

PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS

AGENDA ITEM SUMMARY

Meeting Date: June 8, 2010 ☐ Consent ☒ Regular
 ☐ Workshop ☐ Public Hearing

Department:

Submitted By: Engineering & Public Works

Submitted For: Traffic Division

I. EXECUTIVE BRIEF

Motion and Title: Staff recommends motion to:

- A) approve an alternative design standard for lighting thoroughfare roadways which are County maintained and rural in nature as contained in the attached report; and
- B) determine that Seminole Pratt Whitney Road (Southern Boulevard – Northlake Boulevard) and Northlake Boulevard (Seminole Pratt Whitney Road – Grapeview Boulevard) are rural and eligible for the alternative lighting criteria, when and if, corridor lighting is approved that is associated with one or more widening projects on each road; and
- C) direct staff to proceed with the design and installation of corridor lighting at the alternative/reduced standard for Seminole Pratt Whitney Road (Southern Boulevard to Sycamore Drive), including removal/modification of existing lighting along the segment.

SUMMARY: A) Approval of this design standard will allow some thoroughfare roadways, primarily rural, to be considered for a reduced illumination level. Staff believes this standard should be considered for roadways primarily rural in nature, and predominately residential. Major urban facilities or designated State roads would not be considered for this standard. The decision to implement this standard in lieu of the current major arterial standard would be made by the Board of County Commissioners (Board) when it approves the initial project design phase. B) Designation of these two roads will allow consistent application of lighting when installed after the widening of the two roads. C) The Indian Trail Improvement District (ITID) last week voted 3-2 to recommend the installation of corridor lighting at the alternative/reduced standard along the first segment (Seminole Pratt Whitney Road (Southern Boulevard – Sycamore Drive)), with the dissenting votes supporting installing lights only at each of the intersecting streets. Countywide (MRE)

Background and Justification: All Palm Beach County (County) thoroughfare roadways and street lighting projects have been designed and built to Florida Department of Transportation (FDOT) standards. As the roadways in the western corridor of the County are widened to median divided roadways, they meet the County policy of being considered for lighting. Some thoroughfare roadways could be considered primarily rural and a reduced illumination level may be considered appropriate. (continued on Page 3)

Attachments:

1. Seminole Pratt Whitney Street Lighting Report

Recommended By _____

Division Director

Date

Approved By: _____

County Engineer

Date

II. FISCAL IMPACT ANALYSIS

A. Five Year Summary of Fiscal Impact:

Fiscal Years	2010	2011	2012	2013	2014
Capital Expenditures	\$ -0-	-0-	-0-	-0-	-0-
Operating Costs	-0-	-0-	-0-	-0-	-0-
External Revenues	-0-	-0-	-0-	-0-	-0-
Program Income (County)	-0-	-0-	-0-	-0-	-0-
In-Kind Match (County)	-0-	-0-	-0-	-0-	-0-
NET FISCAL IMPACT	\$ -0-	-0-	-0-	-0-	-0-

ADDITIONAL FTE

POSITIONS (Cumulative)

Is Item Included in Current Budget?

Yes

No

Budget Acct No.: Fund Dept. Unit Object
Program

B. Recommended Sources of Funds/Summary of Fiscal Impact:

* Fiscal impact is indeterminable at this time.

C. Departmental Fiscal Review:

atwillhite

III. REVIEW COMMENTS

A. OFMB Fiscal and/or Contract Dev. and Control Comments:

[Signature] 6/3/10
OFMB
6-2-10
6/2/10

[Signature] 6/4/10
Contract Dev. and Control
E. [Signature] 6/4/10

B. Approved as to Form and Legal Sufficiency:

[Signature] 6/7/10
Assistant County Attorney

C. Other Department Review:

Department Director

This summary is not to be used as a basis for payment.

Background and Justification (continued): A small section of street lighting along Seminole Pratt Whitney Road was recently installed meeting typical thoroughfare lighting parameters. Some residents, along with some supervisors of the ITID, raised concerns that the level of lighting was too bright for the rural community. This prompted the County and our lighting design consultant to research and report design alternatives for a non-urban corridor. Staff now recommends that reduced illumination levels be considered for rural areas. The new proposed alternative is consistent with other lighting design sources from FDOT and the American Association of State Highway and Transportation Officials. The alternative illumination standards are in the attached 11 page report.

County staff requested ITID provide a recommendation regarding the proposed street lighting to the Board. Staff made one presentation last month and at the end of the discussion, ITID supervisors voted to contact residents immediately adjacent to the road. ITID sent out 65 letters informing the property owners that they would be discussing lighting options at the June 3rd ITID meeting. At the meeting, two residents that received the letter spoke out in opposition to the corridor lighting and expressed support for only lighting the intersections, one supported the corridor lighting concept and three other Acreage residents not living on Seminole Pratt Whitney Road opposed the corridor concept and either supported keeping it without lighting or lighting only the intersections.

At the June 3rd meeting, three potential options were addressed – 1- provide no lighting, 2) provide corridor lighting at the rural lighting standard, or 3) light only the intersections. However, County staff also expressed concern that the intersection lighting concept, on a divided four lane road, did not meet any recognized County adopted standard.

After input from residents and substantial discussion, the ITID Board voted to support the corridor lighting concept using the proposed rural lighting standard. They specified they also supported keeping the mounting height at 30' and using "cut-off" fixtures in place of the typical lenses that are visible below the fixture. Staff supports those requests and they will be made part of the final corridor design if the corridor concept is approved.

**Street Lighting
for
Seminole Pratt Whitney Road
from Southern Blvd. to South of Okeechobee Blvd.**

Palm Beach County
May 5, 2010



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INTRODUCTION

The project is Seminole Pratt Whitney Road between Southern Blvd. and Whitton Drive (3 blocks south of Okeechobee Blvd.). The County is constructing a four lane divided roadway. The road includes two distinct sections:

1. The first section is the southern most 0.6 miles of the project between Southern Blvd. and Harlena Dr. This section has joint use poles on the east side of the street at an average spacing of 113'. The west side of the street will have a new pole line for street lights only.
2. The second section is the northern most 0.7 miles of the project between Harlena Dr. and Whitton Dr. This section has joint use poles on the west side of the street at an average spacing of 118'. The east side of the street will have a new pole line for street lights only.

The roadway plans included street lighting plans to conform to the County's standard to light thoroughfare roadways in accordance with the Florida Department of Transportation standards for major arterials. This analysis is to determine if another design criteria could be used that would be appropriate and provide a lower lighting level that is more compatible with the rural nature of this corridor.



LIGHTING STANDARDS

For Palm Beach County Thoroughfare Roadways, such as Seminole Pratt Whitney Road, the County policy is to use the Florida Department of Transportation (FDOT) standards for "Major Arterials". However the FDOT has another classification for "All Other Roadways" which may be considered reasonable for this particular roadway since it is located in a rural, predominately residential area that is unlike the majority of Palm Beach County Thoroughfare roadways. The FDOT criteria are as follows:

Design Criteria	Average Initial Illuminance	Maximum to Minimum Ratio	Average to Minimum Ratio
FDOT – Major Arterials	1.5	10:1	4:1
FDOT – All Other Roadways	1.0	10:1	4:1

The data above is from the FDOT's Plans Preparation Manual (PPM) which establishes criteria for state owned facilities. Additionally, the FDOT has written the *Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways* (commonly known as the Green Book) to provide uniform standards for the public streets throughout the State of Florida that are off the state highway and federal aid systems. The Green Book specifies that the American Association of State Highway and Transportation Officials (AASHTO) guidelines from the *AASHTO-Roadway Lighting Design Guide* shall be used to determine the illumination levels for highway safety. Note that AASHTO establishes a minimum standard. Therefore, using the Green Book/AASHTO standards would be using a lesser standard than the FDOT-PPM standard. The Green Book/AASHTO standards are described below, and offers more detail than the FDOT "Other Roadways" category.

AASHTO publishes an Informational Guide for Roadway Lighting which states that roadway lighting system improves safety, traffic movement, pedestrian movement, deters crime, aids law enforcement, contributes to pride in a community, and completes a roadway facility. The AASHTO standards consider the following factors:

- Roadway classification - Seminole Pratt Whitney Road is considered a Major roadway which is described as follows: "The part of the roadway system that serves as the principal network for through traffic flow. The routes connect areas of principal traffic generation and important rural highways entering the city."
- Land use along the roadway - This section of Seminole Pratt Whitney Road is bounded predominately by residences.
- Reflectivity of the pavement surface - The proposed asphalt roadway (R3) category should be used for this project.

AASHTO recommends that major roadways with typical asphalt pavement along residential land uses be lit to the following minimum specifications:

Design Criteria	Average Initial Illuminance	Maximum to Minimum Ratio	Average to Minimum Ratio
Greenbook/AASHTO for Major Roadways	0.8	10:1	3:1

Therefore, combining the two, the following design criteria are recommended for consideration on Seminole Pratt Whitney Road:

Design Criteria	Average Initial Illuminance	Maximum to Minimum Ratio	Average to Minimum Ratio
Recommended	0.8 to 1.0	10:1	3:1 if 0.8 fc, 4:1 if 1.0 fc

The uniformity ratios are important to help ensure that a consistent and uniform distribution of light occurs over the roadway so that there are no excessively bright or dark spots on the facility that would impede the vision of the motorists or distract motorists. Uniformity ratios typically consider the maximum to minimum ratio and the average to minimum ratio to ensure that none of the three values (maximum, average or minimum) are excessive. Higher mounting of the luminare is often needed to achieve a uniform lighting distribution.



LIGHT TYPE

Cobra head lamps can be either cutoff, with the glass flush with the fixture or standard, with the glass bulb projecting from the fixture. Due to the residential nature of the corridor, the cutoff fixture is desired to reduce glare to both the drivers and the residents on the adjoining properties. Cut off fixtures also direct the light downward and reduce the night glow effect. FPL will install and maintain the lighting system; therefore, FPL lights will be used. The FDOT has established guidelines for minimum mounting heights (distance between the roadway and the lamp) as shown below:

Watts	Lumens	Minimum Mounting Height
100	9,500	25 feet
150	16,000	25 feet
200	22,000	30 feet
400	50,000	40 feet

These minimum mounting heights are used to help reduce the glare from a bright light source by moving the brightest sources farther above the roadway. A brighter light must be installed at a higher level above the roadway to avoid bright spots that would cause unacceptable uniformity ratios.

The following cutoff lamps with a medium type III distribution are available from FPL for street lighting: curve number 35-177292 for the 100 and 150 watt lamps and curve number 35-451006 for the 200 and 400 watt lamps.



ANALYSIS

Due to the width of the roadway and the proposed median, it would be difficult to light the entire roadway from one side. Therefore, in order to illuminate both sides of the street, we will treat each side of the street as a stand alone lighting analysis. This will allow the lights to be placed lower and to have smaller wattage lamps than attempting to light the entire roadway from just one side.

The General Electric Aladin + Plus program, Roadway routine, version 2005.1.3 was used. The program optimizes the layout for the minimum illuminance, and maximum uniformity ratios. To achieve an even distribution of light without extremely bright or dark spots, often, the illuminance level must be exceeded to achieve the required uniformity ratios.



SECTION 1 – SOUTHERN TO HARLENA – EAST SIDE

This is the southern most 0.6 miles of the project between Southern Blvd. and Harlena Dr. This section has joint use poles on the east side of the street at an average spacing of 113'. While evaluating the 31 street lights in this section, an average 1.82 fc is generated by the Aladin analysis with acceptable uniformity ratios. The joint use poles can accommodate a lamp at a 30' mounting height; therefore, 200 watt lamps (22,000 initial lumens) are the maximum wattage that can be used.

The typical section for this portion of the roadway has the following features:

- 2-11' wide lanes
- 5' wide paved shoulder
- 11' wide grass strip
- 10' curb and sidewalk

Therefore, the following pole characteristics will be applied:

- Pole setback – 26'
- Bracket arm length – 12'

Since we must place the lights at the pole spacing of the joint use poles, we are not able to use the optimum spacing and placing a lamp on every other pole results in unacceptable uniformity ratios. Therefore, it is recommended to install a light on each joint use pole. The following conditions were considered:

Condition	Lamp	Spacing	Average Initial Illuminance (fc)	Maximum to Minimum Ratio	Average to Minimum Ratio	Number of Lights
Lamp on every pole	100 w	113'	0.61 ✗	4.0:1 ✓	1.6:1 ✓	28
Lamp on every pole	150 w	113'	1.03 ✓	4.0:1 ✓	1.6:1 ✓	28
Lamp on every other pole	200 w	226'	0.92 ✓	30.5:1 ✗	9.5:1 ✗	14

To reduce the light level as requested by the community, it is recommended that a lower wattage bulb be installed on the poles. That will require that the lamp and fixture be changed, but the poles and bracket arms would remain.



SECTION 2 – SOUTHERN TO HARLENA – WEST SIDE

This is the southern most 0.6 miles of the project between Southern Blvd. and Harlena Dr. The west side of the street will have a new pole line for street lights only; therefore, the spacing can be set as close to the optimum spacing as practical recognizing that the side streets will prevent spacing exactly at the optimum intervals. Since a new pole line is proposed, a 40' mounting height can be achieved and the 400 watt lamp (50,000 initial lumens) could be used. However, since the goal is to reduce the light levels somewhat, a lower wattage lamp may be used.

The typical section for this portion of the roadway has the following features:

- 2-11' wide lanes
- 5' wide paved shoulder
- 8' curb and sidewalk

Therefore, the following pole characteristics will be applied:

- Pole setback – 13'
- Bracket arm length – 12'

Condition	Lamp	Pole Spacing	Average Initial Illuminance (fc)	Maximum to Minimum Ratio	Average to Minimum Ratio	Approx. Number of Poles
30' Mounting	100 w	130'	0.80 ✓	9.1:1 ✓	2.8:1 ✓	26
30' Mounting	150 w	134'	1.31 ✓	9.9:1 ✓	3.0:1 ✓	25
40' Mounting	150 w	169'	0.81 ✓	8.9:1 ✓	3.0:1 ✓	20
30' Mounting	200 w	184'	1.11 ✓	9.8:1 ✓	3.0:1 ✓	19
40' Mounting	200 w	180'	1.04 ✓	9.9:1 ✓	3.1:1 ✓	19

The existing design is for 15 poles with 400 watt fixtures at an average spacing of 224'. It is recommended that the design be revised slightly to reduce the spacing so that a lower wattage lamp can be used without adding many additional poles. It will be necessary to have less than optimum spacing in some areas to avoid conflicts with side streets and canals.



SECTION 3 – HARLENA TO WHITTON – EAST SIDE

This is the northern most 0.7 miles of the project between Harlena Dr. and Whitton Dr. The east side of the street will have a new pole line for street lights only; therefore, the spacing can be set as close to the optimum spacing as practical recognizing that the side streets will prevent spacing exactly at the optimum intervals. Since a new pole line is proposed, a 40' mounting height can be achieved and the 400 watt lamp (50,000 initial lumens) could be used. However, since the goal is to reduce the light levels somewhat, a lower wattage lamp may be used.

The typical section for this portion of the roadway has the following features:

- 2-11' wide lanes
- 5' wide paved shoulder
- 11' wide grass strip
- 10' curb and sidewalk

Therefore, the following pole characteristics will be applied:

- Pole setback – 26'
- Bracket arm length – 12'

Condition	Lamp	Spacing	Average Initial Illuminance (fc)	Maximum to Minimum Ratio	Average to Minimum Ratio	Approx. Number of Poles
30' Mounting	100 w	85'	0.80 ✓	3.1:1 ✓	1.5:1 ✓	46
30' Mounting	150 w	145'	0.80 ✓	6.5:1 ✓	2.2:1 ✓	27
40' Mounting	150 w	132'	0.80 ✓	4.1:1 ✓	1.8:1 ✓	30
30' Mounting	200 w	196'	1.06 ✓	10.0:1 ✓	6.6:1 ✓	20
40' Mounting, Current Spacing	200 w	217'	0.84 ✓	5.4:1 ✓	2.4:1 ✓	18

The existing design is for 18 poles with 400 watt fixtures at an average spacing of 217'. It is recommended that a lower wattage watt bulb be used without adding many additional poles. It will be necessary to have less than optimum spacing in some areas to avoid conflicts with side streets and canals.



SECTION 4 – HARLENA TO WHITTON – WEST SIDE

This is the northern most 0.7 miles of the project between Harlena Dr. and Whitton Dr. This section has joint use poles on the west side of the street at an average spacing of 118'. The east side of the street will have a new pole line for street lights only.

The typical section for this portion of the roadway has the following features:

- 2-11' wide lanes
- 5' wide paved shoulder
- 11' wide grass strip
- 10' curb and sidewalk

Therefore, the following pole characteristics will be applied:

- Pole setback – 26'
- Bracket arm length – 12'

Since we must place the lights at the pole spacing of the joint use poles, we are not able to use the optimum spacing and placing a lamp on every other pole results in unacceptable uniformity ratios. Therefore, it is recommended to install a light on each joint use pole. The following conditions were considered:

Condition	Lamp	Spacing	Average Initial Illuminance (fc)	Maximum to Minimum Ratio	Average to Minimum Ratio	Number of Lights
Lamp on every pole	100 w	118'	0.59 ✗	4.3:1 ✓	1.7:1 ✓	33
Lamp on every pole	150 w	118'	0.99 ✓	4.3:1 ✓	1.7:1 ✓	33
Lamp on every other pole	200 w	236'	0.88 ✓	43.3:1 ✗	12.9:1 ✗	18

To reduce the light level as requested by the community, it is recommended that a lower wattage bulb be installed.

RECOMMENDATIONS

Area	Mounting Height	Lamp	Spacing	Average Initial Illuminance	Number of Light Poles
Section 1 – Southern To Harlena – East Side <i>Lamp On Every FPL Pole</i>	30' on joint use pole	150 w	113'	1.03 fc	28
Section 2 – Southern To Harlena – West Side <i>Add 4 Poles</i>	40' on street light poles	200 w	180'	1.04 fc	19
Section 3 – Harlena To Whitton – East Side <i>Add 0 Poles</i>	40' on street light poles	200 w	217'	0.84 fc	18
Section 4 – Harlena To Whitton – West Side <i>Lamp On Every FPL Pole</i>	30' on joint use pole	150 w	118'	0.99 fc	33

Overall, this recommendation is estimated to reduce the level of illumination by an average of one-third from what was originally proposed for the entire project limits. According to the County Traffic Division, the monthly operation and maintenance cost would be approximately 20% less due to the lower illumination levels. There will be a \$22,713 removal fee associated with the existing 31 lights that have already been installed. We estimate that we will recoup that expense in less than five years given the annual savings by utilizing the lower wattage lamps.

Another option for consideration is not to illuminate the corridor with a uniform lighting system, but rather to install only isolated intersection lights. There are 19 unsignalized intersections within this study section. We would try to utilize the existing poles where possible, therefore eliminating some of the additional 37 poles proposed in the uniform lighting system proposed in this report.