RESOLUTION NO. 24-08-78

A RESOLUTION OF THE VILLAGE COUNCIL OF ISLAMORADA, VILLAGE OF ISLANDS, FLORIDA, ADOPTING THE ISLAMORADA WATERSHED MANAGEMENT PLAN; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the 2017 Coordinator's Manual for the National Flood Insurance Program ("NFIP") Community Rating System ("CRS") introduced a series of credit options for "community efforts to anticipate" future flood risk in relation to climate change (FEMA 2017, pg. 110-15); and

WHEREAS, since sea-level rise is expected to be an increasingly critical issue for floodplain management, many of the CRS credit options and assessment criteria for coastal communities specifically refer to studies of sea-level rise impact on future hydrologic conditions and the local drainage systems; and

WHEREAS, the 2017 Coordinator's Manual notes that a mandatory prerequisite for a community to achieve CRS Class 4 status is that the community must "receive credit for managing the impacts of a 100-year storm and/or sea level rise, where applicable, based on a watershed management plan" (FEMA 2017, Credit 450, pg. 14); and

WHEREAS, each improvement in CRS Class rating (starting from a Class 10) translates into a 5% premium discount on qualifying NFIP policy-holders within the Special Flood Hazard Area ("SFHA"), meaning that a CRS Class 4 status makes qualified policy-holders within the community eligible for a 30% total premium discount; and

WHEREAS, Islamorada is currently rated as a CRS Class 5 community and achieving CRS Class 4 status would result in an additional 5% premium discount for qualified NFIP policy-holders within the SFHA; and

WHEREAS, a qualified watershed management plan is defined as a mandatory prerequisite for CRS Class 4 status and any further NFIP premium discounts that Islamorada residents may receive through the CRS program will likely require the development and adoption of a watershed management plan that meets or exceeds the criteria outlined in the 2017 Coordinator's Manual; and

WHEREAS, the CRS Watershed Master Plan – Prerequisites for Section 452b require the Village to adopt a watershed master (or management) plan that evaluates the future conditions, including the impacts of a median projected sea level rise (based on the National Oceanic and Atmospheric Administration's (NOAA's) "intermediate-high" projection for the year 2100) on the local drainage system during multiple rainfall events, including the 100-year rainfall event.

NOW THEREFORE BE IT RESOLVED BY THE VILLAGE COUNCIL OF ISLAMORADA, VILLAGE OF ISLANDS, FLORIDA, AS FOLLOWS:

Section 1. Recitals. The above recitals are true and correct and incorporated into this Resolution by this reference.

Section 2. Adoption of Watershed Management Plan. The Village Council hereby adopts the Islamorada Watershed Management Plan, attached hereto as Exhibit "A."

Section 3. Authorization of Village Officials. The Village Manager and/or designee and the Village Attorney are authorized to take all actions necessary to implement the terms and conditions of the Watershed Management Plan.

Section 4. Effective Date. This Resolution shall take effect immediately upon adoption.

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Motion to adopt by Elizabeth Jolin, seconded by Sharon Mahoney.

FINAL VOTE AT ADOPTION

VILLAGE COUNCIL OF ISLAMORADA, VILLAGE OF ISLANDS

Mayor Joseph B. Pinder III	Yes
Vice Mayor Sharon Mahoney	Yes
Councilman Mark Gregg	Yes
Councilwoman Elizabeth Jolin	Yes
Councilman Henry Rosenthal	Yes

PASSED AND ADOPTED THIS 7 DAY OF AUGUST, 2024.

Signed by:
Joseph B. Pinder III
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JOSEPH B. PINDER III, MAYOR

ATTEST:

DocuSigned by:
Marne K. McGrath
008BA9A9B2704D5...
MARNE MCGRATH, VILLAGE CLERK

APPROVED AS TO FORM AND LEGALITY
FOR THE USE AND BENEFIT OF
ISLAMORADA, VILLAGE OF ISLANDS:

Signed by:
362BFAA7FDDD417...
JOHN J. QUICK, VILLAGE ATTORNEY

Exhibit A

WATERSHED MANAGEMENT PLAN

ISLAMORADA, VILLAGE OF ISLANDS, FLORIDA

June, 2024

Watershed Management Plan Deliverable 2 Requirements

An electronic copy of the completed WMP will be submitted to the Division no later than 17 months after the beginning of the Period of Performance. If applicable, the Sub-Recipient will revise the submitted WMP to comply with required revisions and feedback from the Division, and then resubmit the WMP to the Division no later than 17 months after the beginning of the Period of Performance.

The Period of Performance begins with the date of execution of the subgrant agreement by both parties, and the Sub-Recipient shall provide the Division with the following no later than 17 months from the beginning of the Period of Performance before payment will be processed:

1. The completed WMP4 (after incorporating comments from the Division, if applicable); and

2. A signed letter from the applicable county's Local Mitigation Strategy (LMS) Chairperson attesting that the completed WMP will be adopted and used to update the risk assessment and mitigation strategy during the next LMS plan update.

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GENERAL ISLAMORADA DESCRIPTION

The Florida Keys chain of islands is in the tropics, bounded by Florida Bay to the north and west and by the Florida Keys National Marine Sanctuary ("FKNMS") to the east and west. Bounded to the north and west by one of the world's largest estuarine systems, Everglades National Park and Florida Bay, and by the FKNMS to the east and west, the Florida Keys are protected from the rough waters of the Atlantic Ocean by the third largest barrier reef in the world, the only living coral reef in the continental United States.

The municipality of Islamorada, Village of Islands (Islamorada) is nestled in the center of this chain of islands, within Monroe County. Islamorada separates the two (2) large bodies of water by no more than one (1) mile of land at its widest point with an average elevation of just five (5) feet above sea level. Islamorada consists of five (5) inhabited islands, Plantation Key, Windley Key, Upper Matecumbe Key, Lower Matecumbe Key, and Tea Table Key which are home to approximately 7,107 permanent residents (2020 U.S. Census). The combined land area of the Village's chain of islands is approximately 6.43 square miles (4,115 acres) with boundaries extending approximately 18.3 linear miles (including the channels between the islands) from Mile Marker ("MM") 90.9 to MM 72.6 along the Overseas Highway ("U.S. Highway 1"). In addition to the five (5) populated islands within Islamorada's waters, several smaller, uninhabited islands including Cowpens Cut and Horseshoe Key are rich in history and important natural habitats.

The waters surrounding Islamorada consist of tidal wetlands, mangrove forests and seagrass habitat, all of which are unique ecosystems that provide food, shelter, and nursery grounds to a multitude of fish, crustaceans, marine mammals, reptiles, and bird species. A vast majority of the saltwater species found in North America are found in the waters surrounding the Florida Keys. The islands of Islamorada are home to many threatened and endangered animal and plant species. The waters of the FKNMS, in Florida Bay, the Gulf of Mexico and the Atlantic Ocean surrounding the entire length of the Florida Keys (including Islamorada), are designated as Outstanding Florida Waters ("OFW") by the Florida Department of Environmental Protection ("FDEP"). This designation means that these waters are specially protected because of their natural attributes, subjecting them to higher regulatory standards and a greater level of protection regarding water quality. This special protection limits, and in some cases eliminates, discharges to these waters that would lower ambient (existing) water quality.

Archeological evidence shows that Native Indian populations inhabited the islands as far back as two (2) to three (3) thousand years ago. The first historical records of the area date back to 1513 when Ponce de Leon passed through the Florida Keys to fill up fresh water from the Matecumbes before sailing to Europe and Central America. Early settlers came from the Bahamas and New England, ultimately building ships and shipping pineapples, sponges, and plundered shipwreck loot to northern markets. It is believed that Islamorada is named "purple island" for what the original settlers saw as they approached the island chain from the sea. Some people believe the name came from the color of healthy sea grass, others say it was the thousands of native orchids or other native fauna in bloom at the time.

Larger population growth did not occur in the Florida Keys until the 1900s when Henry Flagler built a railroad from mainland Florida to Key West, which opened in 1912. The first road followed in 1928, originally existing in two (2) segments – one from the mainland to Lower Matecumbe Key and the other from No Name Key to Key West – with an automobile ferry service connecting the forty-one (41) mile gap between Lower Matecumbe and No Name Keys. On Labor Day in 1935, the most devastating and deadly hurricane in Florida Keys history struck, wiping out the roadways, the train system and built environment, and killing almost 500 people. Survivors of the 1935 hurricane were dedicated people who remained and rebuilt the community. A road spanning the entire distance of the Florida Keys was later constructed on the remnant Flagler railway bed which opened in 1938. The determination to rebuild after such a catastrophic event led to the rebirth of Islamorada. The population of Islamorada exploded exponentially after World War II as northerners discovered the rich history of the islands, building homes and businesses throughout the Village.

In 1975, the State of Florida legislature recognized the unique environmental sensitivity and mounting development pressures of the region and designated the Florida Keys (Monroe County and its municipalities) and Key West as an Area of Critical State Concern ("ACSC"), one (1) of only six (6) areas in the state. The ACSC Principles of Guiding Development, found in Section 380.0552, Florida Statutes, limit growth potential in the County and its municipalities by restricting new development, both residential and commercial, to ensure the protection of the natural environment and allow for orderly and balanced growth. This protects natural ecosystems while maintaining safe hurricane evacuation timelines for residents and visitors. As a result, the potential growth of the permanent population in the Florida Keys – including Islamorada – is minor.

Islamorada incorporated as a municipality on December 31, 1997. Under the Council-Manager form of government, the Islamorada Village Council has the independent power to enact local legislation, adopt budgets, determine policies, and appoint officers and officials. All policies and decisions must be consistent with the ACSC Principles of Guiding Development. Most of Islamorada's governmental functions and activities are supported by Islamorada's Governmental Funds. These funds are generated primarily by taxes, grants, and similar revenue sources, including the collection and disbursement of earmarked monies (special revenue funds) and the servicing of long-term debt (debt service funds).

Islamorada, known by many as the sportfishing capital of the world, is home to perhaps the world's highest density of professional offshore charter boats, serving as the premiere location for backcountry sportfishing and saltwater fly fishing. This is due in part to the designations of both the coinciding FKNMS and OFW which together protect the unique marine ecosystem. Additionally, Islamorada has many parks and open space, including Windley Key Fossil Reef Geologic State Park, six (6) Village parks and four (4) Village beaches.

Finally, Islamorada's geology and elevation are such that tidal influence is significant due to the porous cap rock of the land. This is a large factor for consideration in a watershed planning effort

(significantly impacted by sea level rise) because “barrier” type solutions will provide little benefit to mitigate against tidal impacts.

ISLAMORADA COMMUNITY RATING SYSTEM BACKGROUND

The Community Rating System (CRS) is a voluntary program, that provides for reductions of flood insurance premiums by 5 percent up to a maximum of 45 percent for most policy holders with insurable property located within CRS communities. The CRS recognizes 19 creditable activities organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Warning and Response.

Communities can choose to undertake any or all these activities. Based on the number of credit points received, a community earns a rank in one of ten CRS classes. Premium discounts range from 5 percent to 45 percent.

CRS Credit Points	CRS Class	CRS Discount (Premium Reduction)
4,500+	1	45%
4,000 – 4,499	2	40%
3,500 – 3,999	3	35%
3,000 – 3,499	4	30%
2,500 – 2,999	5	25%
2,000 – 2,499	6	20%
1,500 – 1,999	7	15%
1,000 – 1,499	8	10%
500 – 999	9	5%
0 – 499	10	0

The Village of Islamorada joined CRS in October of 2015 and has continually advanced in the CRS program. In 2023, the Village continued to maintain a CRS Class 5 scoring 2,599 CRS credit points. The Class 5 designation affords most NFIP policy holders with a 25% percent discount annual discount on flood insurance. The table below outlines the CRS Activities and the current scores in each of the CRS Activities.

CRS Current Participation Points *2017 CRS Coordinator's Manual* and *2021 Addendum to the 2017 CRS Coordinator's Manual*		
Activity		**Current Points Scored**
Elevation Certificates	310	**38**
Map Information Service	320	**30**
Outreach Projects	330	**350**
Hazard Disclosure	340	**12**
Flood Protection Information	350	**69**
Flood Protection Assistance	360	**40**
Flood Insurance Promotion	370	**105**
Open Space Preservation	420	**907**
Higher Regulatory Standards	430	**185**
Flood Data Maintenance	440	**127**
Stormwater Management	450	**31**
Floodplain Mgmt. Planning	510	**361**
Flood Protection	530	**14**
Drainage System Maintenance	540	**50**
Flood Warning and Response	610	**280**
	Element Point Total	**2,599**

The Village is exploring the possibility of advancing to CRS Class 4. Historically, one of the major hurdles for Florida Communities meeting the rigorous Class 4 prerequisites is linked to communities adopting a CRS qualifying Watershed Master Plan. It is anticipated that the Watershed Master Plan will meet the CRS Class 4 prerequisite by scoring 90 points for WMP 1 and 30 points for WMP 1. Based on the 2023 CRS Cycle Verification file, and a projected score of 135 points on the WMP, the Village must document an additional 271 overall points and adopt the qualifying Watershed Master Plan to be able to apply for an improvement to a CRS Class 4. The CRS Class 4 prerequisites are in the table below.

Class 4 Prerequisite	Credit	Met
Community agreed to show any draft LiMWAs on the final FIRM, if applic.		X
Enough points to warrant the Class (3,000+)	2,599	
If one or more rep loss properties, actions set in Sections 501-504 are met		X
All flood insurance policies on community owned properties are maintained		X
430—BCEGS of 4/4 or better	4/3	X
Activity 310 Elevation Certificates		
Maintain all required floodplain-related construction certificates		X
≥ 90% accuracy on construction certificates during annual review		X
Credit for construction certificate management procedures (CCMP)	38	X
Activity 430 Higher Regulatory Standards		
1ft Freeboard throughout the SFHA		X
≥ 700 pts. in all other 430 elements, including 422.a., e., and f. in 420 Open Space Preservation (after to imp. adj.)	930	
Activity 450 Watershed Master Plan (WMP)		
Adopt a Watershed Management Plan		
90 pts. for meeting all WMP prerequisites (WMP1)		
30 pts. managing all storms up to and including 100-yr. event (WMP 2)		
rWMP = 0.5 or greater (or show that WMP covers watersheds that comprise at least 50% of its growth)		
Activity 510 Floodplain Management Plan (FMP)		
Adopt a Floodplain Management Plan		X
≥ 50% of the maximum credit under Activity 510 after imp. adj. (≥ 191 pts.)	361	X
≥ 50% of available pts. in Planning Step 2 (≥ 60 pts.)	120	X
≥ 50% of available pts. in Planning Step 5 (≥ 26 pts.)	51	X
≥ 50% of available pts. in Planning Step 8 (≥ 30 pts.)	52	X
Natural Floodplain Functions		
At least 100 pts. (after impact adjustment) from one or a combination of the following elements:	139	
Life Safety Measures		
610 – obtain some credit under this Activity	280	X
620 – meet prerequisite 621.b(2) [map of all areas protected by levees]		

630 – meet prerequisite 631.b(1) [map of all areas flooded by the failure of a high hazard dam and critical facilities that would be flooded.]	n/a	X

I. Data Inventory and Collection

1. Data inventory (used for initial flood modeling):

a. Inventory of ground characteristics (e.g., soil type, impervious surfaces, wetlands)

The Florida Keys is a chain of islands approximately 220 miles long, extending from the end of the Florida peninsula curving southwest toward the Dry Tortugas. Consisting of 822 islands, of which about 30 are inhabited, the Florida Keys are traversed by U.S. Highway 1 (a.k.a., US 1 or Overseas Highway) with 19 miles of bridges. The Keys are entirely within Monroe County and includes the municipalities of Islamorada, Key Colony Beach, Layton Marathon and Key West. Key West represents about 30 percent (24,000 people) of the population of Monroe County, which, according to the 2000 Census, is about 79,600 people. Islamorada is comprised of approximately 4,500 acres within the island chain. Aside from the conservation areas, land within the Islamorada, Village of Islands has primarily been consumed by development.

The beach/berm formation in the Florida Keys is relatively infrequent, with natural beaches found from Upper Matecumbe Key southward. Within Islamorada, Village of Islands naturally formed beaches occur between MM 83 and MM 81 on Upper Matecumbe Key, and along the entire oceanside of Lower Matecumbe Key.

In general, Florida watersheds are characterized by a large land mass that concentrates and directs runoff to a relatively small waterbody. Thus, runoff is discharged to receiving waters wherein pollutants are concentrated. The Florida Keys, in contrast, is a 220 miles-long string of small narrow linear islands surrounded by a very large receiving waterbody. As a result, local runoff is not focused, and pollutants are dispersed in the Gulf of Mexico and Straits of Florida.

Soils are such that infiltration and percolation are relatively enhanced, moving infiltrated runoff and its pollutants to nearshore waters quickly, yielding little or no nutrient entrapment or treatment in the soil matrix. The Florida Keys are in USDA Hardiness Zones 11a (Key Largo to Marathon) and 11b (Marathon through Key West). Soils (Key Largo Limestone and Miami Oolite) are alkaline, with a pH range from 7.2 to 8.2. Rainy/hurricane season extends from June through November. The rest of the year is the dry season. On average, rainfall is about 40 inches per year, with most rainfall occurring during the rainy season.

Land use data representing land cover conditions was derived from the most recent statewide Florida Land Use and Cover Classification System (FLUCCS) code database (2019). A visual comparison was undertaken between the FLUCCS and the Village's Zoning Map in its attribute properties and there appears to be no noticeable difference in zoning classification across all of Islamorada (at least visually) between the two land use coverages. Results of this comparison show a minor increase in urban areas with slight decrease in water and vegetative land use

classifications. Overall, it was noted that areas with slight variations in land use classification appeared to be hydraulically connected to a coastal outfall and would be minimally impacted as a result of slight variations in land use classification. This justifies using FLUCCs shapefile as a basis for land cover.

Most of the watershed is classified as urban area (53.1%), divided into low, medium, and high residential (37.6%), and commercial, recreational, industrial, institutional, and open land uses (15.6%). This is followed by Wetlands (36.2%), water (4.4%), Transportation/utilities at 3.3%, and Upland Forest/Nonforested/Barren Land at 3.3%, 2.3%, and 0.1% respectively. Total impervious surfaces are estimated at 24.12%. Impervious surface percentages are derived from *Chapter 3: Watershed Hydrology, Appendix 3.A.: Land Use Classification/Grouping from SJRWMD Technical Reports, 2012.*

b. Inventory of existing drainage system

1. Village's drainage system

The Village provided an AutoCAD survey conducted by the Village of Islamorada that includes relevant stormwater infrastructure such as driveway culverts, curb and ditch inlets along US-1 to be factored into the analysis. Surveyed structure locations and descriptions, including invert elevation data, were exported, and individually assessed within the Interconnected Channel and Pond Routing Model (ICPR) created for this Watershed Management Plan. The available stormwater inventory includes structures primarily along US-1 with several additional structures along Old Hwy and Old State Road (SR) 905. Most of the stormwater infrastructure located south of the Plantation Key area of Islamorada was mucked and/or filled with water. Consequently, the respective stormwater structures had features and inverts that were not able to be obtained or surveyed at the time of the field efforts.

2. Florida Department of Transportation (FDOT) drainage system

The existing available stormwater inventory was limited to FDOT structures along US-1, Old Hwy, and Old SR 905 such as driveway culverts, curb and ditch inlets with gaps in data beyond Plantation Key. The lack of stormwater invert and feature information for FDOT structures resulted in using drainage assumptions and engineering judgment to obtain missing data, based on LiDAR data, relative positioning of existing structures to major waterways, and characteristics of nearest stormwater structures. Available invert elevation data from structures in the Plantation Key region of Islamorada illustrates that existing FDOT structures were constructed at higher elevations, corresponding to elevations along FDOT right-of-way. As a result, they were determined to have little to no positive drainage impact for the communities in the Keys overall, including Islamorada, at risk of sea level rise-induced inundation with minimal benefit during rainfall design storm events.

c. Inventory of data availability

Data availability within the Village is quite good. Several simultaneous efforts are ongoing at the County and Village levels that are focused on overall resiliency, climate planning, and infrastructure adaptation. Central to those efforts have been data compilation and collection and

the key to developing a Watershed Management Plan is the development of infrastructure data sources and evaluating how those assets are being or will be impacted by flood risk.

1. Village of Islamorada

   i. Islamorada Matters

   The Islamorada Matters Plan was developed in 2015 and was the Village's first effort to coalesce sustainability and resiliency principles with data related to future sea level rise impacts. The Village undertook the effort to develop data sources, policies, strategies and start the community discussion related to resiliency. There were several focus areas identified in the final Islamorada Matters Plan:

   - Habitat
   - Infrastructure and Built Environment
   - Village Buildings and Key Facilities
   - Adaptation Strategies
   - Sustainability

   This Plan evaluated the Village's level of preparedness and investigated the potential impacts of sea level rise, exceptionally high tides, storm surge and other sea level rise issues. As vulnerability and sea level rise modeling data were developed for the project, candidate adaptation strategies were developed and publicly discussed, and a series of public meetings were held to help the community understand what Islamorada will face and what can be done to manage the challenges.

   ii. Stormwater Master Plan

   Pursuant to Chapter 30, Article VII, Division 8 of the Land Development Regulations (LDRs) of Islamorada, Code of Ordinance (the Code), the purpose and intent of the stormwater management regulations is to provide for the safe management and disposal of stormwater runoff from developed areas, and to protect natural resources to minimize or eliminate potential adverse impacts to surface waters, shallow groundwater, and natural resources areas within the Village.

   In 2000, the Village of Islamorada developed a Stormwater Master Plan to address water quality improvements to the stormwater discharges into Village Canals and near shore waters of the Florida bay and Atlantic Ocean. Initial funding for the implementation of the Village Master Program for the fiscal years 1999 –2001 were obtained from various agencies, including the South Florida Water Management District (SFWMD), FDOT, and the Florida Department of Environmental Protection (DEP). This was driven by numerous studies, identifying the concerns of pollutants on the declining near shore water quality. The Stormwater Master Plan allowed the Village to implement corrective actions and preventative measures to minimize stormwater pollutant loading to canals, near shore waters, and provide solutions that account for natural and ecological resources. Additionally, the Master Plan identifies management initiatives such as ordinances and Best Management Practices (BMPs)

that will ensure the health and safety of the ecosystem and protect public and private property.

The Village's Stormwater Master Plan includes identification of drainage basin boundaries, on-site evaluation of existing drainage structures, assessment of natural areas, and assembly of the data into the stormwater Geographical Information System (GIS) Management System. Results of the Master Plan include Event Mean Concentration (EMC) of the four separate islands within the Village including Plantation Key, Windley Key, Upper Matecumbe Key, and Lower Matecumbe Key. These areas were individually evaluated based on their respective EMC parameters, individually ranked per their priority, provided proposed BMPs, and estimated for cost of future implementation.

However, among the requirements for the Five-Year Work Program was to establish multiple financial mechanisms to generate sufficient revenue for a long-term stormwater management program. At the time of creating the Stormwater Master Plan, the Village did not have a source of future funding for implementing stormwater improvements. In response to supplemental financial support of the Stormwater Master Plan, a few opportunities were identified. These included Federal, state, and coastal programs as well as low interest loans, development of village ordinances, stormwater utility, and private endowments.

Islamorada's Stormwater Design Criteria Technical Manual (Manual) (2016) was created as a supplementary and illustrative guide to the Islamorada Village of Islands Stormwater Master Plan (2000). This Technical Manual contains forms and procedures, minimum design standards, details and maintenance requirements for stormwater management to provide technical assistance to those submitting a stormwater management plan for development and to aid and accompany the stormwater regulations. This Manual supersedes the previous Manual dated February 2002. Islamorada has begun updating its Stormwater Master Plan in the coming year following the completion of the Mobile LiDAR data discussed in following section.

iii. Stormwater Assessments

On August 23, 2005, the Village Council adopted Ordinance No. 05-15 (the "Assessment Ordinance"), thereby authorizing the imposition of Stormwater Service Assessments against real property benefited by the Village's provision of Stormwater Management Services. Pursuant to this Assessment Ordinance, the Village imposed Stormwater Service assessments for the first time beginning in November 2005. The funds generated by this assessment are used to fund stormwater service costs within the Village's Stormwater Utility Enterprise Fund. The Assessment Ordinance requires that the Village annually adopt a final rate resolution for each subsequent fiscal year.

iv. Mobile LiDAR

Islamorada has secured mobile LiDAR across the municipality to better understand the elevation changes along owned / maintained roadways and critical infrastructure within the Village. The mobile LiDAR survey was executed in accordance with the FDOT terrestrial mobile

LiDAR (TML) Type A Survey standards to achieve the required accuracies. This includes specific target and validation point spacing, point density requirements and redundant / multiple pass measurements. The dataset is expected to be completed February 2024.

2. Monroe County

Monroe County has been engaged in resiliency, climate, and sustainability planning since 2010 when it first hired a staff person to head the County's sustainability and climate initiatives. That effort was concurrent with the award of American Reinvestment and Recovery Act (ARRA) funds and was one catalyst in undertaking these broader planning and infrastructure initiatives. This led to the County's first sustainability and resiliency planning document known as GreenKeys. Concurrent with the development of GreenKeys, the Village of Islamorada produced its first previously referenced climate planning document known as Islamorada Matters.

The County has continued its resiliency planning initiatives and coordination between the County and the Village on these initiatives has increased. The County has amended provisions of its Comprehensive Plan and integrated sea level rise policy initiatives into the Plan and its Code of Ordinances. The County also produced its first Vulnerability Assessment in 2015 in conjunction with the GreenKeys Planning process. The County also produced a credited CRS Watershed Management Plan in 2019 and was awarded 120 points for that effort. This WMP was one of the first in the Country to incorporate the new guidance related to sea level rise into the effort evaluating the NOAA Intermediate High 2100 condition. The County undertook numerous other policy initiatives such as a specific state-mandated update of its Coastal and Conservation Element of the Comprehensive Plan to comply with new state guidelines. The County updated its Vulnerability Assessment work in 2021. In 2021, new state law was enacted requiring certain technical parameters be included within the local government Vulnerability Assessments and the County is launching that work in 2023.

The County also initiated a planning effort in 2020 to conduct a Roads Vulnerability Analysis and Capital Plan. This extensive engineering-based effort has been based on updated and highly accurate mobile LiDAR previously collected by the County and evaluates the vulnerability and criticality of the County's roadways. The Plan includes conceptual engineering design, cost estimates, and a timetable in five-year increments to undertake road elevation, stormwater, and tidewater adaptation projects. The County and municipalities have engaged in extensive coordination to expand that planning process across the entirety of the Keys including the municipalities. The County has recently launched a Natural Resources Adaptation planning process to determine the cost-benefit and natural resources adaptation priorities in the County. Finally, the County has begun implementing several road elevation/adaptation and shoreline projects according to state and federal grants and appropriations received.

3. FDOT

FDOT has developed a statewide Resilience Action Plan (RAP), including US-1 as required by Section 339.157, F.S. The plan should enhance infrastructure and operational resilience, design retrofits and construct highway facilities, and enhance partnerships to address multijurisdictional needs. The RAP assesses potential impacts of storms, flooding, and sea level rise on the State

Highway System, and identifies strategies to improve the resiliency of Transportation facilities. Recently, FDOT initiated development of the Statewide Resilience Improvement Plan (RIP) which will build on the prior analysis on the statewide RAP and can potentially provide additional federal funding identified by the plan.

The current RAP includes a priority project list, which categorizes short term projects in line with FDOT's five-year work program and long-term projects based on their respective needs and cost-feasible long-range plans. The priority project list identifies geographic areas that may be subjected to water-related hazards. The *FDOT Resilience Action Plan Appendix A (Project List)* reflects that Islamorada falls under the medium tier project category.

4. Florida Keys Aqueduct Authority

The Florida Keys Aqueduct Authority (FKAA) has provided data to both the Village of Islamorada and Monroe County in efforts to conduct Vulnerability Assessments simultaneously with this effort to produce the Watershed Management Plan. Data regarding critical facilities has been incorporated into baseline asset maps referenced later within this document. Because the Village does not own or manage FKAA assets, they are considered "regionally significant" and will be evaluated under the scenarios required by Section 380.093, F.S. and incorporated into the Critical Asset Inventory work product from the Vulnerability Assessment effort.

2. Locations of

a. Critical facilities, cultural/historical, and other places/areas of interest

Within Islamorada, the public has access to the water via beaches, marinas, boat ramps and parks. Islamorada has three parks with water access facilities: Library Park (Upper Matecumbe Key), Plantation Yacht Harbor (Plantation Key) and Anne's Beach (Lower Matecumbe Key). Library Park has a beach. Plantation Yacht Harbor has a marina and boat ramp as well as a beach area that is open to the public. Anne's Beach has a beach and two walkways that provide access to the Atlantic Ocean.

Another way for the public to access the scenery and natural beauty of Islamorada is by the Overseas Highway (U.S. 1). Within the Village, U.S. 1 has several points where either the Atlantic Ocean or the Florida Bay is visible. The three bridges between the islands also provide visual access for the public.

Infrastructure components in the coastal area include roads, water and sewer lines and drainage facilities and at this time, it is not anticipated that any infrastructure will need to be relocated due a severe storm event. There are three bridges in the Islamorada Waterways: Snake Creek Bridge, Whale Harbor Bridge, and the Lignumvitae/Indian Key/Teatable Bridge. All the drainage structures within Islamorada are in the coastal area. The public infrastructure, as identified above, could sustain damage from a natural disaster. Relocation of infrastructure is not a viable solution

since the existing infrastructure is necessary to protect the health and safety of the residents in Islamorada, Village of Islands.

Islamorada is simultaneously conducting a Resilient Florida Vulnerability Assessment concurrently with this Watershed Management Plan. Asset Inventory GIS files are in Appendix B and include the 4 primary asset classes as defined in Section 380.093(2), F.S. The 4 primary asset classes as defined by state statute are:

1. Transportation assets and evacuation routes, including airports, bridges, bus terminals, ports, major roadways, marinas, rail facilities, and railroad bridges.
2. Critical infrastructure, including wastewater treatment facilities and lift stations, stormwater treatment facilities and pump stations, drinking water facilities, water utility conveyance systems, electric production and supply facilities, solid and hazardous waste facilities, military installations, communications facilities, and disaster debris management sites.
3. Critical community and emergency facilities, including schools, colleges, universities, community centers, correctional facilities, disaster recovery centers, emergency medical service facilities, emergency operation centers, fire stations, health care facilities, hospitals, law enforcement facilities, local government facilities, logistical staging areas, affordable public housing, risk shelter inventory, and state government facilities.
4. Natural, cultural, and historical resources, including conservation lands, parks, shorelines, surface waters, wetlands, and historical and cultural assets.

The baseline infrastructure map series generally follows these 4 defined asset classes, but certain maps were separated further within that classification system because the maps would have included too many assets to make them legible. For instance, there are 3 Critical Infrastructure Baseline Maps and 5 related to Natural, Cultural and Historical Resources. The asset data provided by the Village was also supplemented with asset information from the State of Florida, the Department of Homeland Security, and the Florida Department of Transportation.
Actual Asset Maps include the following:

- Aquatic Natural Areas Baseline
- Community and Emergency Management Baseline
- Critical Infrastructure Baseline (Potable Water)
- Critical Infrastructure Baseline (Sanitary Sewer)
- Critical Infrastructure Baseline (Other)
- Historical and Cultural Areas Baseline
- Terrestrial Natural Areas Baseline
- Transportation Baseline

b. Vulnerable areas and their descriptions

The most catastrophic threat to public safety in coastal areas of Florida is the potential loss of life and property from storm surge, flooding and high winds associated with hurricanes. Islamorada

is situated in the Florida Keys along the Atlantic coast, which has been identified by the National Oceanic and Atmospheric Administration (NOAA) as the area of the United States most vulnerable to hurricanes. The National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency (FEMA) has determined that most land within Islamorada is subject to flooding from a 100-year storm. The areas of Islamorada most threatened by flooding are the waterfront properties. As a coastal community, the threat to property and human life from flooding in the Village is primarily from tidal inundation and storm surges associated with severe storm events, not from upstream drainage conditions.

The coastal high hazard area in Florida is defined by Section 163.3178, F.S. as "…the area below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model". Under the South Florida Regional Planning Council's (SFRPC)'s Hurricane Evacuation Plan, all of Islamorada has been identified in the evacuation zone for a Category 1 storm. In the event of a Category 1 or 2 hurricane, the residents of Islamorada are instructed to go to one of the three designated Monroe County Shelters of Last Resort in Islamorada or evacuate from the community. Within Islamorada 3,550 households or approximately 7,632 permanent residents would need to be evacuated. Islamorada residents would primarily use U.S. 1 to evacuate to one of the shelters in Islamorada or on the mainland.

c. Natural and constructed drainage systems and channels

Based on the stormwater inventory provided by the Village of Islamorada, the majority of storm drain inlets and connected pipes exist along US-1. The inventory was provided in the form of CAD as-builts and stormwater shapefiles. Several isolated inlets and associated stormwater infrastructure exist along Old Hwy and Old SR 905. Storm drains inlets located in the northern Plantation key section of Islamorada were in noticeably better condition compared to the remainder of Islamorada. Remaining stormwater structures for Windley Key, Upper Matecumbe Key, and Lower Matecumbe Key consisted primarily of flat grate inlets and yard drains. The vast majority of these structures contained pipe inverts that were either inaccessible, "recessed", filled with water, or filled with muck. Additionally, several shallow swales connected by cross drains were identified along US-1, most notably in the Plantation key region of Islamorada near Founder's Park. Though Islamorada contains a number of shallow drainage systems and channels, the exact number has been determined to be immaterial as they did not appear to be hydraulically connected to positive outfalls based on available information and rely primarily on overland flow as their primary means of discharge. Furthermore, assessing existing channels in basins primarily connected to coastal outfalls as the case of Islamorada, provides little to no benefit from a modeling perspective with increased margin of error and model instability. As a result, existing channels were not modeled in the WMP as they were also accounted for in the stage storage information.

3. Existing regulations and plans in place for reducing flood risks

From the Village's Comprehensive Plan (2022) the following policies are included related to reducing flood risks and stormwater management:

Related to the reduction of flood risk, the Village has adopted numerous policies within the Coastal Element of the Comprehensive Plan. Several of these policies were recently adopted pursuant to the requirements of Section 163.3178, F.S. (Peril of Flood) amendment process. They include:

OBJECTIVE 5-1.17: MAINTAIN CONSISTENCY WITH FEDERAL, STATE, OR REGIONAL COASTAL INITIATIVES AND PROGRAMS

The Village will maintain Federal, State, and regional programs that will assist in reducing flood risk to a level that is at minimum consistent with the required program, and where possible and in the best interest of the Village, more stringent than the program.

- *Policy 5-1.17.1: Coastal Construction Control Line*

The Village shall enforce all regulations pertaining to the State's Coastal Construction Control Line as established pursuant to F.S. § 161.053 to be consistent with F.S. Ch. 161.

- *Policy 5-1.17.2: Florida Building Code*

Ensure the Village remains either consistent with, or more stringent than, the building construction techniques, and additional flood resistant construction requirements within the Florida Building Code and applicable flood plain management regulations set forth in 44 C.F.R. part 60.

- *Policy 5-1.17.3: National Flood Insurance Program, Community Rating System*

The Village will continue to participate in the Community Rating System administered by the National Flood Insurance Program. The Village shall continue to strengthen their sea-level rise adaptation strategies and work to reduce flood risk and losses, to improve their Community Rating Score.

OBJECTIVE 5-2.3: DEVELOPMENT AND REDEVELOPMENT PRINCIPLES, STRATEGIES AND SOLUTIONS TO PROTECT CRITICAL INFRASTRUCTURE FROM FLOOD EVENTS

The Village shall update data of critical facilities and create new strategies related to climate change impacts to infrastructure and shoreline protection.

- *Policy 5-2.2.1: Implement Updated FEMA Maps*

Islamorada, Village of Islands shall implement the revised and updated FEMA flood maps upon receipt of the Final Map Determination by FEMA and evaluate floor elevation requirements, as necessary, for all new construction in vulnerable areas.

- *Policy 5-2.3.1: Inventory Of Critical Facilities*

The Village will maintain a list of critical facilities within areas vulnerable to repeat flooding and analyze the facilities' capacity to accommodate sea-level rise over the life expectancy of the infrastructure.

- *Policy 5-2.3.2: Strategies And Solutions To Protect Critical Facilities*

The Village shall develop strategies that identify how the Village will respond to impacts on critical facilities located in flood areas, considering the potential need and cost to maintain or relocate critical facilities from the areas expected to be affected.

- *Policy 5-2.3.3: Shoreline Stabilization Strategy*

The Village will enforce a shoreline stabilization strategy to protect and enhance the built and natural environments from erosion and sea-level rise impacts, prioritizing natural green infrastructure approaches. The Village shall assure shoreline stabilization strategies are found to be in the public interest while taking into consideration the Village's vulnerability to climate change impacts. The Village shall consider public access to beaches, impacts to neighboring properties and the values and functions of beaches and coastal/marine systems relative to shoreline stabilization strategies.

OBJECTIVE 5-2.4: SITE DEVELOPMENT TECHNIQUES AND BEST PRACTICES TO MINIMIZE LOSS DUE TO FLOODING

In compliance with F. S. 163.3178(2)(f)3, during this short-term planning period the Village will implement site development techniques and best practices that reduce losses due to flooding.

- *Policy 5-2.4.1: New Planning, Design And Permitting Standards*

The Village will incorporate a planning, design and permitting standard for infrastructure and public facilities that includes a sea-level rise assumption based on NOAA's Intermediate High projections. The Village shall review and update sea-level rise projections when new and pertinent data is available.

- *Policy 5-2.4.2: Monitor Changes To Road Elevation Standards*

The Village shall coordinate with appropriate agencies to monitor changes to minimum road elevation standards which may be specific to areas within Monroe County due to its unique exposure to climate change and sea-level rise impacts. Best science available will influence the management technique(s) to be utilized.

- *Policy 5-2.4.3: Adaptation Action Areas*

The Village shall consider designation of "Adaptation Action Areas" with specific site development techniques and best practices to minimize losses due to flooding and claims made under flood insurance policies. New site development techniques could include living shorelines, bio-retention swales, permeable pavement, and green roofs.

Additionally, more general policies related to stormwater management are included within Chapter 4, the Public Facilities Element of the Comprehensive Plan include a stormwater level of service.

- *Policy 4-1.1.2: - Adopt Stormwater Level of Service Standards.*

Islamorada, Village of Islands hereby adopts LOS standards for stormwater management as currently mandated by State agencies, as defined in the Village's adopted Stormwater Management Master Plan as follows:

1. Post development runoff shall not exceed the pre-development runoff rate for a 25-year storm event, up to and including an event with a 24-hour duration.

2. Stormwater treatment and disposal facilities shall be designed to meet the design and performance standards established in F.A.C. Ch. 62-25, § 25.025, with treatment of the runoff from the first one (1) inch of rainfall on-site to meet the water quality standards required by F.A.C. Ch. 62, § 302.500; and
3. Stormwater facilities which directly discharge into 'Outstanding Florida Waters' (OFW) shall provide an additional treatment pursuant to F.A.C. Ch. 62-25.025 (9). Stormwater facilities must be designed so as to not degrade the receiving water body below the minimum conditions necessary to assure the suitability of water for the designated use of its classification as established in F.A.C. Ch. 62-302.

GOAL 4-3: - ADDRESS DRAINAGE/STORMWATER ISSUES.

Islamorada, Village of Islands shall provide a stormwater management system which corrects existing deficiencies, protects real and personal property and enhances and protects ground and nearshore water quality.

OBJECTIVE 4-3.1: - IMPLEMENT STORMWATER IMPROVEMENTS.

Islamorada, Village of Islands shall implement the Village's adopted Stormwater Management Master Plan (Islamorada, Village of Islands, Stormwater Management Master Plan, Project No. 00-0206, prepared by Law Engineering and Environmental Services, Inc., in cooperation with the South Florida Water Management District, September 2000), incorporated herein by reference, through administering an annual Stormwater Management Program.

- *Policy 4-3.1.1: - Implement Priority Stormwater Projects.*

Islamorada, Village of Islands shall continue implementation of priority improvement projects identified in the Village's Stormwater Management Master Plan to improve and make corrections for stormwater management, erosion and sedimentation control and water quality. The Stormwater Management Program shall follow the schedule for improvements provided in the Stormwater Management Master Plan. Each improvement project shall include planning, design, and construction phases. The Village shall fund annual improvement projects through the various innovative funding mechanisms and grant programs identified in the Stormwater Management Master Plan. The Village shall acquire easements as necessary, in conjunction with annual stormwater improvement projects. The Village shall review and update the Stormwater Management Program, as needed, on an annual basis.

- *Policy 4-3.1.2: - Implement Financial and Regulatory Mechanisms for Stormwater Improvements.*

Islamorada, Village of Islands shall continue to fund drainage basin improvements through the Village's stormwater utility and monitor the performance of the system. The Village shall amend the capital improvement schedule to incorporate programs and funding allocations, as necessary, to implement stormwater improvement projects. The Village shall maintain a regulatory framework for alleviating and/or preventing increased stormwater and surface water management problems and issues generated by development and/or redevelopment activity.

- *Policy 4-3.1.3: - Request Funding from FDOT for U.S. 1 Stormwater Improvements.*

Islamorada, Village of Islands shall request funding from FDOT to correct identified stormwater deficiencies within the U.S. 1 corridor.

OBJECTIVE 4-3.2: - PROTECT NATURAL FUNCTIONS.
Islamorada, Village of Islands shall protect the functions of natural groundwater recharge areas and natural drainage features.

- *Policy 4-3.2.1: - Ensure that Developed Lands Provide Adequate Drainage and Protection from Flooding and Manage the Retention of Ground and Surface Water at Levels that Enhance Natural Storage Capacity of Watersheds.*

Islamorada, Village of Islands shall promote the ecological, biological, and hydrological role that surface waters play in sustaining surface vegetation. The Village shall manage the location, design, and intensity of development in order to foster continuance of natural hydrological processes, including promoting on-site retention of surface waters, natural return of surface water into the soil, and channeling excess stormwater volume primarily via natural grassy swales. Land Development Regulation shall require the integration of natural storage areas and natural drainage courses into water management plans for new development and redevelopment.

- *Policy 4-3.2.2: - Provide Adequate On-Site Retention and Ground Water Recharge While Directing Surplus Run-off to Receiving Waterways in a Manner Which Prevents Imbalance to Their Ecosystems.*

Islamorada, Village of Islands shall require Land Development Regulations to include land use controls, such as subdivision regulations, zoning and site plan review, erosion controls, water quality controls, landscaping, and flood management regulations to assist in implementing the Stormwater Management Program. The programs shall be assessed annually and updated as necessary based on improved knowledge of problems, issues, and best management practices.

- *Policy 4-3.2.3: - Pursue the Development of Adequate Off-Site Surface Water Management Facilities.*

The Village shall monitor, at regular intervals, the performance of existing off-site drainage facilities, evaluate existing and potential future problems or issues, and pursue the funding of necessary structural and non-structural system improvements for effective surface water management. All new developments shall provide an equitable contribution for off-site drainage improvements necessitated by the development.

- *Policy 4-3.2.4: - Coordinate Watershed Management Plans and Policies with Appropriate Public Agencies.*

Islamorada, Village of Islands shall ensure coordination of watershed management plans and policies with appropriate local, regional, State, and Federal agencies, including Monroe County, the South Florida Water Management District, the State Department of Environmental

Protection, the Agricultural Extension Service, the United States Army Corps of Engineers and the U.S. Fish and Wildlife Service.

- *Policy 4-3.2.5: - Require Buffer Zones.*

Islamorada, Village of Islands shall maintain Land Development Regulations that require new development to provide buffer zones adjacent to natural drainageways and retention areas.

- *Policy 4-3.2.6: - Manage Land Use in the Floodplain and Coastal Areas.*

Land Development Regulations shall include performance criteria regulating development within the floodplain and shoreline areas as a result of the Stormwater Management Master Plan.

OBJECTIVE 4-6.1: - PROTECT FRESHWATER LENSES.
Islamorada, Village of Islands shall protect freshwater lenses within the Village from loss of recharge potential, ensure the preservation of the existing freshwater lens systems, and from threats of groundwater contamination.

- *Policy 4-6.1.1: - Adopt Stormwater Management Regulations.*

The Village shall continue to maintain Land Development Regulations for managing stormwater run-off. The regulations shall be consistent with the adopted Stormwater Management Master Plan and regulate the quality and quantity of stormwater discharges, encourage the use of site-specific natural drainage features to the maximum extent possible before utilizing structural stormwater control, and shall restrict the percentage of impervious areas on development and redevelopment sites.

From the Village's Code of Ordinances (current), the following policies are summarized in this section, but the Floodplain Management Ordinance is included entirely in Appendix A:

Article 6-III Floodplain Management Standards
The provisions of this article shall apply to all development that is wholly within or partially within any flood hazard area, including but not limited to the subdivision of land; filling, grading, and other site improvements and utility installations; construction, alteration, remodeling, enlargement, improvement, replacement, repair, relocation or demolition of buildings, structures, and facilities that are exempt from the Florida Building Code; placement, installation, or replacement of manufactured homes and manufactured buildings; installation or replacement of tanks; placement of recreational vehicles; installation of swimming pools; and any other development.

Intent. The purposes of this article and the flood load and flood-resistant construction requirements of the Florida Building Code are to establish minimum requirements to safeguard the public health, safety, and general welfare and to minimize public and private losses due to flooding through regulation of development in flood hazard areas to:

1) Minimize unnecessary disruption of commerce, access, and public service during times of flooding.

2) Require the use of appropriate construction practices to prevent or minimize future flood damage.
3) Manage filling, grading, dredging, mining, paving, excavation, drilling operations, storage of equipment or materials, and other development which may increase flood damage or erosion potential.
4) Manage the alteration of flood hazard areas and shorelines to minimize the impact of development on the natural and beneficial functions of the floodplain.
5) Minimize damage to public and private facilities and utilities.
6) Help maintain a stable tax base by providing for the sound use and development of flood hazard areas.
7) Minimize the need for future expenditure of public funds for flood control projects and response to and recovery from flood events; and
8) Meet the requirements of the National Flood Insurance Program for community participation as set forth in Title 44 Code of Federal Regulations, Section 59.22.

Pursuant to Chapter 30, Article VII, Division 8 of the Land Development Regulations (LDRs) of Islamorada, Village of Islands (the Village), Code of Ordinance (the Code), the purpose and intent of the stormwater management regulations is to provide for the safe management and disposal of stormwater runoff from developed areas, and to protect natural resources to minimize or eliminate potential adverse impacts to surface waters, shallow groundwater, and natural resources areas within the Village. Specifically, as applicable to this Watershed Management Plan, the General Design and Performance Standards for Stormwater Management Systems is provided as follows:

Sec 30-1727 General Design And Performance Standards For Stormwater Management Systems
The applicant shall comply with the minimum general design standards as follows:
A stormwater management system designed and installed for the development shall contain provisions for:

Pollution abatement (Category 1, Category 2, and Category 3): Refer to the Design Criteria, Performance and Maintenance section of the stormwater design criteria technical manual to determine required pollution abatement volume.

Rate of discharge limitations (Category 2 and Category 3): The post-development peak rate of discharge permitted from the site shall not exceed the pre-peak rate of discharge from the site during a 72-hour/25-year frequency storm event. Those sites with no positive outfall shall be required to retain total runoff from a 72-hour/25-year storm event.

Finished floor elevation: The finished floor elevation of a retention/detention facility shall be designed to contain a 100-year storm event with no discharge.

Protection from flooding (Category 2 and Category 3): All structures are to be constructed in a manner consistent with flood protection and floodplain encroachment standards established in the village land regulations and comprehensive land use plan.

Airstrip, industrial, mariculture, and residential high-land use activities shall provide for at least 0.5 inch of additional retention/detention pretreatment volume for redevelopment and at least 1.0 inch of retention/detention additional pretreatment volume for new development.

Systems with inlets in grassed areas, in conjunction with vegetated swales, shall be credited with up to 0.20 inch of the required wet detention amount for the contributing areas. Full credit shall be based on a ratio of 5:1 (pervious area: impervious area), with the exception of saltmarsh and buttonwood habitats, which will require a comparable ratio of 7:1. Vegetated and grassed areas must be permanently protected from vehicular use and structural encroachment.

Stormwater discharge facilities which discharge directly to sensitive receiving waters shall provide additional retention pretreatment equal to 50 percent of the total required volume, depending on the arrangement of on-site facilities. Sensitive receiving waters are defined as:
Class III Outstanding Florida Waters; and Canals or other waterways (manmade or natural) connecting with these waters.

A 72-hour/25-year storm event shall be used in computing off-site discharge rates unless otherwise specified by the director of planning and development. However, if the site development has unusual site-specific conditions, the applicant may request an alternative discharge rate given supporting evidence.

A retention/detention system shall be required which limits peak discharge of a developed site to the discharge from the site in the pre-development condition during a 72-hour/25-year frequency storm event.

Stormwater management systems shall be located between the development and the receiving water body where appropriate.

Special engineering features to minimize the transport of floating debris, oil, and grease remaining in the detention volumes to reduce peak discharges must be incorporated into the design of the outlet control structure. The design of this control system should make adequate provision to minimize erosion.

Water surfaces can be deducted from site areas for water quality pervious/impervious calculations.

Prior to building permit approval, projects shall be required to receive appropriate permits from state and federal agencies to comply with the rules and regulations for stormwater facility design, performance, and discharge.

Discharged stormwater runoff shall not degrade receiving surface water bodies below the minimum conditions established by state water quality standards (F.A.C. chs. 62-302 and 62-25).

The Village also has provisions for a Stormwater Management System in Article 48-II Stormwater Assessments within the Code.

This Stormwater Design Criteria Technical Manual (Manual) has been created as a supplementary and illustrative guide to the Islamorada Village of Islands Stormwater Management Master Plan (2000). This Technical Manual contains forms and procedures, minimum design standards, details, and maintenance requirements for stormwater management in order to provide technical assistance to those submitting a stormwater management plan for development and to aid and accompany the stormwater regulations.

This Manual supersedes the previous Manual dated February 2002. This update was implemented to better suit the changing needs of the Village and incorporate additional information regarding new and alternative stormwater management systems. The Manual is subject to future revisions, as deemed necessary by the Village to continue to meet industry standards, the needs of the citizens, and the changing environment. Future revisions to the Manual will be conducted per Section 30-1729 of the Code. The revisions may be conducted by Staff or by consultants under staff direction. This manual is intended for use for all land use categories unless specifically exempt according to Chapter 30 LDRs. Additional requirements set forth by Chapter 30, Article VII, Division 8 of the Code must be observed as applicable.

Finally, Division 48-II-3 establishes the Stormwater Assessments structure previously described. It includes the following legislative determinations:

a) The stormwater utility possesses a logical relationship to the use and enjoyment of all developed property by treating and controlling contaminated stormwater generated by improvements constructed on developed property, which resulted in the alteration of such property from its natural state to accommodate such improvements.
b) The special benefit received by assessed property is the control, management and treatment of the stormwater burden generated by the improvements on developed property.
c) Substantially all of the stormwater burden managed, controlled and treated by the stormwater utility is generated by developed property and the amount of stormwater generated by property in its natural state that is managed, controlled and treated by the stormwater utility is inconsequential.
d) The village has adopted the stormwater management element of the comprehensive plan which sets forth goals that make it necessary and essential to construct improvements and extensions to the existing stormwater system so the collection, storage, treatment, and conveyance of stormwater within the village adequately protects the health, safety, and welfare of the citizens of the village. The creation and maintenance of the stormwater utility is designed to implement the stormwater management element and other municipal, federal and state policies mandating stormwater management programs by local governments.

II. Initial Flood Modeling

As stated throughout this WMP, Islamorada is conducting two efforts simultaneously. There was coordination throughout the development of the WMP and Islamorada's Vulnerability Assessment because members of the Team were consistent across the two projects. Collaboration occurred on elevation data, flood data and scenarios, tide gauge and other data sources to ensure outcomes were coordinated. While the efforts used two different evaluation methods, both were harmonized to meet the objectives under their respective programs including the Section 380.093(3), F.S. criteria for Vulnerability Assessments as well as the CRS Coordinator's Manual (2017 & 2021 Addendum). Summaries of the modeling approaches follow.

For the Vulnerability Assessment, the Team conducted a geospatial analysis to evaluate current and future flood risk based on 38 parameters. Sea level rise, high tide flooding, storm surge, rainfall, and combination flood simulation modeling and corresponding data visualization will be produced using ESRI's ArcGIS Pro. The model foundation harnesses the most recent, best available LiDAR data with numerous federal, state, and private methodologies and GIS data sets, each with its specific limitations and constraints. For the Vulnerability Assessment analysis, the digital elevation model used to map the various flood projections does not incorporate a detailed pipe network analysis, or engineering-grade hydrologic analysis. Climate risk modeling will be provided via high-resolution raster depth grids that detail the maximum water depth for the planning horizon (for this assessment the planning horizons are the years 2040, 2070, and 2100) and the various climate projections in the assessment. The exposure and sensitivity of the critical assets defined in Subsection 380.093, F.S. will be determined by the locations and information stored within the GIS data gathered during the project timeline and produced.

Modeling approaches and corresponding data requirements are described briefly below.

1. Sea level rise is modeled using NOAA Office for Coastal Management's Detailed Method for Mapping Sea Level Rise Inundation (Jan 2017), generally described as a modified bathtub approach and will depict tidal inundation for the Intermediate Low and Intermediate High curves described in NOAA Technical Report NOS CO-OPS 083 Global and Regional Sea Level Rise Scenarios for the United States.
2. High tide flooding, often referred to as "king tides," "nuisance," or "sunny day" flooding will be modeled following a similar approach to the method above and will account for high tide flooding thresholds noted in NOAA Technical Report NOS CO-OPS 086 Patterns and Projections of High Tide Flooding Along the US Coastline Using a Common Impact Threshold as well as the Intermediate High curve described in NOS CO-OPS 083.
3. Storm Surge flooding is modeled using FEMA's HAZUS-MH software's Flood Hazard Analysis module where still water elevations derived from the most recent effective Flood Insurance Study are adjusted for to account for sea level rise.
4. Rainfall precipitation estimates will be sourced from NOAA's Atlas 14 and future rainfall precipitation change factors derived from the SFWMD will be applied to account for future rainfall totals.

5. Various combinations of sea level rise, high tide flooding, storm surge, and rainfall-induced flooding simulations will be modeled using ArcGIS Pro as the foundation for combining the output of the analytical modeling efforts.

Initial and in-progress Inundation Map Series results can be found linked in the footnotes.[1] The following scenarios are being completed as part of the Vulnerability Assessment:

a **Depth of Tidal Flooding, NOAA / DEP "thresholds"**[2]

Timeframe	***Sea Level Rise***	***Sea Level Rise***	***Total # Maps***
Present Date	MSL/MHHW		1
2040	NOAA Intermediate Low	NOAA Intermediate High	2
2070	NOAA Intermediate Low	NOAA Intermediate High	2
2100	NOAA Intermediate Low	NOAA Intermediate High	2

b **Storm Surge + FEMA**[3] **Storm Surge Module of HAZUS (will approximate flood elevations to Category storm events, 1-5)**

Timeframe	***Sea level Rise + Storm Surge***			***Total # Maps***
Present Day	100-year Storm			1
2040	NOAA Intermediate Low	NOAA Intermediate High	100-year storm	2
2070	NOAA Intermediate Low	NOAA Intermediate High	100-year storm	2
2100	NOAA Intermediate Low	NOAA Intermediate High	100-year storm	2

[1] Days of Tidal flooding: https://cvg-nexus.com/~Tito7
Sea level rise flooding: https://cvg-nexus.com/~YxR3z
Surge flooding: https://cvg-nexus.com/~KMQBT
Rainfall flooding: https://cvg-nexus.com/~d3BSF
Combination flooding: https://cvg-nexus.com/~l2U4s

[2] Interpolated between two closest tide gauges or one (higher of the two) with appropriate rationale. We've utilized NOAA's Minor Threshold for high tide flooding (as published in 2021 State of High Tide Flooding and Annual Outlook (noaa.gov) https://repository.library.noaa.gov/view/noaa/30769) paired with the NIH and NIL projections of sea level rise. Awaiting confirmation from DEP on this.

[3] Depends on best available data between NOAA v. FEMA.

c **Rainfall with future boundary conditions modified to consider sea level rise and high tide**

Timeframe	*High Tide + Sea Level Rise + Rainfall*				*Total # Maps*
Present Day	10-year 24[4] hour; 50-year 24 hour; 100-year 24 hour; 500[5]-year 24 hour				4
2040	High Tide	NOAA Intermediate Low	NOAA Intermediate High	25-year, 100-year [6] Rainfall	4
2070	High Tide	NOAA Intermediate Low	NOAA Intermediate High	25-year, 100-year Rainfall	4
2100[7]	High Tide	NOAA Intermediate Low	NOAA Intermediate High	25-year, 100-year Rainfall	4

d **Compound flooding**

Timeframe	*Sea Level Rise + Storm Surge (100-year) + 100-year 24 hour Rainfall + High Tide*					*Total # Maps*
Present Day	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year storm	100-year 24 hr Rainfall	2
2040	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year storm	100-year 24 hr Rainfall	2
2070	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year storm	100-year 24 hr Rainfall	2
2100	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year storm	100-year 24 hr Rainfall	2

The Team also used the Sea Level Affecting Marshes Model (SLAMM) to evaluate future impacts on shorelines and habitats as a function of land elevation, tide range, sea level rise and other environmental factors.

[4] SFWMD requires 72 hour (this may differentiate across WMD).
[5] Present day, 500-year only.
[6] Future conditions beyond 100-year doesn't exist (except 200-year within SFWMD).
[7] May not have change factors for 2100.

4. For the current/existing conditions land use, future land use, and the fully developed watershed a. Evaluations of the existing drainage system's runoff response from design storms using a hydrologic and hydraulic study with a hydrograph approach under current and predicted future land use conditions with assessments of the impacts of climate change and sea level rise for 10-, 25- & 100-year storm events.

General Overview for the WMP

A hydrologic and hydraulic model for Islamorada watersheds was created using Interconnected Channel and Pond Routing (ICPR) software version 4.07.08. The project location is shown in **Figure 1**. The hydrologic portion of the model simulates rainfall runoff hydrographs while the hydraulic component routes hydrographs through stormwater features to determine flood stages and peak flows resulting from specific storm events. While ICPR version 4 has the capabilities to model groundwater and 2D overland flow, for the purposes of this project, the model was constructed using only 1D node-link routing with manually defined sub-basins, as shown in **Figure 5**.

Rainfall

The Mean Annual [2.33-year (yr) 24-hour (hr)], 10-yr 24-hr, 25-yr 24-hr, and 100-yr 24-hr storm events were modeled in ICPR4. The mean annual storm event was used to determine the initial stages for the larger storm events described in the subsequent **Initial Stages** Section. The rainfall amounts for the existing conditions (2025 scenario) were determined using the NOAA Atlas 14, Volume 9, Version 2 Point Precipitation Frequency Estimates for the Project area. The rainfall totals are listed in **Table 1** below. The total rainfall for the mean annual event (2.33-Year) was interpolated based on the 2-year and 5-year 24-hour events. Future extreme rainfall change factors for Monroe County were used to adjust NOAA depth of rainfall for future scenarios 2040, 2070, and 2100 (SFWMD, 2022). Future rainfall depths for 2040, 2070, and 2100 scenarios were determined based on the product of the existing rainfall depth and the corresponding future rainfall change factor.

Table 1. Design Storm Events

Frequency (years)	Duration (hours)	Total Rainfall Existing 2025 Scenario (inches)	Total Rainfall 2040, 2070, 2100 Scenarios (inches)
Mean Annual (2.33)	24	5.45	5.89
10	24	7.7	8.47
25	24	9.77	11.14
100	24	13.5	16.07

Source: NOAA, 2023

Initial Stages

The modeled area primarily consists of residential and commercial areas. Initial stage elevations for all basins were calculated based on using the hot start methodology in ICPR version 4.07.08, further described below.

The initial stages were set at the ground surface elevation based on the Digital Elevation Model (DEM). A dry condition with no rainfall was simulated for 10 hours in the model to establish initial stages for other storm events, leveling out after any initial surges occurred in the model. The mean annual storm event was then run using the node stage elevations at time 9 hours from the no rainfall simulation as the initial stages in the mean annual simulation. The 10-yr 24-hr, 25-yr 24-hr, and 100-yr 24-hr model simulations used the "hot start" function based on the results of the mean annual model simulation at time 96 hours, thereby setting the post-storm mean annual node stages as the initial stages for the larger storm event simulations.

The model results were reviewed by WSP to ensure their adequacy and representativeness.

Subbasin Area

The DEM acquired for Islamorada was created based on the 2018-2019NOAA NGS Topobathy LiDAR (Light Detection and Ranging) DEM ranging from Miami to Marquesas, FL (Refer to Figure 2). All elevation data incorporated in this project is referenced to NAVD88 datum unless otherwise specified. The Islamorada terrain ranges from an upper elevation of 15.9 ft to a lower elevation of -20.2 ft.

The project site's level terrain proposed work boundary, survey data, and LiDAR elevations were used in determining the subbasin size and shape. The subbasin areas and the existing conditions of the ICPR model node-link schematic are shown in **Figure 5** and **Figure 6** respectively.

Curve Number Method

ICPR4 utilizes the soil information and land use data in the map layers and intersects the two datasets to calculate surface runoff via the Technical Release 55 (TR-55) curve number (CN) guidance (NRCS, 1986). Inputs into the model calculations include a curve number set (Table 2) with all relevant combinations of land use zones and soil zones. Once mapped, soil and land use lookup tables were used in ICPR4 to compute rainfall excess for each subbasin. The soil lookup table was populated using data from the SSURGO database and following the ICPR4 guidance document methodology. The model uses this information to determine surface runoff from each union of land use type and soil type within the dataset. CN and Land Use lookup values are summarized in **Table 2**. The respective soils maps for Islamorada are shown in **Figure 3**.

Table 2. Curve Number Soil Parameters

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
1100	Residential Low Density < 2 Dwelling Units Per Acre	A	50
FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
1100	Residential Low Density < 2 Dwelling Units Per Acre	A/D	81.5
1100	Residential Low Density < 2 Dwelling Units Per Acre	B	68
1100	Residential Low Density < 2 Dwelling Units Per Acre	B/D	81.5
1100	Residential Low Density < 2 Dwelling Units Per Acre	C	79
1100	Residential Low Density < 2 Dwelling Units Per Acre	C/D	81.5
1100	Residential Low Density < 2 Dwelling Units Per Acre	D	84
1100	Residential Low Density < 2 Dwelling Units Per Acre	W	100
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	A	57
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	A/D	83.5
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	B	72
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	B/D	83.5
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	C	81

1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	C/D	83.5
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	D	86
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	W	100
FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
1300	Residential High Density	A	77
1300	Residential High Density	A/D	91
1300	Residential High Density	B	85
1300	Residential High Density	B/D	91
1300	Residential High Density	C	90
1300	Residential High Density	C/D	91
1300	Residential High Density	D	92
1300	Residential High Density	W	100
1400	Commercial And Services	A	89
1400	Commercial And Services	A/D	94.5
1400	Commercial And Services	B	92
1400	Commercial And Services	B/D	94.5
1400	Commercial And Services	C	94
1400	Commercial And Services	C/D	94.5
1400	Commercial And Services	D	95
1400	Commercial And Services	W	100
1500	Industrial	A	81
1500	Industrial	A/D	92
1500	Industrial	B	88
1500	Industrial	B/D	92

1500	Industrial	C	91
1500	Industrial	C/D	92
1500	Industrial	D	93
1500	Industrial	W	100
FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
1600	Extractive	A	77
1600	Extractive	A/D	92.5
1600	Extractive	B	86
1600	Extractive	B/D	92.5
1600	Extractive	C	91
1600	Extractive	C/D	92.5
1600	Extractive	D	94
1600	Extractive	W	100
1700	Institutional	A	69
1700	Institutional	A/D	88.5
1700	Institutional	B	81
1700	Institutional	B/D	88.5
1700	Institutional	C	87
1700	Institutional	C/D	88.5
1700	Institutional	D	90
1700	Institutional	W	100
1800	Recreational	A	49
1800	Recreational	A/D	81.5
1800	Recreational	B	69
1800	Recreational	B/D	81.5
1800	Recreational	C	79

1800	Recreational	C/D	81.5
1800	Recreational	D	84
1800	Recreational	W	100

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
1900	Open Land	A	39
1900	Open Land	A/D	77
1900	Open Land	B	61
1900	Open Land	B/D	77
1900	Open Land	C	74
1900	Open Land	C/D	77
1900	Open Land	D	80
1900	Open Land	W	100
2100	Cropland And Pastureland	A	49
2100	Cropland And Pastureland	A/D	81.5
2100	Cropland And Pastureland	B	69
2100	Cropland And Pastureland	B/D	81.5
2100	Cropland And Pastureland	C	79
2100	Cropland And Pastureland	C/D	81.5
2100	Cropland And Pastureland	D	84
2100	Cropland And Pastureland	W	100
2200	Tree Crops	A	44
2200	Tree Crops	A/D	79.5
2200	Tree Crops	B	65
2200	Tree Crops	B/D	79.5
2200	Tree Crops	C	77
2200	Tree Crops	C/D	79.5

2200	Tree Crops	D	82
2200	Tree Crops	W	100
FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
2300	Feeding Operations	A	73
2300	Feeding Operations	A/D	90.5
2300	Feeding Operations	B	83
2300	Feeding Operations	B/D	90.5
2300	Feeding Operations	C	89
2300	Feeding Operations	C/D	90.5
2300	Feeding Operations	D	92
2300	Feeding Operations	W	100
2400	Nurseries And Vineyards	A	57
2400	Nurseries And Vineyards	A/D	84
2400	Nurseries And Vineyards	B	73
2400	Nurseries And Vineyards	B/D	84
2400	Nurseries And Vineyards	C	82
2400	Nurseries And Vineyards	C/D	84
2400	Nurseries And Vineyards	D	86
2400	Nurseries And Vineyards	W	100
2500	Specialty Farms	A	59
2500	Specialty Farms	A/D	84
2500	Specialty Farms	B	74
2500	Specialty Farms	B/D	84
2500	Specialty Farms	C	82
2500	Specialty Farms	C/D	84
2500	Specialty Farms	D	86

2500	Specialty Farms	W	100
FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
2600	Other Open Lands	A	30
2600	Other Open Lands	A/D	74.5
2600	Other Open Lands	B	58
2600	Other Open Lands	B/D	74.5
2600	Other Open Lands	C	71
2600	Other Open Lands	C/D	74.5
2600	Other Open Lands	D	78
2600	Other Open Lands	W	100
3100	Herbaceous Upland Nonforested	A	63
3100	Herbaceous Upland Nonforested	A/D	85
3100	Herbaceous Upland Nonforested	B	71
3100	Herbaceous Upland Nonforested	B/D	85
3100	Herbaceous Upland Nonforested	C	81
3100	Herbaceous Upland Nonforested	C/D	85
3100	Herbaceous Upland Nonforested	D	89
3100	Herbaceous Upland Nonforested	W	100
3200	Shrub And Brushland	A	35
3200	Shrub And Brushland	A/D	73.5
3200	Shrub And Brushland	B	56
3200	Shrub And Brushland	B/D	73.5
3200	Shrub And Brushland	C	70
3200	Shrub And Brushland	C/D	73.5
3200	Shrub And Brushland	D	77
3200	Shrub And Brushland	W	100

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
3300	Mixed Rangeland	A	49
3300	Mixed Rangeland	A/D	81.5
3300	Mixed Rangeland	B	69
3300	Mixed Rangeland	B/D	81.5
3300	Mixed Rangeland	C	79
3300	Mixed Rangeland	C/D	81.5
3300	Mixed Rangeland	D	84
3300	Mixed Rangeland	W	100
4100	Upland Coniferous Forest	A	45
4100	Upland Coniferous Forest	A/D	80
4100	Upland Coniferous Forest	B	66
4100	Upland Coniferous Forest	B/D	80
4100	Upland Coniferous Forest	C	77
4100	Upland Coniferous Forest	C/D	80
4100	Upland Coniferous Forest	D	83
4100	Upland Coniferous Forest	W	100
4200	Upland Hardwood Forest	A	36
4200	Upland Hardwood Forest	A/D	76
4200	Upland Hardwood Forest	B	60
4200	Upland Hardwood Forest	B/D	76
4200	Upland Hardwood Forest	C	73
4200	Upland Hardwood Forest	C/D	76
4200	Upland Hardwood Forest	D	79
4200	Upland Hardwood Forest	W	100

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
4300	Upland Hardwood Forests Continued	A	36
4300	Upland Hardwood Forests Continued	A/D	76
4300	Upland Hardwood Forests Continued	B	60
4300	Upland Hardwood Forests Continued	B/D	76
4300	Upland Hardwood Forests Continued	C	73
4300	Upland Hardwood Forests Continued	C/D	76
4300	Upland Hardwood Forests Continued	D	79
4300	Upland Hardwood Forests Continued	W	100
4400	Tree Plantations	A	36
4400	Tree Plantations	A/D	76
4400	Tree Plantations	B	60
4400	Tree Plantations	B/D	76
4400	Tree Plantations	C	73
4400	Tree Plantations	C/D	76
4400	Tree Plantations	D	79
4400	Tree Plantations	W	100
5100	Streams and waterways	A	100
5100	Streams and waterways	A/D	100
5100	Streams and waterways	B	100

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
5100	Streams and waterways	B/D	100
5100	Streams and waterways	C	100
5100	Streams and waterways	C/D	100
5100	Streams and waterways	D	100
5100	Streams and waterways	W	100
5200	Lakes	A	100
5200	Lakes	A/D	100
5200	Lakes	B	100
5200	Lakes	B/D	100
5200	Lakes	C	100
5200	Lakes	C/D	100
5200	Lakes	D	100
5200	Lakes	W	100
5300	Reservoirs	A	100
5300	Reservoirs	A/D	100
5300	Reservoirs	B	100
5300	Reservoirs	B/D	100
5300	Reservoirs	C	100
5300	Reservoirs	C/D	100
5300	Reservoirs	D	100
5300	Reservoirs	W	100
5400	Bays and estuaries	A	100
5400	Bays and estuaries	A/D	100
5400	Bays and estuaries	B	100

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
5400	Bays and estuaries	B/D	100
5400	Bays and estuaries	C	100
5400	Bays and estuaries	C/D	100
5400	Bays and estuaries	D	100
5400	Bays and estuaries	W	100
5500	Major Springs	A	100
5500	Major Springs	A/D	100
5500	Major Springs	B	100
5500	Major Springs	B/D	100
5500	Major Springs	C	100
5500	Major Springs	C/D	100
5500	Major Springs	D	100
5500	Major Springs	W	100
5600	Slough waters	A	100
5600	Slough waters	A/D	100
5600	Slough waters	B	100
5600	Slough waters	B/D	100
5600	Slough waters	C	100
5600	Slough waters	C/D	100
5600	Slough waters	D	100
5600	Slough waters	W	100
5700	Ocean and Gulf	A	100
5700	Ocean and Gulf	A/D	100
5700	Ocean and Gulf	B	100

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
5700	Ocean and Gulf	B/D	100
5700	Ocean and Gulf	C	100
5700	Ocean and Gulf	C/D	100
5700	Ocean and Gulf	D	100
5700	Ocean and Gulf	W	100
6100	Wetland Hardwood Forests	A	98
6100	Wetland Hardwood Forests	A/D	98
6100	Wetland Hardwood Forests	B	98
6100	Wetland Hardwood Forests	B/D	98
6100	Wetland Hardwood Forests	C	98
6100	Wetland Hardwood Forests	C/D	98
6100	Wetland Hardwood Forests	D	98
6100	Wetland Hardwood Forests	W	98
6200	Wetland Coniferous Forests	A	98
6200	Wetland Coniferous Forests	A/D	98
6200	Wetland Coniferous Forests	B	98
6200	Wetland Coniferous Forests	B/D	98
6200	Wetland Coniferous Forests	C	98
6200	Wetland Coniferous Forests	C/D	98
6200	Wetland Coniferous Forests	D	98
6200	Wetland Coniferous Forests	W	98
6300	Wetland Forested Mixed	A	98
6300	Wetland Forested Mixed	A/D	98
6300	Wetland Forested Mixed	B	98

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
6300	Wetland Forested Mixed	B/D	98
6300	Wetland Forested Mixed	C	98
6300	Wetland Forested Mixed	C/D	98
6300	Wetland Forested Mixed	D	98
6300	Wetland Forested Mixed	W	98
6400	Vegetated Non-Forested Wetlands	A	98
6400	Vegetated Non-Forested Wetlands	A/D	98
6400	Vegetated Non-Forested Wetlands	B	98
6400	Vegetated Non-Forested Wetlands	B/D	98
6400	Vegetated Non-Forested Wetlands	C	98
6400	Vegetated Non-Forested Wetlands	C/D	98
6400	Vegetated Non-Forested Wetlands	D	98
6400	Vegetated Non-Forested Wetlands	W	98
6500	Non-Vegetated	A	98
6500	Non-Vegetated	A/D	98
6500	Non-Vegetated	B	98
6500	Non-Vegetated	B/D	98
6500	Non-Vegetated	C	98
6500	Non-Vegetated	C/D	98
6500	Non-Vegetated	D	98
6500	Non-Vegetated	W	98
7100	Beaches other than swimming	A	77
7100	Beaches other than swimming	A/D	92.5
7100	Beaches other than swimming	B	86

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
7100	Beaches other than swimming	B/D	92.5
7100	Beaches other than swimming	C	91
7100	Beaches other than swimming	C/D	92.5
7100	Beaches other than swimming	D	94
7100	Beaches other than swimming	W	100
7400	Disturbed	A	77
7400	Disturbed	A/D	92.5
7400	Disturbed	B	86
7400	Disturbed	B/D	92.5
7400	Disturbed	C	91
7400	Disturbed	C/D	92.5
7400	Disturbed	D	94
7400	Disturbed	W	100
8100	Transportation	A	81
8100	Transportation	A/D	92
8100	Transportation	B	88
8100	Transportation	B/D	92
8100	Transportation	C	91
8100	Transportation	C/D	92
8100	Transportation	D	93
8100	Transportation	W	100
8200	Communication	A	81
8200	Communication	A/D	92
8200	Communication	B	88

FLUCCS CODE	FLUCSDESC	HYDROLOGIC GROUP	CURVE NUMBER
8200	Communication	B/D	92
8200	Communication	C	91
8200	Communication	C/D	92
8200	Communication	D	93
8200	Communication	W	100
8300	Utilities	A	81
8300	Utilities	A/D	92
8300	Utilities	B	88
8300	Utilities	B/D	92
8300	Utilities	C	91
8300	Utilities	C/D	92
8300	Utilities	D	93
8300	Utilities	W	100

Source: FLUCCS, 2019 Checked by:Gary Qiu

Time of Concentration

The time of concentration (t_c) is the time it takes for runoff to travel from the hydraulically most distant part of the subbasin to the determined subbasin outlet or other point of reference. The t_c is calculated based on the slope of the ground, travel distance within the sub-basin, and type of ground cover as described in the following steps:

- Tc Lines were individually drawn and calculated in Arcmap 10.8.1 and stored in the "time_of_concentration_Islamorada" geodatabase.
- The Tc values for each subbasin were calculated using the NRCS Technical Release 55 (TR-55) methodology, which divides the flow path into three main components:
  - Overland flow (i.e., sheet flow)
  - Shallow concentrated flow
  - Open channel flow.
- Overland sheet flow was limited to the first 100 feet.
- The Manning's n value used for sheet flow was calculated as the weighted average of the land-use-based (2011 SWFWMD Land Use) Manning's n value that the sheet flow portion of the Tc line intersected.

- A minimum slope of 0.001 ft/ft was assumed for all calculations.
- The shallow concentrated flow was classified as paved if greater than 40% of the shallow concentrated portion of the TC line intersected with an impervious surface.
- The average velocity for pipe flow was assumed to be 2.5 feet per second.
- A minimum Tc of 10 minutes was enforced for calculations.

A summary of the t_c for each subbasin is summarized in **Table 3** below:

Table 3. Basin Time of Concentration breakdown

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B001	8.42	6.21	0.00	14.63	14.63
B002	8.11	10.78	0.00	18.89	18.89
B003	7.21	0.49	0.00	7.71	10.00
B004	13.40	2.54	0.00	15.94	15.94
B005	10.64	5.25	0.00	15.89	15.89
B006	5.83	4.14	0.00	9.96	10.00
B007	9.22	0.00	0.00	9.22	10.00
B008	14.04	18.15	0.00	32.19	32.19
B009	6.61	18.29	0.00	24.90	24.90
B010	18.55	15.54	0.00	34.09	34.09
B011	28.64	9.91	0.00	38.55	38.55
B012	20.82	6.76	0.00	27.57	27.57
B013	4.39	14.62	0.00	19.00	19.00
B014	4.57	13.65	0.00	18.22	18.22
B015	2.43	8.80	0.00	11.23	11.23
B016*	0.00	0.00	0.00	0.00	10.00
B017	13.22	9.72	0.00	22.94	22.94
B018	26.05	12.47	0.00	38.52	38.52
B019	6.65	1.65	0.00	8.30	10.00
B020	5.92	1.91	0.00	7.83	10.00
B021	19.03	19.60	0.00	38.63	38.63
B022	9.44	14.65	0.00	24.08	24.08
B023	13.69	1.80	0.00	15.49	15.49
B024	6.70	9.82	0.00	16.51	16.51
B025	7.34	12.97	0.00	20.31	20.31
B026	7.57	15.60	0.00	23.16	23.16
B027	7.89	17.93	0.00	25.82	25.82
B028	8.49	8.28	0.00	16.77	16.77

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B029	9.62	9.23	0.00	18.86	18.86
B030	2.78	5.54	0.00	8.31	10.00
B031	10.31	1.90	0.00	12.21	12.21
B032	5.14	12.08	0.00	17.21	17.21
B033	2.09	19.31	0.00	21.40	21.40
B034*	0.00	0.00	0.00	0.00	10.00
B035	20.48	37.53	0.00	58.01	58.01
B036	6.98	5.32	0.00	12.30	12.30
B037	5.16	10.57	0.00	15.73	15.73
B038	6.54	4.27	0.00	10.82	10.82
B039	6.88	4.47	0.00	11.36	11.36
B040	20.27	22.88	0.00	43.15	43.15
B041	4.39	3.94	0.00	8.33	10.00
B042	26.29	15.32	0.00	41.61	41.61
B043	4.51	13.74	0.00	18.25	18.25
B044	2.62	4.52	0.00	7.14	10.00
B045	3.36	6.51	0.00	9.87	10.00
B046	25.30	5.79	0.00	31.08	31.08
B047	5.39	14.38	0.00	19.77	19.77
B048	3.08	4.95	0.00	8.04	10.00
B049	3.60	4.02	0.00	7.62	10.00
B050	7.94	0.67	0.00	8.61	10.00
B051	0.14	0.00	0.00	0.14	10.00
B052	2.57	4.08	0.00	6.65	10.00
B053	3.66	14.17	0.00	17.83	17.83
B054	3.25	13.81	0.00	17.06	17.06
B055	17.06	10.60	0.00	27.65	27.65
B056	5.51	0.63	0.00	6.13	10.00
B057	24.29	34.10	0.00	58.39	58.39
B058	4.00	16.88	0.00	20.89	20.89
B059	5.30	3.88	0.00	9.18	10.00
B060	3.54	12.66	0.00	16.20	16.20
B061	7.75	32.14	0.00	39.89	39.89
B062	12.41	8.94	0.00	21.35	21.35
B063	3.25	1.70	0.00	4.96	10.00
B064	7.14	5.32	0.00	12.46	12.46
B065	3.73	8.12	0.00	11.85	11.85

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B066	6.29	5.01	0.00	11.29	11.29
B067	6.45	12.69	0.00	19.14	19.14
B068	5.63	73.67	0.00	79.30	79.30
B069	7.25	1.95	0.00	9.20	10.00
B070	0.00	0.04	0.00	0.04	10.00
B071	4.13	0.07	0.00	4.20	10.00
B072	41.75	23.09	0.00	64.84	64.84
B073	6.19	4.24	0.00	10.43	10.43
B074	3.34	0.01	0.00	3.35	10.00
B075	26.79	17.60	0.00	44.39	44.39
B076	6.70	9.88	0.00	16.57	16.57
B077	8.78	7.94	0.00	16.72	16.72
B078	9.38	5.08	0.00	14.47	14.47
B079	10.69	2.33	0.00	13.02	13.02
B080	3.06	11.55	0.00	14.61	14.61
B081	5.87	2.54	0.00	8.40	10.00
B082	6.74	2.18	0.00	8.92	10.00
B083	2.43	15.29	0.00	17.72	17.72
B084	17.19	20.05	0.00	37.24	37.24
B085	5.66	0.63	0.00	6.29	10.00
B086	3.91	10.05	0.00	13.96	13.96
B087	19.05	6.62	0.00	25.68	25.68
B088	6.90	4.62	0.00	11.53	11.53
B089	6.07	4.56	0.00	10.63	10.63
B090	7.85	28.13	0.00	35.98	35.98
B091	20.29	1.35	0.00	21.65	21.65
B092	15.07	46.63	0.00	61.70	61.70
B093	1.11	0.00	0.00	1.11	10.00

* Default Tc of 10 minutes were used in these basins, due to smaller size of basin and very short initial Tc flow path length
Checked by: Gary Qiu

Peaking Factor

The SCS Unit Hydrograph Method requires a unit hydrograph peak attenuation factor (peaking factor). This parameter affects the shape and peak flow rate of the unit hydrograph and is typically considered constant throughout a watershed. A peaking factor of 484 was set for all model basins based on SFWMD ERP Part III, Section 3 of References and Design Aids (SFWMD, 2020). WSP recommends this value as the standard peak rate factor for watersheds with little to no storage

based on the SJRWMD's procedures for selection of SCS Peak Rate Factors for use in MSSW Permit Applications (SJRWMD, 1990).

Hydraulics

Conveyance features for the project primarily include roadway drainage pipes, cross drains, and overland flow weirs. Roadway drainage and cross-drain pipe inverts were entered into the model based on database information provided by Islamorada. Overland flow weir cross sections were drawn between sub-basins and populated using the DEM to generate station-elevation information.

It was noted that most stormwater structures based on the existing inventory were inaccessible likely due to lack of maintenance, causing the structures to fill with muck or water. These structures were generally not included in the model, as they are not functional in the existing conditions. Additionally, a lack of directly surveyed stormwater outfall structures to the coast resulted in exercising engineering judgement based on adjacent survey data and LiDAR data to determine where certain stormwater infrastructure discharged and connected to the remaining system.

Despite the parameterization of the existing stormwater structures in the ICPR model, it was observed that the majority of stormwater inventory along US-1 were placed on elevations higher than the residential areas most at risk of inundation from higher intensity rainfall events and sea level rise. Consequently, the impacts of the existing stormwater structures on the current conditions within these lower lying residential and commercial areas were determined to be negligible.

Rainfall is distributed through the model domain via sub-basin nodes. The stage-area relationship of each sub-basin is represented in these nodes and developed from the DEM within ICPR. Nodes are connected by the link system described above that distributes the water throughout the model domain. When analyzing model results, nodes provide information on maximum stages within the simulation at specific locations while the links provide information about maximum flows. **Figure 6** illustrates the ICPR node link schematic. Please note that all weirs, and pipe links connected to the boundary condition, representing coastal sea level, were schematically displayed and do not represent an at-scale length of those respective links. Overland flow weir labels and select pipe labels were also masked for legibility at scale.

Boundary Conditions

It was determined that the King tide and Wind setup levels in the analysis were recommended to be used in conjunction to the future sea level rise projections to provide a baseline for high water level for inundation analysis. A study conducted by John Wood Group plc, *King Tide and Normal Wind Setup Analysis for Monroe County, Florida (King Tide, 2020)*, assessed 3 active tide gage stations located in Monroe County Florida. The study derived king tides (highest astronomical tides within a minimum period of 19 years) and normal wind setup levels that were then added to the recommended sea level rise projections (from NOAA, 2017). Results of the study concluded the most conservative tide gauge at the highest tidal range and normal wind setup levels, the

Naples location, be the basis of stillwater levels during non-storm conditions along the coastline of the Florida Keys within Monroe County. However, to maintain consistency with the ongoing Vulnerability Assessment and to comply with Section 380.093(3), F.S. requirements to conduct Vulnerability Assessments, the sea level rise projection for the Key West Tide gage was used for the overall boundary condition (Boundary Con in the ICPR model). Additionally, consistent with Section 404 of the Coordinator's Manual, the NOAA Intermediate High sea level rise projection was utilized. This time-stage boundary condition represents the coastal fluctuation for each event. A summary of the sea level rise projection for each modeled storm event is listed in **Table 4** based on a NAVD88 zero datum adjustment from Key West gage 8724580.

Table 4. Boundary Condition Elevations based on Sea Level Rise Projections for Islamorada from King Tides

SLR scenario for Islamorada using the Key West Tide Gauge (station 8724580)	Elevation for Boundary condition in NAVD88 (ft)
2025	0 + 1.93 =1.93
2040	0.6 + 1.93 =2.53
2070	2.5 + 1.93 =4.43
2100	5.35 + 1.93 =7.28

Source: NOAA Intermediate High, 2017 & King Tide and Normal Wind Setup Analysis for Monroe County, Florida, 2020

Additionally, NOAA's 2017 intermediate high (Int-High) projections (NOAA 2017) were also independently assessed without the influence of King Tides and wind setup. This assessment allows for a direct sea level rise projection in feet (ft) NAVD88 without the addition of most astronomical tides and wind setup as observed in the King Tides report, presenting a less severe NOAA intermediate high projection that will be used for the initial proposed project setups. This report was also used to determine the sea level rise adjustment factor of 1.93 ft used in the King Tides report to account for the addition of the most astronomical tides. This adjustment factor was used to interpolate the 2070 sea level rise projection from the King Tides report in **Table 4**. A summary of the sea level rise projections from NOAA's Intermediate High projection is listed in **Table 5**. For legibility and ease of comparison, only the 25-yr 24-hr inundation was displayed in the respective inundation maps. Please visit the following ArcGIS online link for more information on the detailed figures:

https://amecei.maps.arcgis.com/apps/instant/interactivelegend/index.html?appid=d2e77e1289bf4693acf18fc076d71960

Table 5. Boundary Condition Elevations based on Sea Level Rise Projections for Islamorada from NOAA Intermediate High, 2017

SLR scenario for Islamorada using the Key West Tide Gauge (NOAA station 8724580)	Elevation for Boundary condition based NOAA 2017 Int High (ft NAVD88)
2025	0.0
2040	0.6
2070	2.53
2100	5.35

Source: NOAA Intermediate High, 2017

It is important to note that based on the overall delineation approach to the Islamorada watershed, resulting basins were mostly classified as open basins with direct overland flow connections to the coastal boundary node, leading to limited storage volume within the basins themselves. The maximum stage for each basin is primarily determined by the coastal boundary condition elevation rather than the intensity of the rainfall event. This is the primary cause of similar maximum stages for varying storm events within the same time scenario (e.g., Excon_2025_MA_24Hr and Excon_2025_100Y_24Hr).

The Islamorada Future Land Use Map, indicates that the current land use pattern will be maintained in the future. Islamorada anticipates that most of the future development will be residential in nature.

Since the existing conditions Florida Land Use and Cover Classification System (FLUCCS) map includes areas of future development, the corresponding existing land use also serves as the future land use as presented in **Table 6** and **Table 7**. Land use data representing land cover conditions was derived from the most recent statewide FLUCCS code database (2019). Most of the watershed is classified as urban area (53.1%), divided into low, medium, and high residential (37.6%), and commercial, recreational, industrial, institutional, and open land uses (15.6%). This is followed by Wetlands (36.2%), water (4.4%), Transportation/utilities at 3.3%, and Upland Forest/Nonforested/Barren Land at 3.3%, 2.3%, and 0.1% respectively.

A total of 20 land use categories are present in the Islamorada Watershed. This information is summarized by the Land Use Code in **Tables 6** and **7** and is illustrated in **Figure 4**.

Table 6. Existing/Future Land Use Summary Aggregated

FLUCC SERIES SUMMARY	Land Use Description	Area (acres)	Percent of Total Area
1	Urban and Built-Up	2225.4	53.1%
3	Upland Nonforested	23.6	0.6%
4	Upland Forest	94.8	2.3%
5	Water	184.8	4.4%
6	Wetlands	1519.7	36.2%
7	Barren Land	6.2	0.1%
8	Transportation, Communications, Utilities	139.0	3.3%
Grand Total		**4193.7**	**100.0**

Source: FLUCCS, 2019

Table 7. Details of Existing/Future Land Use Summary

FLUCC SERIES SUMMARY	Land Use Description	Area (acres)	Impervious Percent of Total Area	Percent of Total Area
1100	Residential Low Density	230.48	0.83	5.50
1200	Residential Medium Density	1202.26	10.03	28.67
1300	Residential High Density	140.72	2.79	3.36
1400	Commercial and Services	419.38	9.00	10.00
1500	Industrial	7.70	0.16	0.18
1700	Institutional	60.82	1.31	1.45
1800	Recreational	123.09	0	2.94
1900	Open Land	41.00	0	0.98
3200	Shrub and Brushland	23.63	0	0.56
4200	Upland Hardwood Forests	86.58	0	2.07
4300	Upland Mixed Forests	8.23	0	0.20
5100	Streams and Waterways	91.21	2.18	2.18
5300	Reservoirs	3.61	0.09	0.09
5400	Bays and Estuaries	73.98	1.76	1.76
5700	Oceans Seas and Gulfs	16.01	0.38	0.38
6100	Wetland Hardwood Forests	1493.42	0	35.61
6400	Vegetated Non-Forested Wetlands	6.24	0	0.15
6500	Non-Vegetated Wetlands	20.09	0	0.48
7400	Disturbed Lands	6.22	0	0.15
8100	Transportation	139.03	3.32	3.32
	Grand Total	**4193.70**	**24.12%**	**100.00%**

Source: FLUCCS, 2019 & SJRWMD 2012, Chapter 3: Watershed Hydrology, Appendix 3.A.: Land Use Classification/Grouping from SJRWMD Technical Reports

b. For currently fully developed watersheds: studies of existing development and the potential impact of any redevelopment

The existing ICPR model was assessed for the Islamorada watershed on an overall basis. Localized inundation on a subbasin level was not assessed on a granular level due to limited survey and stormwater infrastructure data. Since most basins within Islamorada were classified as open basins with direct overland connections to the coast, most flood inundation is a result of the coastal tides and sea level rise compared to the localized runoff from subbasins. Therefore, most of the future inundation is expected to be a result of the SLR rather than future planned redevelopment.

c. Evaluations of different management scenarios for at least the 100-year rainfall event for a fully developed watershed at a scale sufficient to determine local problems.

The ICPR model was set up to address the current 2025 scenario, as well as to represent future conditions in 2040, 2070, and 2100 to assess impacts of SLR when compared to the existing conditions 2025 scenario. Each scenario was assessed based on two projected SLR sources as previously stated (i.e. 1) NOAA Int-High 2017 & 2) NOAA Int-High 2017 + King Tides Study). The difference in those projections is the inclusion of the largest astronomical tides for the King Tides study into the boundary condition elevations. Most of the basins in the Islamorada Watershed were classified as open basins with direct connections to the coast, and therefore are less influenced by the intensity of the rainfall events compared to the projected elevations of the SLR and King Tide events.

d. Determinations of the change in runoff from current to future, fully developed conditions.

Differences in runoff from current to future conditions were determined to be minimal based on the available existing conditions and future land use classifications for the Islamorada watershed. Existing vacant parcels with a designated land use were conservatively modeled in the existing conditions with the designated current land use in place. Additionally, it was determined based on Islamorada's Building Permit Allocation System (BPAS) that there are only 6 residential and 3 affordable units remaining. These units will not make a significant difference on the flooding extents for the project locations identified later in this Plan as the adjacent parcels were originally designed assuming full build out. Additionally, Islamorada consists of primarily open basins. Consequently, any discharge that would contribute to local flooding generally discharges towards the coast. Therefore, the minor change between the existing land use/future land use classifications would result in minimal overall increases to runoff and flood risks due to the direct surface connection to the coast.

e. Recommendations for managing at least the 10-year and the 25-year rainfall events.

The scope for this Plan includes recommendations for the 10-year 24-hour and 25-year 24-hour rainfall events. The extent of this analysis was limited to scenarios up to and including the 2040, 25Y-24 Hour event in intensity, as the 2070 and 2100 scenarios carry greater uncertainty in projected inundation, risk in infrastructural lifespan for design projects implemented presently, and result in significantly more inundation areas requiring costly installation and upkeep in the interim. A summary of the proposed projects is provided in Section 6.

5. For communities impacted by sea level rise: evaluations of the impacts of the NOAA Intermediate 2100 sea level rise scenario on the 100-year rainfall event

a. It is highly recommended to include 2 other scenarios up to 2100, which could be based on sea level for 2-time frames into the future or several feet of sea level rise within this period.

The ICPR model was set up to address the 2025 present day time frame representing existing conditions, as well as the 2040, 2070, and 2100 to assess impacts of SLR. Each scenario was evaluated for Mean annual 24-hour (2.33 year), 10-year 24-hour, 25-year 24 hour, and 100-year 24-hour design storm events. The results of the SLR on the overall watershed is displayed in **Figures 8-9**.

Existing Model Results

The existing model results were primarily used to determine probable level of service from areas of inundation. The corresponding inundated areas were assessed and projects recommendations were made to reduce flood inundation and provide discharge rate control. A summary of the findings is displayed in **Tables 8, 9, 10, 11, 12**, and **13**.

Table 8. Project Maximum Stage Table based on NOAA's Intermediate High SLR Projection (ft, NAVD88)

Project/ Location	Exist Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2025 SLR projection				2040 SLR projection					2025 SLR projection				2040 SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	6.13	6.20	6.25	6.32	6.15	6.22	6.27	6.36	NA030	3.15	3.55	3.90	4.57	3.23	3.69	4.12	5.02
2/ South of Founders Park Soccer Fields	NA029	6.84	6.95	7.03	7.14	6.86	6.98	7.07	7.21	NA029	5.25	5.79	6.24	6.76	5.36	5.97	6.51	6.93
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	0	0	0	0	0.60	0.60	0.60	0.60	N081A1	0.94	1.18	1.39	1.67	0.99	1.26	1.52	1.74
4/ Old SR905	NA057	0.96	1.27	1.51	1.86	1.03	1.36	1.65	2.04	N057	2.42	2.53	2.61	2.72	2.45	2.56	2.66	2.79
										N057A	2.38	2.50	2.58	2.69	2.41	2.53	2.62	2.75
										N057B	2.37	2.48	2.56	2.67	2.39	2.51	2.60	2.73
										N057C	1.05	1.35	1.57	1.86	1.11	1.44	1.69	2.01
										N057D	2.37	2.48	2.56	2.67	2.39	2.52	2.61	2.73
5/ Palermo Dr	NA024	0	0	0	0	0.60	0.60	0.60	0.60	N024A	1.35	1.42	1.47	1.55	1.37	1.44	1.51	1.60

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2070 SLR projection				2100 SLR projection					2070 SLR projection				2100 SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	6.15	6.22	6.27	6.36	6.15	6.22	6.27	6.36	NA030	3.39	3.83	4.33	5.27	5.67	5.93	6.07	6.19
2/ South of Founders Park Soccer Fields	NA029	6.86	6.98	7.07	7.21	6.86	6.98	7.07	7.21	NA029	5.58	6.23	6.68	7.00	6.39	6.73	6.91	7.13
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	2.53	2.53	2.53	2.53	5.35	5.35	5.35	5.35	N081A1	2.53	2.53	2.53	2.53	5.35	5.35	5.35	5.35
4/ Old SR 905	NA057	2.55	2.56	2.57	2.59	5.35	5.35	5.35	5.36	N057	2.61	2.65	2.71	2.81	5.35	5.36	5.36	5.36
										N057A	2.59	2.63	2.68	2.77	5.36	5.36	5.36	5.36
										N057B	2.59	2.62	2.66	2.75	5.36	5.36	5.36	5.36
										N057C	2.55	2.56	2.57	2.58	5.35	5.35	5.35	5.35
										N057D	2.59	2.62	2.67	2.75	5.35	5.35	5.35	5.36
5/ Palermo Dr	NA024	2.53	2.53	2.53	2.53	5.35	5.35	5.35	5.35	N024A	2.53	2.53	2.53	2.54	5.35	5.35	5.35	5.35

Table. 9 Project Maximum Stage Table Based on King Tides SLR projection (ft, NAVD88)

Project/ Location	Ex Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection					2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	6.13	6.20	6.25	6.32	6.15	6.22	6.27	6.36	NA030	3.16	3.56	3.91	4.58	3.39	3.83	4.25	5.14
2/ South of Founders Park Soccer Fields	NA029	6.84	6.95	7.03	7.14	6.86	6.98	7.07	7.21	NA029	5.25	5.79	6.24	6.76	5.36	5.97	6.51	6.93
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	1.93	1.93	1.93	1.93	2.53	2.53	2.53	2.53	N081A1	1.93	1.93	1.94	1.94	2.53	2.53	2.53	2.53
4/ Old SR 905	NA057	2.00	2.04	2.09	2.18	2.55	2.56	2.57	2.59	N057	2.43	2.54	2.62	2.73	2.61	2.65	2.71	2.81
										N057A	2.39	2.5	2.58	2.69	2.59	2.63	2.68	2.77
										N057B	2.37	2.49	2.56	2.67	2.59	2.62	2.66	2.75
										N057C	2.00	2.04	2.08	2.15	2.55	2.56	2.57	2.58
										N057D	2.37	2.49	2.57	2.67	2.59	2.62	2.67	2.75
5/ Palermo Dr	NA024	1.93	1.93	1.93	1.93	2.53	2.53	2.53	2.53	N024A	1.93	1.93	1.94	1.94	2.53	2.53	2.53	2.54

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection					2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	6.15	6.22	6.27	6.36	7.29	7.29	7.29	7.30	NA030	4.84	5.10	5.49	6.06	7.29	7.29	7.29	7.29
2/ South of Founders Park Soccer Fields	NA029	6.86	6.98	7.07	7.21	7.31	7.32	7.34	7.38	NA029	5.85	6.47	6.78	7.06	7.31	7.32	7.34	7.37
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28	N081A1	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28
4/ Old SR 905	NA057	4.43	4.44	4.44	4.44	7.28	7.28	7.28	7.28	N057	4.44	4.44	4.44	4.45	7.28	7.28	7.28	7.29
										N057A	4.44	4.44	4.44	4.45	7.28	7.29	7.29	7.29
										N057B	4.44	4.44	4.44	4.44	7.28	7.29	7.29	7.29
										N057C	4.43	4.43	4.44	4.44	7.28	7.28	7.28	7.28
										N057D	4.44	4.44	4.44	4.44	7.28	7.28	7.28	7.28
5/ Palermo Dr	NA024	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28	N024A	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28

Table. 10 Project Flood Depth Table based on NOAA's Intermediate High SLR Projection (ft, NAVD88)

Project/ Location	Ex Node	Existing Conditions Flood Depth (in, NAVD88)								Proposed Node	Proposed Conditions Flood Depth (in, NAVD88)							
		2025 SLR projection				2040 SLR projection					2025 SLR projection				2040 SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	3.84	4.68	5.28	6.12	4.08	4.92	5.52	6.60	NA030	0	0	0	0	0	0	0	0
2/ South of Founders Park Soccer Fields	NA029	4.68	6.00	6.96	8.28	4.92	6.36	7.44	9.12	NA029	0	0	0	3.72	0	0	0.72	5.76
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	0	0	0	0	0	0	0	0	N081A1	0	0	0	1.56	0	0	0	2.40
4/ Old SR 905	NA057	0	0	0	0.24	0	0	0	2.40	N057	6.96	8.28	9.24	10.56	7.32	8.64	9.84	11.40
										N057A	6.48	7.92	8.88	10.2	6.84	8.28	9.36	10.92
										N057B	6.36	7.68	8.64	9.96	6.60	8.04	9.12	10.68
										N057C	0	0	0	0.24	0	0	0	2.04
										N057D	6.36	7.68	8.64	9.96	6.6	8.16	9.24	10.68
5/ Palermo Dr	NA024	0	0	0	0	0	0	0	0	N024A	1.56	2.40	3.00	3.96	1.8	2.64	3.48	4.56

***Red values indicate flooding on the lowest edge of roadway has exceeded 4 inches for that project area during the specified storm event.**

Project/ Location	Existing Node	Existing Conditions Flood Depth (in, NAVD88)								Proposed Node	Proposed Conditions Flood Depth (in, NAVD88)							
		2070 SLR projection				2100 SLR projection					2070 SLR projection				2100 SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	4.08	4.92	5.52	6.60	4.08	4.92	5.52	6.60	NA030	0	0	0	0	0	1.44	3.12	4.56
2/ South of Founders Park Soccer Fields	NA029	4.92	6.36	7.44	9.12	4.92	6.36	7.44	9.12	NA029	0	0	2.76	6.60	0	3.36	5.52	8.16
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	11.88	11.88	11.88	11.88	45.72	45.72	45.72	45.72	N081A1	11.88	11.88	11.88	11.88	45.72	45.72	45.72	45.72
4/ Old SR 905	NA057	8.52	8.64	8.76	9.00	42.12	42.12	42.12	42.24	N057	9.24	9.72	10.44	11.64	42.12	42.24	42.24	42.24
										N057A	9.00	9.48	10.08	11.16	42.24	42.24	42.24	42.24
										N057B	9.00	9.36	9.84	10.92	42.24	42.24	42.24	42.24
										N057C	8.52	8.64	8.76	8.88	42.12	42.12	42.12	42.12
										N057D	9.00	9.36	9.96	10.92	42.12	42.12	42.12	42.24
5/ Palermo Dr	NA024	15.72	15.72	15.72	15.72	49.56	49.56	49.56	49.56	N024A	15.72	15.72	15.72	15.84	49.56	49.56	49.56	49.56

***Red values indicate flooding on the lowest edge of roadway has exceeded 4 inches for that project area during the specified storm event.**

Table. 11 Project Flood Depth Table Based on King Tides SLR projection (in, NAVD88)

Project/ Location	Ex Node	Existing Conditions Flood Depth (in, NAVD88)								Proposed Node	Proposed Conditions Flood Depth (in, NAVD88)							
		2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection					2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	3.84	4.68	5.28	6.12	4.08	4.92	5.52	6.60	NA030	0	0	0	0	0	0	0	0
2/ South of Founders Park Soccer Fields	NA029	4.68	6.00	6.96	8.28	4.92	6.36	7.44	9.12	NA029	0	0	0	3.72	0	0	0.72	5.76
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	4.68	4.68	4.68	4.68	11.88	11.88	11.88	11.88	N081A1	4.68	4.68	4.80	4.80	11.88	11.88	11.88	11.88
4/ Old SR 905	NA057	1.92	2.40	3.00	4.08	8.52	8.64	8.76	9.00	N057	7.08	8.40	9.36	10.68	9.24	9.72	10.44	11.64
										N057A	6.6	7.92	8.88	10.2	9.00	9.48	10.08	11.16
										N057B	6.36	7.80	8.64	9.96	9.00	9.36	9.84	10.92
										N057C	1.92	2.40	2.88	3.72	8.52	8.64	8.76	8.88
										N057D	6.36	7.80	8.76	9.96	9.00	9.36	9.96	10.92
5/ Palermo Dr	NA024	8.52	8.52	8.52	8.52	15.72	15.72	15.72	15.72	N024A	8.52	8.52	8.64	8.64	15.72	15.72	15.72	15.84

***Red values indicate flooding on the lowest edge of roadway has exceeded 4 inches for that project area during the specified storm event.**

Project/ Location	Existing Node	Existing Conditions Flood Depth (in, NAVD88)								Proposed Node	Proposed Conditions Flood Depth (in, NAVD88)							
		2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection					2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection			
		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ SE of Palma Ln, SE of Coconut Ln, SW of Pippin Dr	NA030	4.08	4.92	5.52	6.60	17.76	17.76	17.76	17.88	NA030	0	0	0	3.00	17.76	17.76	17.76	17.76
2/ South of Founders Park Soccer Fields	NA029	4.92	6.36	7.44	9.12	10.32	10.44	10.68	11.16	NA029	0	0.24	3.96	7.32	10.32	10.44	10.68	11.04
3/ Intersection of Toll Gate Blvd and Toll Gate Shores Dr	NA081	34.68	34.68	34.68	34.68	68.88	68.88	68.88	68.88	N081A1	34.68	34.68	34.68	34.68	68.88	68.88	68.88	68.88
4/ Old SR 905	NA057	31.08	31.20	31.20	31.20	65.28	65.28	65.28	65.28	N057	31.20	31.20	31.20	31.32	65.28	65.28	65.28	65.40
										N057A	31.20	31.20	31.20	31.32	65.28	65.40	65.40	65.40
										N057B	31.20	31.20	31.20	31.20	65.28	65.40	65.40	65.40
										N057C	31.08	31.08	31.20	31.20	65.28	65.28	65.28	65.28
										N057D	31.20	31.20	31.20	31.20	65.28	65.28	65.28	65.28
5/ Palermo Dr	NA024	38.52	38.52	38.52	38.52	72.72	72.72	72.72	72.72	N024A	38.52	38.52	38.52	38.52	72.72	72.72	72.72	72.72

***Red values indicate flooding on the lowest edge of roadway has exceeded 4 inches for that project area during the specified storm event.**

Table. 12 Project Maximum Flow Table based on NOAA's Intermediate High SLR Projection (ft, NAVD88)

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs)							
		2025 SLR projection				2040 SLR projection					2025 SLR projection				2040 SLR projection			
		MA-24Hr	10Y-24Hr	25-24Hr	100Y-24Hr	MA-24Hr	10Y-24Hr	25-24Hr	100Y-24Hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ Royal Ln	L-2790W	41.24	93	67.85	139.17	46.39	77.04	110	170.84	L-2790W	0	0	1.32	49.4	0	0	16.61	87.04
1/ Old Hwy	L-3780W	0	1.34	5.46	22.73	0	2.58	10.5	38.12	L-5210W	0	0	0	0	0	0	0	0
1/ Old Hwy	L-2810W	0	0	0	0	0	0	0	0	L-2810W	0	0	0	0	0	0	0	0
1/pond pipe link across US-1		NA	NA	NA	NA	NA	NA	NA	NA	L-5360DS	24.03	27.16	29.63	34.74	24.7	28.14	31.61	37.09
1/pond pipe link across Old Hwy		NA	NA	NA	NA	NA	NA	NA	NA	L-5370DS	6.42	6.97	7.22	7.51	4.4	4.89	5.21	5.61
1/ pipe link across RV Park Nautical way		NA	NA	NA	NA	NA	NA	NA	NA	L-5410DS	0	0	0	5.05	0	0	0	10.24
1/ Plantation Blvd	L-2820W	0	0	0	#N/A	0	0	0	0	L-5500W	0	0	0	0	0	0	0	0
2/ Islamorada Chamber of Commerce	L-2780W	0	0	0	0	0	0	0	0	L-2780W	0	0	0	0	0	0	0	0
2/ Old Hwy	L-3770W	0	0	0	0	0	0	0	0	L-3770W	0	0	0	0	0	0	0	0
2/ Pipe link across US-1		NA	NA	NA	NA	NA	NA	NA	NA	L-5420DS	20.9	23.15	24.74	25.9	21.4	23.8	25.31	26.33
3/ Tollgate Blvd	WBC081	66.42	114.16	160.72	247.96	75.41	131.27	192.37	309.18	WBC081	61.21	102.72	142.89	217.7	69.07	117.49	170.14	270.46
4/ Old SR 905	L-3130W	86.4	129.26	169.06	239.74	94.76	143.97	195.26	286.14	L-3130W	95.87	141.61	181.4	247.38	105.03	156.84	206.3	288.02
4/ Old SR 905	L-3120W	0	0	0	0	0	0	0	0.04	L-3120W	0	0	0	0	0	0	0	0
5/ Palermo Dr	L-3720W	0	0	0	0	0	629.31	629.31	629.31	L-3720W	0	0	0	0	0	0	0	0
5/ Palermo Dr	L-2750W	0	0	0	0	0	77.21	77.21	77.21	L-2750W	0	0	0	0	0	0	0	0
5/ Palermo Dr	WBC024	59.88	115.97	172.63	282	74.76	145.47	229.45	388.77	WBC024	56.95	112.32	168.7	278.12	71.72	141.95	225.82	385.05

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2070 SLR projection				2100 SLR projection					2070 SLR projection				2100 SLR projection			
		MA-24Hr	10Y-24Hr		100Y-24Hr	MA-24Hr	10Y-24Hr	25Y-24Hr	100Y-24Hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ Royal Ln	L-2790W	46.4	77.05	110.02	170.86	46.43	77.08	110.05		L-2790W	0	0	16.62	87.07	0	24.09	62.23	136.72
1/ Old Hwy	L-3780W	0	2.58	10.51	38.13	0	2.58	10.52		L-5210W	0	0	0	0	0	0	0	1.22
1/ Old Hwy	L-2810W	0	0	0	0	0	0	0		L-2810W	0	0	0	0	0	8.06	67.95	191.23
1/pond pipe link across US-1		NA	NA	NA	NA	NA	NA	NA		L-5360DS	18.97	23.39	27.49	33.93	11.48	15.58	17.35	18.72
1/pond pipe link across Old Hwy		NA	NA	NA	NA	NA	NA	NA		L-5370DS	0.04	0.06	0.07	0.12	0.01	0.01	0.01	0.01
1/ pipe link across RV Park Nautical way		NA	NA	NA	NA	NA	NA	NA		L-5410DS	0	0	0	8.16	2.75	3.75	4.18	4.51
1/ Plantation Blvd	L-2820W	0	0	0	0	0	0	0		L-5500W	0	0	0	0	0	0	0.02	0.26
2/ Islamorada Chamber of Commerce	L-2780W	0	0	0	0	0	0	0		L-2780W	0	0	0	0	0	0	0	0
2/ Old Hwy	L-3770W	0	0	0	0	0	0	0		L-3770W	0	0	0	0	0	0	0	0
2/ Pipe link across US-1		NA	NA	NA	NA	NA	NA	NA		L-5420DS	21.4	23.8	25.31	26.33	13.71	15.84	16.84	17.96
3/ Tollgate Blvd	WBC081	75.41	131.27	192.38	309.17	75.47	131.33	192.43		WBC081	75.34	131.17	192.24	308.94	75.44	131.3	192.39	309.14
4/ Old SR 905	L-3130W	91.98	140.86	191.24	283.41	46.39	84.09	94.73		L-3130W	97.94	149.95	200.53	285.06	21.19	31.82	42.76	62.86
4/ Old SR 905	L-3120W	4.35	6.13	7.84	11.03	51.71	78.85	106.93		L-3120W	3.58	5.02	6.32	8.46	15	21.98	29.2	42.46
5/ Palermo Dr	L-3720W	0	8767.73	8767.73	8767.73	0.01	50175.92	50175.92		L-3720W	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2070 SLR projection				2100 SLR projection					2070 SLR projection				2100 SLR projection			
		MA-24Hr	10Y-24Hr		100Y-24Hr	MA-24Hr	10Y-24Hr	25Y-24Hr	100Y-24Hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
5/ Palermo Dr	L-2750W	0	251.05	251.05	251.05	0	2440.34	2440.34		L-2750W	0	0	0	0	0	0	0	0
5/ Palermo Dr	WBC024	90.94	165.95	256.25	453.76	103.64	178.89	267.58		WBC024	91.04	165.81	255.74	452.36	103.65	178.72	267	451.55

Table. 13 Project Maximum Flow Table based on King Tides SLR projection (cfs)

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs)							
		2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection					2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection			
		MA-24Hr	10Y-24Hr	25-24Hr	100Y-24Hr	MA-24Hr	10Y-24Hr	25-24Hr	100Y-24Hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr
1/ Royal Ln	L-2790W	41.25	67.86	93.01	139.18	46.4	77.05	110.02	170.86	L-2790W	0	0	1.32	49.41	0	0	16.62	87.07
1/ Old Hwy	L-3780W	0	1.34	5.46	22.73	0	2.58	10.51	38.13	L-5210W	0	0	0	0	0	0	0	0
1/ Old Hwy	L-2810W	0	0	0	0	0	0	0	0	L-2810W	0	0	0	0	0	0	0	0
1/pond pipe link across US-1		NA	NA	NA	NA	NA	NA	NA	NA	L-5360DS	22.99	26.57	29.26	34.58	18.97	23.39	27.49	33.93
1/pond pipe link across Old Hwy		NA	NA	NA	NA	NA	NA	NA	NA	L-5370DS	0.21	0.38	0.48	0.57	0.04	0.06	0.07	0.12
1/ pipe link across RV Park Nautical way		NA	NA	NA	NA	NA	NA	NA	NA	L-5410DS	0	0	0	5.22	0	0	0	8.16
1/ Plantation Blvd	L-2820W	0	0	0	0	0	0	0	0	L-5500W	0	0	0	0	0	0	0	0
2/ Islamorada Chamber of Commerce	L-2780W	0	0	0	0	0	0	0	0	L-2780W	0	0	0	0	0	0	0	0
2/ Old Hwy	L-3770W	0	0	0	0	0	0	0	0	L-3770W	0	0	0	0	0	0	0	0
2/ Pipe link across US-1		NA	NA	NA	NA	NA	NA	NA	NA	L-5420DS	20.9	23.15	24.74	25.9	21.4	23.8	25.31	26.33
3/ Tollgate Blvd	WBC081	66.42	114.16	160.72	247.94	75.41	131.27	192.38	309.17	WBC081	66.31	113.98	160.46	247.37	75.34	131.17	192.24	308.94
4/ Old SR 905	L-3130W	86.31	130.03	170	241.17	91.98	140.86	191.24	283.41	L-3130W	92.69	138.97	179.25	246.03	97.94	149.95	200.53	285.06
4/ Old SR 905	L-3120W	0	0.04	0.11	0.42	4.35	6.13	7.84	11.03	L-3120W	0	0	0	0.09	3.58	5.02	6.32	8.46
5/ Palermo Dr	L-3720W	0	4469.91	4469.91	4469.91	0	8767.73	8767.73	8767.73	L-3720W	0	0.01	0.01	0.01	0	0.01	0.01	0.01
5/ Palermo Dr	L-2750W	0	221.67	221.67	221.67	0	251.05	251.05	251.05	L-2750W	0	0	0	0	0	0	0	0
5/ Palermo Dr	WBC024	72.89	133.57	198.15	331.72	90.94	165.95	256.25	453.76	WBC024	73.01	133.54	197.88	331.26	91.04	165.81	255.74	452.36

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection					2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection			
		MA-24Hr	10Y-24Hr	25Y-24Hr	100Y-24Hr	MA-24Hr	10Y-24Hr	25Y-24Hr	100Y-24Hr		MA-24hr	10Y-24hr	25Y-24hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24 Hr	100Y-24hr
1/ Royal Ln	L-2790W	46.41	77.06	110.02	170.85	62.46	96.75	131.48	193.85	L-2790W	0	0.04	32	107.96	59.99	93.29	127.37	188.75
1/ Old Hwy	L-3780W	0	2.58	10.51	38.13	86.97	127.84	170.76	247.25	L-5210W	0	0	0	0	60.15	83.41	106.15	152.64
1/ Old Hwy	L-2810W	0	0	0	0	0.02	4343.64	4343.64	4343.64	L-2810W	0	0	0	59.04	54.88	86.71	114.29	166.81
1/pond pipe link across US-1		NA	NA	NA	NA	NA	NA	NA	NA	L-5360DS	13.17	16.82	21.12	26.14	0.09	0.2	0.45	1.35
1/pond pipe link across Old Hwy		NA	NA	NA	NA	NA	NA	NA	NA	L-5370DS	0.01	0.01	0.02	0.02	0	0	0.01	0.01
1/ pipe link across RV Park Nautical way		NA	NA	NA	NA	NA	NA	NA	NA	L-5410DS	3.1	4.02	5.08	6.29	0.11	0.21	0.32	0.43
1/ Plantation Blvd	L-2820W	0	0	0	0	0	0	0	0	L-5500W	0	0	0	0.01	1.68	2.22	2.81	4.01
2/ Islamorada Chamber of Commerce	L-2780W	0	0	0	0	0	0	0	0	L-2780W	0	0	0	0	0	0	0	0
2/ Old Hwy	L-3770W	0	0	0	0	0	0	0	0	L-3770W	0	0	0	0	0	0	0	0
2/ Pipe link across US-1		NA	NA	NA	NA	NA	NA	NA	NA	L-5420DS	16.02	19.23	20.64	21.84	2.06	2.64	3.16	4.07
3/ Tollgate Blvd	WBC081	75.45	131.31	192.41	309.19	75.53	131.37	192.5	309.28	WBC081	75.41	131.26	192.35	309.08	75.5	131.37	192.46	309.23
4/ Old SR 905	L-3130W	65.91	101.91	140.16	208.59	36.93	84.22	84.22	111.34	L-3130W	29.91	47.72	69.32	109.27	18.61	28.07	37.19	54.58
4/ Old SR 905	L-3120W	31.45	46.33	60.32	87.75	81.74	152.84	286.77	374.24	L-3120W	9.17	14.93	23.11	38.66	97.19	126.04	159.7	192.99

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection					2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection			
		MA-24Hr	10Y-24Hr	25Y-24Hr	100Y-24Hr	MA-24Hr	10Y-24Hr	25Y-24Hr	100Y-24Hr		MA-24hr	10Y-24hr	25Y-24Hr	100Y-24hr	MA-24hr	10Y-24hr	25Y-24 Hr	100Y-24hr
5/ Palermo Dr	L-3720W	0.01	33556.29	33556.29	33556.29	0.01	93406.7	93406.7	93406.7	L-3720W	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
5/ Palermo Dr	L-2750W	0	375.23	375.23	375.23	0	13660.23	13660.23	13660.23	L-2750W	0	0	0	0	0	0	0	0
5/ Palermo Dr	WBC024	100.35	175.72	265.03	453.63	108.94	184.72	272.3	452.59	WBC024	100.39	175.57	264.48	452.2	108.77	184.18	271.06	450.1

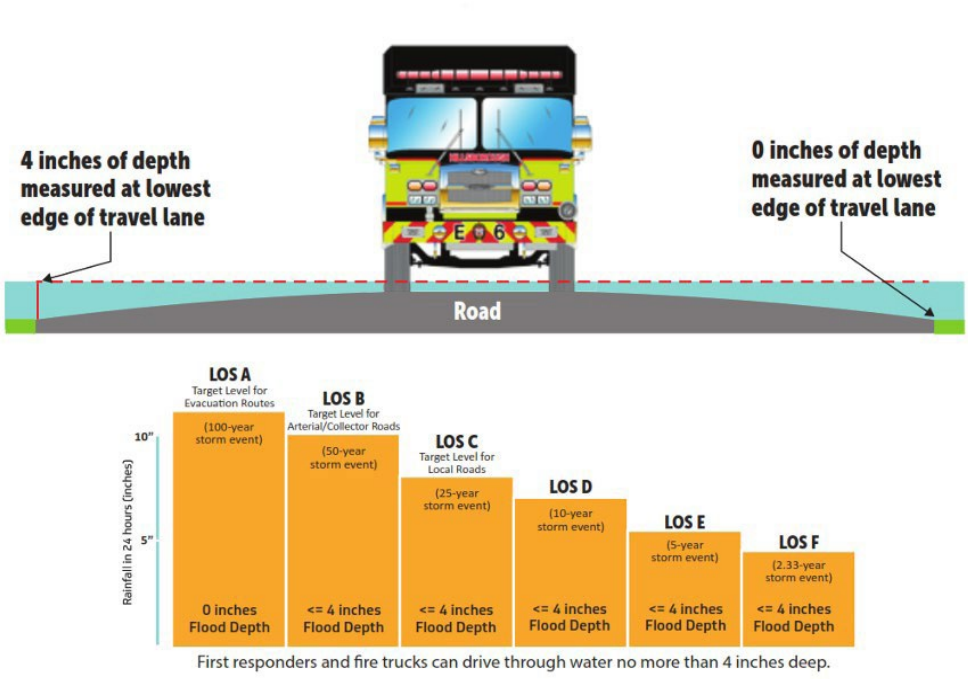
6. The plan must include a strategy and action plan to address the results of the studies for:

Estimated Level of Service Change

To identify areas impacted by sea level rise and rainfall design storms (later referred to as "projects" or "project areas"), an appropriate quantifiable system needs to be followed, typically a level of service guideline. As Islamorada does not define flood protection level of service (FPLOS) for specific storm events with respect to roadway flooding, industry standards, namely from Hillsborough County, have been used to determine existing condition FPLOS. Hillsborough County's Comprehensive Plan details estimating FPLOS (A through F) based on the type of road under consideration and the depth of the flooding at the edge of the travel lane (**Figure 16**). Depending on the type of road, the design storm event used to estimate flooding depth at the edge of the travel lane varies from a 100-yr/24-hr design storm event to a mean-annual (2.33-yr/24-hr storm event). The target flood depth at the edge of the travel lane is 4 inches or less except for the evacuation route where no flooding is allowed.

Figure 16: Stormwater Roadway Flood Protection Level of Service Definitions

Source: Preliminary Engineering Design for Five Intermediate Stormwater Unfunded Projects, Wood, 2021



Using this methodology from Hillsborough County, the existing conditions results display approximately 4 inches of flooding above the lowest edge of the roadway during the mean annual storm event for project areas 1 and 2, as shown in **Figures 10-15**. As a result of intersecting the building footprint layer in GIS with the 2025 existing conditions flood inundation polygons for the 10-year 24-hour storm event, many structures may be at risk of inundation. Therefore, due to variability in building finish floor elevations (FFE) which are not captured in the GIS geodatabase

information, a general guideline was used in determining the building FFEs for evaluation by adding 2 ft to the average LiDAR elevation at the building footprint.

Project Areas in this Watershed Management Plan were selected based on locations where localized roadway inundation exceeds 4 inches using the Hillsborough County methodology to define FPLOS. Figures for the respective Project Areas include **Figures 10 – 15**. Project Areas affected from more immediate and smaller intensity events were prioritized higher than those with longer range less intense impacts. Additionally, inundated roadways affecting a greater number of residential properties were rated with a higher design priority compared to individual commercial areas that were more isolated. Inundated areas resulting from the 2025 and 2040 existing conditions model with NOAA's intermediate high projection were prioritized above inundated areas in the King Tides model scenarios, due to the conservative nature of the King Tide boundary conditions.

As displayed in **Table 10 and Table 11**, the two Project Areas with flood inundation greater than 4 inches of roadway at the outside edge of the pavement are Project Areas 1 and 2 during the 2025 and 2040 events (King Tides SLR projection). Project Areas 3, 4 and 5 were identified as having greater than 4 inches of roadway flooding for the 2025 scenario using the King Tides SLR projection.

Furthermore, it was noted that little to no flow occurs in Project Area 2 as this area is a closed basin with no direct outfall to the coast, which was confirmed based on the available survey data as displayed in **Tables 12 and 13 for link L-5410DS.** Additionally, Project Areas 1 and 5 experience little to no discharge between basins during the lesser intensity storm events and may benefit from direct stormwater connections to their respective outfalls.

Proposed projects for the Project Areas to alleviate flooding concerns for the Islamorada watershed include the following:

- **Project Area 1**: Projects include: adding two wet stormwater detention facilities adjacent to the intersection of US-1, Old Hwy, and Palma Ln along with routing the flow from the mitered end section on Parcel 00412430000000 to the coast (**Figure 10**).
- **Project Area 2**: Projects include: adding an inlet in the swale south of Founders Park Soccer Fields, north of US-1, prior to outfall across US-1 (**Figure 11**).
- **Project Area 3**: Projects include: adding a wet stormwater pond adjacent to the southeast intersection of Toll Gate Blvd and Toll Gate Shores Dr. The stormwater pond will discharge across Toll Gate Shores Dr towards the coast (**Figure 12**).
- **Project Area 4**: Projects include: adding stormwater pipes where viable to hydraulically connect the poorly draining stormwater infrastructure along Old SR-905. These pipes would drain to a proposed inlet prior to discharging to the coast through a potential drainage easement through parcel 00397820000000 (**Figure 13**).
- **Project Area 5**: Projects include: adding inlets to capture runoff along Palermo Dr and discharging to the existing swale system along Venetian Blvd (**Figure 14**).

- **Future Project Areas 6A, 6B, 6C, 6D, 6F, & 6G**: Projects include: several areas that experienced inundation during the 2040 events where the boundary condition was based on the SLR projections from the King Tides Study. These areas are recommended to be assessed for the potential of raising the existing road grades, addition of sea walls, cleaning out existing stormwater infrastructure where survey data indicated silted/mucked-in structures that are not currently functioning, and/or implementing pumping systems due to limitations in existing grades (**Figure 15**).

A summary of the results of the proposed analysis for each Project Area location is provided below:

Project Area 1: Adding two wet stormwater detention facilities on the intersection of US-1, Old Hwy, and Palma Ln along with routing the flow from the mitered end section on Parcel 00412430000000 to the coast. Recommended projects in this Project Area include:

- The addition of 189 LF of 24-inch horizontal elliptical RCP connecting a proposed Type C inlet at the proposed wet detention facility between Palma Ln, Coconut Ln and US-1 (Parcels 0413480, 00413890, 00413880, and 00413870-000000) to a second proposed FDOT Type C inlet in the proposed wet detention facility across US-1, bordered by Old Hwy (Parcels 00413320, 00413330, 00413340, 00413350, & 00413360-000000). The outfall point for this pond would be to the vacant residential parcel immediately southeast across Old Hwy (Parcel 0041518000000), connected via 80 LF of 24-inch elliptical RCP. The outfall will include a Type C Inlet bubble up structure with perforated bottom to allow for infiltration. Additionally, there is to be a Type C inlet conversion of the existing mitered end section on parcel 00412430000000 discharging to a proposed Type C inlet via 153 LF of horizontal elliptical 12-inch RCP on Old Hwy prior to discharging towards the existing docks southeast of the mobile home park through 400 LF of 18-inch RCP.
- Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr events were simulated for each of the 4 proposed scenarios to be assessed. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).
- To measure the level of adverse impacts for each alternative, node N030B and N015A were selected to represent the maximum stage of the proposed stormwater management facilities.
- Based on the proposed results for this project, 4 separate proposed projects were developed individually for the overall area. Project 1A includes the original design of project 1 as previously mentioned, illustrated in **Figure 10-10I**. Project 1B consists of the original design excluding the proposed stormwater network through the mobile home park as a means of cost reduction. Project 1C includes the original design with ten times the number of proposed pipe connections and structures. The purpose of this project is to assess whether the number of pipe connections is the limiting factor for further reductions in discharge. Project 1D is a consists of Project 1B with 10 times the number of proposed pipe connections and structures. Like Project 1C, the purpose of Project 1D

is to assess whether the number of pipe connections is the limiting factor while also being more economically viable.

- The proposed model results for project 1A (project 1 in **Figure 10-10I**) indicates that roadway inundation along US-1 will be eliminated for all modeled 2025 and 2040 storm events. Although US-1 was determined to meet level of service for project 1A, local roadways northwest of US-1 received inundation ranging from 4-7 inches for the 10-year 24-hour event, and 9-13 inches for the 25-year 24-hour event.
- Based on maximum link flows, it was determined that link L-5410DS from node NA030 to node NA016 (spanning across Old Hwy to the existing RV park across US-1) did not contribute significantly to outflows for the 2025 and 2040 events. Additionally, obtaining temporary construction in a developed private property may pose a significant challenge in the permitting process in addition to the added cost of construction. As a result, an alternative project (Project 1B) should be modeled to exclude the proposed Type C inlet (southwest of Pippin Dr) to convey discharge across US-1. Cost estimates for Project 1B are listed in **Table 14B**.
- To determine potential for additional flood reductions, scenarios with 10 pipe links, project 1C and project 1D, were assessed in the ICPR model. Based on the results, it was determined that additional connections provided greater flood reduction by up to 6 inches for the 10-year 24-hour event and 11 inches for the 25-year 24-hour event as displayed in **Figures 10F**, **10G**, and **10H**. This would allow for LOS requirements to be met for the project's impacted local roads (i.e. Palma Ln and Royal Ln). This illustrates that the flow capacity is the bottleneck for reduction in localized inundation and meeting roadway LOS.
- Due to further reductions in flood depths from increasing pipe count, it would be critical for the Village to work with the designers to achieve the most economical solution based on the Village's cost/benefit goals.

Project Area 2: Adding an inlet in the swale south of Founders Park Soccer Fields, north of US-1 prior to outfall across US-1. Recommended projects in this Project Area include:

- This alternative includes the addition of 156 LF of an 18-inch horizontal elliptical RCP connecting a proposed Type C inlet within the existing swale located in the southeast and southwest corners of parcels 00093330000100 and 00093330000000 across US-1. The outfall would be towards a vacant parcel classified as Mixed Wetland Hardwoods prior to overland discharge towards the coast.
- Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).
- To measure the level of adverse impacts for each alternative, node N029 was selected to represent the maximum stage of the proposed inlet, adjacent swale, and elevation of roadway inundation along US-1.

- Based on the proposed results for this project, 2 separate proposed projects were developed individually for the overall area. Project 2A includes the original design of project 1 as previously mentioned, illustrated in **Figure 11-11I**. Project 2B includes the original design for Project 2A with 20 times the number of pipe connections. Like projects 1C and 1D, the purpose of project 2B is to assess whether the number of pipe connections is the limiting factor for further reductions in flooding extents.
- The proposed model results for project 2A (project 2 in **Figure 11-11I**) indicates that roadway inundation for project 2 will be eliminated along US-1 for the 2025 and 2040 scenarios' 10-year and mean annual 24-hour storm events. The 2040 25-year 24-hour event displayed approximately 0.72 inches of inundation for project 2, under the 4-inch depth required by the LOS. Approximately 3.72 to 5.76 inches of inundation is still expected for the 2025 and 2040 100-yr 24-hr events respectively.
- To assess potential for additional flood reductions, a scenario with 20 pipe links was assessed in the ICPR model. Based on the results, it was determined that additional connections provided greater flood reduction by up to 20 inches as displayed in **Figures 11F**, **11G**, and **11H**. This illustrates that the flow capacity is the bottleneck for reduction in localized inundation and meeting roadway LOS.
- Due to significantly improved reductions in flood depths resulting from increasing pipe count, it would be critical for the Village to work with the designers to achieve the most economical solution based on the Village's cost/benefit goals.

Project Area 3: Adding a wet stormwater pond on the southeast intersection of Toll Gate Blvd and Toll Gate Shores Dr. The stormwater pond will discharge across Toll Gate Shores Dr towards the coast. Recommended projects in this Project Area include:

- The addition of 53 LF of 18-inch RCP connecting a proposed Type D inlet controlled via a sluice gate within the proposed wet detention stormwater facility on the southeast intersection of Toll Gate Blvd and Toll Gate Shores Dr to the coast immediate west of the docks on Toll Gate Dr. This alternative will include 2 additional Type D inlets that will drain runoff along Toll Gate Blvd towards the proposed pond. There will be an additional 100 LF of 12 inch-RCP associated with the inlets due to limitations in existing grade.
- Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).
- To measure the level of adverse impacts for each alternative, node N081A1 was selected to represent the maximum stage of the proposed pond and elevation of roadway inundation along Toll Gate Blvd.
- The proposed model results for project 3 indicated that for all design storm events the proposed pond and associated infrastructure provides no benefit in terms of additional flood reduction despite providing additional storage. The results for the 2025 scenarios using King Tide projections (providing more conservative boundary conditions based on NOAA's intermediate high projections) illustrated that despite the availability of additional storage area, the tailwater elevation would prevent positive discharge out of

the pond. As a result, it is not recommended to purse the proposed stormwater infrastructure outlined for project 3 above.

- As an alternative, the addition of a stormwater pump station is advised on the proposed parcel, providing adequate drainage during the design storm events while meeting local regulations for design offsets, landscaping requirements, etc.

Project Area 4: Adding stormwater pipes where viable to hydraulically connect the poorly draining stormwater infrastructure along Old SR-905. These pipes would drain to a proposed inlet prior to discharging to the coast through a potential drainage easement through parcel 00397820000000. Recommended projects in this Project Area include:

- The potential addition of 820 LF of 12-inch RCP connecting 4 existing inlets along Old SR-905 to the coast through a potential drainage easement within parcel 00397820000000. Existing stormwater inlets for this project had unknown invert elevations due to the structures being filled with water at the time of survey. Invert directions and elevations were assumed based on engineering judgement. The existing structures for this project should be drained, measured, and assessed for drainage viability prior to pursuit of this project.
- Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).
- To measure the level of adverse impacts for each alternative, nodes N057, N057A, N057B, N057C and N057D N024A was selected to represent the maximum stage of the proposed inlets and elevation of roadway inundation along Old SR-905.
- The proposed model results for project 4 indicate no reduction in road flooding for the design storm event. Conversely as displayed in **Table 11** and **Table 12**, despite the increase in flow capacity across the connected links, the maximum stages for the project nodes increased from the existing conditions. This could be a result of primarily sea level rise induced backflow coupled with low lying roadway elevations on the projected inundated section of Old SR-905. As a result, it is not recommended to purse the proposed stormwater infrastructure outlined for project 4 above.
- As an alternative, future assessments on raising roadway elevations along Old SR-905 up to 6 inches along the impacted stretch of roadway should be considered. Additionally, a future stormwater pump station is recommended to be assessed to control stormwater discharged into those areas.

Project Area 5: Adding inlets to capture runoff along Palermo Dr and discharging to the existing swale system along Venetian Blvd. Recommended projects in this Project Area include:

- The addition of 967 LF of 12-inch RCP connecting 3 proposed Type D inlets along Palermo Dr to the existing swales west of Venetian Blvd. Due to the existing grades along Palermo

Dr, the addition of 6 inches of cover would be required to ensure the proposed pipe maintains adequate cover.

- Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).
- To measure the level of adverse impacts for each alternative, node N024A was selected to represent the maximum stage of the proposed inlets and elevation of roadway inundation along Palermo Dr.
- The proposed model results for project 5 indicate no reduction in road flooding for the design storm event. In contrast, as displayed in **Table 10**, the proposed hydraulic connection to the swales west of Venetian Blvd results in potential backflow during the 2025 and 2040 NOAA-Intermediate High Scenarios as seen in the increased proposed maximum stages. As a result, it is not recommended to purse the proposed stormwater infrastructure outlined for project 5 above.
- Future assessments on a stormwater pump station to provide positive drainage in addition to raising roadway elevations to alleviate future inundation should be considered. The increased roadway elevations shall be assessed to ensure existing residents are not impacted by future storm events.

Project Areas 6A, 6B, 6C, 6D, 6F, & 6G.

- Several residential areas in the upper Planation Key region of Islamorada, as part of project 6, are prone to inundation from sea level rise. Project 6 includes 6A, 6B, 6C, 6D, 6E, 6F, and 6G. These project areas collectively suffer from low lying roadway elevations and lack of alternative emergency exits. See **Figure 15** and **Figure 16** for more details.
- Due to lack of available parcels for stormwater treatment areas, these areas were not modeled based on proposed stormwater features. Each Project Area is recommended to be assessed for roadway fill requirements to meet LOS, sufficient drainage amendments to prevent adverse impacts to adjacent residential areas and potential implementation of pump stations for drainage on a case-by-case basis.

a. Controlling the timing of peak flows to prevent or minimize problems for the entire watershed due to new development, redevelopment, and fully developed conditions.

Differences in runoff from current to future conditions were determined to be minimal based on the available existing conditions and future land use classifications for the Islamorada watershed. Existing vacant parcels with a designated land use were conservatively modeled in the existing conditions with the designated current land use in place. Therefore, there was negligible change between the existing land use/future land use classifications leading to no major changes in peak flows from new development, redevelopment, and fully developed conditions.

b. The impact of climate change and sea level rise on fully developed conditions.

Future (fully developed) scenarios account for increased rainfall through a product of SFWMD's rainfall change factors with predicted rainfall depth from NOAA Atlas 14 for Monroe County. As mentioned, the basin maximum stages are primarily a result of sea level rise determined by the coastal boundary condition (set to NOAA's intermediate high projection and NOAA's intermediate high with the addition of King Tides) rather than the rainfall event's intensity, except for a few projects discussed below.

Areas within Islamorada identified as immediate closed basins due to lack of hydraulically connected stormwater infrastructure include the intersection of Palm Ln/ US-1 and sections of roadway along US-1, south of Founder's Park Soccer Fields. These areas are particularly vulnerable to impacts of future flood risk, as the increased rainfall depths result in more localized inundation without coastally connected drainage structures for discharge. Proposed stormwater infrastructure for these two regions will include wet detention ponds northeast of Palm Lane and on the empty lot across US-1 (Project Area 1) and supplemental cross drains across US-1, southeast of the Founder's Park Soccer Fields (Project Area 2).

Areas determined to be at risk of inundation due to sea level rise include residential streets along Tollgate Blvd, low lying sections of roadway on Old SR 905, and Palermo Dr. Proposed stormwater infrastructure for Tollgate Blvd will include a central wet detention pond on the empty lot intersected by Toll Gates Shore Dr and Tollgate Blvd (Project Area 3). Remaining projects include the addition of stormwater pipes to drain excess runoff from Old SR 905 (Project Area 4) and inlets to capture runoff along Palermo Dr (Project Area 5).

Project Areas 1, 2, 3, 4, and 5 were assessed for the 2025, and 2040, 100-year 24-hour events in addition to the 25-year and lesser rainfall events. Based on the proposed model results, Project Areas 1 and 2 displayed significant reductions in roadway inundation for all 2025 and 2040 scenarios. LOS requirements along US-1 are met for all 2025 and 2040 storm events less the 2040 100-yr 24-hour event in which there's a maximum of 5.76 inches of flooding along the low point of US-1. Similarly, Project Areas 1 and 2 experienced reductions in flood depth for the 2070 scenarios although to a lesser extent for the 100-yr 24-hour storm event. In contrast, due to the higher boundary conditions because of sea level rise, Project Areas 3, 4, and 5 were not able to provide a reduction in flood elevations for the stated project locations. All 2100 events were determined to adversely affect all proposed project areas by preventing positive drainage and result in backflow through any proposed stormwater network.

c. At least the 25-year rainfall event in fully developed conditions, with a list of possible solutions for addressing at least the 25-year rainfall event.

As mentioned, the basin maximum stages are primarily a result of SLR determined by the coastal boundary condition rather than the rainfall event's intensity. Project Areas 1, 2, 3, 4, and 5 were assessed for the 2025, and 2040, 100-yr 24-hr events in addition to the 25-year and lesser rainfall events.

Since most basins in Islamorada openly discharge towards the coast via overland flow, the intensity of the storm event does not induce flooding to the same extent as sea level rise. The 25-year rainfall event was primarily determined to adversely affect closed basins, particularly Project Area 1 and Project Area 2 in the Plantation Key region of Islamorada.

To address these flooding concerns, temporary storage solutions in the form of two wet detention ponds that discharge across US-1 would provide hydraulic relief for Project Area 1, which is currently not known to be hydraulically connected to an outfall. Additional information on cost estimates for Project Area 1 are displayed in Tables **14A, 14B, 14C, 14D** with aerial schematics on Figures **10, 10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H,** and **10I.**

Similarly, for Project Area 2, hydraulically connecting the swale south of Founder's Park Soccer Fields across US-1 sufficiently meetings LOS requirements and allows for potential infiltration across the vacant lot to be discharged to. Additional information on cost estimates for Project Area 2 are displayed in Tables **15A and 15B** with aerial schematics on Figures **11, 11A, 11B, 11C, 11D, 11E, 11F, 11G, 11H,** and **11I.**

d. At least one event larger than the 25-year rainfall event, with a list of possible solutions for addressing this event.

As mentioned, the basin maximum stages are primarily a result of sea level rise determined by the boundary condition rather than the rainfall event's intensity. Project Areas 1, 2, 3, 4, and 5 were assessed for the 2025, and 2040, 100-yr 24-hr events in addition to the 25-year and lesser rainfall events.

Similarly, to part C, the solutions for Project Areas 1 and 2 sufficiently address roadway LOS requirements up to the 2040 100-yr 24-hr event using the King Tides projection. For project areas impacted by sea level rise, alternative solutions such as raising roadway elevations and pumping solutions are required for scenarios beyond 2040.

e. Ensuring that flood hazards from the 10-year and the 25-year events are not increased by future development (the 2-year storm is also recommended).

Land use for future development is currently incorporated within existing conditions based on the existing land use database. Proposed projects in Project Areas 1 and 2 were determined to not increase flood hazards for existing and future development as maximum stages for the respective project basins were decreased or maintained for all 10-year and 25-year storm events along with the 2-year storm (denoted by mean annual 24-hour storm in resulting tables and figures).

Proposed projects in Project Areas 3 and 5 resulted in no noticeable differences in maximum stages due to potential backflow from their respective outfalls. Project Area 4 resulted in increased maximum stages also due to backflow from increased flow capacity. Therefore, the

hydraulic components of these three projects are not recommended. However, raising low-lying roadway elevations and future pumping solutions are recommended as potential alternatives to be assessed for future implementation.

Engineer's Estimate of Construction Costs

The combined estimated cost of construction for the projects within the Project Areas would be approximately $1,412,397.64 and $117,526.84 respectively for Project Areas 1B, and 2A (**Table 14B** and **Table 15A**), including the base cost of property acquisition. These totals do not include costs associated with addressing utility adjustments/conflicts. Totals for property acquisition assume base market value for the pond parcels for project 1 (referenced from the Monroe County property appraiser). In summary, the proposed improvements for the two greatest value projects include the following:

- Two proposed wet detention facilities for Project 1B, joined by proposed FDOT Type C inlets with elliptical pipe connections, ultimately discharging to a perforated Type C inlet bubble up structure, discharging via overland flow across a vacant parcel towards the coast.
- One proposed Type C inlet for Project 2A connecting across US-1 to a proposed mitered end section, discharging via overland flow across a vacant parcel towards the coast.

Though additional pipe connections as displayed in project 1C, 1D, and 2A resulted in significantly greater flood reductions for these two projects locations, the additional associated costs may or may not be practical as displayed in **Tables 14C, 14D** (10 pipe connections for project 1), and **15B** (20 pipe connections for project 2). Accordingly, it would be critical for the Village to work with the designers to achieve the most economical solution based on a cost/benefit analysis tailored to the goals of the village. A summary of the project estimates is shown below in **Table 14**.

Table. 14. Summary of Engineer's Opinion of Construction Cost

Project	Summary of project	Total Costs	Ranking w/ lowest number corresponding to most desired)
Project 1A	Includes 2 wet detention facilities connected, discharging to a bubble-up structure and a proposed FDOT type C inlet discharging across RV park through Nautical Way	$1,727,041.65	3
Project 1B *	Includes 2 wet detention facilities connected, discharging to a bubble-up structure	$1,445,122.14	1
Project 1C	Includes 2 wet detention facilities connected, discharging to a bubble-up structure and a proposed FDOT type C inlet discharging across RV park through Nautical Way with 10 times the pipe connections	$6,700,936.91	4
Project 1D *	Includes 2 wet detention facilities connected, discharging to a bubble-up structure with 10 times the pipe connections	$3,388,400.82	2
Project 2A	Includes a Type C inlet discharging across US-1 south of Founder's Park Soccer Fields	$127,499.87	1
Project 2B	Includes a Type C inlet discharging across US-1 south of Founder's Park Soccer Fields with 20 time the number of pipe connections	$2,392,317.92	2

**Indicates a project that was determined to be a more cost-effective alternative that was not modeled as the removed link provided insignificant flows for the 2025 and 2040 scenarios*

Proposed pump station costs for Project Areas 3, 4, 5, and the 6 series would require a material take-off based on existing supplier quotes on major equipment such as pumps, drivers, switchgear, instrumentation, labor costs, etc. An approximate cost for a pump station would be $1500 per horsepower (HP) based on *E. Shahsi Menon's in Transmission Pipeline Calculations and Simulations Manual, 2015*. This approximation would account for all material, labor, and equipment costs based on historical data.

Table. 14A. Engineer's Opinion of Construction Cost for Project 1A.

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	2610	$31,528.80
Grading	CY	$2.41	500	$1,205.00
Compaction	CCY	$2.52	625	$1,575.00
Hauling	LCY	$6.30	2813	$17,721.90
Silt Fence Installation	LF	$2.36	2624	$6,192.64
Silt Fence Maintenance	LF	$0.24	2624	$629.76
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	0.89	$4,221.45
Sod	SY	$4.40	4327	$19,038.80
Water Truck	HR	$75.80	10	$758.00
19" x 32" RCP	LF	$213.94	822	$175,858.68
Bedding Stone	CY	$172.17	41	$7,058.97
Geotextile Fabric	SY	$2.37	487	$1,151.76
FDOT Type C Inlet	EA	$7,446.29	5	$37,231.45
Mitered End Section	EA	$4,444.63	1	$4,444.63
Roadway Demolition	SY	$4.47	219	$978.93
Roadway Base	SY	$21.41	219	$4,688.79
Asphalt Pavement	TN	$147.90	2.7	$399.33
Stabilized Subgrade	SY	$7.44	219	$1,629.36
Subtotal				$321,243.75
Easement Area	SF	$3.00	3200	$9,600.00
Property and Parcel 00413900-000000	EA	$28,933.00	1	$28,933.00
Property and Parcel 00413890-000000	EA	$32,026.00	1	$32,026.00
Property and Parcel 00413880-000000	EA	$34,832.00	1	$34,832.00
Property and Parcel 00413870-000000	EA	$29,575.00	1	$29,575.00
Property and Parcel 00413320-000000	EA	$128,345.00	1	$128,345.00
Property and Parcel 00413330-000000	EA	$120,331.00	1	$120,331.00
Property and Parcel 00413340-000000	EA	$115,121.00	1	$115,121.00
Property and Parcel 00413350-000000	EA	$108,356.00	1	$108,356.00
Property and Parcel 00413360-000000	EA	$214,958.00	1	$214,958.00
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$32,117.34	1	$32,117.34
Construction Surveys	EA	$32,117.34	1	$32,117.34
Design and Permitting	EA	$64,234.68	1	$64,234.68
Total cost plus 35% Contingency				$1,727,041.65

Table. 14B. Engineer's Opinion of Construction Cost for Project 1B.

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	2610	$31,528.80
Grading	CY	$2.41	500	$1,205.00
Compaction	CCY	$2.52	625	$1,575.00
Hauling	LCY	$6.30	2813	$17,721.90
Silt Fence Installation	LF	$2.36	2624	$6,192.64
Silt Fence Maintenance	LF	$0.24	2624	$629.76
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	0.89	$4,221.45
Sod	SY	$4.40	4327	$19,038.80
Water Truck	HR	$75.80	10	$758.00
19" x 32" RCP	LF	$213.94	822	$175,858.68
Bedding Stone	CY	$172.17	41	$7,058.97
Geotextile Fabric	SY	$2.37	487	$1,151.76
FDOT Type C Inlet	EA	$7,446.29	5	$37,231.45
Mitered End Section	EA	$4,444.63	1	$4,444.63
Roadway Demolition	SY	$4.47	219	$978.93
Roadway Base	SY	$21.41	219	$4,688.79
Asphalt Pavement	TN	$147.90	2.7	$399.33
Stabilized Subgrade	SY	$7.44	219	$1,629.36
Subtotal				$321,243.75
Easement Area	SF	$3.00	3200	$9,600.00
Property and Parcel 00413900-000000	EA	$28,933.00	1	$28,933.00
Property and Parcel 00413890-000000	EA	$32,026.00	1	$32,026.00
Property and Parcel 00413880-000000	EA	$34,832.00	1	$34,832.00
Property and Parcel 00413870-000000	EA	$29,575.00	1	$29,575.00
Property and Parcel 00413320-000000	EA	$128,345.00	1	$128,345.00
Property and Parcel 00413330-000000	EA	$120,331.00	1	$120,331.00
Property and Parcel 00413340-000000	EA	$115,121.00	1	$115,121.00
Property and Parcel 00413350-000000	EA	$108,356.00	1	$108,356.00
Property and Parcel 00413360-000000	EA	$214,958.00	1	$214,958.00
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$32,117.34	1	$32,117.34
Construction Surveys	EA	$32,117.34	1	$32,117.34
Design and Permitting	EA	$64,234.68	1	$64,234.68
Total cost plus 35% Contingency				$1,445,122.14

Table. 14C. Engineer's Opinion of Construction Cost for Project 1C.

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	63943	$772,431.44
Grading	CY	$2.41	47039	$113,363.99
Compaction	CCY	$2.52	58799	$148,173.48
Hauling	LCY	$6.30	22539	$141,995.70
Silt Fence Installation	LF	$2.36	17420	$41,111.20
Silt Fence Maintenance	LF	$0.24	17420	$4,180.80
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	1.32	$6,261.02
Sod	SY	$4.40	6367	$28,014.80
Water Truck	HR	$75.80	10	$758.00
19" x 32" RCP	LF	$213.94	8220	$1,758,586.80
Bedding Stone	CY	$172.17	406	$69,901.02
Geotextile Fabric	SY	$2.37	4871	$11,519.92
FDOT Type C Inlet	EA	$7,446.29	50	$372,314.50
Mitered End Section	EA	$4,444.63	10	$44,446.30
Roadway Demolition	SY	$4.47	2186	$9,771.42
Roadway Base	SY	$21.41	2186	$46,802.26
Asphalt Pavement	TN	$147.90	27.3	$4,037.67
Stabilized Subgrade	SY	$7.44	2186	$16,263.84
Subtotal				$3,594,864.67
Easement Area	SF	$3.00	3200	$9,600.00
Property and Parcel 00413900-000000	EA	$28,933.00	1	$28,933.00
Property and Parcel 00413890-000000	EA	$32,026.00	1	$32,026.00
Property and Parcel 00413880-000000	EA	$34,832.00	1	$34,832.00
Property and Parcel 00413870-000000	EA	$29,575.00	1	$29,575.00
Property and Parcel 00413320-000000	EA	$128,345.00	1	$128,345.00
Property and Parcel 00413330-000000	EA	$120,331.00	1	$120,331.00
Property and Parcel 00413340-000000	EA	$115,121.00	1	$115,121.00
Property and Parcel 00413350-000000	EA	$108,356.00	1	$108,356.00
Property and Parcel 00413360-000000	EA	$214,958.00	1	$214,958.00
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$179,738.43	1	$179,738.43
Construction Surveys	EA	$179,738.43	1	$179,738.43
Design and Permitting	EA	$179,738.43	1	$179,738.43
Total cost plus 35% Contingency				$6,700,936.91

Table. 14D. Engineer's Opinion of Construction Cost for Project 1D.

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	22335	$269,806.80
Grading	CY	$2.41	15484	$37,316.44
Compaction	CCY	$2.52	19356	$48,777.12
Hauling	LCY	$6.30	9134	$57,544.20
Silt Fence Installation	LF	$2.36	6360	$15,009.60
Silt Fence Maintenance	LF	$0.24	6360	$1,526.40
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	0.88	$4,174.02
Sod	SY	$4.40	4241	$18,660.40
Water Truck	HR	$75.80	10	$758.00
19" x 32" RCP	LF	$213.94	2690	$575,498.60
Bedding Stone	CY	$172.17	133	$22,898.61
Geotextile Fabric	SY	$2.37	1594	$3,769.81
FDOT Type C Inlet	EA	$7,446.29	30	$223,388.70
Roadway Demolition	SY	$4.47	1030	$4,604.10
Roadway Base	SY	$21.41	1030	$22,052.30
Asphalt Pavement	TN	$147.90	12.9	$1,907.91
Stabilized Subgrade	SY	$7.44	1030	$7,663.20
Subtotal				$1,320,286.72
Property and Parcel 00413900-000000	EA	$28,933.00	1	$28,933.00
Property and Parcel 00413890-000000	EA	$32,026.00	1	$32,026.00
Property and Parcel 00413880-000000	EA	$34,832.00	1	$34,832.00
Property and Parcel 00413870-000000	EA	$29,575.00	1	$29,575.00
Property and Parcel 00413320-000000	EA	$128,345.00	1	$128,345.00
Property and Parcel 00413330-000000	EA	$120,331.00	1	$120,331.00
Property and Parcel 00413340-000000	EA	$115,121.00	1	$115,121.00
Property and Parcel 00413350-000000	EA	$108,356.00	1	$108,356.00
Property and Parcel 00413360-000000	EA	$214,958.00	1	$214,958.00
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$105,617.95	1	$105,617.95
Construction Surveys	EA	$105,617.95	1	$105,617.95
Design and Permitting	EA	$158,426.92	1	$158,426.92
Total cost plus 35% Contingency				$3,388,400.82

Table 15A. Engineer's Opinion of Construction Cost for Project 2A.

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	119	$1,437.52
Grading	CY	$2.41	92	$221.72
Compaction	CCY	$2.52	115	$289.80
Hauling	LCY	$6.30	36	$226.80
Silt Fence Installation	LF	$2.36	300	$708.00
Silt Fence Maintenance	LF	$0.24	300	$72.00
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	0.02	$94.86
Sod	SY	$4.40	77	$338.80
Water Truck	HR	$75.80	10	$758.00
19" x 32" RCP	LF	$213.94	150	$32,091.00
Bedding Stone	CY	$172.17	7	$1,205.19
Geotextile Fabric	SY	$2.37	89	$210.49
FDOT Type C Inlet	EA	$7,446.29	1	$7,446.29
Mitered End Section	EA	$4,444.63	1	$4,444.63
Roadway Demolition	SY	$4.47	67	$299.49
Roadway Base	SY	$21.41	67	$1,434.47
Asphalt Pavement	TN	$147.90	0.8	$118.32
Stabilized Subgrade	SY	$7.44	67	$498.48
Subtotal				$56,826.37
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$5,682.64	1	$5,682.64
Construction Surveys	EA	$9,092.22	1	$9,092.22
Design and Permitting	EA	$15,343.12	1	$15,343.12
Total cost plus 35% Contingency				$127,499.87

Table 15B. Engineer's Opinion of Construction Cost for Project 2B.

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	45007	$543,684.56
Grading	CY	$2.41	34098	$82,176.18
Compaction	CCY	$2.52	42623	$107,409.96
Hauling	LCY	$6.30	14544	$91,627.20
Silt Fence Installation	LF	$2.36	6000	$14,160.00
Silt Fence Maintenance	LF	$0.24	6000	$1,440.00
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	0.32	$1,517.82
Sod	SY	$4.40	1541	$6,780.40
Water Truck	HR	$75.80	10	$758.00
19" x 32" RCP	LF	$213.94	3000	$641,820.00
Bedding Stone	CY	$172.17	148	$25,481.16
Geotextile Fabric	SY	$2.37	1778	$4,204.97
FDOT Type C Inlet	EA	$7,446.29	1	$7,446.29
Mitered End Section	EA	$4,444.63	1	$4,444.63
Roadway Demolition	SY	$4.47	674	$3,012.78
Roadway Base	SY	$21.41	674	$14,430.34
Asphalt Pavement	TN	$147.90	8.4	$1,242.36
Stabilized Subgrade	SY	$7.44	674	$5,014.56
Subtotal				$1,561,581.72
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$78,079.09	1	$78,079.09
Construction Surveys	EA	$62,463.27	1	$62,463.27
Design and Permitting	EA	$62,463.27	1	$62,463.27
Total cost plus 35% Contingency				$2,392,317.92

The implementation of projects in Project Areas 1 and 2 will require installation of new storm sewer and drainage structures, associated excavation and grading, and roadway demolition and repair.

III. Conclusions and Recommendations

This Watershed Management Plan has been developed with the specific intent of improving the Village's participation in the CRS program. That said, the Village is engaged in multiple current and near-term projects that are companion to this effort that will truly assist the Village in prioritizing capital project planning based on specific types of flood risk. These efforts include:

1. Islamorada Vulnerability Assessment (reviewing and analyzing all critical assets)
2. Securing mobile LiDAR elevation data
3. Update of Stormwater Master Plan
4. Road Elevation and Adaptation Planning
5. Project specific adaptation projects (in partnership and individually)

Combined, these efforts can help the Village identify the types of flooding risk that it is vulnerable to, understand the timeframes associated with those risks and help prioritize projects and funding sources to implement projects to address those risks. Some of those projects are identified in this Watershed Management Plan that provide an initial start in that direction. Some of these initiatives are partnerships across the Keys, some are individual to the Village.

Additionally, at key intervals throughout the completion of these projects, the Village should review its policy framework to ensure that appropriate levels of service and design standards are reflective of those project priorities.

When designing infrastructure in the Village, there are two basic concepts: the actual design of a project and the level of service it provides. A couple of examples with the Village's Code and Comprehensive Plan are evident to demonstrate this concept and how this vulnerability assessment can help shape those policies based on its outcomes. The Village's Stormwater Design standards are included within this document and referenced throughout.

In terms of utilizing outcomes from this Watershed Management Plan, relevant to these existing design standards, the Village should consider the following:

1. How will stormwater systems have to manage for different conditions over the next 50 years due to changing rainfall conditions, or in some areas, how will sea level rise impact those operations throughout a rising tailwater condition? A recommendation may be to include a "useful life" threshold to include future conditions related to changing rainfall conditions and a reduced tailwater condition due to sea level rise. Pinellas County has incorporated tailwater conditions into its Code to address this issue.
2. Is the 25-year duration storm event enough for design knowing that we are seeing more frequent higher duration events? In certain parts of the Village, this design standard may not be enough or may be compromised by increased tidal flooding from sea level rise. A recommendation may be to incorporate higher frequency critical duration storm events in more advanced stormwater modeling. To note, the Village is currently undergoing such a modeling process in pursuit of a CRS Watershed Management Plan under a separate grant and in its forthcoming Stormwater Master Plan Update that can help define these parameters. This information could help inform areas of the Village where the stormwater system may be compromised by more frequent, higher volume rain or storm events.

In the Village's 2022 Comprehensive Plan found online, the level of service for drainage is as follows in Policy 4-1.1.2: Islamorada, Village of Islands hereby adopts LOS standards for stormwater management as currently mandated by State agencies, as defined in the Village's adopted Stormwater Management Master Plan as follows:

1. Post development runoff shall not exceed the pre-development runoff rate for a 25-year storm event, up to and including an event with a 24-hour duration;
2. Stormwater treatment and disposal facilities shall be designed to meet the design and performance standards established in F.A.C. Ch. 62-25, § 25.025, with treatment of the runoff from the first one (1) inch of rainfall on-site to meet the water quality standards required by F.A.C. Ch. 62, § 302.500; and
3. Stormwater facilities which directly discharge into 'Outstanding Florida Waters' (OFW) shall provide an additional treatment pursuant to F.A.C. Ch. 62-25.025 (9). Stormwater facilities must be designed so as to not degrade the receiving water body below the minimum conditions necessary to assure the suitability of water for the designated use of its classification as established in F.A.C. Ch. 62-302.

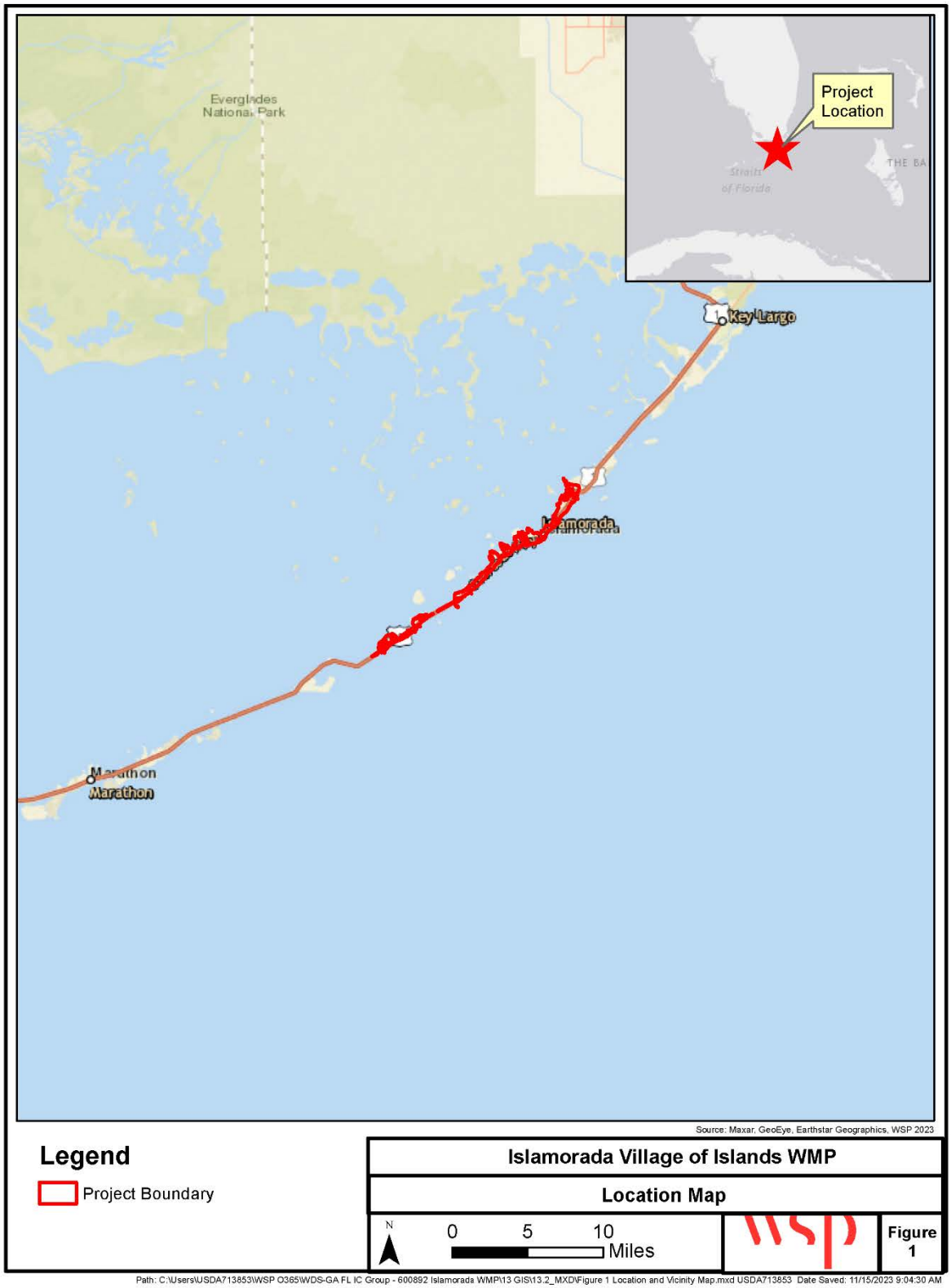
The existing development level of service for a 25-year, 24-hour design storm may be a very low level of service, but since the community is essentially built out, the only opportunities to improve this level of service are going to be through new capital projects or larger redevelopment projects. Future rainfall projections reflect potentially higher volume rainfall events (1.16 times more rainfall in 2040 than present day and 1.21 times more rainfall in 2070). A recommendation may be to re-evaluate these adopted level of service standards in the Comprehensive Plan based upon the information stemming from this Watershed Management Plan and Stormwater Master Plan Update currently underway.

Land use and land development policies generally control how we develop and where. Again, the Village is effectively built out, so the potential to address new development is limited in terms of large scale planned unit developments or larger projects. That said, redevelopment opportunities do exist and there are also implications for affordable housing projects when considering the outputs of the vulnerability assessment.

Overall, because of this Watershed Management Plan, the Village should examine additional policies in relation to increasing flood risk include:

- The Village's Floodplain Management Ordinance in Article 6-III. Key provisions may include enhanced freeboard in certain areas of the Village or for substantial improvements.
- Requiring enhanced pervious surfaces in Landscaping requirements (Division 30-V-6 Landscaping Standards).
- Adopting a shoreline ordinance revision that harmonizes concepts of seawall heights, promoting living or hybrid shorelines in key locations and tying useful life of shoreline improvements to future flood risk. Section 30-1545 Bulkheads, Seawalls or Riprap does not currently address living shorelines or a shoreline structure height.
- Integrating recommended projects from this Watershed Management with outcomes from the Road Elevation and Adaptation Plan as well as the Updated Stormwater Master Plan.

Before projects are implemented, the Village should undertake a review of its Comprehensive Plan and Code so that there are not policy barriers to certain levels of project design and levels of service are clear and achievable based on multiple modes of flood risk.


Everglades National Park
Project Location
Key Largo
Marathon
Source: Maxar, GeoEye, Earthstar Geographics, WSP 2023
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Project Boundary
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Lignumvitae Key Botanical State Park
Lignumvitae Key
Gulf of Mexico
Indian Key Historic State Park
Lower Matecumbe Key
San Pedro Underwater Archaeological Preserve State Park
Legend
Project Boundary
High : 15.9276
Low : -20.2306
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Figure 2 LiDAR Topography Map - Lower Matecumbe Key
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Shell Key
Upper Matecumbe Key
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
High : 15.9276
Low : -20.2306
Islamorada Village of Islands WMP
Figure 2 LiDAR Topography Map - Upper Matecumbe Key
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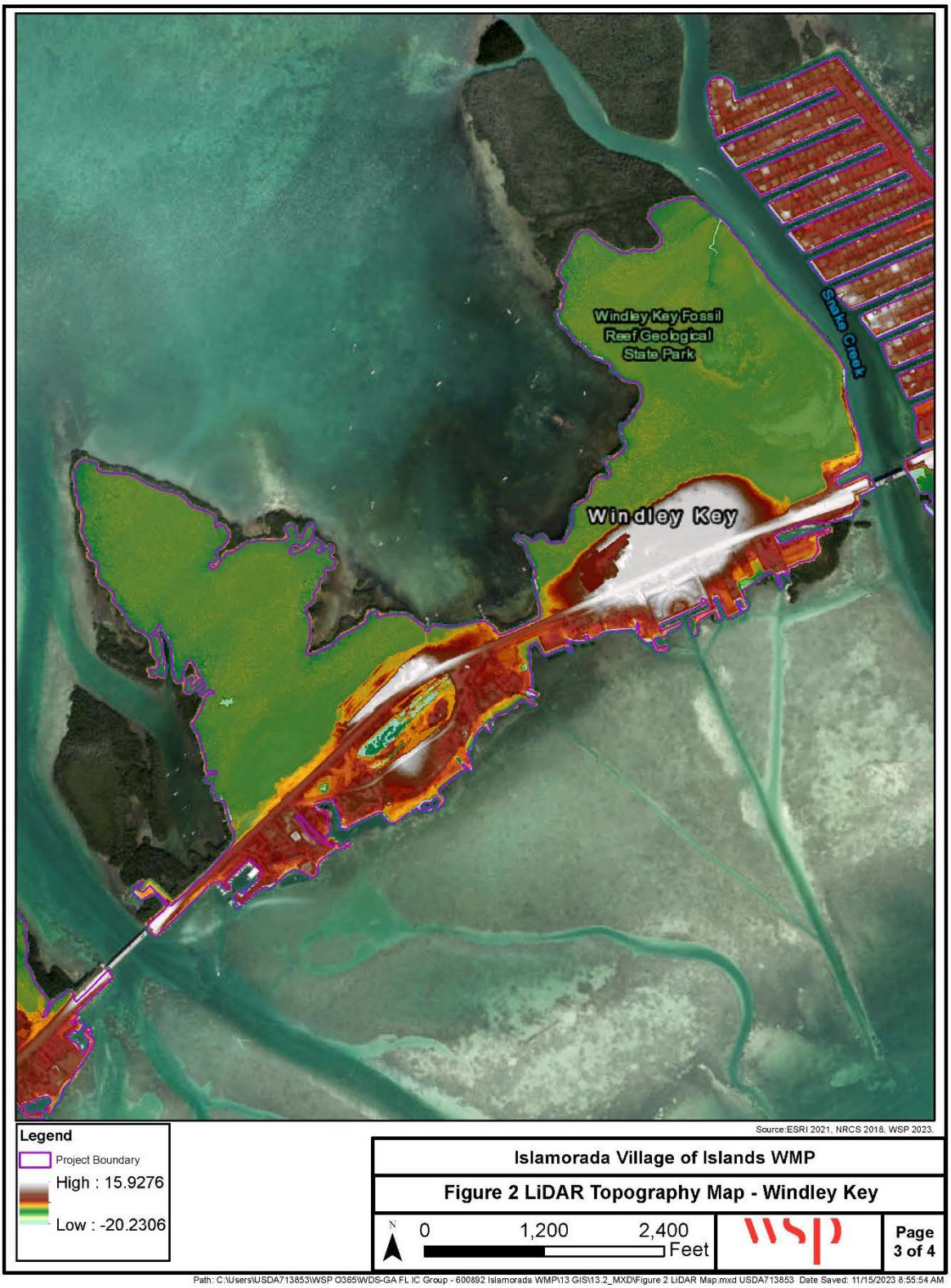
Windley Key Fossil Reef Geological State Park
Snake Creek
Windley Key
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
High : 15.9276
Low : -20.2306
Islamorada Village of Islands WMP
Figure 2 LiDAR Topography Map - Windley Key
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Key Largo
Plantation Key
Founder's Park
Islamorada
Windley Key Fossil Reef Geological State Park
Windley Key
Legend
Project Boundary
High : 15.9276
Low : -20.2306
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Figure 2 LiDAR Topography Map - Plantation Key
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Lignumvitae Key Botanical State Park
Lignumvitae Key
Gulf of Mexico
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Indian Key Historic State Park
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Lower Matecumbe Key
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8
San Pedro Underwater Archaeological Preserve State Park
Soils
100.WATERS OF THE ATLANTIC OCEAN
3.MATECUMBE MUCK, OCCASIONALLY FLOODED
7.UDORTHENTS-URBAN LAND COMPLEX
15.CUDJOE MARL, TIDAL
4.ROCK OUTCROP-TAVERNIER COMPLEX, TIDAL
8.ROCK OUTCROP-CUDJOE COMPLEX, TIDAL
18.BEACHES
5.ISLAMORADA MUCK, TIDAL
9.LIGNUMVITAE MARL, TIDAL
2.PENNEKAMP GRAVELLY MUCK
6.KEYLARGO MUCK, TIDAL
99.WATER
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
Islamorada Village of Islands WMP
Figure 3 NRCS Soils Map - Lower Matecumbe Key
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Shell Key
Upper Matecumbe Key
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Soils
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3.MATECUMBE MUCK, OCCASIONALLY FLOODED
7.UDORTHENTS-URBAN LAND COMPLEX
15.CUDJOE MARL, TIDAL
4.ROCK OUTCROP-TAVERNIER COMPLEX, TIDAL
8.ROCK OUTCROP-CUDJOE COMPLEX, TIDAL
18.BEACHES
5.ISLAMORADA MUCK, TIDAL
9.LIGNUMVITAE MARL, TIDAL
2.PENNEKAMP GRAVELLY MUCK
6.KEYLARGO MUCK, TIDAL
99.WATER
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
Islamorada Village of Islands WMP
Figure 3 NRCS Soils Map - Upper Matecumbe Key
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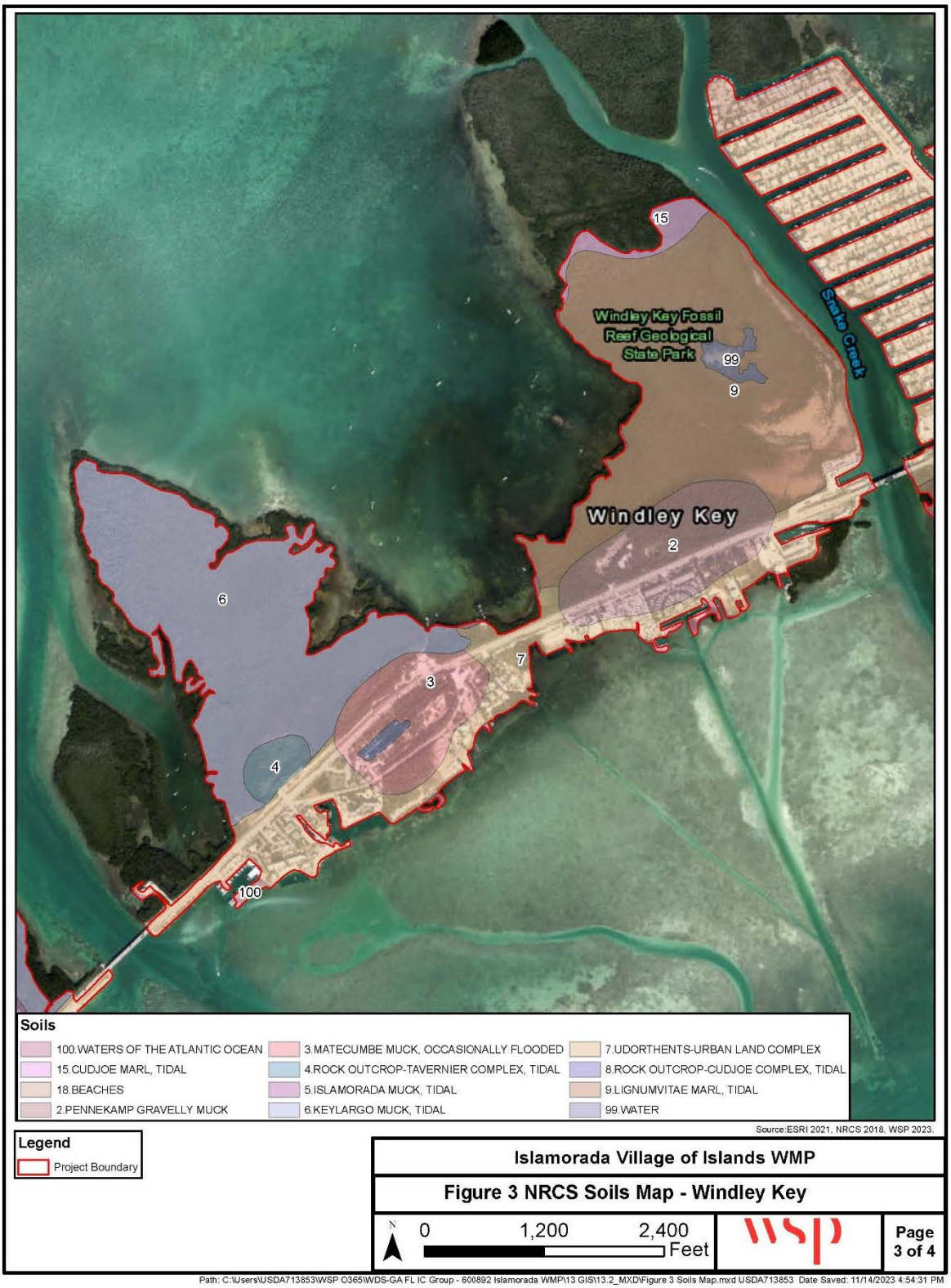
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Windley Key Fossil Reef Geological State Park
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Snake Creek
Windley Key
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Soils
100.WATERS OF THE ATLANTIC OCEAN
15.CUDJOE MARL, TIDAL
18.BEACHES
2.PENNEKAMP GRAVELLY MUCK
3.MATECUMBE MUCK, OCCASIONALLY FLOODED
4.ROCK OUTCROP-TAVERNIER COMPLEX, TIDAL
5.ISLAMORADA MUCK, TIDAL
6.KEYLARGO MUCK, TIDAL
7.UDORTHENTS-URBAN LAND COMPLEX
8.ROCK OUTCROP-CUDJOE COMPLEX, TIDAL
9.LIGNUMVITAE MARL, TIDAL
99.WATER
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
Islamorada Village of Islands WMP
Figure 3 NRCS Soils Map - Windley Key
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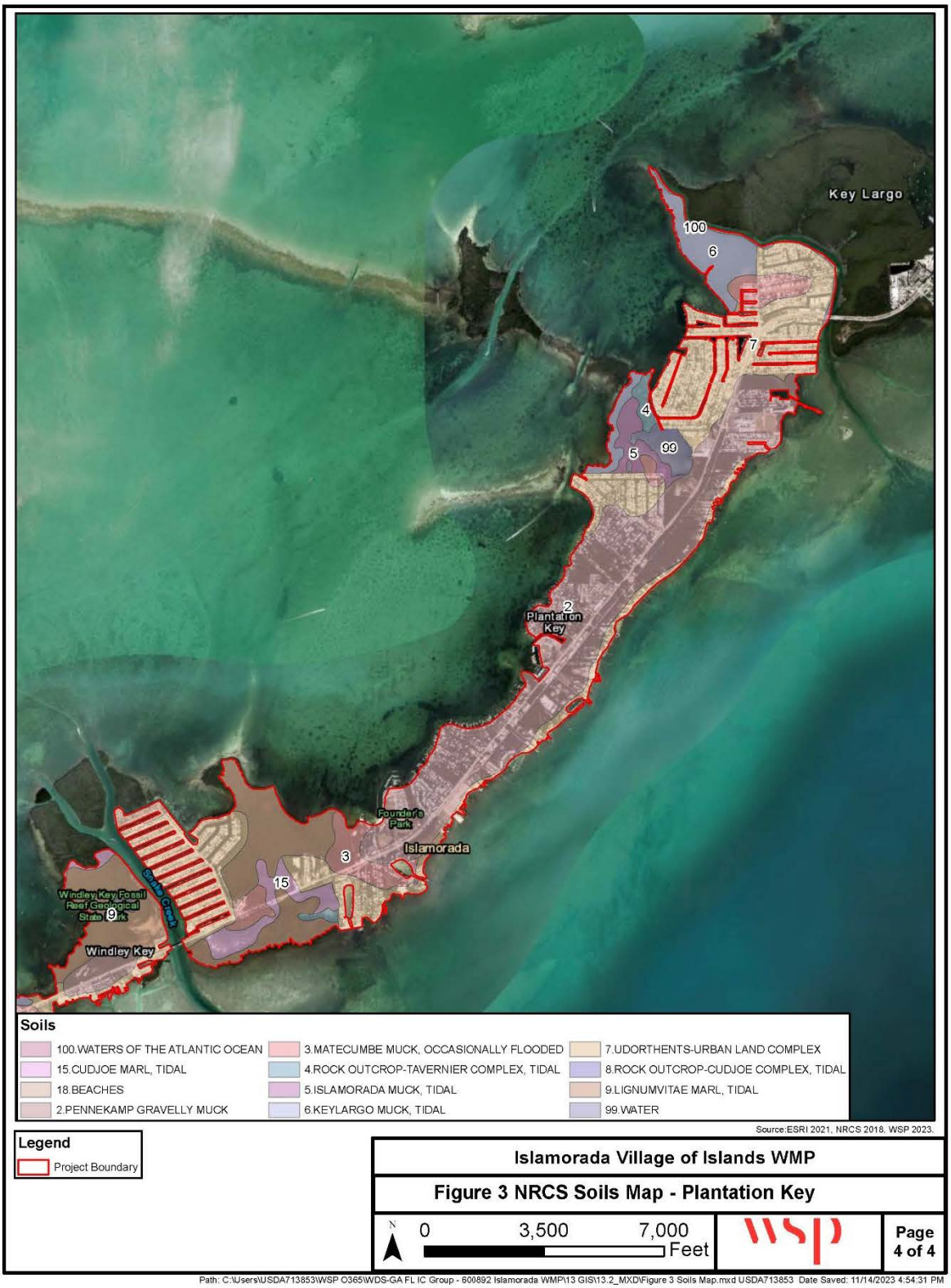
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Windley Key Fossil Reef Geological State Park
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Snake Creek
Soils
100.WATERS OF THE ATLANTIC OCEAN
3.MATECUMBE MUCK, OCCASIONALLY FLOODED
7.UDORTHENTS-URBAN LAND COMPLEX
15.CUDJOE MARL, TIDAL
4.ROCK OUTCROP-TAVERNIER COMPLEX, TIDAL
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18.BEACHES
5.ISLAMORADA MUCK, TIDAL
9.LIGNUMVITAE MARL, TIDAL
2.PENNEKAMP GRAVELLY MUCK
6.KEYLARGO MUCK, TIDAL
99.WATER
Source:ESRI 2021, NRCS 2018, WSP 2023.
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Figure 3 NRCS Soils Map - Plantation Key
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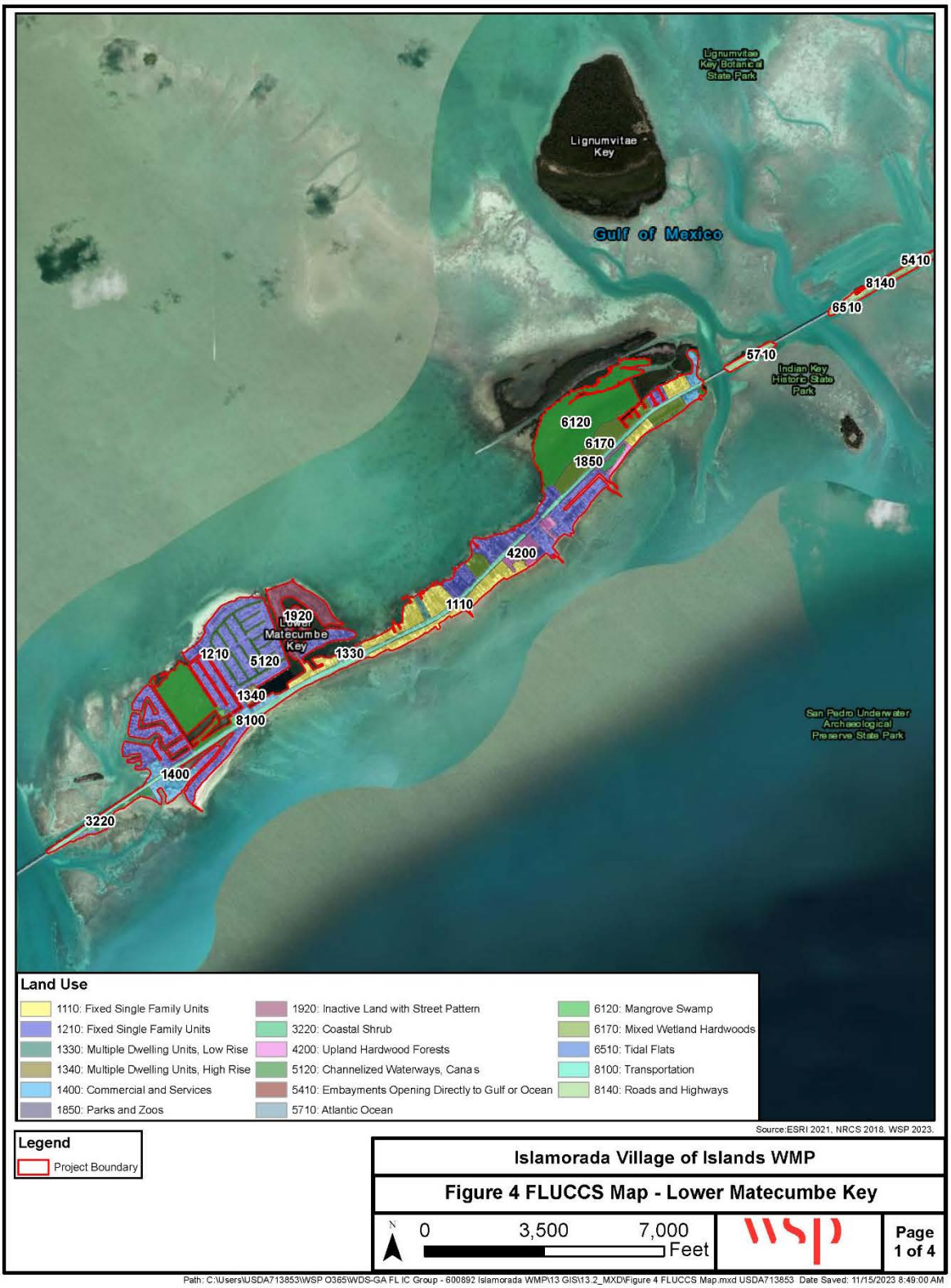
Lignumvitae Key Botanical State Park
Lignumvitae Key
Gulf of Mexico
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8140
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5710
Indian Key Historic State Park
6120
6170
1850
4200
1110
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Lower Matecumbe Key
1210
5120
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1340
8100
1400
3220
San Pedro Underwater Archaeological Preserve State Park
Land Use
1110: Fixed Single Family Units
1210: Fixed Single Family Units
1330: Multiple Dwelling Units, Low Rise
1340: Multiple Dwelling Units, High Rise
1400: Commercial and Services
1850: Parks and Zoos
1920: Inactive Land with Street Pattern
3220: Coastal Shrub
4200: Upland Hardwood Forests
5120: Channelized Waterways, Canals
5410: Embayments Opening Directly to Gulf or Ocean
5710: Atlantic Ocean
6120: Mangrove Swamp
6170: Mixed Wetland Hardwoods
6510: Tidal Flats
8100: Transportation
8140: Roads and Highways
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
Islamorada Village of Islands WMP
Figure 4 FLUCCS Map - Lower Matecumbe Key
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1810
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6170
1180
8140
6510
Land Use
1110: Fixed Single Family Units
1180: Rural Residential
1190: Low Density Under Construction
1210: Fixed Single Family Units
1320: Mobile Home Units
1330: Multiple Dwelling Units, Low Rise
1340: Multiple Dwelling Units, High Rise
1400: Commercial and Services
1700: Institutional
1810: Swimming Beach
1820: Golf Course
1840: Marinas and Fish Camps
1850: Parks and Zoos
4200: Upland Hardwood Forests
4370: Australian Pine
5120: Channelized Waterways, Canals
5300: Reservoirs
5410: Embayments Opening Directly to Gulf or Ocean
5420: Embayments Not Opening Directly to Gulf or Ocean
5710: Atlantic Ocean
6120: Mangrove Swamp
6170: Mixed Wetland Hardwoods
6510: Tidal Flats
8140: Roads and Highways
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
Islamorada Village of Islands WMP
Figure 4 FLUCCS Map - Upper Matecumbe Key
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Page 2 of 4
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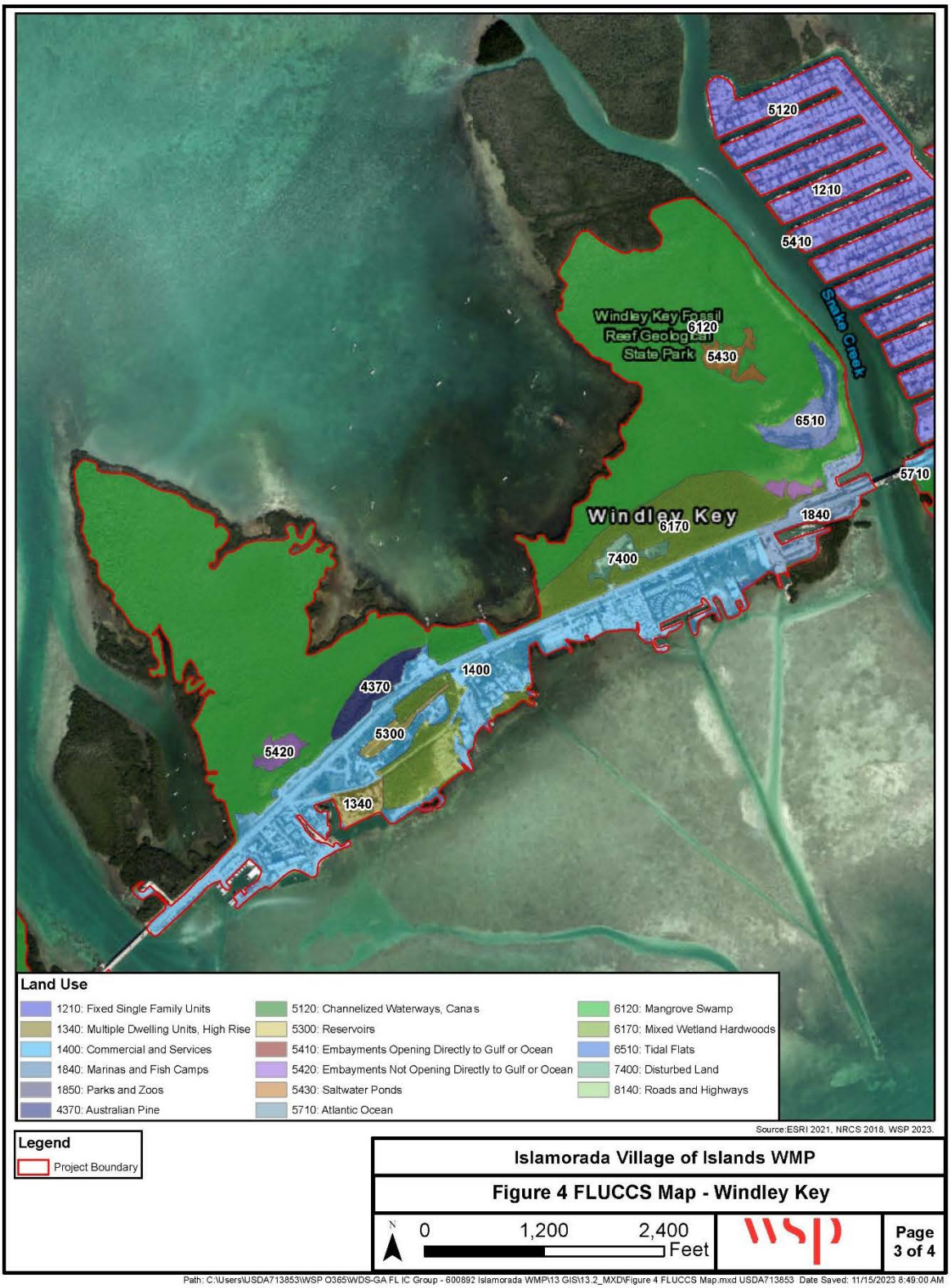
5120
1210
5410
Snake Creek
Windley Key Fossil Reef Geological State Park
6120
5430
6510
5710
Windley Key
6170
1840
7400
1400
4370
5300
5420
1340
Land Use
1210: Fixed Single Family Units
1340: Multiple Dwelling Units, High Rise
1400: Commercial and Services
1840: Marinas and Fish Camps
1850: Parks and Zoos
4370: Australian Pine
5120: Channelized Waterways, Canals
5300: Reservoirs
5410: Embayments Opening Directly to Gulf or Ocean
5420: Embayments Not Opening Directly to Gulf or Ocean
5430: Saltwater Ponds
5710: Atlantic Ocean
6120: Mangrove Swamp
6170: Mixed Wetland Hardwoods
6510: Tidal Flats
7400: Disturbed Land
8140: Roads and Highways
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
Islamorada Village of Islands WMP
Figure 4 FLUCCS Map - Windley Key
N
0
1,200
2,400
Feet
Page 3 of 4
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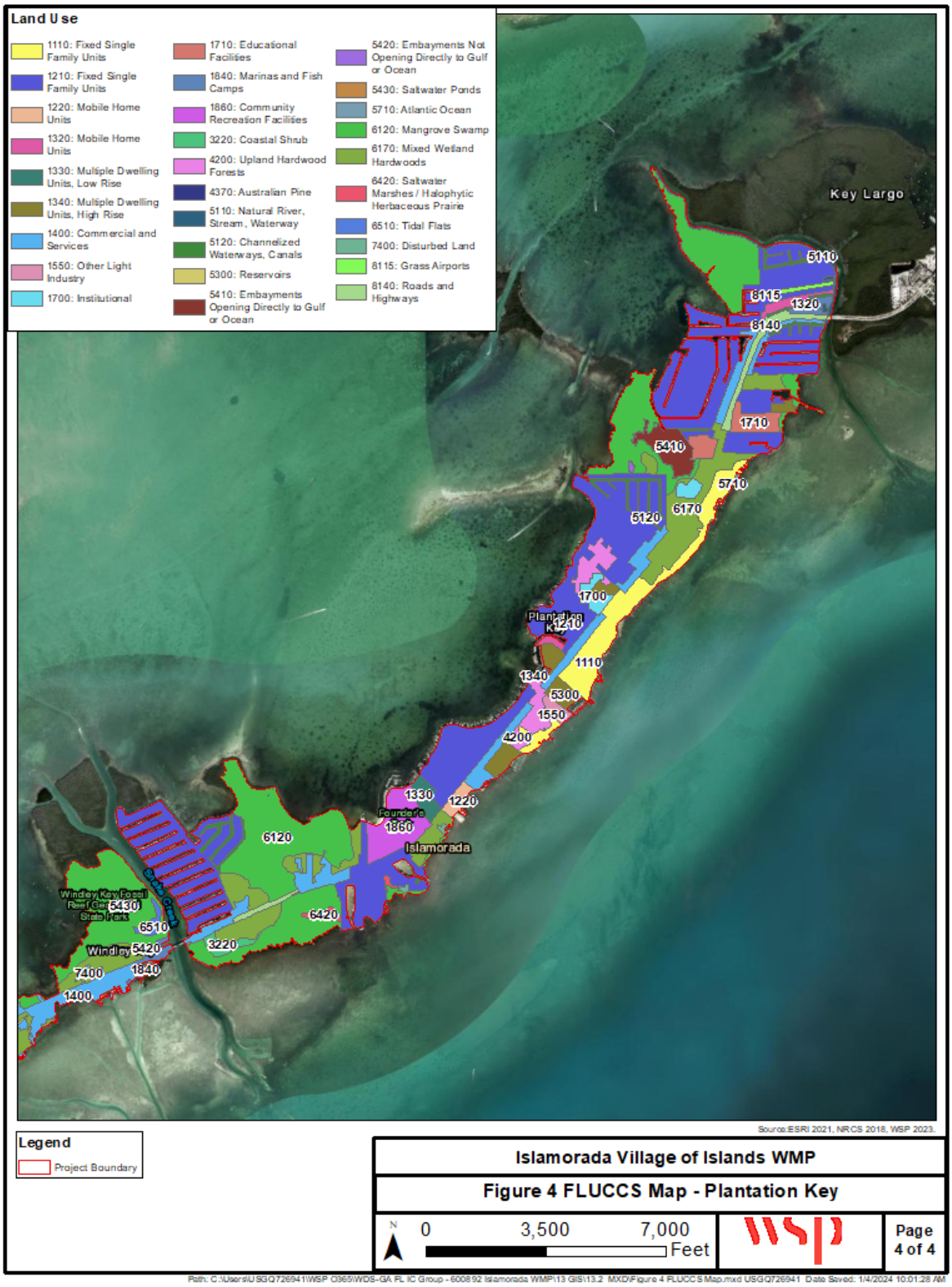
Land Use
1110: Fixed Single Family Units
1210: Fixed Single Family Units
1220: Mobile Home Units
1320: Mobile Home Units
1330: Multiple Dwelling Units, Low Rise
1340: Multiple Dwelling Units, High Rise
1400: Commercial and Services
1550: Other Light Industry
1700: Institutional
1710: Educational Facilities
1840: Marinas and Fish Camps
1860: Community Recreation Facilities
3220: Coastal Shrub
4200: Upland Hardwood Forests
4370: Australian Pine
5110: Natural River, Stream, Waterway
5120: Channelized Waterways, Canals
5300: Reservoirs
5410: Embayments Opening Directly to Gulf or Ocean
5420: Embayments Not Opening Directly to Gulf or Ocean
5430: Saltwater Ponds
5710: Atlantic Ocean
6120: Mangrove Swamp
6170: Mixed Wetland Hardwoods
6420: Saltwater Marshes / Halophytic Herbaceous Prairie
6510: Tidal Flats
7400: Disturbed Land
8115: Grass Airports
8140: Roads and Highways
Key Largo
Plantation Key
Islamorada
Windley Key Fossil Reef Geo. State Park
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Project Boundary
Islamorada Village of Islands WMP
Figure 4 FLUCCS Map - Plantation Key
N
0
3,500
7,000
Feet
Page 4 of 4
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Lignumvitae Key Botanical State Park
Lignumvitae Key
Gulf of Mexico
B070
B071
Indian Key Historic State Park
B072
B091
B092
B073
B074
B075
B090
B076
B077
B089
B078
B087
Lower Matecumbe Key
B088
B086
B085
B084
B082
B083
B079
B081
B080
San Pedro Underwater Archaeological Preserve State Park
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
ICPR Basins
Islamorada Village of Islands WMP
Figure 5 Basin Map - Lower Matecumbe Key
N
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3,500
7,000
Feet
Page 1 of 4
Path: C:\Users\USGQ726941\WSP C365\WDS-GA FL IC Group - 13.2_MXD\Figure 5 Basin Map.mxd USGQ726941 Date Saved: 11/15/2023 11:47:10 AM


B042
B043
B047
B045
B046
B044
B048
B093
B067
B049
B068
B066
B051
B050
B052
B065
Shell Key
B064
B053
Matecumbe Key
B063
B054
B055
B057
B062
B056
B058
B061
B059
B060
B069
B070
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
ICPR Basins
Islamorada Village of Islands WMP
Figure 5 Basin Map - Upper Matecumbe Key
N
0
3,500
7,000
Feet
Page 2 of 4
Path: C:\Users\USGQ726941\WSP C365\WDS-GA FL IC Group - 13.2_MXD\Figure 5 Basin Map.mxd USGQ726941 Date Saved: 11/15/2023 11:47:10 AM


Windley Key Fossil
Reef Geological
State Park
B040
Windley Key
Snake Creek
B042
B047
B045
B044
B046
B043
B033
B067
B068
B049
B025
B024
B023
B022
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
ICPR Basins
Islamorada Village of Islands WMP
Figure 5 Basin Map - Windley Key
N
0
1,200
2,400
Feet
Page
3 of 4
Path: C:\Users\USGQ726941\WSP C365\WDS-GA FL IC Group - 13.2_MXD\Figure 5 Basin Map.mxd USGQ726941 Date Saved: 11/15/2023 11:47:10 AM

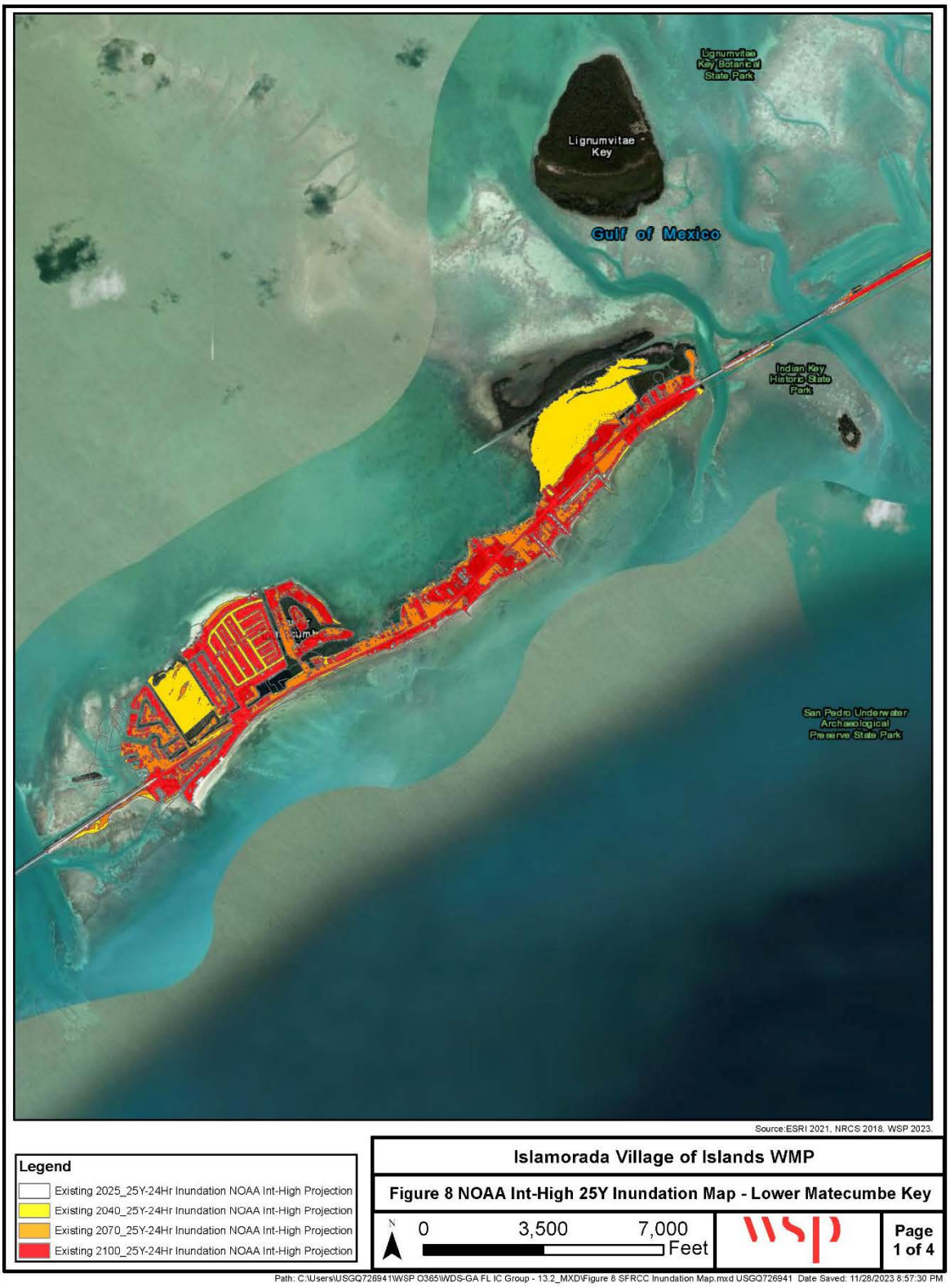

Key Largo
B001
B002
B003
B004
B005
B006
B007
B008
B009
B010
B011
B012
B013
B014
B015
B016
B017
B018
B019
B020
B021
B022
B023
B024
B025
B026
B027
B028
B029
B030
B031
B032
B033
B034
B035
B036
B037
B038
B039
Plantation
Islamorada
Windley Key
Windley Key Fossil Reef Geological
B040
B041
B042
B043
B044
B047
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
ICPR Basins
Islamorada Village of Islands WMP
Figure 5 Basin Map - Plantation Key
N
0
3,500
7,000
Feet
Page 4 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 5 Basin Map.mxd USGQ726941 Date Saved: 11/15/2023 11:47:10 AM


Lignumvitae Key Botanical State Park
Lignumvitae Key
Gulf of Mexico
NA070
NA071
Indian Key Historic State Park
NA091
NA092
NA072
NA073
NA074
NA090
NA075
NA076
NA089
NA077
NA088
NA078
NA087
NA086
NA085
NA084
NA083
NA082
NA081
NA080
NA079
San Pedro Underwater Archaeological Preserve State Park
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing Nodes
Boundary Condition
Overland Flow Weirs
Existing Pipes
ICPR Basins
Islamorada Village of Islands WMP
Figure 6 Node-Link Map - Lower Matecumbe Key
N
0
3,500
7,000
Feet
Page 1 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 6 Node-Link Map.mxd USGQ726941 Date Saved: 11/17/2023 7:06:59 AM

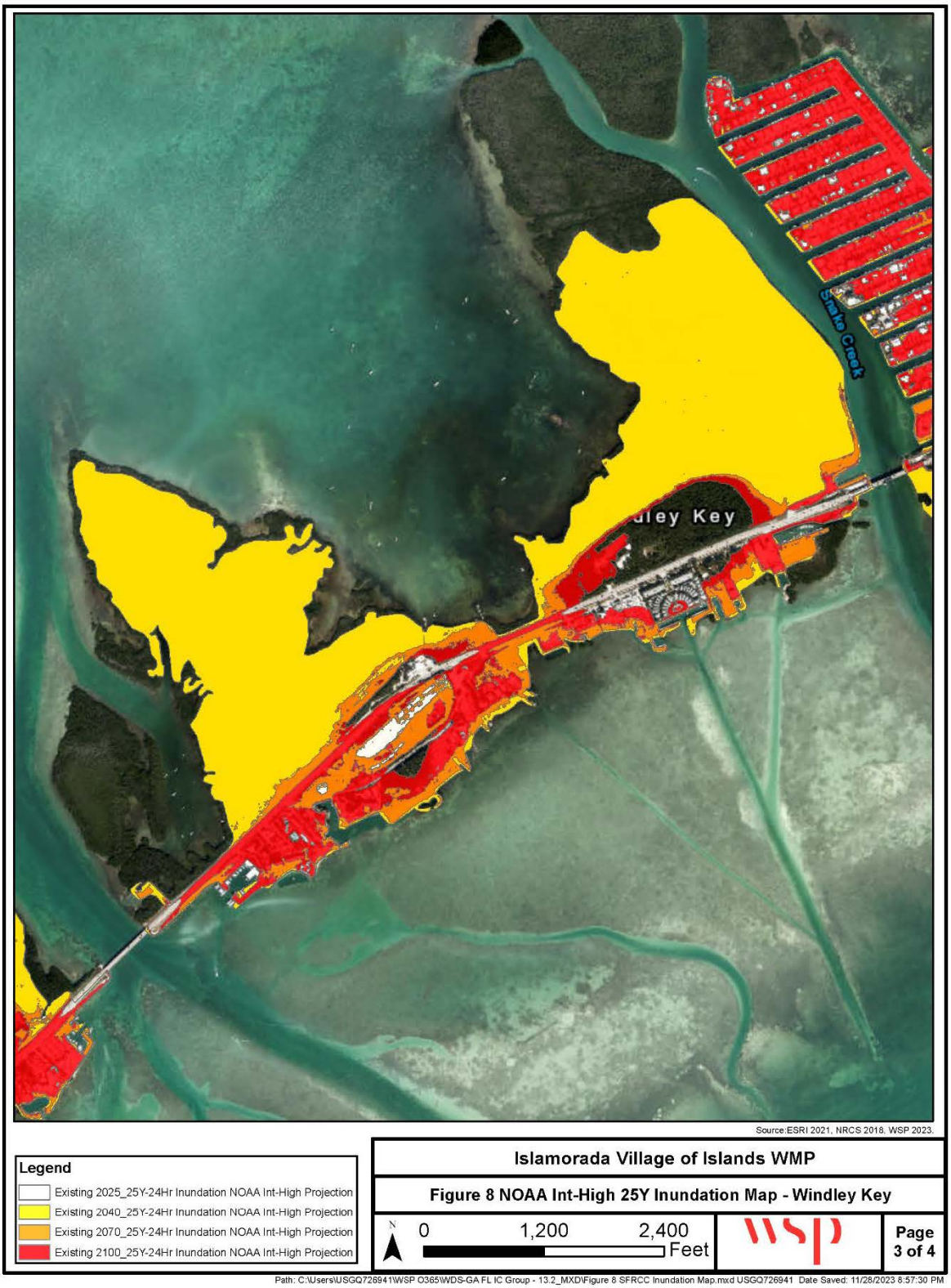

NA045
NA044
NA046
NA047
NA048
NA043
NA067
NA049
NA050
NA068
NA066
NA051
NA065
NA052
Shell Key
NA064
Upper Matecumbe Key
NA063
NA053
NA054
NA055
NA062
NA057
NA056
NA061
NA058
NA059
NA060
NA070
NA069
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing Nodes
Boundary Condition
Overland Flow Weirs
Existing Pipes
ICPR Basins
Islamorada Village of Islands WMP
Figure 6 Node-Link Map - Upper Matecumbe Key
N
0
3,500
7,000
Feet
Page 2 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 6 Node-Link Map.mxd USGQ726941 Date Saved: 11/17/2023 7:06:59 AM

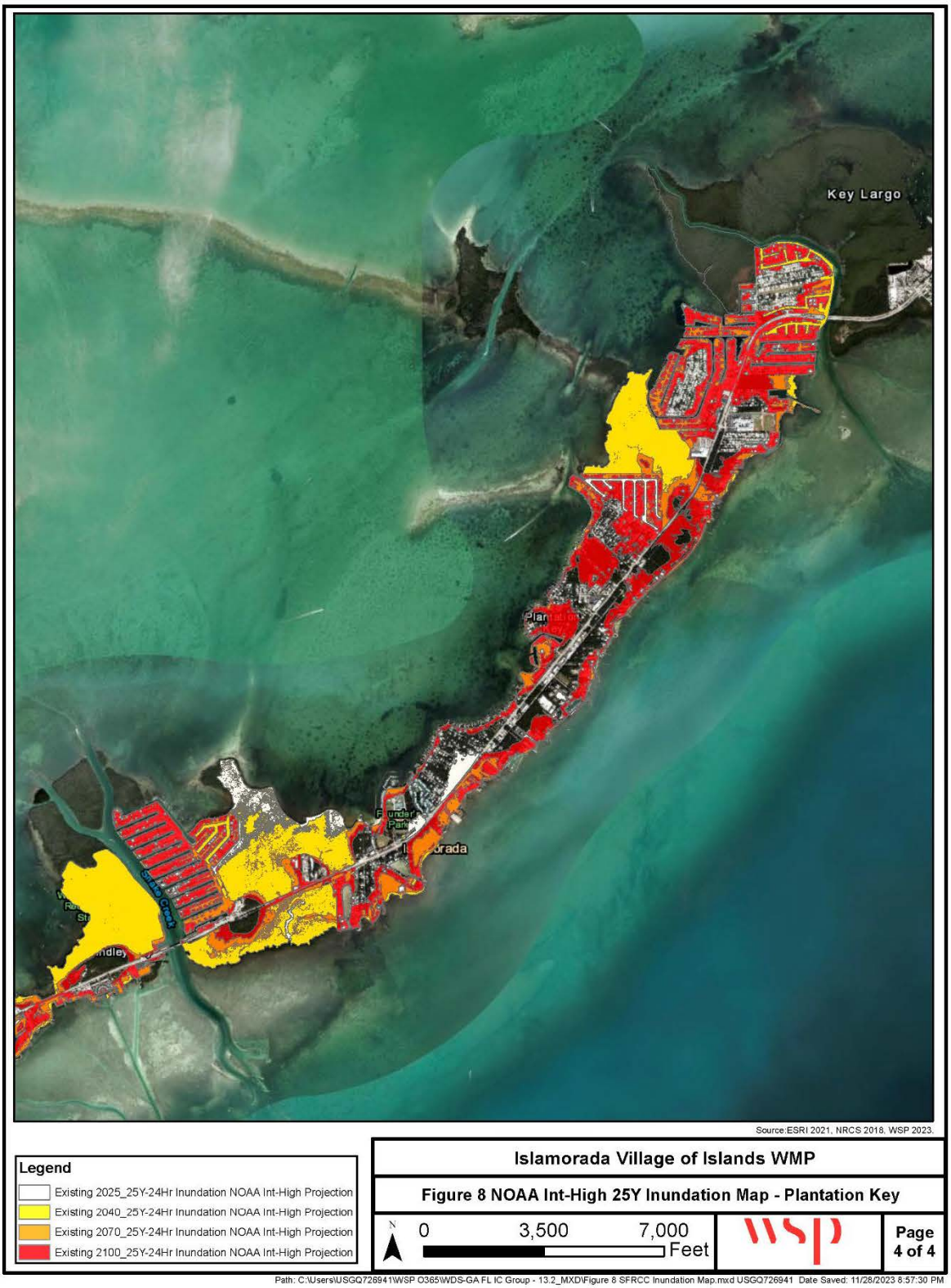

Windley Key Fossil Reef Geological State Park
Windley Key
NA040
NA042
NA041
NA045
NA044
NA046
NA047
NA048
NA093
NA049
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing Nodes
Boundary Condition
Overland Flow Weirs
Existing Pipes
ICPR Basins
Islamorada Village of Islands WMP
Figure 6 Node-Link Map - Windley Key
N
0
1,200
2,400
Feet
Page 3 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 6 Node-Link Map.mxd USGQ726941 Date Saved: 11/17/2023 7:06:59 AM


Key Largo
L-5050P
NA001
NA002
NA003
NA004
NA005
NA006
NA007
NA008
NA009
NA010
NA011
NA012
NA013
NA014
NA015
NA016
NA017
NA018
NA019
NA020
NA021
NA022
NA023
NA024
NA025
NA026
NA027
NA028
NA029
NA030
NA031
NA032
NA033
NA034
NA035
NA036
NA037
NA038
NA039
NA040
NA041
NA042
NA043
NA044
NA045
Plantation Key
Windley Key Fossil Reef Geological State Park
Windley Key
Islamorada
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing Nodes
Boundary Condition
Overland Flow Weirs
Existing Pipes
ICPR Basins
Islamorada Village of Islands WMP
Figure 6 Node-Link Map - Plantation Key
N
0
3,500
7,000
Feet
Page 4 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 6 Node-Link Map.mxd USGQ726941 Date Saved: 11/17/2023 7:06:59 AM


Lignumvitae Key Botanical State Park
Lignumvitae Key
Gulf of Mexico
Indian Key Historic State Park
San Pedro Underwater Archaeological Preserve State Park
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2070_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2100_25Y-24Hr Inundation NOAA Int-High Projection
Islamorada Village of Islands WMP
Figure 8 NOAA Int-High 25Y Inundation Map - Lower Matecumbe Key
N
0
3,500
7,000
Feet
Page 1 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 8 SFRCC Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:57:30 PM

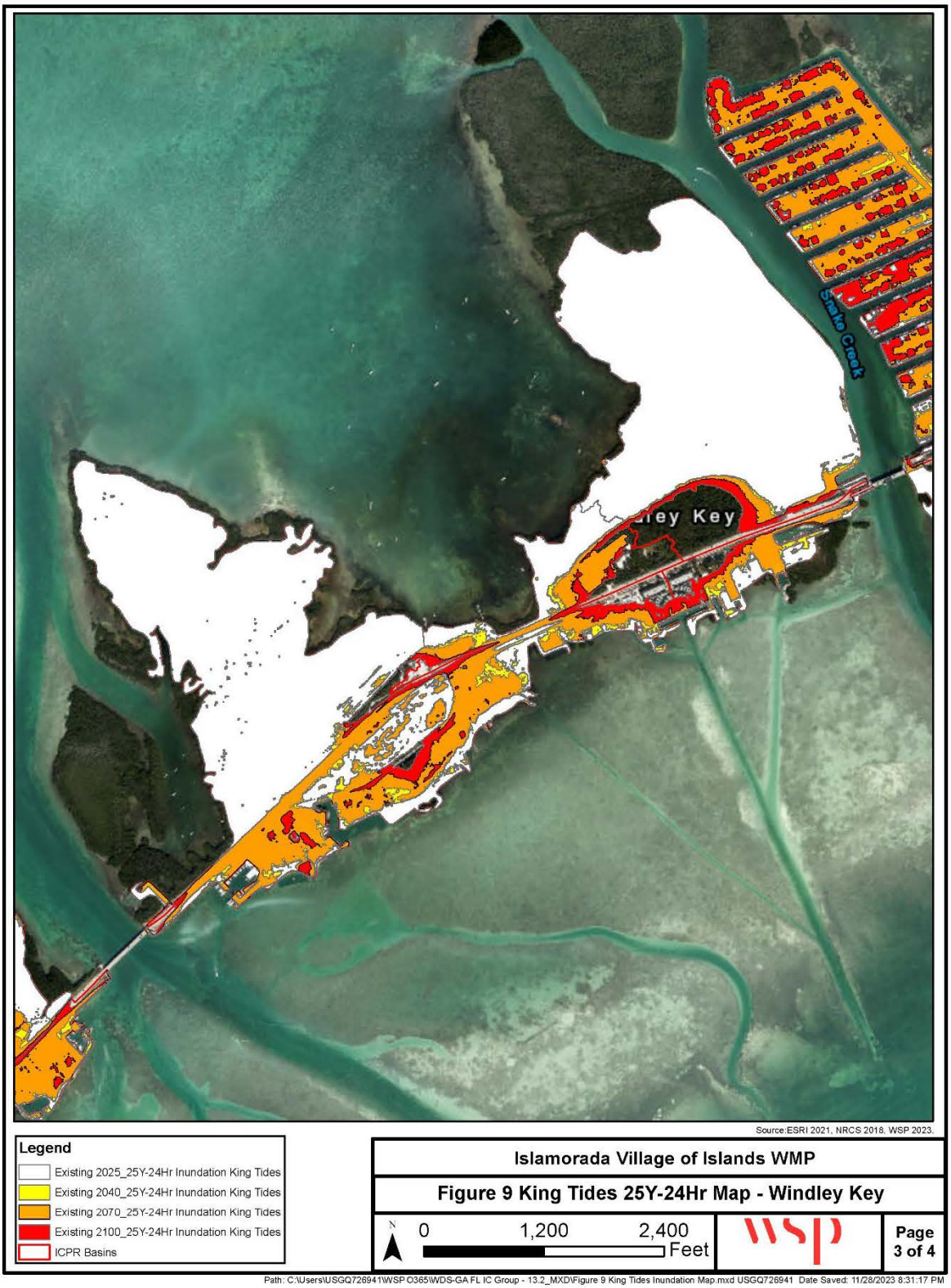

Shell Key
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2070_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2100_25Y-24Hr Inundation NOAA Int-High Projection
Islamorada Village of Islands WMP
Figure 8 NOAA Int-High 25Y Inundation Map - Upper Matecumbe Key
N
0
3,500
7,000
Feet
Page 2 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 8 SFRCC Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:57:30 PM


Snake Creek
uley Key
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2070_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2100_25Y-24Hr Inundation NOAA Int-High Projection
Islamorada Village of Islands WMP
Figure 8 NOAA Int-High 25Y Inundation Map - Windley Key
N
0
1,200
2,400
Feet
Page 3 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 8 SFRCC Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:57:30 PM

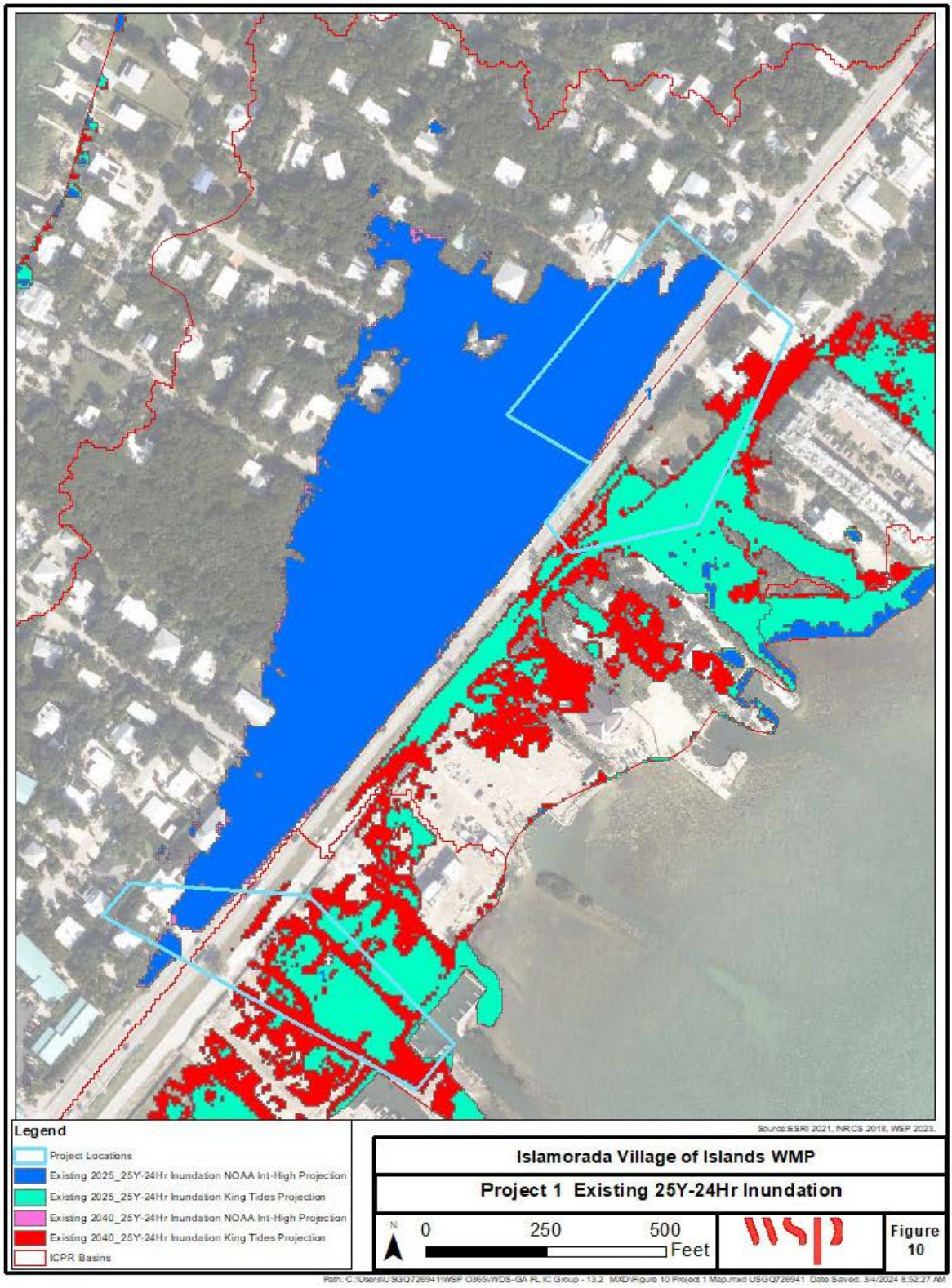

Key Largo
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2070_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2100_25Y-24Hr Inundation NOAA Int-High Projection
Islamorada Village of Islands WMP
Figure 8 NOAA Int-High 25Y Inundation Map - Plantation Key
N
0
3,500
7,000
Feet
Page 4 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 8 SFRCC Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:57:30 PM


Lignumvitae Key Botanical State Park
Lignumvitae Key
Gulf of Mexico
Indian Key Historic State Park
San Pedro Underwater Archaeological Preserve State Park
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing 2025_25Y-24Hr Inundation King Tides
Existing 2040_25Y-24Hr Inundation King Tides
Existing 2070_25Y-24Hr Inundation King Tides
Existing 2100_25Y-24Hr Inundation King Tides
ICPR Basins
Islamorada Village of Islands WMP
Figure 9 King Tides 25Y-24Hr Map - Lower Matecumbe Key
N
0
3,500
7,000
Feet
Page 1 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 9 King Tides Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:31:17 PM


Shell Key
Source:ESRI 2021, NRCS 2018, WSP 2023.
Legend
Existing 2025_25Y-24Hr Inundation King Tides
Existing 2040_25Y-24Hr Inundation King Tides
Existing 2070_25Y-24Hr Inundation King Tides
Existing 2100_25Y-24Hr Inundation King Tides
ICPR Basins
Islamorada Village of Islands WMP
Figure 9 King Tides 25Y-24Hr Map - Upper Matecumbe Key
N
0
3,500
7,000
Feet
Page 2 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 9 King Tides Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:31:17 PM


Snake Creek
Legend
Existing 2025_25Y-24Hr Inundation King Tides
Existing 2040_25Y-24Hr Inundation King Tides
Existing 2070_25Y-24Hr Inundation King Tides
Existing 2100_25Y-24Hr Inundation King Tides
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Figure 9 King Tides 25Y-24Hr Map - Windley Key
N
0
1,200
2,400
Feet
Page 3 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 9 King Tides Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:31:17 PM


Key Largo
Legend
Existing 2025_25Y-24Hr Inundation King Tides
Existing 2040_25Y-24Hr Inundation King Tides
Existing 2070_25Y-24Hr Inundation King Tides
Existing 2100_25Y-24Hr Inundation King Tides
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Figure 9 King Tides 25Y-24Hr Map - Plantation Key
N
0
3,500
7,000
Feet
Page 4 of 4
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2_MXD\Figure 9 King Tides Inundation Map.mxd USGQ726941 Date Saved: 11/28/2023 8:31:17 PM


Legend
Project Locations
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2025_25Y-24Hr Inundation King Tides Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 1 Existing 25Y-24Hr Inundation
N
0
250
500
Feet
Figure 10
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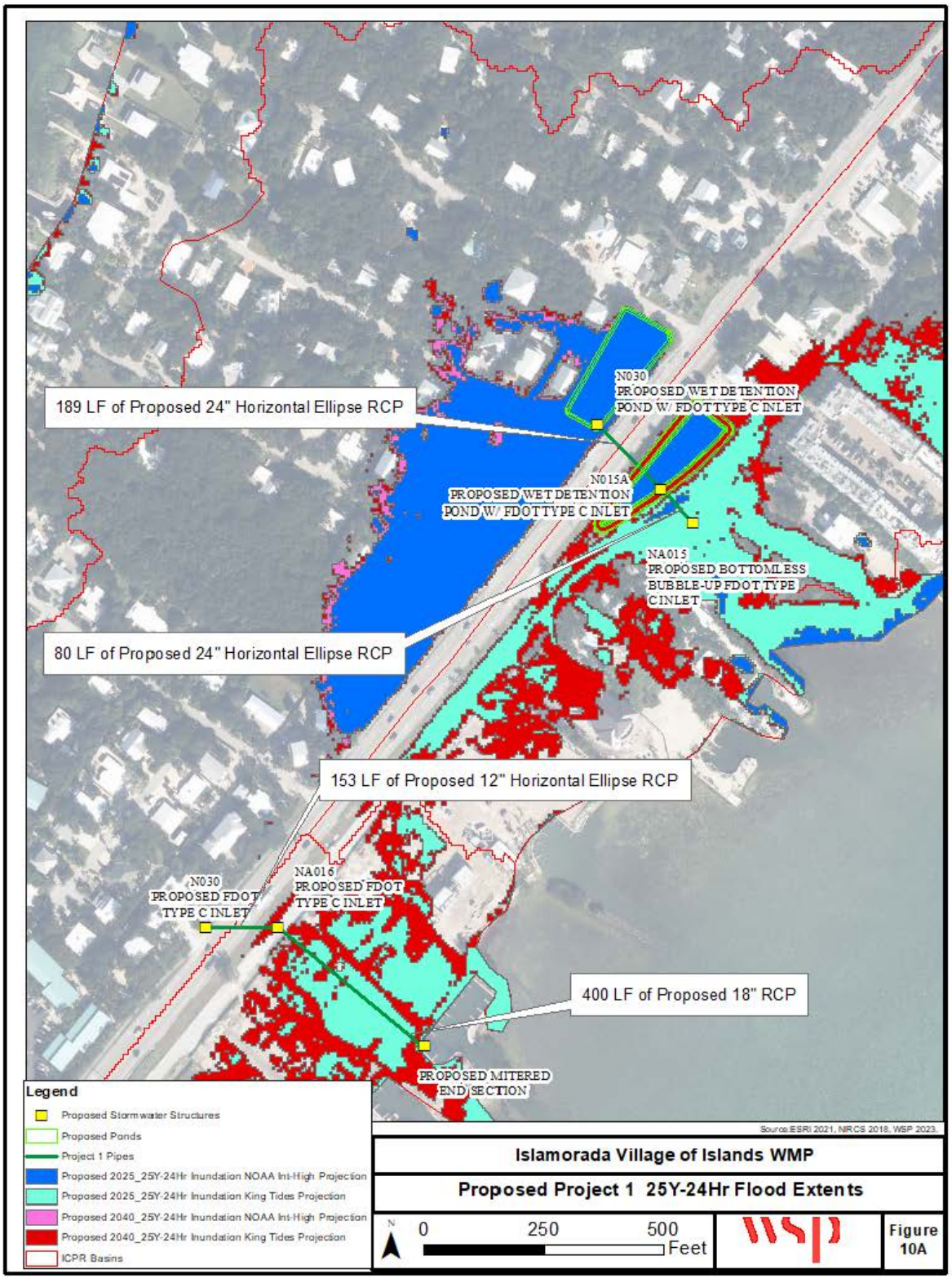
189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
N030
PROPOSED FDOT
TYPE C INLET
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2025_25Y-24Hr Inundation NOAA Int-High Projection
Proposed 2025_25Y-24Hr Inundation King Tides Projection
Proposed 2040_25Y-24Hr Inundation NOAA Int-High Projection
Proposed 2040_25Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Proposed Project 1 25Y-24Hr Flood Extents
N
0
250
500
Feet
Figure
10A
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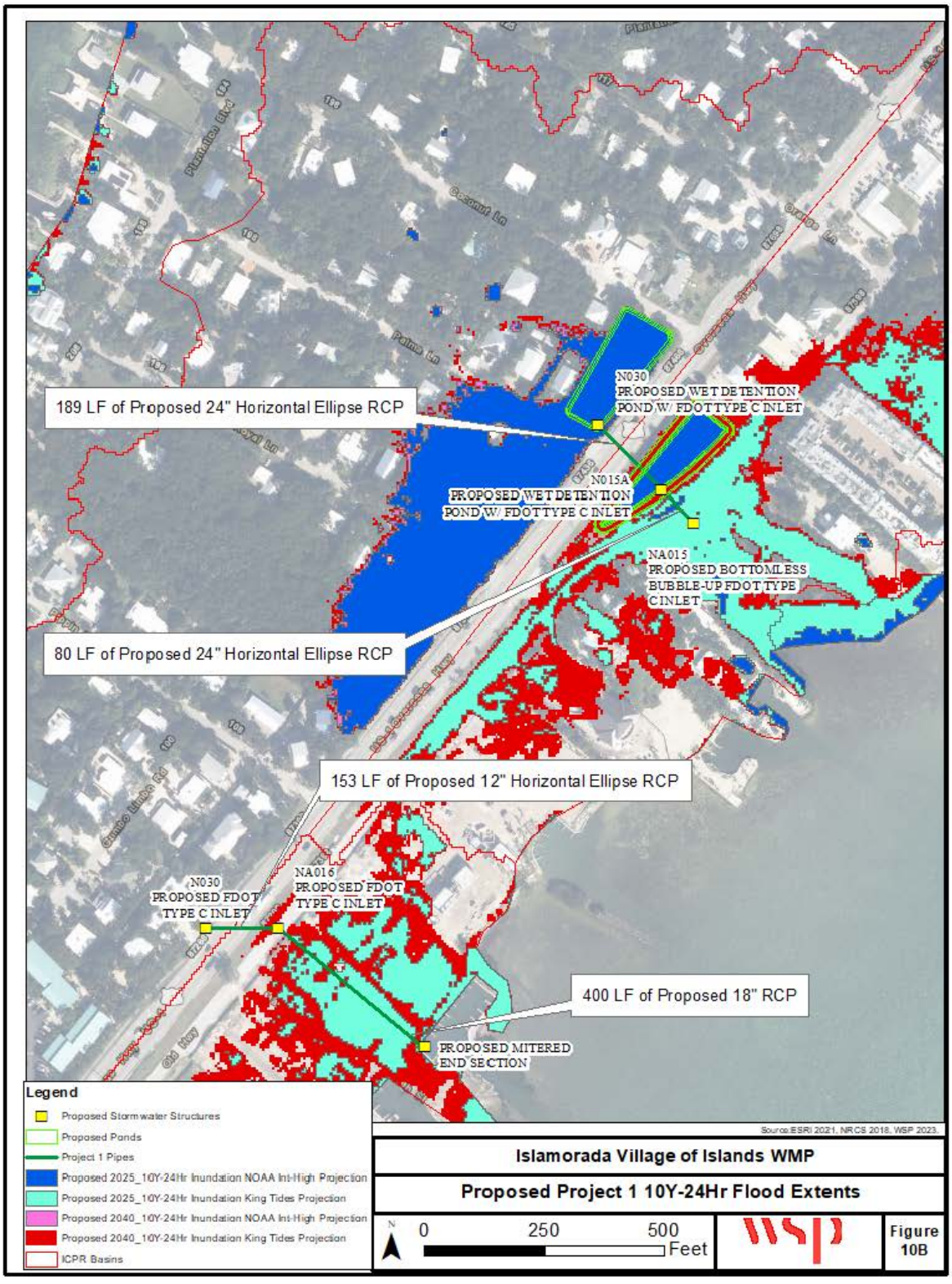

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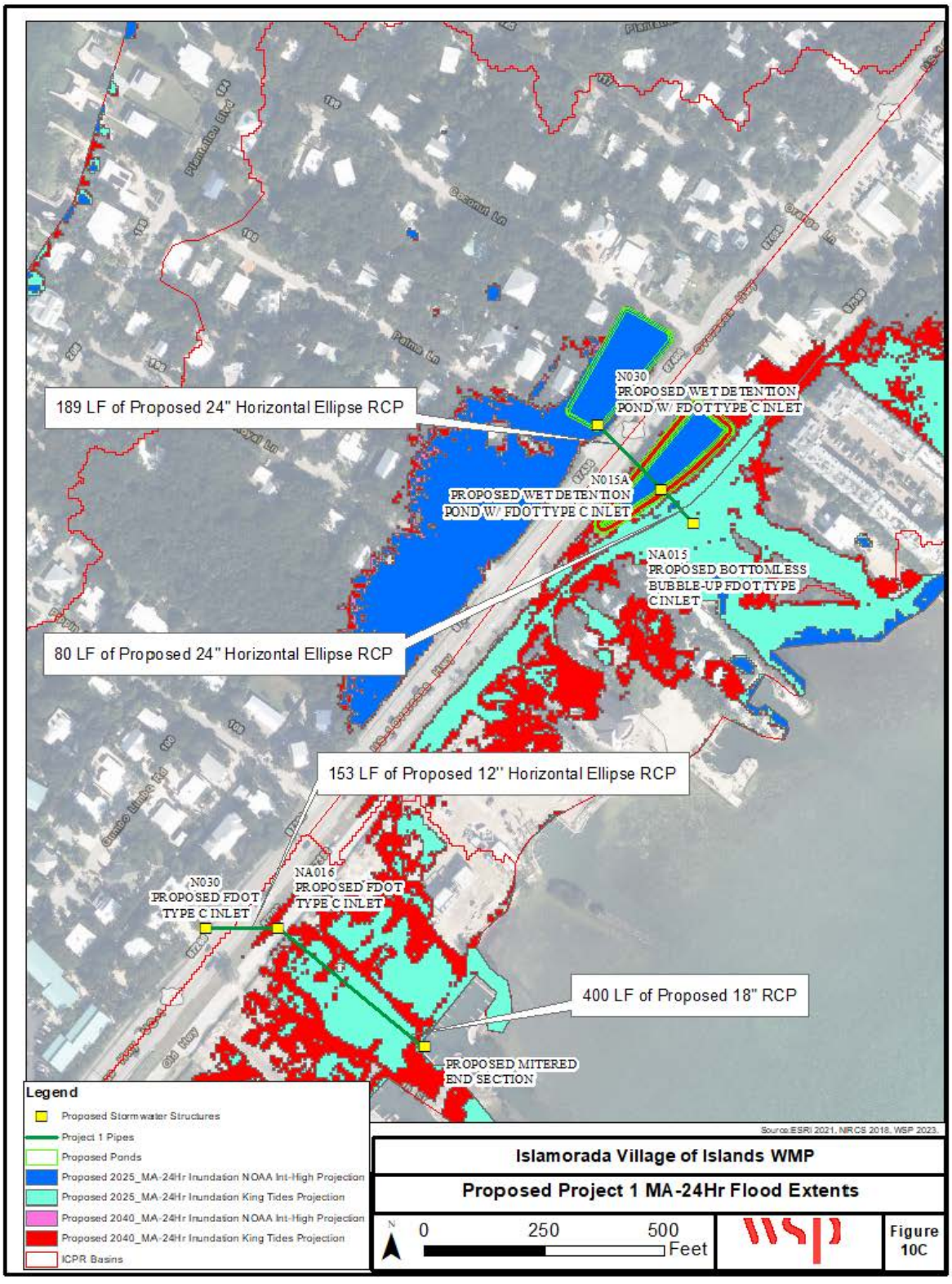

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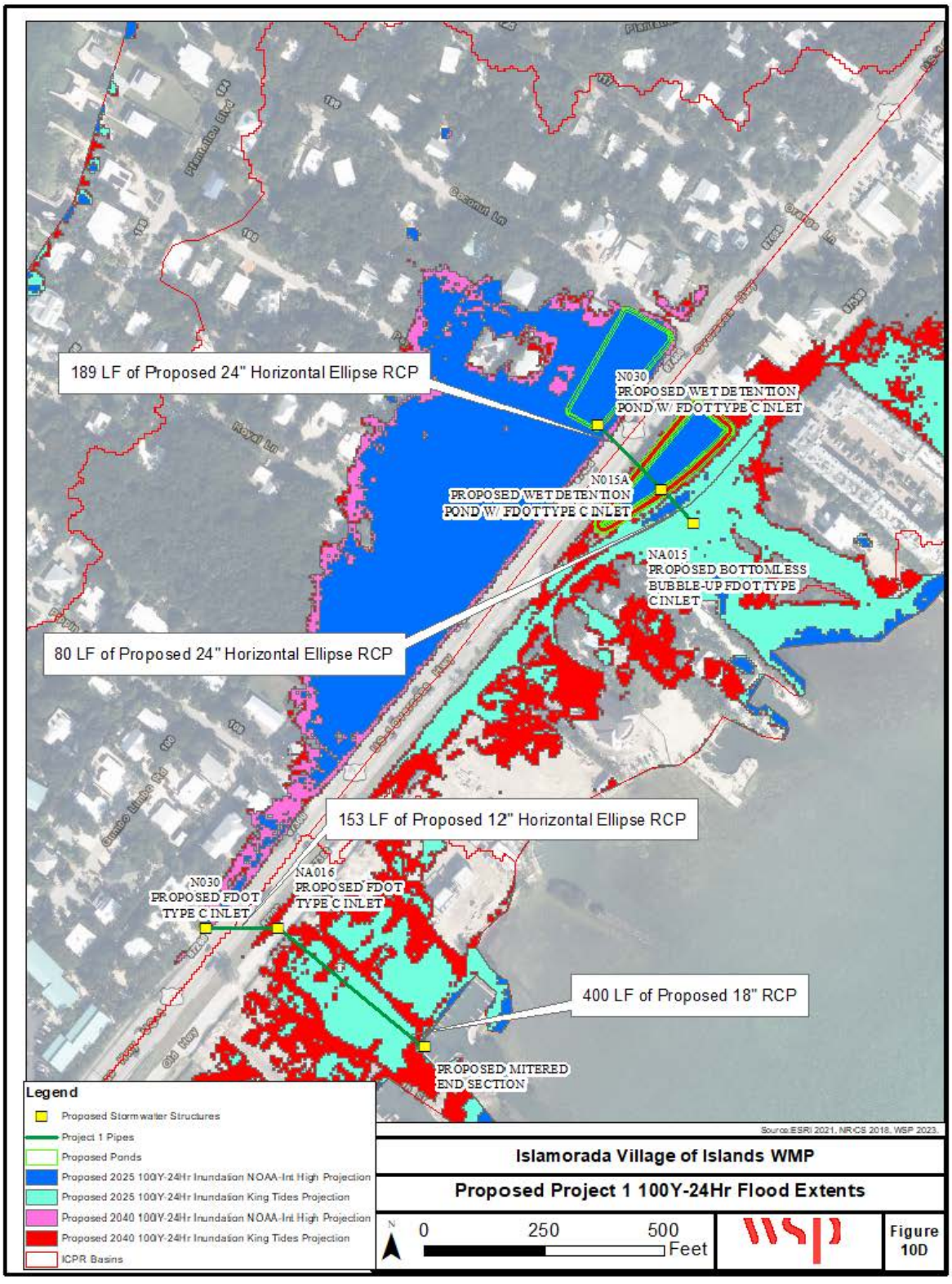
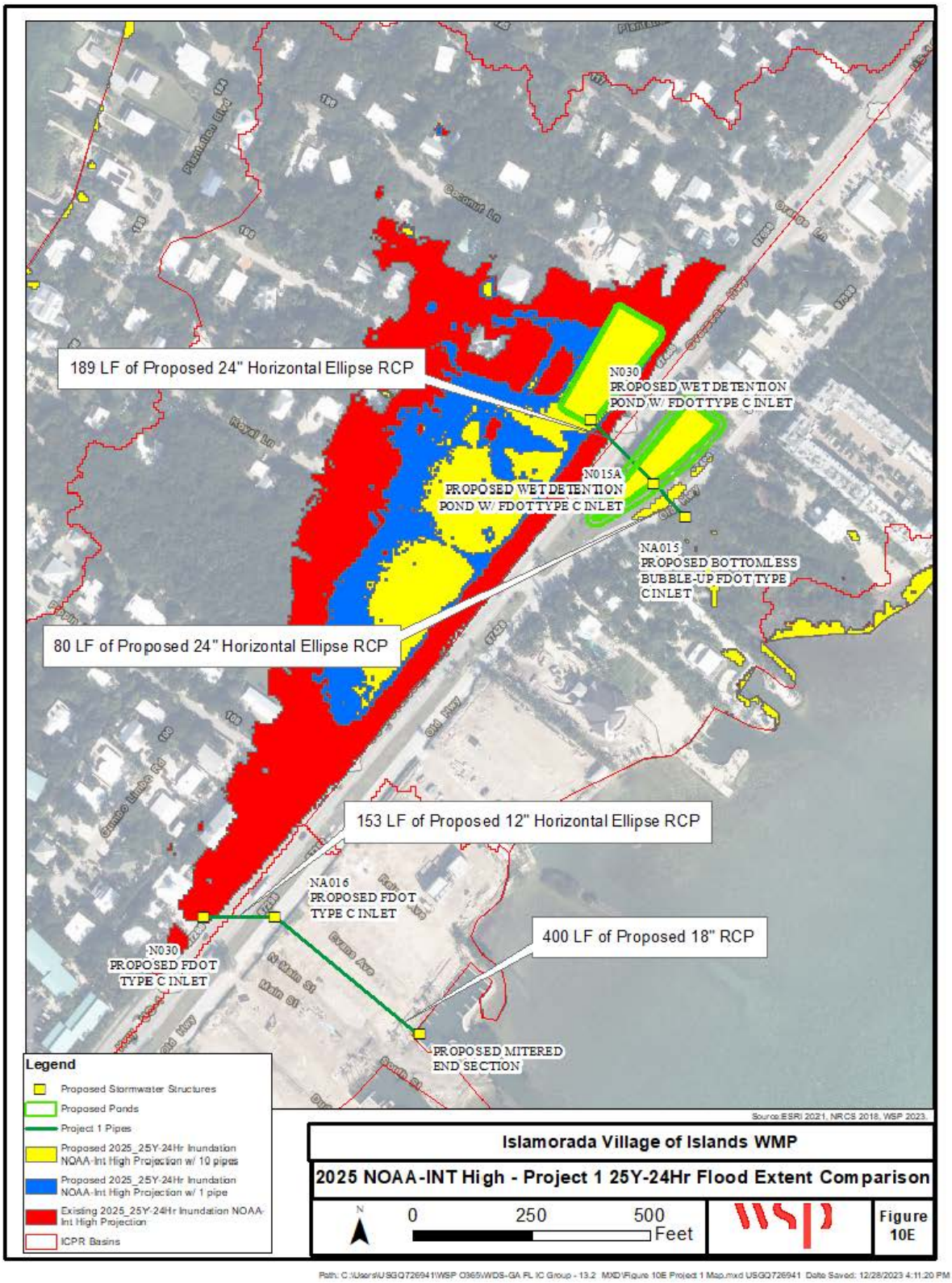

189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
N030
PROPOSED FDOT
TYPE C INLET
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Project 1 Pipes
Proposed Ponds
Proposed 2025 100Y-24Hr Inundation NOAA-Int High Projection
Proposed 2025 100Y-24Hr Inundation King Tides Projection
Proposed 2040 100Y-24Hr Inundation NOAA-Int High Projection
Proposed 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Proposed Project 1 100Y-24Hr Flood Extents
N
0
250
500
Feet
Figure
10D
Path: C:\Users\USGQ726941\WSP O365\WDS-GA FL IC Group - 13.2 MXD\Figure 10D Project 1 Map.mxd USGQ726941 Date Saved: 3/4/2024 9:47:49 AM


189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
N030
PROPOSED FDOT
TYPE C INLET
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2025_25Y-24Hr Inundation NOAA-Int High Projection w/ 10 pipes
Proposed 2025_25Y-24Hr Inundation NOAA-Int High Projection w/ 1 pipe
Existing 2025_25Y-24Hr Inundation NOAA-Int High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 NOAA-INT High - Project 1 25Y-24Hr Flood Extent Comparison
N
0
250
500
Feet
Figure
10E
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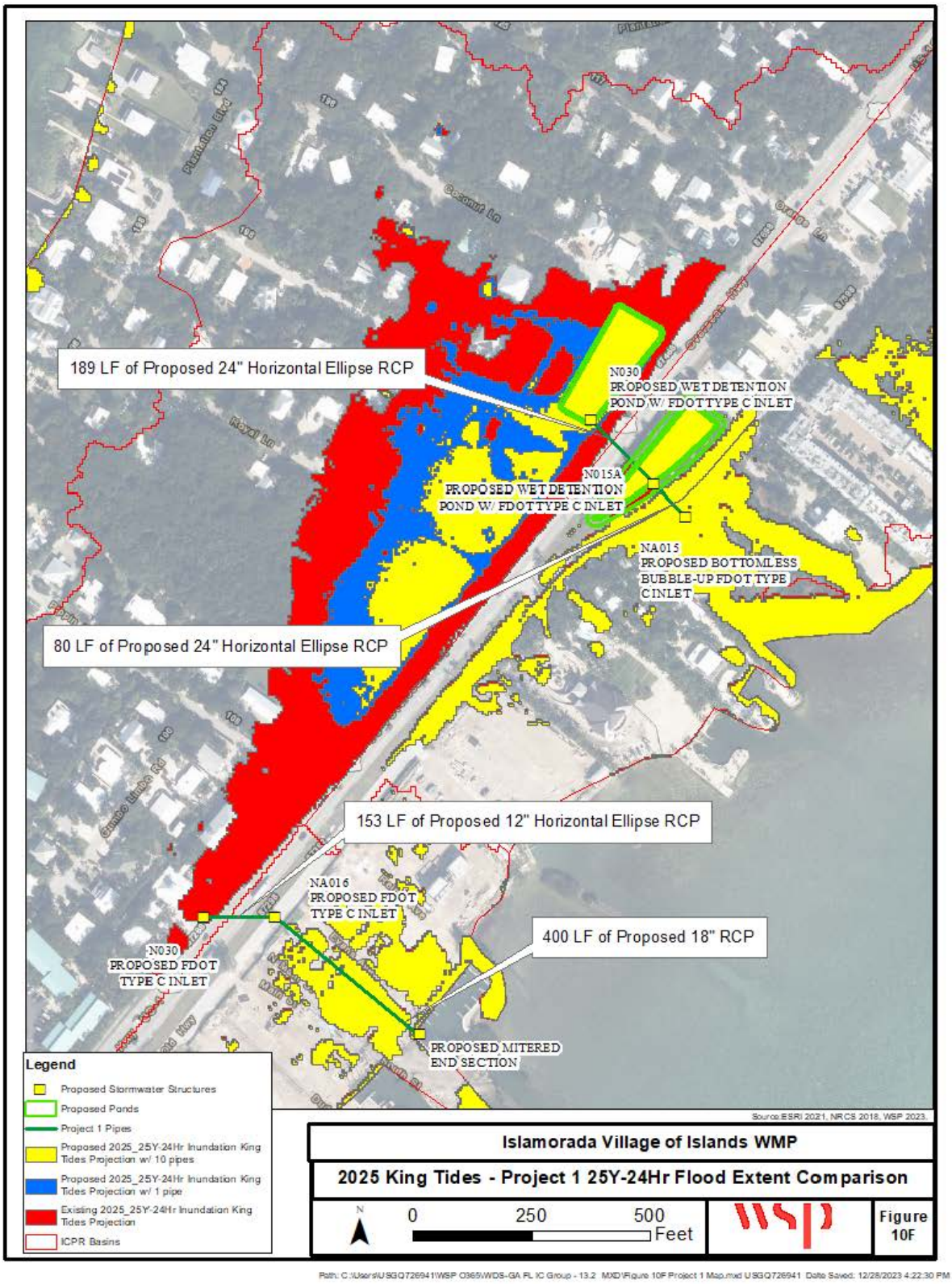
189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
N030
PROPOSED FDOT
TYPE C INLET
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2025_25Y-24Hr Inundation King Tides Projection w/ 10 pipes
Proposed 2025_25Y-24Hr Inundation King Tides Projection w/ 1 pipe
Existing 2025_25Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 King Tides - Project 1 25Y-24Hr Flood Extent Comparison
N
0
250
500
Feet
Figure
10F
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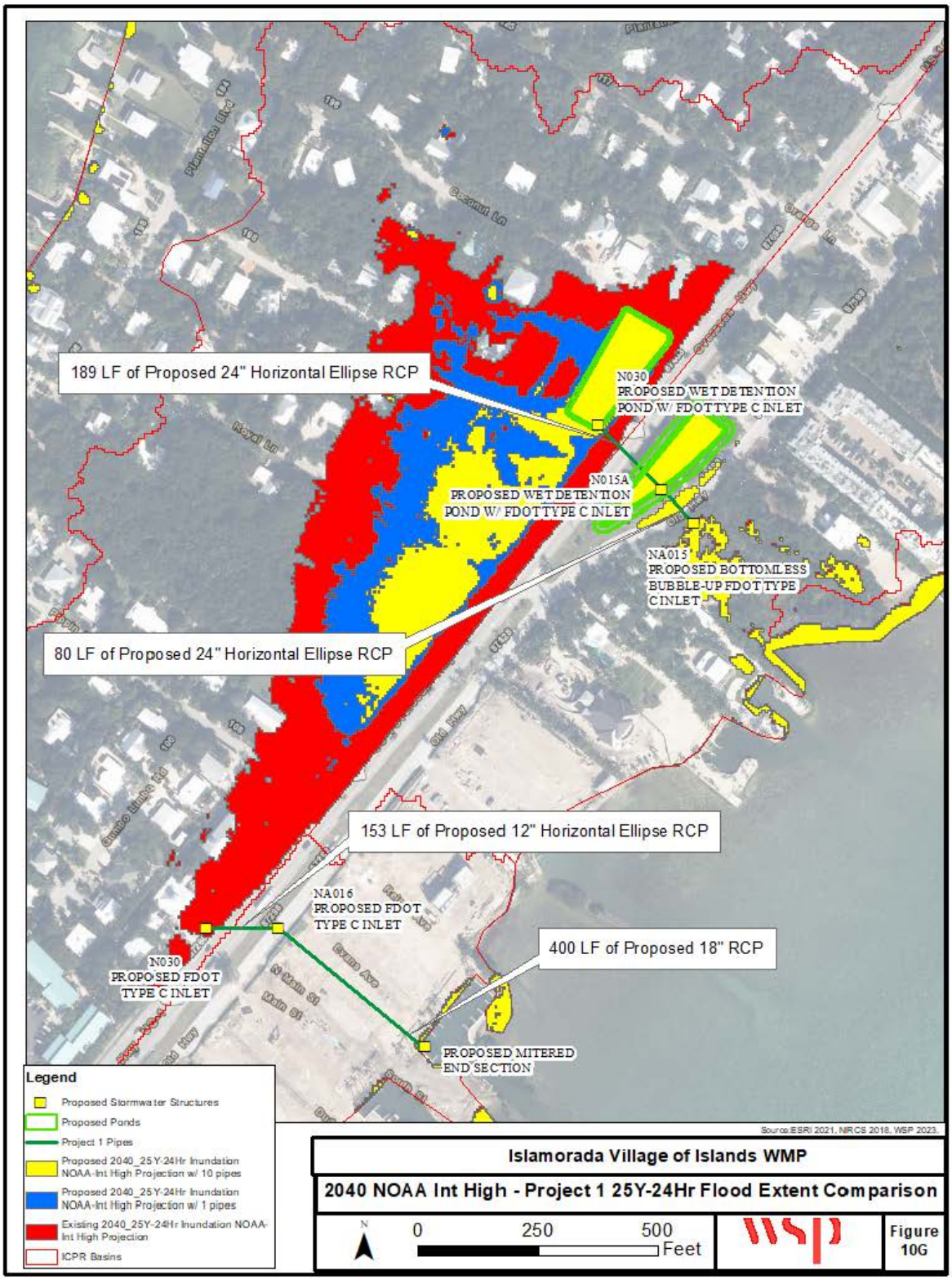
189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
N030
PROPOSED FDOT
TYPE C INLET
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2040_25Y-24Hr Inundation NOAA-Int High Projection w/ 10 pipes
Proposed 2040_25Y-24Hr Inundation NOAA-Int High Projection w/ 1 pipes
Existing 2040_25Y-24Hr Inundation NOAA-Int High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2040 NOAA Int High - Project 1 25Y-24Hr Flood Extent Comparison
N
0
250
500
Feet
Figure
10G
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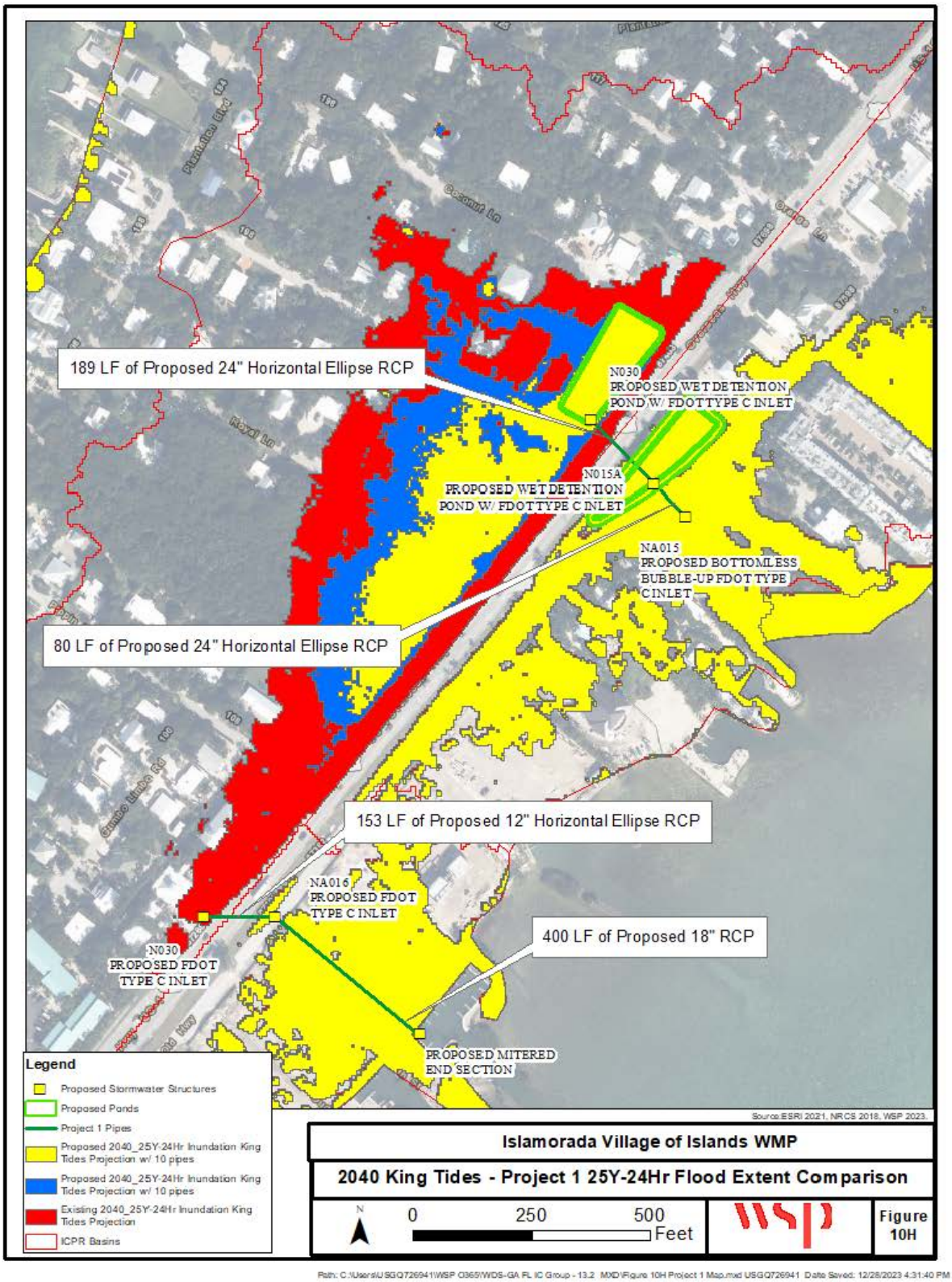

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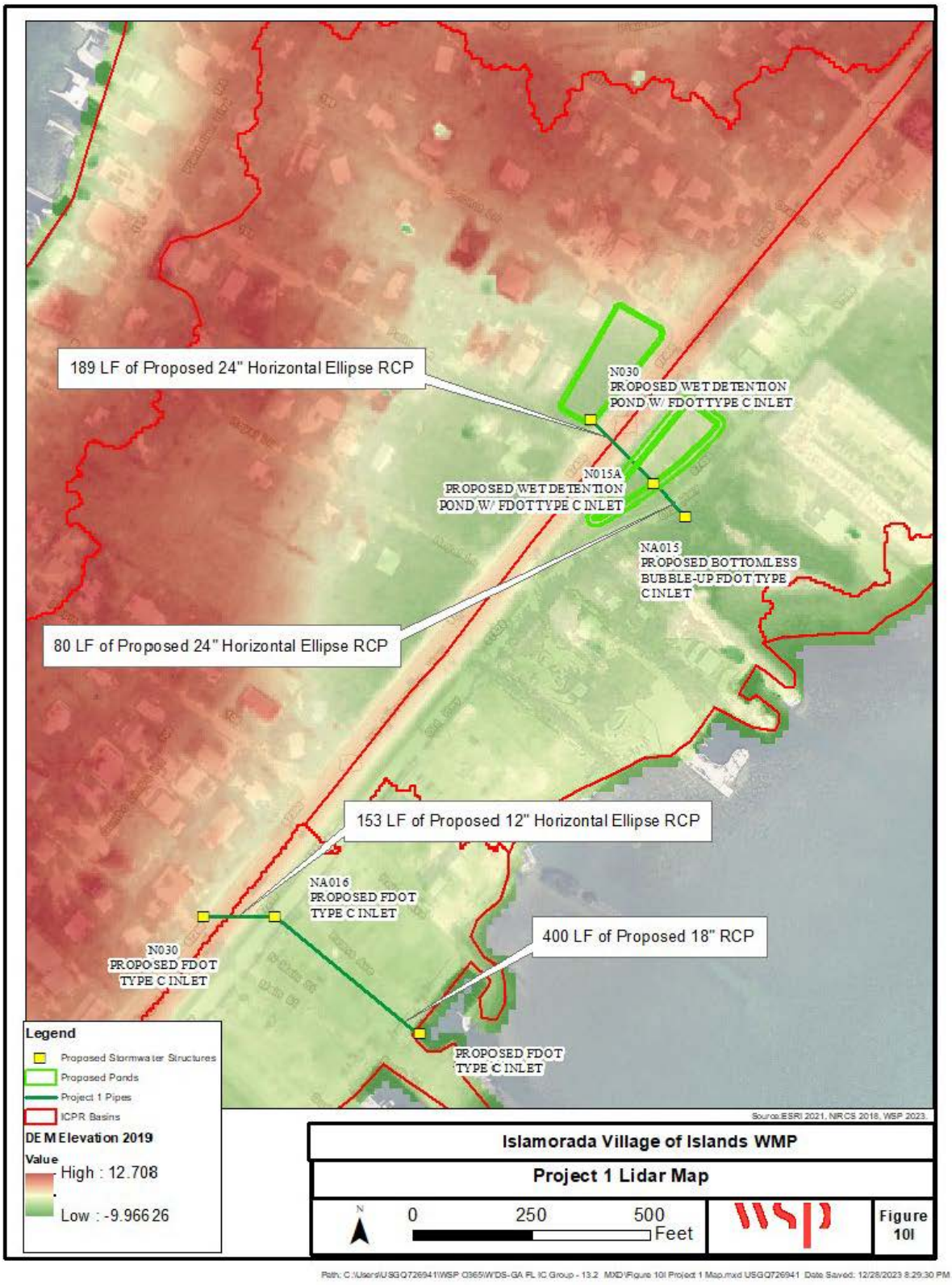

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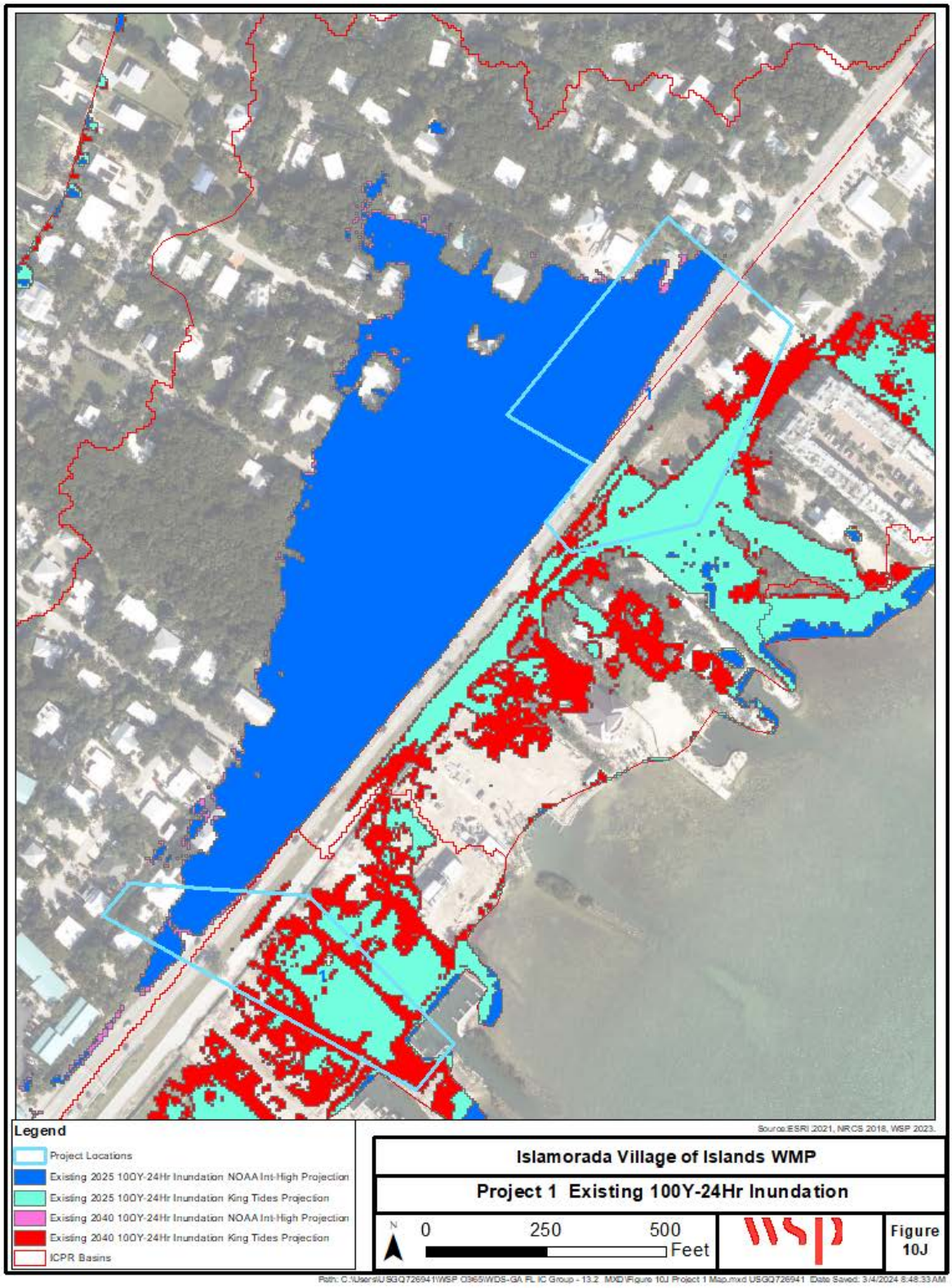
Legend
Project Locations
Existing 2025 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2025 100Y-24Hr Inundation King Tides Projection
Existing 2040 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 1 Existing 100Y-24Hr Inundation
N
0
250
500
Feet
Figure 10J
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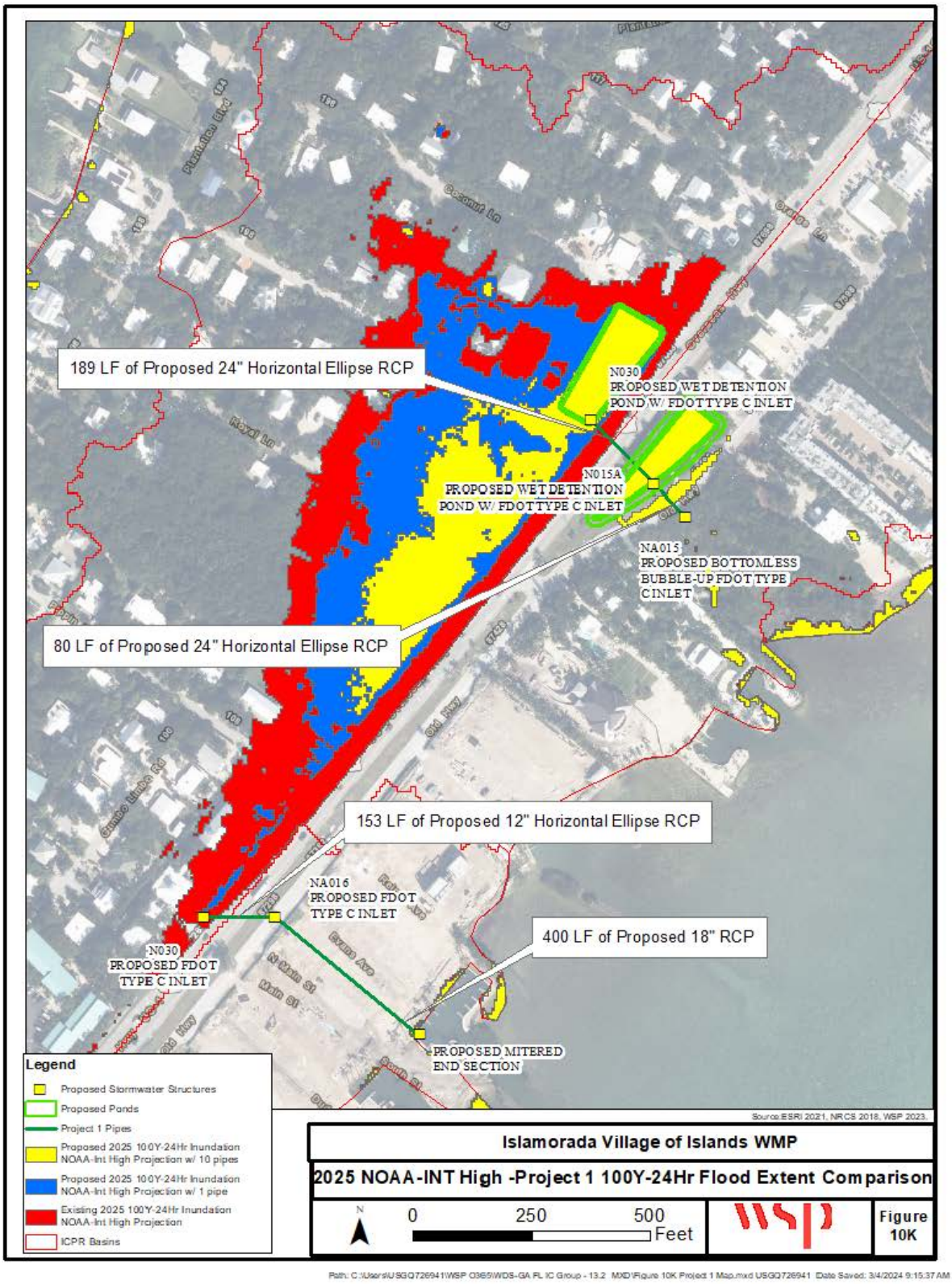
189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
N030
PROPOSED FDOT
TYPE C INLET
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2025 100Y-24Hr Inundation NOAA-Int High Projection w/ 10 pipes
Proposed 2025 100Y-24Hr Inundation NOAA-Int High Projection w/ 1 pipe
Existing 2025 100Y-24Hr Inundation NOAA-Int High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 NOAA-INT High -Project 1 100Y-24Hr Flood Extent Comparison
N
0
250
500
Feet
Figure
10K
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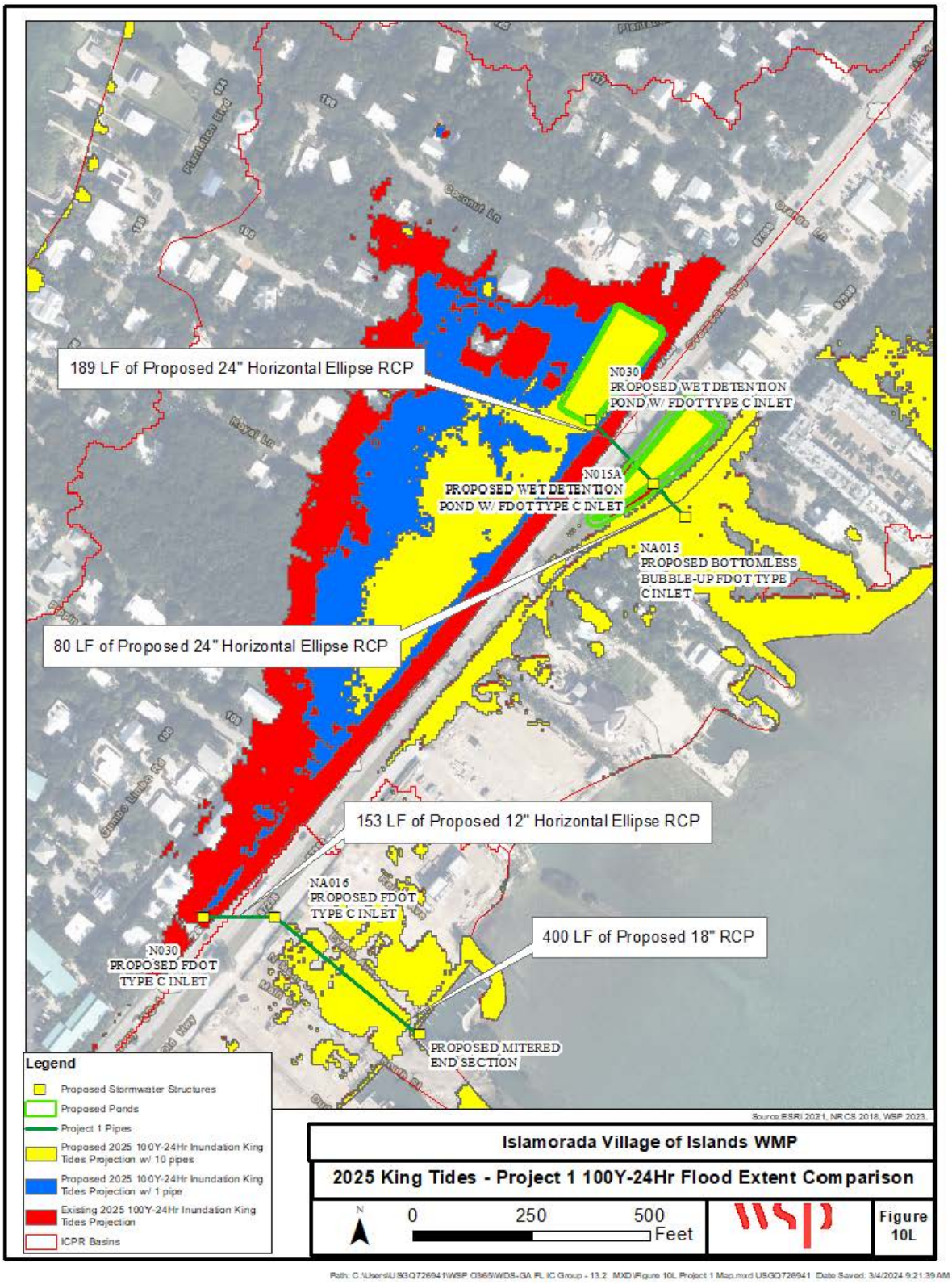
189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
N030
PROPOSED FDOT
TYPE C INLET
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2025 100Y-24Hr Inundation King Tides Projection w/ 10 pipes
Proposed 2025 100Y-24Hr Inundation King Tides Projection w/ 1 pipe
Existing 2025 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 King Tides - Project 1 100Y-24Hr Flood Extent Comparison
N
0
250
500
Feet
Figure
10L
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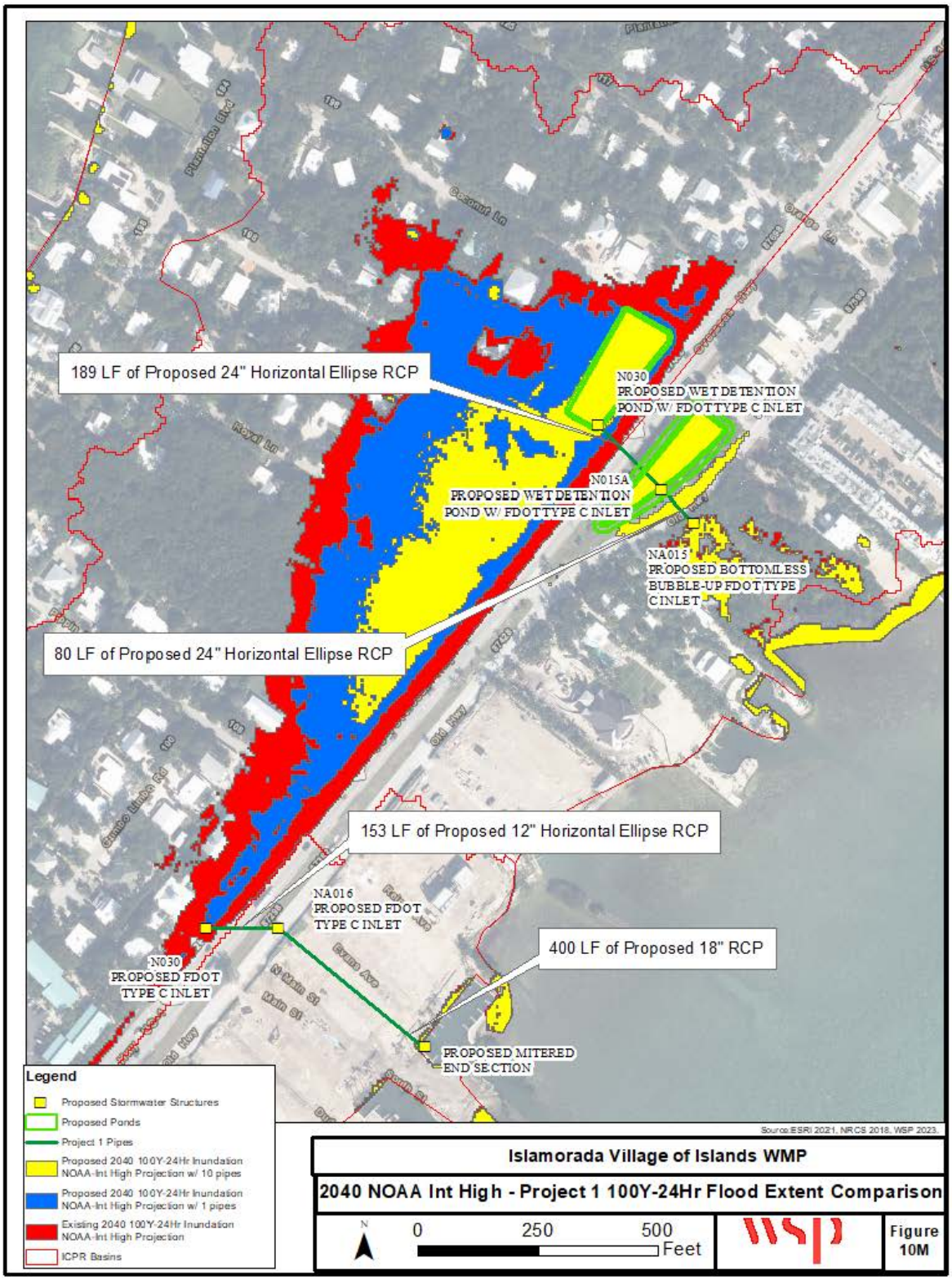
189 LF of Proposed 24" Horizontal Ellipse RCP
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POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
N030
PROPOSED FDOT
TYPE C INLET
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2040 100Y-24Hr Inundation NOAA-Int High Projection w/ 10 pipes
Proposed 2040 100Y-24Hr Inundation NOAA-Int High Projection w/ 1 pipes
Existing 2040 100Y-24Hr Inundation NOAA-Int High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2040 NOAA Int High - Project 1 100Y-24Hr Flood Extent Comparison
N
0
250
500
Feet
Figure 10M
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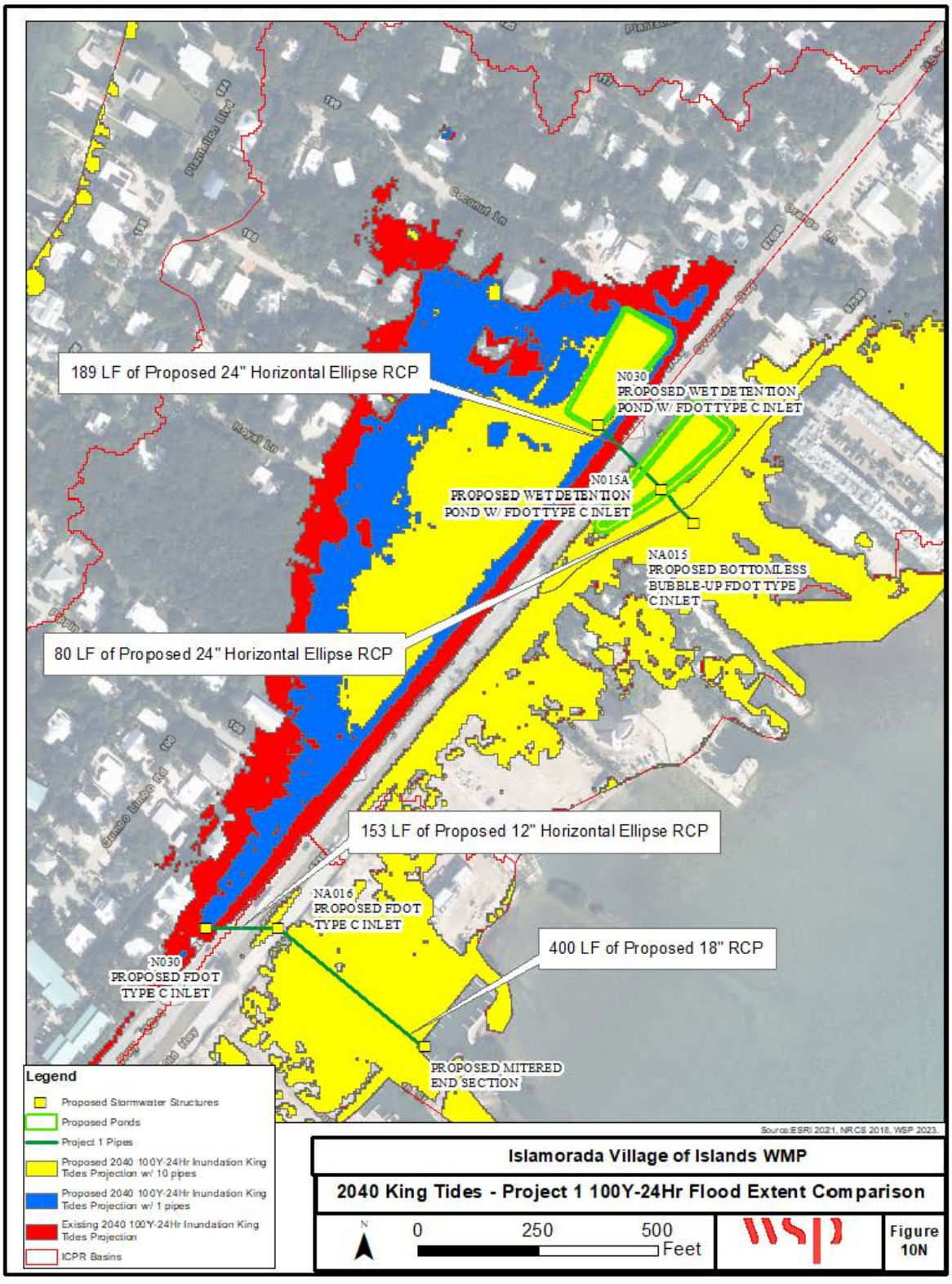
189 LF of Proposed 24" Horizontal Ellipse RCP
N030
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
N015A
PROPOSED WET DETENTION
POND W/ FDOT TYPE C INLET
NA015
PROPOSED BOTTOMLESS
BUBBLE-UP FDOT TYPE
C INLET
80 LF of Proposed 24" Horizontal Ellipse RCP
153 LF of Proposed 12" Horizontal Ellipse RCP
NA016
PROPOSED FDOT
TYPE C INLET
400 LF of Proposed 18" RCP
N030
PROPOSED FDOT
TYPE C INLET
PROPOSED MITERED
END SECTION
Legend
Proposed Stormwater Structures
Proposed Ponds
Project 1 Pipes
Proposed 2040 100Y-24Hr Inundation King Tides Projection w/ 10 pipes
Proposed 2040 100Y-24Hr Inundation King Tides Projection w/ 1 pipes
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2040 King Tides - Project 1 100Y-24Hr Flood Extent Comparison
N
0
250
500
Feet
Figure
10N
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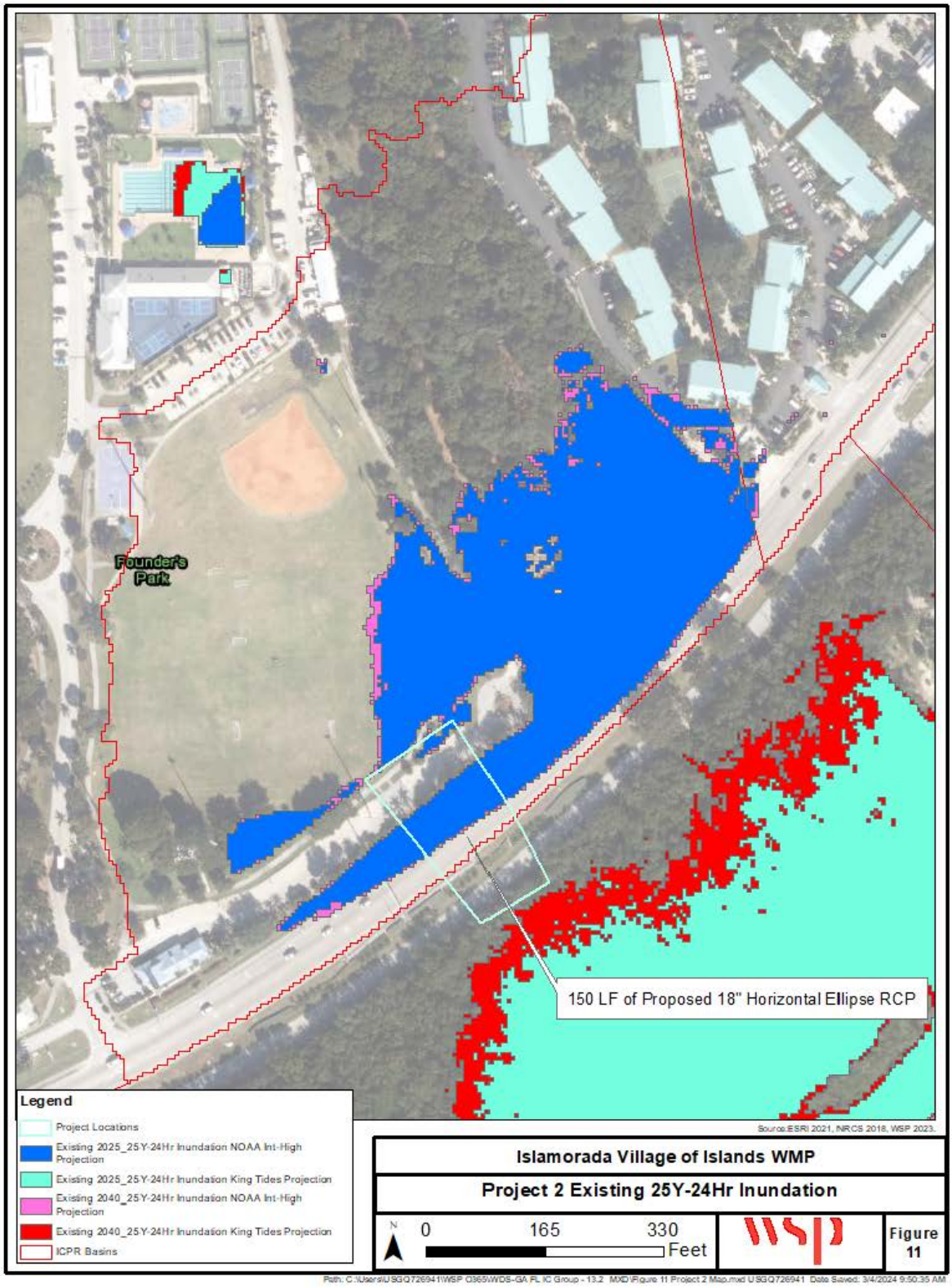
Founder's Park
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
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Existing 2025_25Y-24Hr Inundation King Tides Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 2 Existing 25Y-24Hr Inundation
N
0
165
330
Feet
Figure 11
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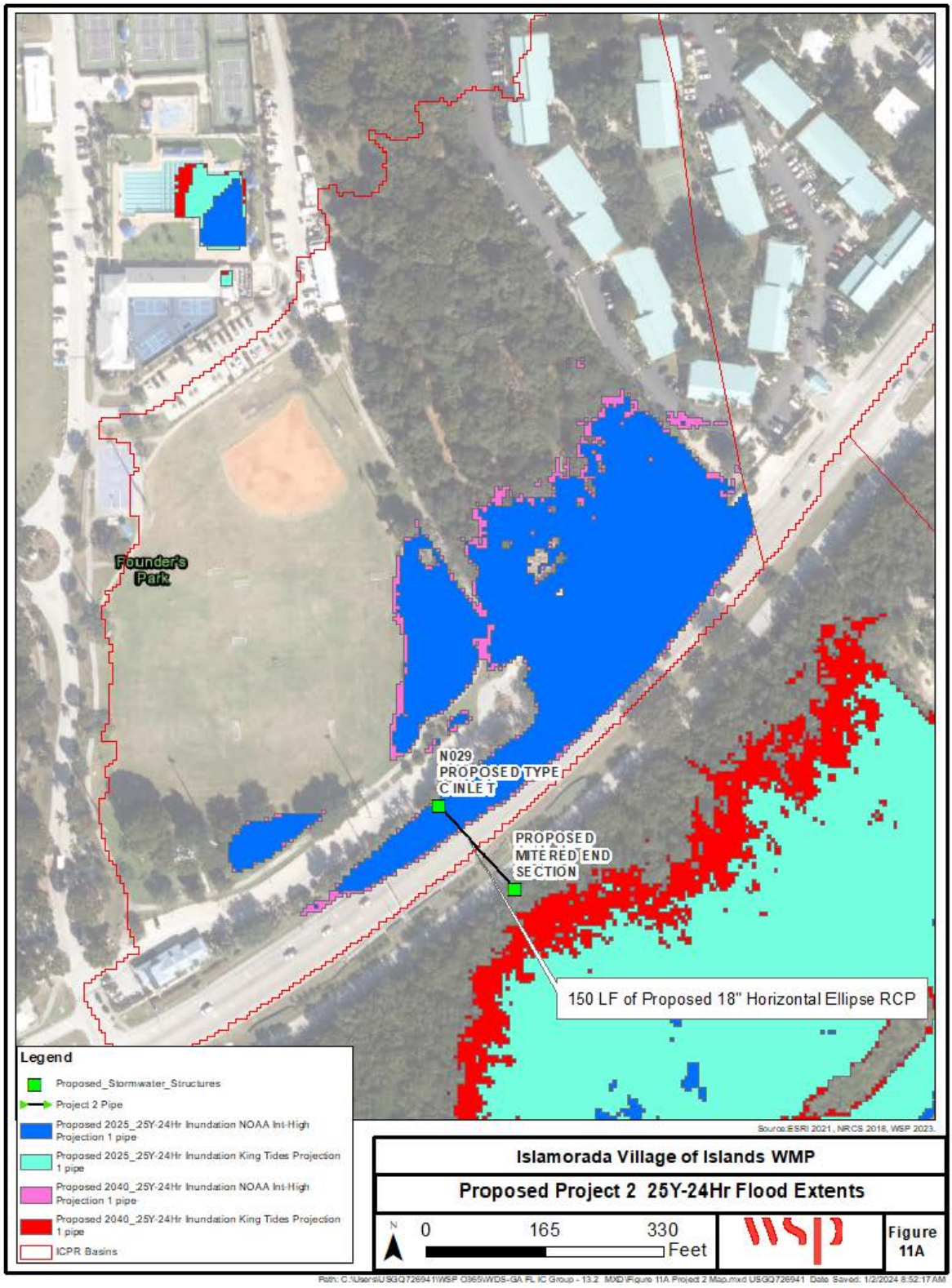
Founder's Park
N029
PROPOSED TYPE
C INLET
PROPOSED
MITERED END
SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2025_25Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2025_25Y-24Hr Inundation King Tides Projection 1 pipe
Proposed 2040_25Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2040_25Y-24Hr Inundation King Tides Projection 1 pipe
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Proposed Project 2 25Y-24Hr Flood Extents
N
0
165
330
Feet
Figure 11A
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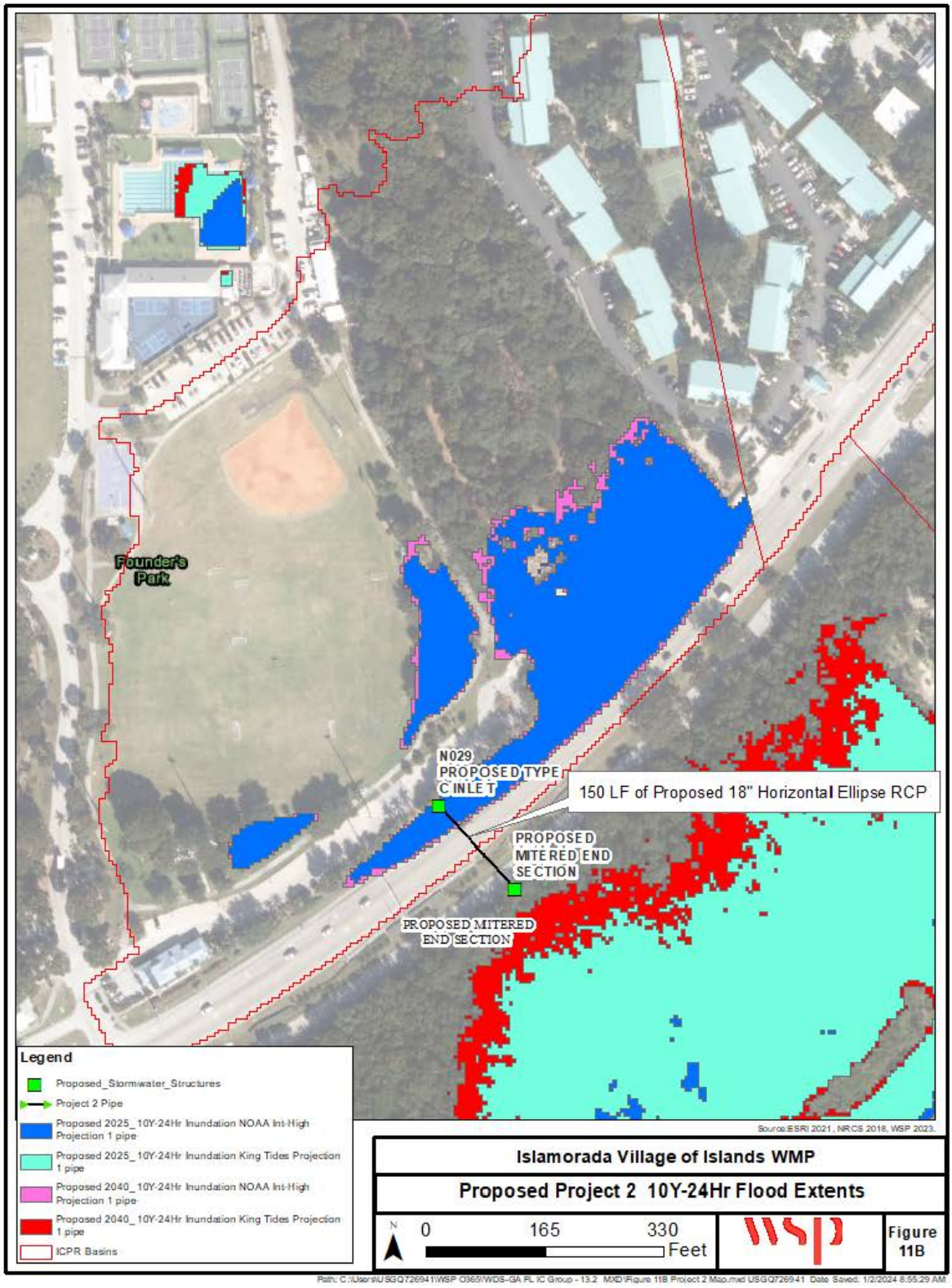
Founder's Park
N029
PROPOSED TYPE C INLET
150 LF of Proposed 18" Horizontal Ellipse RCP
PROPOSED MITERED END SECTION
PROPOSED MITERED END SECTION
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2025_10Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2025_10Y-24Hr Inundation King Tides Projection 1 pipe
Proposed 2040_10Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2040_10Y-24Hr Inundation King Tides Projection 1 pipe
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Proposed Project 2 10Y-24Hr Flood Extents
N
0
165
330
Feet
Figure 11B
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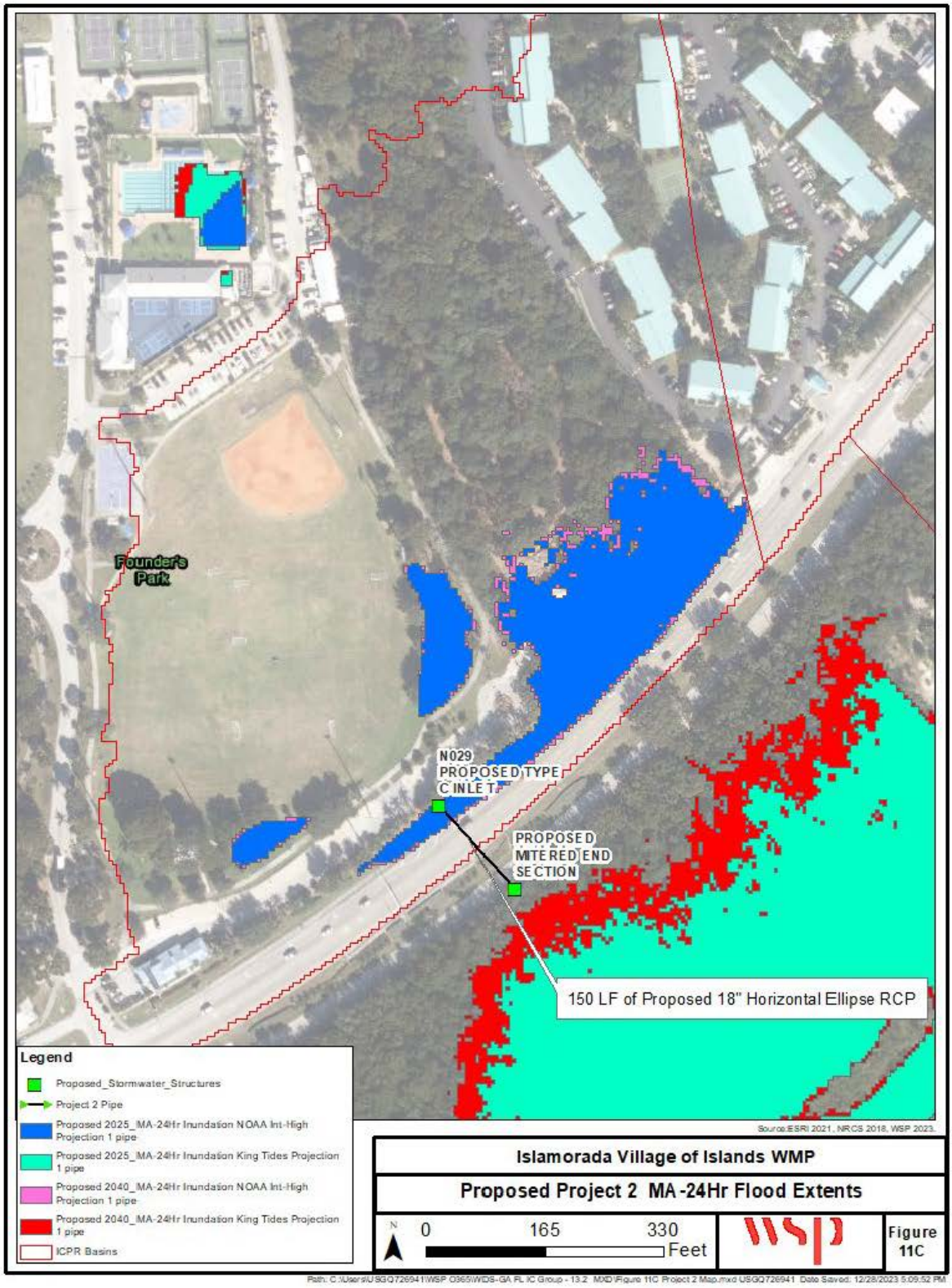
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PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2025_MA-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2025_MA-24Hr Inundation King Tides Projection 1 pipe
Proposed 2040_MA-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2040_MA-24Hr Inundation King Tides Projection 1 pipe
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Proposed Project 2 MA-24Hr Flood Extents
N
0
165
330
Feet
Figure 11C
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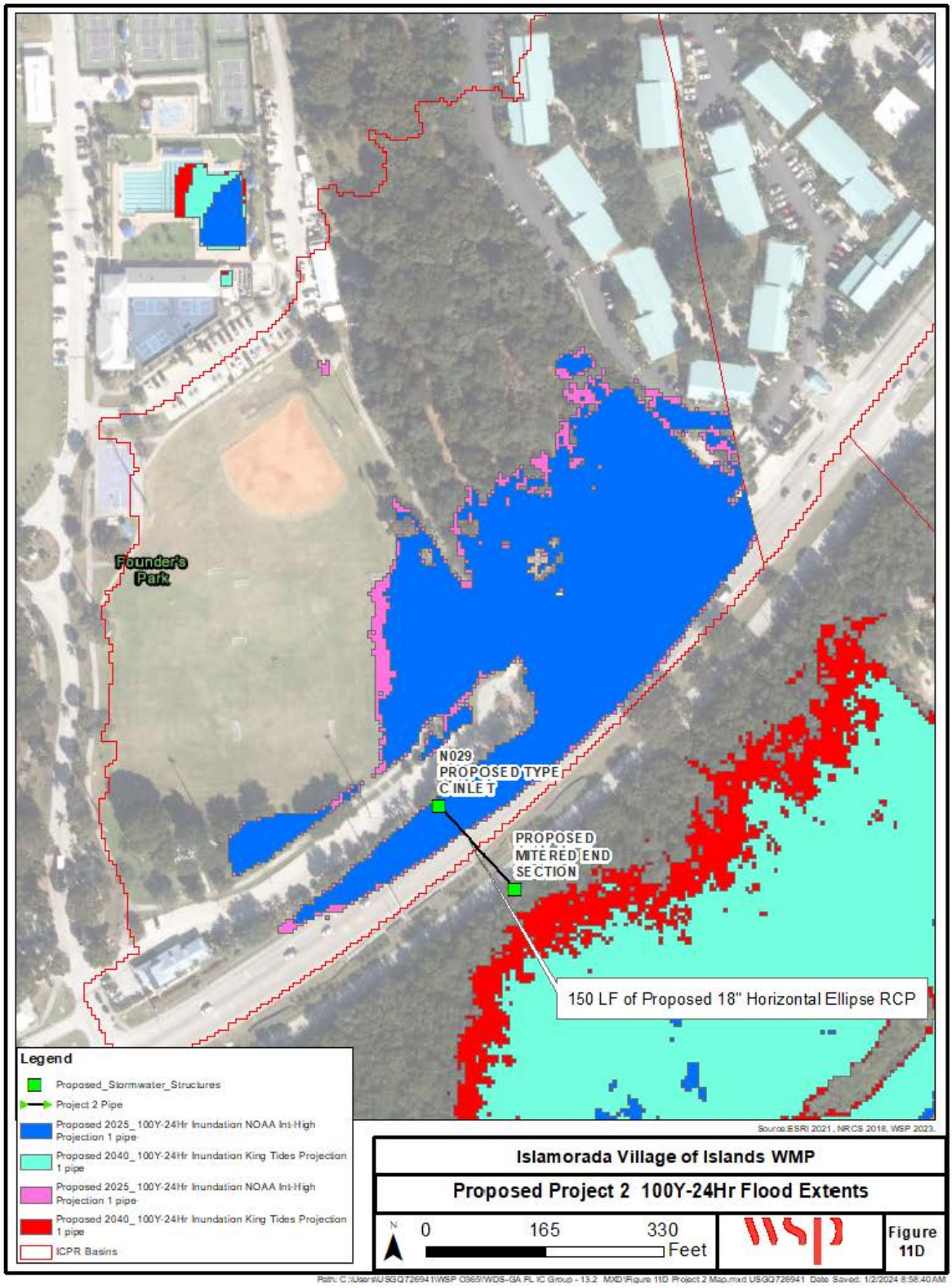
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N029
PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2025_100Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2040_100Y-24Hr Inundation King Tides Projection 1 pipe
Proposed 2025_100Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Proposed 2040_100Y-24Hr Inundation King Tides Projection 1 pipe
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Proposed Project 2 100Y-24Hr Flood Extents
N
0
165
330
Feet
Figure 11D
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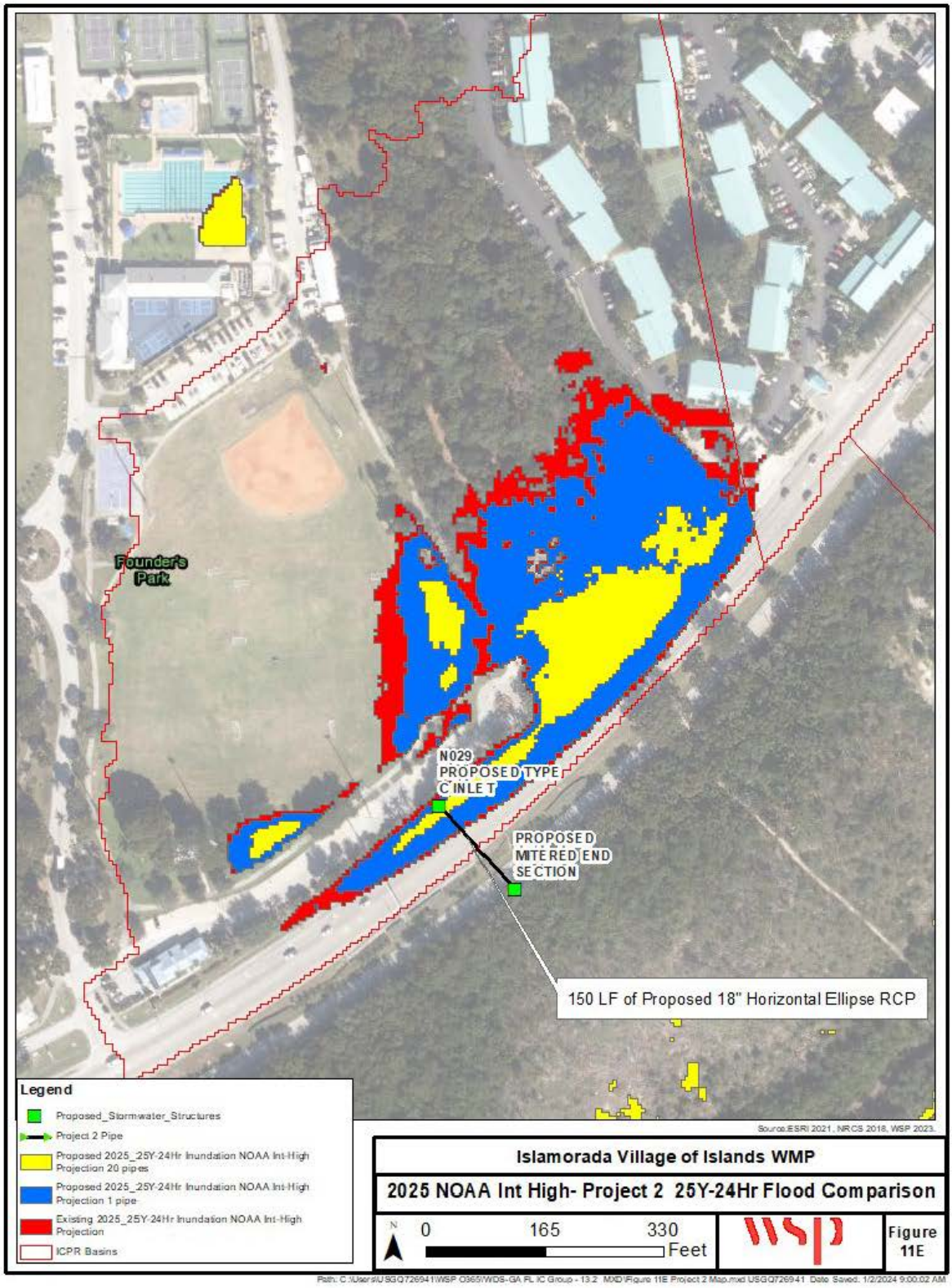
Founder's Park
N029 PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2025_25Y-24Hr Inundation NOAA Int-High Projection 20 pipes
Proposed 2025_25Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 NOAA Int High- Project 2 25Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11E
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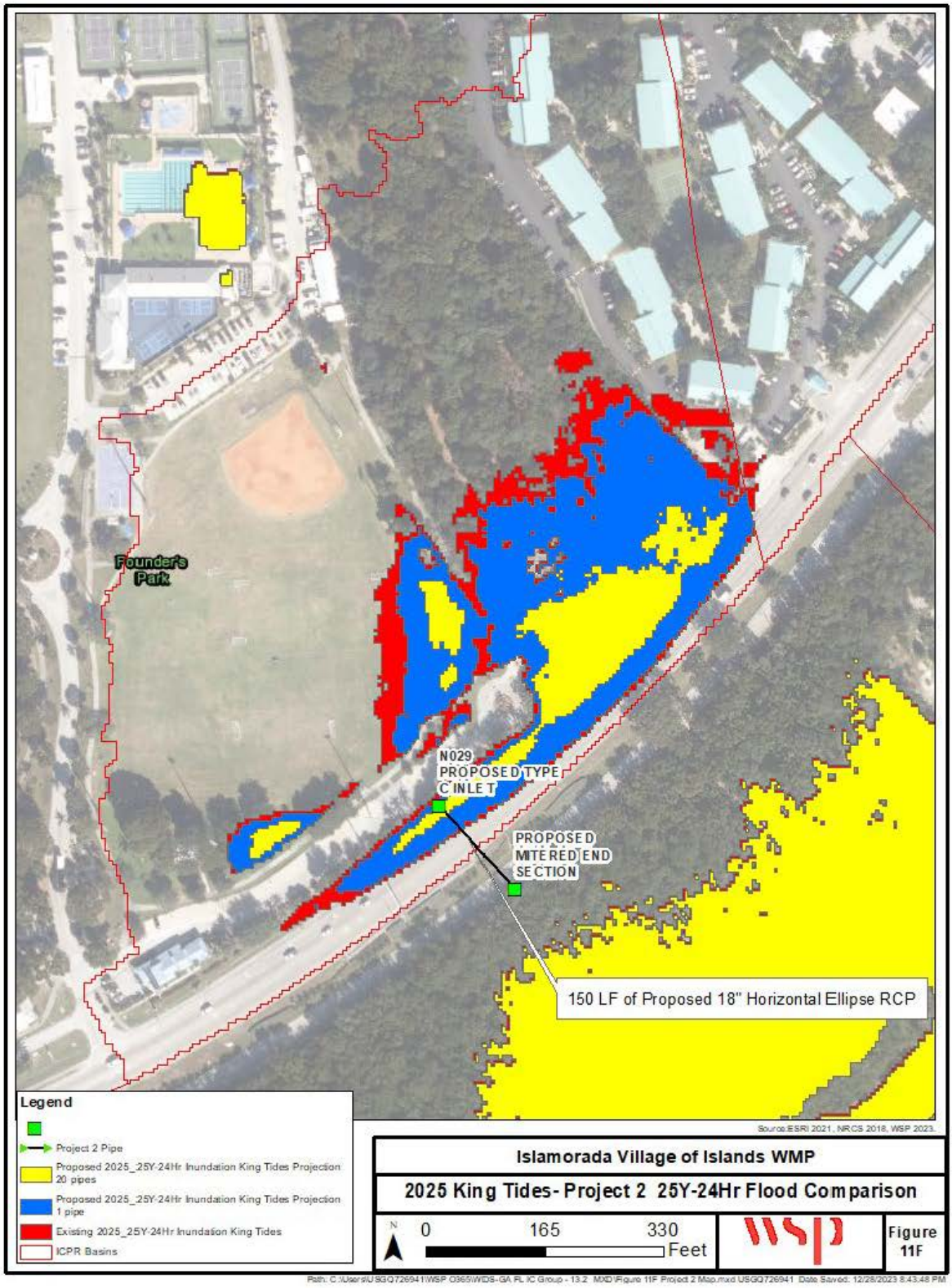
Founder's Park
N029 PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Project 2 Pipe
Proposed 2025_25Y-24Hr Inundation King Tides Projection 20 pipes
Proposed 2025_25Y-24Hr Inundation King Tides Projection 1 pipe
Existing 2025_25Y-24Hr Inundation King Tides
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 King Tides- Project 2 25Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11F
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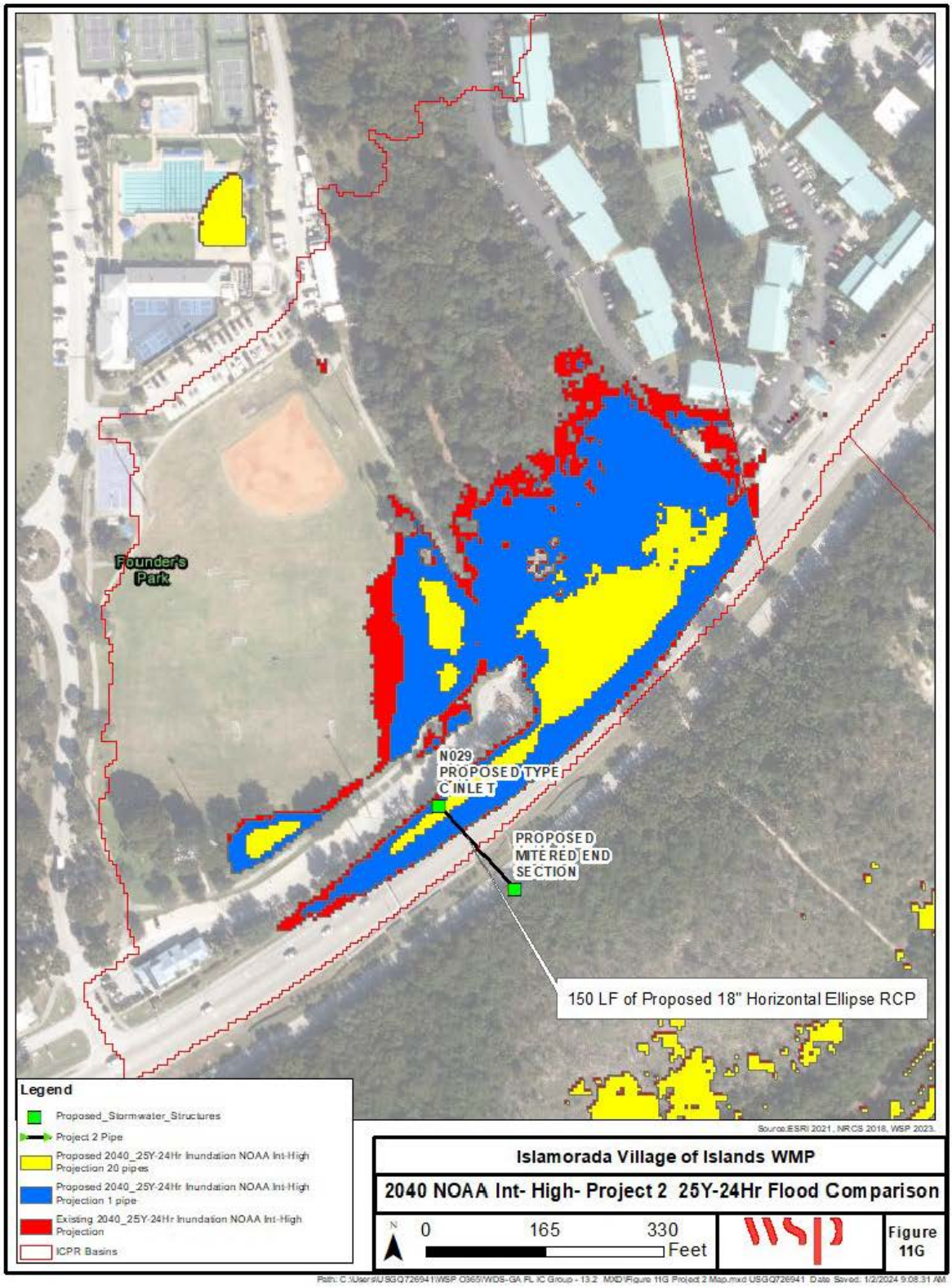
Founder's Park
N029
PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2040_25Y-24Hr Inundation NOAA Int-High Projection 20 pipes
Proposed 2040_25Y-24Hr Inundation NOAA Int-High Projection 1 pipe
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2040 NOAA Int- High- Project 2 25Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11G
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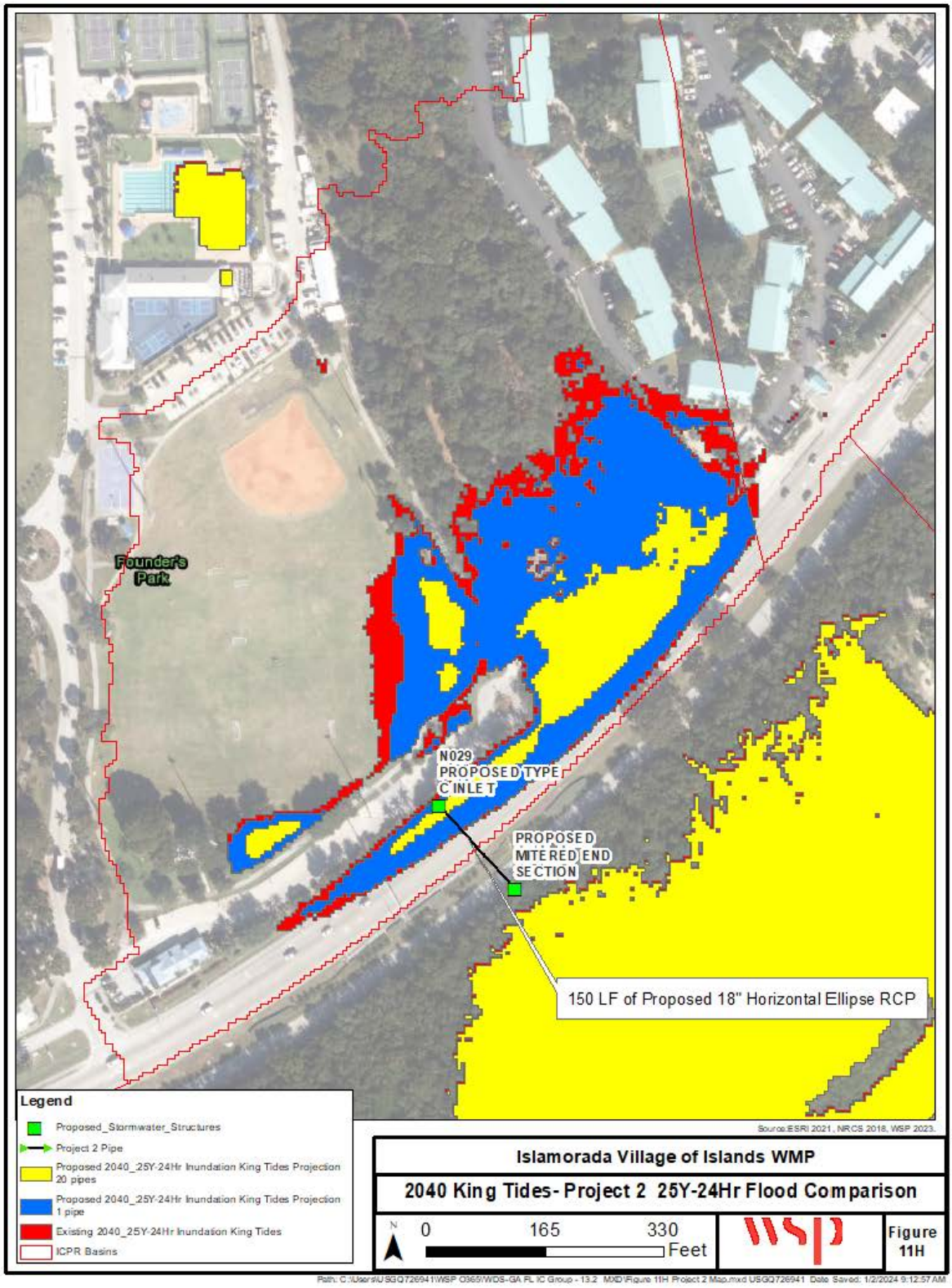
Founder's Park
N029 PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2040_25Y-24Hr Inundation King Tides Projection 20 pipes
Proposed 2040_25Y-24Hr Inundation King Tides Projection 1 pipe
Existing 2040_25Y-24Hr Inundation King Tides
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2040 King Tides- Project 2 25Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11H
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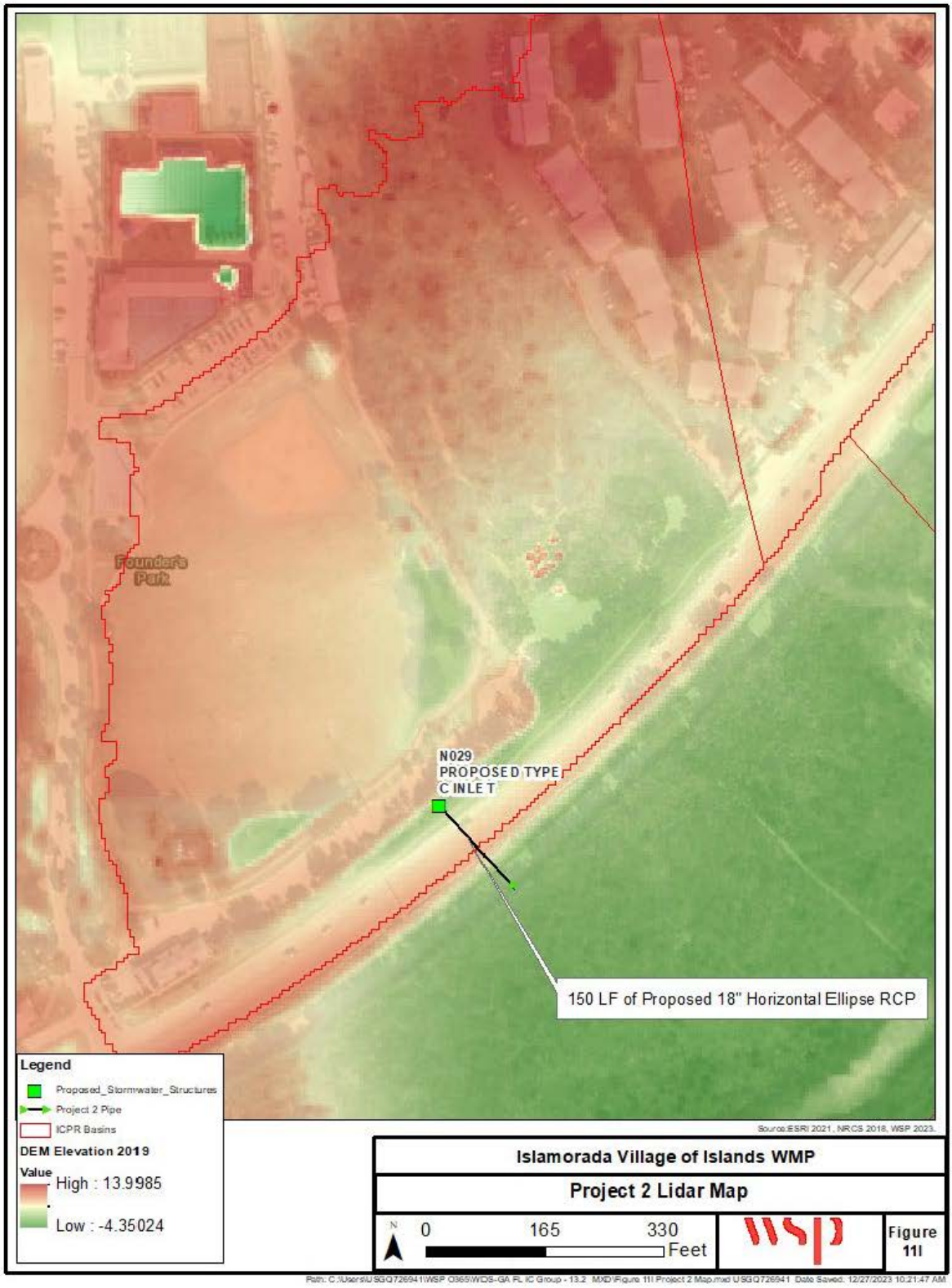
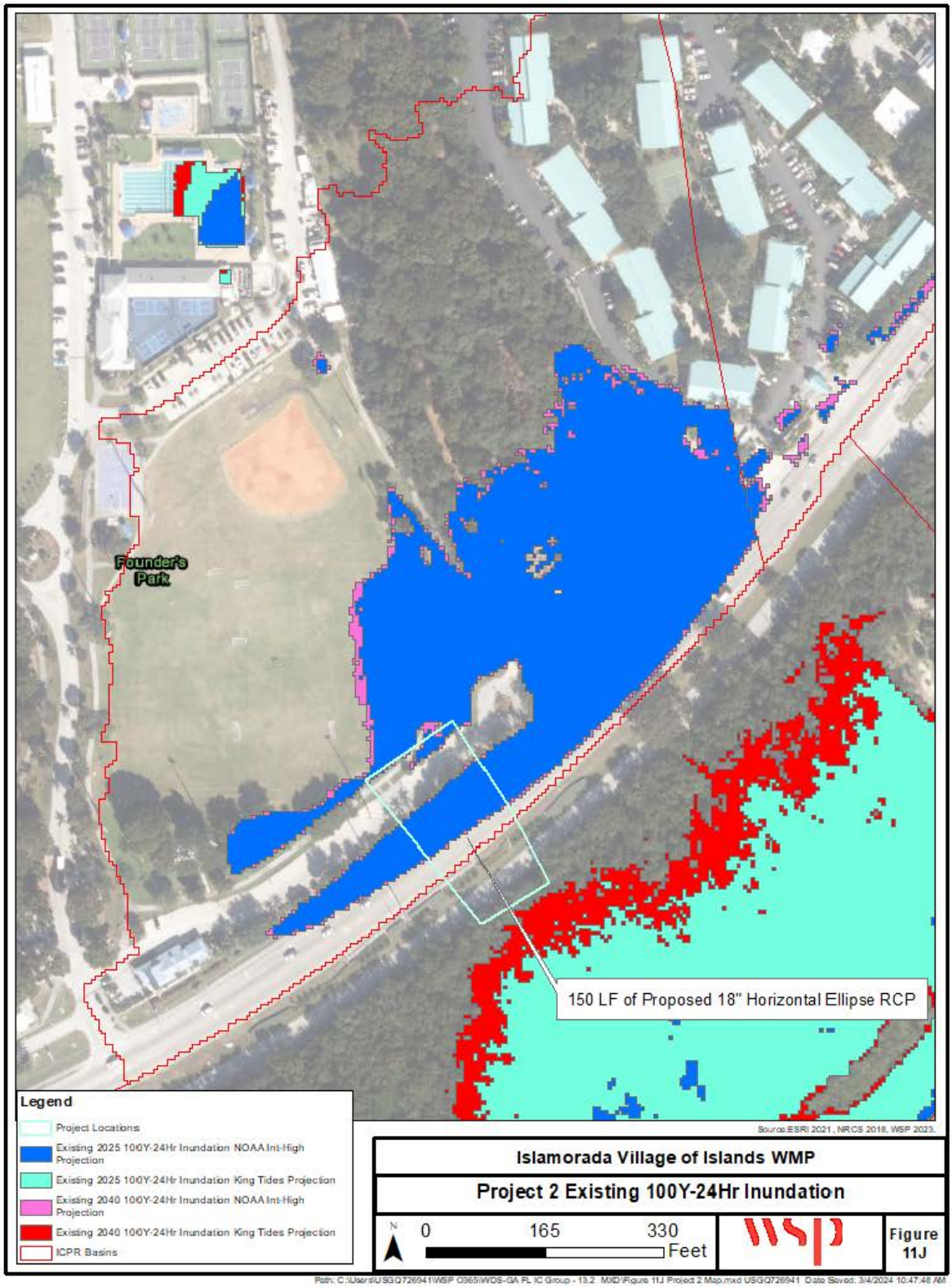

Founder's Park
N029
PROPOSED TYPE
C INLET
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
ICPR Basins
DEM Elevation 2019
Value
High : 13.9985
Low : -4.35024
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 2 Lidar Map
N
0
165
330
Feet
Figure
11I


Founder's Park
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Project Locations
Existing 2025 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2025 100Y-24Hr Inundation King Tides Projection
Existing 2040 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 2 Existing 100Y-24Hr Inundation
N
0
165
330
Feet
Figure 11J
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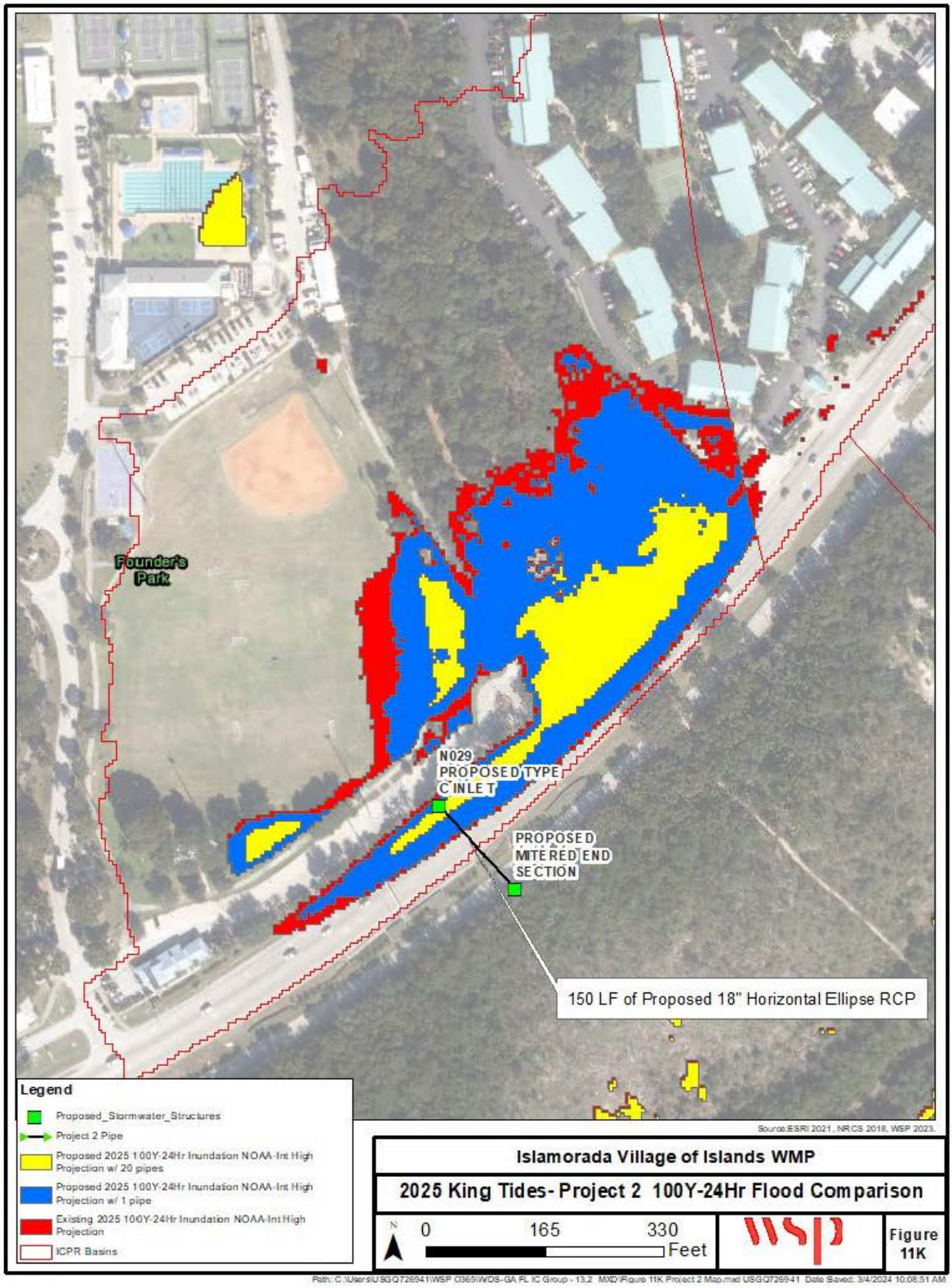
Founder's Park
N029
PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2025 100Y-24Hr Inundation NOAA-Int High Projection w/ 20 pipes
Proposed 2025 100Y-24Hr Inundation NOAA-Int High Projection w/ 1 pipe
Existing 2025 100Y-24Hr Inundation NOAA-Int High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 King Tides- Project 2 100Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11K
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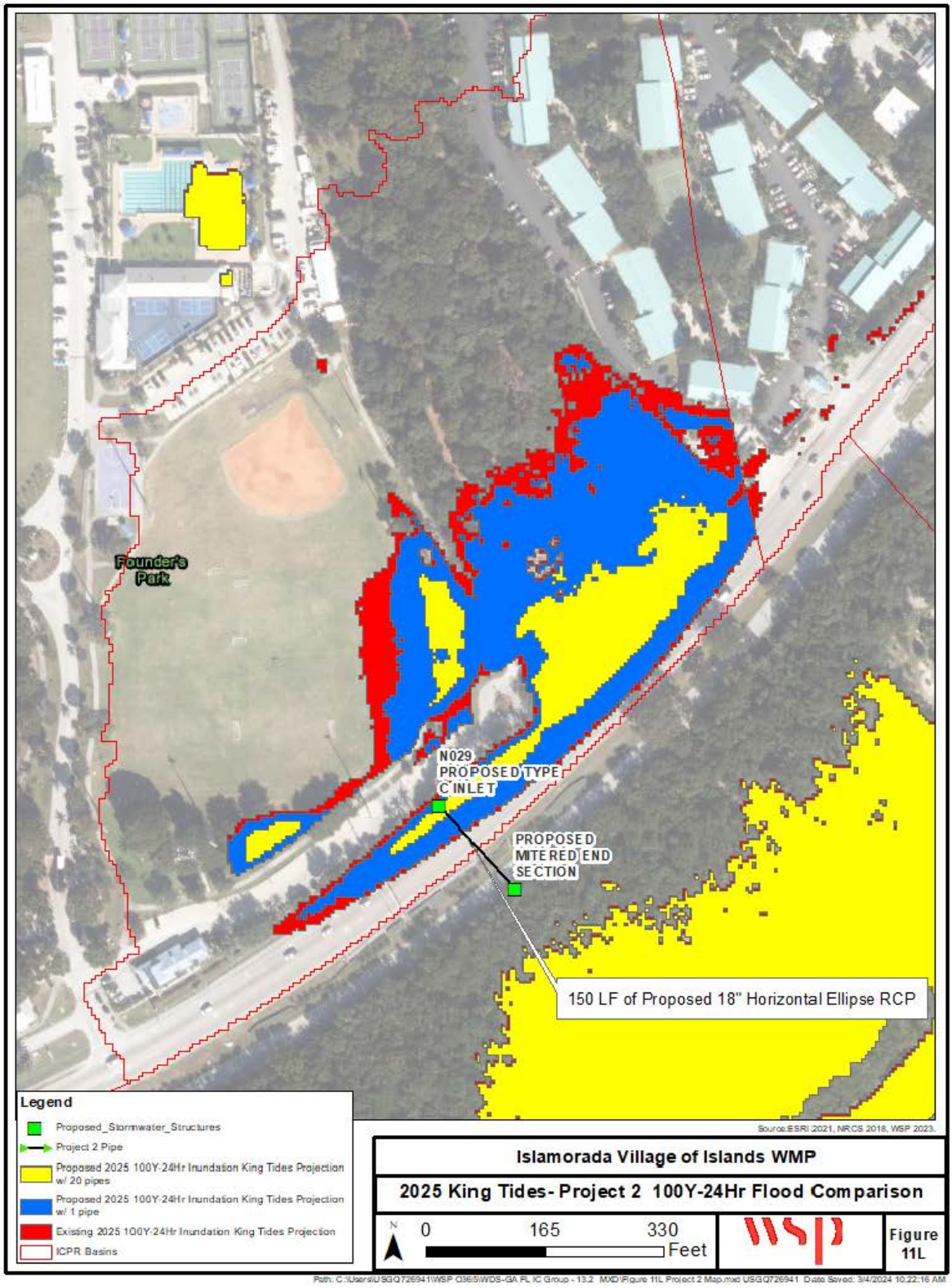
Founder's Park
N029
PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2025 100Y-24Hr Inundation King Tides Projection w/ 20 pipes
Proposed 2025 100Y-24Hr Inundation King Tides Projection w/ 1 pipe
Existing 2025 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2025 King Tides- Project 2 100Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11L
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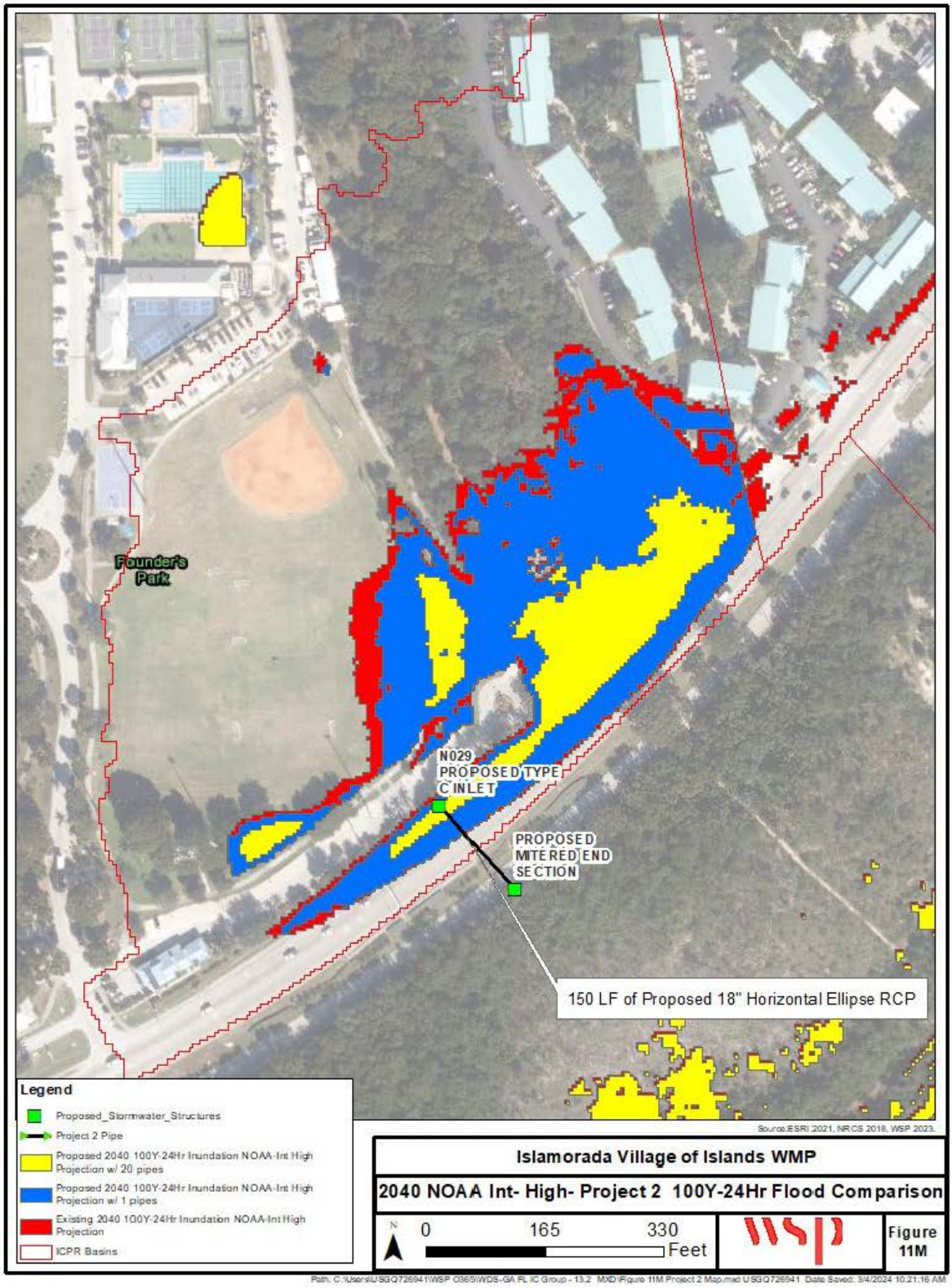
Founder's Park
N029
PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2040 100Y-24Hr Inundation NOAA-Int High Projection w/ 20 pipes
Proposed 2040 100Y-24Hr Inundation NOAA-Int High Projection w/ 1 pipes
Existing 2040 100Y-24Hr Inundation NOAA-Int High Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2040 NOAA Int- High- Project 2 100Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11M
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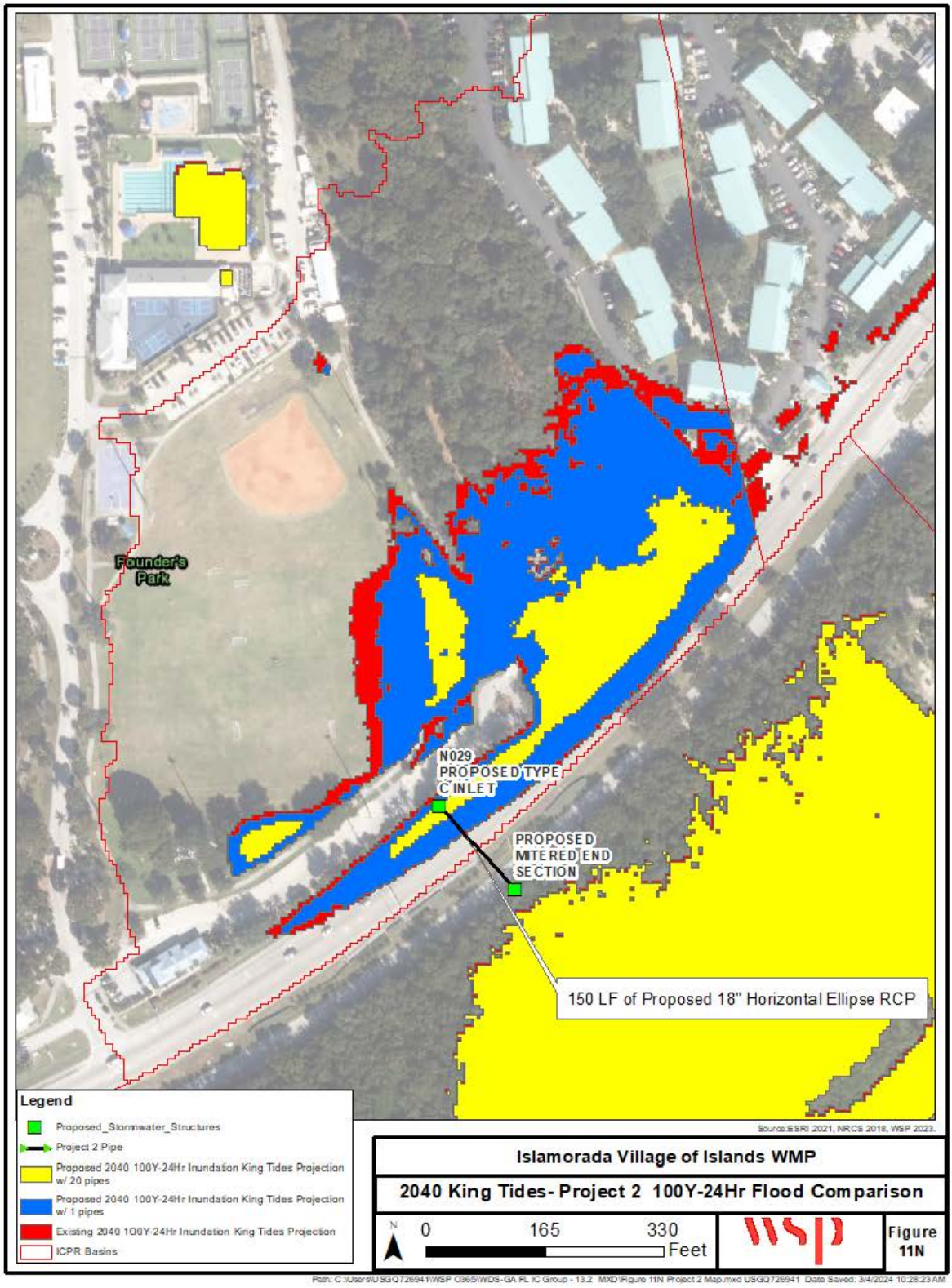
Founder's Park
N029
PROPOSED TYPE C INLET
PROPOSED MITERED END SECTION
150 LF of Proposed 18" Horizontal Ellipse RCP
Legend
Proposed_Stormwater_Structures
Project 2 Pipe
Proposed 2040 100Y-24Hr Inundation King Tides Projection w/ 20 pipes
Proposed 2040 100Y-24Hr Inundation King Tides Projection w/ 1 pipes
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
2040 King Tides- Project 2 100Y-24Hr Flood Comparison
N
0
165
330
Feet
Figure 11N
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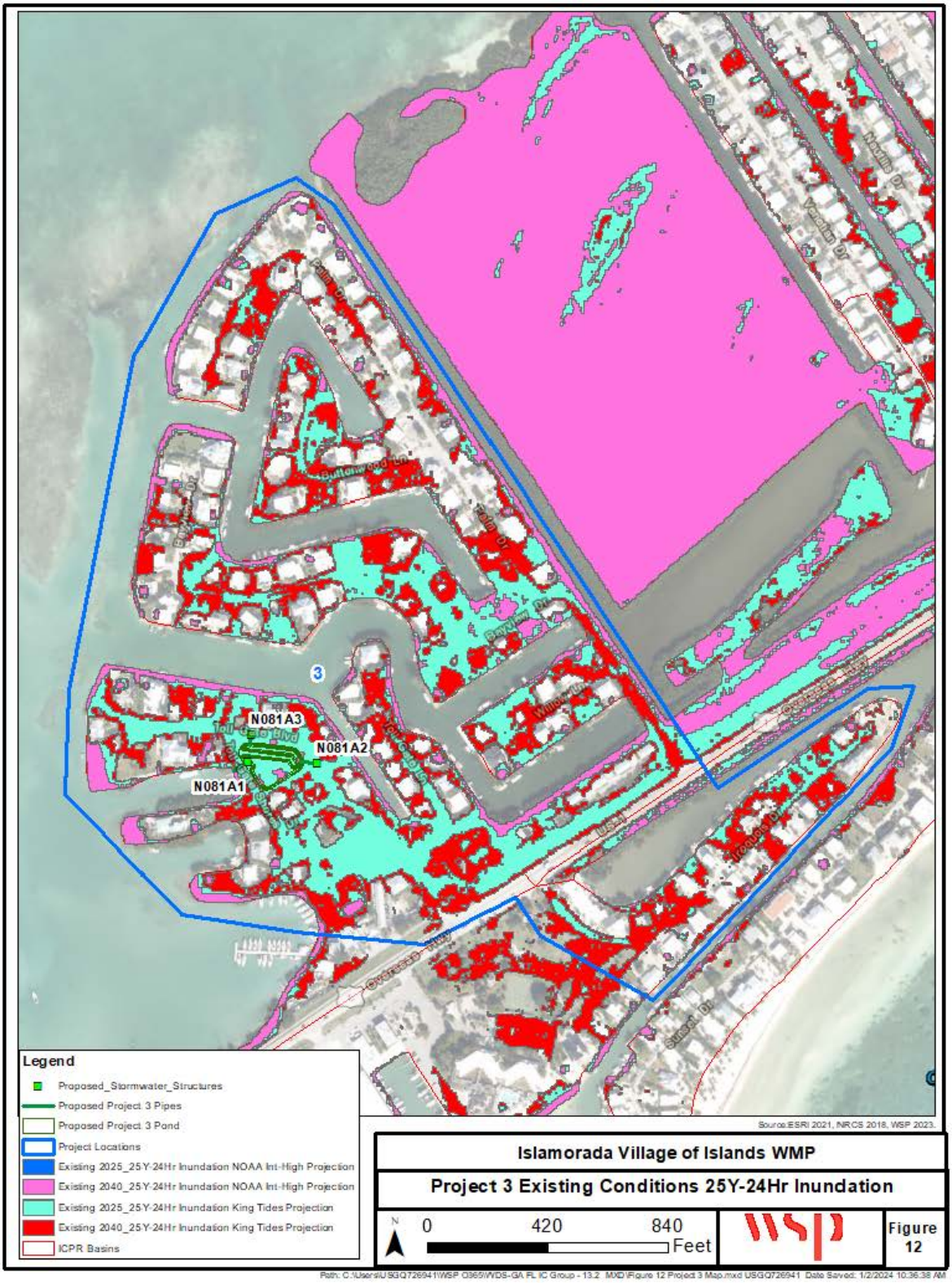
N081A3
N081A2
N081A1
3
Legend
Proposed_Stormwater_Structures
Proposed Project 3 Pipes
Proposed Project 3 Pond
Project Locations
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2025_25Y-24Hr Inundation King Tides Projection
Existing 2040_25Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 3 Existing Conditions 25Y-24Hr Inundation
N
0
420
840
Feet
Figure 12
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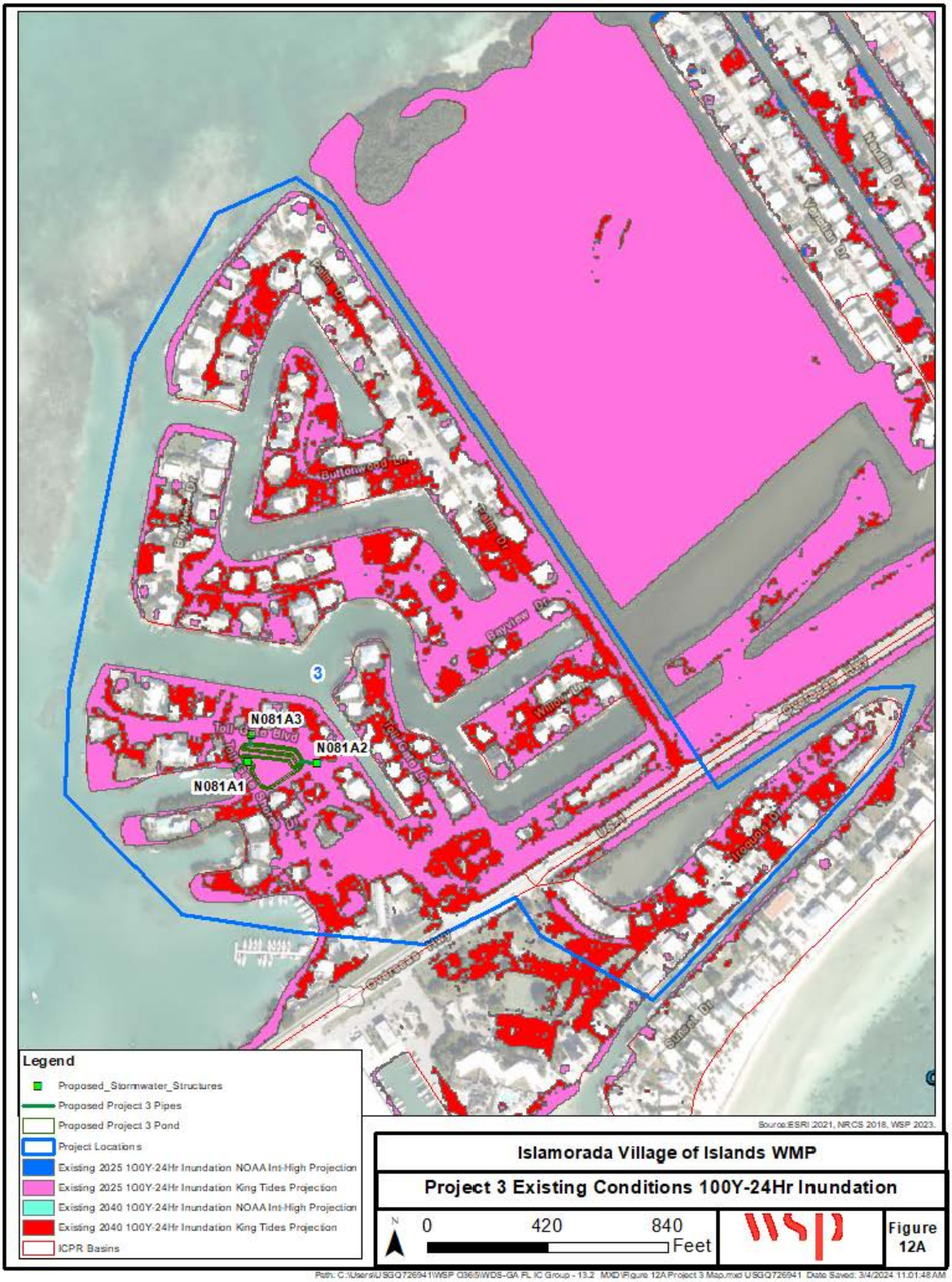
N081A3
N081A2
N081A1
3
Legend
Proposed_Stormwater_Structures
Proposed Project 3 Pipes
Proposed Project 3 Pond
Project Locations
Existing 2025 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2025 100Y-24Hr Inundation King Tides Projection
Existing 2040 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 3 Existing Conditions 100Y-24Hr Inundation
N
0
420
840
Feet
Figure 12A
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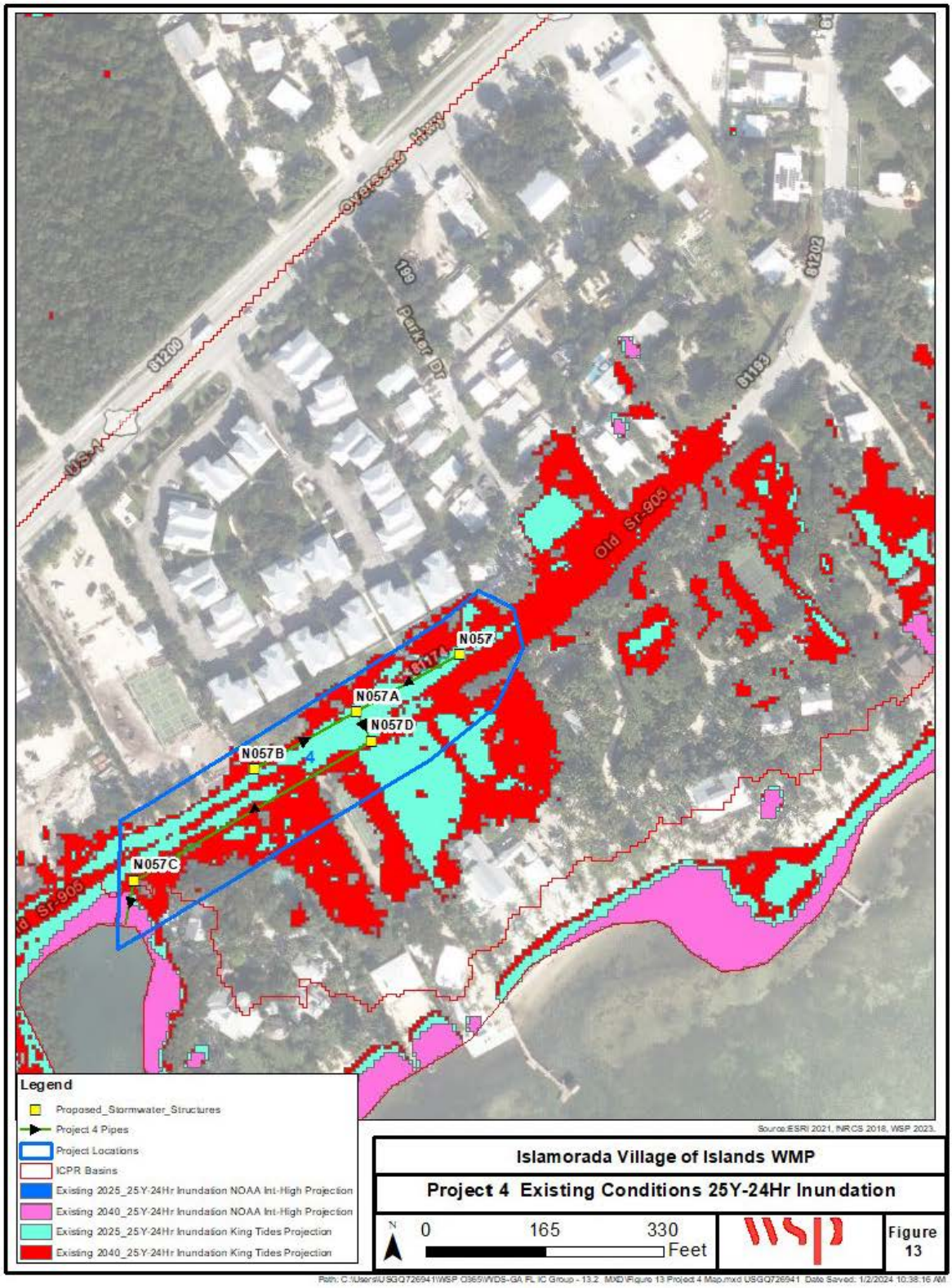
Overseas Hwy
Parker Dr
Old SR-905
US-1
61200
61202
61193
61174
N057
N057A
N057D
N057B
N057C
Legend
Proposed_Stormwater_Structures
Project 4 Pipes
Project Locations
ICPR Basins
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2025_25Y-24Hr Inundation King Tides Projection
Existing 2040_25Y-24Hr Inundation King Tides Projection
Source:ESRI 2021, INRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 4 Existing Conditions 25Y-24Hr Inundation
N
0
165
330
Feet
Figure 13
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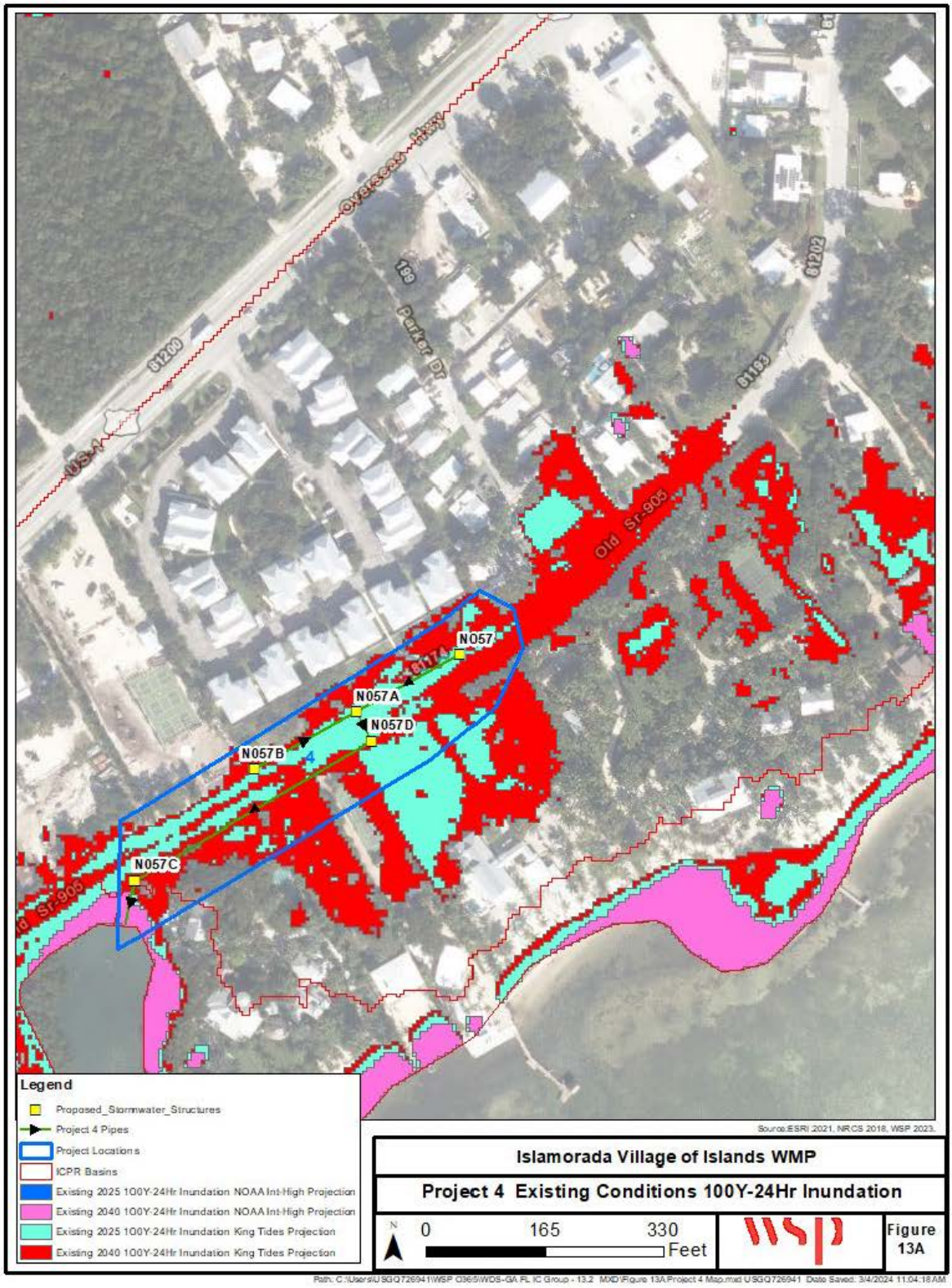
Overseas Hwy
Parker Dr
US-1
Old ST-905
ST-905
N057
N057A
N057D
N057B
N057C
Legend
Proposed_Stormwater_Structures
Project 4 Pipes
Project Locations
ICPR Basins
Existing 2025 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2025 100Y-24Hr Inundation King Tides Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 4 Existing Conditions 100Y-24Hr Inundation
N
0
165
330
Feet
Figure 13A


Gulfside Dr
San Juan Dr
San Marco Dr
Venetian Blvd
Venetian Way
Milano Dr
Giardino Dr
Stromboli Dr
Palo de Oro Dr
Valencia Dr
Leoni Dr
San Remo Dr
Porto Salvo Dr
Snake Creek
N024A
N024B
N024C
US-1 Overseas Hwy
Legend
Proposed_Stormwater_Structures
Project 5 Pipes
Project Locations
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2025_25Y-24Hr Inundation King Tides Projection
Existing 2040_25Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 5 Existing Conditions 25Y-24Hr Inundation
N
0
420
840
Feet
Figure 14


Guilside Dr
San Juan Dr
San Marco Dr
Venetian Way
Venetian Blvd
Milano Dr
Giardino Dr
Stromboli Dr
Palo de Oro Dr
Valencia Dr
Leoni Dr
San Remo Dr
Porto Salvo Dr
Snake Creek
N024A
N024B
N024C
US-1 Overseas Hwy
Legend
Proposed_Stormwater_Structures
Project 5 Pipes
Project Locations
Existing 2025 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2025 100Y-24Hr Inundation King Tides Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 5 Existing Conditions 100Y-24Hr Inundation
N
0
420
840
Feet
Figure 14A


Pelican Rd
Redwing
6F
6A
Mockingbird Rd
Plantation Ave
6G
Plantation Ave
Coconut Palm Dr
Old Hwy
Jasmine St
Hibiscus St
N Coconut Palm Blvd
Azalea St
Gardenia St
Palm Ave
US-1 S
US-1 N
Ocean Dr
Overseas Hwy
6C
Royal Poinciana Blvd
Bougainvillea St
Jasmine St
Hibiscus St
S Coconut Palm Blvd
Azalea St
Gardenia St
US-1
Old Hwy
Riviera Dr
Fontaine Dr
Wrenn St
Overseas Hwy
6D
Woodie
Woodie Ave
Lake Rd
Plantation Shores Dr
Legend
Project Locations
World Transportation
Existing 2025_25-Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25-Y-24Hr Inundation NOAA Int-High Projection
Existing 2025_25-Y-24Hr Inundation King Tides Projection
Existing 2040_25-Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 6 A, C, D F, & G Existing Cond. 25Y-24Hr Inundation
N
0
420
840
Feet
Figure 15
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Pelican Rd
Redwing
6F
6A
Mockingbird Rd
Plantation Ave
6G
Plantation Ave
Coconut Palm Dr
Jasmine St
Hibiscus St
N Coconut Palm Blvd
Azalea St
Gardenia St
Old Hwy
Palm Ave
US-1 S
US-1 N
Ocean Dr
Overseas Hwy
6C
Royal Poinciana Blvd
Bougainvillea St
Jasmine St
Hibiscus St
S Coconut Palm Blvd
Azalea St
Gardenia St
US-1
Old Hwy
Riviera Dr
Fontaine Dr
Wrenn St
Overseas Hwy
6D
Woodie
Woods Ave
Lake Rd
Plantation Shores Dr
Legend
Project Locations
World Transportation
Existing 2025 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 6 A, C, D F, & G Existing Cond. 100Y-24Hr Inundation
N
0
420
840
Feet
Figure 15A
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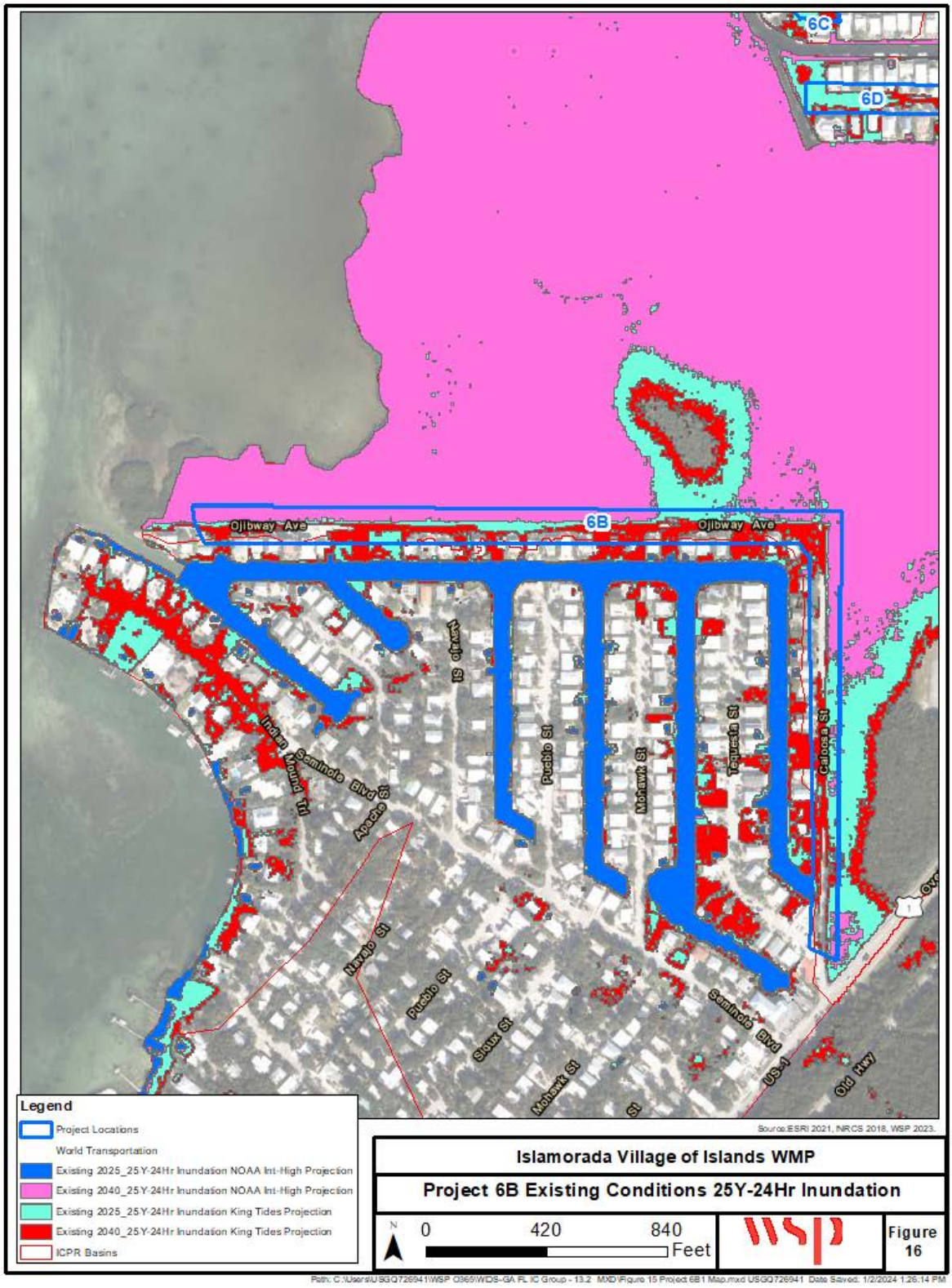
6C
6D
6B
Ojibway Ave
Ojibway Ave
Navajo St
Pueblo St
Mohawk St
Tequesta St
Calusa St
Seminole Blvd
Indian Mound Trl
Apache St
Navajo St
Pueblo St
Sioux St
Mohawk St
Seminole Blvd
US-1
Old Hwy
Legend
Project Locations
World Transportation
Existing 2025_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2040_25Y-24Hr Inundation NOAA Int-High Projection
Existing 2025_25Y-24Hr Inundation King Tides Projection
Existing 2040_25Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, INRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 6B Existing Conditions 25Y-24Hr Inundation
N
0
420
840
Feet
Figure 16
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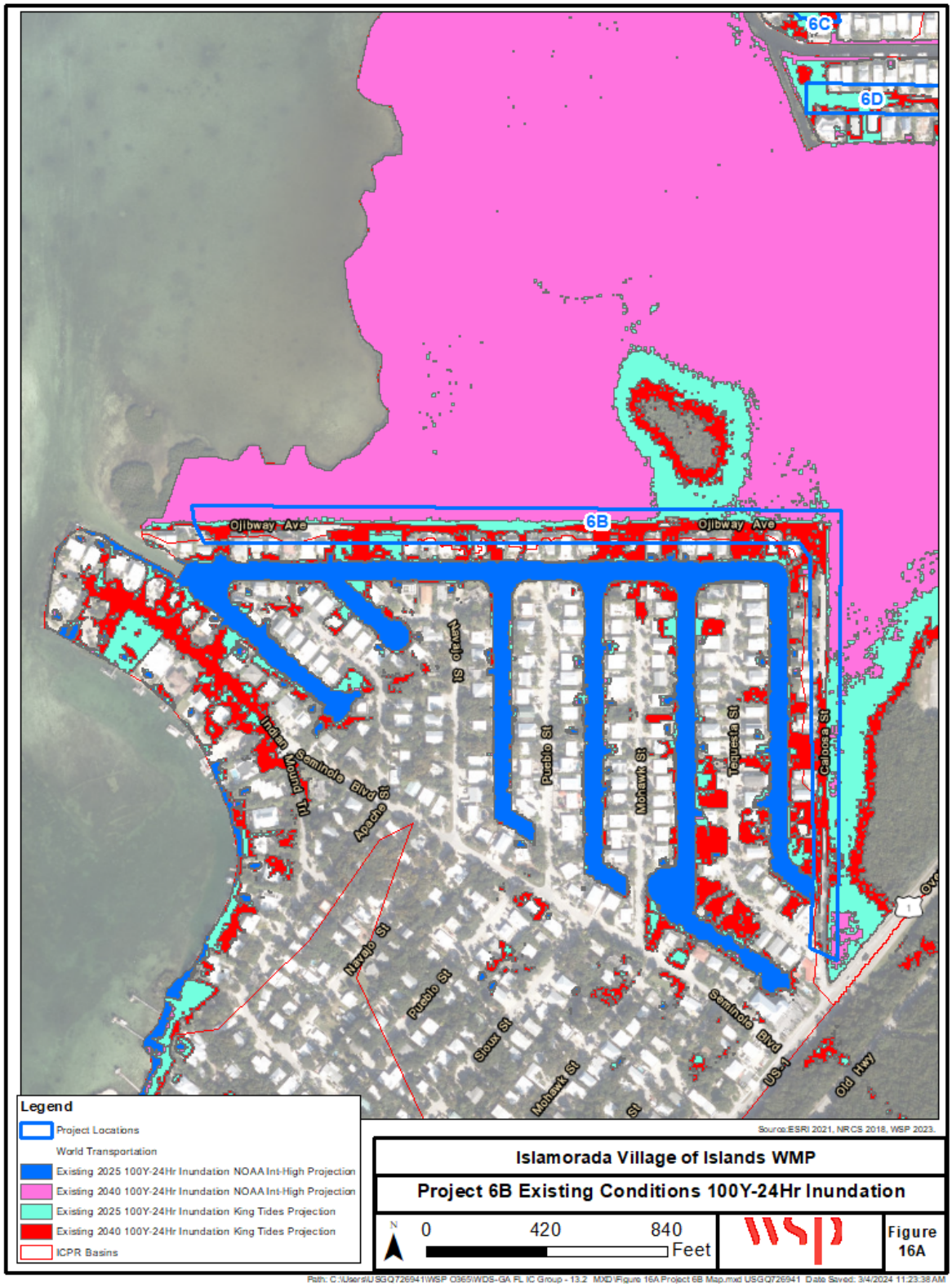
6C
6D
6B
Ojibway Ave
Ojibway Ave
Navajo St
Indian Mound Trl
Seminole Blvd
Apache St
Pueblo St
Mohawk St
Tequesta St
Caloosa St
Navajo St
Pueblo St
Sioux St
Mohawk St
Seminole Blvd
US-1
Old Hwy
Legend
Project Locations
World Transportation
Existing 2025 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2040 100Y-24Hr Inundation NOAA Int-High Projection
Existing 2025 100Y-24Hr Inundation King Tides Projection
Existing 2040 100Y-24Hr Inundation King Tides Projection
ICPR Basins
Source:ESRI 2021, NRCS 2018, WSP 2023.
Islamorada Village of Islands WMP
Project 6B Existing Conditions 100Y-24Hr Inundation
N
0
420
840
Feet
Figure 16A
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7. The community must adopt the final plan.

The community will adopt the final Watershed Management Plan by Resolution when it is completed and submitted to the Village Council.

8. If applicable, WMP plans more than 5 years old must be evaluated to ensure that they remain applicable to current conditions. For instance, are previous assumptions on hydrology, sea level rise and future land use still applicable.

This Section is not relevant because this is the first WMP for the Village.

IV. Jurisdiction Specific Comments for Task 1

Task 1.1: Data collection for structures – Islamorada, Village of Islands shall provide a list of critical assets, including regionally significant, to be evaluated for potential impacts by flooding and sea level rise including (but not limited to) transportation assets and evacuation routes; critical infrastructure; critical community and emergency facilities; and natural, cultural, and historical resources.

> *Please refer to Section xxx, page xxx of this Preliminary Project Plan outlining the work of the Vulnerability Assessment currently being conducted. The links within that section provide an accounting of all critical and regionally significant assets to be evaluated grouped according to asset class. All assets will be evaluated for the Vulnerability Assessment using ArcGIS according to Section 380.093(3), F.S. requirements.*

Additionally, Islamorada, Village of Islands shall include an individualized assessment with updated structures from the 2019 Watershed Management Plan, and any additional field work and analysis stemming from the Countywide Roads and Stormwater Assessment (2022).

> *The 2019 Watershed Management Plan refers to Monroe County's previously approved and credited Watershed Management Plan. To the extent pertinent structure or analytical data would be relevant, it has been included with the Vulnerability Assessment and ICPR Model being developed for this Watershed Management Plan for Islamorada in 2023. Given that was a County plan, very little data has been extracted from that effort because this Watershed Management Plan for Islamorada 2023 is based on Islamorada-specific geographical boundaries, conditions, critical facilities and assets. The same holds true for the Countywide Roads and Stormwater Assessment (2022) because that effort focused on unincorporated County assets and structures, while this Watershed Management Plan for Islamorada 2023 focuses on Islamorada-specific structures, assets and data.*

Tasks 1.2 and 1.3: Preliminary Flood Modeling and Project Plan – In addition to the above Minimum Criteria, Islamorada, Village of Islands shall align the Project Plan modeling effort with Section 380.093, F.S., and the approach for this assessment will include:

1) Mapping potential future regular tidal inundation from sea level rise, high tide flooding, and

> *This work has been conducted in the context of the Islamorada Vulnerability Assessment and the initial map series has been linked earlier in this Preliminary Project Plan. All scenarios have been listed previously. Tide gauge data and inundation levels have been coordinated between the Vulnerability Assessment*

and ICPR modeling effort for this Watershed Management Plan for Islamorada 2023.

2) Map potential storm surge events to project multiple sea-level-adjusted designed storm events (at a minimum, the 100-year event).

This scenario was modeled as previously discussed.

Additionally, Islamorada, Village of Islands will clarify in writing which tasks and efforts have already been completed prior to contract execution. With the mapping efforts, Islamorada, Village of Islands shall provide the source and dates of data acquisition, locational accuracy, and map projection and coordinate system information of geospatial data.

V. References

E. Shahsi 2015, Menon's in Transmission Pipeline Calculations and Simulations Manual.

FDOT, 2023, FDOT Resilience Action Plan Appendix A (Project List).

Monroe County 2020, King Tide and Normal Wind Setup Analysis for Monroe County, Florida.

SJRWMD 1990, Procedure for Selection of SCS Peak Rate Factors for use in MSSW Permit Applications.

SJRWMD 2012, Chapter 3: Watershed Hydrology, Appendix 3.A.: Land Use Classification/Grouping from SJRWMD Technical Reports.

South Florida Water Management District 2022, Adoption of Future Extreme Rainfall Change Factors for Flood Resiliency Planning in South Florida.

VI. Appendix A: Article 6-III Flood plain Management Standards, Islamorada Code of Ordinances.

Sec 6-81 General

1. Title. These regulations shall be known as the Floodplain Management Ordinance of Islamorada, Village of Islands, hereinafter referred to as "this article."
2. Scope. The provisions of this article shall apply to all development that is wholly within or partially within any flood hazard area, including but not limited to the subdivision of land; filling, grading, and other site improvements and utility installations; construction, alteration, remodeling, enlargement, improvement, replacement, repair, relocation or demolition of buildings, structures, and facilities that are exempt from the Florida Building Code; placement, installation, or replacement of manufactured homes and manufactured buildings; installation or replacement of tanks; placement of recreational vehicles; installation of swimming pools; and any other development.
3. Intent. The purposes of this article and the flood load and flood resistant construction requirements of the Florida Building Code are to establish minimum requirements to safeguard the public health, safety, and general welfare and to minimize public and private losses due to flooding through regulation of development in flood hazard areas to:
    1. Minimize unnecessary disruption of commerce, access and public service during times of flooding;
    2. Require the use of appropriate construction practices in order to prevent or minimize future flood damage;
    3. Manage filling, grading, dredging, mining, paving, excavation, drilling operations, storage of equipment or materials, and other development which may increase flood damage or erosion potential;
    4. Manage the alteration of flood hazard areas and shorelines to minimize the impact of development on the natural and beneficial functions of the floodplain;
    5. Minimize damage to public and private facilities and utilities;
    6. Help maintain a stable tax base by providing for the sound use and development of flood hazard areas;
    7. Minimize the need for future expenditure of public funds for flood control projects and response to and recovery from flood events; and
    8. Meet the requirements of the National Flood Insurance Program for community participation as set forth in Title 44 Code of Federal Regulations, Section 59.22.
4. Coordination with the Florida Building Code. This article is intended to be administered and enforced in conjunction with the Florida Building Code. Where cited, ASCE 24 refers to the edition of the standard that is referenced by the Florida Building Code.
5. Warning. The degree of flood protection required by this article and the Florida Building Code, as amended by this community, is considered the minimum reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur. Flood heights may be increased by man-made or natural causes. This article does not imply that land outside of mapped special flood hazard areas, or that uses permitted within such flood hazard areas, will be free from flooding or flood damage.

The flood hazard areas and base flood elevations contained in the Flood Insurance Study and shown on Flood Insurance Rate Maps and the requirements of Title 44 Code of Federal Regulations, Sections 59 and 60 may be revised by the Federal Emergency Management Agency, requiring this community to revise these regulations to remain eligible for participation in the National Flood Insurance Program. No guaranty of vested use, existing use, or future use is implied or expressed by compliance with this article.

6. Disclaimer of Liability. This article shall not create liability on the part of Village Council of Islamorada, Village of Islands or by any officer or employee thereof for any flood damage that results from reliance on this article, or any administrative decision lawfully made thereunder.

Sec 6-82 Definitions

Unless otherwise expressly stated, the following words and terms shall, for the purposes of this article, have the meanings shown in this section. Where terms are not defined in this article and are defined in the Florida Building Code, such terms shall have the meanings ascribed to them in that code. Where terms are not defined in this article or the Florida Building Code, such terms shall have ordinarily accepted meanings such as the context implies.

Accessory structure. A structure that is located on the same parcel of property as the principal structure and the use of which is incidental to the use of the principal structure. Accessory structures should constitute a minimal initial investment, may not be used for human habitation, and must be designed to have minimal flood damage potential. For floodplain management purposes, the term includes only accessory structures used for parking and storage. Examples of accessory structures are detached garages, carports, storage sheds, pole barns, and hay sheds. *Appeal.* A request for a review of the Floodplain Administrator's interpretation of any provision of this article. *ASCE 24.* A standard titled Flood Resistant Design and Construction that is referenced by the Florida Building Code. ASCE 24 is developed and published by the American Society of Civil Engineers, Reston, VA.

Base flood. A flood having a 1-percent chance of being equaled or exceeded in any given year. [Also defined in FBC, B, Section 202.] The base flood is commonly referred to as the "100 year flood" or the "1-percent-annual chance flood."

Base flood elevation (BFE). The elevation of the base flood, including wave height, relative to the National Geodetic Vertical Datum (NGVD), North American Vertical Datum (NAVD) or other datum specified on the Flood Insurance Rate Map (FIRM). [Also defined in FBC, B, Section 202.]

Basement. The portion of a building having its floor subgrade (below ground level) on all sides. [Also defined in FBC, B, Section 202; see "Basement (for flood loads)".] *Coastal high hazard area*. A special flood hazard area extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Coastal high hazard areas are also referred to as "high hazard areas subject to high velocity wave action" or "V Zones" and are designated on Flood Insurance Rate Maps (FIRM) as Zone V1 V30, VE, or V.

Declaration of Land Restriction (*Non-conversion Agreement*). A form provided by the Floodplain Administrator to be signed by the owner and recorded on the property deed in Official Records of the Clerk of Courts, for the owner to agree not to convert or modify in any manner that is inconsistent with the terms of the building permit and these regulations, enclosures below elevated buildings.
Design flood. The flood associated with the greater of the following two areas: [Also defined in FBC, B, Section 202.]

1. Area with a floodplain subject to a 1-percent or greater chance of flooding in any year; or
2. Area designated as a flood hazard area on the community's flood hazard map, or otherwise legally designated.

Design flood elevation. The elevation of the "design flood," including wave height, relative to the datum specified on the community's legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation shall be the elevation of the highest existing grade of the building's perimeter plus the depth number (in feet) specified on the flood hazard map. In areas designated as Zone AO where the depth number is not specified on the map, the depth number shall be taken as being equal to 2 feet. [Also defined in FBC, B, Section 202.]

Development. Any man-made change to improved or unimproved real estate, including but not limited to, buildings or other structures, tanks, temporary structures, temporary or permanent storage of equipment or materials, mining, dredging, filling, grading, paving, excavations, drilling operations or any other land disturbing activities.

Encroachment. The placement of fill, excavation, buildings, permanent structures, or other development into a flood hazard area which may impede or alter the flow capacity of riverine flood hazard areas.
Existing building and existing structure. Any buildings and structures for which the "start of construction" commenced before October 1, 1998. [Also defined in FBC, B, Section 202.]

Federal Emergency Management Agency (FEMA). The federal agency that, in addition to carrying out other functions, administers the National Flood Insurance Program.

Fill, nonstructural. Soil that is not structural fill and that is expected to wash away during a flood event.
Fill, structural. Material such as soil, gravel, or crushed stone that is placed and compacted to a specified density to provide structural support or protection to a structure.

Flood or flooding. A general and temporary condition of partial or complete inundation of normally dry land from: [Also defined in FBC, B, Section 202.]

1. The overflow of inland or tidal waters.
2. The unusual and rapid accumulation or runoff of surface waters from any source.

Flood damage-resistant materials. Any construction material capable of withstanding direct and prolonged contact with floodwaters without sustaining any damage that requires more than cosmetic repair. [Also defined in FBC, B, Section 202.]
Flood hazard area. The greater of the following two areas: [Also defined in FBC, B, Section 202.]

1. The area within a floodplain is subject to a 1-percent or greater chance of flooding in any year.
2. The area designated as a flood hazard area on the community's flood hazard map, or otherwise legally designated.

Flood Insurance Rate Map (FIRM). The official map of the community on which the Federal Emergency Management Agency has delineated both special flood hazard areas and the risk premium zones applicable to the community. [Also defined in FBC, B, Section 202.]

Flood Insurance Study (FIS). The official report provided by the Federal Emergency Management Agency that contains the Flood Insurance Rate Map, the Flood Boundary and Floodway Map (if applicable), the water surface elevations of the base flood, and supporting technical data. [Also defined in FBC, B, Section 202.].
Floodplain Administrator. The office or position designated and charged with the administration and enforcement of this article (may be referred to as the Floodplain Manager).

Florida Building Code. The family of codes adopted by the Florida Building Commission, including Florida Building Code, Building; Florida Building Code, Residential; Florida Building Code, Existing Building; Florida Building Code, Mechanical; Florida Building Code, Plumbing; Florida Building Code, Fuel Gas, National Electric Code, (NFPA 70)

Functionally dependent use. A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water, including only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities; the term does not include long term storage or related manufacturing facilities.

Highest adjacent grade. The highest natural elevation of the ground surface prior to construction next to the proposed walls or foundation of a structure.

Historic structure. Any structure that is determined eligible for the exception to the flood hazard area requirements of the Florida Building Code, Existing Building, Chapter 12 Historic Buildings.

In-ground. Placed fully into the ground such that the top edge or top surface of a pool or other feature that is in the ground is flush with pre-construction grade. Installation where a small portion of the pool or other feature extends above the pre-construction grade is not in-ground.

Letter of Map Change (LOMC). An official determination issued by FEMA that amends or revises an effective Flood Insurance Rate Map or Flood Insurance Study. Letters of Map Change include:

1. Letter of Map Amendment (LOMA): An amendment based on technical data showing that a property was incorrectly included in a designated special flood hazard area. A LOMA amends the current effective Flood Insurance Rate Map and establishes that a specific property, portion of a property, or structure is not located in a special flood hazard area.
2. Letter of Map Revision (LOMR): A revision based on technical data that may show changes to flood zones, flood elevations, special flood hazard area boundaries and floodway delineations, and other planimetric features.
3. Letter of Map Revision Based on Fill (LOMR-F): A determination that a structure or parcel of land has been elevated by fill above the base flood elevation and is, therefore, no longer located within the special flood hazard area. In order to qualify for this determination, the fill must have been permitted and placed in accordance with the community's floodplain management regulations.
4. Conditional Letter of Map Revision (CLOMR): A formal review and comment as to whether a proposed flood protection project or other project complies with the minimum NFIP requirements for such projects with respect to delineation of special flood hazard areas. A CLOMR does not revise the effective Flood Insurance Rate Map or Flood Insurance Study; upon submission and approval of certified as-built documentation, a Letter of Map Revision may be issued by FEMA to revise the effective FIRM.

Light-duty truck. As defined in 40 C.F.R. 86.082-2, any motor vehicle rated at 8,500 pounds Gross Vehicular Weight Rating or less which has a vehicular curb weight of 6,000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less, which is:

1. Designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or
2. Designed primarily for transportation of persons and has a capacity of more than 12 persons; or
3. Available with special features enabling off-street or off-highway operation and use.

Lowest floor. The lowest floor of the lowest enclosed area of a building or structure, including the basement, but excluding any unfinished or flood-resistant enclosure, other than a basement, usable solely for vehicle parking, building access, or limited storage provided that such enclosure is not built so as to render the structure in violation of the non-elevation requirements of the Florida Building Code or ASCE 24. [Also defined in FBC, B, Section 202.]

Manufactured home. A structure, transportable in one or more sections, which is eight (8) feet or more in width and greater than four hundred (400) square feet, and which is built on a permanent, integral chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle" or "park trailer." [Also defined in 15C-1.0101, F.A.C.]

Manufactured home park or subdivision. A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Market value. The value of a building or structure, excluding the land and other improvements on the parcel. Market value is the Actual Cash Value (like-kind replacement cost depreciated for age, wear and tear, neglect, and quality of construction) determined by a qualified independent appraiser or the County Property Appraiser's value of the structure adjusted to approximate market value by a factor provided by the County Property Assessor.

Natural Grade The grade unaffected by construction techniques such as fill, landscaping or berming.

New construction. For the purposes of administration of this article and the flood resistant construction requirements of the Florida Building Code, structures for which the "start of construction" commenced on or after October 1, 1998 and includes any subsequent improvements to such structures.

Park trailer. A transportable unit which has a body width not exceeding fourteen (14) feet and which is built on a single chassis and is designed to provide seasonal or temporary living quarters when connected to utilities necessary for operation of installed fixtures and appliances. [Defined in section 320.01, F.S.]
Real Estate Numbers. (RE List) Real state numbers of parcels that are within the SFAMs identified by the U.S. Fish and Wildlife Service (Service) in accordance with the Biological Opinion dated April 30, 2010. Recreational vehicle. A vehicle, including a park trailer, which is: [See section 320.01, F.S.)

1. Built on a single chassis;
2. Four hundred (400) square feet or less when measured at the largest horizontal projection;
3. Designed to be self propelled or permanently towable by a light duty truck; and
4. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

Sand dunes. Naturally occurring accumulations of sand in ridges or mounds landward of the beach.
Special flood hazard area. An area in the floodplain subject to a 1 percent or greater chance of flooding in any given year. Special flood hazard areas are shown on FIRMs as Zone A, AO, A1 A30, AE, A99, AH, V1 V30, VE or V. [Also defined in FBC, B Section 202.]

Species Focus Area Maps (SFAMs). Identified by the U.S. Fish and Wildlife Service (Service) in accordance with the Biological Opinion dated April 30, 2010. *Start of construction*. Start of construction includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent

construction does not include land preparation, such as clearing, grading, and filling, nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building. [Also defined in FBC, B Section 202.]

Substantial damage. Damage of any origin sustained by a building or structure whereby the cost of restoring the building or structure to its before-damaged condition would equal or exceed 50 percent of the market value of the building or structure before the damage occurred. [Also defined in FBC, B Section 202.]

Substantial improvement. Any repair, reconstruction, rehabilitation, alteration, addition, or other improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure before the improvement or repair is started. If the structure has incurred "substantial damage," any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either: [Also defined in FBC, B, Section 202.].

1. Any project for improvement of a building required to correct existing health, sanitary, or safety code violations identified by the building official and that are the minimum necessary to assure safe living conditions.
2. Any alteration of a historic structure provided the alteration will not preclude the structure's continued designation as a historic structure.

Variance. A grant of relief from the requirements of this article, or the flood resistant construction requirements of the Florida Building Code, which permits construction in a manner that would not otherwise be permitted by this article or the Florida Building Code.

Sec 6-83 Applicability

1. General. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.
2. Areas to which this article applies. This article shall apply to all flood hazard areas within the Islamorada, Village of Islands, as established in Section 6-83(c) of this article.
3. Basis for establishing flood hazard areas and the Species Focus Area Maps and Real Estate Numbers.
    1. The Flood Insurance Study for Monroe County, Florida and incorporated areas dated February 18, 2005, and all subsequent amendments and revisions, and the accompanying Flood Insurance Rate Maps (FIRM), and all subsequent amendments and revisions to such maps, are adopted by reference as a part of this article and shall serve as the minimum basis for establishing flood hazard

areas. Studies and maps that establish flood hazard areas are on file at the Village Planning and Development Services Department.

2. The Species Focus Area Maps (SFAMs) and the Real Estate numbers of parcels (RE List) that are within the SFAMs identified by the U.S. Fish and Wildlife Service in accordance with the Biological Opinion, dated April 30, 2010, as amended, for the Village, and any subsequent revisions there to, are hereby declared to be a part of this article. The SFAMs and RE list are on file at the Village Planning and Development Services Department and on the Village webpage.

4. Submission of additional data to establish flood hazard areas. To establish flood hazard areas and base flood elevations, pursuant to Section 6-87 of this article the Floodplain Administrator may require submission of additional data. Where field surveyed topography prepared by a Florida licensed professional surveyor or digital topography accepted by the community indicates that ground elevations:
    1. Are below the closest applicable base flood elevation, even in areas not delineated as a special flood hazard area on a FIRM, the area shall be considered as flood hazard area and subject to the requirements of this article and, as applicable, the requirements of the Florida Building Code.
    2. Are above the closest applicable base flood elevation, the area shall be regulated as special flood hazard area unless the applicant obtains a Letter of Map Change that removes the area from the special flood hazard area.
5. Other laws. The provisions of this article shall not be deemed to nullify any provisions of local, state or federal law.
6. Abrogation and greater restrictions. This article supersedes any ordinance in effect for management of development in flood hazard areas. However, it is not intended to repeal or abrogate any existing ordinances including but not limited to land development regulations, zoning ordinances, stormwater management regulations, or the Florida Building Code. In the event of a conflict between this article and any other ordinance, the more restrictive shall govern. This article shall not impair any deed restriction, covenant, or easement, but any land that is subject to such interests shall also be governed by this article.
7. Interpretation. In the interpretation and application of this article, all provisions shall be:
    1. Considered as minimum requirements;
    2. Liberally construed in favor of the governing body; and
    3. Deemed neither to limit nor repeal any other powers granted under state statutes.

Sec 6-84 Duties And Powers Of The Floodplain Administrator

1. Designation. The Village Manager is the designated the Floodplain Administrator. The Floodplain Administrator may delegate performance of certain duties to other employees.
2. General. The Floodplain Administrator is authorized and directed to administer and enforce the provisions of this article. The Floodplain Administrator shall have the authority to render interpretations of this article consistent with the intent and purpose of this article and may establish policies and procedures in order to clarify the application of its provisions. Such interpretations, policies, and procedures shall not have the effect of

waiving requirements specifically provided in this article without the granting of a variance pursuant to Section 6-89 of this article.

3. Applications and permits. The Floodplain Administrator, in coordination with other pertinent offices of the community, shall:
    1. Review applications and plans to determine whether proposed new development will be located in flood hazard areas;
    2. Review applications for modification of any existing development in flood hazard areas for compliance with the requirements of this article;
    3. Interpret flood hazard area boundaries where such interpretation is necessary to determine the exact location of boundaries; a person contesting the determination shall have the opportunity to appeal the interpretation;
    4. Provide available flood elevation and flood hazard information;
    5. Determine whether additional flood hazard data shall be obtained from other sources or shall be developed by an applicant;
    6. Review applications to determine whether proposed development will be reasonably safe from flooding;
    7. Issue building permits or approvals for development other than buildings and structures that are subject to the Florida Building Code, including buildings, structures and facilities exempt from the Florida Building Code, when compliance with this article is demonstrated, or disapprove the same in the event of noncompliance; and
    8. Coordinate with and provide comments to the Building Official to assure that applications, plan reviews, and inspections for buildings and structures in flood hazard areas comply with the applicable provisions of this article.
4. Substantial improvement and substantial damage determinations. For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the Floodplain Administrator, in coordination with the Building Official, shall:
    1. Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made;
    2. Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;
    3. Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; for proposed work to repair damage caused by flooding, the determination requires evaluation of previous permits issued to repair flood-related damage as specified in the definition of “substantial damage”; and

4. Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the Florida Building Code and this article is required.

5. Modifications of the strict application of the requirements of the Florida Building Code. The Floodplain Administrator shall review requests submitted to the Building Official that seek approval to modify the strict application of the flood load and flood resistant construction requirements of the Florida Building Code to determine whether such requests require the granting of a variance pursuant to Section 6-89 of this article.
6. Notices and orders. The Floodplain Administrator shall coordinate with appropriate local agencies for the issuance of all necessary notices or orders to ensure compliance with this article.
7. Inspections. The Floodplain Administrator shall make the required inspections as specified in Section 6-88 of this article for development that is not subject to the Florida Building Code, including buildings, structures and facilities exempt from the Florida Building Code. The Floodplain Administrator shall inspect flood hazard areas to determine if development is undertaken without issuance of a permit.
8. Other duties of the Floodplain Administrator. The Floodplain Administrator shall have other duties, including but not limited to:
    1. Establish, in coordination with the Building Official, procedures for administering and documenting determinations of substantial improvement and substantial damage made pursuant to Section 6-84(d) of this article;
    2. Require applicants who submit hydrologic and hydraulic engineering analyses to support permit applications to submit to FEMA the data and information necessary to maintain the Flood Insurance Rate Maps if the analyses propose to change base flood elevations, or flood hazard area boundaries; such submissions shall be made within 6 months of such data becoming available;
    3. Review required design certifications and documentation of elevations specified by this article and the Florida Building Code to determine that such certifications and documentations are complete;
    4. Notify the Federal Emergency Management Agency when the corporate boundaries of Islamorada, Village of Islands are modified; and
    5. Advise applicants for new buildings and structures, including substantial improvements, that are located in any unit of the Coastal Barrier Resources System established by the Coastal Barrier Resources Act (Pub. L. 97-348) and the Coastal Barrier Improvement Act of 1990 (Pub. L. 101-591) that federal flood insurance is not available on such construction; areas subject to this limitation are identified on Flood Insurance Rate Maps as “Coastal Barrier Resource System Areas” and “Otherwise Protected Areas.”
9. Floodplain management records. Regardless of any limitation on the period required for retention of public records, the Floodplain Administrator shall maintain and permanently keep and make available for public inspection all records that are necessary for the administration of this article and the flood resistant construction requirements of the Florida Building Code, including Flood Insurance Rate Maps; Letters of Map Change;

records of issuance of permits and denial of permits; determinations of whether proposed work constitutes substantial improvement or repair of substantial damage; required design certifications and documentation of elevations specified by the Florida Building Code and this article; documentation related to appeals and variances, including justification for issuance or denial; and records of enforcement actions taken pursuant to this article and the flood resistant construction requirements of the Florida Building Code. These records shall be available for public inspection at the Village Planning and Development Services Department.

Sec 6-85 Permits

1. Permits required. Any owner or owner's authorized agent (hereinafter "applicant") who intends to undertake any development activity within the scope of this article, including buildings, structures and facilities exempt from the Florida Building Code, which is wholly within or partially within any flood hazard area shall first make application to the Floodplain Administrator, and the Building Official if applicable, and shall obtain the required permit(s) and approval(s). No such permit or approval shall be issued until compliance with the requirements of this article and all other applicable codes and regulations has been satisfied.
2. Buildings, structures and facilities exempt from the Florida Building Code. Pursuant to the requirements of federal regulation for participation in the National Flood Insurance Program (44 C.F.R. Sections 59 and 60), building permits or approvals shall be required for the following buildings, structures and facilities that are exempt from the Florida Building Code and any further exemptions provided by law, which are subject to the requirements of this article:
    1. Railroads and ancillary facilities associated with the railroad.
    2. Nonresidential farm buildings on farms, as provided in section 604.50, F.S.
    3. Temporary buildings or sheds used exclusively for construction purposes.
    4. Mobile or modular structures used as temporary offices.
    5. Those structures or facilities of electric utilities, as defined in section 366.02, F.S., which are directly involved in the generation, transmission, or distribution of electricity.
    6. Chickees constructed by the Miccosukee Tribe of Indians of Florida or the Seminole Tribe of Florida. As used in this paragraph, the term "chickee" means an open-sided wooden hut that has a thatched roof of palm or palmetto or other traditional materials, and that does not incorporate any electrical, plumbing, or other non-wood features.
    7. Family mausoleums not exceeding 250 square feet in area which are prefabricated and assembled on site or preassembled and delivered on site and have walls, roofs, and a floor constructed of granite, marble, or reinforced concrete.
    8. Temporary housing provided by the Department of Corrections to any prisoner in the state correctional system.
    9. Structures identified in section 553.73(10)(k), F.S., are not exempt from the Florida Building Code if such structures are located in flood hazard areas established on Flood Insurance Rate Maps.

3. Application for a permit or approval. To obtain a building permit or approval the applicant shall first file an application in writing on a form furnished by the community. The information provided shall:
    1. Identify and describe the development to be covered by the permit or approval.
    2. Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitively locate the site.
    3. Indicate the use and occupancy for which the proposed development is intended.
    4. Be accompanied by a site plan or construction documents as specified in Section 6-87 of this article.
    5. State the valuation of the proposed work.
    6. Be signed by the applicant or the applicant's authorized agent.
    7. Give such other data and information as required by the Floodplain Administrator.
    8. For projects proposing to enclose areas under elevated buildings, include signed Declaration of Land Restriction (Nonconversion Agreement); the agreement shall be recorded on the property deed prior to issuance of the Certificate of Occupancy.
4. Validity of permit or approval. The issuance of a building permit or approval pursuant to this article shall not be construed to be a permit for, or approval of, any violation of this article, the Florida Building Codes, or any other ordinance of this community. The issuance of permits based on submitted applications, construction documents, and information shall not prevent the Floodplain Administrator from requiring the correction of errors and omissions.
5. Expiration. A building permit or approval shall become invalid unless the work authorized by such permit is commenced within 180 days after its issuance, or if the work authorized is suspended or abandoned for a period of 180 days after the work commences. Extensions for periods of not more than 180 days each shall be requested in writing and justifiable cause shall be demonstrated.
6. Suspension or revocation. The Floodplain Administrator is authorized to suspend or revoke a building permit or approval if the permit was issued in error, on the basis of incorrect, inaccurate or incomplete information, or in violation of this article or any other ordinance, regulation or requirement of this community.
7. Other permits required. Building permits shall require applicants to obtain all applicable state or federal permits before commencement of the permitted development, including but not limited to the following:
    1. The South Florida Water Management District; section 373.036, F.S.
    2. Florida Department of Economic Opportunity, Chapter 380.05 F.S., Areas of Critical State Concern, and Chapter 553, Part IV, F.S., Florida Building Code.
    3. Florida Department of Health for onsite sewage treatment and disposal systems; section 381.0065, F.S. and Chapter 64E-6, F.A.C.
    4. Florida Department of Environmental Protection for activities subject to the Joint Coastal Permit; section 161.055, F.S.

5. Florida Department of Environmental Protection for activities that affect wetlands and alter surface water flows, in conjunction with the U.S. Army Corps of Engineers; Section 404 of the Clean Water Act.
6. U.S. Fish and Wildlife Service and the Florida Game and Fresh Water Fish Commission pertaining to Federally threatened and endangered species or their habitat.
7. Other Federal permits and approvals.

Sec 6-86 Protection Of Endangered Species

1. Applications with Determination of Unsuitable Habitat. Upon receipt of a building permit application for a property that is determined to be on the SFAMs and the RE list as containing unsuitable habitat, the Floodplain Administrator shall place a letter in the building permit file that indicates:
    1. The name of the Village official that made the determination;
    2. The date of the determination; and
    3. The date of the SFAM and RE list used to make the determination. Once the determination has been made, the Village may take action on the building permit application without further concern for Federally threatened and endangered species and their habitat.
2. Species Assessment Guides and Acceptance Form. The Species Assessment Guide for the Village provided by the U.S. Fish and Service (Service), dated December 23, 2011, and any subsequent revisions there to, is hereby declared to be a part of this article. The Species Assessment Guide is on file at the Village Planning and Development Services Department.
    1. The Village shall use the Species Assessment Guide to determine whether the applicant for a building permit application must seek technical assistance by the Service. For applications that require such assistance, the Village shall provide copies of the applications to the Service for review on a weekly basis.
    2. Based on the Service's technical assistance, Village shall condition the building permit to incorporate the Service's recommendations to avoid and/or to minimize possible impacts on Federally listed threatened and endangered species and their habitat.
    3. The Village shall maintain an Acceptance Form of the Service's recommendations in the permit file. The Acceptance Form shall be signed by the permit applicant and the building official.
    4. The Village shall use the Species Assessment Guides (SAGs) for properties that exist within the boundaries of a completed Habitat Conservation Plan and which are subject to the SFAMs. The Real Estate folio number list which accompanies the SFAMs will be utilized in combination to determine if a development permit application must be provided to the Service for technical assistance in order to meet the full requirements of the Endangered and Threatened sections of this section.

3. Avoiding Impacts on Federally Listed Species. All proposed development shall meet the conditions attached to building permits in accordance with Section 6-86(b) to avoid possible impacts to Federally threatened and endangered species and their habitat.

Sec 6-87 Site Plans And Construction Documents

1. Information for development in flood hazard areas. The site plan or construction documents for any development subject to the requirements of this article shall be drawn to scale and shall include, as applicable to the proposed development:
    1. Delineation of flood hazard areas and flood zone(s), base flood elevation(s), and ground elevations if necessary for review of the proposed development.
    2. Location of the proposed activity and proposed structures, and locations of existing buildings and structures; in coastal high hazard areas and Coastal A Zones, new buildings shall be located landward of the reach of mean high tide.
    3. Location, extent, amount, and proposed final grades of any filling, grading, or excavation.
    4. Where the placement of fill is proposed, the amount, type, and source of fill material; compaction specifications; a description of the intended purpose of the fill areas; and evidence that the proposed fill areas are the minimum necessary to achieve the intended purpose.
    5. Extent of any proposed alteration of sand dunes or mangrove stands, provided such alteration is approved by the Florida Department of Environmental Protection.

    The Floodplain Administrator is authorized to waive the submission of site plans, construction documents, and other data that are required by this article but that are not required to be prepared by a registered design professional if it is found that the nature of the proposed development is such that the review of such submissions is not necessary to ascertain compliance with this article.

2. Additional analyses. When activities that alter sand dunes or mangrove stands are proposed in coastal high hazard areas (Zone V) and Coastal A Zones, the applicant shall submit an engineering analysis that demonstrates that the proposed alteration will not increase the potential for flood damage. The analysis shall be prepared, signed and sealed by a Florida licensed engineer for submission with the site plan and construction documents.
3. Submission of additional data. When additional hydrologic, hydraulic or other engineering data, studies, and additional analyses are submitted to support an application, the applicant has the right to seek a Letter of Map Change from FEMA to change the base flood elevations or change boundaries of flood hazard areas shown on FIRMs, and to submit such data to FEMA for such purposes. The analyses shall be prepared by a Florida licensed engineer in a format required by FEMA. Submittal requirements and processing fees shall be the responsibility of the applicant.

Sec 6-88 Inspections

1. General. Development for which a building permit or approval is required shall be subject to inspection.
2. Development other than buildings and structures. The Floodplain Administrator shall inspect all development to determine compliance with the requirements of this article and the conditions of issued building permits or approvals.
3. Buildings, structures and facilities exempt from the Florida Building Code. The Floodplain Administrator shall inspect buildings, structures and facilities exempt from the Florida Building Code to determine compliance with the requirements of this article and the conditions of issued building permits or approvals.
4. Buildings, structures and facilities exempt from the Florida Building Code, lowest floor inspection. Upon placement of the lowest floor, including basement, and prior to further vertical construction, the owner of a building, structure or facility exempt from the Florida Building Code, or the owner's authorized agent, shall submit to the Floodplain Administrator the certification of elevation of the lowest floor prepared and sealed by a Florida licensed professional surveyor.
5. Buildings, structures and facilities exempt from the Florida Building Code, final inspection. As part of the final inspection, the owner or owner's authorized agent shall submit to the Floodplain Administrator a final certification of elevation of the lowest floor or final documentation of the height of the lowest floor above the highest adjacent grade; such certifications and documentations shall be prepared as specified in Section 6-88(d) of this article.
6. Manufactured homes. The Floodplain Administrator shall inspect manufactured homes that are installed or replaced in flood hazard areas to determine compliance with the requirements of this article and the conditions of the issued permit. Upon placement of a manufactured home, certification of the elevation of the lowest floor shall be submitted to the Floodplain Administrator.

Sec 6-89 Variances And Appeals

1. The Village Council shall hear and decide on requests for appeals and requests for variances from the strict application of this article.
2. Appeals. The Village Council shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the administration and enforcement of this article. Any person aggrieved by the decision may appeal such decision to the Circuit Court, as provided by Florida Statutes.
3. Limitations on authority to grant variances. The Village Council shall base its decisions on variances on technical justifications submitted by applicants, the considerations for issuance in Section 6-89(g) of this article, the conditions of issuance set forth in Section 6-89(h) of this article, and the comments and recommendations of the Floodplain Administrator and the Building Official. Variances shall not be granted after-the-fact. The Village Council has the right to attach such conditions as it deems necessary to further the purposes and objectives of this article.

4. Historic buildings. A variance is authorized to be issued for the repair, improvement, or rehabilitation of a historic building that is determined eligible for the exception to the flood resistant construction requirements of the Florida Building Code, Existing Building, Chapter 12 Historic Buildings, upon a determination that the proposed repair, improvement, or rehabilitation will not preclude the building's continued designation as a historic building and the variance is the minimum necessary to preserve the historic character and design of the building. If the proposed work precludes the building's continued designation as a historic building, a variance shall not be granted and the building and any repair, improvement, and rehabilitation shall be subject to the requirements of the Florida Building Code.
5. Functionally dependent uses. A variance is authorized to be issued for the construction or substantial improvement necessary for the conduct of a functionally dependent use, as defined in this article, and all due consideration has been given to use of methods and materials that minimize flood damage during occurrence of the base flood.
6. Certain at-grade accessory structures. A request for a variance is authorized to be heard and decided by the Director of Planning. For the construction or substantial improvement of at-grade accessory structures located in special flood hazard areas (zone A/AE) other than coastal high hazard areas that are larger than the size limits specified in Section 6-92(b), provided the requirements of this section are satisfied, the accessory structures are used only for parking or storage, and the accessory structures:
    1. Represent minimal investment and has low damage potential.
    2. Are one story and not larger than 1,200 square feet in size and have flood openings in accordance with Section R322.2 of the Florida Building Code, Residential.
    3. Are anchored to resist flotation, collapse or lateral movement resulting from flood loads.
    4. Have flood damage-resistant materials used below the base flood elevation plus one (1) foot.
    5. Have mechanical, plumbing and electrical systems, including plumbing fixtures, elevated to or above the base flood elevation plus one (1) foot.
7. Considerations for issuance of variances. In reviewing requests for variances, the Village Council shall consider all technical evaluations, all relevant factors, all other applicable provisions of the Florida Building Code, this article, and the following:
    1. The danger that materials and debris may be swept onto other lands resulting in further injury or damage;
    2. The danger to life and property due to flooding or erosion damage;
    3. The susceptibility of the proposed development, including contents, to flood damage and the effect of such damage on current and future owners;
    4. The importance of the services provided by the proposed development to the community;
    5. The availability of alternate locations for the proposed development that are subject to lower risk of flooding or erosion;
    6. The compatibility of the proposed development with existing and anticipated development;

7. The relationship of the proposed development to the comprehensive plan and floodplain management program for the area;
8. The safety of access to the property in times of flooding for ordinary and emergency vehicles;
9. The expected heights, velocity, duration, rate of rise and debris and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and
10. The costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, streets and bridges.

8. Conditions for issuance of variances. Variances shall be issued only upon:
    1. Submission by the applicant, of a showing of good and sufficient cause that the unique characteristics of the size, configuration, or topography of the site limit compliance with any provision of this article or the required elevation standards;
    2. Determination by the Village Council that:
        1. Failure to grant the variance would result in exceptional hardship due to the physical characteristics of the land that render the lot undevelopable; increased costs to satisfy the requirements or inconvenience do not constitute hardship;
        2. The granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, nor create nuisances, cause fraud on or victimization of the public or conflict with existing local laws and ordinances; and
        3. The variance is the minimum necessary, considering the flood hazard, to afford relief;
    3. Receipt of a signed statement by the applicant that the variance, if granted, shall be recorded in the Office of the Clerk of the Court in such a manner that it appears in the chain of title of the affected parcel of land; and
    4. If the request is for a variance to allow construction of the lowest floor of a new building, or substantial improvement of a building, below the required elevation, a copy in the record of a written notice from the Floodplain Administrator to the applicant for the variance, specifying the difference between the base flood elevation and the proposed elevation of the lowest floor, stating that the cost of federal flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation (up to amounts as high as $25 for $100 of insurance coverage), and stating that construction below the base flood elevation increases risks to life and property. A copy of the notice shall be recorded by the Floodplain Administrator in the Office of the Clerk of Court and shall be recorded in a manner so that it appears in the chain of title of the affected parcel of land. The fee for recording shall be collected at the time of application.

<u>Sec 6-90 Violations</u>

1. Violations. Any development that is not within the scope of the Florida Building Code but that is regulated by this article that is performed without an issued permit, that is in

conflict with an issued permit, or that does not fully comply with this article, shall be deemed a violation of this article. A building or structure without the documentation of elevation of the lowest floor, other required design certifications, or other evidence of compliance required by this article, or the Florida Building Code is presumed to be a violation until such time as that documentation is provided.

2. Authority. For development that is not within the scope of the Florida Building Code but that is regulated by this article and that is determined to be a violation, the Floodplain Administrator is authorized to serve notices of violation or stop work orders to owners of the property involved, to the owner's agent, or to the person or persons performing the work.
3. Unlawful continuance. Any person who shall continue any work after having been served with a notice of violation or a stop work order, except such work as that person is directed to perform to remove or remedy a violation or unsafe condition, shall be fined not more than $500, and in addition, shall pay all costs and expenses involved in the case. Each day such violation continues shall be considered a separate offense.

Sec 6-91 Real Estate Disclosure; Flood Hazard Warning

All agreements for deed, purchase agreements, leases, or other contracts for sale or exchange of lots within areas of special flood hazard shall carry the following flood hazard warning prominently displayed on the document: FLOOD HAZARD WARNING THIS PROPERTY MAY BE SUBJECT TO FLOODING. YOU SHOULD CONTACT THE ISLAMORADA, VILLAGE OF ISLANDS, BUILDING SERVICES DEPARTMENT AND OBTAIN THE LATEST INFORMATION REGARDING FLOOD ELEVATIONS AND RESTRICTIONS ON DEVELOPMENT BEFORE MAKING USE OF THIS PROPERTY.

Sec 6-92 Buildings And Structures

1. Design and construction of buildings, structures and facilities exempt from the Florida Building Code. Pursuant to Section 6-85(b) of this article, buildings, structures, and facilities that are exempt from the Florida Building Code, including substantial improvement or repair of substantial damage of such buildings, structures and facilities, shall be designed and constructed in accordance with the flood load and flood resistant construction requirements of ASCE 24. Structures exempt from the Florida Building Code that are not walled and roofed buildings shall comply with the requirements of Section 6-94.4 of this article.
2. Non-elevated accessory structures. Accessory structures are permitted below elevations required by the Florida Building Code provided the accessory structures are used only for parking and storage and:
    1. If located in special flood hazard areas (Zone A/AE) other than coastal high hazard areas, are one-story and not larger than 600 sq. ft. and have flood openings in accordance with Section R322.2 of the Florida Building Code, Residential.
    2. If located in coastal high hazard areas (Zone V/VE), are not located below elevated buildings and are not larger than 100 sq. ft.
    3. Are anchored to resist flotation, collapse or lateral movement resulting from flood loads.

4. Have flood damage-resistant materials used below the base flood elevation plus one (1) foot.
5. Have mechanical, plumbing and electrical systems, including plumbing fixtures, elevated to or above the base flood elevation plus one (1) foot.

Sec 6-93 Subdivisions

1. Minimum requirements. Subdivision proposals, including proposals for manufactured home parks and subdivisions, shall be reviewed to determine that:
    1. Such proposals are consistent with the need to minimize flood damage and will be reasonably safe from flooding;
    2. All public utilities and facilities such as sewer, gas, electric, communications, and water systems are located and constructed to minimize or eliminate flood damage; and
    3. Adequate drainage is provided to reduce exposure to flood hazards; in Zones AH and AO, adequate drainage paths shall be provided to guide floodwaters around and away from proposed structures.
2. Subdivision plats. Where any portion of proposed subdivisions, including manufactured home parks and subdivisions, lies within a flood hazard area, the following shall be required:
    1. Delineation of flood hazard areas and flood zones, and design flood elevations, as appropriate, shall be shown on preliminary plats;
    2. Compliance with the site improvement and utilities requirements of Section 6-94 of this article.

Sec 6-94 Site Improvements, Utilities And Limitations

1. Minimum requirements. All proposed new development shall be reviewed to determine that:
    1. Such proposals are consistent with the need to minimize flood damage and will be reasonably safe from flooding;
    2. All public utilities and facilities such as sewer, gas, electric, communications, and water systems are located and constructed to minimize or eliminate flood damage; and
    3. Adequate drainage is provided to reduce exposure to flood hazards; in Zones AH and AO, adequate drainage paths shall be provided to guide floodwaters around and away from proposed structures.
2. Sanitary sewage facilities. All new and replacement sanitary sewage facilities, private sewage treatment plants (including all pumping stations and collector systems), and on-site waste disposal systems shall be designed in accordance with the standards for onsite sewage treatment and disposal systems in Chapter 64E-6, F.A.C. and ASCE 24 Chapter 7 to minimize or eliminate infiltration of floodwaters into the facilities and discharge from the facilities into flood waters, and impairment of the facilities and systems.
3. Water supply facilities. All new and replacement water supply facilities shall be designed in accordance with the water well construction standards in Chapter 62-532.500, F.A.C.

and ASCE 24 Chapter 7 to minimize or eliminate infiltration of floodwaters into the systems.

4. Limitations on placement of fill. Subject to the limitations of this article, fill shall be designed to be stable under conditions of flooding including rapid rise and rapid drawdown of floodwaters, prolonged inundation, and protection against flood-related erosion and scour. Fill shall not adversely impact adjacent properties as specified in Chapter 30, Article VII Environmental Regulations, Division 8 Stormwater Management. In addition to these requirements, if intended to support buildings and structures (Zone A only), fill shall comply with the requirements of the Florida Building Code.
5. Limitations on sites in coastal high hazard areas (Zone V) and Coastal A Zones. In coastal high hazard areas and Coastal A Zones, alteration of sand dunes and mangrove stands shall be permitted only if such alteration is approved by the Florida Department of Environmental Protection and only if the engineering analysis required by Section 6-87(b) of this article demonstrates that the proposed alteration will not increase the potential for flood damage. Construction or restoration of dunes under or around elevated buildings and structures shall comply with Section 6-94.4(e) of this article.

Sec 6-94.1 Manufactured Homes

1. General. All manufactured homes installed in flood hazard areas shall be installed by an installer that is licensed pursuant to Section 320.8249, F.S., and shall comply with the requirements of Chapter 15C-1, F.A.C. and the requirements of this article.
2. Foundations. All new manufactured homes and replacement manufactured homes installed in flood hazard areas shall be installed on permanent, reinforced foundations that:
    1. In flood hazard areas (Zone A) other than coastal high hazard areas and Coastal A Zones, are designed in accordance with the applicable foundation requirements of the Florida Building Code, Residential Section R322 and this article.
    2. In coastal high hazard areas (Zone V) and Coastal A Zones, are designed in accordance with the applicable foundation requirements of the Florida Building Code, Residential Section R322 and this article.
3. Anchoring. All new manufactured homes and replacement manufactured homes shall be installed using methods and practices which minimize flood damage and shall be securely anchored to an adequately anchored foundation system to resist flotation, collapse or lateral movement. Methods of anchoring include, but are not limited to, use of over-the-top or frame ties to ground anchors. This anchoring requirement is in addition to applicable state and local anchoring requirements for wind resistance.
4. Elevation requirement. All manufactured homes that are placed, replaced, or substantially improved shall be elevated such that the bottom of the frame is at or above the elevation required, as applicable to the flood hazard area, in the Florida Building Code, Residential Section R322.
5. Enclosures. Enclosed areas below elevated manufactured homes shall comply with the requirements of the Florida Building Code, Residential Section R322 for such enclosed areas, as applicable to the flood hazard area.

6. Utility equipment. Utility equipment that serves manufactured homes, including electric, heating, ventilation, plumbing, and air conditioning equipment and other service facilities, shall comply with the requirements of the Florida Building Code, Residential Section R322, as applicable to the flood hazard area.

Sec 6-94.2 Recreational Vehicles And Park Trailers

1. Temporary placement. Recreational vehicles and park trailers placed temporarily in flood hazard areas shall:
    1. Be on the site for fewer than 180 consecutive days; or
    2. Be fully licensed and ready for highway use, which means the recreational vehicle or park model is on wheels or jacking system, is attached to the site only by quick-disconnect type utilities and security devices, and has no permanent attachments such as additions, rooms, stairs, decks and porches.
2. Permanent placement. Recreational vehicles and park trailers that do not meet the limitations in Section 6-94.2(a) of this article for temporary placement shall meet the requirements of Section 6-94.1 of this article for manufactured homes.

Sec 6-94.3 Tanks

1. Underground tanks. Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty.
2. Above-ground tanks, not elevated. Above-ground tanks that do not meet the elevation requirements of Section 6-94.3(c) of this article shall:
    1. Be permitted in flood hazard areas (Zone A) other than coastal high hazard areas and Coastal A Zones, provided the tanks are anchored or otherwise designed and constructed to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty and the effects of flood-borne debris.
    2. Not be permitted in coastal high hazard areas (Zone V) and Coastal A Zones.
3. Above-ground tanks, elevated. Above-ground tanks in flood hazard areas shall be elevated to or above the design flood elevation and attached to a supporting structure that is designed to prevent flotation, collapse or lateral movement during conditions of the design flood. Tank-supporting structures shall meet the foundation requirements of the applicable flood hazard area.
4. Tank inlets and vents. Tank inlets, fill openings, outlets and vents shall be:
    1. At or above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and
    2. Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

Sec 6-94.4 Other Development

1. General requirements for other development. All development, including man-made changes to improved or unimproved real estate for which specific provisions are not specified in this article or the Florida Building Code, shall:
    1. Be located and constructed to minimize flood damage;
    2. Be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of the design flood;
    3. Be constructed of flood damage-resistant materials; and
    4. Have mechanical, plumbing, and electrical systems above the design flood elevation or meet the requirements of ASCE 24, except that minimum electric service required to address life safety and electric code requirements is permitted below the design flood elevation provided it conforms to the provisions of the electrical part of building code for wet locations.
2. Concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses in coastal high hazard areas (Zone V) and Coastal A Zones. In coastal high hazard areas and Coastal A Zones, concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses are permitted beneath or adjacent to buildings and structures provided the concrete slabs are designed and constructed to be:
    1. Structurally independent of the foundation system of the building or structure; or
    2. Frangible and not reinforced, so as to minimize debris during flooding that is capable of causing significant damage to any structure; and have a maximum slab thickness of not more than four (4) inches.
3. Decks and patios in coastal high hazard areas (Zone V) and Coastal A Zones. In addition to the requirements of the Florida Building Code, in coastal high hazard areas and Coastal A Zones, decks and patios shall be located, designed, and constructed in compliance with the following:
    1. A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the design flood elevation and any supporting members that extend below the design flood elevation shall comply with the foundation requirements that apply to the building or structure, which shall be designed to accommodate any increased loads resulting from the attached deck.
    2. A deck or patio that is located below the design flood elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.
    3. A deck or patio that has a vertical thickness of more than twelve (12) inches or that is constructed with more than the minimum amount of fill necessary for site drainage shall not be approved unless an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters

or wave runup and wave reflection that would increase damage to the building or structure or to adjacent buildings and structures.

4. A deck or patio that has a vertical thickness of twelve (12) inches or less and that is at natural grade or on nonstructural fill material that is similar to and compatible with local soils and is the minimum amount necessary for site drainage may be approved without requiring analysis of the impact on diversion of floodwaters or wave runup and wave reflection.

4. Other development in coastal high hazard areas (Zone V) and Coastal A Zones. In coastal high hazard areas and Coastal A Zones, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate federal, state or local authority; if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures. Such other development activities include but are not limited to:
    1. Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;
    2. Solid fences and privacy walls, and fences prone to trapping debris, unless designed and con¬structed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters; and
    3. On-site sewage treatment and disposal systems defined in 64E-6.002, F.A.C., as filled systems or mound systems.
5. Nonstructural fill in coastal high hazard areas (Zone V) and Coastal A Zones. In coastal high hazard areas and Coastal A Zones:
    1. Minor grading and the placement of minor quantities of nonstructural fill shall be permitted for landscaping and for drainage purposes under and around buildings.
    2. Fill shall not adversely impact nearby properties as specified in Chapter 30, Article VII Environmental Regulations, Division 8 Stormwater Management.
    3. Fill shall not exceed 2 feet above average grade.
    4. Nonstructural fill with finished slopes that are steeper than one unit vertical to five units horizontal shall be permitted only if an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures.
    5. Where authorized by the Florida Department of Environmental Protection or applicable local approval, sand dune construction and restoration of sand dunes under or around elevated buildings are permitted without additional engineering analysis or certification of the diversion of floodwater or wave runup and wave reflection if the scale and location of the dune work is consistent with local beach-dune morphology and the vertical clearance is maintained between the top of the sand dune and the lowest horizontal structural member of the building.

In-ground pools and other in-ground features in coastal high hazard areas (Zone V) and Coastal A Zones. Installations of pools and other features that are in the ground where a small portion of

the pool or other feature extends above the pre-construction grade is not in-ground. The placement of nonstructural fill to obscure portions that extend above that grade elevation is not permitted.