



# NATIONAL KEY DEER REFUGE
# TRANSPORTATION STUDY
## Transportation Study Report

Contract No: DTFH71-09-D-00001, Task Order: 10-009

US Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division
in cooperation with US Fish and Wildlife Service and the National Key Deer Refuge

Kimley-Horn
and Associates, Inc.

July 2011

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## Executive Summary

The Florida Keys National Wildlife Refuges Complex is a chain of four National Wildlife Refuges (NWRs) in Monroe County, Florida. This plan focuses on the National Key Deer Refuge (NKDR). The NKDR encompasses a series of islands within the Lower Keys that include No Name Key, Big Pine Key, Little Torch Key, Ramrod Key, Summerland Key, Cudjoe Key, and Sugarloaf Key. It is the primary habitat for numerous federally endangered or threatened species including the Lower Keys Marsh Rabbit, the Silver Rice Rat, and the widely recognized Key Deer. The Refuge's approved acquisition boundary encompasses over 84,000 acres of lands and waters with nearly 9,200 acres of land owned or managed by the US Fish and Wildlife Service (USFWS) of the US Department of the Interior.

The Transportation Study Report reviewed the surrounding roadways and parking areas of the National Key Deer Refuge (NKDR) and provides short, medium, and long range recommendations for the improvements to the existing multimodal transportation system. The study included development of a public involvement plan, inventory of existing conditions at the Refuge, and identification of traffic safety and access needs for the Refuge. Based on these reports, preliminary candidate alternatives were developed and responsible stakeholder partners were identified. The preliminary candidate alternatives were divided into potential roadway improvements and additional recommendations for initial screening. The roadway alternatives were then evaluated in further detail to determine the preferred alternatives and developed into a short, medium, and long range implementation plan. The implementation plan presented herein includes a summary of the environmental, social, and financial impacts of the conceptual roadway alternatives. Additional detailed information on the planning process is provided in this report.

Based on the results of the study, short, medium and long range transportation roadway recommendations for the NKDR include the following:

**Short Range (2015)**

**Alternative 1**. Reconfigure Blue Hole Interpretive Site parking lot with defined entrances and exits

**Alternative 2a.** Stripe and sign a mid-block pedestrian crosswalk across Key Deer Boulevard at the Blue Hole Interpretive Site from the existing shared pathway on Key Deer Boulevard

**Alternative 2b.** Stripe sharrows (shared lane markings for bicycles) on Watson Boulevard from Key Deer Boulevard to Avenue B, Watson Boulevard on No Name Key, Watson Boulevard from Key Deer Boulevard to the western terminus, along Big Pine Street, and along Koehn Avenue

**Medium Range (2020)/Long Range (2030)**

As identified during the project process, Alternatives 2c, 3, and 4 have impacts to the environment that may not be considered acceptable to the community. Using the discussion in **Section 7** and **Table 7.1** as a guide, the implementation of the remaining consultant roadway improvement alternatives should be carefully assessed against all potential physical impacts and public concerns, with a determination by

the Refuge and other USFWS staff as to whether or not the implementation of the alternatives should move forward.

**Alternative 2c.** The following priorities have been developed for improvements to bicycle/pedestrian/shoulder facilities proposed in Alternative 2:

- Upgrade shoulder/widen Watson Boulevard to standard width from Key Deer Boulevard to Avenue B
- Upgrade shoulder/widen Watson Boulevard to standard width from No Name Key bridge to eastern terminus
- Upgrade shoulder/widen Watson Boulevard to standard width from Key Deer Boulevard to the western terminus
- Upgrade shoulder on Key Deer Boulevard from Watson Boulevard to Big Pine Street
- Upgrade shoulder on Key Deer Boulevard from Big Pine Street to Kyle Boulevard
- Upgrade shoulder/widen entire length of Big Pine Street to standard width
- Upgrade shoulder/widen entire length of Koehn Avenue to standard width

**Alternative 3**. Extend the shared pathway on Key Deer Boulevard to the northern terminus of Key Deer Boulevard (approximately 0.25 miles) and improve the shoulder facilities on Key Deer Boulevard in that area

**Alternative 4.** Widen the shared pathway on Key Deer Boulevard from eight to ten feet to allow for two-way bicycle and pedestrian traffic. This action would improve the safety of the path for both users. An associated alternative might consider the realignment of the sections adjacent to the vehicle traveled way.

The non-roadway improvements to be implemented as time and monies permit include:

**Alternative 5.** Trim vegetation at pullouts and intersections to increase sight distances where needed (i.e. Key Deer Boulevard)

**Alternative 6.** Perform routine trimming of vegetation around signs for visibility

**Alternative 7.** Review Monroe County's US 1 sign inventory sign study and implement sign improvements

**Alternative 8**. Once constructed, the new Visitors Center should tie into existing bicycle and pedestrian facilities already in place on US 1 and also potentially the back side of the property

**Alternative 9.** Purchase a radar speed check trailer to notify drivers of their travel speed on County roads within the Refuge area

**Alternative 10.** Perform traffic calming studies on key roadways around the Refuge to determine if traffic calming measures are appropriate to help reduce vehicle speeds

**Alternative 11.** In coordination with a local vendor, implement a bike rental station at the new Visitors Center for Refuge visitors

**Alternative 12.** Upgrade all existing USFWS Refuge signage for conformance with the Manual on Uniform Traffic Control Devices (MUTCD) criteria for standard lettering, text message, sign color, size and placement

**Alternative 13.** Survey Refuge visitors at the existing Visitors Center and the Blue Hole Interpretive Site on their trip characteristics to develop visitor pass-by information

**Alternative 14.** Install a kiosk at the new Visitors Center where multiple entities could provide information to reduce signage needs

**Alternative 15.** Update, add, relocate, replace or remove, as appropriate, Key Deer Warning Signs on US 1 through entire Key Deer habitat (including Sugarloaf Key, Cudjoe Key, Summerland Key, Ramrod Key, Little Torch Key, and West Summerland Key) based on discussions with USFWS, FDOT, Monroe County, and animal vehicle collision experts

**Alternative 16.** Continue awareness of Key Deer and other threatened and endangered species crossing area roadways

**Alternative 17.** Implement Intelligent Transportation System application to notify drivers of deer entering roadways

**Alternative 18.** Ongoing coordination with stakeholders

# 1. Introduction

The Florida Keys National Wildlife Refuges Complex is a chain of four National Wildlife Refuges (NWR) in Monroe County, Florida. This plan focuses on the National Key Deer Refuge (NKDR). The NKDR encompasses a series of islands within the Lower Keys that include No Name Key, Big Pine Key, Little Torch Key, Ramrod Key, Summerland Key, Cudjoe Key, and Sugarloaf Key. It is the primary habitat for numerous federally endangered or threatened species including the Lower Keys Marsh Rabbit, the Silver Rice Rat, and the widely recognized Key Deer. The Refuge's approved acquisition boundary encompasses over 84,000 acres of lands and waters with nearly 9,200 acres of land owned or managed by the US Fish and Wildlife Service (USFWS).

## 1.1 USFWS Mission and Goals

The NWR System is administered through the USFWS under the US Department of the Interior. The mission of the USFWS is to:

"Work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

The goals of the USFWS are aimed at fulfilling this mission. Primary USFWS goals are to:

- Sustain fish and wildlife populations including migratory birds, endangered species, anadromous fish, and marine animals;
- Conserve a network of lands and waters, including the NWR System; and
- Provide Americans the opportunity to understand and participate in the conservation and use of fish and wildlife resources.

The USFWS manages refuges across the country. The passage of the NWR System Improvement Act of 1997 defines the mission of the NWR System as follows:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

The goals of the Wildlife Refuge System are to:

- Preserve, restore, and enhance threatened and endangered species in their natural ecosystems;
- Perpetuate the migratory bird resource;
- Preserve a natural diversity and abundance of fish and wildlife ecology;
- Help the public gain an understanding and appreciation of fish and wildlife ecology; and
- Provide Americans the opportunity to understand and participate in the conservation and use of fish and wildlife resources.

The NWR System Improvement Act of 1997 identified six wildlife-dependent recreational uses that are recognized as priority public uses of refuge lands, including:

- Hunting
- Fishing
- Wildlife Observation
- Wildlife Photography
- Environmental Education
- Environmental Interpretation

## 1.2 Project Location

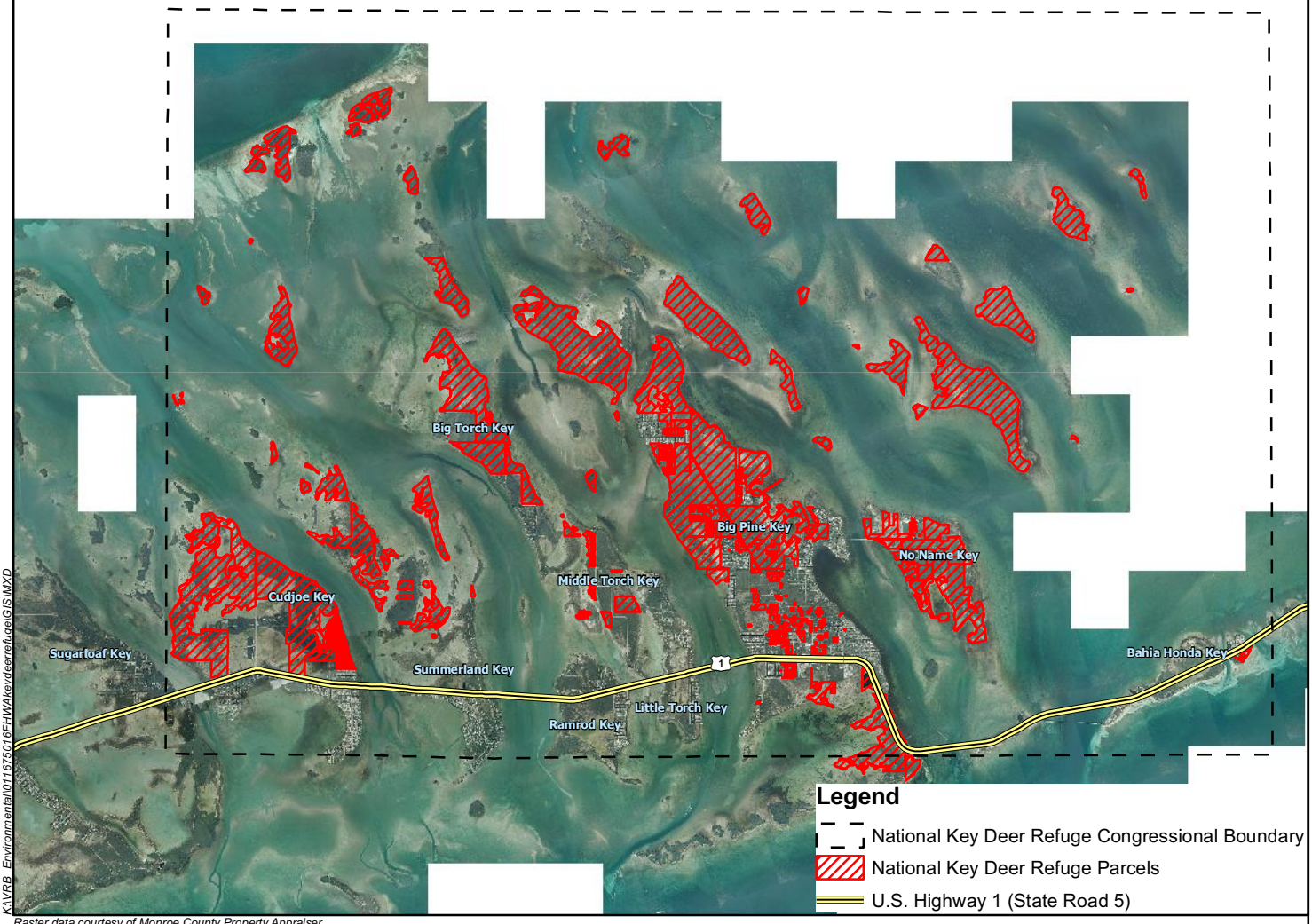
The NKDR is located in the Lower Keys Region of the Florida Keys in Monroe County, Florida. The overall boundary for the NKDR is shown in **Figure 1.1**. The transportation study area for the NKDR (**Figure 1.2**) focuses on areas that are readily accessible to the public on Big Pine Key and No Name Key. General transportation issues such as signage and wayfinding will be addressed for other islands accessible from US 1.

## 1.3 Project Background and Purpose

The Transportation Study documents the existing transportation infrastructure within and around the Refuge and looks at the roads and other regional transportation facilities adjacent to or providing access to the Refuge. The Transportation Study evaluates these existing conditions and proposes short, medium, and long range transportation solutions to improve the mobility for visitors and staff to and within the Refuge. More importantly, it will address safety concerns associated with deer-vehicle collisions that occur in the vicinity of the Refuge. The information presented in this report can be used in the next Comprehensive Conservation Plan (CCP) and US Fish and Wildlife Service Southeastern Regional Long Range Transportation Plan. The key points and the proposed alternatives in this report should be considered in these future planning efforts to assist in investment decisions for the future.

During the data collection and analysis for the Transportation Study, the following existing studies and data were reviewed and referenced. The data and results from these reports were used to derive the methodology applied to the Transportation Study, and to provide a baseline of data for the analysis. General consistency with these studies improved the likelihood of stakeholder consensus, and should increase the ease of implementation of the outlined recommendations.

- URS. 2010 US 1 Arterial Travel Time and Delay Study Monroe County Florida. December 2010
- Monroe County Growth Management Division. A Layman's Guide to Big Pine and No Name Key.
- Hellmuth, Obata + Kassabaum, Inc. Big Pine Key/US 1 Corridor Area Enhancement Plan. June 2003
- Florida Department of Environmental Protection, Office of Greenways and Trails. Contract Plans for the Florida Keys Overseas Heritage Trail Spanish Harbor to Seven-Mile Bridge MM 30.0 to 40.0. October 2009.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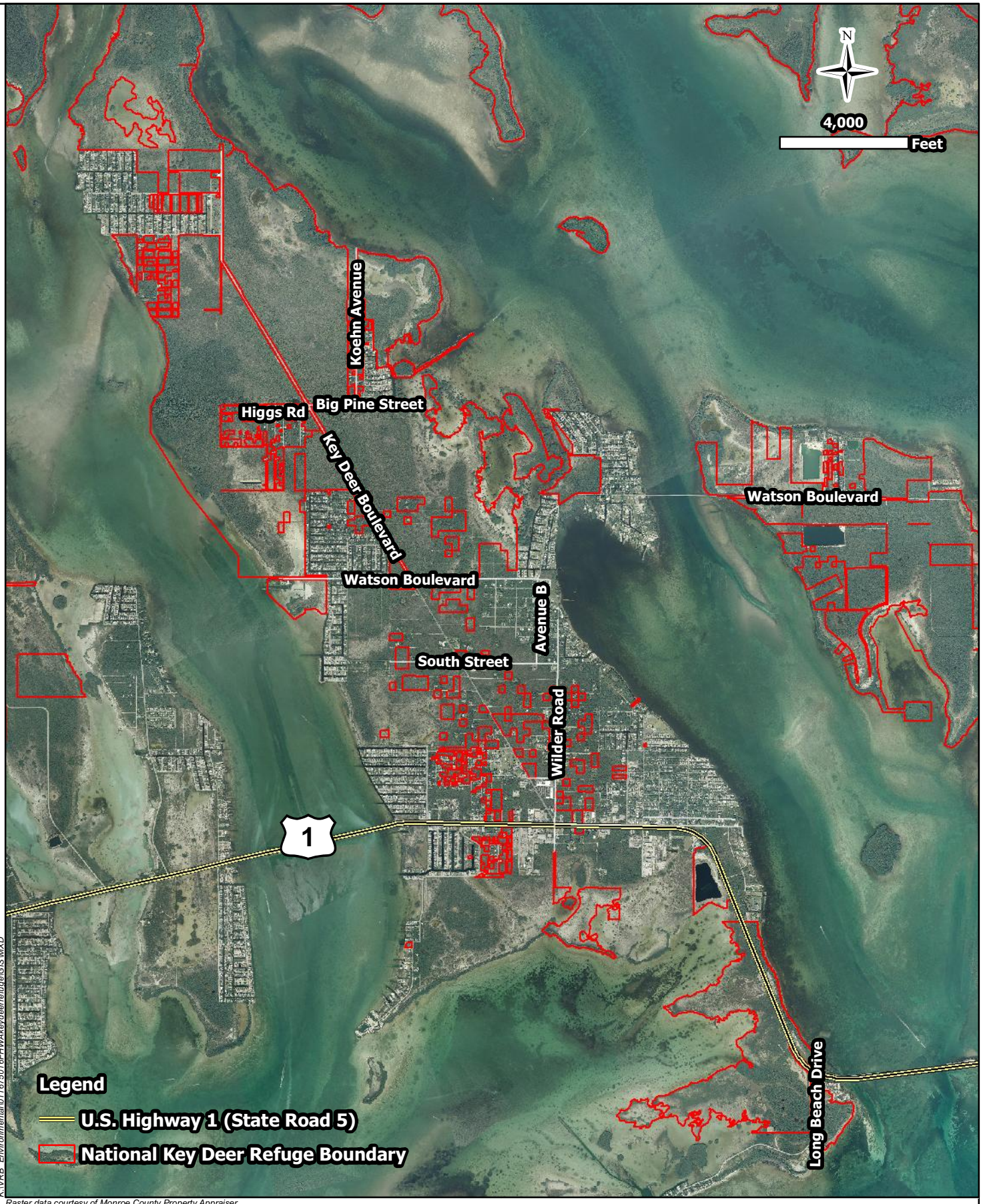
*Raster data courtesy of Monroe County Property Appraiser*

U.S. Department of Transportation
Federal Highway Administration

***Location Map***

***National Key Deer Refuge***
***Transportation Study***
***Contract No.: DTFH71-09-D-00001***

Figure 1.1: Overall Site Location Map

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Raster data courtesy of Monroe County Property Appraiser

U.S. Department of Transportation
Federal Highway Administration

**Big Pine Key Street Map**

**National Key Deer Refuge**
**Transportation Study**
**Contract No.: DTFH71-09-D-00001**

Figure 1.2: Location Map

- USFWS Southeast Region. 5-year Review: Summary and Evaluation Eastern Indigo Snake (*Drymarchon Couperi*). April 2008.
- USFWS Southeast Region. 5-year Review: Summary and Evaluation Rice Rat (*Oryzomys palustris natator*). August 2008.
- USFWS Southeast Region. 5-year Review: Summary and Evaluation Key Deer (*Odocoileus virginianus clavium*). August 2010.
- USFWS Southeast Region. 5-year Review: Summary and Evaluation. Lower Keys Marsh Rabbit (*Sylvilagus palustris hefneri*). September 2007.
- Monroe County. Habitat Conservation Plan for Florida Key Deer (*Odocoileus virginianus clavium*) and other Protected Species on Big Pine Key and No Name Key. Monroe County, Florida. April 2003: April 2006 Revision.
- Monroe County Planning and Environmental Resouces Department. Livable CommuniKeys Master Plan for Big Pine Key and No Name Key. Original BOCC Adoption 08/2004: Amended by Ordinance 020-2009.
- USFWS Southeast Region. Lower Florida Keys National Wildlife Refuges Comprehensive Conservation Plan. October 2009.
- Monroe County. Monroe County Comprehensive Plan Update 2009.
- USFWS Southeast Region. Multi Species Recovery Plan for South Florida. May 1999.
- Parker, et al. Effects of US 1 Project on Florida Key Deer Mortality. Journal of Wildlife Management, 72(2): 354-359; 2008
- Schmidt, Jason A.; Lopez, Roel R. and Silvy, Nova J. Evaluation of The US 1 Crossing Project in Reducing Key Deer Mortality (4 Year Post-Project Report). Texas A&M University, February 2007.
- FHWA Central Federal Lands Highway Division. The Road Inventory of National Key Deer National Wildlife Refuge. June 2010.
- URS. Florida Keys Carrying Capacity Study. September 2002.
- FDOT. Contract Plans State Road No. 5 US 1/Overseas Highway at Key Deer Boulevard. March 2010.
- FDOT. Florida Greenbook. May 2011
- Area Traffic Counts


**Internet Resources:**


- 2009 Aerial Imagery: http://www.monroecounty-fl.gov/Pages/MonroeCoFL_WebDocs/mcpa
- Census 2000 Data: http://factfinder.census.gov/home/saff/main.html?_lang=en
- Community Services, FEMA Flood Zones and NWI Wetlands data: www.fgdl.org
- Endangered Species Act Review of the National Flood Insurance Program in the Florida Keys: http://www.fws.gov/verobeach/images/pdflibrary/FEMA%20Flood%20Insurance%20Biological%20Opinion%20-%20August%209,%202006%20Q&As.pdf
- Estimates of Population by County and City in Florida: April 1, 2008: http://www.bebr.ufl.edu/files/2008_Estimates_Table01_0.pdf
- Existing Land Use, Future Land Use, Habitat and Tier System Data: http://www.monroecounty-fl.gov/Pages/MonroeCoFL_GIS/index

- Facts About Monroe County: http://www.monroecounty-fl.gov/Pages/MonroeCoFL_admin/about
- State Historical Preservation Officer Master Site File Data: http://dhr.dos.state.fl.us/preservation/sitefile/
- Species Focus Areas and Key Deer Mortality data: http://www.fws.gov/verobeach/

**Appendix A: Supporting Documentation and References** contains additional supporting documentation and reference information.

## 1.4 Overview of Transportation Study

The Transportation Study Report reviews the surrounding roadways and parking areas of the NKDR and provides short, medium, and long range recommendations for the transportation system. This document is a compilation of four previously completed reports:

- Existing Conditions Report – January 2011
- Traffic Needs and Safety Report – February 2011
- Preliminary Candidate Alternatives Report – March 2011
- Short and Long Range Improvement Plan – July 2011

The comments received from the stakeholder and public meetings have been incorporated into the overall study and final recommendations.

# 2. Public Involvement

A public involvement plan was created to outline the public and stakeholder involvement efforts for the study. The public involvement plan including the project stakeholder list and notes from the three stakeholder meetings are included in **Appendix B: Public Involvement Plan** and **Appendix C**: **Stakeholder Meeting Notes**, respectively.

## 2.1 Stakeholder and Public Meetings

The first stakeholder meeting was conducted on October 13, 2010 (**Figure 2.1**) at the NKDR Headquarters in Big Pine Key, Florida. The focus of this meeting was to inform the stakeholders of the study, build consensus around the transportation challenges and opportunities at the Refuge, and establish what available data existed for the project team. Major project tasks, project schedule, project objectives, data/information requests, and the public involvement plan were reviewed. During the meeting specific transportation issues within the Refuge including safety, pedestrian/bicycle access, circulation, parking, and assessment of current Key Deer warning systems were discussed.

The second stakeholder meeting took place on January 31, 2011 at the NKDR Headquarters in Big Pine Key, Florida. The purpose of this meeting was to discuss the project reports that had been submitted to date and collect feedback from the stakeholders on the preliminary recommendations. Discussion at the meeting included a wide range of topics including potential bicycle and pedestrian and shoulder upgrades, currently planned improvements, traffic calming alternatives, and some possible funding options for improvements.

**Figure 2.1: October 13, 2010 Stakeholder Kickoff Meeting**

The first public meeting followed the stakeholder meeting on January 31, 2011. The project was presented and existing conditions were reviewed. The public provided feedback on the study, existing conditions, and potential opportunities around the Refuge.

The third stakeholder meeting was held on April 7, 2011 at the NKDR Headquarters in Big Pine Key, Florida. The Short and Long Range Improvement Plan recommendations were presented and discussed. Discussion included but was not limited to the aspects of each alternative, the limitations on improvements related to the HCP, the location of the new Visitors Center, potential implementation of sharrows, and the Monroe County sign inventory. Comments received during this meeting were incorporated into the study's recommendations.

The second public meeting followed the stakeholder meeting (**Figure 2.2**) on April 7, 2011. The details of the project were presented again as well as potential conceptual alternatives for public feedback. The public discussed issues around the Refuge such as vehicles speeding on Watson Boulevard on No Name Key.

**Figure 2.2: April 7, 2011 Public Meeting**

# 3. Existing Conditions

Existing internal transportation conditions and external transportation systems providing access to the NKDR were reviewed as the first step of this study. This section identifies the findings of this review and presents the existing conditions.

## 3.1 Refuge History

The NKDR was established in 1957 to protect and preserve Key Deer and other wildlife resources in the Florida Keys. The NKDR is located in the lower Florida Keys and currently consists of approximately 9,200 acres of land that includes pine rockland forests, tropical hardwood hammocks, freshwater wetlands, salt marsh wetlands, and mangrove forests. These natural communities are critical habitat for hundreds of endemic and migratory species including 17 federally-listed species such as the Key Deer, Lower Keys Marsh Rabbit, and Silver Rice Rat.

## 3.2 Regional Location

The NKDR is located in the Lower Keys Region of the Florida Keys in Monroe County, Florida. Its uplands are comprised of a series of islands some of which are accessible from US 1.

## 3.3 Entrances to the Refuge

Access to Refuge lands is provided through various County-maintained pubic roadways and Refuge trails as Refuge lands are not contiguous. The majority of public access to the NKDR on Big Pine and No Name Keys is provided via US 1. Secondary Refuge access routes that connect to US 1 include Key Deer Boulevard, Wilder Road, and Long Beach Road. There are driving, bicycling, and walking activities available at NKDR to experience wildlife observation and photography (**Figure 3.1**). The Visitors Center provides opportunities for wildlife education and interpretation. Saltwater fishing is allowed. Prohibited activities include, but are not limited to, hunting, camping, unleashed pets, and campfires.


**Figure 3.1: Visitor Signage at NKDR**

At the intersection of US 1 and Key Deer Boulevard, there is a collection of recreational guide signs (**Figure 3.2**) providing wayfinding messages for the Refuge Headquarters, the Visitors Center, and points of interest including the Blue Hole Interpretive Site and the Jack Watson and Fred Mannillo Wildlife Trails.


**Figure 3.2: Wayfinding Signs at the intersection of US 1 and Key Deer Boulevard**

## 3.4 Refuge Visitors Center

The NKDR Visitors Center, shown in **Figure 3.3**, is currently located in the Big Pine Key Plaza on Key Deer Boulevard near mile marker (MM) 30.5 on US 1. Parking for the Visitors Center is shared with retail uses within the plaza.


**Figure 3.3: Existing Visitors Center**

A one-acre site for a new Visitors Center has been acquired along US 1. The site is located near MM 30.6 on the north side of US 1 with vehicular access from US 1. **Figure 3.4** shows the site on US 1 planned to be developed as the new Visitors Center facility. Specific details including the total size of the new facility have not been confirmed so the number and types of parking spaces to be provided at the new facility cannot be determined at this time.

**Figure 3.4: Future Site of New Refuge Visitors Center on US 1**

The NKDR Headquarters building is located at the western terminus of Watson Boulevard. The facility provides administrative and meeting space for Refuge staff. Gated access to the facility and parking are provided.

## 3.5 Water Transportation Access

There are no public boat access points on Refuge property. However, a public boat ramp maintained by Monroe County is located at the northern terminus of Koehn Avenue within the Eden Pines community. There are also numerous state and county boat public boat ramps within the NKDR boundary.

## 3.6 Refuge's Major Points of Interest

There are two major points of interest located in the transportation study area, the Blue Hole Interpretive Site and the Jack Watson and Fred Mannillo Wildlife Trails.

The Blue Hole Interpretive site is an old quarry with freshwater with a viewing platform and interpretive kiosk. It is shown in **Figure 3.5**.

The Jack Watson Nature Trail is a 2/3 mile trail through pine rockland forest and freshwater wetlands, **Figure 3.6**.

The Fred Mannillo Nature Trail is a wheelchair accessible trail with a viewing platform at its terminus, **Figure 3.7**.

## 3.7 Visitation Summary and Profile

Approximately 207,000 people visited the NKDR in 2009. The unique geographical boundaries of the Refuge and the interspersed private lands within the Refuge make visitor quantifications difficult. Visitation data is tracked from various sources including Visitors Center counts and automated counters located at several Refuge destinations including the Blue Hole Interpretive Site and the Jack Watson and Fred Mannillo Nature Trails. **Table 3.1** shows the estimated number of annual visitors to the Refuge over the past 10 years.

**Figure 3.5: Blue Hole Interpretive Site**


**Figure 3.6: Jack Watson Nature Trail**

**Figure 3.7: Fred Mannillo Nature Trail**

| Table 3.1: NKDR Visitation Summary | |
|---|---|
| **Fiscal Year** | **Annual Visitors** |
| 2000 | 86,096 |
| 2001 | 93,440 |
| 2002 | 95,000 |
| 2003 | 75,000 |
| 2004 | 86,810 |
| 2005 | 280,125 |
| 2006 | 250,000 |
| 2007 | 250,000 |
| 2008 | 250,000 |
| 2009 | 207,068 |

Source: NKDR staff

# 4. Traffic Needs and Safety

The core of the Refuge is on Big Pine Key as the majority of accessible areas, points of interest, and Refuge facilities are located there. Most of public access to the NKDR is provided on Big Pine and No Name Keys via US 1. Roadways on Big Pine Key that provide primary access to the Refuge include Key Deer Boulevard, Wilder Road, and Long Beach Road.

## 4.1 Regional Roadway Infrastructure

**US 1 –** US 1 functions as both a local and regional facility throughout the Florida Keys region carrying approximately 20,000 average annual daily traffic. It is a lifeline for the regional economy and the only hurricane evacuation route for Keys residents and visitors. For the purposes of this report due to the orientation of US 1 in the study area, US 1 will be referred to as an east/west facility. Immediately outside of Big Pine Key, the typical cross section includes two (2) 12-ft travel lanes with 4-foot shoulders. From Ships Way (MM 29.8) to 1st Street (MM 31.1), US 1 has recently been widened to provide between three and five total lanes. The three-lane section includes a center two-way, continuous left-turn lane. Within the five-lane section from Loma Lane (MM 30.2) to Chambers Street (MM 30.8), an additional eastbound through lane is provided along with turning lanes at the intersection of Key Deer Boulevard.

The proposed Visitors Center is located on the north side of US 1, east of the Key Deer Boulevard intersection where the eastbound travel lanes merge from two (2) lanes to one (1) lane and there is one (1) lane in the westbound direction.

The posted speed limit within this area is 45 mph with a night speed limit of 35 mph as a mitigation measure primarily to reduce deer vehicle collisions. The speed limit is strictly enforced within the Big Pine Key area on US 1. The Florida Keys Overseas Heritage Trail (FKOHT) exists along portions of US 1 within the NKDR and is discussed later in this report.

In an effort to reduce the number of vehicular collisions with Key Deer along the US 1 corridor, fencing exists along both sides of the roadway from the east side of Big Pine Key (MM 33) to approximately MM 30.6 near St. Peter's Catholic Church. **Figure 4.1** depicts an example of the fenced area. Two wildlife underpasses (**Figure 4.2**) exist within this section of US 1, and deer grates (**Figure 4.3**) also have been installed at all intersecting roadways to deter Key Deer from entering the roadway.

### 4.1.1 Key Deer Boulevard

Key Deer Boulevard serves as the primary access to a majority of the Refuge facilities and areas of interest, as well as several churches and community centers, parks and residential neighborhoods. The roadway is generally oriented in the northwest-southeast direction and has a posted speed limit of 30 mph. A signed speed zone with an overhead flashing beacon exists approximately 50 feet south of South Street for Watson Field (**Figure 4.4**) when it is in use for sports activities.

**Figure 4.1: Section of Key Deer Fencing on US 1**

**Figure 4.2: Example of a Key Deer Underpass**


**Figure 4.3: Example of Key Deer Grates in Fenced Areas**


**Figure 4.4: Key Deer Boulevard near South Street**

Key Deer Boulevard terminates into NKDR lands to the north and intersects US 1 at a signalized intersection at its southern terminus. The typical cross section includes two 11-foot travel lanes, no paved shoulders, and no turn lanes. Signalization features are provided at the US 1 intersection allowing pedestrians to cross Key Deer Boulevard and US 1 in this area. Unsignalized crosswalks also allow pedestrians to cross Wilder Road in the area of this intersection.

Originating from the existing FKOHT along US 1, a County-maintained shared used path exists on both sides of the roadway to the north side of the Big Pine Key Plaza where the west side path terminates and a midblock pedestrian crossing is provided.

The east side shared use path continues north along Key Deer Boulevard to Kyle Boulevard. In a number of locations, the shared use path is immediately adjacent to the travel lane (**Figure 4.5**) rather than physically separated from the roadway. At Kyle Boulevard, the shared use pathway ends.

**Figure 4.5: Key Deer Boulevard Shared Use Pathway Adjacent to the Travel Lane**

### 4.1.2 Wilder Road

Wilder Road is a north-south oriented two-lane roadway with 10.5-ft lanes and 5-ft shoulders designated as bicycle lanes. The roadway intersects Key Deer Boulevard just north of the signalized intersection with US 1 to the south and terminates at a four-way stop-controlled intersection at South Street/Avenue A to the north. The roadway has a posted speed of 25 mph. This roadway provides access to numerous residential homes as well as the NKDR maintenance facility located near Raccoon Run.

### 4.1.3 Long Beach Road

Long Beach Road has a stop-controlled intersection with US 1, at MM 32.9. The intersection of Long Beach Road at US 1 is within the restricted access section and deer-gated section of US 1 on Big Pine Key. The roadway consists of 25.5 feet of total pavement with 3.5-ft paved shoulders designated as bicycle lanes. The posted speed limit is 30 mph. Speed humps exist along the roadway intermittently. This roadway provides access to the NKDR's Long Beach Trail and private residences.

### 4.1.4 Watson Boulevard

Watson Boulevard (**Figure 4.6**) is a generally an east-west oriented roadway running from Big Pine Key's western shore at the Refuge Headquarters to a point near the east shoreline of No Name Key. The roadway crosses Key Deer Boulevard and Avenue B at stop controlled intersections. The posted speed limit is 30 mph. The typical cross section includes 10-ft lanes and unpaved shoulders from the western terminus to Avenue B. Paved shoulders are provided from Avenue B east to the bridge to No Name Key. From the bridge to the eastern terminus on No Name Key, shoulders are gravel.

**Figure 4.6: Watson Boulevard near the NKDR Administrative offices, west of Key Deer Boulevard**

Three bridges exist along the roadway: Watson Cut Bridge, SR 940 Leg A Bridge, and the No Name Bridge. The Watson Cut Bridge is located near the Refuge headquarters. The SR 940 Leg A bridge is located immediately north of the Avenue B intersection. The No Name Bridge connects Big Pine Key to No Name Key. Each bridge is routinely inspected and assigned a sufficiency rating by Monroe County. A

sufficiency rating is defined as a numerical rating of a bridge based on its structural adequacy and safety, essentiality for public use, and its serviceability and functional obsolescence. The result of the sufficiency rating formula is a percentage in which 100 is an entirely sufficient bridge and 0 is an entirely deficient bridge. To be eligible for federal aid to replace the bridge, the sufficiency rating must be less than 50. The sufficiency ratings for each bridge in the study area are summarized in **Table 4.1**.

**Table 4.1:**
**Bridge Sufficiency Summary**

| Bridge Name | Bridge No. | Sufficiency Rating (0 to 100) |
|---|---|---|
| Watson Cut | 90-4305 | 74.5 |
| SR 940 Leg A | 90-4310 | 39 |
| No Name | 90-4320 | 36 |

Source: Monroe County

### 4.1.5 South Street

South Street is an east-west facility traversing Big Pine Key. The portion of South Street from Key Deer Boulevard to Avenue B was considered as part of this report. The section of the roadway is a native roadway from Key Deer Boulevard to Avenue B. The roadway provides access to several community facilities including Watson Field**,** the Susann Thisler Tennis Courts, and the Big Pine Key Boys and Girls Club. Within this area, there are no speed limit signs posted.

South Street is a paved roadway from Avenue B to Wilder Road with a posted speed limit of 25 mph. At the intersection of Avenue B, the eastbound approach is stop-controlled. Although the westbound approach operates under free-flow conditions, a stop bar exists on the pavement. The intersection of South Street and Wilder Road is four-way stop controlled.

### 4.1.6 Big Pine Street

Big Pine Street is primarily a residential roadway in the northern portion of Big Pine Key from Key Deer Boulevard to a residential community east of Koehn Avenue. The posted speed is 25 mph and the total pavement width is 17.5 feet. The existing pavement surface is coarse on this facility.

### 4.1.7 Koehn Avenue

Koehn Avenue is a north-south roadway from Big Pine Street to the north shoreline of Big Pine Key. A Monroe County boat ramp exists at the northern terminus. The roadway is 18 feet wide and has a posted speed limit of 25 mph. The pavement surface is similar to Big Pine Street.

### 4.1.8 Avenue B

Avenue B is a north-south roadway connecting South Street to Watson Boulevard. The roadway is posted at 25 mph and has a typical cross section that includes 10-ft lanes and 4-ft designated bicycle lanes.

## 4.2 Parking Areas

As discussed, parking is available at the existing Visitors Center and is shared with retail uses at the plaza. There is a 10-space paved parking area at the Blue Hole Interpretive Site (**Figure 4.7**). An unpaved parking area exists at the Jack Watson and Fred Mannillo Wildlife Trails. Parking areas are not provided at any other Key Deer and wildlife viewing areas which are typically gated. Visitors often park their vehicles along the gravel shoulders at key viewing locations such as the north terminus of Key Deer Boulevard and the east terminus of Watson Boulevard (**Figure 4.8**) and enter the Refuge by foot. Based on the Refuge's mission of resource protection and stakeholder input, establishing parking at these locations is not preferred.

**Figure 4.7: Blue Hole Interpretive Site Parking Area**

**Figure 4.8: Gravel Shoulder at Watson Boulevard Terminus on No Name Key**

## 4.3 Regional Traffic Volume Summary

Traffic volumes within the NKDR transportation study area have been collected and maintained by the Florida Department of Transportation (FDOT). **Table 4.2** shows the available average annual daily traffic (AADT) volumes from the past five years, where available.

Supplemental traffic volume information was obtained at the intersection of US 1 and Key Deer Boulevard/Wilder Road. Intersection turning movement counts (TMCs) were conducted during peak and non-peak periods. Based upon hourly traffic count information collected by FDOT along US 1, the peak period generally occurs on a Friday from 4:00 PM to 6:00 PM. An off-peak count was also conducted from 9:00 AM to 11:00 AM on a Friday. The turning movement counts were conducted on Friday, November 5, 2010. Peak times during the collection period were from 10:00 AM to 11:00 AM and from 4:45 PM to 5:45 PM. Based on the count data there is limited pedestrian travel at this intersection. Key movements at this intersection are the eastbound left-turn from US 1 to Key Deer Boulevard and its reciprocal movement. A summary of the collected traffic count data is presented in **Appendix D: Supporting Data**.

**Table 4.2: Historical Daily Traffic Volumes for Study Area Roadways**

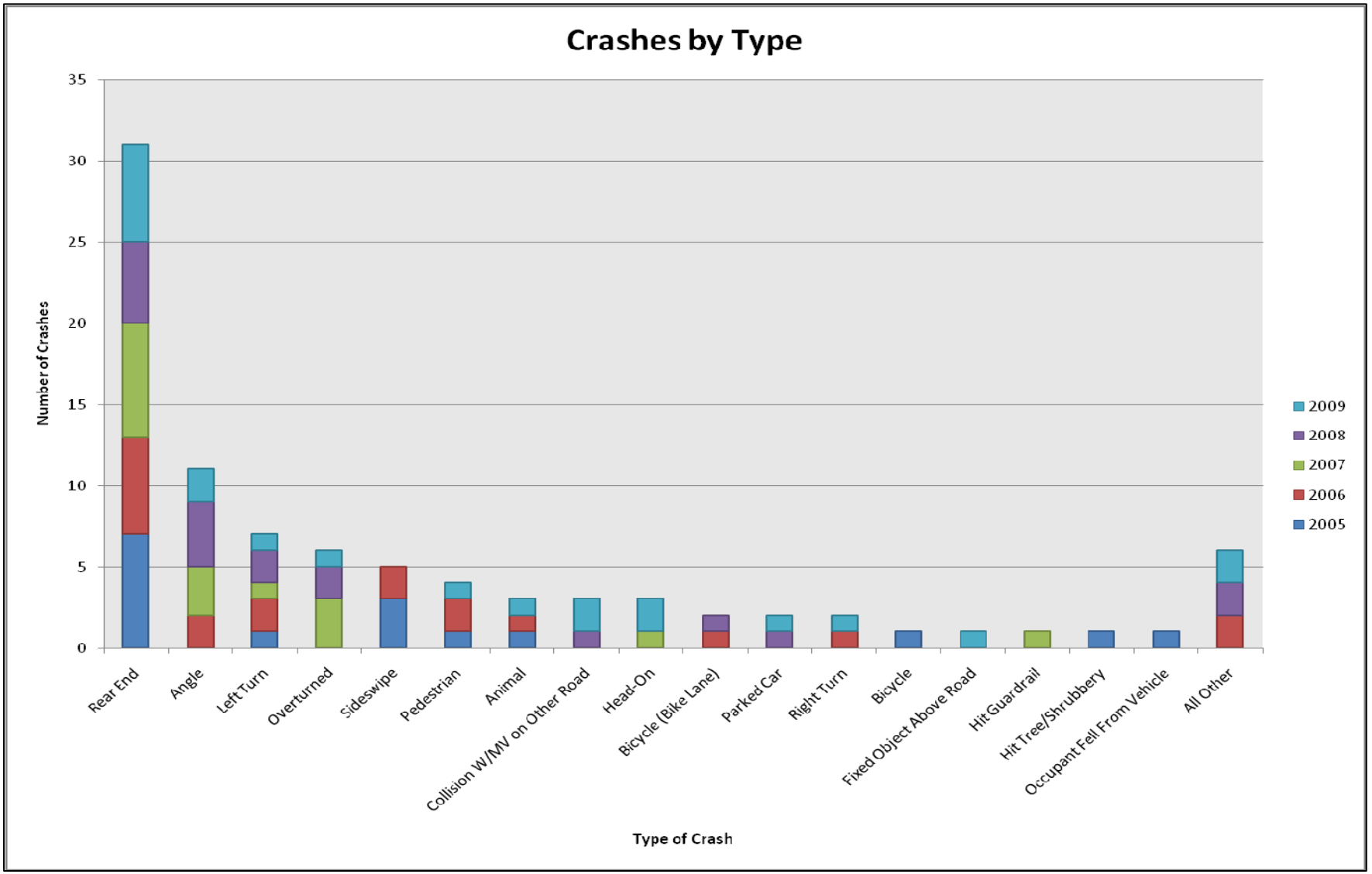
| Roadway | Location | 2005 AADT | 2006 AADT | 2007 AADT | 2008 AADT | 2009 AADT |
|---|---|---|---|---|---|---|
| Key Deer Boulevard | North of Gulf Boulevard | - | - | - | - | 700 |
| | North of Watson Boulevard | - | - | - | - | 2,500 |
| | North of US 1/Wilder Road | 7,600 | 9,900 | 11,000 | 10,700 | 10,700 |
| US 1 | East of North Pine Channel | 18,000 | 26,500 | 20,000 | 16,600 | 18,600 |
| | East of 1st Street | 18,800 | 18,700 | 18,200 | 16,300 | 19,600 |

Source: FDOT Traffic Information 2009
Note: - Indicates data was not available

## 4.4 Crash Summary

Based on data obtained from the Monroe County Sherriff Office, 90 crashes occurred along the portion of US 1 within Big Pine Key from 2005 through 2009. Over the five-year period, 16 crashes occurred at or adjacent to the signalized intersection at Key Deer Boulevard. No more than two crashes occurred within the five-year period at any other locations. Over one-third of the crashes within the study area were rear-end crashes**.** Collisions with an animal only accounted for three of the 90 crashes reported; however, collisions with animals are often not reported to law enforcement agencies unless property damage occurs.

Crash report summaries for major Refuge area roadways were obtained from Monroe County's Sheriff Office. **Table 4.3** summarizes crash frequency by street. As shown, Key Deer Boulevard has the highest number of crashes from 2005-2009. **Figure 4.9** also shows crashes by type.




Source: Monroe County Sheriff's Department

**Figure 4.9: US 1 Crash Summary by Type**

**Table 4.3:**
**Refuge Area Roadways Crash Summary by Year**

| Roadway | 2005 | 2006 | 2007 | 2008 | 2009 | Total |
|---|---|---|---|---|---|---|
| Key Deer Boulevard | 38 | 48 | 38 | 33 | 61 | 218 |
| Wilder Road | 1 | 6 | 2 | 2 | 1 | 12 |
| Long Beach Road | 0 | 0 | 0 | 4 | 0 | 4 |
| Watson Boulevard | 3 | 6 | 4 | 6 | 5 | 24 |
| South Street | 0 | 2 | 2 | 0 | 1 | 5 |
| Big Pine Street | 2 | 1 | 2 | 0 | 0 | 5 |
| Koehn Avenue | 1 | 0 | 0 | 0 | 0 | 1 |
| Avenue B | 1 | 3 | 1 | 1 | 1 | 7 |

Source: Monroe County Sheriff's Department

## 4.5 Future Land Use

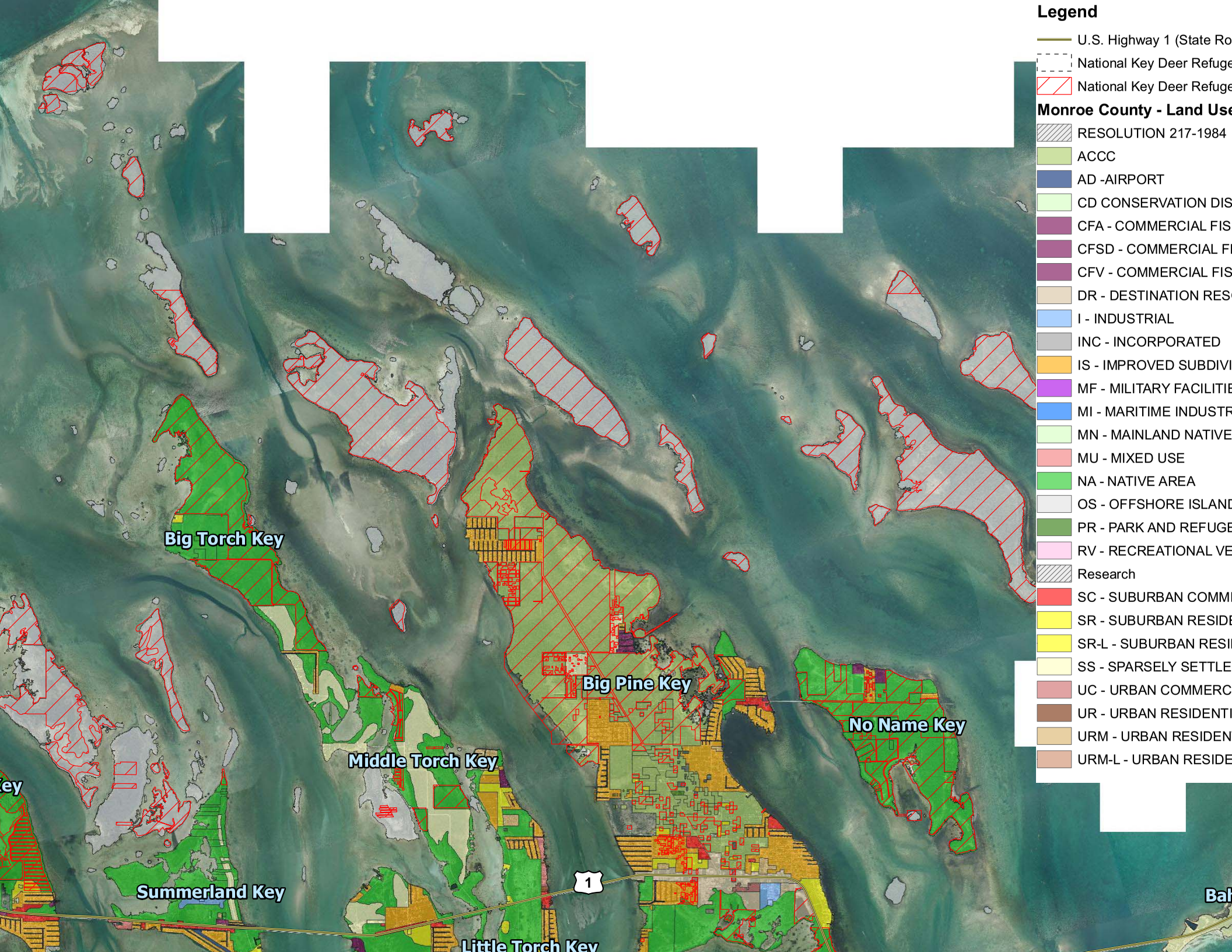
It is the goal of Monroe County to manage future growth to preserve the rural or low density community character, protect the natural environment of the Lower Keys, and maintain and encourage commercial revitalization along US 1 corridor, including promotion of small businesses.

For many years, there was a moratorium on residential development on Big Pine Key and No Name Key because the segment of US 1 that passes through Big Pine had been found to have an inadequate level of service. This has limited residential development and other development on the island.

During the Livable CommuniKeys Program process the community indicated that additional commercial development should be oriented to the local community rather than the regional or tourist economy.[1] New development should be kept at a small scale to maintain the rural and suburban character of the islands envisioned by the community. Currently, Big Pine Key has a mix of locally owned businesses, franchises and national chain stores. Many of the businesses, such as grocery stores, drug stores, banks, and restaurants serve not only the residents of Big Pine Key, but also other areas of the Lower Keys. The Monroe County Future Land Use Map is shown in **Figure 4.10.** The types of land use vary from Residential High (RH) density to commercial designations such as Mixed Use/Commercial (MC).

Future development within the study area is governed by the Habitat Conservation Plan (HCP)[2]. The HCP uses a Population Viability Analysis model to evaluate the impacts of development scenarios on the Key Deer population. The Master Plan for Future Development of Big Pine Key and No Name Key, developed in accordance with the HCP and adopted by Monroe County in December 2004, determines the rate of growth and development standards in the project area over the next 20 years.

[1] Monroe County Planning and Environmental Resources Department. Livable CommuniKeys Master Plan for Big Pine Key and No Name Key Original BOCC Adoption 08/2004: Amended by Ordinance 020-2009.
[2] Monroe County. Habitat Conservation Plan for Florida Key Deer (*Odocoileus virginianus clavium*) and other Protected Species on Big Pine Key and No Name Key. Monroe County, Florida. April 2003: April 2006 Revision.


Big Torch Key
Big Pine Key
No Name Key
Middle Torch Key
Summerland Key
Little Torch Key
1
Legend
U.S. Highway 1 (State Ro
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National Key Deer Refuge
Monroe County - Land Use
RESOLUTION 217-1984
ACCC
AD -AIRPORT
CD CONSERVATION DIS
CFA - COMMERCIAL FIS
CFSD - COMMERCIAL FI
CFV - COMMERCIAL FIS
DR - DESTINATION RES
I - INDUSTRIAL
INC - INCORPORATED
IS - IMPROVED SUBDIVI
MF - MILITARY FACILITIE
MI - MARITIME INDUSTR
MN - MAINLAND NATIVE
MU - MIXED USE
NA - NATIVE AREA
OS - OFFSHORE ISLAND
PR - PARK AND REFUGE
RV - RECREATIONAL VE
Research
SC - SUBURBAN COMMI
SR - SUBURBAN RESIDE
SR-L - SUBURBAN RESI
SS - SPARSELY SETTLE
UC - URBAN COMMERC
UR - URBAN RESIDENTI
URM - URBAN RESIDEN
URM-L - URBAN RESIDE

## 4.6 Planned Area Transportation Improvement Projects

The FDOT has numerous projects programmed within the Refuge boundary within the next five years. Project types include resurfacing as well as improvements to the Florida Keys Overseas Heritage Trail (FKOHT). Relevant FDOT projects are summarized in **Table 4.4**.

**Table 4.4: FDOT Work Program Summary**

| Financial Management No. | Fiscal Year | Project Limits | Project Type |
|---|---|---|---|
| 423136-1 | 2011 | US 1 from E. Circle Drive to Crane Boulevard | Resurfacing |
| 423137-1 | 2011 | US 1 from West Indies Drive to Palmetto Avenue | Resurfacing |
| 405612-2 | 2011 | US 1 from Ships Way to Sand Road/from Sands Road to West of Key Deer Crossing | Widen/Resurfacing Existing Lanes |
| 418396-1 | 2012 | FKOHT - Kemp Channel Bridge (MM 23.6) | Bike Path/Trail |
| 422629-1 | 2012 | FKOHT - South Pine Channel Bridge (MM 29) | Bike Path/Trail |
| 250589-3 | 2011 | US 1 - Big Spanish Canal (Bahia Honda) | Bridge Repair |
| 422628-1 | 2012 | FKOHT - Spanish Harbor Bridge (MM 33) | Bike Path/Trail |
| 425401-1 | 2011 | US 1 – Spanish Harbor Bridge | Bridge Repair |
| 426119-1 | 2012 | US 1-Bahia Honda Bridge | Bridge Repair |
| 428298-1 | 2011 | US 1 from MM 0 to MM 106 | Signage Improvements |

Source: FDOT

No roadway capital improvement projects are programmed on Big Pine Key in the most recent version of Monroe County's Capital Improvement Program.

## 4.7 FKOHT User Volume Summary

The Florida Department of Environmental Protection (FDEP) maintains the existing FKOHT that parallels US 1 within the study area. A count station is located on the trail within the study area and the user volumes are summarized in **Table 4.5**. Note there are two spikes in the data but it is understood that the equipment was working properly. Also note that this area was actively under construction from May 2010 to December 2010.

The average monthly pedestrian/bicyclist volume on FKOHT was over 7,400 people with the inclusion of the peak months and over 6,300 people excluding the peak months.

| Table 4.5: FKOHT User Volume Summary | | | |
|---|---|---|---|
| **Month** | **Visitor Volumes** | | |
| | **2009** | **2010** | **2011** |
| January | n/a | 4,822 | 3,729 |
| February | n/a | 8,088 | 4,855 |
| March | n/a | 8,325 | 6,387 |
| April | n/a | 7,615 | 14,335 |
| May | 3,047 | n/a | 5,726 |
| June | 7,040 | n/a | 9,202 |
| July | 6,303 | n/a | n/a |
| August | 7,995 | n/a | n/a |
| September | 4,595 | n/a | n/a |
| October | 18,418 | n/a | n/a |
| November | 8,321 | n/a | n/a |
| December | 5,064 | n/a | n/a |

n/a = not available or under construction
Source: FDEP

# 5. Community and Environment

## 5.1 Community Features and Potential 4(f) Resources

A review of parks and campgrounds, places of worship, community centers, social services, government facilities, daycare facilities, cultural centers, cemeteries, schools, fire stations, correctional facilities, law enforcement facilities, hospitals and health centers in the vicinity of the NKDR was performed using GIS data available from the Florida Geographic Library (www.fgdl.org). Ground truthing of the data was performed during the field reconnaissance conducted on October 26, 2010. A summary of the observed community features on Big Pine Key and No Name Key is shown in **Table 5.1**, with the locations depicted in **Figure 5-1**. It is expected that the parks would be considered potential 4(f) resources.

**Table 5.1: Community Features**

| Community Feature | Name | Location |
|---|---|---|
| **Parks** | Watson Field/Susann Thisler Tennis Courts | Key Deer Boulevard |
| | Big Pine Community Park | 31009 Atlantis Drive |
| | Blue Heron Park | Wilder Road and Lytton Road |
| **Places of worship** | Saint Peter Catholic Church | 31300 US 1 |
| | Big Pine United Methodist Church | 280 Key Deer Boulevard |
| | First Baptist Church Big Pine | 300 Key Deer Boulevard |
| | Vineyard Community Church | 100 County Road |
| | Lord of the Seas Lutheran Church | 1250 Key Deer Boulevard |
| | Saint Francis in the Keys Episcopal Church | 1600 Key Deer Boulevard |
| **Community centers** | Lower Keys Chamber of Commerce | 31020 US 1 |
| | Dallas McDonald Senior Center | 380 Key Deer Boulevard |
| | Loyal Order of Moose Lodges | 21st St & Wilder Road |
| | Elks Lodge | 28481 Kyle Boulevard |
| **Social services** | Boys and Girls Club | 30150 South Street |
| | Habitat for Humanity | 30320 US 1 |
| **Government facilities** | Big Pine Key U.S. Post Office | 29959 US 1 |
| | Florida Division of Forestry | 400 Key Deer Boulevard |
| | Monroe County Animal Shelter | Industrial Street |
| **Daycare facilities** | Kind to Kids Learning Center | 30070 Pond Lane |
| **Cultural centers** | Artist in Paradise | 221 Key Deer Boulevard |
| | Big Pine Library | 213 Key Deer Boulevard |
| **Cemetery** | Pinewood Memorial Cemetery | 31140 US 1 |
| **School** | Big Pine Academy | 30220 US 1 |
| **Fire Station** | Big Pine Key Volunteer Fire Department | 400 Key Deer Boulevard |
| **Correctional Facility** | Big Pine Key Road Prison | 450 Key Deer Boulevard |


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U.S. Highway
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Potential Sect
* WATSON FIELD / SUSANN THISLER TENNIS COURTS
ELKS LODGE
FRANCIS IN THE KEYS EPISCOPAL CHURCH
LORD OF THE SEAS LUTHERAN CHURCH
DALLAS MACDONALD SENIOR CENTER
KIND TO KIDS LEARNING CENTER
Big Torch Key
FLORIDA DIVISION OF FORESTRY
Big Pine Key
BIG PINE KEY ROAD PRISON
G PINE KEY VOLUNTEER FIRE DEPARTMENT
Middle Torch Key
U S POST OFFICE - BIG PINE KEY
HABITAT FOR HUMANITY
Summerland Key
1
BOYS AND GIRLS CLUB
FIRST BAPTIST CHURCH BIG PINE
ARTIST IN PARADISE
* BLUE HERON PARK
BIG PINE UNITED METHODIST CHURCH
LOYAL ORDER OF MOOSE LODGES
* BIG PINE COMMUNITY PARK
No Name Key
BIG PINE LIBRARY
VINEYARD COMMUNITY CHURCH
LOWER KEYS CHAMBER OF COMMERCE
SAINT PETER CATHOLIC CHURCH
PINEWOOD MEMORIAL CEMETERY

## 5.2 Demographic Profile of Study Area

The NKDR study area on Big Pine Key is located in Monroe County between Sunshine and Ramrod Keys. According to the US. Census Bureau, the study area is located within Census Blocks 9714 and 9715. The population of Monroe County has decreased over the past decade, experiencing almost 10% decline from 2000 to 2010. Note that detailed 2010 census data was not yet available for this area at the time of publication of this report.

Tourism and tourist related industries are the major sources of revenue in Monroe County. According to Monroe County Growth Management Department, 2005 saw a slight decrease in the number of cruise ships stopping in Key West's port and the number of visitors driving by car. This can be partly attributed to four hurricane events.[3] However, the Key West International Airport continues to see an increase in the number of passenger enplanements from five commercial airline services. Top recreational activities in the area include (in order by ranking) dining out/night life, sightseeing/attractions, beach activities, viewing wildlife and museums/historic areas. US 1 on Big Pine Key carries traffic volumes approaching 20,000 vehicles per day, with considerably heavier volumes during peak season.

The Livable CommuniKeys Masterplan, a planning effort carried out by Monroe County based on community participation, indicates that most of the population on Big Pine Key lives north of U.S. 1. Nearly 25% of the permanent household population is in rented units. During the winter season the population increases by nearly 38% to an estimated 6,944 people. The average persons per household on Big Pine Key are 2.21 and on No Name Key it is 2.48. The 2000 Census reports that the per capita income on Big Pine Key was $23,169. The per capita income of Monroe County was $26,102. Within the County a reported 7,977 individuals had incomes that placed them below the poverty level, roughly 10.2%. On Big Pine Key the ratio remains similar, with 472 individuals below the poverty level (roughly 9.5%)[4]. **Table 5.2** shows the population figures in Monroe County and cities in proximity to NKDR.

**Table 5.2: Estimates of Population in Monroe County: April 1, 2008**

| Location | April 1, 2008 | April 1, 2000 | Total Change | Percent Change |
|---|---|---|---|---|
| Monroe | 76,081 | 79,589 | -3,508 | -4.4% |
| Islamorada | 7,113 | 6,846 | 267 | 3.9% |
| Key Colony Beach | 854 | 788 | 66 | 8.4% |
| Key West | 23,024 | 25,478 | -2,454 | -9.6% |
| Layton | 205 | 186 | 19 | 10.2% |
| Marathon | 10,097 | 10,255 | -158 | -1.5% |
| UNINCORPORATED | 34,788 | 36,036 | -1,248 | -3.5% |

Source: Estimates of Population by County and City in Florida: April 1, 2008: http://www.bebr.ufl.edu/files/2008_Estimates_Table01_0.pdf

[3] http://www.monroecounty-fl.gov/Pages/MonroeCoFL_admin/about

[4] Monroe County Planning and Environmental Resources Department. Livable CommuniKeys Master Plan for Big Pine Key and No Name Key. Original BOCC Adoption 08/2004: Amended by Ordinance 020-2009.

## 5.3 Environmental Justice Impacts

According to the U.S. Environmental Protection Agency (EPA) Compliance and Enforcement department:

"*Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work*."[5]

For the purposes of this report, population, income, and race in Monroe County and municipalities surrounding the NKDR are reported in the following sections.

### 5.3.1 Poverty

According to the U.S. Census Bureau, Census 2000 summary data, the percentage of families and individuals below the poverty level at both the state and national levels is 12%. The poverty level of Monroe County is 10%, lower than both state and national poverty levels.

**Table 5.3** shows the percentage of individuals below the poverty level in the study area and within select municipalities relative to the national total. Detailed information on income can be found in **Appendix D: Supporting Data**.

**Table 5.3: Poverty Level in Study Area and Select Municipalities**

| | United States | Big Pine Key | Islamorada | Key Colony Beach | Key West | Layton | Marathon |
|---|---|---|---|---|---|---|---|
| **Total:** | 273,882,232 | 4,988 | 6,718 | 740 | 24,757 | 240 | 10,030 |
| Income in 1999 below poverty level: | 33,899,812 | 472 | 466 | 55 | 2,535 | 37 | 1,422 |
| % below poverty level | 12% | 9% | 7% | 7% | 10% | 15% | 14% |

Source: US Census Bureau, 2000 Census

### 5.3.2 Income

Based on US Census data, median household income in the study area, $43,021, exceeds the national median household income of $41,994. Median household income in Big Pine Key was $44,514, Islamorada, $41,552, and Key West, $43,021.

[5] www.epa.gov/environmentaljustice/index.html

**Table 5.4** shows the median household income in the study area and within select municipalities relative to the national median. Detailed information on income can be found in **Appendix D: Supporting Data**.

| Table 5.4: Median Household Income in the Study Area and Select Municipalities (in dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **United States** | **Big Pine Key** | **Islamorada** | **Key Colony Beach** | **Key West** | **Layton** | **Marathon** |
| Median household income in 1999 | $41,994 | $44,514 | $41,522 | $45,577 | $43,021 | $53,750 | $36,010 |

Source: US Census Bureau 2000

### 5.3.3 Race

Whites make up the largest race category within the study area at 88.98%. Blacks or African Americans comprise 6.12%. The state average of Blacks or African Americans is 14.47% and the national average is 12.21%. Although not the majority, Blacks or African Americans comprise a significant portion (9.16%) of the population in Key West. No other race categories make up a significant percentage of the population in the study area.

**Table 5.5** shows the number of individuals by race in the study area and within select municipalities relative to national values. Detailed information on income can be found in **Appendix D: Supporting Data**.

| Table 5.5: Individuals by Race in the Study Area and Select Municipalities | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **United States** | **Big Pine Key** | **Islamorada** | **Key Colony Beach** | **Key West** | **Layton** | **Marathon** |
| White alone | 211,353,725 | 4,718 | 6,716 | 730 | 21,575 | 221 | 9,241 |
| Black or African American alone | 34,361,740 | 89 | 8 | 0 | 2,335 | 0 | 541 |
| American Indian and Alaska Native alone | 2,447,989 | 0 | 7 | 3 | 131 | 0 | 15 |
| Asian alone | 10,171,820 | 82 | 39 | 2 | 199 | 13 | 28 |
| Native Hawaiian and Other Pacific Islander alone | 378,782 | 0 | 13 | 0 | 0 | 0 | 0 |
| Some other race alone | 15,436,924 | 39 | 18 | 0 | 538 | 0 | 245 |
| Two or more races | 7,270,926 | 121 | 46 | 9 | 702 | 6 | 124 |
| **Total:** | 281,421,906 | 5,049 | 6,847 | 744 | 25,480 | 240 | 10,194 |

Source: US Census Bureau, 2000 Census

## 5.4 Air Quality

The NKDR is located in Monroe County, Florida, which is currently in attainment for all of the National Ambient Air Quality Standards (NAAQS) criteria pollutants (ozone, nitrogen dioxide, particulate matter, sulfur oxides, carbon monoxide and lead).

## 5.5 Habitat

The NKDR is comprised of saltwater wetlands and uplands consisting of pinelands, hammock, salt, marsh, buttonwood, mangrove and scrub mangrove. These habitats are the primary habitat for numerous federally endangered or threatened species including the Lower Keys Marsh Rabbit, the Silver Rice Rat, and the Key Deer.

### 5.5.1 Biotic Communities

The study area is underlain by Key Largo Limestone, formed from ancient reefs and made up of mostly very porous material. The Lower Keys are known as the Oolitic Keys because they are primarily composed of oolites, small spherical grains of calcium carbonate cemented together to form a limestone. Geological and biological processes that date to the Pleistocene Period were instrumental in forming the reefs and the Florida Keys of today.

The warm temperatures and shallow waters typical to the Keys provide ideal conditions for the growth of coral reefs, which predominate along the Keys island chain.

According to the County's Advanced Identification of Wetlands (ADIA) Program, the main types of habitat in the study area are saltwater wetlands and uplands consisting of pinelands, hammock, salt, marsh, buttonwood, mangrove and scrub mangrove.

**Figure 5.2** shows the estuarine and marine deepwater as well as the estuarine and marine wetlands.

The following habitat descriptions were excerpted from the HCP[6].

#### 5.5.1.1 Pineland

Pinelands (**Figure 5.3**) are upland forest communities with an open canopy dominated by native slash pine (*Pinus elliottii var. densa*). Keys pinelands are fire-adapted and dependent on periodic fires for their long-term persistence. Surrounded by wet prairie habitats and/or mangroves, pinelands typically occur on locally elevated areas of bedrock, which may flood seasonally or during extreme storm events. Xeric conditions in this habitat are partly caused by locally low rainfall and the exposed rock ground cover.

The extent of sub canopy development in a pineland is dependent upon the frequency of surface fires. Pinelands on Big Pine Key typically have a well-developed sub canopy consisting of palms (silver thatch

[6] Monroe County. Habitat Conservation Plan for Florida Key Deer (*Odocoileus virginianus clavium*) and other Protected Species on Big Pine Key and No Name Key. Monroe County, Florida. April 2003: April 2006 Revision.

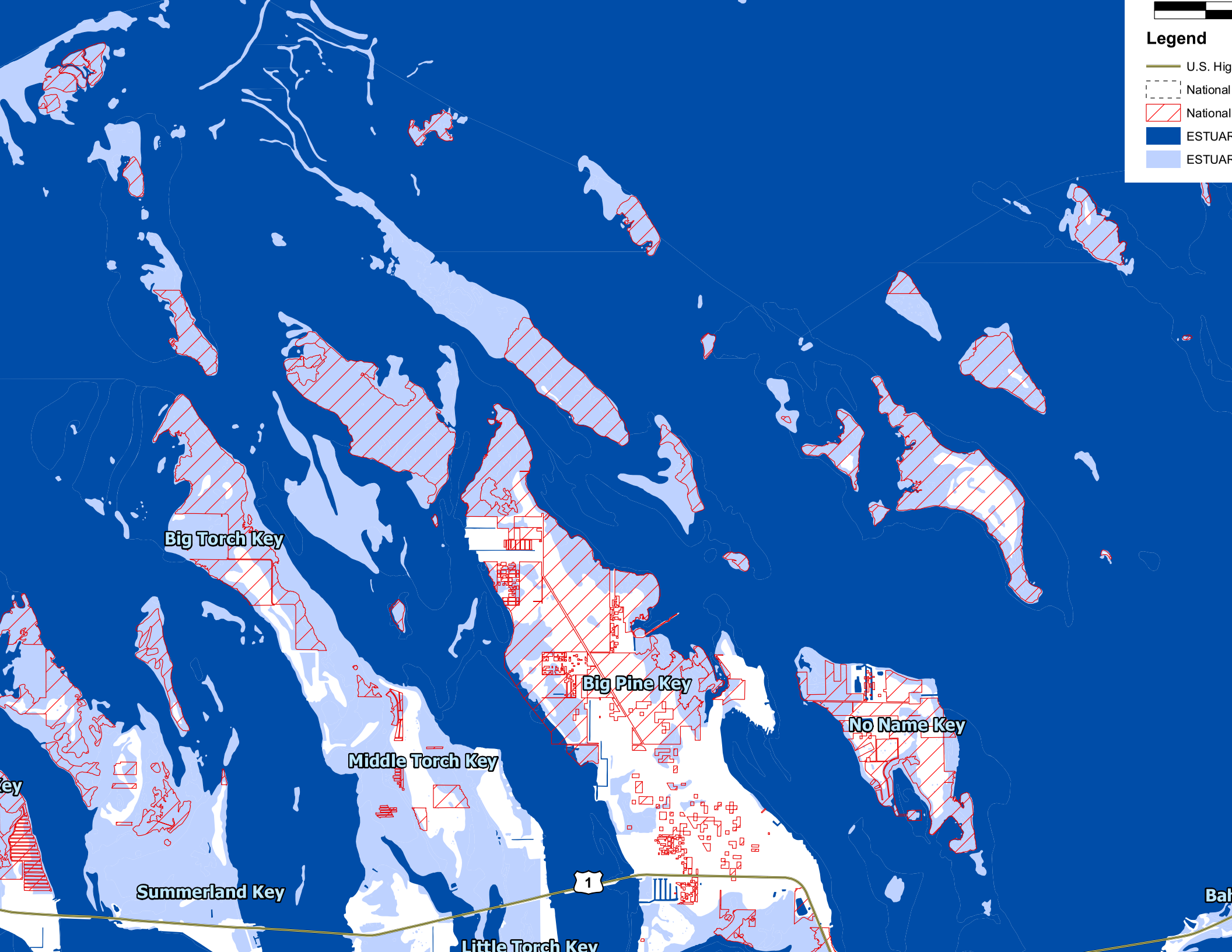
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**Figure 5.3: Pinelands (typ.) after recent controlled burn**

palm, *Coccothrinax argentata*; Key thatch palm, *Thrinax morissii*; thatch palm, *T. radiata*; saw palmetto *Serenoa repens*)[7]. Other species found in the pineland understory include strongbark (*Bourreria cassinifolia*), locust berry (*Byrsonima lucida*), silver thatch palm, pineland croton (*Croton linearis*), rough velvetseed (*Guettarda scabra*), wild sage (*Lantana involucrata*), and long-stalked stopper (*Psidium longipes*). Shrub vegetation in Lower Keys pinelands varies in composition and density. For example, Big Pine Key pinelands have a low and sparse ground covering of grasses and bare limestone, whereas on Cudjoe, Little Pine, and No Name Keys a continuous hardwood understory of six meters height or more is present due to prolonged absence of fire.

More tropical plant species also occur in the Lower Keys pineland shrub stratum including Caesalpinia (*Caesalpinia pauciflora*), dune lily-thorn (*Catesbaea parviflora*), pisonia (*Pisonia rotundata*), and pride-of-Big-Pine (*Strumpfia maritima*). Plant species from adjacent habitats may invade at the pineland margins. For example, gumbo limbo (*Bursera simaruba*), inkwood (*Exothea paniculata*), and wild tamarind (*Lysiloma latisiliquum*) occur in pinelands sited adjacent to a hammock. Only four plant species endemic to South Florida pinelands: partridge pea (*Chamescista lineate*), small-leaved melanthera (*Melanthera parvifolia*), rockland spurge (*Chamaesyce deltoidea var. serpyllum*) and sand flax (*Linum arenicola*) occur on Big Pine Key, likely as a result of water table depth, salinity, and other physical variables.

Pinelands occur throughout the project area. Key Deer preferentially utilize this habitat for the permanent freshwater sources that are critical to survival of the species. Key Deer also feed on herbaceous species and the fruits of woody species found in pinelands. The USFWS performs controlled burns within the Refuge to maintain the pineland habitat where possible.

[7] Habitat Conservation Plan for Florida Key Deer (*Odocoileus virginianus clavium*) and other Protected Species on Big Pine Key and No Name Key, Monroe County, Florida. April 2003: April 2006 Revision.

#### 5.5.1.2 Hammock

Tropical hardwood hammocks represent the climax upland community type in the Florida Keys and are second to pinelands in terms of biodiversity. Tropical hardwood hammocks in the Florida Keys are closed, broad-leaved forests that occupy elevated, well-drained and relatively fire-free areas. Hammocks in the Lower Keys are more widespread than pinelands, except for Big Pine Key where the area of pineland is greater than that of hammock. Approximately 560 acres of hammock occur on Big Pine Key and 385 acres on No Name Key.

Canopy trees of the Lower Keys hammocks tend to be smaller than those in hammocks occurring in other parts of Florida, and are often referred to as "low hammock" or "Keys hammock thicket." Trees commonly found in low hammock generally have a smaller trunk diameter and grow closer together. Species include poisonwood (*Metopium toxiferum*), buttonwood (*Conocarpus erectus*), blolly (*Guapira discolor*), Key thatch palm, Spanish stopper (*Eugenia foetida*), wild dilly (*Manilkara bahamensis*), Jamaica dogwood (*Piscidia piscipula*), and white stopper (*Eugenia axillaris*). Other species present on the windward side of low hammocks, referred to as transitional hammock or thorn scrub, include black torch (*Erithalis fruticosa*), saffron plum (*Bumelia celastrina*), sea grape (*Coccoloba uvifera*), blackbead (*Pithecellobium guadalupense*), indigo berry (*Randia aculeata*), tallowwood (*Ximenia americana*), darling plum (*Reynosia septentrionalis*), joewood (*Jacquinia keyensis*), barbed-wire cactus (*Cereus pentagonus*), and prickly pear cactus (*Opuntia stricta*).

Herbaceous plants are largely absent from Keys hammocks. Grasses include low panicum (*Panicum* spp.) and sour paspalum (*Paspalum conjugatum*). In addition, hammocks support a diverse flora of orchids, ferns, bromeliads, and other epiphytes, and are home to the federally endangered Key tree-cactus (*Pilosocereus robinii*).

Tropical hammocks provide shelter for many animals during periods of high water and also nesting, feeding and roosting sites for many local and migratory birds. Key Deer primarily utilize this habitat for cover, cool shelter, fawning and bedding. Other endangered and threatened species found in these areas in the Florida Keys include the Lower Keys marsh rabbit and eastern indigo snake. Additionally, tropical hardwood hammocks in south Florida provide essential habitat for the white-crowned pigeon (*Columba leucocephala*), Schaus' swallowtail butterfly (*Papilio aristodemus ponceanus*), and tree snails (*Liguus* spp.).

#### 5.5.1.3 Freshwater Wetlands

Freshwater wetlands are restricted to areas landward of the seasonal high tide line and in the Lower Keys are found in areas underlain by freshwater lenses. The persistence of freshwater ecosystems is limited primarily by freshwater availability, tidal influence, and human activities, including direct and indirect effects of development such as draw-down and contamination. During the dry season, freshwater lenses of Big Pine Key can diminish by as much as 50 percent. Freshwater wetlands are located in the northern and central portions of Big Pine Key and are present in one parcel on No Name Key, representing 689.4 and 3.4 acres, respectively.

This habitat type is dominated by saw grass (*Cladium jamaicense*) and spike rush (*Eleocharis* spp.). Forested freshwater systems in the Keys are generally pinelands with a saw grass understory. Freshwater wetlands are typically found in isolated, seasonally flooded depressions with elevations of +3.0 feet National Geodetic Vertical Datum (NGVD) or less and may be found in conjunction with pinelands. Freshwater wetlands provide critical habitat for several listed species, in particular the Key Deer and Lower Keys marsh rabbit (*Sylvilagus palustris hefneri*). These habitats and surface waters represent the only dry season source of freshwater for wildlife and play an important role in attenuating nutrients and other contaminants in surface water runoff.

#### 5.5.1.4 Salt Marsh and Buttonwood

Salt marshes and buttonwood associations **(Figure 5.4)** occur in coastal locations similar to mangrove wetlands. Salt marshes are non-woody, salt-tolerant communities that are occasionally inundated with salt water. Two types of salt marsh are found in the Florida Keys, low marsh and high marsh. Low marsh species include salt-tolerant herbs such as glasswort (*Salicornia* spp.) and Keygrass (*Monanthochloe littoralis*), while high marsh is dominated by Gulf cord grass (*Spartina spartinae*), fringe rushes (*Fimbrystylis* spp.), and sea-oxeye daisy (*Borrichia frutescens*).

**Figure 5.4: Salt Marsh and Buttonwood**

Buttonwood associations border high marsh communities and have similar ecological characteristics. Plant species that inhabit this community prefer low-energy waves with little tidal disturbance. Buttonwood forests are dominated by the silver buttonwood (*Conocarpus erectus*). Other species include salt-tolerant herbaceous perennials and woody shrubs such as fringe-rushes, Keygrass, Gulf cordgrass, and seashore dropseed (*Sporobolus virginianus*). There are approximately 685 acres of buttonwood marsh on Big Pine Key and 170 acres on No Name Key.

Salt marsh/buttonwood marsh communities provide important habitat for terrestrial species including the Federally endangered Lower Keys marsh rabbit, Silver Rice Rat (*Oryzomys argentatus*), and diamondback terrapin (*Malaclemys terrapin*). Buttonwood areas provide herbaceous foods and loafing areas for Key Deer. Common residents include polychaetes, gastropod mollusks, bivalve mollusks and

crustaceans. Birds tend to use the marsh for feeding rather than for nesting. A few species of birds, fish, reptiles, or mammals can be considered residents of salt marshes; larger longer-lived organisms are not tolerant of the environmental fluctuations.

#### 5.5.1.5 Mangrove and scrub mangrove

Mangrove communities consist of facultative halophytes, which are tolerant of anaerobic saline soils and tidal inundation. Three species are found in Florida: the red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*).

In general, the zonation of mangrove communities is regulated by elevation. Red mangroves occur in the middle and lower intertidal zone and upper subtidal zone. Black mangroves dominate the upper intertidal zone and are generally found between the red and white species. White mangroves occur on the landward edge of mangrove forests, throughout the intertidal and in the upper portions of the swamp. Ground cover within a mangrove forest consists of leaf litter and decomposing forest debris.

Throughout the Florida Keys, mangrove forests form the predominant coastal vegetation community. Mangroves are found along the edges of shorelines, bays and lagoons and on over wash areas throughout the Keys. Major limiting factors on mangrove establishment, growth and persistence in the Florida Keys appear to be water quality, substrate, and development. Mangrove habitat occurs on approximately 1,495 acres of Big Pine Key and 374 acres of No Name Key.

Mangrove communities in the Florida Keys provide essential habitat for numerous ecologically and economically important species. The leaves and fruits of red and black mangroves are a primary food source for the Key Deer, which spend considerable time foraging in tidal wetlands. In South Florida, mangroves are important habitat for at least 220 fish species, 24 reptile and amphibian species, 18 mammal species, and 181 bird species, and provide nesting habitat for a number of threatened and endangered species. Dissolved organic matter from mangroves serves as an alternate food source, the basis for heterotrophic microorganism food webs, and a source of chemical cues for estuarine species.

### 5.5.2 Listed Species and U.S. Fish and Wildlife Service Focus Areas

A biodiversity matrix search of the Florida Natural Areas Inventory database was performed and the CCP[8] was reviewed to determine the potential for the occurrence of listed species within the project vicinity. A summary of the state and federally listed species potentially occurring within the project vicinity is included in **Table 5.6**.

As part of the review of the National Flood Insurance Program's (NFIP) activities in the Florida Keys USFWS re-evaluated how it reviews the impacts on listed species from the FEMA NFIP. A revised biological opinion was prepared. The review of impacts outlined an improved strategy for protecting threatened and endangered species and their habitats. Focus areas were developed for four species: Key Deer, Eastern Indigo Snake, Lower Keys Marsh Rabbit and Silver Rice Rat. For the purposes of this

[8] USFWS Southeast Region. Lower Florida Keys National Wildlife Refuges Comprehensive Conservation Plan. October 2009.

**Table 5.6: State and Federally listed species that have the potential to occur within the project vicinity**

| Common Name | Scientific Name | Federal Status | State Status |
|---|---|---|---|
| **Birds** | | | |
| Piping Plover* | *Charadrius melodus* | T | T |
| Roseate Tern | *Sterna dougallii* | T | T |
| Red Knot* | *Calidris canutus rufa* | C | N |
| Kirtland's warbler | *Dendroica kirtlandii* | E | |
| Least Tern | *Sterna antillarum* | N | T |
| Florida burrowing owl | *Athene cunicularia floridana* | N | SSC |
| White-crowned Pigeon | *Patagioenas leucocephala* | N | T |
| Wading Birds, Little blue heron, Tricolored heron, Snowy egret, White ibis, Limpkin | *Egretta caerulea*, *Egretta tricolor*, *Egretta thula*, *Eudocimus albus, Aramus guarauna* | N | SSC |
| **Mammals** | | | |
| Key Deer | *Odocoileus virginianus clavium* | E | E |
| Silver Rice Rat | *Oryzomys palustris natator* | E | E |
| Lower Keys Marsh Rabbit | *Sylvilagus palustris hefneri* | E | E |
| West Indian manatee | *Trichecus manatus* | E | E |
| **Reptiles** | | | |
| Key Ringneck Snake | *Diadophis punctatus acricus* | N | T |
| Lower Keys Ribbon Snake | *Thamnophis sauritus* | N | T |
| Lower Keys Brown Snake | *Storeria dekayi* | N | T |
| Eastern Indigo Snake | *Drymarchon couperi* | T | T |
| American alligator | *Alligator mississippiensis* | T(S/A) | SSC |
| American crocodile | *Crocodylus acutus* | T | T |
| Green sea turtle | *Chelonia mydas* | E | E |

**Table 5.6: State and Federally listed species that have the potential to occur within the project vicinity**

| Common Name | Scientific Name | Federal Status | State Status |
|---|---|---|---|
| Hawksbill sea turtle | *Eretmochelys imbricate* | E | E |
| Kemp's ridley sea turtle | *Lepidochelys kempii* | E | E |
| Leatherback sea turtle | *Dermochelys coriacea* | E | E |
| Loggerhead sea turtle | *Caretta caretta* | T | T |
| Key Mud Turtle | *Kinosternon baurii* | N | E |
| **Fish** | | | |
| Smalltooth sawfish (U.S. Distinct Population Segment) | *Pristis pectinata* | E (NMFS) | |
| **Invertebrates** | | | |
| Stock Island tree snail | *Orthalicus reses (not including nesodryas)* | T | |
| Bartram's hairstreak butterfly | *Strymon acis bartrami* | C | |
| Florida leafwing | *Anaea troglodyta floridalis* | C | |
| Miami blue butterfly | *Cyclargus thomasi bethunebaker* | C | |
| **Plants** | | | |
| Blodgett's silverbush | *Argythamnia blodgettii* | C | |
| Big pine partridge pea | *Chamaecrista lineata var. Keyensis* | C | |
| Wedge spurge | *Chamaesyce deltoridea spp. Serpyllum* | C | |
| Garber's spurge | *Chamaesyce garberi* | T | |
| Sand flax | *Linum arenicola* | C | |
| Florida semaphore cactus | *Consolea corallicola* | C | |
| Key tree cactus | *Pilosocereus robinii* | E | |

*Possibly occurring based on Lower Florida Keys National Wildlife Refuge Comprehensive Conservation Plan (USFWS, October 2009). E=Endangered, T=Threatened, T(S/A) = Threatened due to similarity of appearance, C=Candidate Species, SSC= Species of Special Concern, N=Not listed. NMFS = National Marine Fisheries Service

study, draft copies of the spatial extent of these habitats were obtained from the USFWS South Florida Ecological Services Office in ArcGIS shape file format. The spatial extent of species focus areas within the study area are depicted in the following subsections. A HCP was prepared and the impacts to these habitats were limited under the HCP. The following provides additional detail regarding these four species. The following information is excerpted from the USFWS's Multi Species Recovery Plan for South Florida and their respective 5-year reviews by USFWS.

#### 5.5.2.1 Florida Key Deer (Odocoileus virginianus clavium)[9] - Figure 5.5

Key Deer utilize all habitat types including pine rock lands, hardwood hammocks, buttonwood salt marshes, mangrove wetlands, freshwater wetlands, and disturbed and developed lands. Key Deer use disturbed and developed lands extensively for foraging, travel, loafing, and socializing. The Key Deer feed primarily on red and black mangrove, but also feed on approximately 160 other plants to meet nutritional requirements. They may use these habitats year-round or seasonally for foraging, cover, shelter, fawning, and bedding. Pine rock lands, in particular, are very important to Key Deer because they contain permanent freshwater sources that are critical to the long-term survival of the species. Only Big Pine, Little Pine, Sugarloaf, Cudjoe, and No Name Keys, support extensive pine rock lands. Key Deer forage on mangroves in tidal wetlands and use open areas for foraging and resting. Key Deer also use residential and commercial areas extensively where they feed on ornamental plants and grasses and where they can seek refuge from biting insects.

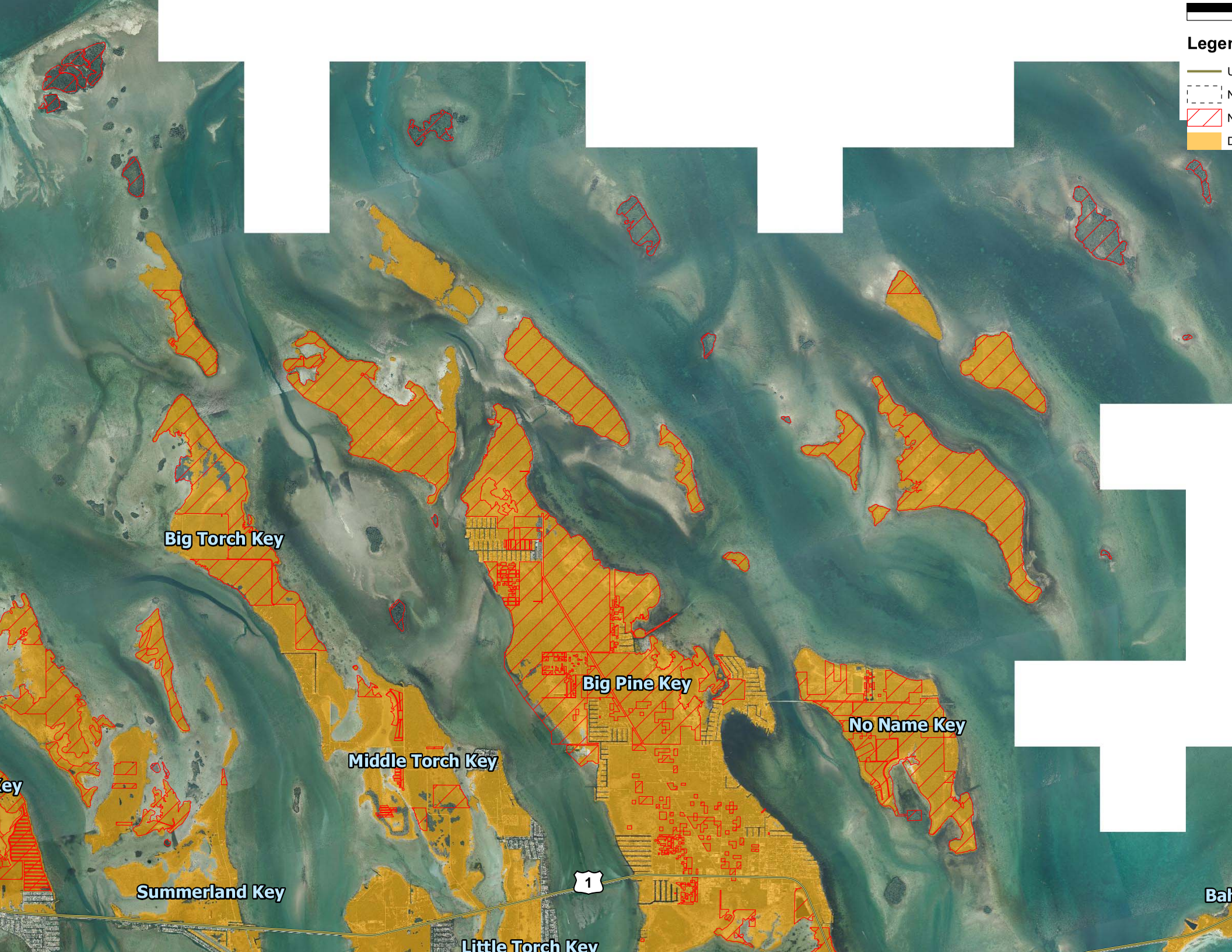
The National Key Deer Refuge was established in the 1950s, and the Key Deer was officially listed as federally endangered on March 11, 1967 (32 FR 4001). The Key Deer was listed as an endangered species because of the loss of its habitat to residential and commercial construction and because of high, human-related mortality and human disturbances.

Historically, the maximum population of Key Deer was probably between 600 to 700 individuals occupying about 19,014 acres of habitat in the historical range. Based on the 2010 5-year review for the Key Deer, the estimated population is 646. Due to continued urbanization of Key Deer habitat, there is little opportunity to increase the carrying capacity of the Keys, although habitat enhancement on outlying islands may afford some opportunities. In addition to habitat loss, the persistence of the Key Deer is highly vulnerable to natural events such as hurricanes and sea-level rise.

#### 5.5.2.2 Lower Keys Marsh Rabbit (Sylvilagus palustris hefneri)[10] – Figure 5.6

Lower Keys Marsh Rabbits (LKMR) inhabit salt marsh and buttonwood transition areas, freshwater wetlands, and coastal beach berms. As stated previously, freshwater wetlands occupy 689.4 and 3.4 acres, respectively. The LKMR builds mazes of runs, dens, and nests in coastal (saline to brackish) or freshwater, inland marsh habitats. Two plant species, fringerush (*Fimbristylis* sp.) and buttonwood (*Conocarpus erectus*), are often present in the rabbit's habitat. In freshwater marshes, cattails (*Typha*

[9] USFWS Southeast Region. 5-year Review: Summary and Evaluation Key Deer (*Odocoileus virginianus clavium*). August 2010.
[10] USFWS Southeast Region. 5-year Review: Summary and Evaluation. Lower Keys Marsh Rabbit (*Sylvilagus palustris hefneri*). September 2007.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*latifolia*), sawgrass (*Cladium jamaicense*), and sedges (*Cyperus* sp.) are common associates. Sometimes, spikerush (*Eleocharis* sp.) is also found. In coastal marshes, common associates include cordgrass (*Spartina* sp.), saltwort (*Batis maritima*), glasswort (*Salicornia virginica*), sawgrass, and sea ox-eye daisy (*Borrichia frutescens*). The rabbit's runs, dens, and nests are made in cordgrass or sedges.

The LKMR's original range extended from Big Pine Key to Key West encompassing a linear distance of about 30 miles. Historically, LKMR probably occurred on all of the Lower Keys that supported suitable habitat but did not occur east of the Seven-mile Bridge where it is replaced by *S. p. paludicola*.

Based on the 5-year review, three separate metapopulations exist in the Boca Chica area (Boca Chica, Geiger, East Rockland, and Saddlehill Key), the Big Pine Key area (Big Pine, Annette, East Water, Howe, Johnson, Little Pine, Mayo, Newfound Harbor, Porpoise, and No Name Keys), and the Sugarloaf area (Sugarloaf and Saddlebranch Keys). There are also potential habitats on Cudjoe, Ramrod, the Torch Keys and several other small keys.

The LKMR was listed as a federally endangered species on June 21, 1990 (55 FR 25591). The marsh rabbit was listed because of habitat loss and fragmentation, predation by cats, and road mortalities caused by automobiles; critical habitat was not designated. The rabbit was also listed as endangered by the State of Florida in 1989 (F.A.C. 39-27). Current population estimates range between 100 and 300 rabbits in the Lower Florida Keys and numbers appear to be declining. Rangewide surveys were initiated in 2001. There were 228 patches identified and 45% were occupied during 2001 – 2003. Since 2004, suitable habitat patches have been surveyed annually for occupancy by the LKMR. Based on the 2007 USFWS 5-year review, annual patch occupancy surveys show a steep decline in occupancy. The 5-year review noted the Forys and Humphrey study indicated that the population viability analysis estimated that there was 100% probability of extinction in 50 years. It was, however, noted that due to the larger habitat patch sizes on Big Pine Key, this metapopulation was the most resilient to cat predation and catastrophes.

As urbanization has increased over the past 20 years, construction of new roads, or the improvement of existing roads, has been necessary to accommodate more vehicles. The construction of roads results in two main threats to the LKMR: interference with its dispersal and increased road mortality. Vehicular traffic interferes with dispersal and may prevent essential interchange between subpopulations. Dispersing males are the most vulnerable to road mortality. Dispersal is needed for repopulating sites where rabbits have been extirpated. Since only a portion of the males breed during the year, the loss of these males may lower the likelihood of mating and hence decrease the reproductive potential. The threat of roads and traffic has increased in significance because of the magnitude of habitat fragmentation: the size of the remaining habitat fragments forces more adult males to disperse in order to establish territories, putting them at a greater risk of being killed by cars. Other threats to the LKMR include development, prevalence of hardwood overstories in LKMR patches, hurricane storm surges, sea level rise and invasive exotic plants.

#### 5.5.2.3 Silver Rice Rat (Oryzomys palustris natator)[11] – Figure 5.7

The Silver Rice Rat is a small wetland rodent adapted to the unique island habitats of the Lower Keys. The Silver Rice Rat differs from the more common marsh rice rat by its rarity, larger body size, lower fecundity, and larger home range size. Populations of these rice rats are found at extremely low densities on 12 islands in the Lower Keys and were listed as endangered primarily because their wetland habitat had been destroyed by residential and commercial construction activities. With a small population size and restricted geographic range, rice rats in the Florida Keys are greatly impacted by loss of habitat. The Refuge considers black rats, exotic snakes, free-ranging cats, sea level rise, and hurricanes potential threats to the Silver Rice Rat.

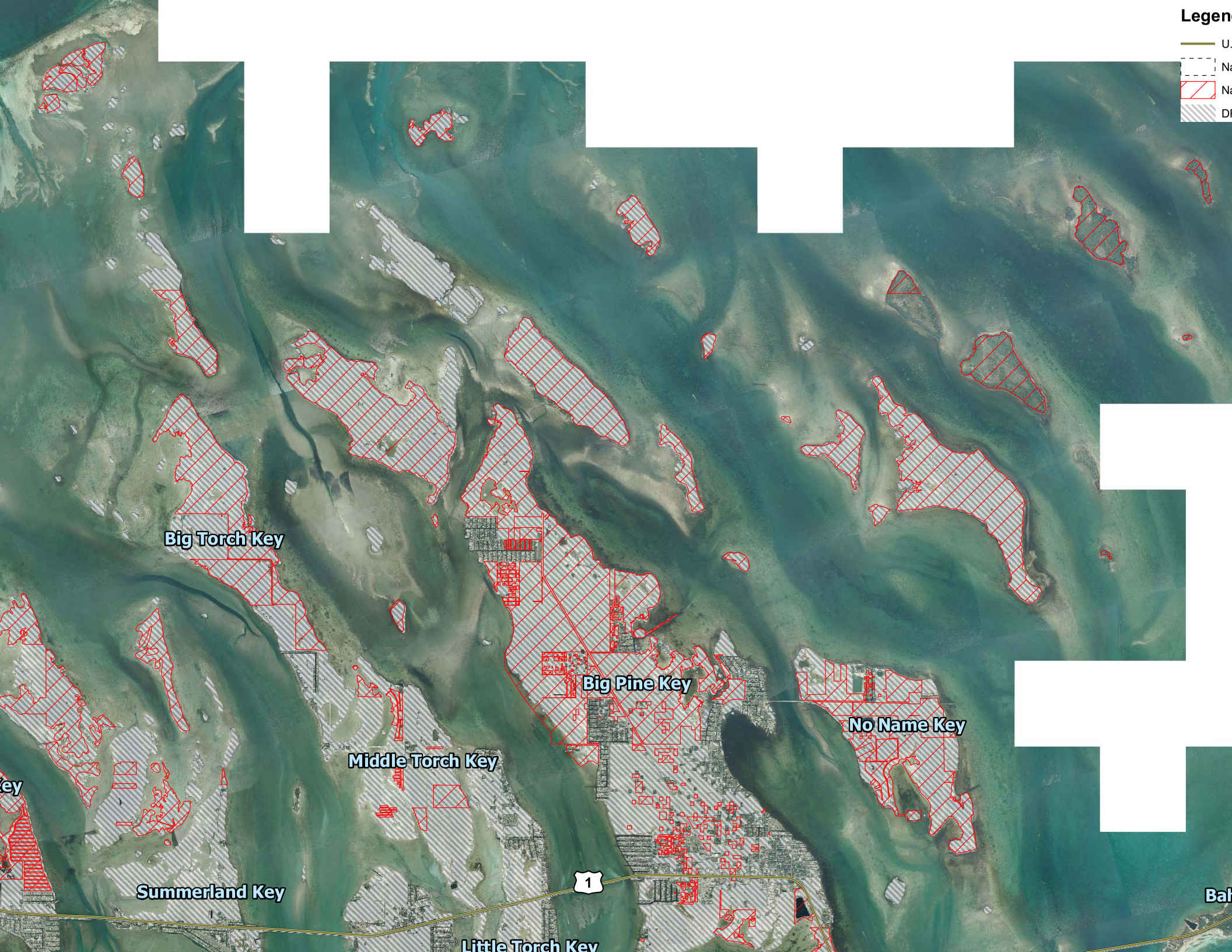
Silver Rice Rats typically use three zones that are delineated by their salinity and topography: (1) low intertidal areas, (2) salt marsh flooded by spring or storm tides and (3) buttonwood transitional areas that are slightly more elevated and only flooded by storm tides. The low intertidal area is comprised primarily of red and black mangroves with white mangroves, buttonwoods, glasswort, saltwort, and Key grass found on higher elevated areas. These areas are used by Silver Rice Rats mainly during nocturnal activity periods and also for foraging, moving between habitats, and nesting. The low salt marsh area consists of the grasses salt grass (*Distichilis* spp.) and dropseed (*Sporobolus* spp.); interspersed with sea ox-eye (*Borrichia frutescens*), white and black mangrove, and buttonwood, in addition to depression areas that contain saltwort, black mangrove, and glasswort. Silver Rice Rats use this zone mainly for foraging and nesting. The buttonwood transitional salt marsh area is at a higher elevation than other salt marsh habitats, contains a denser coverage of saltgrass, dropseed, and sea ox-eye, and is used for foraging and nesting.

The 2008 5-year review noted that based on Perry's rangewide general survey between 2004 and 2005 resulted in captures on 12 keys (Big Pine, Big Torch, Cudjoe, Howe, Lower Sugarland, Middle Torch, Raccoon, Ramrod, Saddlebranch, Summerland, Upper Sugarloaf, and Water Keys) and rice rats were not detected on Little Pine, Big Coppit, Boca Chica, East Rockland, and Geiger Keys.

The 5-year review documented that one rice rat was found on Big Pine Key and one on Ramrod Key. Follow-up trapping on Big Pine Key resulted in no additional captures. Perry suggested that the Ramrod Key and Big Pine Key individuals may represent isolated dispersal incidents or may represent populations that "persist at low numbers or are functional sinks in an island metapopulation". Islands such as the Contents, Muds, Sawyer, and the Snipe Keys are large pristine islands but do not contain the three vegetative communities used by rice rats nor sufficient freshwater sources. Silver Rice Rats are not found in the Middle or Upper Keys presumably because of the lack of suitable habitat.

The Silver Rice Rat was listed as an endangered species on April 30, 1991 (56 Federal Register 19814). At that time, the Silver Rice Rat was extirpated from one key where it formerly occurred and was believed to be extirpated from two additional keys. The Silver Rice Rat was listed as endangered because its wetland habitat had been destroyed by residential and commercial construction; because of predation,

[11] USFWS Southeast Region. 5-year Review: Summary and Evaluation Rice Rat (*Oryzomys palustris natator*). August 2008.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competition, and habitat modification from various introduced mammals and because it's low populations make it more susceptible to reduced genetic variability.

#### 5.5.2.4 Eastern Indigo Snake[12] – Figure 5.8

The Eastern Indigo Snake seems to be strongly associated with high, dry, well-drained sandy soils, closely paralleling the sandhill habitat preferred by the gopher tortoise. The Eastern Indigo Snake can occur in most types of hammock in Florida and southeastern Georgia, often near wetlands, and often in association with gopher tortoise burrows. It is also known to occur in mangrove swamps, seepage swamp, flowing water swamp, pond swamp, wet prairie, xeric pinelands and scrub, flatwoods, dry glades, tropical hardwood hammocks, beach dune/coastal strand, pine rockland, and muckland fields in southern Florida. Gopher tortoise burrows, tree stumps, piles of debris, land crab burrows, and other subterranean cavities are commonly used as dens and for egg laying.

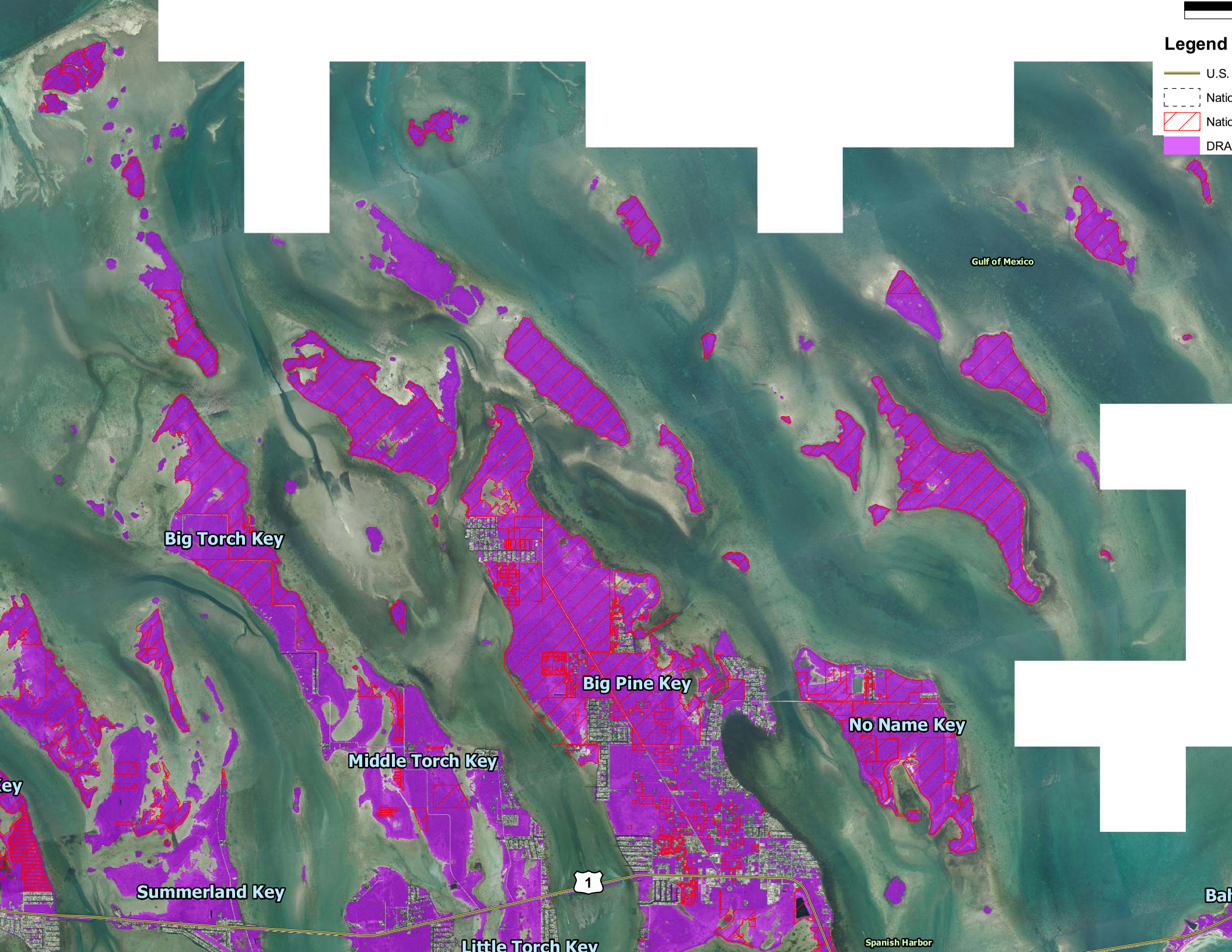
Historically, the species ranged throughout Florida, except in the Marquesas and Dry Tortugas. Museum records document specimens from the Upper Keys and the Lower Keys, but not from the in the Middle Keys. The species has declined throughout its range and has been extirpated from some areas due to habitat fragmentation, decline in the gopher tortoise populations, over-collecting, direct human-related mortality, and road mortality. The Eastern Indigo Snake was listed because of a population decline caused by habitat loss, over-collecting for the pet trade, and mortality from gassing gopher tortoise burrows to collect rattlesnakes (43 FR 4028). Even with continued habitat destruction and alterations, this species will probably persist in most localities where large, unfragmented pieces of natural habitat remain. Unfortunately, current and anticipated future habitat fragmentation will probably result in a large number of isolated, small groups of indigo snakes. Fragmented habitat patches probably cannot support a sufficient number of individuals to ensure viable populations. The Indigo snakes have not been documented in Big Pine Key for several years, despite the presence of suitable habitat throughout Big Pine and No Name Keys and according to the 2008 USFWS 5-year review for the Eastern Indigo Snake, there are no recent occurrence records for the Florida Keys.

### 5.5.3 HCP Three Tier System for Development[13]

Based on the Key Deer studies done under the HCP, Monroe County developed a conservation priority classification for private undeveloped lands in the study area. Lands in the study area are classified into three "Tiers," as illustrated in **Figure 5.9**. Tier 1 are lands where all or a significant portion of the land area is characterized as environmentally sensitive and important for the continued viability of HCP covered species. These lands are high quality Key Deer habitat, generally representing large contiguous patches of native vegetation that provide habitat for other protected species in addition to the Key Deer. Most of the islands are classified as Tier 1 because of their environmental sensitivity and importance for the continued viability of the endangered species. Tier 2 lands are scattered lots and

[12] USFWS Southeast Region. 5-year Review: Summary and Evaluation Eastern Indigo Snake (*Drymarchon Couperi*). April 2008.

[13] Monroe County. Habitat Conservation Plan for Florida Key Deer (*Odocoileus virginianus clavium*) and other Protected Species on Big Pine Key and No Name Key. Monroe County, Florida. April 2003: April 2006 Revision.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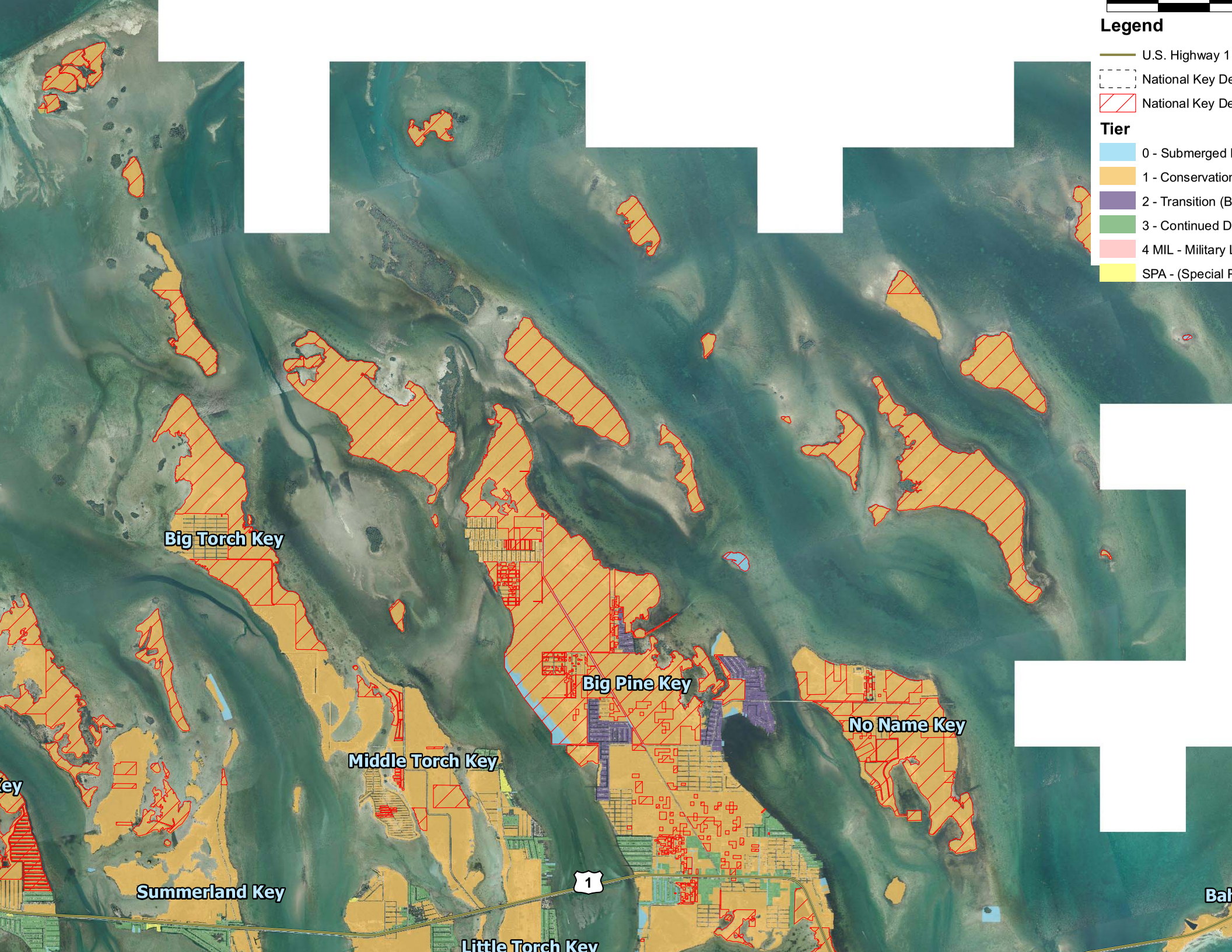
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fragments of environmentally sensitive lands that may be found in platted subdivisions. A large number of these lots are located on canals and are of minimal value to the Key Deer and other protected species because the canal presents a barrier to dispersal. Tier 3 lands are scattered lots within already heavily developed areas that provide little habitat value to the Key Deer and other protected species. Some of the undeveloped lots in this Tier are located between existing developed commercial lots within the US 1 corridor or are located on canals. All of the businesses in Tier 3 are located in the US 1 corridor. Most of the parcels in Tiers 2 and 3 are interspersed among developed parcels and among canals. These areas provide little habitat value to the covered species. The tier classification helped in determining the location of potential new development and prioritizing mitigation areas.

Tiers 1 and 2 minimize development impact on natural resources and sparsely settled areas. Tier 3 encourages development in disturbed areas already heavily settled. It is envisioned that future development patterns will be accomplished through the application of minimum eligibility requirements for competing in the permit allocation system. Tier 3 applicants will be immediately eligible to compete whereas Tier 1 and Tier 2 applicants will be required to amass points via land preservation prior to being eligible for entry into the system.

The Livable CommuniKeys Masterplan envisions issuance of 200 residential dwelling units over the twenty-year planning horizon. The first 30 of those 200 permits will be issued to applicants who had already received an allocation but could not be issued a permit due to a traffic concurrency moratorium. These applicants were awarded regulatory relief through beneficial use or administrative relief after waiting for at least five years. All but two of the permits will be issued for single family lots within Tier 3. The two remaining lots are in Tier 1[14]. In the project area, commercial development is primarily found along US 1; the remaining private lands are residential with a few industrial sites, such as rock quarries. No Name Key is less developed and no public electrical service is available on the island. According to the HCP, 15 percent and 4.5 percent of the total landmass of Big Pine Key and No Name Key, respectively, are developed.

The HCP anticipated the FDOT will complete the addition of a third lane, a two-way left-turn lane, on the developed segment of US 1 on Big Pine Key. This involves the extension of the newly constructed turn lane east and west of the intersection improvement project. New development will be concentrated on already disturbed lands in order to minimize the loss of prime habitat for the covered species. New commercial development will be limited to infill areas mainly along the existing commercial corridor on US 1. The HCP estimates that no more than 7 acres of native vegetation will be cleared over the permit period. Wetland impacts, estimated at no more than 3 acres over 20 years, will be limited to roadside swales and ditches.

The Livable CommuniKeys Masterplan identified the need to implement solutions to the traffic congestion on US 1 and minimize the need for local trips on US 1, minimize the need for local vehicular trips on and across US 1 (from north to south), and improve the level of traffic service on US 1 to a standard that, in accordance with local regulations, would allow some development and maintain that

[14] Monroe County Planning and Environmental Resources Department. Livable CommuniKeys Master Plan for Big Pine Key and No Name Key. Original BOCC Adoption 08/2004: Amended by Ordinance 020-2009.

level of service over the next 20 years. The preferred alternative identified in the HCP provides for development activities that improve the level of service on US 1, restore a low rate of growth in the study area, and offer community and public facilities improvements that satisfy community needs. The avoidance, minimization, and mitigation measures described in this HCP should ensure that populations of the covered species remain viable. According to the USFWS' 2001 Biological Opinion, the combined effect of the underpasses and intersection improvement projects could result in nine fewer human-related deer deaths per year. The model suggests that such reduction in mortality would ameliorate a significant portion of the impact of the proposed 20-year development program.

In accordance with avoidance and minimization measures outlines in the HCP, road widening activities along US 1 would occur within existing cleared and filled portions of the FDOT right-of-way. FDOT will avoid impacts to wetlands during US 1 three-laning.

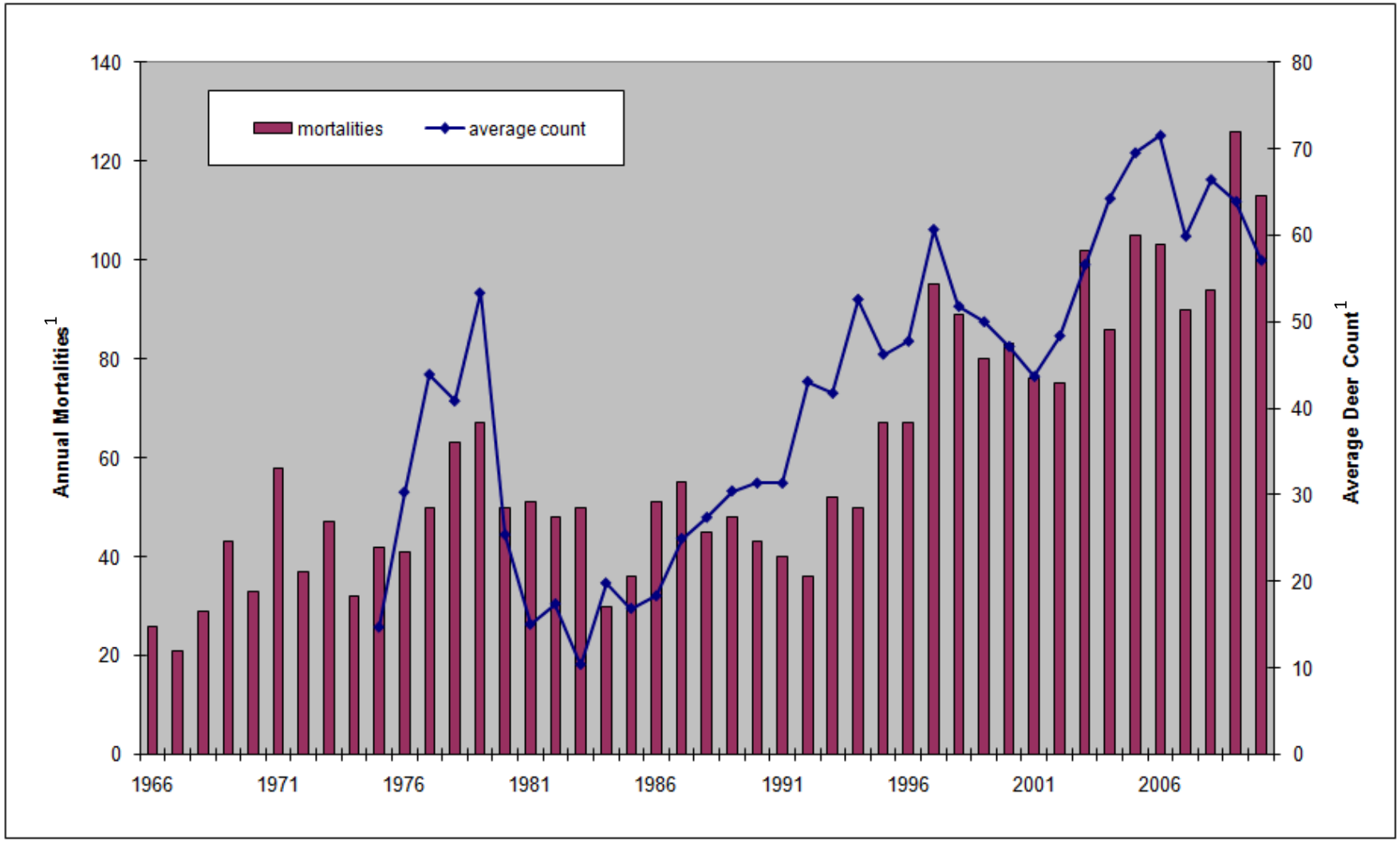
### 5.5.4 Key Deer Mortality

The following data on Key Deer mortality and trends is based on GIS data from 1966 – 2010 provided by the USFWS and the 2010 USFWS's 5-year review of the Key Deer. The majority of the deaths can be attributed to deer vehicle collisions. Other causes of death include drowning, disease, dogs, entanglement, poaching, and combat with other deer. There is a distinct trend of deer vehicle collisions along US 1 on Big Pine, Little Torch and Ramrod Keys, and on Key Deer Boulevard and Watson Boulevard leading to No Name Key, as well as residential roads on Big Pine Key. Big Pine and No Name Keys subpopulations of Key Deer constitute the core of the Key Deer metapopulation. Key Deer numbers on Big Pine Key and No Name Key in 2000 revealed a 240 percent increase since 1971, a population growth rate of about 5 percent annually.[15] Deer vehicle collisions accounted for approximately 50% of the known mortality from 1968 to 1972 and from 1998 to 2000. There were also increased mortalities from entanglement (predominately fences) from 0 to 7.9% and disease from 0 to 5.3% for these same two time periods, while mortalities due to drowning decreased between sample periods from 9.6 to 2.6%, respectively. **Figure 5.10** shows the Key Deer abundance and mortality indices within the core (the subpopulations on Big Pine Key and No Name Key) from 1966 to 2010.

Mortality due to deer vehicle collisions is higher in the southern portion of Big Pine Key primarily due to lower quality and quantity of habitat, greater habitat fragmentation, and the urban landscape (highway length, road length, fenced areas, developed land and traffic on US 1). Survival was highest on No Name Key, intermediate on northern Big Pine Key and lowest on southern Big Pine Key. Currently, northern Big Pine Key serves as a source for Key Deer while southern Big Pine Key serves as a sink.

The high occurrence of deer vehicle collisions along this road segment prompted USFWS and FDOT biologists to address this problem. In 2001 - 2002, FDOT constructed a 2.6-km long system of fencing, two underpasses, and four experimental deer guards to address deer vehicle collisions along a portion of the US 1 roadway.

[15] USFWS Southeast Region. 5-year Review: Summary and Evaluation Key Deer (*Odocoileus virginianus clavium*). August 2010.




Source: USFWS

Notes: 1)Left y-axis represents the annual count of known mortalities, right y-axis represents the yearly average of monthly road counts conducted along the Service's survey route 2)Core = subpopulations on Big Pine Key and No Name Key

**Figure 5.10: Key Deer Abundance and mortality indices within the Core[2] 1966 – 2010**

Based on the four years of post-project data (January 28, 2003 - December 31, 2006), the US 1 corridor project successfully reduced Key Deer mortality within the project area of US 1[16]. Key Deer mortalities within the project area have decreased from an average of 12 – 24 mortalities per year to two mortalities in 2003, one mortality in 2004, zero mortalities in 2005, and three mortalities in 2006.

In comparing Key Deer mortality pre- and post-project completion, researchers found that deer vehicle collisions along the fenced segment of the US 1 project were reduced by 83% – 92%. Improvements to the US 1 corridor project have successfully reduced deer vehicle collisions along the fenced segment of US 1. This decrease translates into increased human safety and an increase in the overall population viability of Key Deer. Based on discussions with USFWS, there has, however, been an increase of deer mortalities in the unfenced segment of US 1. Based on post fence construction monitoring, the increased deer mortalities on US 1 in the unfenced portions could be attributed to potentially several factors including natural increases in fence mortality associated with fence ends, the addition of traffic lanes, habitat improvements conducted along US 1 and an increase in the deer population.[17]

## 5.6 Floodplains

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) throughout Monroe County, Florida. During consultation on the effects of FEMA's Federal action required under 7(a) (2) of the Endangered Species Act (ESA), the USFWS issued a biological opinion on June 16, 1997. The USFWS recommended a "reasonable and prudent alternative" whereby Monroe County, with the assistance of the USFWS and FEMA, would identify habitat and assist with regulation of development. The USFWS and FEMA generated a list administered by the County of specific lots on Big Pine Key and No Name Key, which were considered to contain important Key Deer habitat. The County coordinates with the USFWS on behalf of FEMA on permit application activities on the designated lots.

**Table 5.7** lists the FEMA map panels in the study area.

**Table 5.7: FEMA Map Panels**

| | | | |
|---|---|---|---|
| 12087C1200H | 12087C1505H | 12087C1517H | 12087C1536H |
| 12087C1225H | 12087C1506H | 12087C1519H | 12087C1537H |
| 12087C1480H | 12087C1507H | 12087C1526H | 12087C1539H |
| 12087C1485H | 12087C1508H | 12087C1527H | 12087C1545H |
| 12087C1490H | 12087C1509H | 12087C1528I | 12087C0450G |
| 12087C1491H | 12087C1511H | 12087C1529H | 12087C1565G |
| 12087C1492H | 12087C1512H | 12087C1535H | |

Source: Community Services, FEMA Flood and NWI Wetlands data www.fgdl.com

[16] Jason A. Schmidt, Roel R. Lopez and Nova J. Silvy, Evaluation of The US 1 Crossing Project in Reducing Key Deer Mortality (4 Year Post-Project Report). Texas A&M University. February 2007.
[17] Israel D. Parker, Anthony W. Braden, Roel R. Lopez, Nova J. Silvy, Donald S. Davis and Catherine B. Owen. Effects of US 1 Project on Florida Key Deer Mortality. The Journal of Wildlife Management 72(2):354-359; 2008.

According to the FEMA maps, portions of the Refuge are located within Flood Zone X500, between the limits of the 100-year and 500-year flood; Flood Zone AE, subject to the 100-year flood; and Flood Zone VE, subject to the 100-year flood and additional velocity hazard (wave action). Low lying floodplain areas within the Refuge are vulnerable to sea level rise and flooding events such as hurricanes and other major storms. Areas that are within the velocity hazard zone are vulnerable to storm surges. These types of events can result in habitat changes where salt water inundates freshwater systems affecting the vegetative composition or the availability of freshwater for wildlife including the Key Deer. Loss of floodplain from development outside the Refuge also affects the extent of flooding.

## 5.7 Cultural Resources

The Comprehensive Plan contains standards for designation of historic structures and districts within the County (Objective 104). The planning area contains several archeological sites and older structures that may be of local historic importance. To date, only one structure has been designated pursuant to the County process. That structure is on the eastern shoreline of Big Pine Key at the site of a former shark fishery and processing plant. There may be other structures and sites suitable for designation. The County is currently conducting an inventory of historical sites Countywide.

Data was obtained from the State Historic Preservation Office (SHPO), Florida Master Site File (FMSF) for previously recorded cultural resources within NKDR. The FMSF included two historic structures, 24 archaeological sites, and one resource group. The cultural resources identified in the Refuge are not listed on the National Register of Historic Places (NRHP) and none have been evaluated by SHPO for eligibility for listing on the NRHP.

# 6. Alternatives Analysis

Based on the findings from the existing conditions review, the *Traffic Needs and Safety Report*, and comments from stakeholders, potential improvements to the Refuge's transportation network were reviewed and roadway alternatives initially screened. These alternatives were then screened environmentally, socially, and financially in more detail to develop the preferred alternatives for the Refuge.

Preliminary alternatives were initially developed then initially screened to develop conceptual alternatives. These are discussed in this section. The conceptual alternatives were further reviewed for impacts in **Section 7**.

## 6.1 Preliminary Alternatives

Preliminary alternatives for physical roadway construction and other improvements were selected for the Refuge. These were further categorized by implementation time periods of short (2015), medium (2020), and long range (2030). The following matrix, **Table 6.1**, was developed to identify potential alternatives and responsible partners. The partner agencies on this project include: USFWS, the Florida Department of Transportation (FDOT), Monroe County, FL, the Florida Fish and Wildlife Conservation Commission (FWC), the Florida Department of Environmental Protection Office of Greenways and Trails – Florida Keys Overseas Heritage Trail (FDEP/FKOHT), the Lower Keys Chamber of Commerce, Friends and Volunteers of Refuges (FAVOR), and the Key Deer Protection Alliance (KDPA). At stakeholder meetings, the stakeholders have agreed to work together to implement the alternatives.

### 6.1.1 Roadway Segment Improvements

The following recommendations were identified as potential improvements to the roadways near and adjacent to the Refuge. The suggested responsible partners are listed by each alternative.

#### Short Range Alternatives (2015)

- Reconfigure Blue Hole Interpretive Site parking lot with defined entrances and exits
  *Responsible Partner: USFWS, Monroe County*

#### Medium Range Alternatives (2020)

- Bicycle, pedestrian and shoulder facility upgrades on Refuge access roadways
  *Responsible Partners: Monroe County, USFWS*

#### Long Range Alternatives (2030)

- Upgrade shared pathway on Key Deer Boulevard including separation from Key Deer Boulevard
  *Responsible Partners: Monroe County, USFWS*

- Continue bicycle, pedestrian and shoulder facility upgrades on Refuge access roadways
  *Responsible Partners: Monroe County, USFWS*

**Table 6.1: Proposed Stakeholder Responsibilities**

| | USFWS | FDOT | Monroe County | FWC | FDEP/FKOHT | Lower Keys Chamber | FAVOR | KDPA |
|---|---|---|---|---|---|---|---|---|
| Blue Hole Site Parking Lot Reconfiguration | X | | X | | | | | |
| Key Deer Boulevard Vegetation Trimming/Sight Distance | X | | X | | | | | |
| Key Deer Boulevard Vegetation Trimming/Sign Visibility | X | | X | | | | | |
| Key Deer Awareness Campaigns | X | X | X | X | X | X | X | X |
| Monroe County Sign Inventory Recommendations Implementation | X | X | X | | X | | | |
| Identification of Missing Bicycle/Pedestrian Facility Segments | X | | X | | | | | |
| Purchase and Deploy Speed Check Trailer | X | | X | | | | | |
| Perform Traffic Calming Studies | X | | X | | | | | |
| New Visitors Center Bicycle Rental Program Implementation | X | | | | | X | X | |
| USFWS Signage Upgrades | X | | X | | | | | |
| Visitor Trip Characteristics Survey | X | | | | | | | |
| Visitors Center Information Kiosk | X | | | | | X | | |
| US 1 Deer Crossing Signage Improvements | X | X | X | | | | X | X |
| Refuge Access Roadways Upgrades | X | | X | | | | | |
| Stakeholder Coordination | X | X | X | X | X | X | X | X |
| Key Deer Awareness Campaigns | X | X | X | X | X | X | X | X |
| Intelligent Transportation Systems Improvements | X | X | X | | | | X | X |
| Key Deer Boulevard Shared Pathway Extension/ Key Deer Boulevard Reconfiguration North of Kyle Boulevard | X | | X | | | | | |
| Key Deer Boulevard Pathway Upgrades | X | | X | | | | | |
| Refuge Access Roadways Upgrades | X | | X | | | | | |
| Key Deer Awareness Campaigns | X | X | X | X | X | X | X | X |
| Stakeholder Coordination | X | X | X | X | X | X | X | X |

| | |
|---|---|
| | Short Range Alternatives |
| | Medium Range Alternatives |
| | Long Range Alternatives |

### 6.1.2 Additional Recommendations

Fourteen additional recommendations have been proposed at the NKDR. These recommendations are not anticipated to have direct impacts to the environment. These include:

#### Short Range Alternatives (2015)

- Trim vegetation at pullouts and intersections to increase sight distances where needed (i.e. Key Deer Boulevard)
  *Responsible Partner: USFWS, Monroe County*

- Perform routine trimming of vegetation around all signs for visibility
  *Responsible Partners: USFWS, Monroe County*

- Continue awareness of Key Deer and other threatened and endangered species crossing area roadways. This may include:

  1) Development of new materials/exhibits at the Visitors Center (existing or future)
  2) Run notifications in the local newspapers/radio/homeowner association newsletters
  3) Create unique signage for secondary roads notifying special times for the Key Deer
  4) Perform workshops at Visitors center and schools

  *Responsible Partners: All Stakeholders*

- Review Monroe County's US-1 sign inventory study and implement sign improvements
  *Responsible Partners: FDOT, Monroe County, USFWS, FDEP/FKOHT*

- Identify missing bicycle and pedestrian facility segments to serve key Refuge areas including access to the new Visitors Center[18]
  *Responsible Partners: USFWS, Monroe County*

- Purchase a radar speed check trailer to notify drivers of their travel speed on County roads within the Refuge area
  *Responsible Partners: USFWS, Monroe County*

- Perform traffic calming studies on key roadways around the Refuge to determine if traffic calming measures are appropriate to help reduce vehicle speeds.
  *Responsible Partners: Monroe County, USFWS*

- In coordination with a local vendor, implement a bike rental station at the new Visitors Center for visitor to use to visit the Refuge
  *Responsible Partners: USFWS, Chamber of Commerce, FAVOR*

[18] Depending on the location of the bicycle and pedestrian paths leading to/from the Visitors Center, there may some environmental impacts. These should be reviewed at that time.

- Upgrade all existing USFWS Refuge signage for conformance with the Manual on Uniform Traffic Control Devices (MUTCD) criteria for standard lettering, text message, sign color, size and placement
  *Responsible Partners: USFWS, Monroe County*

- Survey Refuge Visitors at the existing Visitors Center and the Blue Hole Interpretive Site on their trip characteristics
  *Responsible Partner: USFWS*

- Installation of a kiosk at new Visitors Center where multiple entities could provide information rather than have multiple signs
  *Responsible Partners: USFWS, Chamber of Commerce*

- Update, add, relocate, replace or remove as appropriate Key Deer Warning Signs on US 1 through entire Key Deer habitat (including Sugarloaf Key, Cudjoe Key, Summerland Key, Ramrod Key, Little Torch Key, Spanish and Harbor Key)
  *Responsible Partners: FDOT, USFWS, Monroe County, FAVOR, KDPA*

### Medium Range Alternatives (2020)

- Continue awareness of Key Deer and other threatened and endangered species crossing area roadways. This may include:

  1) Development of new materials/exhibits at the Visitors Center (existing or future)
  2) Run notifications in the local newspapers/radio/homeowner association newsletters
  3) Create unique signage for secondary roads notifying special times for the Key Deer
  4) Perform workshops at Visitors Center and schools

  *Responsible Partners: All Stakeholders*

- Implement Intelligent Transportation System application to notify drivers of deer entering roadways
  *Responsible Partners: FDOT, Monroe County, USFWS, FAVOR, KDPA*

### Long Range Alternatives (2030)

- Continue awareness of Key Deer and other threatened and endangered species crossing area roadways. This may include:

  1) Development of new materials/exhibits at the Visitors Center (existing or future)
  2) Run notifications in the local newspapers/radio/church bulletins/school papers at the start of breeding for male running seasons
  3) Create unique signage for secondary roads notifying special times for the Key Deer
  4) Perform workshops at Visitors Center and schools

  *Responsible Partners: All Stakeholders*

- Ongoing coordination with stakeholders
  *Responsible Partner: USFWS*

## 6.2 Screening Criteria

The screening criteria used for selection of the preliminary candidate roadway alternatives are detailed below. These screening criteria were established based on the conditions and issues that future improvements addressed. These were divided into four categories:

- **Environmental and Cultural Impacts** – Environmental and cultural impacts include issues pertaining to the physical environment (i.e. wetlands, floodplains, natural wildlife habitats) and social features (i.e. demographics, environmental justice, livability).

- **Constructability** – Constructability refers to the reasonable issues and elements involved with the physical construction of a recommendation. For example: this criterion would review whether or not the improvement could be effectively implemented within the physical constraints of the study area's existing conditions.

- **Transportation Benefit** – Transportation includes the review of the properties and conditions associated with existing and future roadways, safety, connectivity, and capacity of the transportation network for the study area.

- **Cost** – Cost includes the financial obligation associated with implementing a recommendation including design, construction, maintenance, and related expenses.

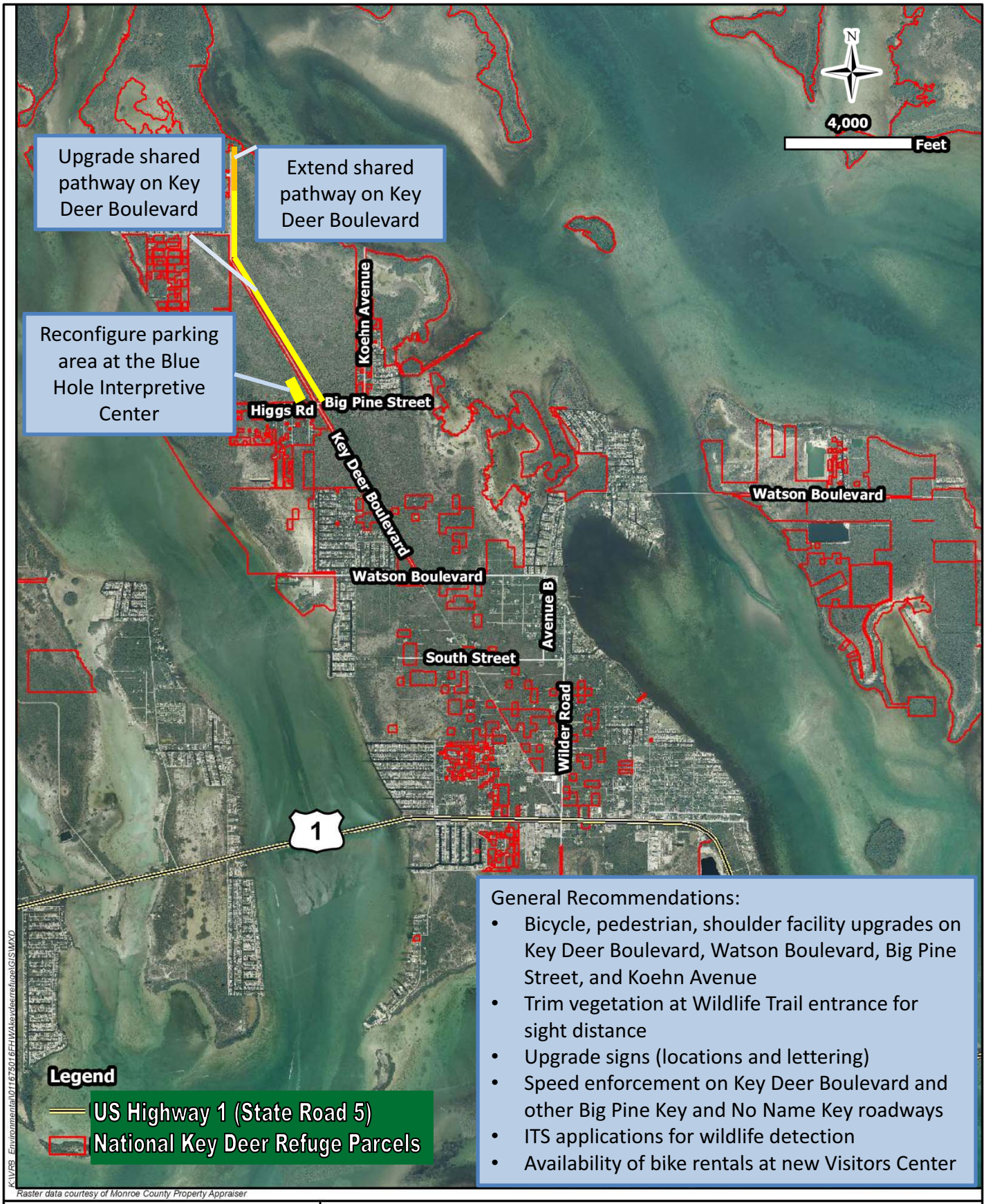
## 6.3 Preliminary Candidate Alternatives

Five preliminary candidate alternatives (including a No Build alternative) presented in the *Preliminary Candidate Alternatives Report* were identified as either short range (2015), medium range (2020), or long range (2030).

These alternatives are not exclusive and should all be considered for implementation in the future. Also, for some of the alternatives, improvements have been broken down into sections and prioritized. This allows improvements to be implemented in phases as monies are available. These alternatives are shown in **Figure 6.1**.

### 6.3.1 Alternative 1 - Reconfigure Blue Hole Interpretive Site Parking Lot with Defined Entrances and Exits – Short Range

Reconfiguring the parking area would prevent vehicles from entering and blocking travel lanes on Key Deer Boulevard while performing parking maneuvers. This safety improvement could be performed at a relatively low cost with limited or no impact to the surrounding area. This alternative will promote livability by adding a multimodal resource to the area.




U.S. Department of Transportation
Federal Highway Administration

Figure 6.1: Map of Preliminary Alternatives

***National Key Deer Refuge***
***Transportation Study***
***Contract No.: DTFH71-09-D-00001***

| 1 inch = 4,000 feet | PROJECT NUMBER: 011675016 | March 2011 | . . |
|---|---|---|---|

### 6.3.2 Alternative 2 - Bicycle, Pedestrian and Shoulder Facility Upgrades on Refuge Access Roadways – Medium Range

Priorities should be determined for Refuge access roadways with substandard or no shoulders based on known use of Refuge visitors and other users. These upgrades will promote multimodal transportation and increase livability. Once prioritized, improvements can be made by the County in a systematic manner starting with the highest priority project as money becomes available. There would be some impact to the natural environment as previously cleared shoulder area may not be available at all upgrade locations. Costs include design, construction, and maintenance of the facilities. There may be constructability issues at some locations.

### 6.3.3 Alternative 3 - Extend Shared Pathway on Key Deer Boulevard North of Kyle Boulevard – Long Range

The shared pathway on Key Deer Boulevard currently terminates at Kyle Boulevard. This extension would lengthen the pathway approximately 0.25 miles to the northern terminus of Key Deer Boulevard. While extending this pathway, it would be constructed to standards for 2-way bicycle and pedestrian traffic, expanding the multimodal transportation network, increasing livability. Costs include design, construction and maintenance of the facility. Limited environmental impact is expected.

### 6.3.4 Alternative 4 - Upgrade Shared Pathway on Key Deer Boulevard including separation from Key Deer Boulevard – Long Range

This alternative upgrades the existing shared pathway on Key Deer Boulevard.

**Alternative 4a – Widen existing pathway to 2-way bicycle and pedestrian traffic standards:** This alternative would have some impact to the natural environment as it would increase the amount of impervious area when the trail is widened. However, it would allow for two-way bicycle and pedestrian traffic to pass safely, enhancing the existing multimodal system on Big Pine Key, increasing livability. Costs would include design, construction and maintenance of the trail. The widening of the pathway is adjacent to Key Deer Boulevard may create some additional environmental impacts.

**Alternative 4b – Widen existing pathway to 2-way bicycle and pedestrian traffic standards and separate sections adjacent to Key Deer Boulevard:** This alternative would have impacts to the natural environment by adding impervious area and would have more impacts to the pathway sections that are directly adjacent to Key Deer Boulevard. As in Alternative 4a, it would allow for 2-way bicycle and pedestrian traffic, enhancing the existing multimodal system on Big Pine Key, increasing livability. Costs would include design, construction and maintenance of the trail.

## 6.4 Short and Long Range Implementation Plan Alternatives

These alternatives were further screened by developing preliminary concept drawings and construction cost estimates for the five roadway improvement alternatives prior to the impact analysis. The No Build alternative was also reviewed.

All construction cost estimates are conceptual. The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive

bidding or market conditions. Opinions of probable costs provided herein are based on the information known to the Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from opinions of probable costs.

### 6.4.1 No Build Alternative

The No Build alternative provides no improvements to the existing transportation facilities in the study area. Therefore, there also would be no improvement costs or impacts to the natural environment in the study area. In the No Build Alternative, the existing habitat would remain. However, there would be no improvements implemented that could minimize deer-vehicle collisions.

### 6.4.2 Alternative 1 - Reconfigure Parking Area at Blue Hole Interpretive Site

Alternative 1 involves reconfiguring the parking area at the Blue Hole Interpretive Site to prevent vehicles from entering and blocking travel lanes on Key Deer Boulevard while performing parking maneuvers (**Figure 6.2**). With this reconfiguration, the parking lot vehicles will not need to maneuver onto Key Deer Boulevard. This alternative would result in no impacts to the environment. The construction cost estimate for this alternative is approximately $5,000 for restriping and the median treatment. Detailed impacts are identified in **Section 7**.

### 6.4.3 Alternative 2 - Bicycle, Pedestrian and Shoulder Facility Upgrades on Refuge Access Roadways

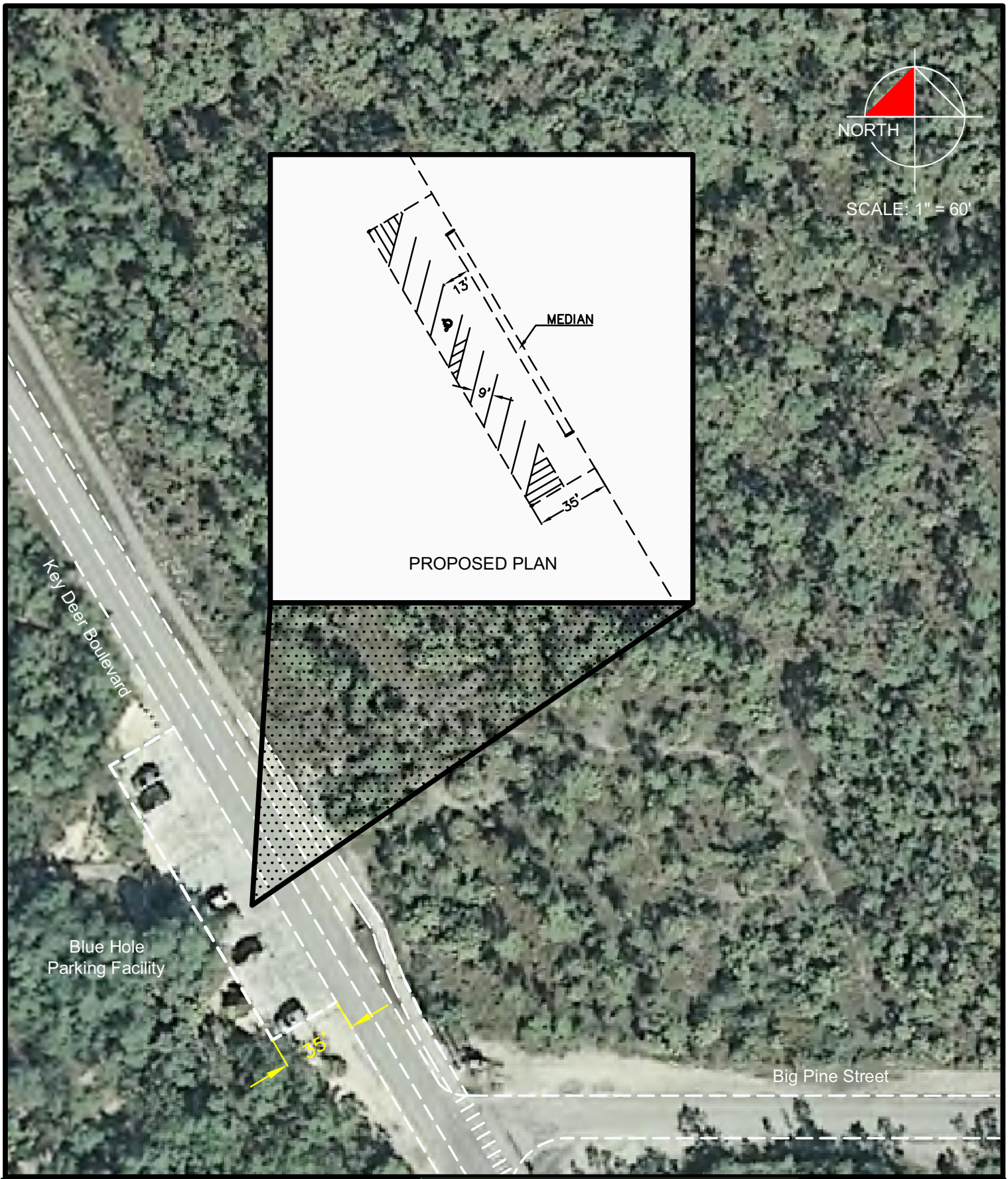
As stated in previous studies, a number of the roadways around the Refuge have substandard or no shoulders. Alternative 2 involves upgrading segments of these roadways around the Refuge. Alternative 2 is broken down into various options that can be constructed depending on the cost and implementation constraints. Detailed impacts are identified in **Section 7**.

#### 6.4.3.1 Alternative 2a – Mid-Block Crosswalk across Key Deer Boulevard

**Figure 6.3** shows an unsignalized pedestrian crossing alternative at the Blue Hole Interpretive Site. This alternative would include signing and striping and a mid-block crosswalk across Key Deer Boulevard at Blue Hole Interpretive Site. This crosswalk will facilitate visitor access from the existing shared pathway on Key Deer Boulevard to the Blue Hole Interpretive Site for bicycles and pedestrians.

#### 6.4.3.2 Alternative 2b – Sharrow Striping

An alternative to widening the roadways for bicycle lanes is the striping of sharrows on the roadway and the installation of appropriate signage. An example of sharrow striping in Miami, Florida is shown in **Figure 6.4**. It is recommended that sharrow implementation be reviewed for Watson Boulevard from Key Deer Boulevard to Avenue B, Watson Boulevard on No Name Key, Watson Boulevard from Key Deer Boulevard to the western terminus, along Big Pine Street, and along Koehn Avenue.




NATIONAL KEY DEER REFUGE TRANSPORTATION STUDY

Reconfigure Parking Area at Blue Hole Interpretive Site

Figure 6.2: Reconfigure Parking Area at Blue Hole Interpretive Site

Proposed Alternative 2a


For visualization purposes.

Figure 6.3: Create Mid-Block Crosswalk at Blue Hole Interpretive Site

**Figure 6.4 – Sharrow Striping Example**

#### 6.4.3.3 Alternative 2c – Shoulder Widening

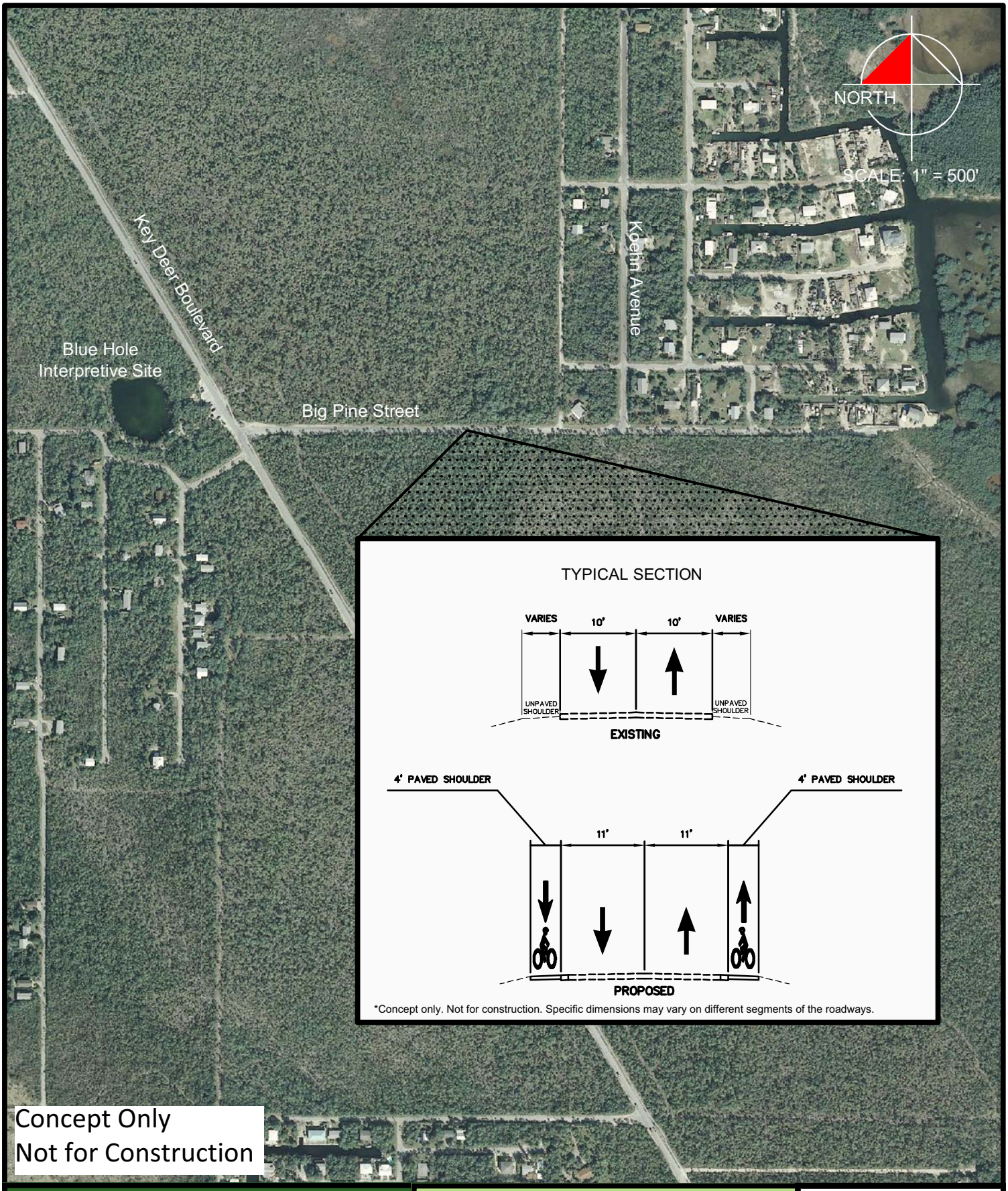
Shoulder widening for bicycle lanes has been identified as another option of this alternative. **Figure 6.5** shows an example of the widened section. Roadway segments and associated improvements have been prioritized based on their relative location and projected traffic volume. **Figure 6.6** shows the locations of these segments. The prioritized list should be submitted to the County for inclusion in the capital improvement program as indicated in the Livable CommuniKeys Masterplan. As monies become available, the County then has a systematic manner in determining the order in which projects should be completed. It is expected that the first three locations on Watson Boulevard would be medium range improvements with the remaining locations as long range improvements.

All improvements should be constructed consistent with Monroe County standards as appropriate. When upgrading for shoulders (8-foot shoulders) and widening to standard width (12-foot travel lanes), resurfacing will likely also occur. Resurfacing the existing roadway preserves the life expectancy of the road and enhances the travelers' experience driving along the road.

Limited environmental impacts are expected for the striping and marking alternative, while some environmental impacts are expected for the shoulder or widening alternative sections. Detailed impacts are discussed in **Section 7**. As these facility upgrades occur, some impacts to the natural environment are expected as previously cleared shoulder areas may not be available at all upgrade locations.

The total construction cost estimate for this alternative is approximately $4 million. However, it is expected that these projects would be completed in phases. **Table 6.2** shows an estimated breakdown of each of these segments in priority order and the associated projected construction costs.

# Proposed Alternative 2c




For visualization purposes

Figure 6.5: Example Cross Section for Recommended Facility Upgrades

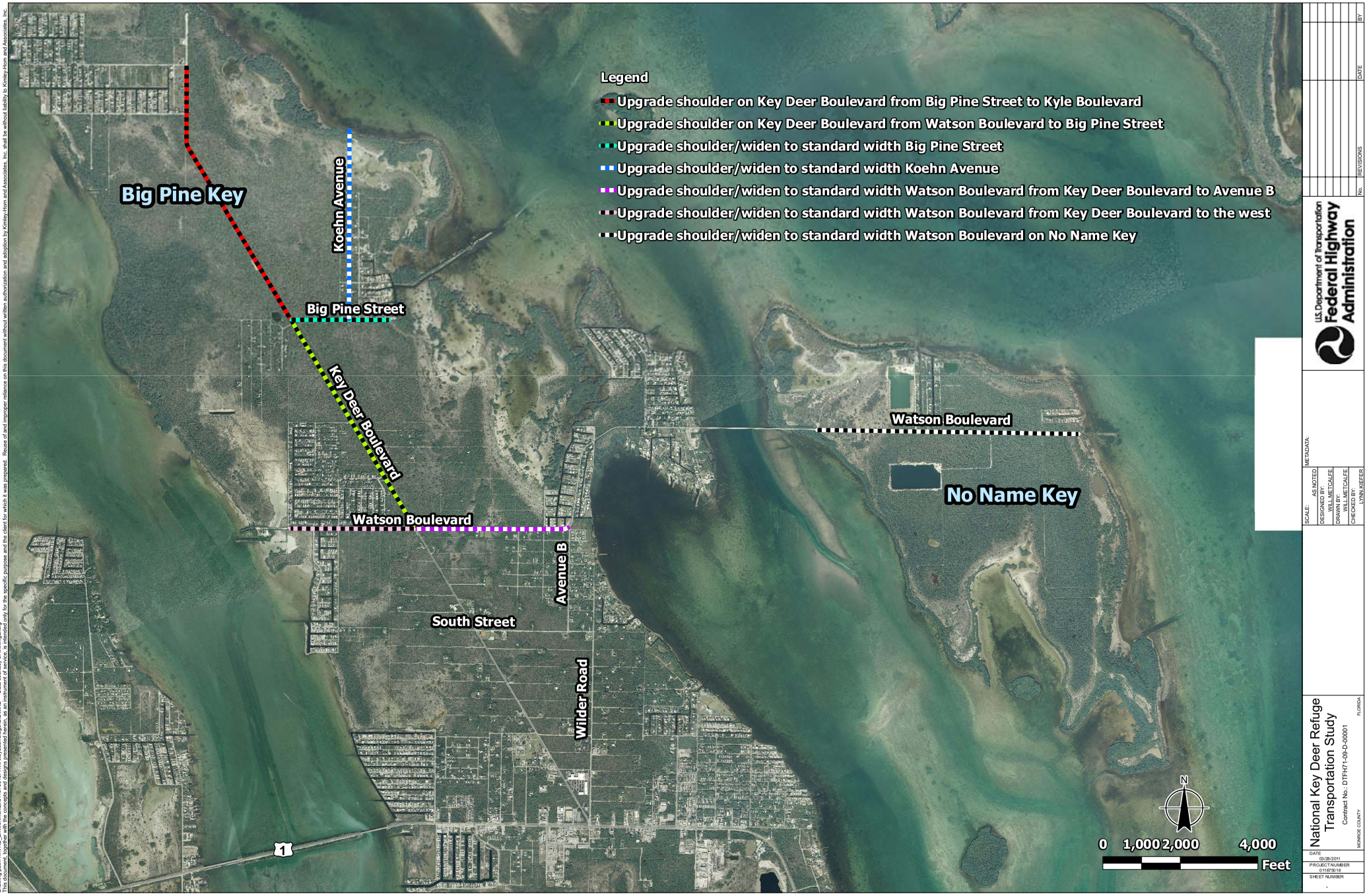



Figure 6.6: Alternative 2c Potential Segments

| Table 6.2: Alternative 2c Roadway Segment Priority List | | | |
|---|---|---|---|
| **Priority** | **Description** | **Distance** | **Cost[1]** |
| 1 | Upgrade shoulder/widen to standard width Watson Boulevard from Key Deer Boulevard to Avenue B | 3,950 Feet | $474,000 |
| 2 | Upgrade shoulder/widen to standard width Watson Boulevard from No Name Key Bridge to the east terminus | 7,400 Feet | $888,000 |
| 3 | Upgrade shoulder/widen to standard width Watson Boulevard from Key Deer Boulevard to the west terminus | 3,400 Feet | $408,000 |
| 4 | Upgrade shoulder on Key Deer Boulevard from Watson Boulevard to Big Pine Street | 6,310 Feet | $663,000 |
| 5 | Upgrade shoulder on Key Deer Boulevard from Big Pine Street to Kyle Boulevard | 7,350 Feet | $772,000 |
| 6 | Upgrade shoulder/widen to standard width Big Pine Street | 1,500 Feet | $180,000 |
| 7 | Upgrade shoulder/widen to standard width Koehn Avenue | 4,900 Feet | $588,000 |

Notes:

1: Opinions of Probable Costs, available in Appendix E: Opinions of Probable Cost

### 6.4.4 Alternative 3 (Figure 6.7) - Extend Shared Pathway and Add Shoulders on Key Deer Boulevard North of Kyle Boulevard

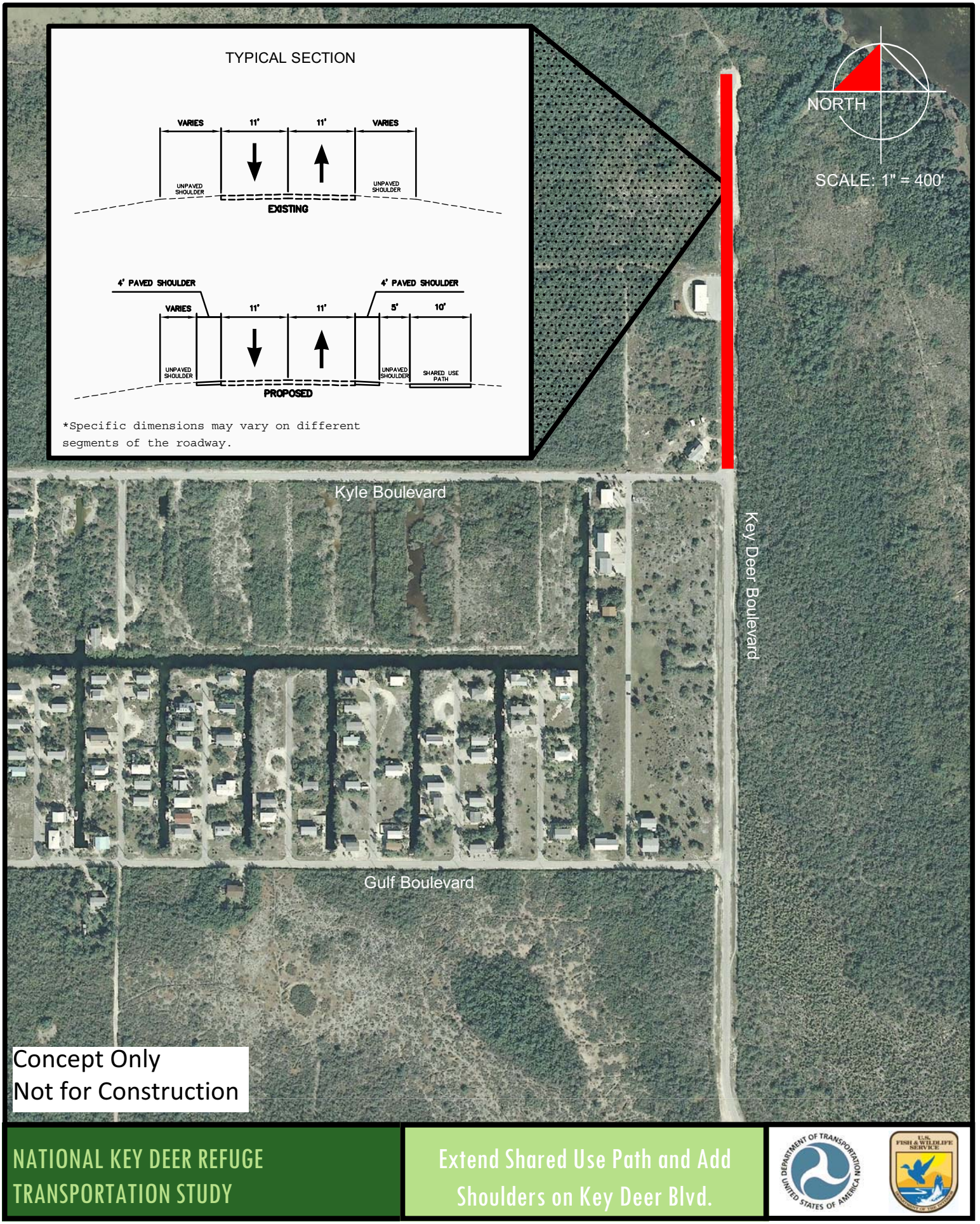
The shared pathway on Key Deer Boulevard currently terminates at Kyle Boulevard. This alternative would extend the pathway approximately 0.25 miles to the northern terminus of Key Deer Boulevard. The pathway extension would be constructed to standards for two-way bicycle and pedestrian traffic.

This alternative would also include the addition of paved shoulders (8-foot shoulders) and resurfacing of the existing roadway. Extending the shared pathway and constructing it to standards for two-way bicycle and pedestrian traffic help to provide connectivity and a better bicycle and pedestrian network for visitors around the Refuge. The addition of paved shoulders brings the road segments into compliance with County standards. Resurfacing the existing roadway preserves the life expectancy of the road and enhances the travelers' experience driving along the road. The environmental impacts to native habitat, wetlands and floodplains are minimal for this alternative because a majority of the improvements would occur within the existing cleared and maintained roadway and road shoulders. Environmental impacts are detailed in **Section 7**. The construction cost is estimated at approximately $238,000.

### 6.4.5 Alternative 4 (Figures 6.8 and 6.9) – Widen Shared Pathway on Key Deer Boulevard

Currently the shared pathway on Key Deer Boulevard is eight feet wide. Alternative 4 has two options. Alternative 4a includes widening the existing pathway to 10 feet, two feet narrower than current Monroe County standards and therefore would require a design exception. Alternative 4b involves widening the existing pathway to 10 feet and separating the pathway from Key Deer Boulevard north of Watson Boulevard. Widening the shared pathway increases the number of visitors who can

# Proposed Alternative 3




For visualization purposes

Figure 6.7: Extend Shared Use Path and Add Shoulder on Key Deer Blvd.

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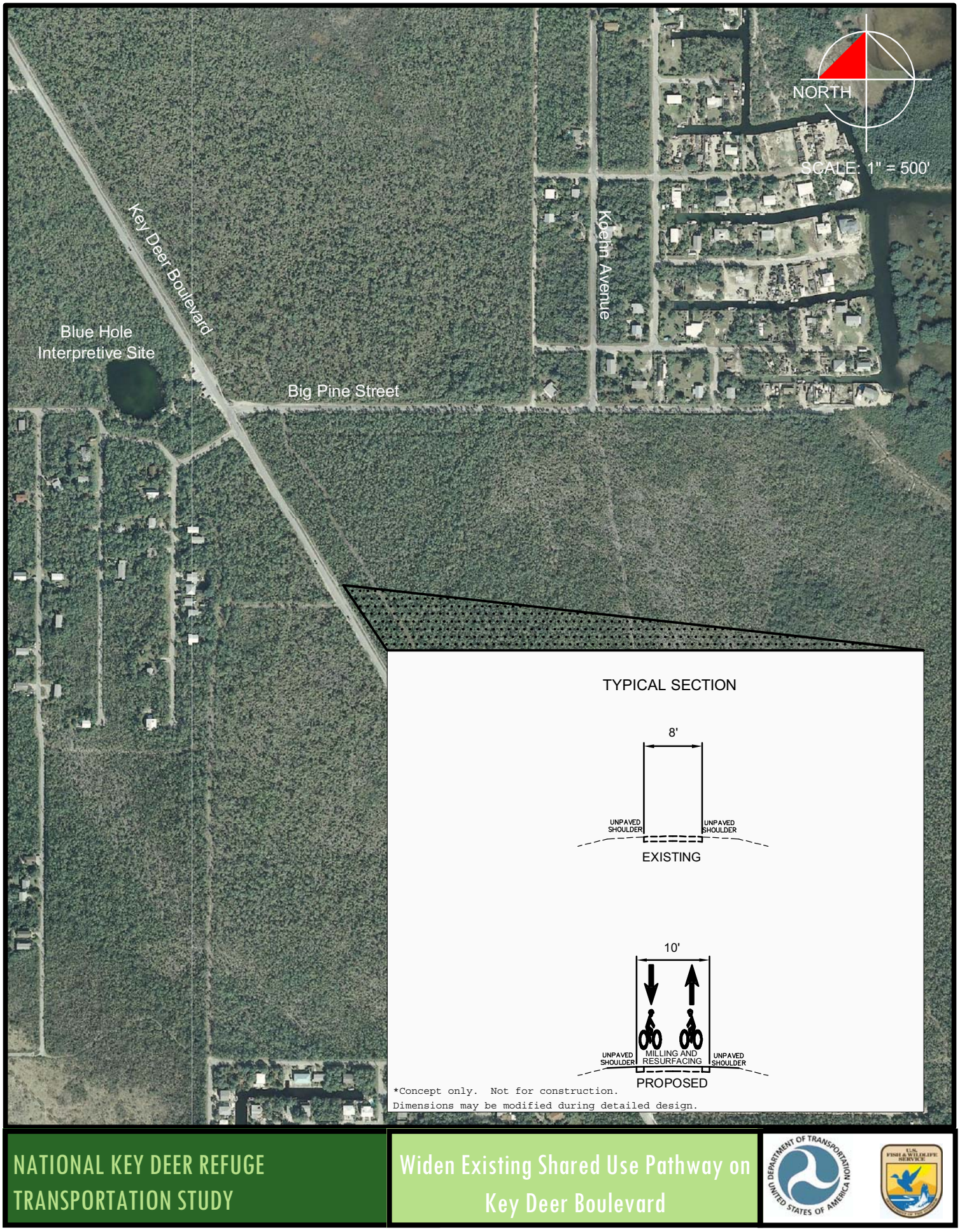
Proposed Alternative 4a




For visualization purposes

Figure 6.8: Widen Existing Shared Use Pathway on Key Deer Blvd.

# Proposed Alternative 4b


Figure 6.9: Widen Shared Use Pathway and Separate from Key Deer Blvd.

safely and comfortably use the pathway. Environmental impacts are expected for each of these alternatives. Detailed impacts are discussed in **Section 7**. The estimated construction cost for Alternative 4a is approximately $562,000. The estimated construction cost for Alternative 4b is approximately $873,000.

## 6.5 Additional Recommendations (Non-roadway Improvements)

Fourteen additional transportation recommendations were further developed have been proposed at the NKDR. These recommendations are not anticipated to have direct impacts to the environment with a potential exception of Alternative 8 dependant on its design.

### 6.5.1 Alternative 5 - Trim Vegetation at Pullouts and Intersections to Increase Sight Distances Where Needed (i.e. Key Deer Boulevard)

See **Figure 6.10** for an example of the sight distance triangle on Key Deer Boulevard at the Nature Trail Entrance/Exit. Frequency schedule will be determined by vegetation growth.

### 6.5.2 Alternative 6 - Perform Routine Trimming of Vegetation Around Signs for Visibility

Similar to Alternative 5, trimming of vegetation around the signs will increase visibility. Partner with Monroe County and FDOT Maintenance staff for assistance.

### 6.5.3 Alternative 7 - Review Monroe County's US-1 Sign Inventory Sign Study and Implement Sign Improvements

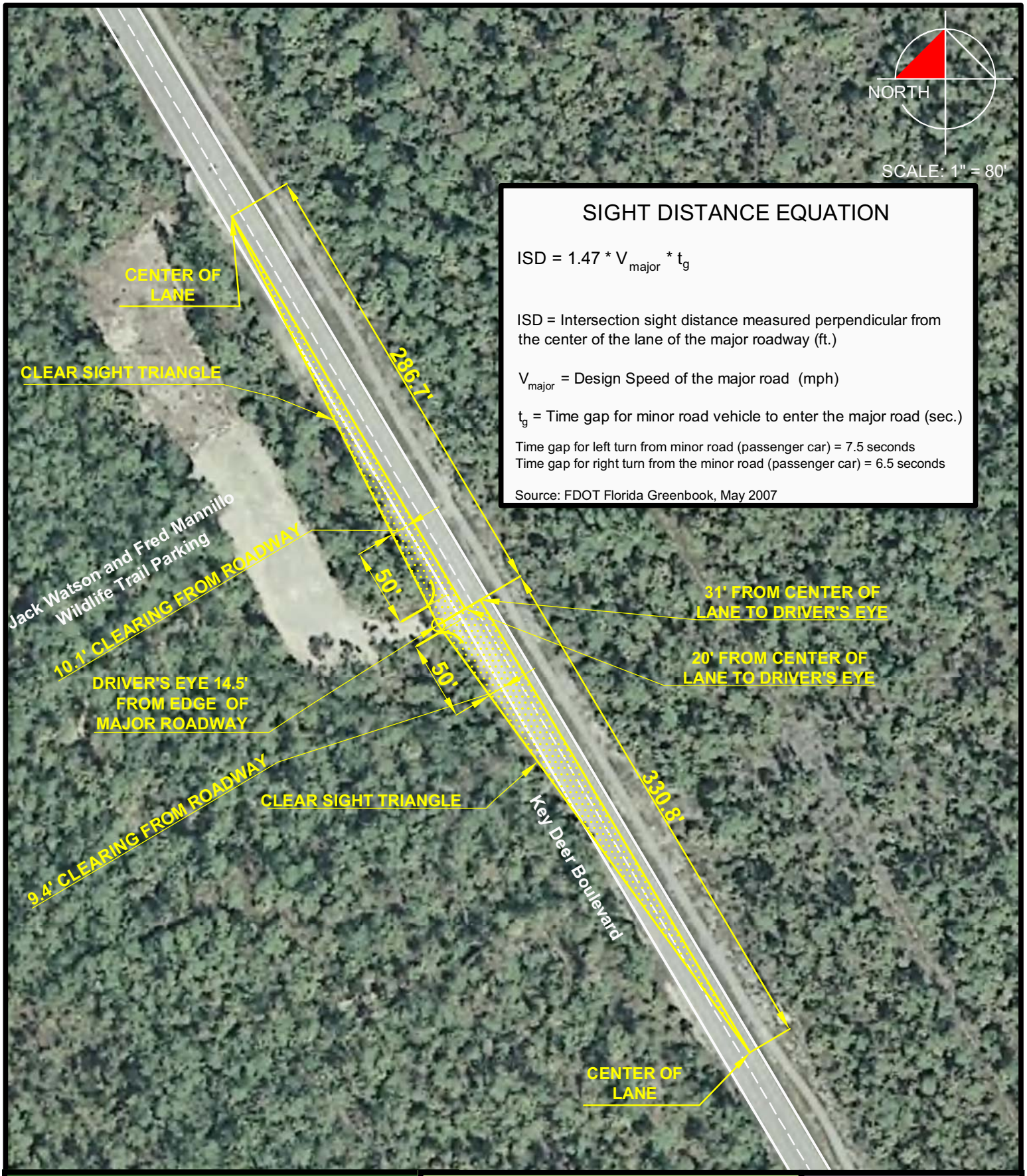
The inventory task has been completed. The Refuge will coordinate with Monroe County regarding new sign locations identified in Alternative 15.

### 6.5.4 Alternative 8 - Once Constructed, the New Visitors Center Should Tie Into Existing Bicycle and Pedestrian Facilities Already in Place on US 1 and Also Potentially the Back Side of the Property.

Include this bicycle/pedestrian connectivity during the development of the new Visitors Center. Environmental impacts of this alternative have not been determined because the impact is subject to more specific design parameters (e.g. location of the trail at the back of the property, additional parking facilities, etc.). It is expected that there would be impacts to upland habitat with the construction of trails or bicycle facilities at the back side of the property. These impacts could be minimized depending on the size and type of trail that is designed and constructed.

### 6.5.5 Alternative 9 - Purchase a Radar Speed Check Trailer to Notify Drivers of Their Travel Speed on County Roads Within the Refuge Area

Coordinate with Monroe County Sheriff's Department prior to purchase. Identify if there is opportunity for shared use of an existing speed check trailer. Work with the Sheriff's Department on implementation of placement.




NATIONAL KEY DEER REFUGE TRANSPORTATION STUDY

Sight Triangle at Nature Trail Entrance/Exit

Figure 6.10: Sight Triangle at Nature Trail Entrance/Exit

### 6.5.6 Alternative 10 - Perform Traffic Calming Studies on Key Roadways Around the Refuge to Determine if Traffic Calming Measures are Appropriate to Help Reduce Vehicle Speeds

Formally request a traffic calming study to be performed on Key Deer Boulevard, Watson Boulevard (on Big Pine Key and No Name Key), and any other roadways of interest to Monroe County. When funding to conduct this analysis becomes available, Monroe County can then perform a traffic calming study for these roadways to determine what traffic calming measures would be appropriate. This was also recommended as an action item in the Livable CommuniKeys Masterplan.

### 6.5.7 Alternative 11 - In Coordination With a Local Vendor, Implement a Bike Rental Station at the New Visitors Center for Refuge Visitors.

Recommend this to be completed when the new Visitors Center is built.

### 6.5.8 Upgrade all existing USFWS Refuge signage for conformance with the Manual on Uniform Traffic Control Devices (MUTCD) criteria for standard lettering, text message, sign color, size and placement

Upgrade signs at the Blue Hole Interpretive Site and the Nature Trail to MUTCD standards. Examples of General Directional Guide signs can be seen in Figure 2M-2 on page 334 of the MUTCD, 2009 Edition. This section can be accessed via the following weblink:

http://mutcd.fhwa.dot.gov/pdfs/2009/part2ithu2n.pdf

Examples have been provided to the Refuge under separate cover.

### 6.5.9 Alternative 13 - Survey Refuge Visitors at the Existing Visitors Center and the Blue Hole Interpretive Site on Their Trip Characteristics to Develop Visitor Pass-By Information.

If a traffic study is required for the Visitors Center, it is recommended that a survey questionnaire be prepared to determine visitor pass-by trip characteristics. This survey will need to be coordinated with the Office of Management and Budget (OMB) for approval of the survey. Also access to the site should be reviewed including turn-lane warrant analyses as necessary. The proposed survey questions are:

Thank you for visiting the National Key Deer Refuge. In an effort to better understanding our visitors, we ask that you answer the following questions related to your trip today.

1. Are you a full-time resident, part-time resident, or vacationer?
2. Prior to arriving at the Refuge today, what city, mile-marker, or zip code was your previous stop?
3. After visiting the Refuge today, will you go directly back to your previous stop?
   a. If yes, proceed to question 4.
   b. If no, what is the city, mile-marker, or zip code of your next destination?
4. If you had not stopped at the Refuge today, would you have traveled on U.S. 1 through Big Pine Key?

### 6.5.10 Alternative 14 - Installation of a Kiosk at New Visitors Center Where Multiple Entities Can Provide Information Rather Than Have Multiple Signs

Recommend a kiosk be installed when the new Visitors Center is built.

### 6.5.11 Alternative 15 - Update, Add, Relocate, Replace or Remove, as appropriate, Key Deer Warning Signs on US 1 Through Entire Key Deer Habitat (including Sugarloaf Key, Cudjoe Key, Summerland Key, Ramrod Key, Little Torch Key, and West Summerland Key)

Partner with FDOT to determine the permitting procedures and sign standards on US 1. Suggest placement of signs at the start of the Key Deer habitat rather than just on Big Pine Key to make motorists aware of the potential deer crossings. Recommend working with stakeholders on determining the locations and messages on signs.

### 6.5.12 Alternative 16 - Continue Awareness of Key Deer and Other Threatened and Endangered Species Crossing Area Roadways

Continue public outreach activities.

### 6.5.13 Alternative 17 - Implement Intelligent Transportation System application to Notify Drivers of Deer Entering Roadways

ITS applications are mainly research based, with many different technologies being tested worldwide with the most success being found with large (elk-size) migratory animals. Recommend coordinating with FDOT, Monroe County and animal/vehicle sign experts on proper location of signs. Some well known animal/vehicle sign experts are Dr. Marcel P. Huijser at Montana State University and Patricia White with Defenders of Wildlife. Recommend contacting animal/vehicle collision experts and request the Refuge be included in one of the research activities to help determine the proper type of ITS application.

### 6.5.14 Alternative 18 - Ongoing Coordination With Stakeholders

Continue partnerships with stakeholders.

# 7. Preliminary Impact Screening

This section describes the impact screening for the roadway improvement alternatives proposed at the NKDR Impacts are based on the preliminary footprints of the conceptual alternatives previously described.

## 7.1 Summary of Screening

The following categories were considered during the preliminary impact screening process.

**Land Use, Habitat Conservation Plan (HCP) Impacts and applicability to Livable CommuniKeys Masterplan** – Changes to existing and proposed land uses. The conditions of the Federal Fish and Wildlife Permit No. TE 083411-0 and the supporting Habitat Conservation Plan (HCP) limits the amount of clearing of native vegetation that can occur on Big Pine Key and No Name Key to 7 acres through year 2023. Coordination with USFWS's Ecological Services Division will be required if it is decided that alternatives described herein are selected for implementation and thus using portions of the 7-acre threshold. The Livable CommuniKeys Masterplan established a number of goals, follow-on strategies and action items related to land use and redevelopment, environmental protection, community character, economic development, traffic and transportation, and community participation. These goals will be reviewed relative to the alternatives presented.

**Socioeconomic and Community Features** – Socioeconomic composition of affected communities and impacts to community features.

**Environmental Justice** – Impacts on minority or low-income populations.

**Cultural Resources** – Impacts to historic or archaeological resources.

**Transportation and Safety** – Changes in traffic patterns and safety for drivers, pedestrians, and bicyclists.

**Visitor Use and Experience** – Changes to visitor facilities and experience.

**Wetlands** – Impacts to jurisdictional waters and wetlands based on National Wetland Inventory (NWI) mapping.

**Floodplains** – Changes to impervious area within floodplains and floodways based on Federal Emergency Management Agency (FEMA) mapping.

The following sections briefly describe the existing natural and human environment within the NKDR and potentially impacted areas. **Table 7.1** summarizes the screening for the roadway alternatives.

## 7.2 Potential Impacts to Existing Conditions

Impacts to wetlands, habitat and floodplains have been calculated for the alternatives. This study is being conducted primarily using existing Geographical Information System data. The impact acreages are approximate and were determined based on GIS mapping and aerial interpretation. The acreages

| Table 7.1. Impact Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Impact Resource or Category** | **Alternative** | | | | | | |
| | **Alternative 1** | **Alternative 2a** | **Alternative 2b** | **Alternative 2c** | **Alternative 3** | **Alternative 4a** | **Alternative 4b** |
| | **Reconfigure Blue Hole parking** | **Stripe Crosswalk on Key Deer Blvd** | **Stripe Sharrows** | **Shoulder and Widening Improvements** | **Extend Shared Pathway on Key Deer Blvd.** | **Widen Shared Pathway on Key Deer Blvd.** | **Widen and Separate Shared Pathway on Key Deer Blvd.** |
| Upland Habitat (acres) | No Impact | No Impact | No Impact | 0.5 | 0.05 | 0.13 | 0.14 |
| Community Features | Temporary construction impact to Blue Hole Interpretive site. | No Impact | No Impact | No impact | No Impact | No Impact | No Impact |
| Environmental Justice | No impact | No impact | No impact | No impact | No impact | No impact | No impact |
| Cultural Resources | No impact anticipated | No impact anticipated | No impact anticipated | No impact anticipated | No impact anticipated | No impact anticipated | No impact anticipated |
| Transportation and Safety | Improve operation for visitors using the parking facilities and travelers on Key Deer Blvd. | Enhances bicycle and pedestrian crossing of Key Deer Blvd. | Improves bicycle facilities | improves bicycle and pedestrian facilities | Improves bicycle and pedestrian facilities | Improve shared use pathway | Improve shared use pathway and provides separation from traffic on Key Deer Blvd. |
| Visitor Use and Experience | Enhances | Enhances | Enhances | Enhances | Enhances | Enhances | Enhances |
| Wetlands (acres) | No impact | No impact | No impact | 0.09 | No impact | No impact | No impact |
| Floodplains (acres) | No impact | No impact | No impact | 1.03 | 0.68 | 1.04 | 1.44 |

are provided for comparative purposes but are subject to field evaluation, wetland delineation and final engineering during future design and permitting phases including further examination by the USFWS locally and the Ecological Services Division as it relates to consistency with the HCP. It should be noted that this future screening may result in the elimination of certain alternatives from implementation.

As stated previously, the HCP dictates that the seven acres includes habitat loss due to public and private projects including roadway improvements for bicycles, paving of dirt roads, three-laning of US 1 and private development on previously disturbed land. There are no specific projects identified, except for the widening of US 1. Therefore, in general the roadway alternatives presented fall within the HCP and Livable CommuniKeys Masterplan compliance if USFWS is willing to utilize the remaining acreage for these transportation improvements.

**Land Use, Habitat Conservation Plan (HCP) Impacts, and applicability to Livable CommuniKeys Masterplan** – The study area contains a wide range of intensities and patterns of land use including large tracts of undeveloped lands, including property under public ownership or protected through conservation easement; pockets of low density residential use; moderate to higher density residential development concentrated in improved subdivisions; and strips of commercial and industrial development along stretches of US 1. The areas potentially impacted by the proposed alternatives are located primarily in the roadway right-of-way owned by either Monroe County or USFWS. The HCP allows for no more than 7 total acres of native vegetation to be cleared through year 2023 on Big Pine Key and No Name Key. The HCP accounts for the future roadway improvements to both paved and unpaved roadways within the Refuge generally consistent with the proposed improvements. However, it is conceivable that proposed alternatives may not be implemented if the acreage of the removed vegetation exceeds the desired amount allocated for improvements to roadway facilities. The Livable CommuniKeys Masterplan addresses these types of improvements with action items to permit bicycle and pedestrian facilities in limited right-of-way, where appropriate.

**Socioeconomic and Community Features** – The National Key Deer Refuge is located in Monroe County Florida. The alternatives proposed within the Refuge are concentrated on two of the islands within the National Key Deer Refuge - Big Pine Key and No Name Key. It is not expected that any community features will be adversely impacted by these improvements. Two public information meetings have occurred for this project and citizen input on the alternatives has been requested. Advertisement and notification of these meetings has been through mailers to stakeholders, news announcements, email from the Refuge to local citizens and through the project specific web page.

**Environmental Justice** – Although the Refuge is open to all visitors, residents of the Florida Keys and Monroe County are more likely to pass through the Refuge. US 1, the main arterial to the Refuge, functions as both a local and regional facility throughout the Florida Keys. It is a lifeline for the regional economy and the only hurricane evacuation route for Keys residents and visitors. According to 2000 Census data, 6.5% of residents in Big Pine Key are minority (primarily two or more races, Black, or Asian). The 2000 US Census indicated that 10% of families and individuals in Monroe County and 9% in Big Pine Key are below the poverty level, which is lower than both state and national poverty levels (12%). The

percentages of minority residents and the families below poverty are lower in Monroe County and specifically Big Pine Key than the state as a whole. Each of the alternatives proposed occur along existing roads and do not result disproportionate impacts to low income or minority populations.

**Cultural Resources** – The planning area contains several archeological sites and older structures that may be of local historic importance. No cultural resources in the Refuge are listed on the National Register of Historic Places (NRHP) and none have been evaluated by SHPO for eligibility for listing on the NRHP. There are no expected impacts to cultural resources for the alternatives considered in this study.

**Transportation and Safety** – The transportation study area for the project includes US 1, Key Deer Boulevard, Watson Boulevard, Long Beach Drive, Big Pine Road, South Street, Avenue B, Koehn Avenue and Wilder Road. Safety concerns within the Refuge include deer vehicle collisions, visitors backing out of parking lots into oncoming traffic, lack of standard shoulders, and lack of standard pedestrian/bicycle facilities.

**Visitor Use and Experience** – Vehicular access to Refuge lands is provided through various County-maintained public roadways. The majority of public access to the NKDR is provided on Big Pine and No Name Keys via US 1. Roadways on Big Pine Key that provide primary access to the Refuge via US 1 include Key Deer Boulevard, Wilder Road, and Long Beach Road. Most entrances from public streets to the NKDR are gated and not accessible to the public by vehicle. However, there are small unmarked, unpaved parking areas where visitors can park and enter the Refuge by foot at the northern terminus of Key Deer Boulevard, the eastern terminus of Watson Boulevard, Long Beach Trail, and Ohio Key Beach Trail. Parking areas are provided for the Blue Hole Interpretive Site and Watson/Mannillo Trails. The existing Visitors Center is located near US 1 MM 30.5 on Key Deer Boulevard. A one-acre site for a new Visitors Center has been acquired along US 1. The shoulder and pathways alternatives are expected to further enhance visitor mobility and experience.

**Wetlands** – Based on NWI and GIS land cover mapping, wetlands are located throughout all the islands in the National Key Deer Refuge. Impacts to wetlands are minimal for all alternatives.

**Floodplains** – FEMA mapping indicates that portions of the Refuge are located within Flood Zone X500, between the limits of the 100-year and 500-year flood; Flood Zone AE, subject to the 100-year flood; and Flood Zone VE, subject to the 100-year flood and additional velocity hazard (wave action). Low lying floodplain areas within the Refuge are vulnerable to sea level rise and flooding events such as hurricanes and other major storms. Areas that are within the velocity hazard zone are vulnerable to storm surges. These types of events can result in habitat changes where salt water inundates freshwater systems affecting the vegetative composition or the availability of freshwater for wildlife including the key deer. Loss of floodplain from development outside the Refuge also affects the extent of flooding. Some impacts to floodplains are expected.

## 7.3 Potential Impacts for Alternatives

### 7.3.1 Alternative 1 – Reconfigure Parking Area at Blue Hole Interpretive Site

**Land Use, Habitat Conservation Plan (HCP) Impacts, and applicability to Livable CommuniKeys Masterplan** – Alternative 1 involves reconfiguring the parking area of an existing paved parking lot at the Blue Hole Interpretive Site. Ten head-in parking spaces will be replaced with nine angled parking spaces and a median will be added to separate the parking lot from Key Deer Boulevard. No negative impacts are anticipated.

**Socioeconomic and Community Features** – This alternative will not directly impact any residents, communities, or community features.

**Environmental Justice** – There are no disproportionate impacts to low income or minority populations as a result of this alternative.

**Cultural Resources** – No impacts are anticipated as a result of Alternative 1.

**Transportation and Safety** – Alternative 1 will help improve safety on Key Deer Boulevard by preventing vehicles from entering the Blue Hole Parking Facility and blocking Key Deer Boulevard while performing parking maneuvers. It will also prevent visitors from backing out of their parking space, conflicting with Key Deer Boulevard southbound traffic positively improving traffic flow.

**Visitor Use and Experience** – The improvements included as part of Alternative 1 will enhance the visitor experience and safety making it easier to both park at the Blue Hole Interpretive Site and travel along Key Deer Boulevard.

**Wetlands** – No impacts to wetlands are anticipated.

**Floodplains** – No impacts to floodplains are anticipated.

### 7.3.2 Alternative 2 – Bicycle, Pedestrian and Shoulder Facility Upgrades on Refuge Access Roadways

#### 7.3.2.1 Alternative 2a – Mid-Block Crosswalk across Key Deer Boulevard

**Land Use, Habitat Conservation Plan (HCP) Impacts, and applicability to Livable CommuniKeys Masterplan** – Alternative 2a includes striping a mid-block crosswalk at the Blue Hole Interpretive Site. No negative impacts are anticipated.

**Socioeconomic and Community Features** – This alternative will not directly impact any residents, communities, or community features.

**Environmental Justice** – There are no disproportionate impacts to low income or minority populations as a result of this alternative.

**Cultural Resources** – No impacts are anticipated as a result of Alternative 2a.

**Transportation and Safety** – The addition of a mid-block crosswalk at the Blue Hole Interpretive Site will help improve safety by providing pedestrians with a designated point to cross Key Deer Boulevard.

**Visitor Use and Experience** – The bicycle and pedestrian facility upgrades will make enhance pedestrian and bicyclist travel on the Refuge access roadways.

**Wetlands** – No impacts to wetlands are anticipated.

**Floodplains** – No impacts to floodplains are anticipated.

#### 7.3.2.2 Alternative 2b – Sharrow Striping

**Land Use, Habitat Conservation Plan (HCP) Impacts, and applicability to Livable CommuniKeys Masterplan** – Alternative 2b provides bicycle and pedestrian upgrades by striping sharrows on key roadway facilities and installing the appropriate signage. This is consistent with the HCP and the Livable CommuniKeys Masterplan.

**Socioeconomic and Community Features** – This alternative will not directly impact any residents, communities, or community features.

**Environmental Justice** – There are no disproportionate impacts to low income or minority populations as a result of this alternative.

**Cultural Resources** – No impacts are anticipated as a result of Alternative 2b.

**Transportation and Safety** – Alternative 2b will provide a designated area for bicyclists on key area roadways.

**Visitor Use and Experience** – The bicycle facility upgrades will enhance bicyclist travel on the Refuge access roadways.

**Wetlands** – No impacts to wetlands are anticipated.

**Floodplains** – No impacts to floodplains are anticipated.

#### 7.3.2.3 Alternative 2c – Shoulder Widening

**Land Use, Habitat Conservation Plan (HCP) Impacts, and applicability to Livable CommuniKeys Masterplan** – Alternative 2c provides bicycle and pedestrian upgrades including adding paved shoulders and widening of seven road segments. Approximately 280,000 square feet would be impacted for the shoulder/widening projects. Impacted areas are undeveloped areas containing native habitat on the edge of roadways. For the shoulder improvements, approximately 0.5 acres of upland habitat (primarily pinelands and hammocks) are projected to be impacted. The CommuniKeys Masterplan identifies widening of specific roadways for bicycle facilities as a goal with an action item to permit the necessary road widening within the right-of-way. Also it was noted to work with the County's seven-year roadway maintenance plan for these types of improvements. Implementation of this alternative should be carefully assessed by the Refuge and other USFWS staff for willingness to use some of the remaining HCP acreage.

**Socioeconomic and Community Features** – This alternative will not directly impact any residents, communities, or community features.

**Environmental Justice** – There are no disproportionate impacts to low income or minority populations as a result of this alternative.

**Cultural Resources** – No impacts are anticipated as a result of Alternative 2.

**Transportation and Safety** – The widening of road segments will help vehicles and bicyclists to more safely share the road. The addition of paved shoulders will bring the road segments into compliance with County standards while resurfacing of the road segments will enhance the safety of the roadways.

**Visitor Use and Experience** – The bicycle, pedestrian, and shoulder facility upgrades will enhance pedestrian and bicyclist travel on the Refuge access roadways.

**Wetlands** – Approximately 0.09 acres of wetland impacts would occur with this alternative. Impacts to wetlands will need to be avoided and minimized to the extent practical during final design of the improvements.

**Floodplains** – Approximately 1.03 acres of impact to floodplains could occur with this alternative. Impacts to floodplains will need to be minimized to the extent practical during final design of the improvements.

### 7.3.3 Alternative 3– Extend Shared Pathway on Key Deer Boulevard North of Kyle Boulevard

**Land Use, Habitat Conservation Plan (HCP) Impacts, and applicability to Livable CommuniKeys Masterplan** – Alternative 3 would extend the existing shared pathway from its current terminus at Kyle Boulevard to the northern terminus of Key Deer Boulevard. The alternative is anticipated to impact 13,200 square feet of land, primarily undeveloped land containing trees and shrubs. Approximately 0.05 acres of habitat may be potentially impacted by this action. This is consistent with the Livable CommuniKeys Masterplan as an enhancement to the bicycle facility system. Implementation of this alternative should be carefully assessed by the Refuge and other USFWS staff for willingness to use some of the remaining HCP acreage.

**Socioeconomic and Community Features** – This alternative will not directly impact any residents, communities, or community features.

**Environmental Justice** –There are no disproportionate impacts to low income or minority populations as a result of this alternative.

**Cultural Resources** – No impacts are anticipated as a result of Alternative 3.

**Transportation and Safety** – Alternative 3 would improve bicycle and pedestrian safety by allowing bicyclists and pedestrians to travel on the northernmost section of Key Deer Boulevard without having to share travel lanes with vehicles.

**Visitor Use and Experience** – Extending the shared pathway will enhance the visitor experience by expanding the bicycle and pedestrian network available to Refuge visitors.

**Wetlands** – No impacts to wetlands are anticipated.

**Floodplains** – Impacts to approximately 0.68 acres of identified floodplains may potentially occur with this action.

### 7.3.4 Alternative 4– Widen Shared Pathway on Key Deer Boulevard

**Land Use, Habitat Conservation Plan (HCP) Impacts, and applicability to Livable CommuniKeys Masterplan** – Alternative 4 widens the shared use path along Key Deer Boulevard from US 1 to Kyle Boulevard. Alternative 4a is anticipated to impact approximately 45,000 square feet of land, primarily undeveloped land containing trees and shrubs. Alternative 4a widens the pathway at the existing location while Alternative 4b also separates the pathway from Key Deer Boulevard where it is currently adjacent. Alternative 4a is projected to impact 0.13 acres of pineland and Alternative 4b is projected to impact 0.14 acres of pineland. The enhancement of bicycle facilities where appropriate with limited right-of-way permitting is an overall action item of the Livable CommuniKeys Masterplan. Implementation of this alternative should be carefully assessed by the Refuge and other USFWS staff for willingness to use some of the remaining HCP acreage.

**Socioeconomic and Community Features** – This alternative will not directly impact any residents, communities, or community features.

**Environmental Justice** –There are no disproportionate impacts to low income or minority populations as a result of this alternative.

**Cultural Resources** – No impacts are anticipated as a result of Alternative 4.

**Transportation and Safety** – Widening the shared pathway would improve functionality of the pathway for bicycles and pedestrians by allowing two-way travel on the existing shared use pathway. In Alternative 4b, it would further provide separation of the bicyclists and pedestrians from vehicles traveling on Key Deer Boulevard.

**Visitor Use and Experience** – Widening the shared pathway will enhance the visitor experience by improving bicycle and pedestrian facilities near the Refuge.

**Wetlands** – No impacts to wetlands are anticipated.

**Floodplains** – Alternative 4a would impact approximately 1.04 acres of floodplains and Alternative 4b would impact approximately 1.44 acres of floodplains.

## 8. Implementation Priorities

Based on the preliminary impacts presented in this report and reflective of the general consensus of local public and agency representatives, the following short, medium, and long range roadway improvement alternatives are recommended:

**Short Range (2015)**

**Alternative 1**. Reconfigure Blue Hole Interpretive Site parking lot with defined entrances and exits

**Alternative 2a.** Stripe and sign a mid-block pedestrian crosswalk across Key Deer Boulevard at the Blue Hole Interpretive Site from the existing shared pathway on Key Deer Boulevard

**Alternative 2b.** Stripe sharrows (shared lane markings for bicycles) on Watson Boulevard from Key Deer Boulevard to Avenue B, Watson Boulevard on No Name Key, Watson Boulevard from Key Deer Boulevard to the western terminus, along Big Pine Street, and along Koehn Avenue

**Medium Range (2020)/Long Range (2030)**

As identified during the project process, Alternatives 2c, 3, and 4 have impacts to the environment that may not be considered acceptable to the community. Using the discussion in **Section 7** and **Table 7.1** as a guide, the implementation of the remaining consultant roadway improvement alternatives should be carefully assessed against all potential physical impacts and public concerns, with a determination by the Refuge and other USFWS staff as to whether or not the implementation of the alternatives should move forward.

**Alternative 2c.** The following priorities have been developed for improvements to bicycle/pedestrian/shoulder facilities proposed in Alternative 2:

- Upgrade shoulder/widen Watson Boulevard to standard width from Key Deer Boulevard to Avenue B
- Upgrade shoulder/widen Watson Boulevard to standard width from No Name Key bridge to eastern terminus
- Upgrade shoulder/widen Watson Boulevard to standard width from Key Deer Boulevard to the western terminus
- Upgrade shoulder on Key Deer Boulevard from Watson Boulevard to Big Pine Street
- Upgrade shoulder on Key Deer Boulevard from Big Pine Street to Kyle Boulevard

- Upgrade shoulder/widen entire length of Big Pine Street to standard width
- Upgrade shoulder/widen entire length of Koehn Avenue to standard width

**Alternative 3**. Extend the shared pathway on Key Deer Boulevard to the northern terminus of Key Deer Boulevard (approximately 0.25 miles) and improve the shoulder facilities on Key Deer Boulevard in that area

**Alternative 4.** Widen the shared pathway on Key Deer Boulevard from eight to ten feet to allow for two-way bicycle and pedestrian traffic. This action would improve the safety of the path for both users. An associated alternative might consider the realignment of the sections adjacent to the vehicle traveled way.

The non-roadway improvements to be implemented as time and monies permit include:

**Alternative 5.** Trim vegetation at pullouts and intersections to increase sight distances where needed (i.e. Key Deer Boulevard)

**Alternative 6.** Perform routine trimming of vegetation around signs for visibility

**Alternative 7.** Review Monroe County's US 1 sign inventory sign study and implement sign improvements

**Alternative 8**. Once constructed, the new Visitors Center should tie into existing bicycle and pedestrian facilities already in place on US 1 and also potentially the back side of the property

**Alternative 9.** Purchase a radar speed check trailer to notify drivers of their travel speed on County roads within the Refuge area

**Alternative 10.** Perform traffic calming studies on key roadways around the Refuge to determine if traffic calming measures are appropriate to help reduce vehicle speeds

**Alternative 11.** In coordination with a local vendor, implement a bike rental station at the new Visitors Center for Refuge visitors

**Alternative 12.** Upgrade all existing USFWS Refuge signage for conformance with the Manual on Uniform Traffic Control Devices (MUTCD) criteria for standard lettering, text message, sign color, size and placement

**Alternative 13.** Survey Refuge visitors at the existing Visitors Center and the Blue Hole Interpretive Site on their trip characteristics to develop visitor pass-by information

**Alternative 14.** Install a kiosk at the new Visitors Center where multiple entities could provide information to reduce signage needs

**Alternative 15.** Update, add, relocate, replace or remove, as appropriate, Key Deer Warning Signs on US 1 through entire Key Deer habitat (including Sugarloaf Key, Cudjoe Key, Summerland Key, Ramrod Key, Little Torch Key, and West Summerland Key) based on discussions with USFWS, FDOT, Monroe County, and animal vehicle collision experts

**Alternative 16.** Continue awareness of Key Deer and other threatened and endangered species crossing area roadways

**Alternative 17.** Implement Intelligent Transportation System application to notify drivers of deer entering roadways

**Alternative 18.** Ongoing coordination with stakeholders

# 9. List of Preparers

### Federal Highway Administration

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### Kimley-Horn and Associates, Inc.

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John McWilliams, P.E. – *Project Engineer*

Lynn Kiefer – *Project Biologist*

# APPENDIX A

## Supporting Documentation and References

**Supporting Documents:**


URS. 2010 US 1 Arterial Travel Time and Delay Study Monroe County Florida. December 2010

Monroe County Growth Management Division. A Layman's Guide to Big Pine and No Name Key.

Hellmuth, Obata + Kassabaum, Inc. Big Pine Key/US 1 Corridor Area Enhancement Plan. June 2003

Florida Department of Environmental Protection, Office of Greenways and Trails. Contract Plans for the Florida Keys Overseas Heritage Trail Spanish Harbor to Seven-Mile Bridge MM 30.0 to 40.0. October 2009.

USFWS Southeast Region. 5-year Review: Summary and Evaluation Eastern Indigo Snake (*Drymarchon Couperi*). April 2008.

USFWS Southeast Region. 5-year Review: Summary and Evaluation Rice Rat (*Oryzomys palustris natator*). August 2008.

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FDOT. Florida Greenbook. May 2011

Area Traffic Counts

American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, 5th Edition. Washington DC. 2004.

U.S. Department of Transportation, Federal Highway Administration. Manual on Uniform Traffic Control Devices for Street and Highways. 2009 Edition.

**Internet Resources:**

2009 Aerial Imagery: http://www.monroecounty-fl.gov/Pages/MonroeCoFL_WebDocs/mcpa

Census 2000 Data: http://factfinder.census.gov/home/saff/main.html?_lang=en

Community Services, FEMA Flood Zones and NWI Wetlands data: www.fgdl.org

Endangered Species Act Review of the National Flood Insurance Program in the Florida Keys: http://www.fws.gov/verobeach/images/pdflibrary/FEMA%20Flood%20Insurance%20Biological%20Opinion%20-%20August%209,%202006%20Q&As.pdf

Estimates of Population by County and City in Florida: April 1, 2008: http://www.bebr.ufl.edu/files/2008_Estimates_Table01_0.pdf

Existing Land Use, Future Land Use, Habitat and Tier System Data: http://www.monroecounty-fl.gov/Pages/MonroeCoFL_GIS/index

Facts About Monroe County: http://www.monroecounty-fl.gov/Pages/MonroeCoFL_admin/about

State Historical Preservation Officer Master Site File Data: http://dhr.dos.state.fl.us/preservation/sitefile/

Species Focus Areas and Key Deer Mortality data: http://www.fws.gov/verobeach/

# APPENDIX B

# Public Involvement Plan

# Public Involvement Plan

**DTFH71-09-D-00001**
TASK ORDER 10-009

## NATIONAL KEY DEER REFUGE
BIG PINE KEY, FLORIDA
TRANSPORTATION STUDY

**Prepared for:**

**FHWA: Eastern Federal Lands Highway Division**

**Prepared by:**

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**September 17, 2010**

# 1. INTRODUCTION

The preparation of a transportation study for the National Key Deer Refuge is being performed to develop short- and long-range transportation enhancements for mobility to and within the Refuge.

# 2. BACKGROUND

## 2.1. PURPOSE OF PUBLIC INVOLVEMENT

The purpose of the public involvement process is to promote and provide a variety of meaningful forums for citizens to learn about and comment on the project. A list of known stakeholders is detailed later in this plan. The outcome of this effort will be that stakeholders and interested citizens will have had meaningful opportunities to provide input regarding mobility in and around the National Key Deer Refuge.

### 2.2. PUBLIC INVOLVEMENT OBJECTIVES

- Disseminate information about this project to the general public and to directly affected stakeholders.
- Identify and actively solicit input from stakeholder groups affected by and interested in this project.
- Provide a variety of opportunities for public participation and involvement throughout the planning process.

## 2.3. PRINCIPLES GUIDING THE PUBLIC INVOLVEMENT

The project team recognizes and embraces the important role of public involvement in this project's process. Team members will be guided by the following principles when dealing with constituencies interested in this project:

- Two-way communication (i.e., the free exchange of information, ideas, and values between Federal Highway Administration: Eastern Federal Lands Highway Division (FHWA-EFLHD), US Fish and Wildlife Service (FWS), the Consultant (KHA), and citizens/stakeholders) will be sought. A specific methodology to solidify two-way communication will be established early and used routinely (e-mail contact, comment forms, etc.)

- Project information will be communicated to stakeholders and citizens identified within a defined study area through the website and public meetings.
- Reasonable input from the citizens will be given consideration by the project team.
- Citizen/public questions will be followed up on within two business days. This quick action builds trust and confidence.
- Public involvement activities and input will be documented.
- A series of formal public outreach actions including two public information meetings. Team members will be mindful of non-technical language, different cultures and the need for simple illustrations where possible. In addition, we will avoid the suit-and-tie look by using business-casual attire.
- Opportunities for multiple forms of input will be illustrated from the beginning. Interested citizens will be given the website information and the appropriate FHWA-EFLHD, FWS and KHA contact information.

# 3. COMMUNICATION STRATEGIES

To be effective, outreach efforts need to be tailored to the needs and concerns of specific constituent groups in a manner conducive to their involvement. Some communications can meet the diverse needs of stakeholders, such as through the use of newspaper columns. Other times, different strategies are more effective in accomplishing study objectives.

The strategies of the public involvement plan are to:

- Establish the need for better connections in clear and concise terms.
- Provide forums to encourage discussion and dialogue between the public and project team members.

# 4. PUBLIC INVOLVEMENT ACTION STEPS

## 4.1. INFORMATION GATHERING

### 4.1.1. PROJECT MAILING LIST

A project mailing list, prepared by FHWA-EFLHD/FWS, will be used to announce each public information meeting. Citizens who request information about the project will be added to the study's database. The mailing list will be used to distribute targeted information important to the study and to track public comments and questions. A database of mailing addresses will be maintained through the project.

KHA will add the local officials, agencies, and additional citizens to the mailing list.

Deliverable: Project mailing list database

Responsible: Develop original mailing list – FHWA-EFLHD/FWS
Maintain and update mailing list – KHA

## 4.2. INFORMATION DISTRIBUTION

### 4.2.1. MEDIA RELATIONS

KHA will develop a draft of black and white text and graphics for newspaper notices to announce the public information meetings. After review and approval by FHWA-EFLHD/FWS, KHA will submit public meeting notices to newspapers determined by the project team (see Appendix for listing of newspapers in the area).

Deliverable: Newspaper notices for public information meetings

Responsible: Example from other studies of newspaper releases – FHWA-EFLHD
Newspaper notices - KHA

### 4.2.2. PUBLIC INFORMATION MEETINGS

Two public information meetings are planned. The purpose of the first meeting is to present an overview of the project and begin gathering information. The purpose of the second meeting is to share the developed alternatives and receive feedback. Meetings will be structured to provide opportunities for attendees to express their preferences and ideas, both verbally and in writing. Comment sheets will be distributed to obtain input from attendees. Results of the comment sheets will be summarized by KHA for submittal to FHWA-EFLHD/FWS.

The format for the meetings will be an informal walk-in session. Citizens may drop in any time during the workshop. A short powerpoint presentation may be available (on a loop) for viewing to provide general project information. Citizens are then encouraged to view large-scale maps and talk directly with the project team.

Deliverable: Coordination, promotion and hosting of two meetings

Responsible: KHA

## 4.2.3. STAKEHOLDER MEETINGS

Three stakeholder meetings will be held. The first meeting will explain the project process and identify constraints, key issues and expectations. The second meeting will solicit input from stakeholders on the alternative evaluations. The third meeting will review the results of the alternatives analysis and present final recommendations. A list of potential stakeholders is shown in the Appendix along with a list of notifications for other agency officials.

Deliverable: Scheduling, development and presentation of project, summary of comments

Responsible: KHA

## 4.2.4. WEBSITE

Project information will be developed and provided to EFLHD/FWS in pdf format to be posted on FHWA's website. This posted information will be another avenue to disseminate information to the public. Information updates will be provided as appropriate.

Deliverable: Updated information as needed (up to 1 time per month)

Responsible: Review of material– FHWA-EFLHD and FWS

Website Information Updates - KHA

# APPENDIX

| Table A-1: Media | | | |
|---|---|---|---|
| **NAME** | **ADDRESS** | **PHONE** | **WEBSITE** |
| Key West Citizen | c/o Cooke Communications, LLC 3420 Northside Dr., Key West, FL 33040 | 305-292-7777 | www.keysnews.com |
| Florida Keys Keynoter – Key West | 2720-A North Roosevelt Blvd., Overseas Market, Key West, FL 33040 | 305-296-6989 | www.keysnet.com |
| Florida Keys Keynoter - Marathon | 3015 Overseas Hwy., Marathon, FL. 33050 | 305-743-5551 | www.keysnet.com |
| WKWM-91.5 FM | 172 NE 15th Street, Miami, FL 33132 | 305-995-1717/ 1-866-740-9596 | www.wlrn.org |
| Monroe County Television (MCTV/76) | Harvey Govt. Center, Suite 211 1200 Truman Ave Key West, FL 33040 | 305-295-5128 | http://www.monroecountyfl.gov/ |

| Table A-2: Potential Stakeholders | | | | |
|---|---|---|---|---|
| **NAME** | **AGENCY & POSITION** | **ADDRESS** | **PHONE** | **EMAIL** |
| Jo Ann Clark | USFWS, SER Refuge Roads/FLH Program Coordinator | 1875 Century Blvd., Ste. 420 Atlanta, GA 30345 | 404-679-4114 | JoAnn_Clark@fws.gov |
| Anne Morkill | USFWS, Manager, National Key Deer Refuge | 179 Key Deer Boulevard, Big Pine Key Plaza, Big Pine Key, FL 33043 | 305-872-2239 | Anne_morkill@fws.gov |
| Karen Hillier | USFWS, Deputy Manager, National Key Deer Refuge | 179 Key Deer Boulevard, Big Pine Key Plaza, Big Pine Key, FL 33043 | 305-872-2239 | Karen_hillier@fws.gov |
| Phillip Hughes | USFWS, Ecologist, National Key Deer Refuge | 179 Key Deer Boulevard, Big Pine Key Plaza, Big Pine Key, FL 33043 | 305-872-2239 | Phillip_hughes@fws.gov |
| Tom Wilmers | USFWS, Sr. Biologist, National Key Deer Refuge | 179 Key Deer Boulevard, Big Pine Key Plaza, Big Pine Key, FL 33043 | 305-872-2239 | Thomas_wilmers@fws.gov |
| Chad Anderson | USFWS, Refuge Biologist, National Key Deer Refuge | 179 Key Deer Boulevard, Big Pine Key Plaza, Big Pine Key, FL 33043 | 305-872-2239 | Chad_anderson@fws.gov |
| Jim Bell | USFWS, Visitor Services, National Key Deer Refuge | 179 Key Deer Boulevard, Big Pine Key Plaza, Big Pine Key, FL 33043 | 305-872-2239 | James_bell@ fws.gov |
| Steve Berger | USFWS, Law Enforcement Officer, National Key Deer Refuge | 179 Key Deer Boulevard, Big Pine Key Plaza, Big Pine Key, FL 33043 | 305-872-2239 | Steven_berger@fws.gov |
| John Wrublik | USFWS, Transportation Projects Liaison | 1339 20th Street, Vero Beach, FL 32960-3559 | 772-562-3909 x282 | john_wrublik@fws.gov |
| Lt. Elizabeth Riesz | FWC, South Region – Marathon Office | 2796 Oversees Highway #100, Marathon, FL 33050 | 305-289-2320 | Elizabeth.riesz@MyFWC.com |
| Joe Medallion | Monroe County Public Works Department - Roads and Bridges Division | Upper Keys Operations 186 Key Heights Road Plantation Key, FL | 305-852-7161 | Medallion-Joe@monroecounty-fl.gov |
| Judith Clark | Monroe County, Engineering Services Director | 1100 Simonton Street Suite 2-216 Key West, FL 33040 | 305-292-4426 | Clark-Judith@monroecounty-fl.gov |

| Table A-2: Potential Stakeholders | | | | |
|---|---|---|---|---|
| **NAME** | **AGENCY & POSITION** | **ADDRESS** | **PHONE** | **EMAIL** |
| Jane Tallman | Monroe County, Scenic Highway Coordinator | Marathon Govt. Center, Suite 400 2798 Overseas Highway Marathon, FL 33050 | 305-289-2521 | Tallman-Jane@monroecounty-fl.gov |
| Mitchell Harvey | Monroe County, Comprehensive Planning Manager | Marathon Govt. Center, Suite 400 2798 Overseas Highway Marathon, FL 33050 | 305-289-2514 | Harvey-Mitchell@monroecounty-fl.gov |
| Patricia Smith | Monroe County, Transportation Planner | Marathon Govt. Center 2798 Overseas Highway Suite 400 Marathon, FL 33050 | 305- 289-2562 | smith-patricia@monroecounty-fl.gov |
| Laura Kammerer | Deputy, Bureau of Historic Preservation | 500 South Bronough Street Room 305 Tallahassee, FL 32399-0250 | 850-245-6333 | lkammerer@dos.state.fl.us |
| Steven Craig James | FDOT District 6, Environmental Administrator | 1000 NW 111th Avenue, Room 6109 Miami, Florida 33172 Office (305) 470-5221 | 305-470-5221 | steven.james@dot.state.fl.us |
| Aileen Boucle | FDOT District6, Planning & Environmental Management Administrator | 1000 NW 111th Avenue, Room 6111-A Miami, Florida 33172 | 305-470-5201 | Aileen.boucle@dot.state.fl.us |
| Patricia Ivey | FDOT District 6 Project Administrator | 3100 Overseas Highway Marathon, FL 33050 | 305-289-6106 | patty.ivey@dot.state.fl.us |
| Omar Meitin | FDOT District 6 Traffic Operations Engineer | 1000 NW 111th Avenue Room 6206A Miami, FL 33172 | 305-470-5335 | omar.meitin@dot.state.fl.us |
| Ken Jeffries | FDOT District 6 Planner & Bicycle Pedestrian Coordinator | 1000 NW 111th Avenue Room 6112 Miami, FL 33172 | 305-470-6736 | ken.jeffries@dot.state.fl.us |
| Anthony Knott | FDEP, Office of Greenways and Trails (OGT), FL Keys Overseas Heritage Trail Manager | 3 La Croix Court Key Largo, Florida 33037 | 305-853-3571 | Anthony.knott@dep.state.fl.us |
| Todd McGee | FDEP-OGT, FL Keys Oversees Heritage Trail Construction Manager | 3 La Croix Court Key Largo, Florida 33037 | 305-420-8432 | Todd.mcgee@dep.state.fl.us |

| Table A-2: Potential Stakeholders | | | | |
|---|---|---|---|---|
| **NAME** | **AGENCY & POSITION** | **ADDRESS** | **PHONE** | **EMAIL** |
| Carole Stevens | Lower Keys Chamber of Commerce – Executive Director | P.O. Box 430511 / Big Pine Key, FL 33043 | 305-872-2411 | info@lowerkeyschamber.com |
| Jerry Dykhuisen | Key Deer Protection Alliance | PO Box 430224<br>Big Pine Key, FL 33043-0224 | N/A | jdykhuisen@aol.com |
| Alison Higgins | Friends and Volunteers of Refuges (FAVOR – Florida Keys) | P.O. Box 431840, Big Pine Key, FL 33043-1840 | 305-872-0774 | ahiggins@tnc.org |
| Chris Bergh | The Nature Conservancy, Florida Keys Program Director | 4245 North Fairfax Drive, Suite 100<br>Arlington, VA 22203-1606 | 703-841-5300 | cbergh@tnc.org |
| Mark Songer | Last Stand, President | P.O. Box 146,<br>Key West, FL 33041 | 305-296-3335 | admin@last-stand.org |
| July Hull | Florida Keys Scenic/All-American Highway Corridor Alliance, President | P.O. Box 501930<br>Marathon, FL 33050 | 305-289-2521 | director@islamoradachamber.org |

| Table A-3: Additional Notifications | | | | |
|---|---|---|---|---|
| **NAME** | **AGENCY & POSITION** | **ADDRESS** | **PHONE** | **EMAIL** |
| Paul Souza | USFWS, Field Supervisor, South Florida Ecological Services | 1339 20th Street, Vero Beach, FL 32960-3559 | 772-562-3909 | Paul_souza@fws.gov |
| Trish Adams | USFWS, Habitat Conservation Program Coordinator | 1339 20th Street, Vero Beach, FL 32960-3559 | 772-562-3909 x262 | trish_adams@fws.gov |
| Dana Hartley | USFWS Endangered Species Recovery Coordinator | 1339 20th Street, Vero Beach, FL 32960-3559 | 772-562-3909 x236 | dana_hartley@fws.gov |
| Major Alfredo Escanio | FWC, Regional Law Enforcement Commander | 3200 NE 151st Street, Miami, FL 33181 | 305-956-2500 | alfredo.escanio@MyFWC.com |
| Chuck Collins | FWC, South Region, Regional Director | 8535 Northlake Boulevard, West Palm Beach, FL | 561-625-5130 | chuck.collins@MyFWC.com |
| George Neugent | Monroe County, District 2 Commissioner | 25 Ships Way Big Pine Key, FL 33043 | 305-872-1678 | Neugent-George@monroecounty-fl.gov |
| Roman Gastesi | Monroe County, Administrator | 1100 Simonton Street Key West, FL 33040 | 305-292-4441 | Gastes-Roman@MonroeCounty-fl.gov |
| Dent Pierce | Monroe County, Public Works Director | 1100 Simonton Street, Suite 2-231 Key West, FL 33040 | (305) 292-4560 | Pierce-Dent@MonroeCounty-FL.gov |
| Christine Hurley | Monroe County, Growth Management Director | Marathon Govt. Center, Suite 400 2798 Overseas Highway Marathon, FL 33050 | 305- 289-2517 | Hurley-Christine@monroecounty-fl.gov |
| Townsley Schwab | Monroe County, Planning and Environmental Resources Senior Director | Marathon Govt. Center, Suite 400 2798 Overseas Highway Marathon, FL 33050 | 305-289-2500 | Schwab-Townsley@monroecounty-fl.gov |
| Kathy Grasser | Monroe County, Comprehensive Planner (HCP) | Marathon Govt. Center, Suite 400 2798 Overseas Highway Marathon, FL 33050 | 305-289-2526 | Grasser-Kathy@monroecounty-fl.gov |

| Table A-3: Additional Notifications | | | | |
|---|---|---|---|---|
| **NAME** | **AGENCY & POSITION** | **ADDRESS** | **PHONE** | **EMAIL** |
| Michael Roberts | Monroe County, Environmental Resources Sr. Administrator | Marathon Govt. Center, Suite 400 2798 Overseas Highway Marathon, FL 33050 | 305-289-2502 | Roberts-Michael@monroecounty-fl.gov |
| Rajendran Shanmugam | Monroe County, Transportation Consultant (URS Corp.) | The Exchange 3343 West Commercial Boulevard, Suite 100 Fort Lauderdale, FL, 33309 | 954-739-1881 | Raj_shanmugam@urscorp.com |
| Lt. Gen Thompson | Monroe County, Sheriff's Office, Traffic Safety | Freeman Substation 20950 Overseas Hwy. Cudjoe Key, FL 33042 | 305-745-3184 | gthompson@keysso.net |
| Dpty. Linda Kohout | Monroe County, Sheriff's Office, Environmental Issues | Freeman Substation 20950 Overseas Hwy. Cudjoe Key, FL 33042 | 305-745-3184 | lkohout@keysso.net |
| Mr. Scott M. Stroh III | State Historic Preservation Officer, Division of Historical Resources | 500 S. Bronough Street Room 305 Tallahassee, FL 32399-0250 | 850-245-6300 | smstroh@dos.state.fl.us |
| John Palenchar | FDOT District 6, Environmental Permits Coordinator | 1000 NW 111th Avenue Miami, FL 33172 | 305-470-5223 | John.palenchar@dot.state.fl.us |
| Phil Frank | FDOT District 6 Consultant, Consulting, Engineering & Science, Inc. | 10700 N. Kendall Drive, #400, Miami, FL 33176 | 305-378-5555 | ceskeys@bellsouth.net |
| Omar Meitin | FDOT District 6 Traffic Operations Engineer | 1000 NW 111th Avenue Room 6206A Miami, FL 33172 | 305-470-5335 | omar.meitin@dot.state.fl.us |
| Rebecca Jetton | Florida Dept. of Community Affairs, Areas of Critical State Concern Administrator | 2555 Shumard Oak Boulevard, Tallahassee, FL 32399-2100 | 850-922-1766 | Rebecca.jetton@dca.state.fl.us |

# APPENDIX C

## Stakeholder Meeting Notes

October 13, 2010

January 31, 2011

April 7, 2011

**National Key Deer Refuge Transportation Study**
Eastern Federal Lands Highway Division
Federal Highway Administration
Contract No. DTFH71-09-D-00001

**Stakeholder Meeting #1**
October 13, 2010, 1:00 PM

**Kimley-Horn and Associates, Inc**
5200 NW 33rd Avenue, Suite 109
Fort Lauderdale, FL 33309

# *MEETING NOTES*

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Attendees:

US Fish and Wildlife Service (FWS)
JoAnn Clark
Anne Morkill
Karen Hillier
Phillip Hughes
Jim Bell
Tom Wilmers
Dana Hartley*
Mark Salvato*

Federal Highway Administration (FHWA)
Chris Jaeschke
Norah Ocel

Kimley-Horn and Associates, Inc. (KHA)
Larry Meisner
Lynn Kiefer
John McWilliams

**Attended via conference call*

Monroe County
Judy Clarke
Mike Roberts
Jane Tallman

FDOT District 6
Ken Jeffries*
Ramon Sierra*
Susanne Travis*

Florida Keys Overseas Heritage Trail (FKOHT)
Anthony Knott

Florida Department of Community Affairs (DCA)
Shane Laakso

Florida State Division of Historical Resources
Alyssa McManus*
Jennifer Jones*

Introduction
The first stakeholder meeting for the National Key Deer Refuge Transportation Study convened on October 13, 2010 at the National Key Deer Refuge Headquarters in Big Pine Key, Florida. Anne, the refuge manager, introduced herself and thanked the stakeholders for attending. Attendees introduced themselves and Chris Jaeschke provided a brief overview of FHWA's role in the study. Chris indicated that the three main reasons for inviting the stakeholders this early in the study process was to inform them of the study, build consensus for the transportation challenges and opportunities, and request their assistance for any data they could contribute. Norah reviewed

major project tasks in final proposal. Larry Meisner and John McWilliams outlined the meeting's agenda.

Purpose of Meeting

The purpose of this meeting was to review the major project tasks, project schedule, project objectives, data/information requests, and public involvement plan. The meeting also outlined the specific transportation issues within the Refuge including safety, pedestrian/bicycle access, circulation, parking, and assessment of current Key Deer warning systems.

Discussion

Discussion of particular agenda items occurred during the meeting. Specific items of discussions are outlined below.

*Study Overview/purpose*

- KHA and FHWA staff provided a brief project overview and purpose. The project will include examination of access to, from, and within the Refuge and the development of improvements that address specific transportation issues unique to the Refuge. The objective of the study is to outline the transportation needs of the Refuge and evaluate those improvements with regards to cost and environmental impact.

*Project Schedule*

- The group reviewed the project schedule indicating that the Existing Conditions Report would be completed in November, Alternatives Analysis completed in January, and the Recommendations Report completed in May. Once the reports are finalized, they will be posted on the project website.

*Stakeholder Concerns/Issues*

- KHA staff presented the preliminary list of specific transportation issues identified in the Refuge which included the new visitor's center, the Overseas Heritage Trail (OHT) along US 1, deer/vehicle collisions, parking, and bicycle/pedestrian issues.

- FDOT staff inquired about the location of the proposed visitor's center. FWS staff indicated that the center would be located along US 1. The site is currently being used by FDOT for construction staging. The site will have vehicular access to US 1.

- KHA staff inquired about the location of the OHT on the eastern portion of Big Pine Key. Anthony Knott indicated that he can provide the plans or the contact for obtaining the plans for that section if KHA did not already have them.

- The group discussed the Monroe County traffic impact study requirements (i.e. US 1 Level of Service Study) of the visitor's center. KHA staff indicated that this specific study was typically performed closer to the construction of the facility which is several years from now.

- FHWA staff suggested that this study provide some design criteria for the visitor's center that would address access, parking, pedestrian/bicycle facilities, and bus maneuverability. FWS staff indicated a need for bus access for school children.

- The group discussed numerous events that impact traffic along US 1 in and around the Refuge. These events include the annual birding/wildlife festival, attracting approximately 700 people, Boy Scouts Kid's Carnival, Summerland Key's astronomy event, the weekly flea market, the Bahia Honda's Annual Earth Day event and the Seven-mile bridge race that attracts 1,000 people The group also discussed other events that increase traffic along US 1 including lobster mini-season, Fantasy Fest, and the poker runs.

- KHA staff inquired about transit service in the area. The group indicated that the City of Key West operates the Lower Keys Shuttle from Key West to Marathon stopping at Key Deer Boulevard. The City of Key West contact for this service is Myra Wittenberg.

- KHA staff indicated that ITS technologies addressing animal-vehicle collisions are available but relatively unproven in an urban environment. The study will examine preliminary options with regard to this approach.

- It was mentioned that based on the recently completed CCP, it was decided not to advertise the key deer more than it is currently done.

*Data Requirements*

- KHA staff inquired about Refuge visitation data. Jim Bell indicated that he could provide the information that is available. Counters at the Blue Hole indicate that approximately 138,000 people visited last year while the site typically averages 80,000 to 100,000 people per year. The existing visitor center has approximately 20,000 visitors per year.

- KHA staff indicated that they would be reaching out to stakeholders for additional available data as necessary including cultural resources, census data, and tourism data. Tourism data would be obtained from either the Big Pine Key Chamber of Commerce, or the Tourism Development Council.

- OHT staff indicated that trail use data is available. KHA staff will contact OHT staff to obtain this information.

- Stakeholders indicated that significant information/data was included in the 2009 Habitat Conversation Plan (HCP).

- John McWilliams stated that he would formally request crash data and work program data from FDOT. A significant amount of traffic volume data has been collected and compiled by FDOT and is available online.

- Monroe County staff is currently working on the Lower Keys Communi-Keys Study that may provide some more information/data in the area.

- Jane Tallman stated that Monroe County is currently working on a US 1 sign inventory project which may be of use in this study.

- Michael Roberts recommended that the group examine the Florida Keys Carrying Capacity Study.

*Public Involvement Plan*

- John McWilliams indicated that the project schedule called for a total of three (3) stakeholder meetings and two (2) public information meetings. The stakeholder's group agreed that 1:00 P.M. was an acceptable time to hold future stakeholder meetings and evenings will be a good time for the public meetings.

*Open Discussion*

- FWS discussed the potential for Podcast tours of the Refuge in the future.

**National Key Deer Refuge Transportation Study**
Eastern Federal Lands Highway Division
Federal Highway Administration
Contract No. DTFH71-09-D-00001

**Stakeholder Meeting #2**
January 31, 2011, 2:00 PM

**Kimley-Horn and Associates, Inc**
5200 NW 33rd Avenue, Suite 109
Fort Lauderdale, FL 33309

# *MEETING NOTES*

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Attendees:

US Fish and Wildlife Service (FWS)
JoAnn Clark*
Anne Morkill
Karen Hillier

Federal Highway Administration (FHWA)
Norah Ocel

Kimley-Horn and Associates, Inc. (KHA)
Jennifer Bihl
John McWilliams

**Attended via conference call*

Monroe County
Judy Clarke

FDOT District 6
Ramon Sierra*
Susanne Travis*

Florida Department of Community Affairs (DCA)
Erin sitting in for Shane Laakso*
Jo Penrose*

Florida State Division of Historical Resources
Ginny Jones*

Introduction
The second stakeholder meeting for the National Key Deer Refuge Transportation Study convened on January 31, 2011 at the National Key Deer Refuge Headquarters in Big Pine Key, Florida. Jennifer thanked the stakeholders for attending and attendees introduced themselves.

Purpose of Meeting
The purpose of this meeting was to review the reports to date and to get feedback from the stakeholders on recommendations.

Discussion

Discussion of specific items occurred during the meeting and are outlined below.

- Bicycle and Pedestrian and Shoulder upgrades – Monroe County would get the request for these upgrades on County roads. The project should compile a list of priority locations and get it to Judy Clarke.
- The study will provide a typical cross section for the County to be used at these bicycle/pedestrian crossings.
- The resurfacing program in Monroe County is on hold due to bridge repair needs. There are about 5 to 6 years left to complete the needed bridge repairs in the County. We need to compile a list of priority resurfacing locations and get it to Judy Clarke. Note that before resurfacing, typically the sewer system needs to go in first, there are a few locations/neighborhoods on Big Pine Key where this would be an issue. Judy will provide their most recent list of priority roadways on Big Pine Key for resurfacing (this will be old).
- Bridges – SR 940 Leg A – This bridge has LAP funding, it is scheduled for design in the upcoming fiscal year and construction the year after. Requested from Judy that sidewalks be reviewed during design to add bicycle and pedestrian facilities on the bridge and add connectivity.
- Bridges – No Name Bridge – Not eligible for federal funding due to its functional classification. Design will begin in the fall. Construction will depend on future funding.
- Judy Clarke will get an update from June on the status of the sign inventory and let the team know the status.
- Traffic calming – Speeds humps are not a standard practice on County roadways, discussed the recommendation of a traffic calming study to be performed to determine the appropriate traffic calming treatment. Speed enforcement is key to traffic calming.
- Bus Pullouts – The Refuge inquired if these be improved on Big Pine Key. Myra Wittenberg of Key West Transit has a grant to improve the one on Big Pine Key. In general, if there is not a pullout or a shelter it is because it could not physically be implemented.
- The Refuge indicated that the Visitor's Center is scheduled for a 2013 design and a 2014/2015 construction timeframe.
- Look at the potential for kiosks at the new Visitor's Center for USFWS, FDEP, etc. to put their information on. Add to the recommendations in the report.
- Scenic Highway grants are in February/March every year.
- Refuge staff liked the idea of recommending dynamic flashing signs at least along Key Deer Boulevard.
- Other recommendation would be to have sporadic "speed check stations"

**National Key Deer Refuge Transportation Study**
Eastern Federal Lands Highway Division
Federal Highway Administration
Contract No. DTFH71-09-D-00001

**Stakeholder Meeting #2**
April 7, 2011, 2:00 PM

**Kimley-Horn and Associates, Inc**
5200 NW 33rd Avenue, Suite 109
Fort Lauderdale, FL 33309

# *MEETING NOTES*

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Attendees:

US Fish and Wildlife Service (FWS)
Anne Morkill
Karen Hillier

Federal Highway Administration (FHWA)
Norah Ocel

Kimley-Horn and Associates, Inc. (KHA)
Jennifer Bihl
John McWilliams

Monroe County
Judy Clarke
Trish Smith*
Michael Roberts

FDOT District 6
Ramon Sierra*

Florida Department of Community Affairs (DCA)
Rebecca Jetton*
Shane Laakso*

Florida State Division of Historical Resources
Ginny Jones*
Dan McClaren*

The Last Stand/Key Deer Protection Alliance
Joyce Newman
Deb Curlee

**Attended via conference call*

Introduction
The third stakeholder meeting for the National Key Deer Refuge Transportation Study convened on April 7, 2011 at the National Key Deer Refuge Headquarters in Big Pine Key, Florida. Kimley-Horn thanked the stakeholders for attending and attendees introduced themselves.

Purpose of Meeting
The purpose of this meeting was to review the reports to date and to get feedback from the stakeholders on recommendations.

Discussion:

Discussion of specific items occurred during the meeting and is outlined below.

- Kimley-Horn provided a brief overview of the meeting agenda and the reports previously prepared as part of the overall transportation study. It was stated that the main focus of this meeting was to obtain input on potential alternatives presented in the Preliminary Candidates Report.

- Kimley-Horn discussed the proposed roadway alternatives including the Blue Hole Interpretive Site parking lot improvements. The conceptual plan for this improvement indicated a need to expand the concrete pavement 5-7 additional feet. Kimley-Horn provided background on the need for the expansion and the improvements to traffic flow/safety in and out of the parking area. Representatives from the Last Stand indicated that they did not support this improvement. They indicated that the improvement was not a priority and would use a portion of the limited allowable development outlined in the Habitat Conservation Plan (HCP).

- Kimley-Horn presented the proposed improvements to the existing roadways to provide for standard bicycle facilities and roadway shoulders to improve safety. A majority of roadways around the Refuge do not meet current standards and the Refuge would need to prioritize the facilities would be upgraded first.

- The group discussed the overall limitations on improvements within the Refuge as outlined in the HCP. It is not clear upgrading the existing roadway facilities up to current standards would be considered impacted area per the HCP. The group consensus was that it would be considered an impacted area because of the loss of habitat. Representatives from the Last Stand indicated that Key Deer often feed on the vegetation on the roadside that would be eliminated by roadway shoulder improvements.

- Kimley-Horn indicated that all of the proposed candidate improvements would be evaluated for environmental impacts and this evaluation would be included in the next report. It was reiterated that the planning process requires that all potential improvements be thoroughly reviewed and that not all candidate improvements would be implemented. It will be up to the stakeholders to determine which improvements provide a greater benefit despite the additional impacts the improvement would create. The final report will provide the information needed for stakeholders to make this determination.

- Rebecca Jetton voiced concerns over the compatibility of the improvements with the HCP. She asked how the future Visitors Center was related to this project. The Visitors Center project is independent of this report. Additionally, providing design criteria for the Visitors Center as part of the project was determined to be premature since the Visitors Center is not planned in the immediate future. Anne Morkill provided the group with a short overview of the future Visitors Center.

- Mike Roberts indicated that he recalled that the HCP contemplated some roadway widening and that the USFWS office in Vero Beach would need to be contacted to confirm.

- The group discussed the limitations of the HCP and that only 7 additional acres could be impacted. The Last Stand indicated that a new gas station is currently being proposed on Big Pine Key.

- The representatives from The Last Stand provided several comments on the Preliminary Candidates Report. They had concerns over the future Visitors Center and the additional traffic it would generate. Kimley-Horn indicated that a visitor survey was being developed to assess the travel patterns of current visitors to better estimate the number of new trips that the Visitors Center would potentially generate. It is anticipated that a significant portion of visitor traffic originates from locals/tourists that are already traveling on the US 1 corridor.

- The representatives from the Last Stand did not concur with the need to widen the existing 8' shared-use path to 10' as the bicycle and pedestrian traffic volumes do not warrant such am improvement. They reiterated that any increase of pavement along the roadway would eliminate the foliage that serves as a food source for Key Deer. They indicated that standard engineering practices/standards are not applicable to this area and that the overall mindset is different in and around the Refuge.

- Trish Smith stated that improvements to widen the shared-use path along US 1 (Overseas Heritage Trail) often did not provide for a continuous 12' wide bicycle path and, in some locations, the path was only constructed at 8 feet. It was clarified that the report recommends a 10' minimum path width consistent with the minimum design standards and not the current 12' FDOT requirement.

- Kimley-Horn discussed the potential of implementing share lane markings or "sharrows" along the Refuge roadways in lieu of widening of the roadway to provide bicycle lanes. The stakeholders were supportive of "sharrows" and the appropriate signage.

- The group agreed that all alternatives would need to review the U.S. Fish and Wildlife Service in Vero Beach, Florida. Anne Morkill said that USFWS Vero Beach staff is included on this project's distribution list and they've received all meeting notifications with limited participation.

- Trish Smith suggested that the lead agency identified for each improvement be revisited. She indicated that any improvement that potentially impacts the HCP should be examined by the Refuge/U.S. Fish and Wildlife Service before moving forward. If changes to the HCP are required, Monroe County would request these agencies to take the lead on that effort.

- Trish Smith provided and update on the US 1 signage inventory project. She stated that the inventory was recently completed and she expects a deliverable soon. This report will be

provided to Refuge staff. She also reiterated that any requests for changes to the existing Refuge signage along US -1 should be submitted to Monroe County as soon as possible.

- Representatives from Last Stand stated that Key Deer warning signs should also be considered on other minor roadways where signage does not exist including Crane Blvd. and Sugarloaf Blvd. on Sugarloaf Key, and Blimp Road on Cudjoe Key.

- Kimley-Horn suggested that stakeholders be identified and a workshop be conducted to review and discuss the existing signage. It was stated that it would be beneficial for stakeholders that we part of the development of the HCP and fencing project is present at that workshop.

- Kimley-Horn discussed the report recommendation for the Refuge to investigate purchasing a "speed check" trailer that could be operated by Refuge staff and moved around within the Refuge to improve driver awareness of their speeds. Representatives from Last Stand did not support this suggestion and stated that speeding motorists within the Refuge know they are speeding and the trailer would not be effective. The group agreed that increased speed enforcement on Key Deer Boulevard would be most effective. Anne Morkill stated that the Refuge, in partnership with the Key Deer Protection Alliance, has already purchased a speed indicator that will be modified to include custom cartoon messages about key deer crossing the road.

- Ramon Sierra stated that the speed study results may warrant an overall speed limit reduction from 45 mph to 40 mph on US 1. He also inquired about the enforcement of the nighttime speed limit of 35 mph. He suggested consideration for one (1) speed limit of 40 mph. Several members of the group did not support this change.

- Kimley-Horn discussed the report recommendation that the Refuge formally request to be included in a future research study examining the use of Intelligent Transportation Systems (ITS) technologies to improve safety/reduce deer collisions within the Refuge.

# APPENDIX D

## Supporting Data Tables

U.S. Census Bureau
American FactFinder

Main Search Feedback FAQs Glossary Site Map Help

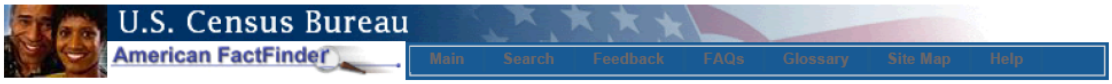
P53. MEDIAN HOUSEHOLD INCOME IN 1999 (DOLLARS) [1] - Universe: Households
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

| | United States | Big Pine Key CDP, Florida | Islamorada, Village of Islands village; Florida | Key Colony Beach city, Florida | Key West city, Florida | Layton city, Florida | Marathon city, Florida |
|---|---|---|---|---|---|---|---|
| Median household income in 1999 | 41,994 | 44,514 | 41,522 | 45,577 | 43,021 | 53,750 | 36,010 |

U.S. Census Bureau
Census 2000

**Standard Error/Variance documentation for this dataset:**
Accuracy of the Data: Census 2000 Summary File 3 (SF 3) - Sample Data (PDF 141.5KB)



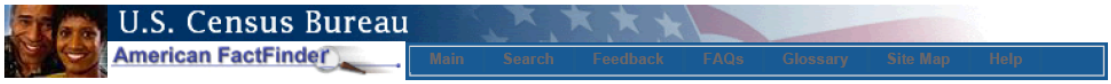

PCT141. RATIO OF INCOME IN 1999 TO POVERTY LEVEL [11] - Universe: Population for whom poverty status is determined
Data Set: Census 2000 Summary File 4 (SF 4) - Sample Data

NOTE: Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf4.htm.

| | United States | Big Pine Key CDP, Florida | Islamorada, Village of Islands village; Florida | Key Colony Beach city, Florida | Key West city, Florida | Layton city, Florida | Marathon city, Florida |
|---|---|---|---|---|---|---|---|
| Total: | 273,882,232 | 4,988 | 6,718 | 740 | 24,757 | 240 | 10,030 |
| Under .50 | 15,337,408 | 230 | 224 | 29 | 1,312 | 12 | 700 |
| .50 to .74 | 8,510,306 | 57 | 157 | 17 | 472 | 20 | 432 |
| .75 to .99 | 10,052,098 | 185 | 85 | 9 | 751 | 5 | 290 |
| 1.00 to 1.24 | 11,287,823 | 141 | 333 | 23 | 708 | 3 | 335 |
| 1.25 to 1.29 | 2,323,160 | 17 | 11 | 2 | 229 | 3 | 137 |
| 1.30 to 1.49 | 9,809,354 | 183 | 168 | 11 | 722 | 0 | 494 |
| 1.50 to 1.74 | 11,872,262 | 358 | 161 | 20 | 1,083 | 0 | 506 |
| 1.75 to 1.84 | 5,104,996 | 193 | 138 | 28 | 626 | 0 | 181 |
| 1.85 to 1.99 | 6,897,202 | 48 | 191 | 28 | 670 | 8 | 271 |
| 2.00 and over | 192,687,623 | 3,576 | 5,250 | 573 | 18,184 | 189 | 6,684 |

U.S. Census Bureau
Census 2000

**Standard Error/Variance documentation for this dataset:**
Accuracy of the Data: Census 2000 Summary File 4 (SF 4) - Sample Data (PDF 141.5KB)




P3. RACE [71] - Universe: Total population
Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

| | United States | Big Pine Key CDP, Florida | Islamorada, Village of Islands village; Florida | Key Colony Beach city, Florida | Key West city, Florida | Layton city, Florida | Marathon city, Florida |
|---|---|---|---|---|---|---|---|
| Total: | 281,421,906 | 5,032 | 6,846 | 788 | 25,478 | 186 | 10,255 |
| Population of one race: | 274,595,678 | 4,942 | 6,778 | 785 | 24,923 | 186 | 10,113 |
| White alone | 211,460,626 | 4,772 | 6,630 | 781 | 21,642 | 184 | 9,341 |
| Black or African American alone | 34,658,190 | 55 | 31 | 4 | 2,365 | 1 | 477 |
| American Indian and Alaska Native alone | 2,475,956 | 25 | 15 | 0 | 99 | 0 | 37 |
| Asian alone | 10,242,998 | 29 | 42 | 0 | 329 | 1 | 49 |
| Native Hawaiian and Other Pacific Islander alone | 398,835 | 1 | 6 | 0 | 14 | 0 | 4 |
| Some other race alone | 15,359,073 | 60 | 54 | 0 | 474 | 0 | 205 |
| Population of two or more races: | 6,826,228 | 90 | 68 | 3 | 555 | 0 | 142 |
| Population of two races: | 6,368,075 | 88 | 62 | 3 | 518 | 0 | 139 |
| White; Black or African American | 784,764 | 1 | 3 | 0 | 72 | 0 | 8 |
| White; American Indian and Alaska Native | 1,082,683 | 52 | 28 | 1 | 66 | 0 | 29 |
| White; Asian | 868,395 | 4 | 7 | 0 | 74 | 0 | 8 |
| White; Native Hawaiian and Other Pacific Islander | 112,964 | 0 | 1 | 0 | 7 | 0 | 1 |
| White; Some other race | 2,206,251 | 23 | 19 | 2 | 192 | 0 | 42 |
| Black or African American; American Indian and Alaska Native | 182,494 | 2 | 0 | 0 | 9 | 0 | 3 |
| Black or African American; Asian | 106,782 | 2 | 0 | 0 | 13 | 0 | 1 |
| Black or African American; Native Hawaiian and Other Pacific Islander | 29,876 | 0 | 0 | 0 | 1 | 0 | 4 |
| Black or African American; Some other race | 417,249 | 3 | 2 | 0 | 61 | 0 | 33 |
| American Indian and Alaska Native; Asian | 52,429 | 1 | 1 | 0 | 2 | 0 | 0 |
| American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander | 7,328 | 0 | 0 | 0 | 0 | 0 | 1 |
| American Indian and Alaska Native; Some other race | 93,842 | 0 | 0 | 0 | 6 | 0 | 1 |
| Asian; Native Hawaiian and Other Pacific Islander | 138,802 | 0 | 0 | 0 | 5 | 0 | 2 |
| Asian; Some other race | 249,108 | 0 | 1 | 0 | 10 | 0 | 6 |
| Native Hawaiian and Other Pacific Islander; Some other race | 35,108 | 0 | 0 | 0 | 0 | 0 | 0 |
| Population of three races: | 410,285 | 2 | 5 | 0 | 35 | 0 | 3 |
| White; Black or African American; American Indian and Alaska Native | 112,207 | 1 | 0 | 0 | 19 | 0 | 0 |
| White; Black or African American; Asian | 21,166 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; Native Hawaiian and Other Pacific Islander | 2,938 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; Some other race | 43,172 | 0 | 0 | 0 | 5 | 0 | 3 |
| White; American Indian and Alaska Native; Asian | 23,766 | 0 | 0 | 0 | 3 | 0 | 0 |
| White; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander | 4,843 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; American Indian and Alaska Native; Some other race | 29,095 | 1 | 1 | 0 | 0 | 0 | 0 |
| White; Asian; Native Hawaiian and Other Pacific Islander | 89,611 | 0 | 0 | 0 | 1 | 0 | 0 |
| White; Asian; Some other race | 34,962 | 0 | 1 | 0 | 2 | 0 | 0 |
| White; Native Hawaiian and Other Pacific Islander; Some other race | 8,364 | 0 | 2 | 0 | 0 | 0 | 0 |
| Black or African American; American Indian and Alaska Native; Asian | 5,798 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander | 998 | 0 | 0 | 0 | 1 | 0 | 0 |
| Black or African American; American Indian and Alaska Native; Some other race | 7,023 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American; Asian; Native Hawaiian and Other Pacific Islander | 5,309 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American; Asian; Some other race | 8,069 | 0 | 1 | 0 | 4 | 0 | 0 |
| Black or African American; Native Hawaiian and Other Pacific Islander; Some other race | 2,167 | 0 | 0 | 0 | 0 | 0 | 0 |
| American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander | 3,063 | 0 | 0 | 0 | 0 | 0 | 0 |
| American Indian and Alaska Native; Asian; Some other race | 2,544 | 0 | 0 | 0 | 0 | 0 | 0 |
| American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some other race | 586 | 0 | 0 | 0 | 0 | 0 | 0 |
| Asian; Native Hawaiian and Other Pacific Islander; Some other race | 4,604 | 0 | 0 | 0 | 0 | 0 | 0 |
| Population of four races: | 38,408 | 0 | 1 | 0 | 1 | 0 | 0 |
| White; Black or African American; American Indian and Alaska Native; Asian | 10,672 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander | 988 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; American Indian and Alaska Native; Some other race | 4,645 | 0 | 1 | 0 | 0 | 0 | 0 |
| White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander | 2,128 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; Asian; Some other race | 1,376 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; Native Hawaiian and Other Pacific Islander; Some other race | 325 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander | 6,450 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; American Indian and Alaska Native; Asian; Some other race | 1,099 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some other race | 309 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Asian; Native Hawaiian and Other Pacific Islander; Some other race | 7,932 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander | 750 | 0 | 0 | 0 | 1 | 0 | 0 |
| Black or African American; American Indian and Alaska Native; Asian; Some other race | 334 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some other race | 111 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some other race | 1,082 | 0 | 0 | 0 | 0 | 0 | 0 |
| American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some other race | 207 | 0 | 0 | 0 | 0 | 0 | 0 |
| Population of five races: | 8,637 | 0 | 0 | 0 | 1 | 0 | 0 |
| White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander | 6,611 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; American Indian and Alaska Native; Asian; Some other race | 724 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some other race | 68 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some other race | 379 | 0 | 0 | 0 | 1 | 0 | 0 |
| White; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some other race | 639 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some other race | 216 | 0 | 0 | 0 | 0 | 0 | 0 |
| Population of six races: | 823 | 0 | 0 | 0 | 0 | 0 | 0 |
| White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some other race | 823 | 0 | 0 | 0 | 0 | 0 | 0 |

U.S. Census Bureau
Census 2000

**Standard Error/Variance documentation for this dataset:**
Accuracy of the Data: Census 2000 Summary File 1 (SF 1) 100-Percent Data (PDF 44KB)

# Crosroads Engineering Data, Inc.

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Miami, Florida, 33186
Tel: 305-233-3997 Fax: 305-233-7720


CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE

File Name : BIG PINE @ US-1
Site Code : 00000000
Start Date : 11/5/2010
Page No : 1

Groups Printed- AUTOS - HEAVY VEHICLES

| | US-1 From East | | | | | WILDER RD. From South | | | | | US-1 From West | | | | | KEY DEER BLVD. From Northwest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Bear Right | Thru | Left | Peds | Right | Thru | Bear Left | Left | Peds | Right | Thru | Left | Hard Left | Peds | Hard Right | Bear Right | Bear Left | Peds | Int. Total |
| 09:00 AM | 8 | 18 | 53 | 2 | 0 | 3 | 0 | 2 | 4 | 0 | 9 | 66 | 7 | 23 | 0 | 29 | 4 | 24 | 3 | 255 |
| 09:15 AM | 5 | 9 | 68 | 3 | 0 | 2 | 0 | 1 | 5 | 0 | 8 | 75 | 6 | 13 | 0 | 25 | 2 | 19 | 0 | 241 |
| 09:30 AM | 9 | 14 | 64 | 4 | 0 | 3 | 0 | 4 | 0 | 0 | 0 | 99 | 10 | 26 | 0 | 30 | 5 | 33 | 3 | 304 |
| 09:45 AM | 7 | 8 | 62 | 5 | 0 | 7 | 0 | 0 | 1 | 0 | 3 | 99 | 17 | 15 | 0 | 37 | 5 | 17 | 0 | 283 |
| Total | 29 | 49 | 247 | 14 | 0 | 15 | 0 | 7 | 10 | 0 | 20 | 339 | 40 | 77 | 0 | 121 | 16 | 93 | 6 | 1083 |
| 10:00 AM | 10 | 19 | 92 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 2 | 97 | 16 | 26 | 0 | 29 | 3 | 19 | 0 | 318 |
| 10:15 AM | 4 | 11 | 79 | 0 | 0 | 7 | 0 | 0 | 2 | 0 | 3 | 83 | 5 | 18 | 0 | 29 | 1 | 22 | 0 | 264 |
| 10:30 AM | 7 | 19 | 117 | 2 | 0 | 7 | 0 | 5 | 5 | 0 | 15 | 122 | 5 | 22 | 0 | 27 | 1 | 25 | 0 | 379 |
| 10:45 AM | 6 | 24 | 118 | 3 | 0 | 4 | 0 | 3 | 1 | 0 | 6 | 112 | 8 | 51 | 0 | 26 | 1 | 25 | 0 | 388 |
| Total | 27 | 73 | 406 | 5 | 0 | 23 | 0 | 8 | 8 | 0 | 26 | 414 | 34 | 117 | 0 | 111 | 6 | 91 | 0 | 1349 |
| *** BREAK *** | | | | | | | | | | | | | | | | | | | | |
| 04:00 PM | 11 | 29 | 138 | 1 | 0 | 6 | 1 | 6 | 5 | 0 | 5 | 81 | 12 | 29 | 0 | 61 | 0 | 19 | 0 | 404 |
| 04:15 PM | 0 | 20 | 126 | 3 | 0 | 1 | 1 | 5 | 5 | 0 | 4 | 89 | 11 | 37 | 0 | 58 | 6 | 20 | 1 | 387 |
| 04:30 PM | 15 | 35 | 141 | 2 | 0 | 10 | 2 | 2 | 7 | 0 | 4 | 98 | 17 | 49 | 0 | 36 | 3 | 30 | 0 | 451 |
| 04:45 PM | 13 | 32 | 168 | 1 | 0 | 6 | 1 | 4 | 2 | 0 | 7 | 101 | 14 | 51 | 0 | 54 | 0 | 24 | 1 | 479 |
| Total | 39 | 116 | 573 | 7 | 0 | 23 | 5 | 17 | 19 | 0 | 20 | 369 | 54 | 166 | 0 | 209 | 9 | 93 | 2 | 1721 |
| 05:00 PM | 15 | 43 | 140 | 1 | 0 | 0 | 1 | 2 | 5 | 0 | 10 | 89 | 23 | 42 | 0 | 36 | 2 | 34 | 0 | 443 |
| 05:15 PM | 6 | 40 | 141 | 2 | 0 | 6 | 2 | 2 | 3 | 0 | 6 | 90 | 20 | 34 | 0 | 60 | 0 | 43 | 0 | 455 |
| 05:30 PM | 15 | 38 | 140 | 1 | 0 | 4 | 3 | 2 | 7 | 0 | 8 | 90 | 36 | 59 | 0 | 55 | 1 | 42 | 2 | 503 |
| 05:45 PM | 16 | 33 | 93 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 5 | 69 | 23 | 46 | 0 | 44 | 1 | 21 | 0 | 356 |
| Total | 52 | 154 | 514 | 4 | 0 | 10 | 6 | 9 | 17 | 0 | 29 | 338 | 102 | 181 | 0 | 195 | 4 | 140 | 2 | 1757 |
| Grand Total | 147 | 392 | 1740 | 30 | 0 | 71 | 11 | 41 | 54 | 0 | 95 | 1460 | 230 | 541 | 0 | 636 | 35 | 417 | 10 | 5910 |
| Apprch % | 6.4 | 17 | 75.4 | 1.3 | 0 | 40.1 | 6.2 | 23.2 | 30.5 | 0 | 4.1 | 62.8 | 9.9 | 23.3 | 0 | 57.9 | 3.2 | 38 | 0.9 | |
| Total % | 2.5 | 6.6 | 29.4 | 0.5 | 0 | 1.2 | 0.2 | 0.7 | 0.9 | 0 | 1.6 | 24.7 | 3.9 | 9.2 | 0 | 10.8 | 0.6 | 7.1 | 0.2 | |
| AUTOS | 147 | 384 | 1675 | 29 | 0 | 71 | 11 | 41 | 54 | 0 | 94 | 1403 | 230 | 536 | 0 | 632 | 34 | 412 | 10 | 5763 |
| % AUTOS | 100 | 98 | 96.3 | 96.7 | 0 | 100 | 100 | 100 | 100 | 0 | 98.9 | 96.1 | 100 | 99.1 | 0 | 99.4 | 97.1 | 98.8 | 100 | 97.5 |
| HEAVY VEHICLES | 0 | 8 | 65 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 57 | 0 | 5 | 0 | 4 | 1 | 5 | 0 | 147 |
| % HEAVY VEHICLES | 0 | 2 | 3.7 | 3.3 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 3.9 | 0 | 0.9 | 0 | 0.6 | 2.9 | 1.2 | 0 | 2.5 |

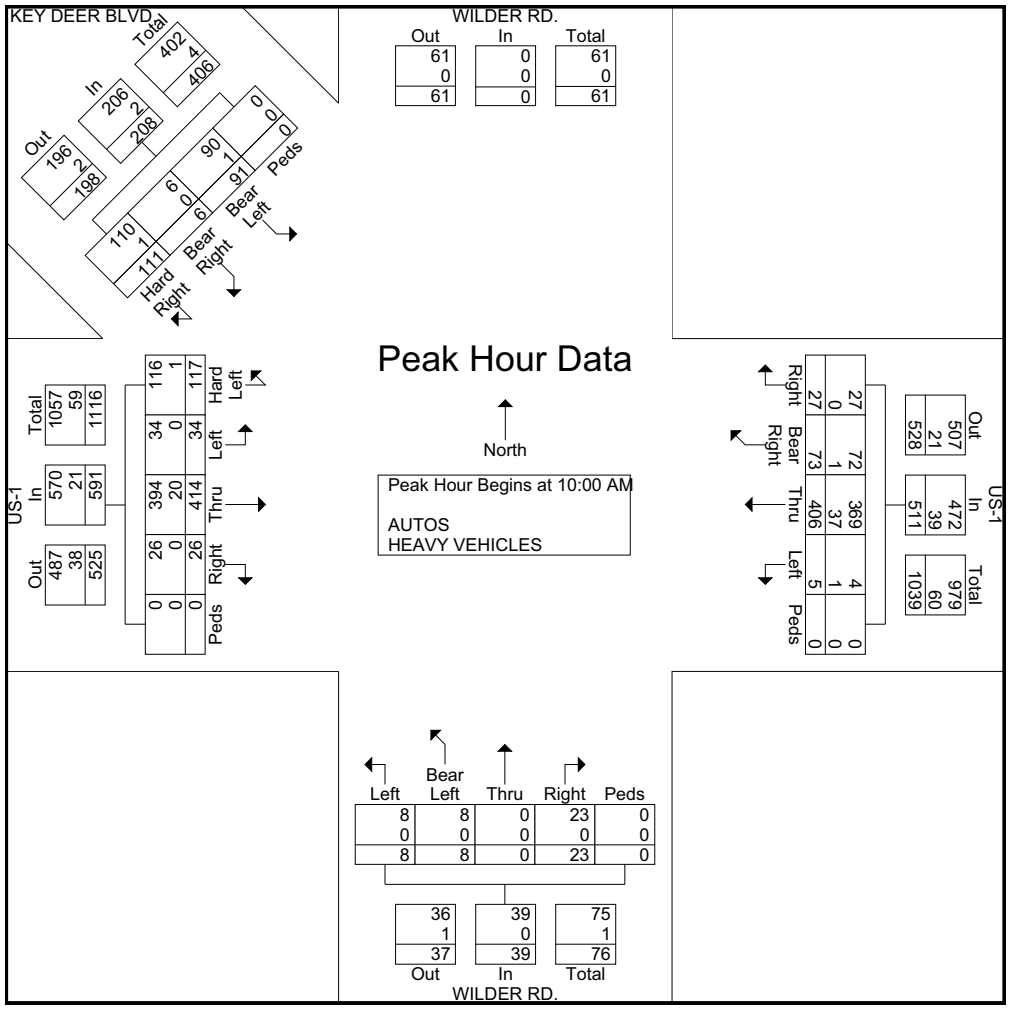
# Crosroads Engineering Data, Inc.

13284 SW 120th Street
Miami, Florida, 33186
Tel: 305-233-3997 Fax: 305-233-7720


CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE

File Name : BIG PINE @ US-1
Site Code : 00000000
Start Date : 11/5/2010
Page No : 2

| Start Time | US-1 From East | | | | | | WILDER RD. From South | | | | | | US-1 From West | | | | | | KEY DEER BLVD. From Northwest | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right | Bear Right | Thru | Left | Peds | App. Total | Right | Thru | Bear Left | Left | Peds | App. Total | Right | Thru | Left | Hard Left | Peds | App. Total | Hard Right | Bear Right | Bear Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 09:00 AM to 11:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 10:00 AM | | | | | | | | | | | | | | | | | | | | | | | | |
| 10:00 AM | 10 | 19 | 92 | 0 | 0 | 121 | 5 | 0 | 0 | 0 | 0 | 5 | 2 | 97 | 16 | 26 | 0 | 141 | 29 | 3 | 19 | 0 | 51 | 318 |
| 10:15 AM | 4 | 11 | 79 | 0 | 0 | 94 | 7 | 0 | 0 | 2 | 0 | 9 | 3 | 83 | 5 | 18 | 0 | 109 | 29 | 1 | 22 | 0 | 52 | 264 |
| 10:30 AM | 7 | 19 | 117 | 2 | 0 | 145 | 7 | 0 | 5 | 5 | 0 | 17 | 15 | 122 | 5 | 22 | 0 | 164 | 27 | 1 | 25 | 0 | 53 | 379 |
| 10:45 AM | 6 | 24 | 118 | 3 | 0 | 151 | 4 | 0 | 3 | 1 | 0 | 8 | 6 | 112 | 8 | 51 | 0 | 177 | 26 | 1 | 25 | 0 | 52 | 388 |
| Total Volume | 27 | 73 | 406 | 5 | 0 | 511 | 23 | 0 | 8 | 8 | 0 | 39 | 26 | 414 | 34 | 117 | 0 | 591 | 111 | 6 | 91 | 0 | 208 | 1349 |
| % App. Total | 5.3 | 14.3 | 79.5 | 1 | 0 | | 59 | 0 | 20.5 | 20.5 | 0 | | 4.4 | 70.1 | 5.8 | 19.8 | 0 | | 53.4 | 2.9 | 43.8 | 0 | | |
| PHF | .675 | .760 | .860 | .417 | .000 | .846 | .821 | .000 | .400 | .400 | .000 | .574 | .433 | .848 | .531 | .574 | .000 | .835 | .957 | .500 | .910 | .000 | .981 | .869 |
| AUTOS | 27 | 72 | 369 | 4 | 0 | 472 | 23 | 0 | 8 | 8 | 0 | 39 | 26 | 394 | 34 | 116 | 0 | 570 | 110 | 6 | 90 | 0 | 206 | 1287 |
| % AUTOS | 100 | 98.6 | 90.9 | 80.0 | 0 | 92.4 | 100 | 0 | 100 | 100 | 0 | 100 | 100 | 95.2 | 100 | 99.1 | 0 | 96.4 | 99.1 | 100 | 98.9 | 0 | 99.0 | 95.4 |
| HEAVY VEHICLES | 0 | 1 | 37 | 1 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 1 | 0 | 21 | 1 | 0 | 1 | 0 | 2 | 62 |
| % HEAVY VEHICLES | 0 | 1.4 | 9.1 | 20.0 | 0 | 7.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.8 | 0 | 0.9 | 0 | 3.6 | 0.9 | 0 | 1.1 | 0 | 1.0 | 4.6 |



# Crosroads Engineering Data, Inc.

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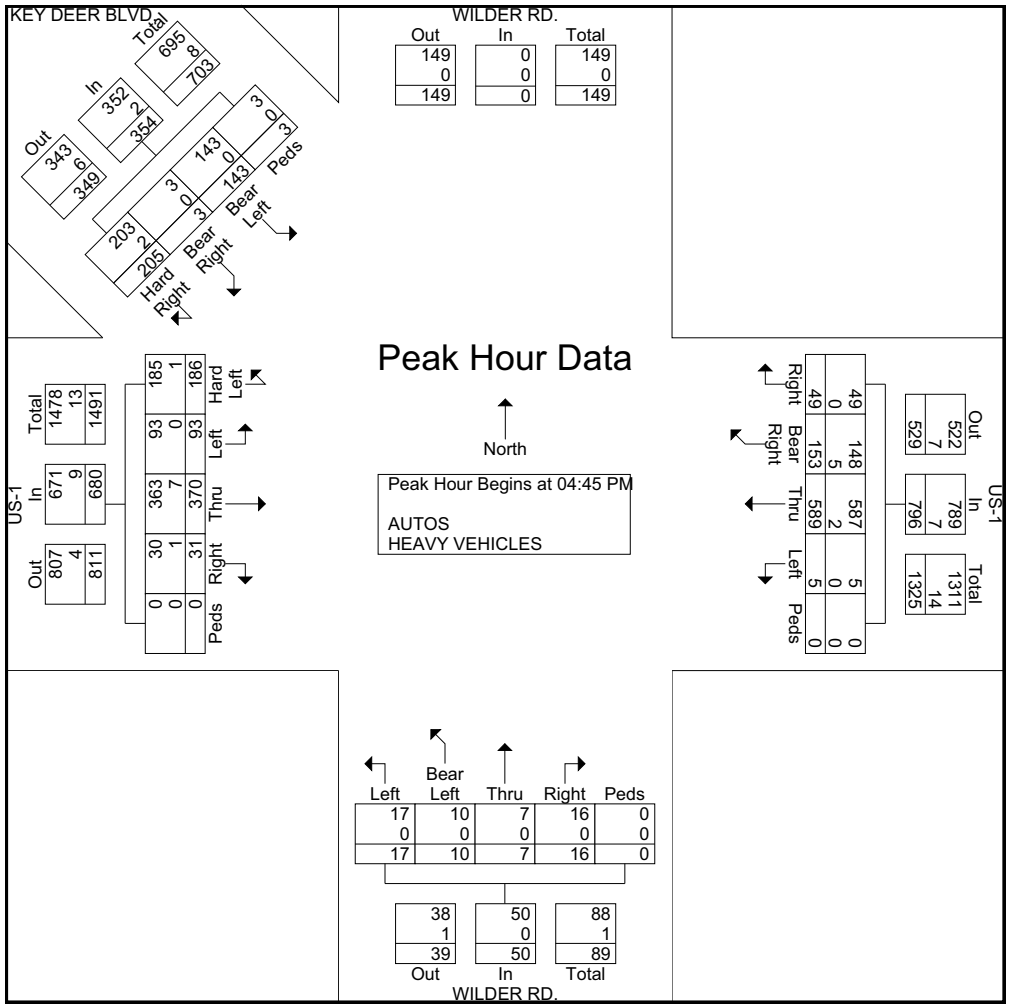
CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE

File Name : BIG PINE @ US-1
Site Code : 00000000
Start Date : 11/5/2010
Page No : 3

| Start Time | US-1 From East | | | | | | WILDER RD. From South | | | | | | US-1 From West | | | | | | KEY DEER BLVD. From Northwest | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right | Bear Right | Thru | Left | Peds | App. Total | Right | Thru | Bear Left | Left | Peds | App. Total | Right | Thru | Left | Hard Left | Peds | App. Total | Hard Right | Bear Right | Bear Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | | | | | | | | |
| 04:45 PM | 13 | 32 | 168 | 1 | 0 | 214 | 6 | 1 | 4 | 2 | 0 | 13 | 7 | 101 | 14 | 51 | 0 | 173 | 54 | 0 | 24 | 1 | 79 | 479 |
| 05:00 PM | 15 | 43 | 140 | 1 | 0 | 199 | 0 | 1 | 2 | 5 | 0 | 8 | 10 | 89 | 23 | 42 | 0 | 164 | 36 | 2 | 34 | 0 | 72 | 443 |
| 05:15 PM | 6 | 40 | 141 | 2 | 0 | 189 | 6 | 2 | 2 | 3 | 0 | 13 | 6 | 90 | 20 | 34 | 0 | 150 | 60 | 0 | 43 | 0 | 103 | 455 |
| 05:30 PM | 15 | 38 | 140 | 1 | 0 | 194 | 4 | 3 | 2 | 7 | 0 | 16 | 8 | 90 | 36 | 59 | 0 | 193 | 55 | 1 | 42 | 2 | 100 | 503 |
| Total Volume | 49 | 153 | 589 | 5 | 0 | 796 | 16 | 7 | 10 | 17 | 0 | 50 | 31 | 370 | 93 | 186 | 0 | 680 | 205 | 3 | 143 | 3 | 354 | 1880 |
| % App. Total | 6.2 | 19.2 | 74 | 0.6 | 0 | | 32 | 14 | 20 | 34 | 0 | | 4.6 | 54.4 | 13.7 | 27.4 | 0 | | 57.9 | 0.8 | 40.4 | 0.8 | | |
| PHF | .817 | .890 | .876 | .625 | .000 | .930 | .667 | .583 | .625 | .607 | .000 | .781 | .775 | .916 | .646 | .788 | .000 | .881 | .854 | .375 | .831 | .375 | .859 | .934 |
| AUTOS | 49 | 148 | 587 | 5 | 0 | 789 | 16 | 7 | 10 | 17 | 0 | 50 | 30 | 363 | 93 | 185 | 0 | 671 | 203 | 3 | 143 | 3 | 352 | 1862 |
| % AUTOS | 100 | 96.7 | 99.7 | 100 | 0 | 99.1 | 100 | 100 | 100 | 100 | 0 | 100 | 96.8 | 98.1 | 100 | 99.5 | 0 | 98.7 | 99.0 | 100 | 100 | 100 | 99.4 | 99.0 |
| HEAVY VEHICLES | 0 | 5 | 2 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 1 | 0 | 9 | 2 | 0 | 0 | 0 | 2 | 18 |
| % HEAVY VEHICLES | 0 | 3.3 | 0.3 | 0 | 0 | 0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 3.2 | 1.9 | 0 | 0.5 | 0 | 1.3 | 1.0 | 0 | 0 | 0 | 0.6 | 1.0 |



**Crossroads Engineering Data, Inc.**
13284 SW 120th Street
Miami, Florida, 33186
PH: 305-233-3997 FAX: 305-233-7720

CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE
NB, SB

KEY DEER COMBINED
KEY DEER BLVD. SOUTH OF
WATSON BLVD.
Date Start: 12-Nov-10

| Start | 1 | 6 | 11 | 16 | 21 | 26 | 31 | 36 | 41 | 46 | 51 | 56 | 61 | 66 | 71 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 147 | Total |
| 11/12/1 | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 00:15 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 00:30 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 00:45 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| | 0 | 0 | 0 | 1 | 0 | 7 | 18 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| 01:00 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 01:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 02:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:45 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| 03:00 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 03:15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:45 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 6 |
| 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 05:00 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 05:15 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 8 |
| 05:30 | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 05:45 | 0 | 0 | 0 | 0 | 0 | 5 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| | 0 | 0 | 0 | 0 | 2 | 8 | 22 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 41 |
| 06:00 | 0 | 0 | 0 | 0 | 0 | 3 | 9 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 06:15 | 0 | 0 | 0 | 0 | 0 | 1 | 10 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 17 |
| 06:30 | 0 | 0 | 0 | 0 | 0 | 6 | 14 | 5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 28 |
| 06:45 | 0 | 0 | 0 | 0 | 1 | 6 | 21 | 9 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 39 |
| | 0 | 0 | 0 | 0 | 1 | 16 | 54 | 19 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 101 |
| 07:00 | 0 | 0 | 0 | 0 | 4 | 11 | 28 | 20 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 69 |
| 07:15 | 0 | 0 | 0 | 0 | 3 | 2 | 35 | 17 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 61 |
| 07:30 | 0 | 0 | 0 | 0 | 1 | 5 | 23 | 17 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 07:45 | 0 | 0 | 0 | 0 | 1 | 6 | 24 | 21 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 57 |
| | 0 | 0 | 0 | 0 | 9 | 24 | 110 | 75 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 235 |
| 08:00 | 0 | 0 | 0 | 0 | 1 | 7 | 30 | 17 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 66 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 9 | 32 | 11 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 54 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 6 | 21 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 44 |
| 08:45 | 0 | 0 | 0 | 1 | 1 | 13 | 29 | 22 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 69 |
| | 0 | 0 | 0 | 1 | 2 | 35 | 112 | 65 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 233 |
| 09:00 | 0 | 0 | 1 | 0 | 1 | 10 | 24 | 10 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 50 |
| 09:15 | 0 | 0 | 0 | 1 | 2 | 7 | 27 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 09:30 | 0 | 0 | 1 | 0 | 3 | 9 | 25 | 8 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 47 |
| 09:45 | 0 | 0 | 0 | 0 | 1 | 13 | 39 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 67 |
| | 0 | 0 | 2 | 1 | 7 | 39 | 115 | 41 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 212 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 7 | 29 | 14 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 52 |
| 10:15 | 0 | 0 | 0 | 1 | 1 | 11 | 17 | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 42 |
| 10:30 | 0 | 0 | 0 | 0 | 1 | 15 | 23 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| 10:45 | 0 | 0 | 0 | 0 | 1 | 13 | 29 | 11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 55 |
| | 0 | 0 | 0 | 1 | 3 | 46 | 98 | 44 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 199 |
| 11:00 | 0 | 0 | 0 | 0 | 1 | 10 | 27 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 49 |
| 11:15 | 0 | 1 | 0 | 0 | 1 | 12 | 31 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 57 |
| 11:30 | 0 | 1 | 0 | 0 | 3 | 8 | 35 | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 56 |
| 11:45 | 0 | 0 | 0 | 0 | 2 | 7 | 39 | 12 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| | 0 | 2 | 0 | 0 | 7 | 37 | 132 | 36 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 226 |
| Total | 0 | 2 | 2 | 4 | 32 | 214 | 669 | 296 | 65 | 12 | 2 | 1 | 0 | 0 | 0 | 1299 |

**Crossroads Engineering Data, Inc.**
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PH: 305-233-3997 FAX: 305-233-7720

CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE

KEY DEER COMBINED
KEY DEER BLVD. SOUTH OF
WATSON BLVD.
Date Start: 12-Nov-10

NB, SB

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 PM | 0 | 0 | 0 | 0 | 1 | 14 | 18 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| 12:15 | 0 | 0 | 1 | 0 | 2 | 11 | 31 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 53 |
| 12:30 | 0 | 0 | 2 | 0 | 0 | 16 | 24 | 11 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 55 |
| 12:45 | 0 | 0 | 0 | 0 | 2 | 7 | 28 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 48 |
| | 0 | 0 | 3 | 0 | 5 | 48 | 101 | 41 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 206 |
| 13:00 | 0 | 0 | 0 | 0 | 2 | 15 | 30 | 14 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| 13:15 | 0 | 1 | 0 | 0 | 0 | 17 | 34 | 12 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 65 |
| 13:30 | 0 | 0 | 0 | 0 | 1 | 10 | 24 | 15 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 54 |
| 13:45 | 0 | 0 | 0 | 0 | 3 | 11 | 31 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 55 |
| | 0 | 1 | 0 | 0 | 6 | 53 | 119 | 49 | 7 | 3 | 0 | 0 | 0 | 0 | 0 | 238 |
| 14:00 | 0 | 0 | 1 | 0 | 2 | 6 | 30 | 11 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 52 |
| 14:15 | 0 | 0 | 0 | 0 | 1 | 8 | 37 | 6 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 56 |
| 14:30 | 0 | 0 | 0 | 0 | 3 | 8 | 26 | 9 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 51 |
| 14:45 | 0 | 2 | 0 | 0 | 7 | 11 | 23 | 14 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 61 |
| | 0 | 2 | 1 | 0 | 13 | 33 | 116 | 40 | 12 | 2 | 1 | 0 | 0 | 0 | 0 | 220 |
| 15:00 | 0 | 0 | 0 | 0 | 0 | 14 | 27 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 53 |
| 15:15 | 0 | 0 | 0 | 0 | 2 | 7 | 39 | 19 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 70 |
| 15:30 | 0 | 1 | 0 | 0 | 0 | 10 | 37 | 12 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 62 |
| 15:45 | 0 | 0 | 0 | 0 | 1 | 10 | 27 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| | 0 | 1 | 0 | 0 | 3 | 41 | 130 | 50 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 233 |
| 16:00 | 0 | 0 | 0 | 0 | 2 | 11 | 27 | 17 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |
| 16:15 | 0 | 0 | 0 | 0 | 1 | 13 | 37 | 16 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 70 |
| 16:30 | 0 | 0 | 0 | 0 | 2 | 19 | 36 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 70 |
| 16:45 | 0 | 0 | 2 | 0 | 0 | 4 | 38 | 11 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 58 |
| | 0 | 0 | 2 | 0 | 5 | 47 | 138 | 56 | 9 | 2 | 1 | 0 | 0 | 0 | 0 | 260 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 12 | 30 | 14 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 58 |
| 17:15 | 0 | 0 | 0 | 0 | 2 | 17 | 45 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 79 |
| 17:30 | 0 | 0 | 1 | 0 | 2 | 14 | 50 | 14 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 85 |
| 17:45 | 0 | 0 | 1 | 0 | 4 | 28 | 42 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 88 |
| | 0 | 0 | 2 | 0 | 8 | 71 | 167 | 53 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 310 |
| 18:00 | 0 | 0 | 0 | 0 | 0 | 19 | 49 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 |
| 18:15 | 0 | 0 | 0 | 0 | 1 | 18 | 41 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 71 |
| 18:30 | 1 | 0 | 0 | 1 | 1 | 18 | 41 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 74 |
| 18:45 | 0 | 0 | 0 | 0 | 1 | 23 | 38 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 |
| | 1 | 0 | 0 | 1 | 3 | 78 | 169 | 36 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 293 |
| 19:00 | 0 | 0 | 1 | 0 | 0 | 20 | 33 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 60 |
| 19:15 | 0 | 0 | 0 | 0 | 0 | 12 | 25 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| 19:30 | 0 | 0 | 1 | 0 | 0 | 8 | 32 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| 19:45 | 0 | 0 | 0 | 0 | 1 | 8 | 18 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| | 0 | 0 | 2 | 0 | 1 | 48 | 108 | 31 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 196 |
| 20:00 | 0 | 0 | 0 | 0 | 0 | 11 | 16 | 7 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 37 |
| 20:15 | 0 | 0 | 0 | 0 | 0 | 3 | 22 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| 20:30 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 20:45 | 0 | 0 | 0 | 0 | 2 | 8 | 12 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| | 0 | 0 | 0 | 0 | 2 | 34 | 62 | 21 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 125 |
| 21:00 | 0 | 0 | 0 | 0 | 0 | 3 | 13 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 21:15 | 0 | 0 | 0 | 0 | 0 | 5 | 22 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 21:30 | 0 | 0 | 0 | 1 | 0 | 7 | 21 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 21:45 | 1 | 0 | 0 | 0 | 0 | 7 | 11 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| | 1 | 0 | 0 | 1 | 0 | 22 | 67 | 23 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 116 |
| 22:00 | 0 | 0 | 0 | 0 | 0 | 4 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 22:15 | 0 | 0 | 0 | 0 | 2 | 3 | 11 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 22:30 | 0 | 0 | 0 | 0 | 2 | 0 | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 22:45 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| | 0 | 0 | 0 | 0 | 4 | 7 | 37 | 12 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 63 |
| 23:00 | 0 | 0 | 0 | 0 | 0 | 2 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 23:15 | 0 | 0 | 0 | 0 | 0 | 4 | 11 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 23:30 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 23:45 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| | 0 | 0 | 0 | 0 | 0 | 14 | 37 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 65 |
| Total | 2 | 4 | 10 | 2 | 50 | 496 | 1251 | 424 | 73 | 11 | 2 | 0 | 0 | 0 | 0 | 2325 |
| Total | 2 | 6 | 12 | 6 | 82 | 710 | 1920 | 720 | 138 | 23 | 4 | 1 | 0 | 0 | 0 | 3624 |

| Stats | |
|---|---|
| 15th Percentile : | 29 MPH |
| 50th Percentile : | 33 MPH |
| 85th Percentile : | 38 MPH |
| 95th Percentile : | 40 MPH |
| Mean Speed(Average) : | 33 MPH |
| 10 MPH Pace Speed : | 31-40 MPH |
| Number in Pace : | 2640 |
| Percent in Pace : | 72.8% |
| Number of Vehicles > 30 MPH : | 2806 |
| Percent of Vehicles > 30 MPH : | 77.4% |

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PROJECT: BIG PINE
COUNTY : MONROE

KEY DEER S. OF WATSON (NB)
KEY DEER BLVD. SOUTH OF WATSON BLVD.
Date Start: 12-Nov-10

NB

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/12/1 | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 00:15 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 00:30 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 00:45 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| | 0 | 0 | 0 | 1 | 0 | 6 | 17 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 01:00 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 01:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:45 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:45 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 06:00 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 07:00 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 07:15 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 07:30 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 07:45 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| | 0 | 0 | 0 | 0 | 2 | 4 | 11 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 08:45 | 0 | 0 | 0 | 1 | 0 | 2 | 11 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| | 0 | 0 | 0 | 1 | 0 | 3 | 36 | 13 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 57 |
| 09:00 | 0 | 0 | 1 | 0 | 0 | 2 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 09:15 | 0 | 0 | 0 | 1 | 1 | 3 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 09:30 | 0 | 0 | 1 | 0 | 0 | 2 | 10 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 09:45 | 0 | 0 | 0 | 0 | 0 | 4 | 19 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| | 0 | 0 | 2 | 1 | 1 | 11 | 49 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 75 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 2 | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 10:15 | 0 | 0 | 0 | 0 | 0 | 5 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 10:30 | 0 | 0 | 0 | 0 | 0 | 3 | 12 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| 10:45 | 0 | 0 | 0 | 0 | 0 | 8 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| | 0 | 0 | 0 | 0 | 0 | 18 | 47 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 75 |
| 11:00 | 0 | 0 | 0 | 0 | 0 | 7 | 14 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| 11:15 | 0 | 1 | 0 | 0 | 0 | 5 | 20 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 11:30 | 0 | 1 | 0 | 0 | 1 | 4 | 19 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 31 |
| 11:45 | 0 | 0 | 0 | 0 | 0 | 2 | 20 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| | 0 | 2 | 0 | 0 | 1 | 18 | 73 | 12 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 110 |
| Total | 0 | 2 | 2 | 3 | 4 | 62 | 241 | 56 | 12 | 2 | 1 | 0 | 0 | 0 | 0 | 385 |

**Crossroads Engineering Data, Inc.**
13284 SW 120th Street
Miami, Florida, 33186
PH: 305-233-3997 FAX: 305-233-7720

CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE

KEY DEER S. OF WATSON (NB)
KEY DEER BLVD. SOUTH OF WATSON BLVD.
Date Start: 12-Nov-10

NB

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 PM | 0 | 0 | 0 | 0 | 1 | 10 | 12 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 12:15 | 0 | 0 | 1 | 0 | 1 | 5 | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 12:30 | 0 | 0 | 2 | 0 | 0 | 6 | 14 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 27 |
| 12:45 | 0 | 0 | 0 | 0 | 0 | 5 | 19 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| | 0 | 0 | 3 | 0 | 2 | 26 | 65 | 17 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 115 |
| 13:00 | 0 | 0 | 0 | 0 | 0 | 8 | 12 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 13:15 | 0 | 1 | 0 | 0 | 0 | 7 | 14 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| 13:30 | 0 | 0 | 0 | 0 | 0 | 3 | 14 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 13:45 | 0 | 0 | 0 | 0 | 1 | 7 | 13 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| | 0 | 1 | 0 | 0 | 1 | 25 | 53 | 22 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 105 |
| 14:00 | 0 | 0 | 1 | 0 | 2 | 3 | 20 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 14:15 | 0 | 0 | 0 | 0 | 1 | 6 | 20 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 14:30 | 0 | 0 | 0 | 0 | 1 | 7 | 14 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 14:45 | 0 | 2 | 0 | 0 | 4 | 6 | 15 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| | 0 | 2 | 1 | 0 | 8 | 22 | 69 | 18 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 126 |
| 15:00 | 0 | 0 | 0 | 0 | 0 | 3 | 10 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 15:15 | 0 | 0 | 0 | 0 | 0 | 4 | 25 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| 15:30 | 0 | 1 | 0 | 0 | 0 | 6 | 23 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| 15:45 | 0 | 0 | 0 | 0 | 0 | 7 | 19 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| | 0 | 1 | 0 | 0 | 0 | 20 | 77 | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 120 |
| 16:00 | 0 | 0 | 0 | 0 | 1 | 6 | 15 | 11 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 38 |
| 16:15 | 0 | 0 | 0 | 0 | 0 | 6 | 20 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 16:30 | 0 | 0 | 0 | 0 | 2 | 8 | 23 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| 16:45 | 0 | 0 | 2 | 0 | 0 | 0 | 17 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| | 0 | 0 | 2 | 0 | 3 | 20 | 75 | 29 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 135 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 8 | 17 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 10 | 34 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 8 | 32 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| 17:45 | 0 | 0 | 1 | 0 | 3 | 20 | 24 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 55 |
| | 0 | 0 | 1 | 0 | 3 | 46 | 107 | 26 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 187 |
| 18:00 | 0 | 0 | 0 | 0 | 0 | 13 | 30 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| 18:15 | 0 | 0 | 0 | 0 | 1 | 16 | 29 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| 18:30 | 1 | 0 | 0 | 1 | 0 | 18 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 |
| 18:45 | 0 | 0 | 0 | 0 | 0 | 16 | 25 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 |
| | 1 | 0 | 0 | 1 | 1 | 63 | 110 | 15 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 192 |
| 19:00 | 0 | 0 | 1 | 0 | 0 | 16 | 23 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 44 |
| 19:15 | 0 | 0 | 0 | 0 | 0 | 8 | 16 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| 19:30 | 0 | 0 | 1 | 0 | 0 | 6 | 29 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 |
| 19:45 | 0 | 0 | 0 | 0 | 1 | 6 | 12 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| | 0 | 0 | 2 | 0 | 1 | 36 | 80 | 22 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 144 |
| 20:00 | 0 | 0 | 0 | 0 | 0 | 9 | 14 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 20:15 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| 20:30 | 0 | 0 | 0 | 0 | 0 | 11 | 9 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 20:45 | 0 | 0 | 0 | 0 | 2 | 6 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| | 0 | 0 | 0 | 0 | 2 | 27 | 50 | 17 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 99 |
| 21:00 | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 21:15 | 0 | 0 | 0 | 0 | 0 | 4 | 18 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 21:30 | 0 | 0 | 0 | 1 | 0 | 5 | 18 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 21:45 | 1 | 0 | 0 | 0 | 0 | 7 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| | 1 | 0 | 0 | 1 | 0 | 18 | 51 | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 91 |
| 22:00 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 22:15 | 0 | 0 | 0 | 0 | 1 | 3 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| 22:30 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 22:45 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| | 0 | 0 | 0 | 0 | 2 | 7 | 28 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 47 |
| 23:00 | 0 | 0 | 0 | 0 | 0 | 2 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| 23:15 | 0 | 0 | 0 | 0 | 0 | 4 | 11 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 23:30 | 0 | 0 | 0 | 0 | 0 | 3 | 6 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 23:45 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| | 0 | 0 | 0 | 0 | 0 | 13 | 32 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| Total | 2 | 4 | 9 | 2 | 23 | 323 | 797 | 222 | 34 | 1 | 0 | 0 | 0 | 0 | 0 | 1417 |
| Total | 2 | 6 | 11 | 5 | 27 | 385 | 1038 | 278 | 46 | 3 | 1 | 0 | 0 | 0 | 0 | 1802 |

| Stats | |
|---|---|
| 15th Percentile : | 28 MPH |
| 50th Percentile : | 33 MPH |
| 85th Percentile : | 37 MPH |
| 95th Percentile : | 40 MPH |
| Mean Speed(Average) : | 33 MPH |
| 10 MPH Pace Speed : | 26-35 MPH |
| Number in Pace : | 1423 |
| Percent in Pace : | 79.0% |
| Number of Vehicles > 30 MPH : | 1366 |
| Percent of Vehicles > 30 MPH : | 75.8% |

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JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE
SB

KEY DEER S. OF WATSON (SB)
KEY DEER BLVD. SOUTH OF WATSON BLVD.
Date Start: 12-Nov-10

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/12/1 | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 00:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 00:30 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 00:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 01:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 02:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:00 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 03:15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:45 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:00 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:15 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| 05:30 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 05:45 | 0 | 0 | 0 | 0 | 0 | 4 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| | 0 | 0 | 0 | 0 | 2 | 7 | 18 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 35 |
| 06:00 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 06:15 | 0 | 0 | 0 | 0 | 0 | 1 | 10 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 17 |
| 06:30 | 0 | 0 | 0 | 0 | 0 | 6 | 13 | 5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 27 |
| 06:45 | 0 | 0 | 0 | 0 | 1 | 6 | 21 | 9 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 39 |
| | 0 | 0 | 0 | 0 | 1 | 16 | 52 | 19 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 99 |
| 07:00 | 0 | 0 | 0 | 0 | 4 | 9 | 26 | 20 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 65 |
| 07:15 | 0 | 0 | 0 | 0 | 2 | 2 | 33 | 16 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 57 |
| 07:30 | 0 | 0 | 0 | 0 | 0 | 4 | 20 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 42 |
| 07:45 | 0 | 0 | 0 | 0 | 1 | 5 | 20 | 20 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 50 |
| | 0 | 0 | 0 | 0 | 7 | 20 | 99 | 72 | 15 | 1 | 0 | 0 | 0 | 0 | 0 | 214 |
| 08:00 | 0 | 0 | 0 | 0 | 1 | 7 | 24 | 14 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 54 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 9 | 18 | 6 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 35 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 5 | 16 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| 08:45 | 0 | 0 | 0 | 0 | 1 | 11 | 18 | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| | 0 | 0 | 0 | 0 | 2 | 32 | 76 | 52 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | 176 |
| 09:00 | 0 | 0 | 0 | 0 | 1 | 8 | 15 | 7 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 35 |
| 09:15 | 0 | 0 | 0 | 0 | 1 | 4 | 16 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 09:30 | 0 | 0 | 0 | 0 | 3 | 7 | 15 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 31 |
| 09:45 | 0 | 0 | 0 | 0 | 1 | 9 | 20 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| | 0 | 0 | 0 | 0 | 6 | 28 | 66 | 31 | 3 | 2 | 0 | 1 | 0 | 0 | 0 | 137 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 5 | 10 | 13 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 30 |
| 10:15 | 0 | 0 | 0 | 1 | 1 | 6 | 13 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 10:30 | 0 | 0 | 0 | 0 | 1 | 12 | 11 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 10:45 | 0 | 0 | 0 | 0 | 1 | 5 | 17 | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 33 |
| | 0 | 0 | 0 | 1 | 3 | 28 | 51 | 35 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 124 |
| 11:00 | 0 | 0 | 0 | 0 | 1 | 3 | 13 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 11:15 | 0 | 0 | 0 | 0 | 1 | 7 | 11 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 11:30 | 0 | 0 | 0 | 0 | 2 | 4 | 16 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 11:45 | 0 | 0 | 0 | 0 | 2 | 5 | 19 | 9 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 39 |
| | 0 | 0 | 0 | 0 | 6 | 19 | 59 | 24 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 116 |
| Total | 0 | 0 | 0 | 1 | 28 | 152 | 428 | 240 | 53 | 10 | 1 | 1 | 0 | 0 | 0 | 914 |

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KEY DEER S. OF WATSON (SB)
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Date Start: 12-Nov-10

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 PM | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| 12:15 | 0 | 0 | 0 | 0 | 1 | 6 | 11 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| 12:30 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 12:45 | 0 | 0 | 0 | 0 | 2 | 2 | 9 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 20 |
| | 0 | 0 | 0 | 0 | 3 | 22 | 36 | 24 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 91 |
| 13:00 | 0 | 0 | 0 | 0 | 2 | 7 | 18 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| 13:15 | 0 | 0 | 0 | 0 | 0 | 10 | 20 | 8 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 39 |
| 13:30 | 0 | 0 | 0 | 0 | 1 | 7 | 10 | 6 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 27 |
| 13:45 | 0 | 0 | 0 | 0 | 2 | 4 | 18 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| | 0 | 0 | 0 | 0 | 5 | 28 | 66 | 27 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 133 |
| 14:00 | 0 | 0 | 0 | 0 | 0 | 3 | 10 | 7 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 21 |
| 14:15 | 0 | 0 | 0 | 0 | 0 | 2 | 17 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 26 |
| 14:30 | 0 | 0 | 0 | 0 | 2 | 1 | 12 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 22 |
| 14:45 | 0 | 0 | 0 | 0 | 3 | 5 | 8 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| | 0 | 0 | 0 | 0 | 5 | 11 | 47 | 22 | 6 | 2 | 1 | 0 | 0 | 0 | 0 | 94 |
| 15:00 | 0 | 0 | 0 | 0 | 0 | 11 | 17 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 15:15 | 0 | 0 | 0 | 0 | 2 | 3 | 14 | 11 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| 15:30 | 0 | 0 | 0 | 0 | 0 | 4 | 14 | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 27 |
| 15:45 | 0 | 0 | 0 | 0 | 1 | 3 | 8 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| | 0 | 0 | 0 | 0 | 3 | 21 | 53 | 30 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 113 |
| 16:00 | 0 | 0 | 0 | 0 | 1 | 5 | 12 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| 16:15 | 0 | 0 | 0 | 0 | 1 | 7 | 17 | 12 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 40 |
| 16:30 | 0 | 0 | 0 | 0 | 0 | 11 | 13 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 16:45 | 0 | 0 | 0 | 0 | 0 | 4 | 21 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 31 |
| | 0 | 0 | 0 | 0 | 2 | 27 | 63 | 27 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 125 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 4 | 13 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 17:15 | 0 | 0 | 0 | 0 | 2 | 7 | 11 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 17:30 | 0 | 0 | 1 | 0 | 2 | 6 | 18 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| 17:45 | 0 | 0 | 0 | 0 | 1 | 8 | 18 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| | 0 | 0 | 1 | 0 | 5 | 25 | 60 | 27 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 123 |
| 18:00 | 0 | 0 | 0 | 0 | 0 | 6 | 19 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 18:15 | 0 | 0 | 0 | 0 | 0 | 2 | 12 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 18:30 | 0 | 0 | 0 | 0 | 1 | 0 | 15 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 18:45 | 0 | 0 | 0 | 0 | 1 | 7 | 13 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| | 0 | 0 | 0 | 0 | 2 | 15 | 59 | 21 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 101 |
| 19:00 | 0 | 0 | 0 | 0 | 0 | 4 | 10 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 19:15 | 0 | 0 | 0 | 0 | 0 | 4 | 9 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 19:30 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 19:45 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| | 0 | 0 | 0 | 0 | 0 | 12 | 28 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| 20:00 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| 20:15 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 20:30 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 20:45 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| | 0 | 0 | 0 | 0 | 0 | 7 | 12 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 26 |
| 21:00 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 21:15 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 21:30 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 21:45 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| | 0 | 0 | 0 | 0 | 0 | 4 | 16 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 22:00 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 22:15 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 22:30 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 22:45 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 | 2 | 0 | 9 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 23:00 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 23:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 23:30 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 23:45 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| Total | 0 | 0 | 1 | 0 | 27 | 173 | 454 | 202 | 39 | 10 | 2 | 0 | 0 | 0 | 0 | 908 |
| Total | 0 | 0 | 1 | 1 | 55 | 325 | 882 | 442 | 92 | 20 | 3 | 1 | 0 | 0 | 0 | 1822 |

| Stats | |
|---|---|
| 15th Percentile : | 29 MPH |
| 50th Percentile : | 33 MPH |
| 85th Percentile : | 39 MPH |
| 95th Percentile : | 42 MPH |
| Mean Speed(Average) : | 34 MPH |
| 10 MPH Pace Speed : | 31-40 MPH |
| Number in Pace : | 1324 |
| Percent in Pace : | 72.7% |
| Number of Vehicles > 30 MPH : | 1440 |
| Percent of Vehicles > 30 MPH : | 79.0% |

**Crossroads Engineering Data, Inc.**
13284 SW 120th Street
Miami, Florida, 33186
PH: 305-233-3997 FAX: 305-233-7720

CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE
EB

US-1 (EB) SPEED
US-1 AT MM 31.3/ EAST OF
KEY DEER BLVD.
Date Start: 12-Nov-10

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/12/1 | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 1 | 6 | 8 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 00:15 | 0 | 0 | 0 | 2 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 00:30 | 0 | 1 | 3 | 2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 00:45 | 0 | 0 | 0 | 3 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| | 0 | 1 | 4 | 13 | 27 | 5 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| 01:00 | 0 | 0 | 0 | 1 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 01:15 | 0 | 0 | 1 | 4 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 01:30 | 0 | 1 | 4 | 2 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 01:45 | 0 | 0 | 0 | 1 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| | 0 | 1 | 5 | 8 | 20 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 |
| 02:00 | 0 | 1 | 0 | 2 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 02:15 | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 02:30 | 0 | 0 | 0 | 0 | 4 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 02:45 | 0 | 0 | 1 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| | 0 | 1 | 2 | 6 | 17 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 03:00 | 0 | 0 | 1 | 0 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 03:15 | 0 | 0 | 0 | 0 | 4 | 5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 03:30 | 0 | 0 | 1 | 0 | 2 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 03:45 | 0 | 0 | 0 | 2 | 5 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| | 0 | 0 | 2 | 2 | 13 | 16 | 8 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |
| 04:00 | 0 | 0 | 0 | 1 | 5 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 04:15 | 0 | 0 | 0 | 0 | 6 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 04:30 | 0 | 0 | 1 | 2 | 5 | 7 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 04:45 | 0 | 2 | 2 | 1 | 5 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| | 0 | 2 | 3 | 4 | 21 | 20 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 |
| 05:00 | 0 | 0 | 0 | 1 | 3 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 05:15 | 0 | 0 | 0 | 0 | 8 | 5 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 05:30 | 0 | 0 | 0 | 1 | 5 | 11 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 25 |
| 05:45 | 0 | 0 | 0 | 3 | 4 | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| | 0 | 0 | 0 | 5 | 20 | 24 | 20 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 77 |
| 06:00 | 0 | 2 | 1 | 0 | 0 | 4 | 15 | 6 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 30 |
| 06:15 | 0 | 0 | 0 | 1 | 1 | 6 | 10 | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| 06:30 | 0 | 0 | 0 | 0 | 1 | 4 | 4 | 12 | 14 | 5 | 0 | 0 | 0 | 0 | 0 | 40 |
| 06:45 | 0 | 0 | 0 | 0 | 0 | 5 | 7 | 30 | 21 | 3 | 0 | 0 | 0 | 0 | 0 | 66 |
| | 0 | 2 | 1 | 1 | 2 | 19 | 36 | 68 | 38 | 9 | 0 | 0 | 0 | 0 | 0 | 176 |
| 07:00 | 0 | 0 | 0 | 1 | 0 | 2 | 9 | 21 | 25 | 9 | 1 | 0 | 0 | 0 | 0 | 68 |
| 07:15 | 0 | 0 | 0 | 0 | 0 | 1 | 26 | 22 | 22 | 15 | 0 | 0 | 0 | 0 | 0 | 86 |
| 07:30 | 0 | 0 | 0 | 0 | 0 | 8 | 18 | 27 | 31 | 9 | 1 | 0 | 0 | 0 | 0 | 94 |
| 07:45 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 16 | 27 | 15 | 1 | 0 | 0 | 0 | 0 | 66 |
| | 0 | 0 | 0 | 1 | 1 | 13 | 57 | 86 | 105 | 48 | 3 | 0 | 0 | 0 | 0 | 314 |
| 08:00 | 0 | 0 | 1 | 0 | 1 | 8 | 13 | 30 | 35 | 14 | 1 | 0 | 0 | 0 | 0 | 103 |
| 08:15 | 0 | 0 | 0 | 0 | 1 | 1 | 11 | 38 | 37 | 12 | 1 | 0 | 0 | 0 | 0 | 101 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 9 | 11 | 22 | 34 | 12 | 0 | 1 | 0 | 0 | 0 | 89 |
| 08:45 | 0 | 1 | 0 | 0 | 1 | 1 | 16 | 38 | 28 | 11 | 0 | 0 | 0 | 0 | 0 | 96 |
| | 0 | 1 | 1 | 0 | 3 | 19 | 51 | 128 | 134 | 49 | 2 | 1 | 0 | 0 | 0 | 389 |
| 09:00 | 0 | 0 | 0 | 0 | 1 | 2 | 13 | 37 | 42 | 13 | 0 | 0 | 0 | 0 | 0 | 108 |
| 09:15 | 0 | 0 | 0 | 0 | 3 | 12 | 24 | 39 | 38 | 5 | 1 | 0 | 0 | 0 | 0 | 122 |
| 09:30 | 0 | 0 | 1 | 0 | 2 | 5 | 24 | 42 | 43 | 7 | 1 | 0 | 0 | 0 | 0 | 125 |
| 09:45 | 0 | 0 | 0 | 0 | 1 | 2 | 20 | 45 | 41 | 22 | 2 | 0 | 0 | 0 | 0 | 133 |
| | 0 | 0 | 1 | 0 | 7 | 21 | 81 | 163 | 164 | 47 | 4 | 0 | 0 | 0 | 0 | 488 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 4 | 19 | 29 | 31 | 18 | 0 | 0 | 0 | 0 | 0 | 101 |
| 10:15 | 0 | 0 | 2 | 1 | 4 | 7 | 27 | 38 | 40 | 5 | 0 | 0 | 0 | 0 | 0 | 124 |
| 10:30 | 0 | 0 | 0 | 0 | 2 | 4 | 17 | 40 | 43 | 10 | 0 | 0 | 0 | 0 | 0 | 116 |
| 10:45 | 2 | 1 | 2 | 1 | 10 | 16 | 22 | 41 | 43 | 8 | 0 | 0 | 0 | 0 | 0 | 146 |
| | 2 | 1 | 4 | 2 | 16 | 31 | 85 | 148 | 157 | 41 | 0 | 0 | 0 | 0 | 0 | 487 |
| 11:00 | 0 | 0 | 1 | 0 | 8 | 20 | 26 | 38 | 31 | 10 | 0 | 0 | 0 | 0 | 0 | 134 |
| 11:15 | 0 | 0 | 0 | 1 | 3 | 7 | 22 | 52 | 33 | 9 | 3 | 0 | 0 | 0 | 0 | 130 |
| 11:30 | 1 | 0 | 0 | 0 | 0 | 8 | 22 | 44 | 37 | 11 | 3 | 0 | 0 | 0 | 0 | 126 |
| 11:45 | 0 | 2 | 3 | 0 | 1 | 13 | 28 | 39 | 25 | 9 | 1 | 1 | 0 | 0 | 0 | 122 |
| | 1 | 2 | 4 | 1 | 12 | 48 | 98 | 173 | 126 | 39 | 7 | 1 | 0 | 0 | 0 | 512 |
| Total | 3 | 11 | 27 | 43 | 159 | 230 | 452 | 775 | 727 | 234 | 16 | 2 | 0 | 0 | 0 | 2679 |

**Crossroads Engineering Data, Inc.**
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Miami, Florida, 33186
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CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE
EB

US-1 (EB) SPEED
US-1 AT MM 31.3/ EAST OF
KEY DEER BLVD.
Date Start: 12-Nov-10

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 PM | 0 | 0 | 1 | 0 | 3 | 10 | 32 | 47 | 27 | 6 | 0 | 0 | 0 | 0 | 0 | 126 |
| 12:15 | 0 | 0 | 0 | 0 | 3 | 20 | 26 | 46 | 38 | 12 | 1 | 1 | 0 | 0 | 0 | 147 |
| 12:30 | 0 | 0 | 0 | 0 | 1 | 0 | 15 | 38 | 40 | 11 | 0 | 0 | 0 | 0 | 0 | 105 |
| 12:45 | 0 | 0 | 0 | 0 | 2 | 4 | 22 | 26 | 45 | 15 | 4 | 0 | 0 | 0 | 0 | 118 |
| | 0 | 0 | 1 | 0 | 9 | 34 | 95 | 157 | 150 | 44 | 5 | 1 | 0 | 0 | 0 | 496 |
| 13:00 | 0 | 0 | 0 | 1 | 2 | 5 | 18 | 28 | 43 | 15 | 0 | 1 | 0 | 0 | 0 | 113 |
| 13:15 | 0 | 0 | 1 | 0 | 3 | 13 | 29 | 39 | 29 | 17 | 2 | 0 | 0 | 0 | 0 | 133 |
| 13:30 | 0 | 0 | 1 | 1 | 4 | 7 | 30 | 40 | 28 | 9 | 3 | 1 | 0 | 0 | 0 | 124 |
| 13:45 | 0 | 0 | 0 | 1 | 1 | 4 | 15 | 39 | 31 | 13 | 2 | 0 | 0 | 0 | 0 | 106 |
| | 0 | 0 | 2 | 3 | 10 | 29 | 92 | 146 | 131 | 54 | 7 | 2 | 0 | 0 | 0 | 476 |
| 14:00 | 0 | 0 | 1 | 1 | 1 | 10 | 23 | 39 | 41 | 7 | 5 | 1 | 0 | 0 | 0 | 129 |
| 14:15 | 0 | 0 | 0 | 0 | 0 | 7 | 7 | 22 | 42 | 20 | 2 | 0 | 0 | 0 | 0 | 100 |
| 14:30 | 0 | 0 | 0 | 0 | 1 | 4 | 8 | 32 | 46 | 19 | 1 | 1 | 0 | 0 | 0 | 112 |
| 14:45 | 1 | 0 | 0 | 0 | 4 | 4 | 24 | 36 | 32 | 11 | 1 | 0 | 0 | 0 | 0 | 113 |
| | 1 | 0 | 1 | 1 | 6 | 25 | 62 | 129 | 161 | 57 | 9 | 2 | 0 | 0 | 0 | 454 |
| 15:00 | 0 | 0 | 0 | 0 | 0 | 4 | 13 | 35 | 40 | 13 | 2 | 1 | 0 | 0 | 0 | 108 |
| 15:15 | 0 | 0 | 0 | 0 | 1 | 4 | 18 | 45 | 36 | 13 | 2 | 2 | 0 | 0 | 0 | 121 |
| 15:30 | 0 | 0 | 0 | 0 | 0 | 8 | 27 | 46 | 42 | 13 | 0 | 0 | 0 | 0 | 0 | 136 |
| 15:45 | 0 | 0 | 0 | 0 | 4 | 13 | 31 | 29 | 45 | 19 | 0 | 0 | 0 | 0 | 0 | 141 |
| | 0 | 0 | 0 | 0 | 5 | 29 | 89 | 155 | 163 | 58 | 4 | 3 | 0 | 0 | 0 | 506 |
| 16:00 | 0 | 0 | 0 | 0 | 0 | 12 | 25 | 38 | 40 | 17 | 0 | 0 | 0 | 0 | 0 | 132 |
| 16:15 | 0 | 0 | 0 | 0 | 1 | 11 | 22 | 36 | 39 | 18 | 2 | 0 | 0 | 0 | 0 | 129 |
| 16:30 | 0 | 0 | 0 | 0 | 3 | 6 | 20 | 32 | 54 | 13 | 2 | 0 | 0 | 0 | 0 | 130 |
| 16:45 | 0 | 0 | 0 | 0 | 1 | 8 | 27 | 53 | 42 | 14 | 0 | 0 | 0 | 0 | 0 | 145 |
| | 0 | 0 | 0 | 0 | 5 | 37 | 94 | 159 | 175 | 62 | 4 | 0 | 0 | 0 | 0 | 536 |
| 17:00 | 0 | 0 | 0 | 0 | 3 | 6 | 21 | 48 | 40 | 22 | 0 | 0 | 0 | 0 | 0 | 140 |
| 17:15 | 1 | 0 | 0 | 0 | 3 | 0 | 16 | 46 | 45 | 15 | 2 | 0 | 0 | 0 | 0 | 128 |
| 17:30 | 0 | 0 | 0 | 0 | 2 | 9 | 15 | 40 | 44 | 15 | 2 | 0 | 0 | 0 | 0 | 127 |
| 17:45 | 0 | 0 | 0 | 0 | 1 | 5 | 31 | 47 | 25 | 10 | 0 | 1 | 0 | 0 | 0 | 120 |
| | 1 | 0 | 0 | 0 | 9 | 20 | 83 | 181 | 154 | 62 | 4 | 1 | 0 | 0 | 0 | 515 |
| 18:00 | 0 | 0 | 0 | 0 | 0 | 16 | 42 | 46 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 121 |
| 18:15 | 1 | 0 | 0 | 0 | 1 | 14 | 45 | 30 | 9 | 4 | 1 | 0 | 0 | 0 | 0 | 105 |
| 18:30 | 0 | 0 | 0 | 0 | 1 | 7 | 38 | 46 | 11 | 2 | 1 | 0 | 0 | 0 | 0 | 106 |
| 18:45 | 0 | 0 | 0 | 1 | 0 | 3 | 39 | 33 | 7 | 2 | 1 | 0 | 0 | 0 | 0 | 86 |
| | 1 | 0 | 0 | 1 | 2 | 40 | 164 | 155 | 43 | 9 | 3 | 0 | 0 | 0 | 0 | 418 |
| 19:00 | 0 | 0 | 0 | 0 | 0 | 4 | 28 | 36 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 75 |
| 19:15 | 0 | 0 | 0 | 0 | 1 | 4 | 30 | 22 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 69 |
| 19:30 | 0 | 0 | 0 | 0 | 4 | 13 | 28 | 11 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 65 |
| 19:45 | 0 | 1 | 0 | 0 | 1 | 4 | 16 | 21 | 13 | 5 | 1 | 0 | 0 | 0 | 0 | 62 |
| | 0 | 1 | 0 | 0 | 6 | 25 | 102 | 90 | 36 | 10 | 1 | 0 | 0 | 0 | 0 | 271 |
| 20:00 | 0 | 0 | 0 | 0 | 1 | 1 | 22 | 13 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 44 |
| 20:15 | 0 | 1 | 0 | 0 | 0 | 9 | 17 | 25 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 61 |
| 20:30 | 0 | 0 | 0 | 0 | 0 | 2 | 31 | 27 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 69 |
| 20:45 | 0 | 0 | 0 | 0 | 0 | 4 | 22 | 8 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 41 |
| | 0 | 1 | 0 | 0 | 1 | 16 | 92 | 73 | 25 | 7 | 0 | 0 | 0 | 0 | 0 | 215 |
| 21:00 | 0 | 0 | 0 | 0 | 0 | 1 | 21 | 18 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 49 |
| 21:15 | 0 | 0 | 0 | 0 | 0 | 4 | 10 | 20 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 46 |
| 21:30 | 0 | 0 | 0 | 0 | 1 | 2 | 13 | 16 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 37 |
| 21:45 | 0 | 0 | 0 | 0 | 0 | 7 | 22 | 9 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 44 |
| | 0 | 0 | 0 | 0 | 1 | 14 | 66 | 63 | 26 | 6 | 0 | 0 | 0 | 0 | 0 | 176 |
| 22:00 | 1 | 0 | 0 | 0 | 2 | 4 | 14 | 14 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 40 |
| 22:15 | 0 | 0 | 0 | 0 | 0 | 3 | 6 | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 22:30 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 13 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 31 |
| 22:45 | 0 | 0 | 0 | 0 | 0 | 3 | 15 | 6 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 32 |
| | 1 | 0 | 0 | 0 | 2 | 10 | 46 | 41 | 18 | 6 | 0 | 0 | 0 | 0 | 0 | 124 |
| 23:00 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 13 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 19 |
| 23:15 | 0 | 0 | 0 | 0 | 0 | 4 | 13 | 13 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 36 |
| 23:30 | 0 | 0 | 0 | 0 | 0 | 1 | 18 | 4 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 23:45 | 0 | 0 | 0 | 0 | 0 | 1 | 13 | 9 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 27 |
| | 0 | 0 | 0 | 0 | 0 | 7 | 48 | 39 | 13 | 4 | 0 | 0 | 0 | 0 | 0 | 111 |
| Total | 4 | 2 | 4 | 5 | 56 | 286 | 1033 | 1388 | 1095 | 379 | 37 | 9 | 0 | 0 | 0 | 4298 |
| Total | 7 | 13 | 31 | 48 | 215 | 516 | 1485 | 2163 | 1822 | 613 | 53 | 11 | 0 | 0 | 0 | 6977 |

| Stats | |
|---|---|
| 15th Percentile : | 31 MPH |
| 50th Percentile : | 38 MPH |
| 85th Percentile : | 44 MPH |
| 95th Percentile : | 48 MPH |
| Mean Speed(Average) : | 38 MPH |
| 10 MPH Pace Speed : | 36-45 MPH |
| Number in Pace : | 3985 |
| Percent in Pace : | 57.1% |
| Number of Vehicles > 40 MPH : | 2499 |
| Percent of Vehicles > 40 MPH : | 35.8% |

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US-1 (WB) SPEED
US-1 @ MM 31.3/ EAST OF
KEY DEER BLVD.
Date Start: 11-Nov-10

WB

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/11/1 | | | | | | | | | | | | | | | | |
| 0 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 00:15 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 00:30 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 00:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 01:15 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 01:30 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 01:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 02:15 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 02:30 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 02:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 03:15 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 03:30 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 03:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 04:15 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 04:30 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 04:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 05:15 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 05:30 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 05:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 06:15 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 06:30 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 06:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 07:15 | 0 | 0 | 3 | 2 | 0 | 0 | 6 | 13 | 24 | 8 | 3 | 0 | 0 | 0 | 0 | 59 |
| 07:30 | 0 | 0 | 0 | 2 | 0 | 1 | 14 | 30 | 23 | 7 | 0 | 0 | 0 | 0 | 0 | 77 |
| 07:45 | 0 | 0 | 0 | 1 | 0 | 1 | 6 | 38 | 20 | 6 | 1 | 0 | 0 | 0 | 0 | 73 |
| | 0 | 0 | 3 | 5 | 0 | 2 | 26 | 81 | 67 | 21 | 4 | 0 | 0 | 0 | 0 | 209 |
| 08:00 | 0 | 0 | 1 | 1 | 1 | 3 | 10 | 35 | 19 | 3 | 0 | 0 | 0 | 0 | 0 | 73 |
| 08:15 | 0 | 0 | 0 | 0 | 4 | 1 | 15 | 29 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 75 |
| 08:30 | 0 | 0 | 0 | 1 | 1 | 0 | 24 | 51 | 18 | 5 | 0 | 0 | 0 | 0 | 0 | 100 |
| 08:45 | 0 | 0 | 1 | 2 | 0 | 2 | 18 | 40 | 30 | 4 | 0 | 0 | 0 | 0 | 0 | 97 |
| | 0 | 0 | 2 | 4 | 6 | 6 | 67 | 155 | 93 | 12 | 0 | 0 | 0 | 0 | 0 | 345 |
| 09:00 | 0 | 0 | 0 | 1 | 1 | 1 | 26 | 41 | 27 | 5 | 0 | 0 | 0 | 0 | 0 | 102 |
| 09:15 | 0 | 0 | 0 | 4 | 0 | 2 | 17 | 37 | 28 | 1 | 0 | 0 | 0 | 0 | 0 | 89 |
| 09:30 | 0 | 0 | 2 | 0 | 0 | 2 | 20 | 51 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 92 |
| 09:45 | 0 | 0 | 0 | 0 | 3 | 5 | 23 | 21 | 22 | 2 | 0 | 0 | 0 | 0 | 0 | 76 |
| | 0 | 0 | 2 | 5 | 4 | 10 | 86 | 150 | 92 | 10 | 0 | 0 | 0 | 0 | 0 | 359 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 2 | 22 | 56 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 108 |
| 10:15 | 0 | 0 | 1 | 3 | 2 | 7 | 35 | 46 | 23 | 5 | 0 | 0 | 0 | 0 | 0 | 122 |
| 10:30 | 0 | 0 | 0 | 2 | 5 | 10 | 21 | 39 | 53 | 6 | 0 | 0 | 0 | 0 | 0 | 136 |
| 10:45 | 0 | 0 | 1 | 1 | 2 | 3 | 24 | 40 | 41 | 4 | 0 | 0 | 0 | 0 | 0 | 116 |
| | 0 | 0 | 2 | 6 | 9 | 22 | 102 | 181 | 145 | 15 | 0 | 0 | 0 | 0 | 0 | 482 |
| 11:00 | 0 | 0 | 0 | 0 | 6 | 5 | 27 | 60 | 22 | 4 | 0 | 0 | 0 | 0 | 0 | 124 |
| 11:15 | 0 | 0 | 1 | 1 | 1 | 3 | 45 | 68 | 31 | 3 | 0 | 0 | 0 | 0 | 0 | 153 |
| 11:30 | 0 | 0 | 0 | 1 | 1 | 5 | 29 | 59 | 21 | 1 | 0 | 0 | 0 | 0 | 0 | 117 |
| 11:45 | 0 | 0 | 1 | 0 | 1 | 9 | 31 | 65 | 42 | 5 | 0 | 0 | 0 | 0 | 0 | 154 |
| | 0 | 0 | 2 | 2 | 9 | 22 | 132 | 252 | 116 | 13 | 0 | 0 | 0 | 0 | 0 | 548 |
| Total | 0 | 0 | 11 | 22 | 28 | 62 | 413 | 819 | 513 | 71 | 4 | 0 | 0 | 0 | 0 | 1943 |

**Crossroads Engineering Data, Inc.**
13284 SW 120th Street
Miami, Florida, 33186
PH: 305-233-3997 FAX: 305-233-7720

CLIENT : KIMLEY-HORN
JOB NO : 2010-47
PROJECT: BIG PINE
COUNTY : MONROE
WB

US-1 (WB) SPEED
US-1 @ MM 31.3/ EAST OF
KEY DEER BLVD.
Date Start: 11-Nov-10

| Start Time | 1 5 | 6 10 | 11 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 147 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 PM | 0 | 0 | 0 | 1 | 1 | 2 | 29 | 62 | 38 | 4 | 1 | 0 | 0 | 0 | 0 | 138 |
| 12:15 | 0 | 0 | 1 | 0 | 0 | 1 | 23 | 63 | 35 | 6 | 0 | 0 | 0 | 0 | 0 | 129 |
| 12:30 | 0 | 0 | 0 | 0 | 2 | 2 | 33 | 85 | 43 | 2 | 0 | 0 | 0 | 0 | 0 | 167 |
| 12:45 | 0 | 0 | 1 | 0 | 0 | 8 | 31 | 69 | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 150 |
| | 0 | 0 | 2 | 1 | 3 | 13 | 116 | 279 | 157 | 12 | 1 | 0 | 0 | 0 | 0 | 584 |
| 13:00 | 0 | 0 | 0 | 1 | 1 | 9 | 49 | 71 | 42 | 1 | 0 | 0 | 0 | 0 | 0 | 174 |
| 13:15 | 0 | 0 | 0 | 2 | 1 | 1 | 27 | 62 | 37 | 5 | 0 | 0 | 0 | 0 | 0 | 135 |
| 13:30 | 0 | 0 | 0 | 1 | 1 | 7 | 24 | 73 | 45 | 3 | 0 | 0 | 0 | 0 | 0 | 154 |
| 13:45 | 0 | 0 | 1 | 2 | 2 | 7 | 45 | 77 | 36 | 3 | 0 | 0 | 0 | 0 | 0 | 173 |
| | 0 | 0 | 1 | 6 | 5 | 24 | 145 | 283 | 160 | 12 | 0 | 0 | 0 | 0 | 0 | 636 |
| 14:00 | 0 | 0 | 3 | 0 | 3 | 5 | 21 | 88 | 43 | 8 | 0 | 0 | 0 | 0 | 0 | 171 |
| 14:15 | 0 | 0 | 1 | 0 | 0 | 13 | 43 | 61 | 48 | 6 | 0 | 0 | 0 | 0 | 1 | 173 |
| 14:30 | 0 | 0 | 1 | 1 | 2 | 6 | 48 | 77 | 20 | 4 | 1 | 0 | 0 | 0 | 0 | 160 |
| 14:45 | 0 | 0 | 1 | 2 | 1 | 18 | 73 | 66 | 20 | 5 | 0 | 0 | 0 | 0 | 0 | 186 |
| | 0 | 0 | 6 | 3 | 6 | 42 | 185 | 292 | 131 | 23 | 1 | 0 | 0 | 0 | 1 | 690 |
| 15:00 | 0 | 0 | 2 | 3 | 6 | 21 | 42 | 72 | 29 | 3 | 0 | 0 | 0 | 0 | 0 | 178 |
| 15:15 | 0 | 0 | 0 | 1 | 1 | 9 | 50 | 81 | 37 | 3 | 0 | 0 | 0 | 0 | 0 | 182 |
| 15:30 | 0 | 0 | 1 | 0 | 5 | 6 | 34 | 83 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 184 |
| 15:45 | 0 | 0 | 0 | 2 | 6 | 18 | 57 | 59 | 35 | 9 | 0 | 0 | 0 | 0 | 0 | 186 |
| | 0 | 0 | 3 | 6 | 18 | 54 | 183 | 295 | 156 | 15 | 0 | 0 | 0 | 0 | 0 | 730 |
| 16:00 | 0 | 0 | 1 | 4 | 0 | 9 | 43 | 80 | 31 | 5 | 1 | 0 | 0 | 0 | 0 | 174 |
| 16:15 | 0 | 0 | 1 | 1 | 0 | 9 | 59 | 64 | 20 | 3 | 0 | 0 | 0 | 0 | 0 | 157 |
| 16:30 | 0 | 0 | 0 | 1 | 0 | 2 | 34 | 73 | 34 | 4 | 0 | 0 | 0 | 0 | 0 | 148 |
| 16:45 | 0 | 0 | 0 | 1 | 1 | 8 | 22 | 55 | 44 | 7 | 0 | 0 | 0 | 0 | 0 | 138 |
| | 0 | 0 | 2 | 7 | 1 | 28 | 158 | 272 | 129 | 19 | 1 | 0 | 0 | 0 | 0 | 617 |
| 17:00 | 0 | 0 | 1 | 3 | 2 | 2 | 38 | 73 | 27 | 4 | 0 | 0 | 0 | 0 | 0 | 150 |
| 17:15 | 0 | 0 | 1 | 0 | 0 | 6 | 36 | 69 | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 142 |
| 17:30 | 0 | 0 | 0 | 2 | 2 | 15 | 62 | 51 | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 152 |
| 17:45 | 0 | 0 | 0 | 1 | 2 | 15 | 54 | 43 | 19 | 3 | 0 | 0 | 0 | 0 | 0 | 137 |
| | 0 | 0 | 2 | 6 | 6 | 38 | 190 | 236 | 94 | 9 | 0 | 0 | 0 | 0 | 0 | 581 |
| 18:00 | 0 | 0 | 0 | 0 | 3 | 16 | 75 | 31 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 126 |
| 18:15 | 0 | 0 | 0 | 0 | 1 | 16 | 79 | 29 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 127 |
| 18:30 | 0 | 0 | 1 | 1 | 1 | 12 | 56 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 89 |
| 18:45 | 0 | 0 | 0 | 1 | 2 | 13 | 56 | 35 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 108 |
| | 0 | 0 | 1 | 2 | 7 | 57 | 266 | 113 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 450 |
| 19:00 | 0 | 0 | 1 | 0 | 6 | 15 | 49 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 85 |
| 19:15 | 0 | 0 | 0 | 1 | 1 | 23 | 44 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 77 |
| 19:30 | 0 | 0 | 0 | 1 | 13 | 15 | 20 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| 19:45 | 0 | 0 | 0 | 0 | 7 | 34 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 |
| | 0 | 0 | 1 | 2 | 27 | 87 | 124 | 24 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 267 |
| 20:00 | 0 | 0 | 0 | 1 | 11 | 28 | 29 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 |
| 20:15 | 0 | 0 | 0 | 2 | 17 | 24 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 |
| 20:30 | 0 | 0 | 0 | 1 | 8 | 21 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 |
| 20:45 | 0 | 0 | 0 | 0 | 19 | 13 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| | 0 | 0 | 0 | 4 | 55 | 86 | 54 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 205 |
| 21:00 | 0 | 0 | 1 | 5 | 34 | 10 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| 21:15 | 0 | 0 | 2 | 1 | 9 | 20 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| 21:30 | 0 | 0 | 1 | 3 | 8 | 26 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 |
| 21:45 | 0 | 0 | 1 | 1 | 8 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| | 0 | 0 | 5 | 10 | 59 | 72 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 160 |
| 22:00 | 0 | 0 | 1 | 0 | 16 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| 22:15 | 0 | 0 | 0 | 0 | 4 | 10 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 22:30 | 0 | 0 | 0 | 1 | 14 | 31 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 22:45 | 0 | 2 | 0 | 0 | 6 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| | 0 | 2 | 1 | 1 | 40 | 57 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 |
| 23:00 | 0 | 0 | 0 | 1 | 9 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 23:15 | 2 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 23:30 | 1 | 1 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 23:45 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 3 | 4 | 24 | 49 | 236 | 582 | 1446 | 1802 | 833 | 90 | 3 | 0 | 0 | 0 | 1 | 5073 |
| Total | 3 | 4 | 35 | 71 | 264 | 644 | 1859 | 2621 | 1346 | 161 | 7 | 0 | 0 | 0 | 1 | 7016 |

| Stats | |
|---|---|
| 15th Percentile : | 31 MPH |
| 50th Percentile : | 37 MPH |
| 85th Percentile : | 42 MPH |
| 95th Percentile : | 45 MPH |
| Mean Speed(Average) : | 36 MPH |
| 10 MPH Pace Speed : | 31-40 MPH |
| Number in Pace : | 4480 |
| Percent in Pace : | 63.9% |
| Number of Vehicles > 40 MPH : | 1515 |
| Percent of Vehicles > 40 MPH : | 21.6% |

# APPENDIX E
# Opinions of Probable Cost

## OPINION OF PROBABLE COST

### Restriping of Blue Hole Parking Lot

| ITEM NUMBER | DESCRIPTION | UNIT | QTY. | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|
| | | | | | |
| | **SIGNING AND PAVEMENT MARKING PAY ITEMS** | | | | |
| | | | | | |
| 711-11-111 | THERMOPLASTIC, WHITE SOLID, 6 INCHES | NM | 0.091 | $ 3,257.00 | $ 296.40 |
| 711-11-421 | THERMOPLASTIC, BLUE SOLID, 6 INCHES | LF | 54 | $ 0.84 | $ 45.40 |
| 711-11-460 | THERMOPLASTIC, BLUE, MESSAGE | EA | 1 | $ 150.00 | $ 150.00 |
| | | | | | |
| | | **SIGNING & PM TOTAL** | | | **$ 491.80** |
| | | | | | |
| | | **SUBTOTAL** | | | **$ 491.80** |
| | | | | | |
| 101-1 | MOBILIZATION | LS | 10% | - | $ 50.00 |
| 102-1 | MAINTENANCE OF TRAFFIC | LS | 10% | - | $ 50.00 |
| | PE & CEI | LS | 30% | - | $ 147.54 |
| | CONTINGENCY | LS | 25% | - | $ 122.95 |
| | SMALL PROJECT PREMIUM | LS | 15% | - | $ 73.77 |
| | | | | | |
| | | | | | |
| | | **GRAND TOTAL** | | | **$ 936.06** |

Kimley-Horn and Associates, Inc. has no control over the cost of labor, materials, equipment, or services furnished by others, or over methods of determining price, or over competitive bidding or market conditions. Any and all professional opinions as to costs reflected herein, including but not limited to professional opinions as to the costs of construction materials, are made on the basis of professional experience and available data. Kimley-Horn and Associates, Inc. cannot and does not guarantee or warrant that proposals, bids, or actual costs will not vary from the professional opinions of costs shown herein.

Kimley-Horn and Associates, Inc.
5200 NW 33rd Avenue
Suite 109
Fort Lauderdale, Florida 33309
FBPE Number: CA 00000696

Kimley-Horn and Associates, Inc.

T:\011675016 key deer nwr\short and long term needs\[Parking Striping OPC 03 02 11.xlsx]10 26 09

## OPINION OF PROBABLE COST

### Crosswalk at Blue Hole Interpretive Site

| ITEM NUMBER | DESCRIPTION | UNIT | QTY. | UNIT PRICE | TOTAL COST |
|---|---|---|---|---|---|
| | | | | | |
| | **ROADWAY PAY ITEMS** | | | | |
| 522-2 | SIDEWALK, CONCRETE, 6" THICK | SY | 2 | $ 46.00 | $ 92.00 |
| | | | | | |
| | | | | | |
| | | **ROADWAY TOTAL** | | | **$ 92.00** |
| | | | | | |
| | **SIGNING AND PAVEMENT MARKING PAY ITEMS** | | | | |
| | | | | | |
| 700-20-11 | SIGN, SINGLE POST, FURNISH AND INSTALL | AS | 4 | $ 250.94 | $ 1,003.80 |
| 711-11-123 | THERMOPLASTIC, WHITE SOLID, 12 INCHES | LF | 44 | $ 2.04 | $ 89.80 |
| 711-11-125 | THERMOPLASTIC, WHITE SOLID, 24 INCHES | LF | 27 | $ 3.37 | $ 91.00 |
| 711-11-180 | THERMOPLASTIC, WHITE, YIELD LINE | LF | 44 | $ 1.20 | $ 52.80 |
| | | | | | |
| | | **SIGNING & PM TOTAL** | | | **$ 1,237.40** |
| | | | | | |
| | | **SUBTOTAL** | | | **$ 1,329.40** |
| | | | | | |
| 101-1 | MOBILIZATION | LS | 10% | - | $ 133.00 |
| 102-1 | MAINTENANCE OF TRAFFIC | LS | 10% | - | $ 133.00 |
| | PE & CEI | LS | 50% | - | $ 664.70 |
| | CONTINGENCY | LS | 50% | - | $ 664.70 |
| | SMALL PROJECT PREMIUM | LS | 75% | - | $ 997.05 |
| | | | | | |
| | | | | | |
| | | **GRAND TOTAL** | | | **$ 3,921.85** |
| | | **SAY** | | | **$ 4,000** |

Kimley-Horn and Associates, Inc. has no control over the cost of labor, materials, equipment, or services furnished by others, or over methods of determining price, or over competitive bidding or market conditions. Any and all professional opinions as to costs reflected herein, including but not limited to professional opinions as to the costs of construction materials, are made on the basis of professional experience and available data. Kimley-Horn and Associates, Inc. cannot and does not guarantee or warrant that proposals, bids, or actual costs will not vary from the professional opinions of costs shown herein.

Kimley-Horn and Associates, Inc.
5200 NW 33rd Avenue
Suite 109
Fort Lauderdale, Florida 33309
FBPE Number: CA 00000696

Kimley-Horn and Associates, Inc.

K:\FTL_TPTO\011675016 - Deer Key Refuge\OPCs\[Crosswalk Striping.xlsx]10 26 09

Kimley-Horn and Associates, Inc.

OPINION OF PROBABLE COST
Add Paved Shoulder, Resurface Roadway

| Description | Pay Item # | Width (ft) | Thickness (in) | Length (ft) | Unit | Quantity | Unit Price* | Total Cost |
|---|---|---|---|---|---|---|---|---|
| **ROADWAY AND DRAINAGE** | | | | | | | | |
| CLEARING & GRUBBING | 110-1-1 | 12 | | 1 | AC | 0.000275 | $15,350.42 | $4.23 |
| EMBANKMENT | 120-6 | 21 | 12 | 1 | CY | 0.778 | $10.47 | $8.14 |
| | | | | | | | | |
| **MILLING AND RESURFACING (Two 11' lanes)** | | | | | | | | |
| MILLING EXIST ASPH PAVT, 2" AVG DEPTH | 327-70-5 | 22 | 2 | 1 | SY | 2.44 | $1.65 | $4.03 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 22 | 1 | 1 | TN | 0.134 | $94.05 | $12.64 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 22 | 1 | 1 | TN | 0.134 | $118.20 | $15.89 |
| | | | | | | | | |
| **SHOULDER NEW CONSTRUCTION/WIDENING (on each side: 4' Paved Shoulder and 2' Unpaved Shoulder)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 12 | | 1 | SY | 1.33 | $4.30 | $5.73 |
| OPTIONAL BASE,BASE GROUP 08 (Shoulder) | 285-708 | 8.67 | | 1 | SY | 0.963 | $13.49 | $12.99 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 8 | 1 | 1 | TN | 0.049 | $94.05 | $4.60 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 8 | 1 | 1 | TN | 0.049 | $118.20 | $5.78 |
| | | | | | | | | |
| THERMOPLASTIC, STD, WHITE, MESSAGE | 711-11-160 | | | 1 | EA | 0.000758 | $91.04 | $0.07 |
| | | | | | | | | |
| | | | | | | | ***Roadway Sub-Total*** | ***$74.11*** |
| | | | | | | | ***Maintenance of Traffic (15%)*** | ***$11.12*** |
| | | | | | | | ***Mobilization (15%)*** | ***$11.12*** |
| | | | | | | | ***Signing and Marking (5%)*** | ***$3.71*** |
| | | | | | | | ***Contingency (20%)*** | ***$14.82*** |
| | | | | | | | ****Total*** | ***$100.05*** |
| | | | | | | | ****Say*** | ***$105.00*** |

* Unit costs are FDOT Item Average costs from February 2010 to January 2011 whenever available.

*** List of items not included in the Total Estimated Cost includes but is not limited to: Signals, Lighting, Landscaping, Structures, Utilities, R/W costs, Permits, Engineering or CEI fees, factor for inflation.

*** Because the Consultant does not control the cost of labor, materials, equipment or services furnished by others, methods of determining prices, or competitive bidding or market conditions, any opinions rendered as to costs, including but not limited to opinions as to the costs of construction and materials, shall be made on the basis of its experience and represent its judgment as an experienced and qualified professional, familiar with the industry. The Consultant cannot and does not guarantee that proposals, bids or actual costs will not vary from its opinions of cost. If the Client wishes greater assurance as to the amount of any cost, it shall employ an independent cost estimator.

Kimley-Horn and Associates, Inc.

OPINION OF PROBABLE COST
Add Paved Should and Widen Roadway

| Description | Pay Item # | Width (ft) | Thickness (in) | Length (ft) | Unit | Quantity | Unit Price* | Total Cost |
|---|---|---|---|---|---|---|---|---|
| **ROADWAY AND DRAINAGE** | | | | | | | | |
| CLEARING & GRUBBING | 110-1-1 | 16 | | 1 | AC | 0.000367 | $15,350.42 | $5.64 |
| EMBANKMENT | 120-6 | 16 | 12 | 1 | CY | 0.593 | $10.47 | $6.20 |
| | | | | | | | | |
| **MILLING AND RESURFACING (Two 10' lanes)** | | | | | | | | |
| MILLING EXIST ASPH PAVT, 2" AVG DEPTH | 327-70-5 | 20 | 2 | 1 | SY | 2.22 | $1.65 | $3.67 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 20 | 1 | 1 | TN | 0.122 | $94.05 | $11.50 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 20 | 1 | 1 | TN | 0.122 | $118.20 | $14.45 |
| | | | | | | | | |
| **ROADWAY WIDENING (on each side: 2' Pavement)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 0 | | 1 | SY | 0.0 | $4.30 | $0.00 |
| OPTIONAL BASE,BASE GROUP 11 (Roadway Pavement) | 285-711 | 4.67 | | 1 | SY | 0.519 | $22.00 | $11.41 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 4 | 1 | 1 | TN | 0.0244 | $94.05 | $2.30 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 4 | 1 | 1 | TN | 0.0244 | $118.20 | $2.89 |
| | | | | | | | | |
| **SHOULDER NEW CONSTRUCTION/WIDENING (on each side: 4' Paved Shoulder and 2' Unpaved Shoulder)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 12 | | 1 | SY | 1.33 | $4.30 | $5.73 |
| OPTIONAL BASE,BASE GROUP 08 (Shoulder) | 285-708 | 8.67 | | 1 | SY | 0.963 | $13.49 | $12.99 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 8 | 1 | 1 | TN | 0.0489 | $94.05 | $4.60 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 8 | 1 | 1 | TN | 0.0489 | $118.20 | $5.78 |
| | | | | | | | | |
| THERMOPLASTIC, STD, WHITE, MESSAGE | 711-11-160 | | | 1 | EA | 0.000758 | $91.04 | $0.07 |
| | | | | | | | | |
| | | | | | | | ***Roadway Sub-Total*** | ***$87.22*** |
| | | | | | | | ***Maintenance of Traffic (15%)*** | ***$13.08*** |
| | | | | | | | ***Mobilization (15%)*** | ***$13.08*** |
| | | | | | | | ***Signing and Marking (5%)*** | ***$4.36*** |
| | | | | | | | ***Contingency (20%)*** | ***$17.44*** |
| | | | | | | | ******Total*** | ***$117.74*** |
| | | | | | | | ******Say*** | ***$120.00*** |

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*** Because the Consultant does not control the cost of labor, materials, equipment or services furnished by others, methods of determining prices, or competitive bidding or market conditions, any opinions rendered as to costs, including but not limited to opinions as to the costs of construction and materials, shall be made on the basis of its experience and represent its judgment as an experienced and qualified professional, familiar with the industry. The Consultant cannot and does not guarantee that proposals, bids or actual costs will not vary from its opinions of cost. If the Client wishes greater assurance as to the amount of any cost, it shall employ an independent cost estimator.

Kimley-Horn and Associates, Inc.

OPINION OF PROBABLE COST
Extend Shared Use Path and Add Paved Shoulders, Resurface Roadway

| Description | Pay Item # | Width (ft) | Thickness (in) | Length (ft) | Unit | Quantity | Unit Price* | Total Cost |
|---|---|---|---|---|---|---|---|---|
| **ROADWAY AND DRAINAGE** | | | | | | | | |
| CLEARING & GRUBBING | 110-1-1 | 30 | | 1 | AC | 0.000689 | $15,350.42 | $10.57 |
| EMBANKMENT | 120-6 | 21 | 12 | 1 | CY | 0.778 | $10.47 | $8.14 |
| | | | | | | | | |
| **MILLING AND RESURFACING (Two 11' lanes)** | | | | | | | | |
| MILLING EXIST ASPH PAVT, 2" AVG DEPTH | 327-70-5 | 22 | 2 | 1 | SY | 2.44 | $1.65 | $4.03 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 22 | 1 | 1 | TN | 0.134 | $94.05 | $12.64 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 22 | 1 | 1 | TN | 0.134 | $118.20 | $15.89 |
| | | | | | | | | |
| **SHOULDER NEW CONSTRUCTION/WIDENING (on each side: 4' Paved Shoulder and 2' Unpaved Shoulder)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 12 | | 1 | SY | 1.33 | $4.30 | $5.73 |
| OPTIONAL BASE,BASE GROUP 08 (Shoulder) | 285-708 | 8.67 | | 1 | SY | 0.963 | $13.49 | $12.99 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 8 | 1 | 1 | TN | 0.0489 | $94.05 | $4.60 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 8 | 1 | 1 | TN | 0.049 | $118.20 | $5.78 |
| | | | | | | | | |
| **SHARED USE PATH (10' Wide)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 14 | | 1 | SY | 1.56 | $4.30 | $6.69 |
| OPTIONAL BASE GROUP 01 | 285-701 | 10.67 | | 1 | SY | 1.19 | $32.00 | $37.93 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC A (1") | 334-1-11 | 10 | 1 | 1 | TN | 0.0611 | $97.32 | $5.95 |
| | | | | | | | | |
| THERMOPLASTIC, STD, WHITE, MESSAGE | 711-11-160 | | | 1 | EA | 0.000758 | $91.04 | $0.07 |
| | | | | | | | | |
| | | | | | | | ***Roadway Sub-Total*** | ***$131.02*** |
| | | | | | | | ***Maintenance of Traffic (15%)*** | ***$19.65*** |
| | | | | | | | ***Mobilization (15%)*** | ***$19.65*** |
| | | | | | | | ***Signing and Marking (5%)*** | ***$6.55*** |
| | | | | | | | ***Contingency (20%)*** | ***$26.20*** |
| | | | | | | | ******Total*** | ***$176.87*** |
| | | | | | | | ******Say*** | ***$180.00*** |

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Kimley-Horn and Associates, Inc.

OPINION OF PROBABLE COST
Widen Shared Use Path

| Description | Pay Item # | Width (ft) | Thickness (in) | Length (ft) | Unit | Quantity | Unit Price* | Total Cost |
|---|---|---|---|---|---|---|---|---|
| **ROADWAY AND DRAINAGE** | | | | | | | | |
| CLEARING & GRUBBING | 110-1-1 | 8 | | 1 | AC | 0.000184 | $15,350.42 | $2.82 |
| EMBANKMENT | 120-6 | 4 | 6 | 1 | CY | 0.0741 | $10.47 | $0.78 |
| | | | | | | | | |
| **SHARED USE PATH (Widen 8' path to 10' - 2' Widening)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 6 | | 1 | SY | 0.667 | $4.30 | $2.87 |
| OPTIONAL BASE GROUP 01 | 285-701 | 2.67 | | 1 | SY | 0.296 | $32.00 | $9.48 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC A (1") | 334-1-11 | 2 | 1 | 1 | TN | 0.0122 | $97.32 | $1.19 |
| | | | | | | | | |
| THERMOPLASTIC, STD, WHITE, MESSAGE | 711-11-160 | | | 1 | EA | 0.0 | $91.04 | $0.07 |
| | | | | | | | | |
| | | | | | | | ***Roadway Sub-Total*** | ***$17.20*** |
| | | | | | | | ***Maintenance of Traffic (15%)*** | ***$2.58*** |
| | | | | | | | ***Mobilization (15%)*** | ***$2.58*** |
| | | | | | | | ***Signing and Marking (5%)*** | ***$0.86*** |
| | | | | | | | ***Contingency (20%)*** | ***$3.44*** |
| | | | | | | | ******Total*** | ***$23.22*** |
| | | | | | | | ******Say*** | ***$25.00*** |

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Kimley-Horn and Associates, Inc.

OPINION OF PROBABLE COST
Replace Existing Path with Shoulder and Construct Shared Use Path with Separation from Roadway

| Description | Pay Item # | Width (ft) | Thickness (in) | Length (ft) | Unit | Quantity | Unit Price* | Total Cost |
|---|---|---|---|---|---|---|---|---|
| **ROADWAY AND DRAINAGE** | | | | | | | | |
| CLEARING & GRUBBING | 110-1-1 | 20 | | 1 | AC | 0.000459 | $15,350.42 | $7.05 |
| EMBANKMENT | 120-6 | 15 | 12 | 1 | CY | 0.556 | $10.47 | $5.82 |
| | | | | | | | | |
| **MILLING AND RESURFACING (Two 11' lanes)** | | | | | | | | |
| MILLING EXIST ASPH PAVT, 2" AVG DEPTH | 327-70-5 | 22 | 2 | 0 | SY | 0.00 | $1.65 | $0.00 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 22 | 1 | 0 | TN | 0.000 | $94.05 | $0.00 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 22 | 1 | 0 | TN | 0.000 | $118.20 | $0.00 |
| | | | | | | | | |
| **SHOULDER NEW CONSTRUCTION/WIDENING (on each side: 4' Paved Shoulder and 2' Unpaved Shoulder)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 6 | | 1 | SY | 0.67 | $4.30 | $2.87 |
| OPTIONAL BASE,BASE GROUP 08 (Shoulder) | 285-708 | 4.33 | | 1 | SY | 0.481 | $13.49 | $6.50 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC C | 334-1-13 | 4 | 1 | 1 | TN | 0.0244 | $94.05 | $2.30 |
| ASPH CONC FC,TRAFFIC C,FC-9.5,RUBBER | 337-7-32 | 4 | 1 | 1 | TN | 0.024 | $118.20 | $2.89 |
| | | | | | | | | |
| **SHARED USE PATH (10' Wide)** | | | | | | | | |
| TYPE B STABILIZATION | 160-4 | 14 | | 1 | SY | 1.56 | $4.30 | $6.69 |
| OPTIONAL BASE GROUP 01 | 285-701 | 10.67 | | 1 | SY | 1.19 | $32.00 | $37.93 |
| SUPERPAVE ASPHALTIC CONC, TRAFFIC A (1") | 334-1-11 | 10 | 1 | 1 | TN | 0.0611 | $97.32 | $5.95 |
| | | | | | | | | |
| THERMOPLASTIC, STD, WHITE, MESSAGE | 711-11-160 | | | 0 | EA | 0.000000 | $91.04 | $0.00 |
| | | | | | | | | |
| | | | | | | | ***Roadway Sub-Total*** | ***$77.98*** |
| | | | | | | | ***Maintenance of Traffic (20%)*** | ***$15.60*** |
| | | | | | | | ***Mobilization (20%)*** | ***$15.60*** |
| | | | | | | | ***Signing and Marking (5%)*** | ***$3.90*** |
| | | | | | | | ***Contingency (20%)*** | ***$15.60*** |
| | | | | | | | ****Total*** | ***$113.07*** |
| | | | | | | | ****Say*** | ***$115.00*** |

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