade County. The bridges are part of SR 934/NE 79th Street (John F. Kennedy Causeway), a roadway classified as "Urban Principal Arterial - Other", which connects mainland Miami to Miami Beach and North Bay Village. The specific limits of the project extend from milepost (MP) 1.077 (west of Pelican Harbor Drive) to MP 1.947 (east of Adventure Avenue), as shown in **Figure 1**. The western bridge pair, comprised of Bridge Identification (ID) Numbers 870083 (westbound) and 870549 (eastbound), is located just west of North Bay Island/Harbor Island. The eastern bridge pair, comprised of Bridge ID Numbers 870084 (westbound) and 870550 (eastbound), is located between North Bay Island/Harbor Island and Treasure Island. The project is approximately 0.8 mile in length.

The existing western bridge pair consists of six lanes, including four 11-foot-wide travel lanes to the inside and two 13.5-foot-wide travel lanes to the outside, and a raised median connecting the two bridge structures. The outside travel lanes include shared-use markings to accommodate bicycles. In addition, a 5-foot-wide raised sidewalk is present on each side of the bridge pair to the outside. The existing eastern bridge pair consists of six 10-foot-wide travel lanes with a raised median connecting the two bridge structures, as well as a 5.5-foot-wide dedicated bicycle lane and a sidewalk varying between 5 and 6 feet in width (separated by guardrail) on each side of the bridge pair to the outside. The bridge approaches are generally consistent with the typical section of the bridges, except for east of the western bridge pair which includes dedicated bicycle lanes. Crossing over the Biscayne Bay, the bridges have a maximum vertical clearance of 6.78 feet at Mean Low Water and a minimum vertical clearance of 4.78 feet at Mean High Water. Biscayne Bay at the bridge crossings is not deemed a navigable waterway by the United States Coast Guard. See **Appendix A** for a USGS Regional Project Location Map.

1.2.1 Logical Termini

The project's western study limits fall within the City of Miami, while the eastern study limits fall within North Bay Village. Outside the project limits, NE 79th Street is expected to remain as a six-lane urban principal arterial. Therefore, to align with the existing configuration and accommodate additional lanes being dropped or added at the intersections, the logical termini for this project involve NE 79th Street from west of Pelican Harbor Drive (western terminus) to east of Adventure Avenue (eastern terminus). These logical termini also allow for full inclusion of the intersection footprints.



Figure 1 | Study Area

1.3 Purpose and Need

1.3.1 Purpose

The purpose of this project is to evaluate bridge replacement alternatives to address the structural deficiencies of four existing bridges (two bridge pairs) along NE 79th Street. Additionally, a project goal is to maintain emergency evacuation capabilities.

1.3.2 Need

The project is needed to address substandard structural elements and to maintain evacuation and emergency response times.

2 Existing Conditions

2.1 Existing Typical Section

The existing section of NE 79th Street consists of a curb and gutter section with four 11-foot-wide travel lanes to the inside and two 13.5-foot-wide travel lanes to the outside, and a raised median. The outside travel lanes include shared-use markings to accommodate bicycles. In addition, a 5-foot-wide raised sidewalk is present on each side of the roadway. **Appendix E** shows existing typical sections.

2.2 Existing Drainage

Based on survey information, as-builts, aerial photos and a site visit completed on August 29th, 2023, the current stormwater system is divided into six systems. All six systems currently directly discharge without water quality treatment to Biscayne Bay, which is considered an Outstanding Florida Water (OFW) system.

The electronic survey file received depicts the location of the existing inlets and manholes within the project limits. Invert information is available only at the intersection of NE 79th Street and Adventure Avenue. The as-builts detail the invert elevations, drainage structures type, and size of pipes within the project limits.

The **First System** is located on the west side of the project between Pelican Harbor Drive and the beginning of Bridge No. 870083 (westbound) and Bridge No. 870549 (eastbound). The stormwater runoff is collected via curb inlets along both sides of the roadway. Each curb inlet currently has a direct discharge to Biscayne Bay without previous water quality treatment. Per the as-builts and existing permits, the diameter of each discharge pipe is 15”.

The **Second System** corresponds to the existing limits of Bridge No. 870083 (westbound)/Bridge No. 870549 (eastbound). Along this system, the stormwater is collected via scuppers which have a direct discharge into Biscayne Bay.

The **Third System** is located at the end limit of Bridge No. 870083 (westbound)/Bridge No. 870549 (eastbound) and Larry Paskow Way (Harbor Island Drive). Along this system, the stormwater is collected via curb inlets type P-6, connected via 15” pipes to one manhole located in the middle of the eastbound lane which directs the flow to the west through a 24” diameter pipe and directly discharges to Biscayne Bay. Per as-builts, the outfall is located under the southeast side of Bridge No. 870549. The exact location of the 24” outfall was not depicted on the electronic survey map.

The **Fourth System** is located east of Harbor Island between Larry Paskow Way (Harbor Island Drive) and Bridge No. 870084 (westbound)/Bridge No. 870550 (eastbound). Along this system, the stormwater is collected via curb inlets type P-6 and P-9/P-10, connected via 15” diameter pipes to one manhole located in the middle of the eastbound lane and directs the flow to the east through a 24” diameter pipe and directly discharges to Biscayne Bay. Per as-builts, the outfall is located on the southwest side of Bridge No. 870550. The exact location of the 24” outfall was not depicted on the survey map.

The **Fifth System** corresponds to the existing limits of Bridge No. 870084 (westbound)/Bridge No. 870550 (eastbound). Along this system the stormwater is collected via scuppers which have a direct discharge into the bay.

The **Sixth System** is located at the east of the project between the end of Bridge No. 870084 (westbound)/Bridge No. 870550 (eastbound) and east of Adventure Avenue. Along this system the stormwater is collected via curb inlets type P-6 and P-9/P-10, connected via 15” diameter pipes to one manhole located on the middle of the eastbound lane and directs the flow to the west through a 30” diameter pipe and discharges to Biscayne Bay. Per as-builts, the outfall is

located on the southeast side of Bridge No. 870550. The exact location of the 30" outfall was not depicted on the survey map.

Pre drainage maps have been included with the Conceptual Drainage Design Report under separate cover.

2.3 Soils

Based on the U.S. Department of Agriculture (USDA) web soil survey, it was determined that the soil property within the project falls in urban land. The Natural Resource Conservative Service, Web Soil Map & Survey is included in **Appendix C**.

2.4 Existing Land Use

The project land use is primarily urban land association, and no future land use change is anticipated within project corridor. A copy of the Miami-Dade County land use plan is included in **Appendix D**.

2.5 Cross Drains

Existing cross drains were located based on existing construction plans, FDOT Straight Line Diagrams (SLDs), and field investigations. The SLD shows 18-inch pipe sizes.

The existing cross drain locations are summarized in **Table 1** and shown in **Appendix F**. More information and analysis of existing cross drains will be required during the final design.

Table 1 | Summary of Cross Drains

CD No.	Approx. Location	Size and Material	Approx. Length	Description
CD 1	43+00	15-Inch Conc. Pipe	24 ft	Connected with Type P-5 inlet
CD 2	43+90	15-Inch Conc. Pipe	24 ft	Connected with Type P-5 inlet
CD 3 LT	49+00	15-Inch Conc. Pipe	25 ft	Connected with Type P-6 inlet
CD 3 RT	49+00	15-Inch Conc. Pipe	23 ft	Connected with Type P-6 inlet
CD 4 LT	55+04	15-Inch Conc. Pipe	15 ft	Connected with Type P-6 inlet
CD 4 RT	55+06.5	15-Inch Conc. Pipe	23 ft	Connected with Type P-6 inlet

2.6 Floodplains and Floodways

NE 79th Street falls within the limits of Community Panel 12086C0306L and 12086C0307L of the FEMA FIRM Maps for Miami Dade County. The project is within FEMA flood zone AE where Base Flood is determined as EL 10 ft. NGVD (10.00-1.54 = 8.46 ft. NAVD) at the west end of

the project and 9.0 ft. NGVD (9.00- 1.54 = 7.46 ft. NAVD) at east end of the project. For more details, refer to **Appendix B**.

Floodplain encroachment calculations were completed for the existing conditions. Preliminary evaluation indicates that the existing roadway and bridges are below the 7.46 NAVD; therefore, floodplain encroachment for this project is not significant and mitigation for the floodplain encroachment is not required. The proposed improvement will result in no adverse floodplain impact.

2.7 Flooding History

To determine the flooding history in the project area, FDOT construction plans, United States Geological Survey (USGS) Quadrangle maps, South Florida Water Management District (SFWMD) information, and FEMA Flood Insurance Rate Maps (FIRM) were used for areas within the corridor. A field inspection was conducted to identify obvious drainage problems. Additionally, FDOT District Six North Dade Maintenance staff members were contacted to obtain information about local drainage conditions. One minor flooding event was identified that occurred on 10/1/2022 within FDOT right-of-way, which was caused by a clogged drain, and it was confirmed that the existing cross drains have adequate hydraulic capacity.

3 Proposed Conditions

3.1 Proposed Typical Section

The proposed typical section of NE 79th St consists of a curb and gutter section with two 10-foot-wide travel lanes on the inside and one 11-foot-wide travel lane on the outside of the roadway, along with a raised median. Additionally, 7-foot-wide bike lanes are included on the outside to accommodate bicycles. In addition, there is a 6-foot-wide raised sidewalk on each side of the roadway. Proposed typical sections are provided in **Appendix E**.

3.2 Proposed Drainage

Based on the proposed roadway and bridge profile for Alternative 2B, the drainage system is divided into four systems that will comply with all water quality and quantity requirements required by the permitting agencies having jurisdiction along the corridor.

The limits for proposed **System 1** are located from the western limit of the project, between Pelican Harbor Drive and the high point at Bridge No. 870083 (westbound) and Bridge No. 870549 (eastbound) at Sta. 60+79.25. The stormwater runoff will be collected via curb inlets along both sides of the road and will be treated and attenuated before discharging into Biscayne Bay.

The limits for proposed **System 2** are located between the high point at Bridge No. 870083 (westbound) and Bridge No. 870549 (eastbound) at Sta. 60+79.25 and Larry Paskow Way. The stormwater runoff will be collected via curb inlets along both sides of the road and will be treated and attenuated before discharging into Biscayne Bay.

The limits for the proposed **System 3** are from Larry Paskow Way and the high point of Bridge No. 870084 (westbound)/Bridge No. 870550 (eastbound) at Sta. 76+45.00. The stormwater runoff will be collected via curb inlets along both sides of the road and will be treated and attenuated prior to discharging into Biscayne Bay.

The proposed **System 4** limits are located between the high point of Bridge No. 870084 (westbound)/Bridge No. 870550 (eastbound) at Sta. 76+45.00 and east of Adventure Avenue at Sta. 93+00.00. The east limits of this system extend beyond the area of study due to the existing drainage system in place. The stormwater runoff will be collected via curb inlets along both sides of the road and will be treated and attenuated prior to discharging into Biscayne Bay.

Proposed drainage maps, treatment, attenuation, and spread calculations are included in the Conceptual Drainage Design Report under separate cover.

3.3 Future Land Use

The Miami-Dade County Future Land Use Map is shown in **Appendix D**. It shows that the future land uses in the project area will remain mostly unchanged.

3.4 Proposed Cross Drains

All cross drains along the project limits will remain as part of the proposed improvements. During the final design phase, the exact nature of the any modifications will be determined.

3.5 Floodplains and Floodways

Floodplain encroachment is estimated using as-built roadway cross-sections and proposed roadway improvements. The proposed roadway area is below the FEMA floodplain elevation except the proposed two bridge structures. The proposed structures will perform hydraulically in a manner equal to or greater than the existing structures, and backwater surface elevations are not expected to increase. As a result, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Also proposed improvements within the roadway are below FEMA flood elevation. Therefore, it has been determined that the floodplain encroachment for this project is not significant and mitigation for the floodplain encroachment is not required.

3.6 Project Classification

In accordance with FDOT's PD&E Manual, Part 2, Chapter 13, Floodplains, the corridor has been evaluated to determine the impact of the proposed hydraulic modifications. Hydraulic improvements are grouped into five categories based upon the type of hydraulic improvements and estimated floodplain impact.

The proposed project can be best described as Project Activity Category 4 – Projects on existing alignment involving replacement of existing drainage structures with no record of drainage problem. This type of work excludes replacement activities that would increase the hydraulic performance of existing facilities. Also, there should be no record of drainage

problems and no unresolved complaints from residents in the area. The proposed structure will perform hydraulically in a manner equal to or greater than the existing structure, and backwater surface elevations are not expected to increase. Thus, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.

3.7 Risk Evaluation

FDOT's PD&E Manual, Part 2, Chapter 13, Floodplains, refers to Title 23 CFR Part 650A in conducting the risk evaluation. Because it has been determined that there is No Encroachment (No Encroachment means that there are floodplains in the vicinity of the project alternatives, but there is no floodplain encroachment), it can be concluded that the encroachments do not create:

- Risks to transportation infrastructure (road closure, repair costs)
- Risks to highway users (loss of life, service disruption)
- Risks to property owners (damages, service disruption, property loss).

3.8 Coordination with Local Agencies

Coordination with South Florida Management District (SFWMD) and Florida Department of Environment Protection (FDEP) has taken place during PD&E Study:

- SFWMD - General Environmental Resource Permit (ERP) and the Standard Right of Way Occupancy Permit.
- FDEP – An NPDES (Erosion Control Plans, Stormwater Pollution Prevention Plan, Notice of Intent, and Notice of Termination) Permit is required due to disturbance of more than 1 acre of soil.

3.9 PD&E Manual Requirement's with No Encroachment

No Encroachment means that there are floodplains in the vicinity of the project alternatives, but there is no floodplain encroachment.

4 Recommendation and Conclusions

The encroachments to the floodplains along the project corridor are considered No Encroachment.

No Encroachment - No encroachment means that there are floodplains in the vicinity of the project alternatives, but there is no floodplain encroachment.

5 References

FDOT Drainage Manual dated January 2023.

FDOT PD&E Manual, 2023.

FDOT Drainage Design Guide January 2023.

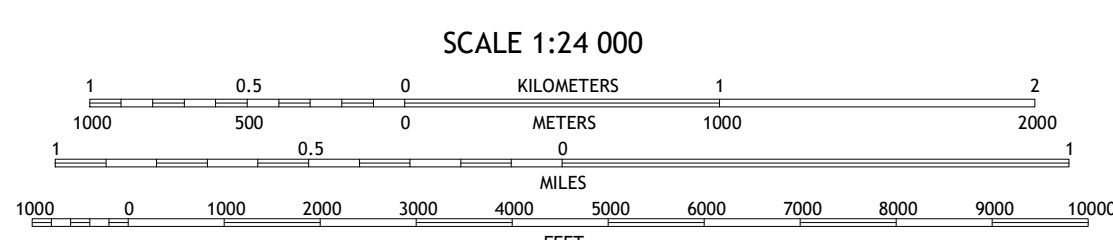
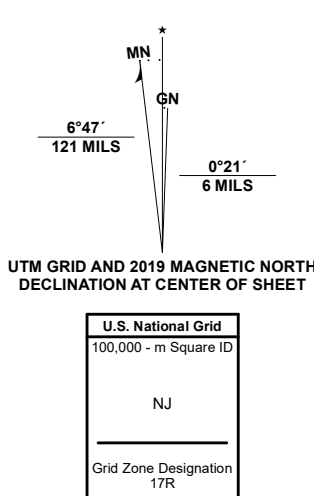
FDOT Design Standards 2023.

SFWMD Environmental Resource Permit Information Manual, 2016.

Appendix A Project Location Map



Produced by the United States Geological Survey North American Datum of 1983 (NAD83) World Geodetic System of 1984 (WGS84) Projection and 1 000-meter grid/Universal Transverse Mercator, Zone 17R. This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.



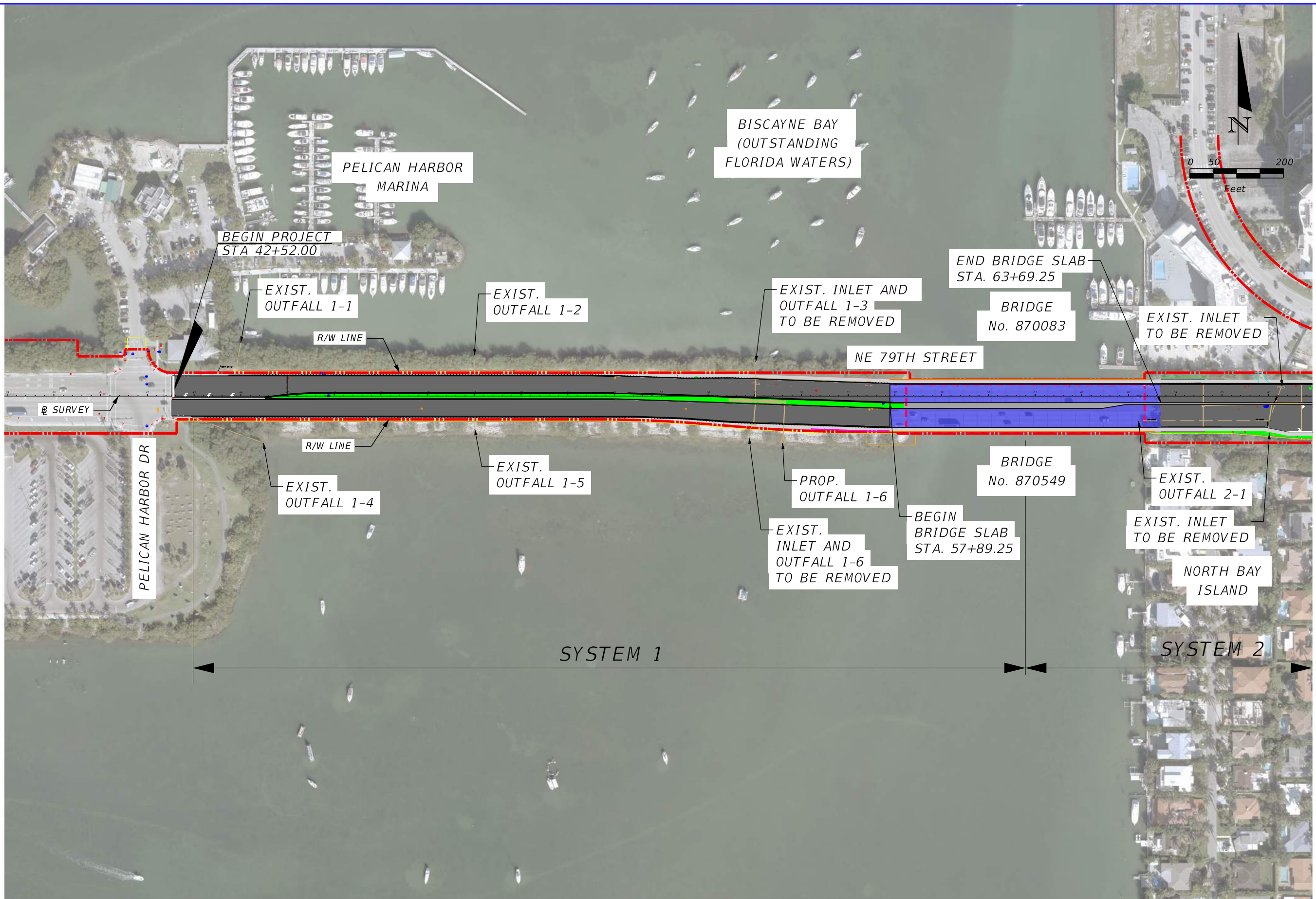
CONTOUR INTERVAL 10 FEET NORTH AMERICAN VERTICAL DATUM OF 1988. This map was produced to conform with the National Geospatial Program US Topo Product Standard.

1	2	3
4	5	6
7	8	9

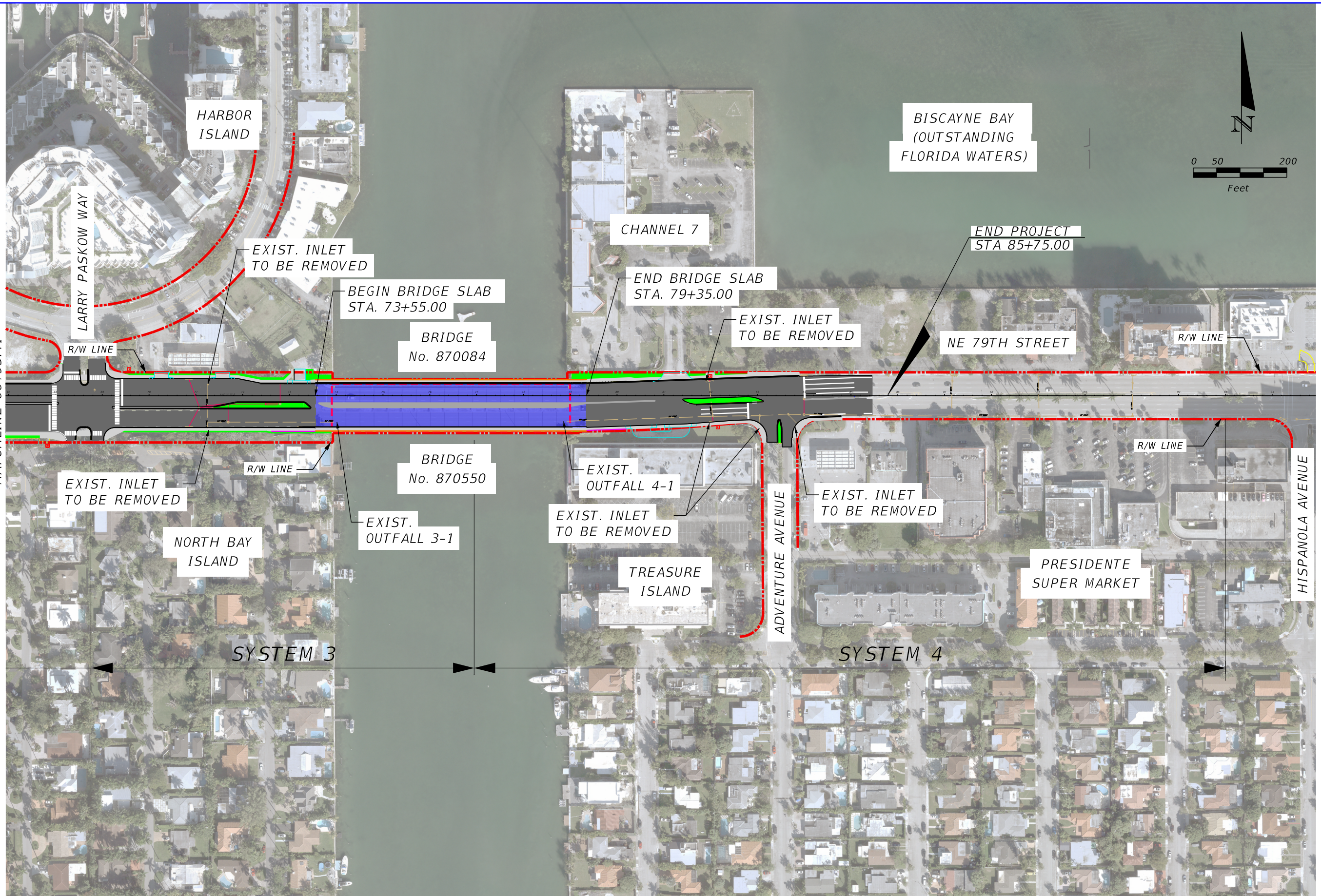
ADJOINING QUADRANGLES

ROAD CLASSIFICATION

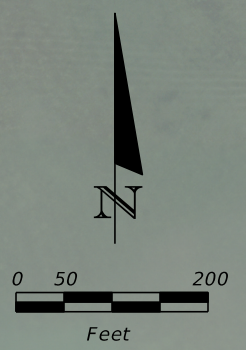
Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
	State Route



REVISIONS				ROHAN A HAMEED, P.E. P.E. LICENSE NUMBER 56734 HDR ENGINEERING, INC. 3250 W. COMMERCIAL BLVD., SUITE 100 FORT LAUDERDALE, FL 33309-3451	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PROJECT LOCATION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 934	MIAMI-DADE	449007-1-22-01		



MATCHLINE 66+93.41



REVISIONS				ROHAN A HAMEED, P.E. P.E. LICENSE NUMBER 56734 HDR ENGINEERING, INC. 3250 W. COMMERCIAL BLVD., SUITE 100 FORT LAUDERDALE, FL 33309-3451	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
					SR 934	MIAMI-DADE	449007-1-22-01	PROJECT LOCATION

Appendix B FEMA FIRM Maps of Miami Dade County

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane east zone (FIPSZONE 0901). The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was provided in digital format by the Miami-Dade County Information Technology Department. These data were compiled at a scale of 1:3,600 from digital orthophotography dated 2001. Additional base map information was provided by the Cities of Aventura, Coral Gables, and Homestead, and the Town of Cutler Bay, and Miami-Dade County.

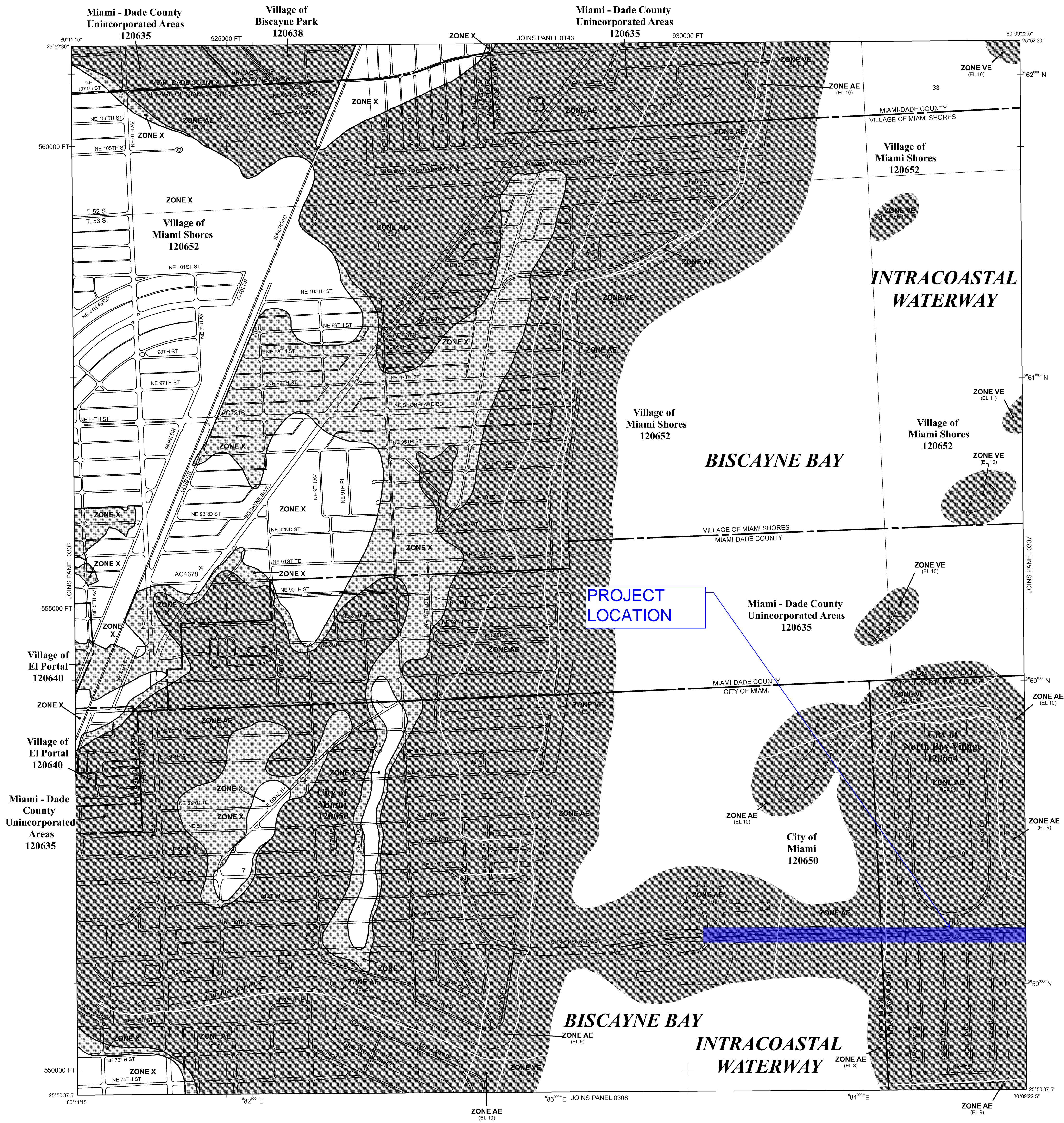
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://msc.fema.gov>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE D Areas in which flood hazards are undetermined, but possible.
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

- * Referenced to the National Geodetic Vertical Datum of 1929
- Cross section line
- Transsect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid values, zone 17
- 5000-foot grid ticks; Florida State Plane coordinate system, East Zone (FIPSZONE 0901), Transverse Mercator projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
January 20, 1993

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
March 2, 1994 - May 16, 1994 - July 17, 1995 - for description of revision, see Notice to Users page in the Flood Insurance Study report.
September 11, 2009 - to reflect revised shoreline, to reflect updated topographic information, to update corporate limits, to add and change Base Flood Elevations, to change zone designations, to add roads and road names, to add and change Special Flood Hazard Areas, and to incorporate previously issued Letters of Map Revision

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0306L

FIRM
FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 306 OF 1031
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BISCAYNE PARK, VILLAGE OF	120638	0306	L
EL PORTAL, VILLAGE OF	120640	0306	L
MIAMI-DADE COUNTY	120635	0306	L
MIAMI SHORES, VILLAGE OF	120652	0306	L
MIAMI, CITY OF	120650	0306	L
NORTH BAY VILLAGE, CITY OF	120654	0306	L

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12086C0306L

MAP REVISED
SEPTEMBER 11, 2009

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane east zone (FIPSZONE 0901). The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
S/MC-3, #9202
1315 East/West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was provided in digital format by the Miami-Dade County Information Technology Department. These data were compiled at a scale of 1:3,600 from digital orthophotography dated 2001. Additional base map information was provided by the Cities of Aventura, Coral Gables, and Homestead, the Town of Cutler Bay, and Miami-Dade County.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://msc.fema.gov>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.

LEGEND

SPECIAL FLOOD HAZARD SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A**
No Base Flood Elevations determined.
- ZONE AE**
Base Flood Elevations determined.
- ZONE AH**
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO**
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR**
Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99**
Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V**
Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE**
Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X
Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D
Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
(EL. 987)
- Base Flood Elevation value where uniform within zone; elevation in feet*

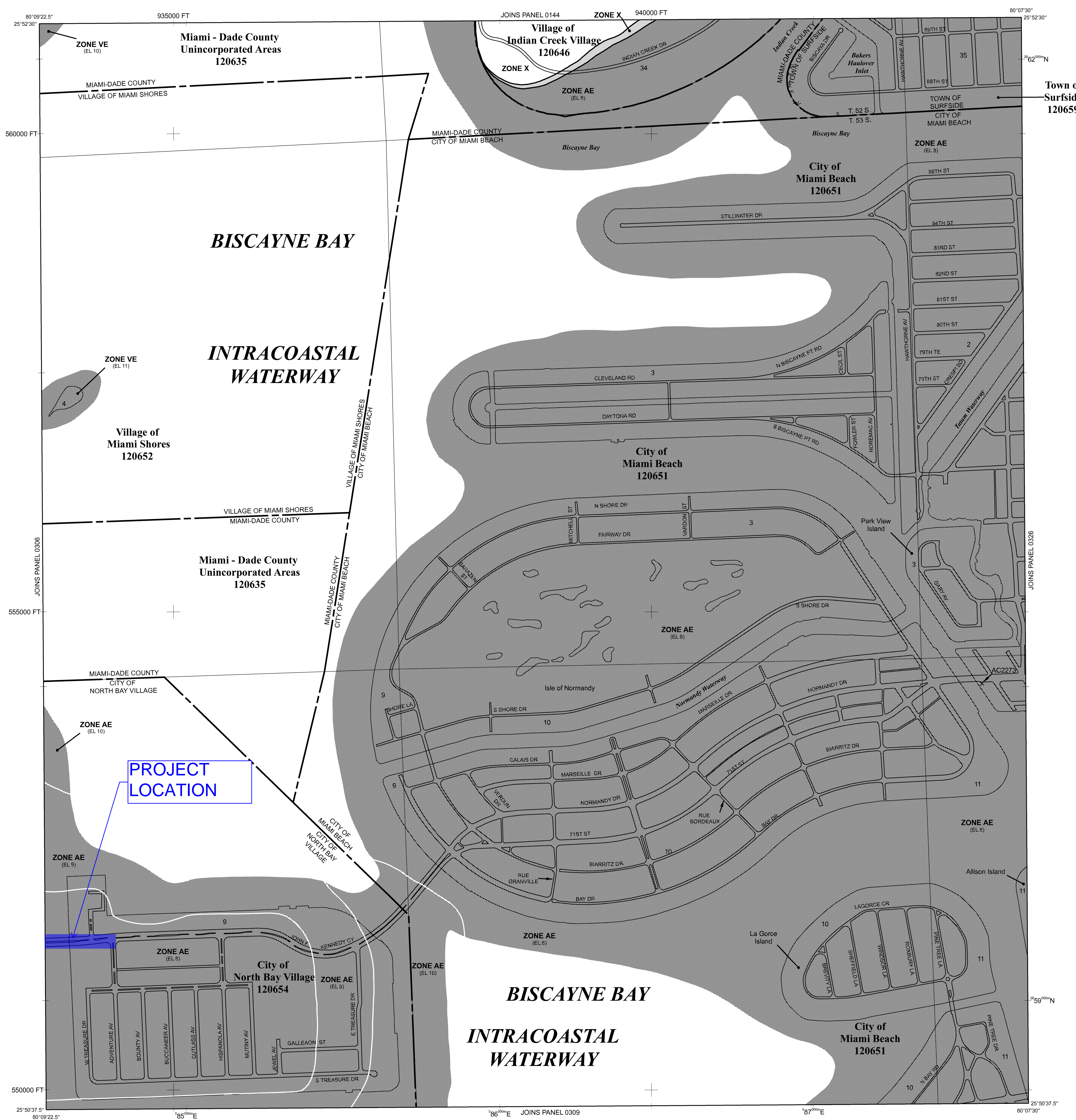
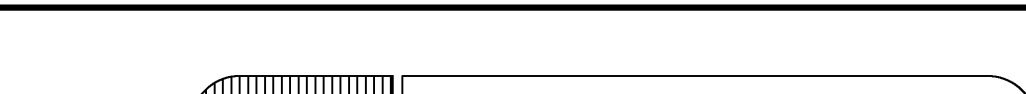
- * Referenced to the National Geodetic Vertical Datum of 1929
- ⊕ ⊖ Cross section line
- ⊕ ⊖ Transsect line
- 87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 17°06'00"N 1000-meter Universal Transverse Mercator grid values, zone 17
- 600000 FT 5000-foot grid ticks: Florida State Plane coordinate system, East zone (FIPSZONE 0901), Transverse Mercator projection
- DX5510 x Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
January 20, 1993

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
March 2, 1994 - May 16, 1994 - July 17, 1995 - for description of revision, see Notice to Users page in the Flood Insurance Study report.
September 11, 2009 - to reflect revised shoreline, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information, to update corporate limits, to add and change Base Flood Elevations, to change zone designations, to add roads and road names, and to add and change Special Flood Hazard Areas

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.
To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



PANEL 0307L

FIRM FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 307 OF 1031
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
INDIAN CREEK VILLAGE, VILLAGE OF	120646	0307	L
MIAMI-DADE COUNTY	120635	0307	L
MIAMI BEACH, CITY OF	120651	0307	L
MIAMI SHORES, VILLAGE OF	120652	0307	L
NORTH BAY VILLAGE, CITY OF	120654	0307	L
SURFSIDE, TOWN OF	120659	0307	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12086C0307L

MAP REVISED SEPTEMBER 11, 2009

Federal Emergency Management Agency

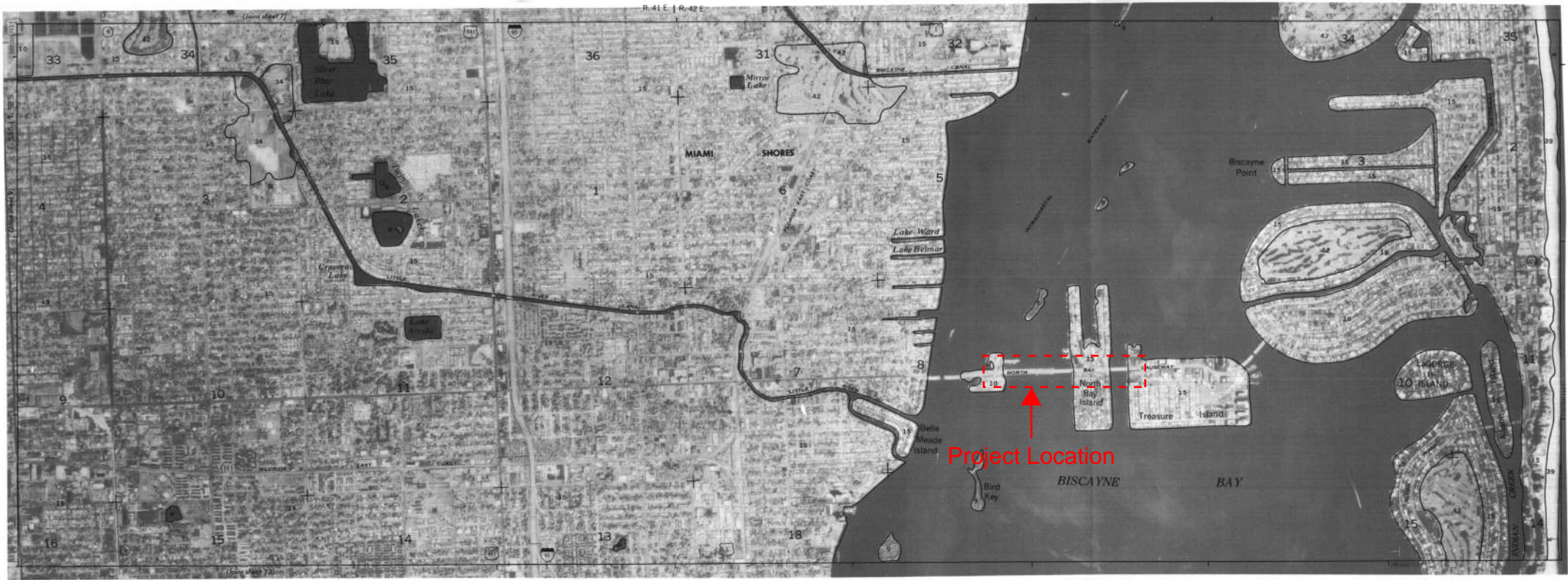


Appendix C Natural Resource Conservative Service Soil Map

SOIL SURVEY OF DADE COUNTY AREA, FLORIDA - SHEET NUMBER 10

10

N



bedrock. They consist of unconsolidated or heterogeneous geologic material removed during the excavation of ditches, canals, lakes, ponds, and quarries. The material commonly is piled along banks or in scattered areas. Slopes are 15 to 60 percent. About 65 percent of this map unit is Udorthents, and about 20 percent is water. Included in this map unit are small areas of a Udorthents-Urban land complex, which makes up less than 15 percent of any one area.

Typically, the Udorthents consist of mixed light gray and white limestone gravel and loamy carbonatic material, which extend to a depth of 80 inches or more.

The water table in areas of the Udorthents is within the limestone bedrock. Permeability is moderate.

Weeds and native grasses have become established in some areas. Other areas support little or no vegetation.

This map unit is not used as cropland. In many areas it is used as a source of road-building material and as a source of fill for new homesites, golf courses, and other purposes.

No capability classification is assigned.

10—Udorthents, limestone substratum-Urban land

complex. About 40 to 70 percent of this map unit consists of Udorthents in open areas, and 25 to 60 percent consists of Urban land, or areas covered by concrete and buildings. The Udorthents and Urban land occur as areas so intermixed or so small that mapping them separately is impractical. Slopes are 0 to 2 percent.

The Udorthents are in areas of lawns, vacant lots, parks, and playgrounds. The Urban land consists of streets, driveways, sidewalks, parking lots, buildings, and other structures in areas where the soil is covered and cannot be readily observed.

Typically, the Udorthents consist of fill material that is light gray and white extremely stony loam about 55 inches thick. The fill material is underlain by hard, porous limestone bedrock.

Included in this map unit are small areas of Krome and Cardsound soils and areas in which the fill material is less than 8 or more than 80 inches thick. Also included are areas where a few inches of marl is between the fill and the limestone and areas where 2 to 4 inches of marl overlies the stony fill. Included soils make up 10 percent or less of any one area. Cardsound and Krome soils are in positions on the landscape similar to those of the Udorthents. They are very shallow over limestone bedrock.

The water table in areas of the Udorthents is within the limestone bedrock. Permeability is moderate in the stony fill material.

This map unit is not used as cropland. The Udorthents consist mostly of stony limestone fragments used as fill material in low areas. The fill material improves the suitability of the low areas for building site development or other urban uses. If lawns and ornamental plants are to be established and maintained on the soils in this map unit, a layer of good topsoil about 6 inches thick is needed. Proper watering and regular applications of fertilizer also are needed.

No capability classification is assigned.

11—Udorthents, marl substratum-Urban land complex. About 40 to 70 percent of this map unit consists of Udorthents in open areas, and 25 to 60 percent consists of Urban land, or areas covered by concrete and buildings. The Udorthents consist of heterogeneous geologic material that has been excavated and spread. The Udorthents and Urban land occur as areas so intermixed or so small that mapping them separately is impractical. Slopes are 0 to 2 percent.

The Udorthents are in areas of lawns, vacant lots, parks, and playgrounds. The Urban land consists of streets, driveways, sidewalks, parking lots, buildings, and other structures in areas where the soil is covered and cannot be readily observed.

Typically, the upper 12 inches of the Udorthents is fill material that is light gray very gravelly loam. The next 29 inches is brown gravelly sandy loam. Below this to a depth of 60 inches or more is natural soil, which is predominantly marl that has a texture of silt loam. Hard, porous limestone bedrock is at a depth of 60 inches or more.

Included in this map unit are small areas in which the fill material is less than 40 or more than 80 inches thick. Also included are areas where the fill material directly overlies limestone bedrock or muck. Included soils make up 10 percent or less of any one area.

Depth to the water table in the Udorthents is dominantly more than 40 inches, but it varies, depending on the thickness of the fill material. Permeability is moderately slow or moderate in the layers of marl.

This map unit is not used as cropland. The Udorthents consist of gravelly limestone fragments used as fill material in low areas of marl. The fill material improves the suitability of the low areas for building site development or other urban uses. If lawns and ornamental plants are to be established and maintained on the soils in this map unit, a layer of good topsoil about 6 inches thick is needed. Proper watering and regular applications of fertilizer also are needed.

No capability classification is assigned.

The natural vegetation consists of sawgrass, cattail, primrose willow, smooth cordgrass, buttonbush, boneset, gulf muhly, broom sedge, and a variety of water-tolerant sedges and grasses. Calcium carbonate crusted periphyton covers the surface and bases of plants in many areas. Exotic tree species, including Australian pine, Brazilian pepper, and melaleuca, have become established in some areas. Areas of this soil provide habitat for wading birds, aquatic reptiles, small crustaceans, and other kinds of wetland wildlife.

This soil is poorly suited to cultivated crops, nursery plants, and pasture because of the ponding. In areas nearest to the coast, the soil is too saline for most cultivated crops and ornamental nursery plants. If a complete water-control system, including canals and field ditches, were installed and carefully maintained, many areas of the soil would be well suited to a variety of vegetable crops, ornamental nursery plants, and pasture.

This soil is unsuited to the production of citrus, mangos, and avocados because of the ponding.

This soil is not used as rangeland or forest land. It is in the Sawgrass Marsh and Freshwater Marsh ecological plant communities.

This soil is severely limited as a site for buildings, sanitary facilities, and recreational development because of the ponding and the depth to bedrock. Extensive water-control measures and large amounts of suitable fill material are needed to overcome these limitations.

The capability subclass is VIIw.

14—Dania muck, depressional. This shallow, nearly level, very poorly drained soil is in poorly defined drainageways and adjacent to deeper organic soils within sawgrass marshes. It is ponded for 9 to 12 months in most years. Individual areas are long and are narrow or broad. They range from 6 to 3,000 acres in size. Slopes are smooth and are less than 2 percent.

On 95 percent of the acreage mapped as Dania muck, depressional, Dania and similar soils make up 83 to 99 percent of the mapped areas.

Typically, the surface layer is black muck about 15 inches thick. Soft, porous limestone bedrock is at a depth of about 15 inches.

Included in mapping are soils that are similar to Dania muck, depressional, but have limestone bedrock at a depth of more than 20 or less than 8 inches or have a layer of periphyton or marl in the upper 1 to 8 inches.

Dissimilar soils that are included with this soil in mapping occur as small areas of Biscayne soils and small areas of Udorthents. Dissimilar soils make up 1 to 17 percent of most mapped areas. Biscayne soils are in

positions on the landscape similar to those of the Dania soil. They have a surface layer of marl. Udorthents are in the slightly higher areas of mineral fill material.

Under natural conditions, the Dania soil usually is ponded throughout most of the year. The water table is within 10 inches of the surface for the rest of the year. Permeability is rapid in the organic material. Oxidation decreases the amount of organic material each year. If drained, the organic material initially shrinks to about half the original thickness and then subsides further as a result of compaction and oxidation. These losses are most rapid during the first 2 years. The lower the water table, the more rapid the loss. The marl does not subside.

Most areas support native vegetation, which consists of sawgrass and cattail. Melaleuca trees have invaded some areas. Areas of this soil provide cover for deer and excellent habitat for wading birds and other kinds of wetland wildlife.

Under natural conditions, this soil generally is not suited to cultivation. If water is controlled through a system of dikes, ditches, and pumps, however, the soil is well suited to most winter vegetable crops. A well designed and maintained water-control system can remove excess water during periods when crops are growing on the soil and can keep the soil saturated at all other times. Keeping the soil saturated minimizes oxidation. Cover crops and crop residue should be left on the surface or plowed under. Fertilizer should be applied according to the needs of the crop. In some areas the soil is used as improved pasture. Improved bahiagrass and pangolagrass are suitable.

This soil is not suited to the production of citrus, mangos, or avocados because of the wetness.

This soil is not used as native rangeland or forest land. It is in the Sawgrass Marsh ecological plant community.

This soil is severely limited as a site for buildings, sanitary facilities, and recreational development because of the ponding, excess humus, low strength, and the depth to bedrock. Water-control measures are needed to prevent ponding. The organic material should be removed, and suitable backfill material should be provided. Sealing or lining sewage lagoons and trench sanitary landfills with impervious soil material helps to prevent seepage. Mounding may be needed on sites for septic tank absorption fields.

The capability subclass is VIIw.

15—Urban land. This map unit is in areas where more than 85 percent of the surface is covered by shopping centers, parking lots, streets, sidewalks, airports, large buildings, houses, and other structures. The natural soil cannot be observed. The soils in open

areas, mostly lawns, vacant lots, playgrounds, and parks, are mainly Udorthents. These soils generally have been altered by land grading and shaping or have been covered with about 18 inches of extremely stony, loamy fill material. Areas of these soils are so small that mapping them separately is impractical.

No capability classification is assigned.

16—Biscayne marl, drained. This very shallow or shallow, nearly level, poorly drained soil is on broad, low coastal flats and in transverse glades that extend into the Pineland Ridge. Individual areas are broad and irregularly shaped or are rectangular. They range from 6 to 3,000 acres in size. Slopes are smooth or concave and are less than 2 percent.

On 95 percent of the acreage mapped as Biscayne marl, drained, Biscayne and similar soils make up 80 to 99 percent of the mapped areas.

Typically, the surface layer is about 5 inches of gray marl that has a texture of silt loam. The underlying layer, to a depth of about 15 inches, is gray and light gray marl that has a texture of silt loam. Hard, porous limestone bedrock is at a depth of about 15 inches. It has scattered small solution holes containing very dark gray, noncalcareous mucky silt loam.

Included in mapping are soils that are similar to Biscayne marl, drained, but have more than 15 percent gravel, by volume, are ponded and may have a continuous layer or layers of organic material that are more than 8 inches thick but make up less than half of the total soil depth, or have limestone bedrock at a depth of more than 20 or less than 40 inches.

Dissimilar soils that are included with this soil in mapping occur as small areas of Chekika, Dania, Lauderhill, and Pennsuco soils. Also included are areas of rock outcrop. Dissimilar inclusions make up about 1 to 20 percent of most mapped areas. Chekika soils are in the slightly higher positions on the landscape. They have more than 35 percent gravel in the surface layer. Dania and Lauderhill soils are in the slightly lower positions on the landscape. They have an organic surface layer. Pennsuco soils are in positions on the landscape similar to those of the Biscayne soil. They are deep or very deep over limestone bedrock.

The water table in the Biscayne soil remains within 10 inches of the surface for 4 to 6 months during most years, receding to as deep as 20 inches during dry periods. Permeability is moderate.

All areas have been drained and cultivated at some time in the past. The native vegetation no longer remains. Abandoned fields quickly become overgrown with thick stands of Brazilian pepper, leatherleaf fern, and a variety of shrubs, broadleaf weeds, and grasses.

A water-control system has been installed in most

areas. If the water-control system is properly maintained, this soil is well suited to a variety of shallow-rooted cultivated crops. Much of the cultivated acreage is used for corn, potatoes, snap beans, sorghum, malanga, or ornamental trees and shrubs. Land grading and smoothing fill in the small depressions that are common in areas of this soil and thus improve surface drainage and permit more efficient use of farm equipment and more uniform application of irrigation water. Bedding is necessary if ornamental plants or root crops are grown. Returning crop residue to the soil or regularly adding other organic material improves fertility and tilth and increases the rate of water intake. Prolonged cultivation with heavy equipment can result in the formation of a tillage pan. Subsoiling during dry periods helps to break up the pan and thus permits deeper root penetration. Disking during wet periods often results in cloddiness. Important management practices include preparing a good seedbed, applying fertilizer according to the results of soil tests and the needs of the crop, and controlling weeds and brush. Because of a high pH, some micronutrients may not be available to certain crops. Boron toxicity may affect some crops.

This soil is suited to pasture. Common bermudagrass and improved bahiagrass grow well if the pasture is properly managed. Regular applications of fertilizer are needed. Irrigation is needed during dry periods. Controlled grazing helps to prevent overgrazing and maintains plant vigor. Deferred grazing during wet periods helps to prevent compaction of the soil.

This soil is poorly suited to the production of citrus and mangos because of the wetness. It is unsuited to the production of avocados.

This soil generally is not used as rangeland or forest land. Under natural conditions, it is in the Freshwater Marsh and Sawgrass Marsh ecological plant communities.

This soil is severely limited as a site for buildings, sanitary facilities, and recreational development because of the wetness and the depth to bedrock. Additional drainage measures and large amounts of suitable fill material are needed to overcome these limitations.

The capability subclass is IIIw.

18—Tamiami muck, depressional. This moderately deep or deep, nearly level, very poorly drained soil is in freshwater swamps and marshes. It is ponded for 9 to 12 months in most years. Individual areas are broad and irregularly shaped and range from 50 to 1,000 acres in size. Slopes are smooth or slightly concave and are less than 2 percent.

On 95 percent of the acreage mapped as Tamiami

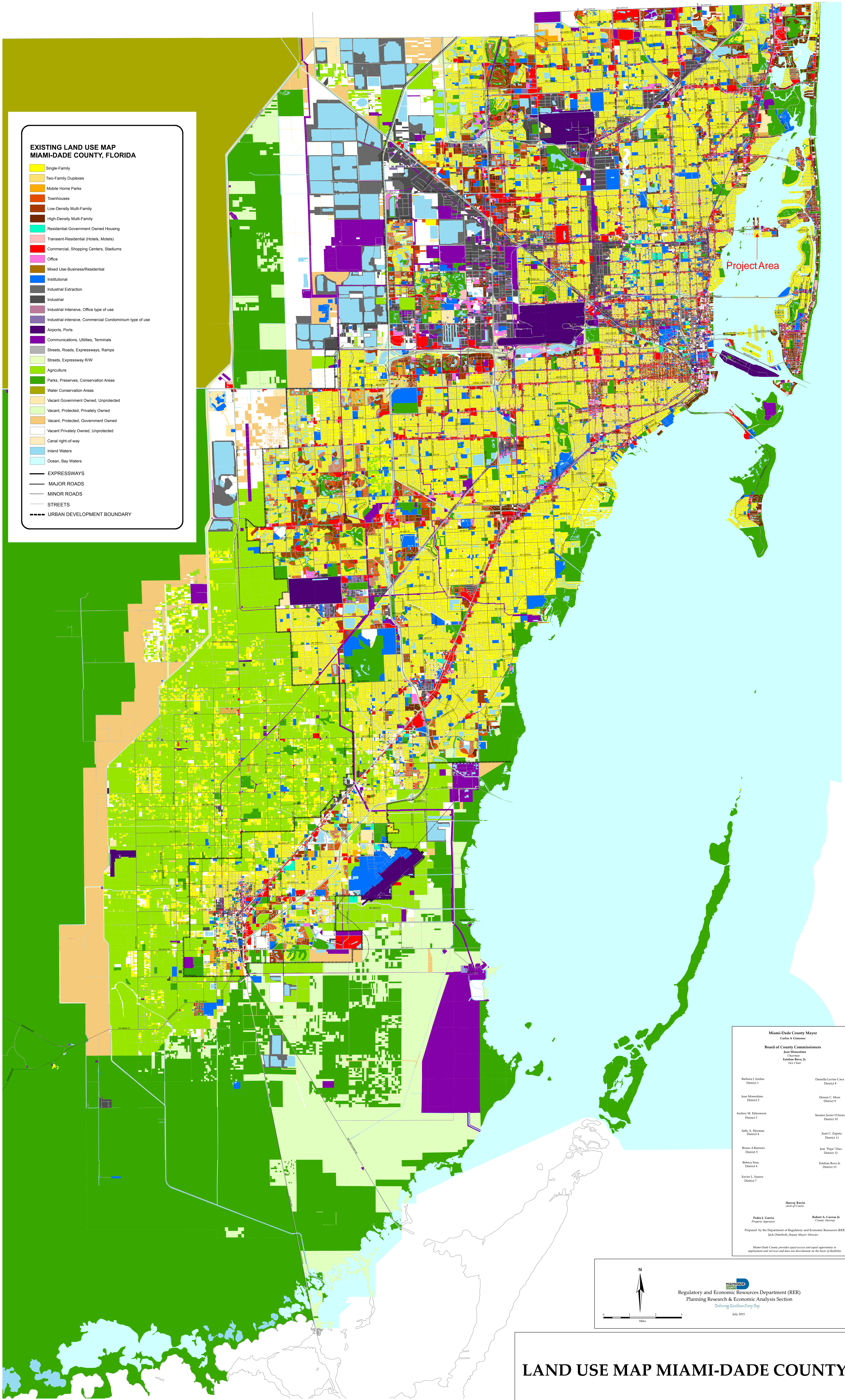
TABLE 11.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
2----- Biscayne	B/D	None-----	---	---	0-1.0	Apparent	Jun-Sep	1-20	Hard	---	---	High-----	Low.
3----- Lauderhill	B/D	None-----	---	---	+2-0	Apparent	Jun-Apr	20-40	Hard	12-16	16-24	High-----	Moderate.
4, 5----- Pennsuco	D	None-----	---	---	0-1.0	Apparent	Jun-Nov	40-72	Soft	---	---	High-----	Low.
6----- Perrine	D	None-----	---	---	+1-1.0	Apparent	Jun-Nov	20-40	Soft	---	---	High-----	Low.
7----- Krome	A	None-----	---	---	4.0-5.0	Apparent	Jun-Nov	2-10	Hard	---	---	Low-----	Low.
9*: Udorthents. Water.													
10*, 11*: Udorthents. Urban land.													
12----- Perrine	D	None-----	---	---	+1-1.0	Apparent	Jun-Nov	20-40	Soft	---	---	High-----	Low.
13----- Biscayne	B/D	None-----	---	---	0-1.0	Apparent	Jun-Sep	1-20	Hard	---	---	High-----	Low.
14----- Dania	B/D	None-----	---	---	+2-0	Apparent	Jun-Apr	8-20	Soft	4-8	8-14	High-----	Moderate.
15*. Urban land													
16----- Biscayne	B/D	None-----	---	---	0-1.0	Apparent	Jun-Sep	1-20	Hard	---	---	High-----	Low.

See footnote at end of table.

Appendix D Miami-Dade County Land Use Map



**EXISTING LAND USE MAP
MIAMI-DADE COUNTY, FLORIDA**

- Single-Family
- Two-Family Duplexes
- Mobile Home Parks
- Townhouses
- Low-Density Multi-Family
- High-Density Multi-Family
- Residential-Government Owned Housing
- Transient-Residential (Hotels, Motels)
- Commercial, Shopping Centers, Stadiums
- Office
- Mixed Use-Business/Residential
- Institutional
- Industrial Extraction
- Industrial
- Industrial Intensive, Office type of use
- Industrial Intensive, Commercial Condominium type of use
- Airports, Ports
- Communications, Utilities, Terminals
- Streets, Roads, Expressways, Ramps
- Streets, Expressway RW
- Agriculture
- Parks, Preserves, Conservation Areas
- Water Conservation Areas
- Vacant Government Owned, Unprotected
- Vacant, Protected, Privately Owned
- Vacant, Protected, Government Owned
- Vacant Privately Owned, Unprotected
- Canal right-of-way
- Inland Waters
- Ocean, Bay Waters
- EXPRESSWAYS
- MAJOR ROADS
- MINOR ROADS
- STREETS
- URBAN DEVELOPMENT BOUNDARY

Project Area

Miami-Dade County Mayor Carlos A. Giamoreo	
Board of County Commissioners	
Jan Manóvilva Chairman Esteban Bove, Jr. Vice Chair	
Barbara J. Jordan District 1	Daniella Levine-Cava District 8
Juan Merced District 2	Dennis C. Moss District 9
Audrey M. Edmonson District 3	Senaito Javier D. Sandoz District 10
Sally A. Heyman District 4	Juan C. Zapata District 11
Bruce A. Bannister District 5	Jose "Tito" Diaz District 12
Rebeca Sosa District 6	Esteban Bove, Jr. District 13
Xavier L. Satorre District 7	
Harvey Levin Acting Mayor	
Pedro J. Garcia Deputy Mayor	Robert A. Curran Jr. County Attorney
Prepared by the Department of Regulatory and Economic Resources (DER) Jack Oberholtz, Deputy Director	
Miami-Dade County provides equal access and equal opportunity in employment and services and does not discriminate on the basis of disability.	

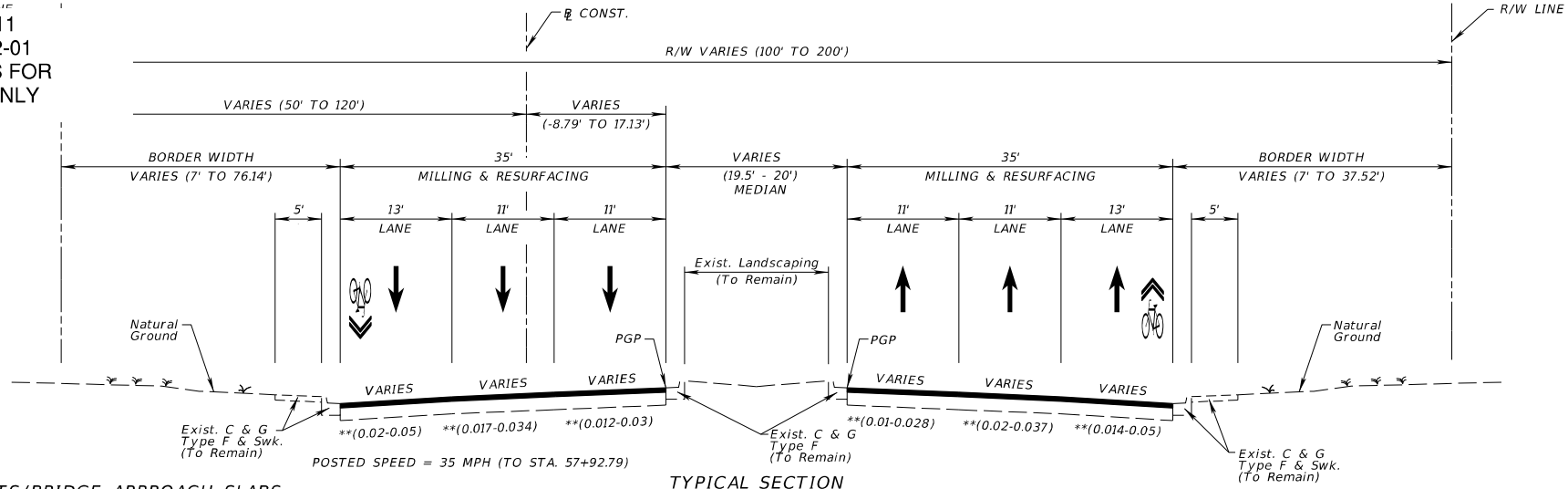
Regulatory and Economic Resources Department (RER)
 Planning Research & Economic Analysis Section
Building. Enriching. Energizing.
 July 2015

LAND USE MAP MIAMI-DADE COUNTY

Appendix E Existing and Proposed Typical Sections

Existing Typical Section

SHEET NO BX1-11
 FPID 436526-1-52-01
 EXISTING PLANS FOR
 INFORMATION ONLY



** MATCH EXISTING CROSS SLOPES
 APPROXIMATE RANGE IS SHOWN.
 Δ 1.75" BELOW LIP OF GUTTER ON THE LOW SIDE

SIDE STREETS/BRIDGE APPROACH SLABS

MILLING

Mill Existing Asphalt Pavement (1" Avg. Depth)

RESURFACING

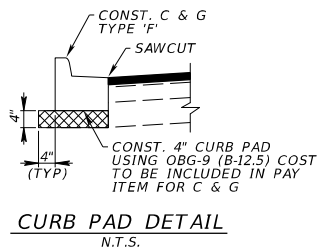
Friction Course FC-9.5 (Traffic C) (1") (PG 76-22-ARB)

TYPICAL SECTION
 SR 934 (NE 79th STREET CAUSEWAY)
 STA. 39+00.00 TO STA. 58+03.07

MILLING
 Mill Existing Asphalt Pavement (2" Avg. Depth) Δ

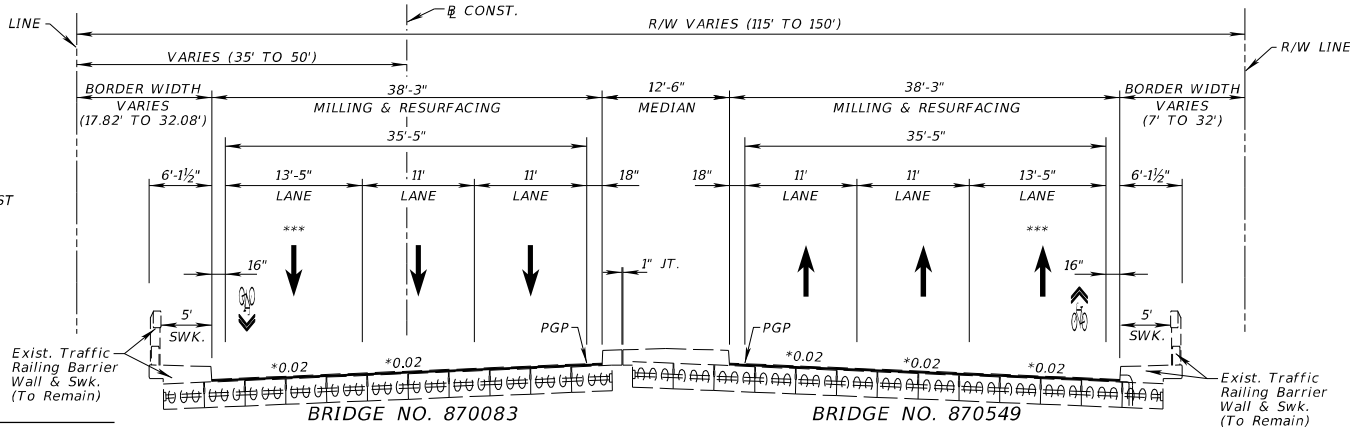
RESURFACING

Type SP Structural Course (Traffic C) (1")
 And Friction Course FC-9.5 (Traffic C) (1") (PG 76-22-ARB)



TRAFFIC DATA

CURRENT YEAR = 2013 AADT = 35,500
 ESTIMATED OPENING YEAR = 2015 AADT = 35,600
 ESTIMATED DESIGN YEAR = 2035 AADT = 39,700
 K = 8.98% D = 54.08% T = 8.32% (24 HOUR)
 DESIGN SPEED = 45 MPH
 POSTED SPEED = 35 MPH (TO STA. 63+38.04)



** MATCH EXISTING CROSS SLOPES
 APPROXIMATE RANGE IS SHOWN.
 *** PROVIDE SHARE-LANE MARKINGS AS PER DESIGN STANDARDS INDEX 17347.
 **** MILL TO TOP OF CONCRETE DECK

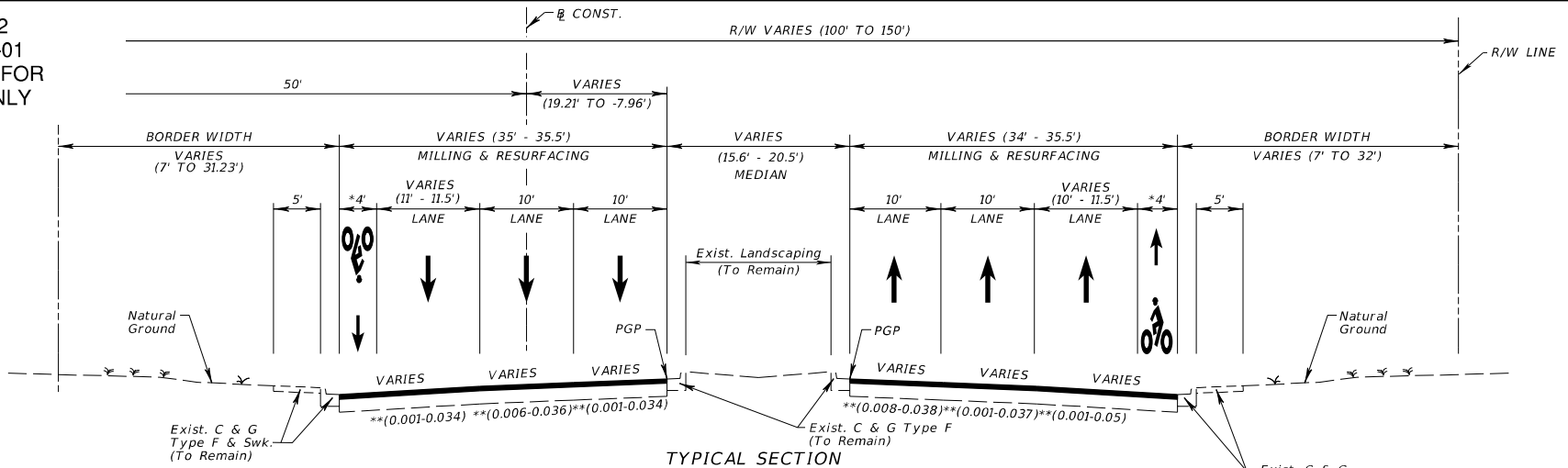
REVISIONS				AMERICAN ENGINEERS OF FLORIDA, LLC 2000 Palm Beach Lakes Boulevard, Suite 1000 West Palm Beach, FL 33409 Phone: (561) 253-9550 Fax: (561) 253-9551 Certificate of Authorization No. 9302 Andrew C. Nunes, P.E. No. 52731	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO. 11
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
					934	MIAMI-DADE	431180-1-52-01	

TYPICAL SECTION

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

Existing Typical Section

SHEET NO BX1-12
 FPID 436526-1-52-01
 EXISTING PLANS FOR
 INFORMATION ONLY



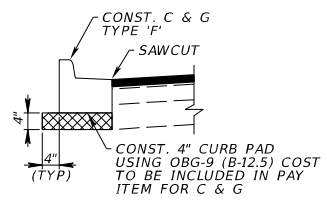
TYPICAL SECTION
 SR 934 (NE 79th STREET CAUSEWAY)
 STA. 63+38.04 TO STA. 73+90.65
 STA. 78+99.65 TO STA. 95+33.65

SIDE STREETS/BRIDGE APPROACH SLABS

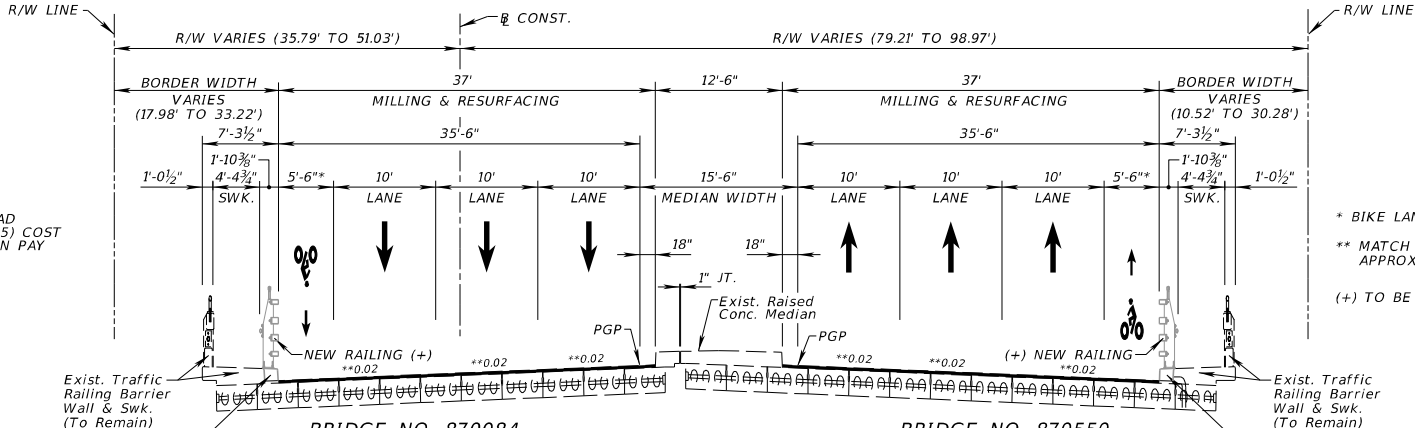
- MILLING**
 Mill Existing Asphalt Pavement (1" Avg. Depth)
- RESURFACING**
 Friction Course FC-9.5 (Traffic C) (1") (PG 76-22-ARB)

- MILLING**
 Mill Existing Asphalt Pavement (2" Avg. Depth) Δ
- RESURFACING**
 Type SP Structural Course (Traffic C) (1")
 And Friction Course FC-9.5 (Traffic C) (1") (PG 76-22-ARB)

* BIKE LANE
 ** MATCH EXISTING CROSS SLOPES
 APPROXIMATE VALUE OR RANGE IS SHOWN.
 Δ 1.75" BELOW LIP OF GUTTER ON THE LOW SIDE



CURB PAD DETAIL
 N.T.S.



STRUCTURES TYPICAL SECTION
 BRIDGE NO. 870084 BRIDGE NO. 870550
 STA. 73+90.65 TO STA. 78+99.65

- BRIDGES (WITH ASPHALT OVERLAY) MILLING**
 Mill Existing Asphalt Pavement (2" Max. Depth)****
- BRIDGES (WITH ASPHALT OVERLAY) RESURFACING**
 Type SP Structural Course (Traffic C) (1")
 And Friction Course FC-9.5 (Traffic C) (1") (PG 76-22-ARB)

* BIKE LANE
 ** MATCH EXISTING CROSS SLOPES
 APPROXIMATE VALUE OR RANGE IS SHOWN.
 (+) TO BE CONSTRUCTED UNDER FPID 431180-2-52-01

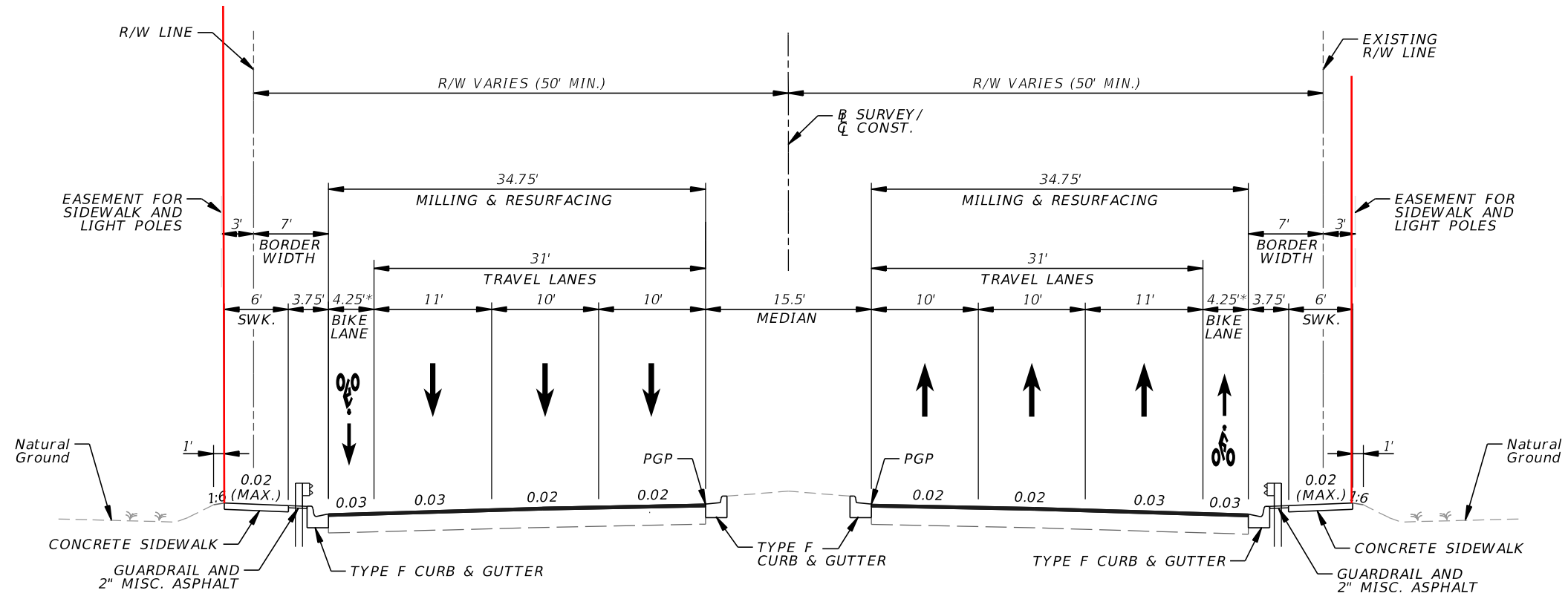
TRAFFIC DATA

CURRENT YEAR = 2013 AADT = 35,500
ESTIMATED OPENING YEAR = 2015 AADT = 35,600
ESTIMATED DESIGN YEAR = 2035 AADT = 39,700
K = 8.98% D = 54.08% T = 8.32% (24 HOUR)
DESIGN SPEED = 35 MPH, POSTED SPEED = 30 MPH

REVISIONS				AMERICAN ENGINEERS OF FLORIDA, LLC 2000 Palm Beach Lakes Boulevard, Suite 1000 West Palm Beach, FL 33409 Phone: (561) 253-9550 Fax: (561) 253-9551 Certificate of Authorization No. 9302 Andrew C. Nunes, P.E. No. 52731	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION	SHEET NO. 12
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					934	MIAMI-DADE	431180-1-52-01		

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

Proposed Typical Section

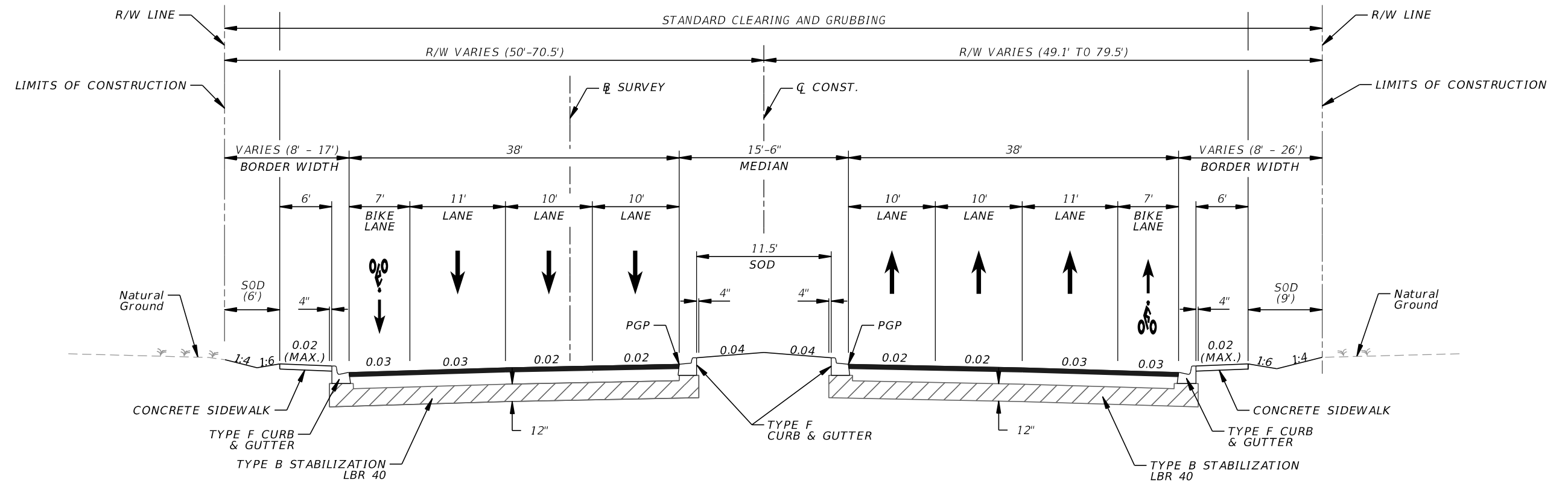


TYPICAL SECTION
 SR 934 / NE 79th STREET / JOHN F. KENNEDY CAUSEWAY
 STA. 42+52.00 TO STA. 54+00.00

CURRENT YEAR: 2023 AADT = 81700
 ESTIMATED OPENING YEAR: 2030 AADT = 85400
 ESTIMATED DESIGN YEAR: 2050 AADT = 95600
 K= 7.3% D=54.2% T= 2.4% (24 HOUR)
 DESIGN SPEED= 35 MPH
 TARGET SPEED= 35 MPH
 POSTED SPEED= 30, 35 MPH
 CONTEXT CLASSIFICATION= C5

REVISIONS				WILLIAM W. LEIDY, P.E. P.E. LICENSE NUMBER 83790 HDR ENGINEERING, INC. 3250 W. COMMERCIAL BLVD., SUITE 100 FORT LAUDERDALE, FL 33309-3451	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		2
					SR 934	MIAMI-DADE	449007-1-22-01		

Proposed Typical Section

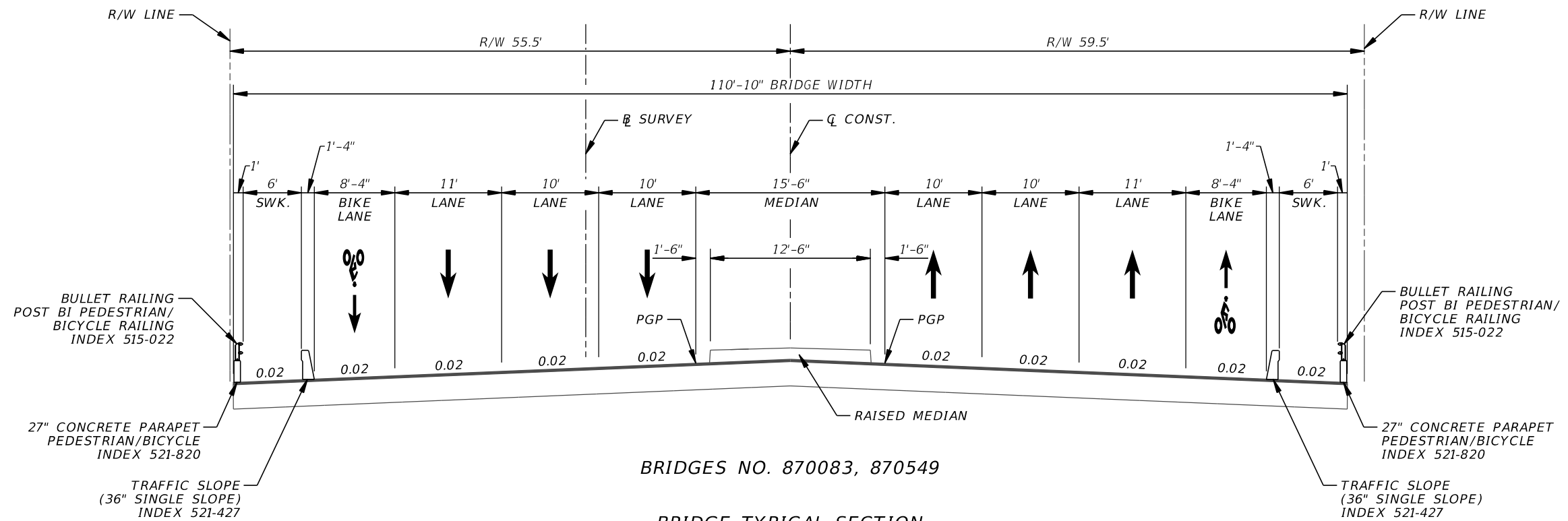


TYPICAL SECTION
 SR 934 / NE 79th STREET / JOHN F. KENNEDY CAUSEWAY
 STA. 54+00.00 TO STA. 58+19.25
 STA. 63+39.25 TO STA. 73+85.00
 STA. 79+05.00 TO STA. 85+45.00

CURRENT YEAR: 2023 AADT = 81700
 ESTIMATED OPENING YEAR: 2030 AADT = 85400
 ESTIMATED DESIGN YEAR: 2050 AADT = 95600
 K= 7.3% D=54.2% T= 2.4% (24 HOUR)
 DESIGN SPEED= 35 MPH
 TARGET SPEED= 35 MPH
 POSTED SPEED= 30, 35 MPH
 CONTEXT CLASSIFICATION= C5

REVISIONS				WILLIAM W. LEIDY, P.E. P.E. LICENSE NUMBER 83790 HDR ENGINEERING, INC. 3250 W. COMMERCIAL BLVD., SUITE 100 FORT LAUDERDALE, FL 33309-3451	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		3
					SR 934	MIAMI-DADE	449007-1-22-01		

Proposed Typical Section



BRIDGES NO. 870083, 870549

BRIDGE TYPICAL SECTION
 STA. 58+19.25 TO STA. 63+39.25
 STA. 73+85.00 TO STA. 79+05.00

CURRENT YEAR: 2023 AADT = 81700
 ESTIMATED OPENING YEAR: 2030 AADT = 85400
 ESTIMATED DESIGN YEAR: 2050 AADT = 95600
 K= 7.3% D=54.2% T= 2.4% (24 HOUR)
 DESIGN SPEED= 35 MPH
 TARGET SPEED= 35 MPH
 POSTED SPEED= 30, 35 MPH
 CONTEXT CLASSIFICATION= C5

REVISIONS				WILLIAM W. LEIDY, P.E. P.E. LICENSE NUMBER 83790 HDR ENGINEERING, INC. 3250 W. COMMERCIAL BLVD., SUITE 100 FORT LAUDERDALE, FL 33309-3451	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TYPICAL SECTION	SHEET NO. 4
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 934	MIAMI-DADE	449007-1-22-01		

Appendix F Cross Drain Maps



MATCHLINE 45+00.00

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

WILLIAM W. LEIDY, P.E.
 P.E. LICENSE NUMBER 83790
 HDR ENGINEERING, INC.
 3250 W. COMMERCIAL BLVD., SUITE 100
 FORT LAUDERDALE, FL 33309-3451

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 934	MIAMI-DADE	449007-1-22-01

**PRELIMINARY CONCEPT
PLANS**

SHEET NO.
5



LEGEND:

	PROPOSED SIDEWALK
	ROADWAY PAVEMENT
	PROPOSED SOD

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

WILLIAM W. LEIDY, P.E.
 P.E. LICENSE NUMBER 83790
 HDR ENGINEERING, INC.
 3250 W. COMMERCIAL BLVD., SUITE 100
 FORT LAUDERDALE, FL 33309-3451

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 934	MIAMI-DADE	449007-1-22-01

**PRELIMINARY CONCEPT
PLANS**

SHEET NO.
6



BISCAYNE BAY
(OUTSTANDING
FLORIDA WATERS)

R/W LINE



MATCHLINE 52+00.00

MATCHLINE 59+00.00

R/W LINE

BISCAYNE BAY
(OUTSTANDING
FLORIDA WATERS)

LEGEND:

- EXISTING BRIDGE
- PROPOSED BRIDGE
- PROPOSED SIDEWALK
- ROADWAY PAVEMENT
- PROPOSED SOD
- PROPOSED GRAVITY WALL & PED. RAILING
- PROPOSED PED. & BICYCLE RAILING
- TEMPORARY CONSTRUCTION EASEMENT

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

WILLIAM W. LEIDY, P.E.
P.E. LICENSE NUMBER 83790
HDR ENGINEERING, INC.
3250 W. COMMERCIAL BLVD., SUITE 100
FORT LAUDERDALE, FL 33309-3451

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 934	MIAMI-DADE	449007-1-22-01

**PRELIMINARY CONCEPT
PLANS**

SHEET
NO.
7

CROSS SECTIONS
Scale 1 inch = 5 feet

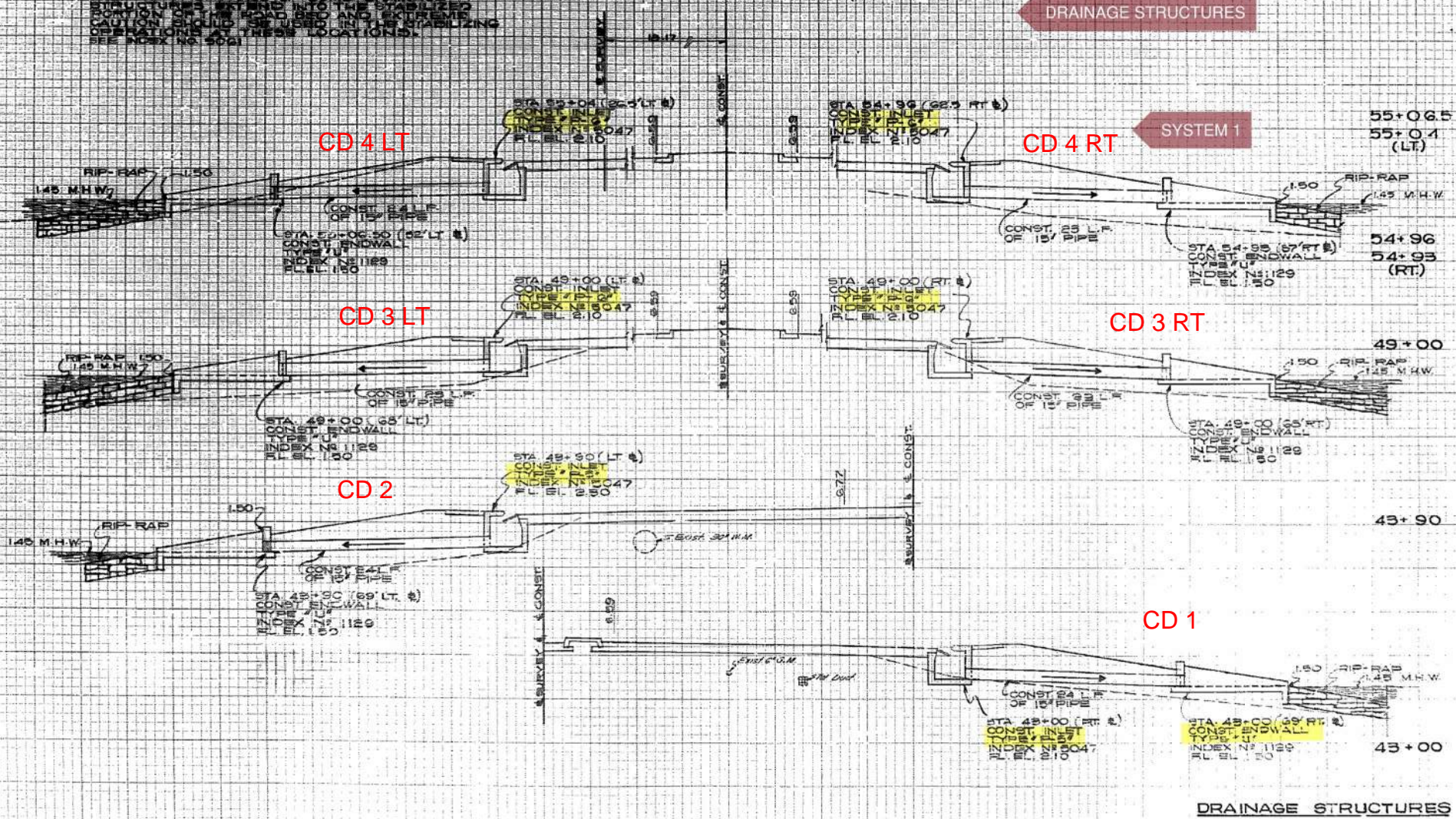
Proj. No.	State	County	Route	Proj. No.	Sheet No.
3	FLA.	DADE	825		22

STATE JOB NO. 67080-3506

NOTE:

SPECIAL ATTENTION IS DIRECTED TO THE LOCATION OF THE ENDS OF SOME DRAINAGE STRUCTURES WHICH ARE NOT TO BE OPERATED WITHOUT MAINTENANCE AND EXTENSIVE CAUTION SHOULD BE USED IN THE STABILIZING OPERATIONS AT THESE LOCATIONS. SEE BOOK NO. 5061

DRAINAGE STRUCTURES



DATE	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
BY	07/07/2017	08/21/2017				
	URS	URS				

FLORIDA DEPARTMENT OF TRANSPORTATION
STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO.
02		SR 934	MIAMI-DADE	06	87080000	2 OF 2

