

Location Hydraulics Report

**Turnpike Extension (SR 821) Widening
Project Development and Environment (PD&E) Study
from US 1 (South of Palm Drive) to Campbell Drive | Miami-Dade County, Florida**

FM No. 439545-1-22-01



**Florida Department of Transportation
Florida's Turnpike Enterprise
P.O. Box 613069 | Ocoee, FL 34761**

November 2020



Location Hydraulics Report

Miami-Dade County, Florida
FM No: 439545-1-22-01 | ETDM No: 14322

Prepared for
Florida's Turnpike Enterprise
Florida's Turnpike Mile Post 263
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November 2020

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Florida.

Renaud Olivier, P.E. No. 58127

Date

Stanley Consultants, Inc.
Certificate of Authorization No. 1978
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My license renewal date is February 28, 2021.

Pages or sheets covered by this seal: Entire Report

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Section 1

Purpose

1.1 Report Purpose

The purpose of this report is to address base floodplain encroachments resulting from the roadway improvements evaluated in the Project Development and Environment study. In accordance with Executive Order 11988 “Floodplain Management”, USDOT Order 5650.2, “Floodplain Management Protection”, and Federal-Aid Policy Guidance on Location and Hydraulic Design of Encroachments on Flood Plains, 23 CFR 650A, floodplains must be protected. The intent of these regulations is to avoid or minimize highway encroachments within the 100-year (base) floodplains, and to avoid land use development encroachments that reduce storage and increase water surface elevations within the base floodplains. This Location Hydraulics Report is prepared pursuant to Part 2, Chapter 13 of the FDOT Project Development and Environment Manual.

Project Description

2.1 Project Description

This Project Development and Environment (PD&E) Study evaluates the southern three (3) miles of the Turnpike Extension within Miami-Dade County. The PD&E study limits are from US 1 (south of Palm Drive) to Campbell Drive/SW 312nd Street. Turnpike milepost (MP) 0.00 is located at US 1 and MP 3.0 is located at the Campbell Drive interchange.

The proposed improvements include widening the existing four lane toll road and bridges to six lanes between US 1 and Campbell Drive; improving the US 1 interchange with a new ramp over Palm Drive, adding a partial interchange at Lucy Street, and converting the taper ramps to parallel ramps at the Campbell Drive interchange. Bridge widening, and minor improvements are proposed at Lucy Street, SW 162nd Avenue, C-103 Canal and Campbell Drive. Two new bridges are proposed over the US 1 northbound lanes and over Palm Drive. The project location is illustrated in **Figure 2-1**.

The vertical datum for this project is the North American. Vertical Datum of 1988 (NAVD88). Elevations can be converted from the National Geodetic Vertical Datum of 1929 (NGVD29) to NAVD88 by subtracting 1.5 feet ($10.00 \text{ ft-NGVD} = 8.5 \text{ ft-NAVD}$).

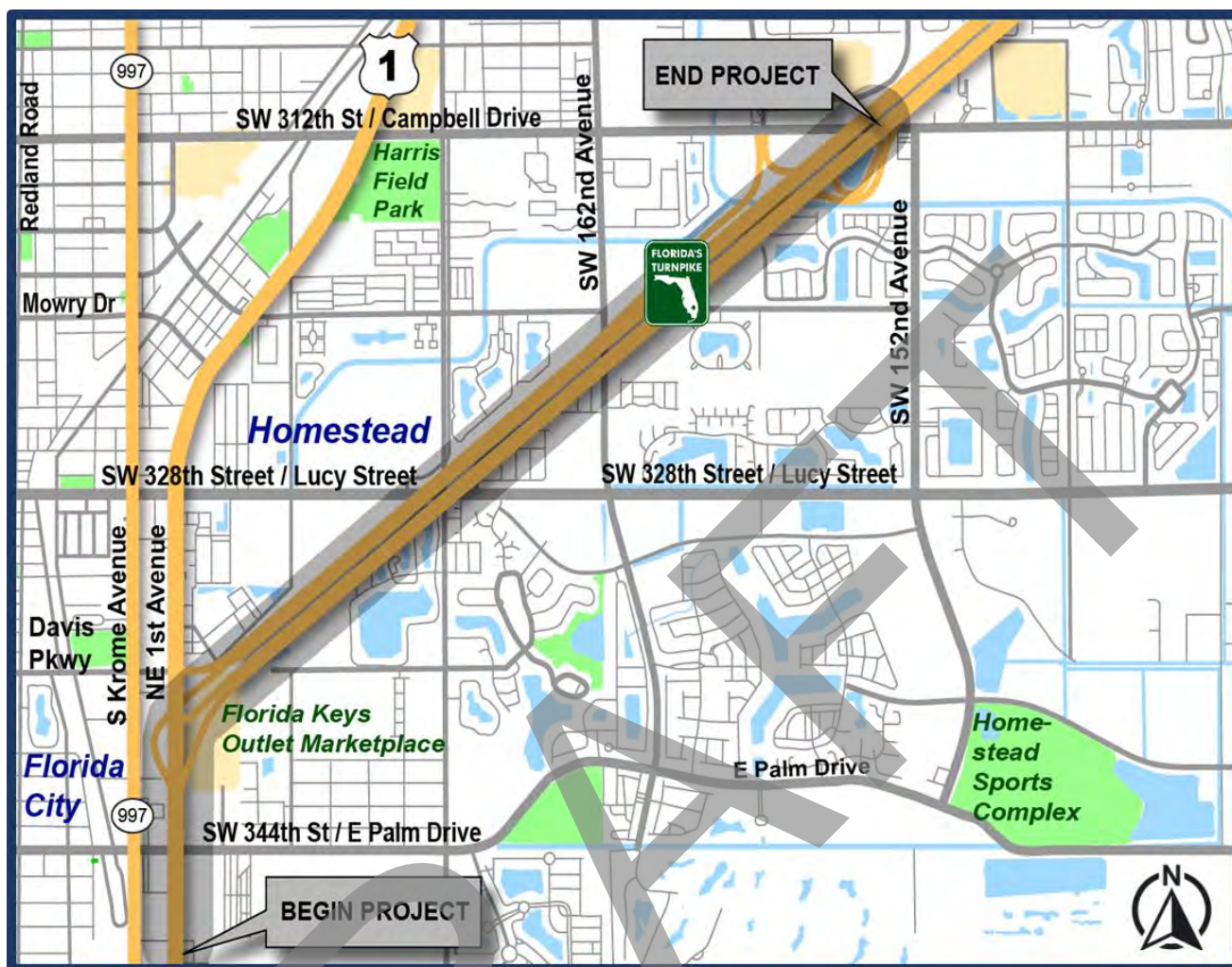


Figure 2-1 Project Location Map

Base Floodplain

3.1 Base Floodplain

Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the cities of Florida City and Homestead, Miami Dade County, community panel number (s) 12086C0730L and 12086C0727L, dated September 2009, base flood elevations have been determined for the project. The major waterways crossing the project limits include the C-103 Canal (a.k.a. Mowry Canal). In addition, there are two culverts that carry stormwater runoff through the project. These include a 7-ft x 3-ft box culvert located 800-ft north of Palm Drive and a 60" culvert located 250-ft north of Lucy Street. There are no regulated floodway(s) within the project limits. There are no flooding issues of the existing facilities.

Florida's Turnpike was constructed above the base floodplain in the early 1970's. The preferred alternative widens primarily towards the inside (median) and towards the outside along the southbound lanes of the Turnpike. Along US 1, the preferred alternative widens to the outside along the northbound lanes and along Lucy Street, widens to provide a new interchange. These widening improvements have minimal longitudinal encroachments into the base floodplain at the following locations.

1. Where the northbound US 1 lanes are being realigned, south of Palm Drive.
 - This area is in Zone AE. The base flood elevation is determined to be 7 ft NGVD.
2. Where the southbound US 1 right turn lane is proposed, south of Davis Parkway.
 - This area is in Zone AH. The base flood elevation is determined to be 8 ft NGVD.
3. Where the Lucy Street interchange on-ramp is proposed, near the ramp terminal.
 - This area is in Zone AH. The base flood elevation is determined to be 7 ft NGVD.
4. Where the Lucy Street interchange off-ramp is proposed.
 - This area is in Zone AE. The base flood elevation determined to be 8 ft NGVD.

Practical alternatives were evaluated that minimize floodplain impacts. These include widening towards the median along the Turnpike and optimizing the proposed Lucy Street interchange ramp geometry to reduce the overall interchange footprint.

The floodplain encroachments that cannot be avoided can be compensated by excavating the ponds at the US 1 interchange, constructing infield ponds at the Lucy Street interchange and widening the roadside swales along the Turnpike.

3.2 Water Quality

This project will have no adverse impact to the area's water quality. Stormwater treatment of the additional impervious areas will be treated as required by the SFWMD Environmental Resource Permit (ERP).

Conclusion

4.1 Conclusion

There are minimal encroachments to the base floodplain. The modifications to drainage structures included in this project will result in an insignificant change in their capacity to carry floodwater. Proposed drainage features will be designed in accordance with the FDOT Drainage Manual, Topic No. 625-040-002, the FTE Drainage Manual Supplement and the South Florida Water Management District criteria. This change will cause minimal increases in flood heights and flood limits. These minimal increases will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. 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 there is no change in flood “Risk” or floodplain impacts associated with this project.

Appendix A

FEMA Maps / Floodplain Compensation Calculations

DRAFT

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 to landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD 29). Users of the 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, NGS12
National Geodetic Survey
SSM3-3, #5022
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.

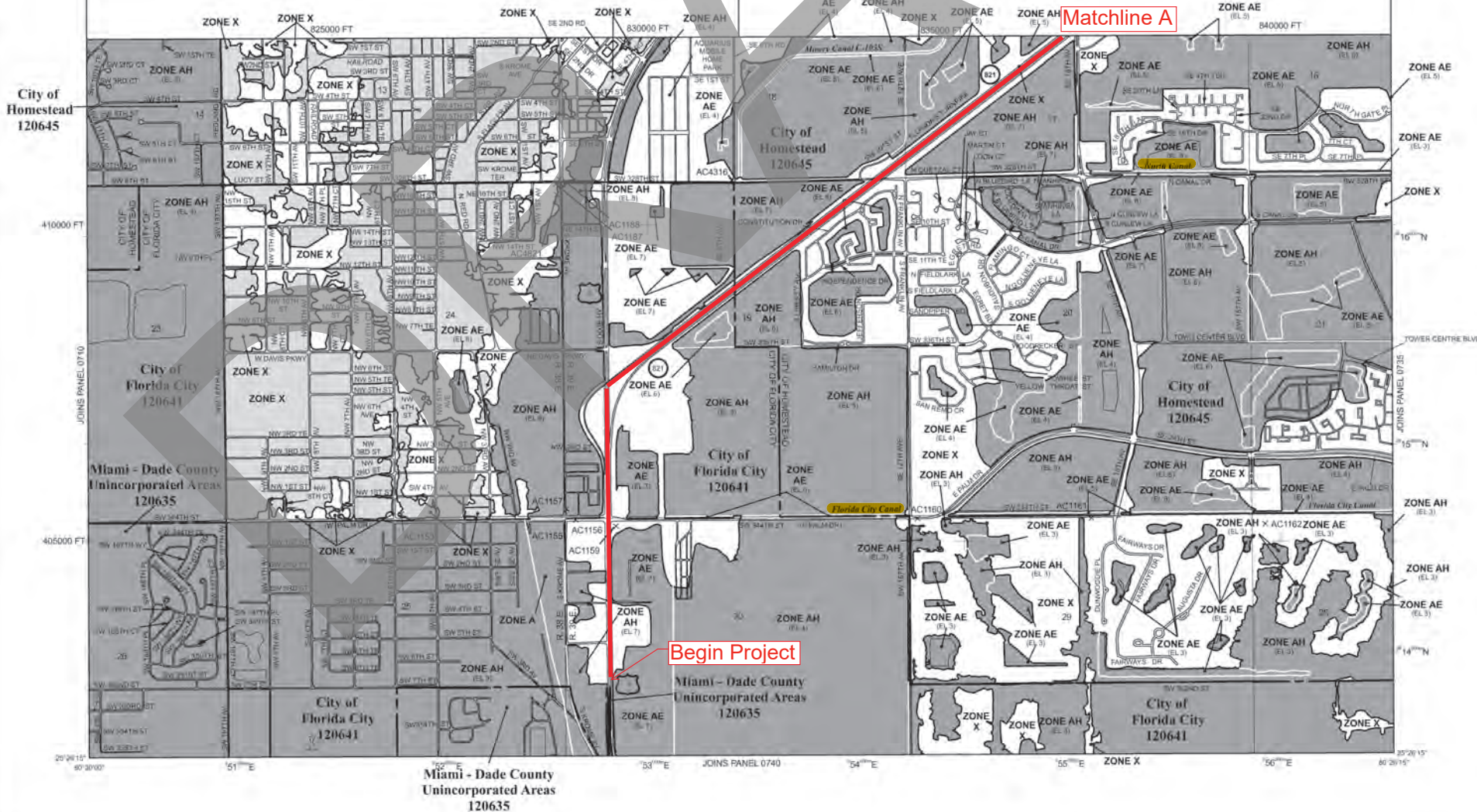
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which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

Contact the **FEMA Map Service Center** at 1-800-358-6616 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://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>.

THIS AREA SHOWN AT A SCALE OF 1"=500'
ON MAP NUMBER 12086C0726

THIS AREA SHOWN AT A SCALE OF 1"=500'
ON MAP NUMBER 12086C0727



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, AV, 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 areas of ponding); average depths determined. For areas of shallow 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 decommissioned. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE AV** Areas 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 floodway 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 heights 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 velocity 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
- Traversed 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

Scale: 1 inch = 1000 feet
Bench mark (see explanation in Notes to Users section of this Flood panel)

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index.

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

EFFECTIVE DATES OF REVISIONS TO THIS PANEL:
March 2, 1994 - May 10, 1994 - July 17, 1995 - for consideration of revision, see Notice to Users page in the Flood Insurance Study report.

September 11, 2009 - to update corporate limits, to add and change Special Flood Hazard Areas; to add and change Base Flood Elevations; to change zone designations; to reflect revised elevations; to reflect updated geographic information; to add notes and road names; 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 1-800-425-6252.

MAP SCALE 1" = 1000'
0 500 1000 2000 FEET
0 500 1000 2000 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0730L

FIRM
FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 730 OF 1031
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	PANEL	SUFFIX
FLORIDA CITY, CITY OF	120641	0730	L
HOMESTEAD CITY OF	120645	0730	L
MIAMI-DADE COUNTY	120635	0730	L

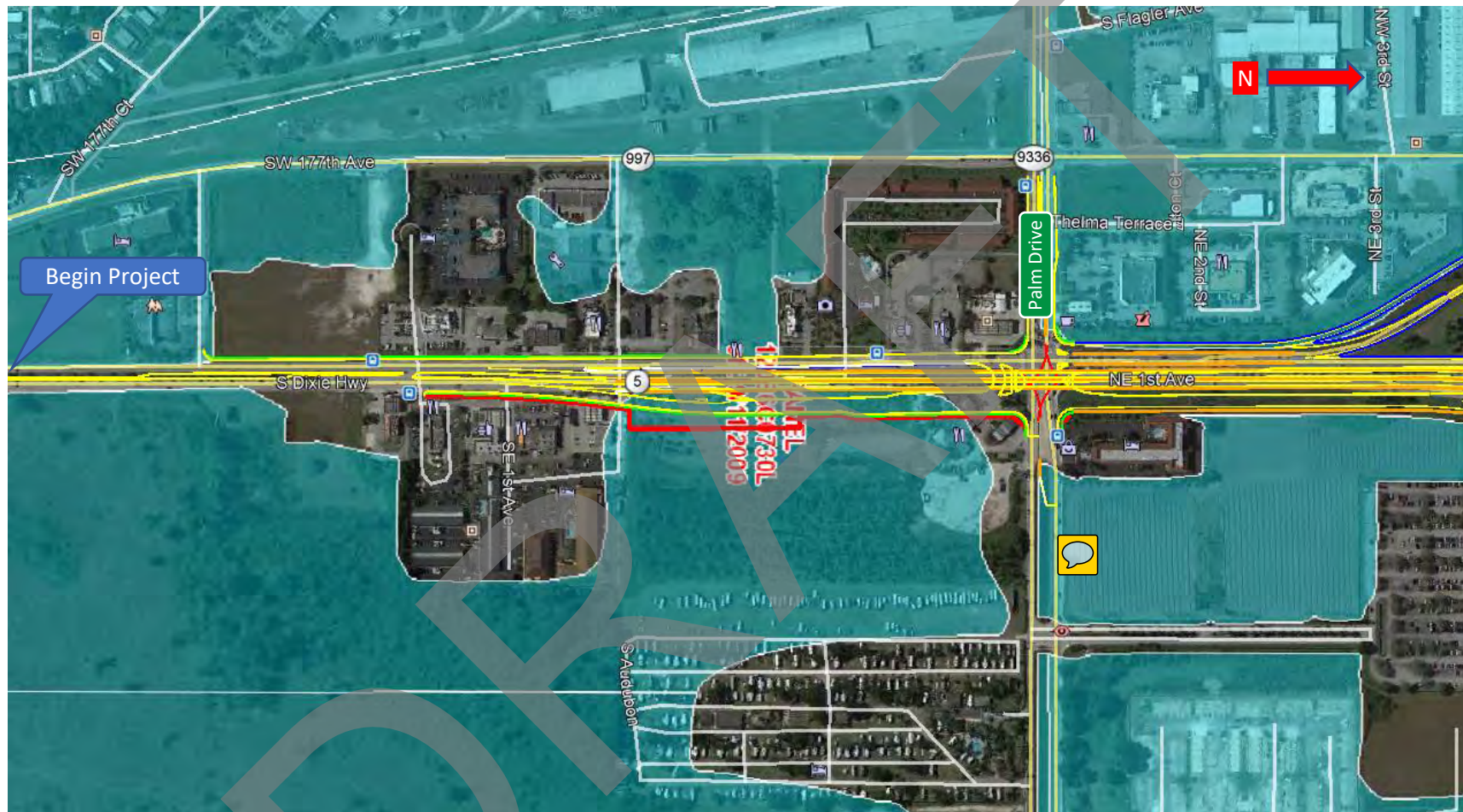
Notes to Users: The Map Number shown below should be used when obtaining map copies; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12086C0730L

MAP REVISED
SEPTEMBER 11, 2009

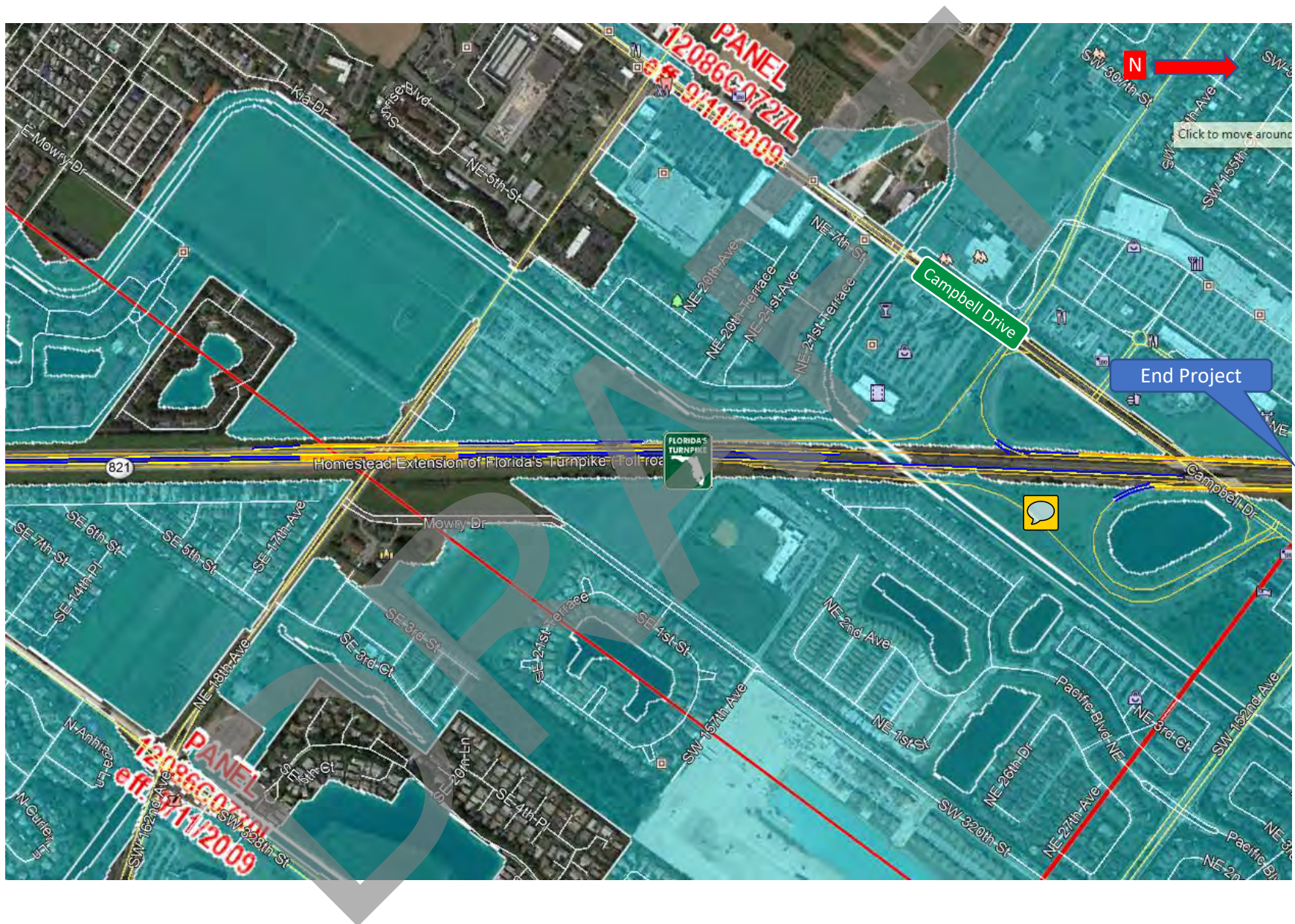
Federal Emergency Management Agency

FEMA Base Flood Plain Delineations (Ref. National Flood Hazard Layer, Google Earth KMZ file)









Estimate of Flood Plain Volume Encroachment												
Basin No.	Location Description	Station	to	Station	Length (ft)	Average Width (ft)	Approx. Low EOP Elev. (ft NGVD)	Base Flood Plain Elev (ft NGVD)	Avg. Existing Ground Elev (ft NGVD)	Flood Plain Encroachment Elev. (ft NGVD)	Flood Plain Encroachment Volume (cu.ft.)	Flood Plain Encroachment Volume (ac-ft)
1	NB US 1 Lanes	58+50	to	69+50	1100	80	7	7.0	5.0	7.0	176,000	4.04
2	SB US 1 RT Turn Lane	512+00	to	520+00	800	15	7.7	8.0	3.0	7.7	56,400	1.29
3	Lucy St Intx On-ramp	100+50	to	103+00	250	24	8.3	7.0	3.0	7.0	24,000	0.55
3	Lucy St Intx Off-ramp	201+00	to	216+00	1500	30	8.3	8.0	3.0	8.0	225,000	5.17
4	No floodplain impacts in Basin 4										-	0.00
5	No floodplain impacts in Basin 5										-	0.00
										Total:	481,400	11.05

Estimate of Floodplain Compensation														
Basin No.	Location Description	Station	to	Station	Length (ft)	Average Width (ft)	Area (ac)	Area (sf)	Avg. Existing Ground Elev (ft NGVD)	NWL Elev. Or Bottom Swale Elev. (ft)	Avg. Depth (ft)	Flood Plain Compensation Volume (cf)	Flood Plain Compensation Volume (ac-ft)	Compensation Approach
2	US 1 interchange ponds	n/a		n/a	n/a	n/a	2.33	101,495	3.0	2.0	1.0	101,495	2.33	Ponds
3	Lucy St interchange ponds	n/a		n/a	n/a	n/a	2.55	111,078	3.0	2.0	1.0	111,078	2.55	Ponds
3	Roadside Swale LT	3535+00	to	3570+00	3500	18	n/a	n/a	3.5	2.0	1.5	94,500	2.17	Make roadside swales wider
3	Roadside Swale LT	3590+00	to	3605+00	1500	18	n/a	n/a	3.5	2.0	1.5	40,500	0.93	Make roadside swales wider
4	Roadside Swale RT	3535+00	to	3570+00	3500	18	n/a	n/a	3.5	2.0	1.5	94,500	2.17	Make roadside swales wider
4	Roadside Swale RT	3590+00	to	3605+00	1500	18	n/a	n/a	3.5	2.0	1.5	40,500	0.93	Make roadside swales wider
											Total:	502,573	11.08	