



**CITY OF FORT LAUDERDALE
City Commission Agenda Memo
CONFERENCE MEETING**

#15-0180

2-17-15
BUS-1
REVISED
CAM
+
EXHIBITS

TO: Honorable Mayor & Members of the
Fort Lauderdale City Commission

FROM: Lee R. Feldman, ICMA-CM, City Manager *L.R. Feldman*

DATE: February 17, 2015

TITLE: REVISED BUS-1 - Bridge Master Plan Presentation

The purpose of this presentation is to provide an update on the Bridge Master Plan, following the completion of 46 bridge assessments performed by TranSystems Corporation (TranSystems). It will outline the costs associated with repairing and replacing bridges Citywide, and to inform the Commission of staff's intention to adhere to the Bridge Master Plan.

In an effort to develop a Comprehensive Bridge Master Plan and to identify funding needs, on July 1, 2014, the City Commission approved the finalized agreement between the City and TranSystems, at which time it began the inspection, evaluation, and documentation of the 46 roadway bridges identified for the study. Five City owned bridges were not included in this study as they are currently being replaced by the Florida Department of Transportation (FDOT).

On November 17, 2014, TranSystems submitted a comprehensive bridge assessment plan, outlining the conditions of the 46 bridges and recommending a repair and replacement schedule. These recommendations are based on bridge deficiencies which are broken into six categories:

1. Concrete Pile Deterioration
2. Deteriorated Beam Concrete Superstructure
3. Concrete Delamination with Exposed Reinforcement
4. Concrete Delamination with Non-Exposed Reinforcement
5. Expansion Joint Deterioration
6. Non-Compliance Functionally Obsolete

Based on the findings, TranSystems has provided both short term and long term recommendations.

Short term recommendations are meant to address minor structural issues this year which, if unaddressed, will result in additional structural damage to the bridge. Short

term repairs have been recommended for seven bridges at a total budget of ~~\$178,500~~ \$86,000, as presented in Exhibit 1.

Long term recommendations, to be completed over the course of the next 20 years, in five year increments, fall into two categories:

1. Repair: Significant structural repairs intended to extend the service life of the bridge over 20 years
2. Replacement: If necessary repairs cannot extend the service life of the bridge over 20 years, the bridge will be demolished and replaced

Long term repairs have been recommended for 25 bridges and replacement has been recommended for 17 bridges at a total cost of \$35,136,308.

Considering the short and long term recommendations for the initial five years of the master plan, ~~4319~~ bridges have been identified for repair and two for replacement at a total cost of ~~\$4,245,100~~ \$4,152,600. Currently, ~~\$6,480,454~~ \$5,747,741 has been included in the Community Investment Plan (CIP) for bridge repair and replacement for Fiscal Years 2015-2019. As such, staff intends to move forward following the schedule outlined by TranSystems.

Strategic Connection

This item is a Press Play Fort Lauderdale Strategic Plan 2018 initiative, included within the Infrastructure Cylinder of Excellence, specially:

- Goal 2: Be a sustainable and resilient community.
- Objective 1: Proactively maintain our water, waste water, road, bridge and facilities infrastructure.

This item advances the *Fast Forward Fort Lauderdale 2035 Vision Plan: We are Ready*

Attachments

Exhibit 1 – Presentation

Exhibit 2 – Bridge Replacement Master Plan 0-5 Year Recommendations

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Department Director: Hardeep Anand, P.E., Public Works

Revised 2/16, 2015

City of Fort Lauderdale - Bridge Master Plan



CAM 15-0180

Exhibit 1

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Susanne M. Torriente

Assistant City Manager

Hardeep Anand, P.E.

Public Works Director

November 17, 2014

Rev. 2/16/15

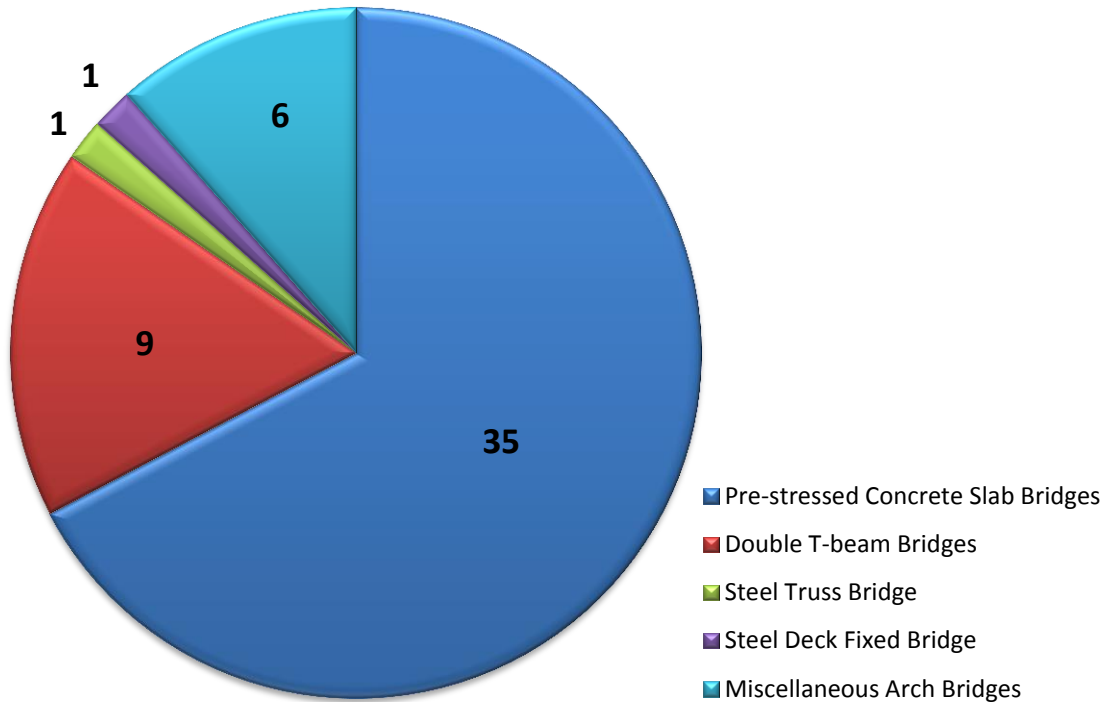


Agenda

- **Background, Current Approach & Challenges**
- **Bridge Assessment Results**
- **Proposed Bridge Management Options**
- **Q&A**

Background: Existing Bridge Inventory and Types

Currently the City owns and maintains 51 bridges
with the **Average age of 50 years-old**



Bridge Management Current Process



- Inspection of superstructure (decks, girders, barriers, etc.) bi-annually by FDOT.
- Inspection of substructure (Frames, piers, piles and bulkheads) bi-annually by FDOT.
- Based on visual observations by City Staff in conjunction with deficiencies indicated in the FDOT Bridge Inspection Report, bridges are recommended to be repaired or replaced on an annual basis.

Bridge Management - Current Repair Process

Repairs

- Concrete Repairs with approved FDOT materials
- Pile Concrete Jacketing (to improve strength and integrity of the piles)
- Corrosion Inhibitors
- Use of Fiber Reinforced Polymers (Wrap) for bridge rehab and extension of service life

Mechanism

- In-House Design
 - Annual contract

Funding

- General Capital Operating Fund
- Special Obligation Construction Bond 2011 Fund
- Special Obligation Construction Bond 2008B Fund

Bridge Management Repair History – 2010-2013

Rev. Years 2/16/15

All repairs made through the annual contract

FY	2010	2011	2012	2013	Total
Bridges Repaired	6	4	7	0	17
Cost	\$180,000	\$120,000	\$210,000	\$0	\$510,000

No funding was available in 2013

2014 Projects Under Construction Continuing into 2015

NE 55 th Street	\$147,112 rolled over for 2015 expenditures
Gordon Road	\$250,000 rolled over for 2015 expenditures
Laguna Terrace	\$40,000 rolled over for 2015 expenditures
SE 13 th Street	\$40,000 rolled over for 2015 expenditures

Bridge Management Current Replacement Process

Replacement

- Based on FDOT bridge inspection report

Mechanism

- CCNA for bridge design
- Invitation to Bid for construction
- CEI Consultant

Funding

- FDOT Funding (LAP)
- General Capital Operating Fund
- Special Obligation Construction Bond 2011 Fund
- Water & Sewer Fund

Bridge Management Replacement History – Past 5-Years

FY	2010	2011	2012	2013	Total
Bridges Replaced	0	0	1	2	3
Cost	\$0	\$0	\$1,544,692	\$4,314,078	\$5,858,770

2014 Projects Under Construction Continuing into 2015

Nurmi Drive – FDOT funded 100%
 Isle of Palm – FDOT funded 100%
 Isle of Venice – FDOT funded 100%
 Fiesta Way – FDOT funded 100%
 Sunrise Key – FDOT funded 100%

Current Challenges

- No comprehensive bridge management program in place.
- Insufficient annual funding allocated to address the needs of the bridges.
- Deferred maintenance increased the rate of deterioration of the bridges due to the corrosive environment.
- Due to a combination of age and deterioration, Limited load capacity is posted on 23 bridges.
 - Over the years, the load, bridges are required to carry has increased. As such, newer bridges are designed with a higher load capacity than those designed decades ago.



FAST FORWARD FORT LAUDERDALE 2035

We Are Connected

We move seamlessly and easily through a safe transportation system where the pedestrian is first.



PRESS PLAY FORT LAUDERDALE - STRATEGIC PLAN 2018

Infrastructure Goal 2: Be a sustainable and resilient community.

Objective 1: Proactively maintain our water, wastewater, road and bridge infrastructure.

Strategic Initiative 4: Examine funding options to maintain and update our aging bridge infrastructure, considering sea level rise , pedestrian friendliness, and aesthetics.

PRIOR CITY COMMISSION APPROVAL

March 18, 2014 - Motion to award a contract to TranSystems Corporation Consultants

Bridge Master Plan

Scope Of Work - Transystems Corp.

1. Inspection/Data Collection

- Visual inspection of damaged bridge elements
- Underwater inspection (scouring, undermining, stability, etc.)
- Measurement of the area and length of damage
- Photographic recording of damages
- Review of FDOT District IV reports for City of Fort Lauderdale bridges

2. Evaluation/Data Analysis

3. Reporting

- Report the results of the investigation and recommend repair schedule and budget
- Develop Master Plan
- Bridge Master Plan received on August 6th 2014

46 City Bridges Inspected by TranSystems

<u>Bridge No.</u>	<u>Feature Carried</u>	<u>Feature Intersected</u>	<u>Bridge No.</u>	<u>Feature Carried</u>	<u>Feature Intersected</u>
865732	Coconut Isle Drive	Grande Canal	865740	NE 23rd Avenue	Rio Aragon Canal
865775	South Ocean Drive	Marion River	865742	NE 23rd Avenue	Rio Giraldo Canal
865709	NE 55th Street	Landings Inlet West	865741	NE 23rd Avenue	Rio Toledo Canal
865710	Bayview Drive	Landings Inlet South	865782	SE 25th Avenue	Rio Idlewild Canal
865733	Hendricks Isle Drive	Las Olas Canal	865712	Castle Harbor Isle	Toulon Waterway
865731	South Gordon Road	Las Olas Canal	865713	NE 41st Street	Toulon Waterway
865745	Solar Plaza Drive	Rio Canal	865772	West Lake Drive	Diane River
865746	Solar Plaza Drive	Rio Placid Canal	865773	West Lake Drive	Lucille River
865720	Old Dixie Highway	S. Fork Middle River	865774	West Lake Drive	Mercedes River
865707	NE 59th Avenue	Pelican Canal	865770	Laguna Terrace	Diane River
865777	NE 18th Avenue	Cypress Creek Canal C-14	865760	SE 7th Street	Rio Cordova
865727	NE 1st Street	Stranahan Lake	865761	SE 8th Street	Rio Cordova
865765	SE 13th Street	Cerro Gordo River	865762	SE 9th Street	Rio Cordova
865771	West Lake Drive	Estelle River	865763	SE 10th Street	Rio Cordova
865708	Bayview Drive	Longboat Inlet	865764	SE 11th Street	Rio Cordova
865748	SW 11th Avenue	N. Fork New River	865776	SE 2nd Court	Himmarshee Canal
865752	SW 7th Street	Tarpon River	865781	Access Road	Mills Pond Canal
865729	East Las Olas Boulevard	Himmarshee Canal	865743	NE 26th Terrace	Rio De Sota
865728	SE 8th Avenue	Himmarshee Canal	865759	SE 9th Street	Tarpon River
865721	NE 15th Avenue	S. Fork Middle River	865758	SE 9th Avenue	Tarpon River
864025	Riverland Road	Branch South N New River	865783	Harborage Isle Drive	New River Sound
865738	SE 23rd Avenue	Rio Del Mar	865789	SE 15th Avenue	Marcheta River
865739	SE 23rd Avenue	Rio Castilla Canal	865790	SE 15th Avenue	Carlotta River

The five bridges not inspected by the consultant are under construction by FDOT

Typical Bridge Deficiencies: Concrete Pile Deterioration



Typical Bridge Deficiencies: Concrete Beam Deterioration



Typical Bridge Deficiencies: Concrete Delamination with Exposed Reinforcement



Typical Bridge Deficiencies: Concrete Delamination with Non-Exposed Reinforcement



Typical Bridge Deficiencies: Expansion Joint Deterioration



Typical Bridge Deficiencies: “Functionally Obsolete” Per FDOT



Deficiency Category Statistics

• Concrete pile deterioration	10%
• Deteriorated beam concrete superstructure	10%
• Concrete delamination with exposed reinforcement	28%
• Concrete delamination with non-exposed reinforcement	37%
• Expansion joint deterioration	5%
• Non-compliance functionally obsolete	10%

Short Term Recommendations

- Continue to address minor structural problems which, if unaddressed, will result in additional and larger structural damage to the bridge and require additional capital improvements

Proposed Short Term Repair Cost

No. of Bridges	Construction Cost	Administration Cost	Total
13	\$76,000	\$10,000	\$86,000

Rev. Chart 2/16/15

Repairs include concrete patching, steel corrosion protection, and aluminum railings.

Long Term Recommendations

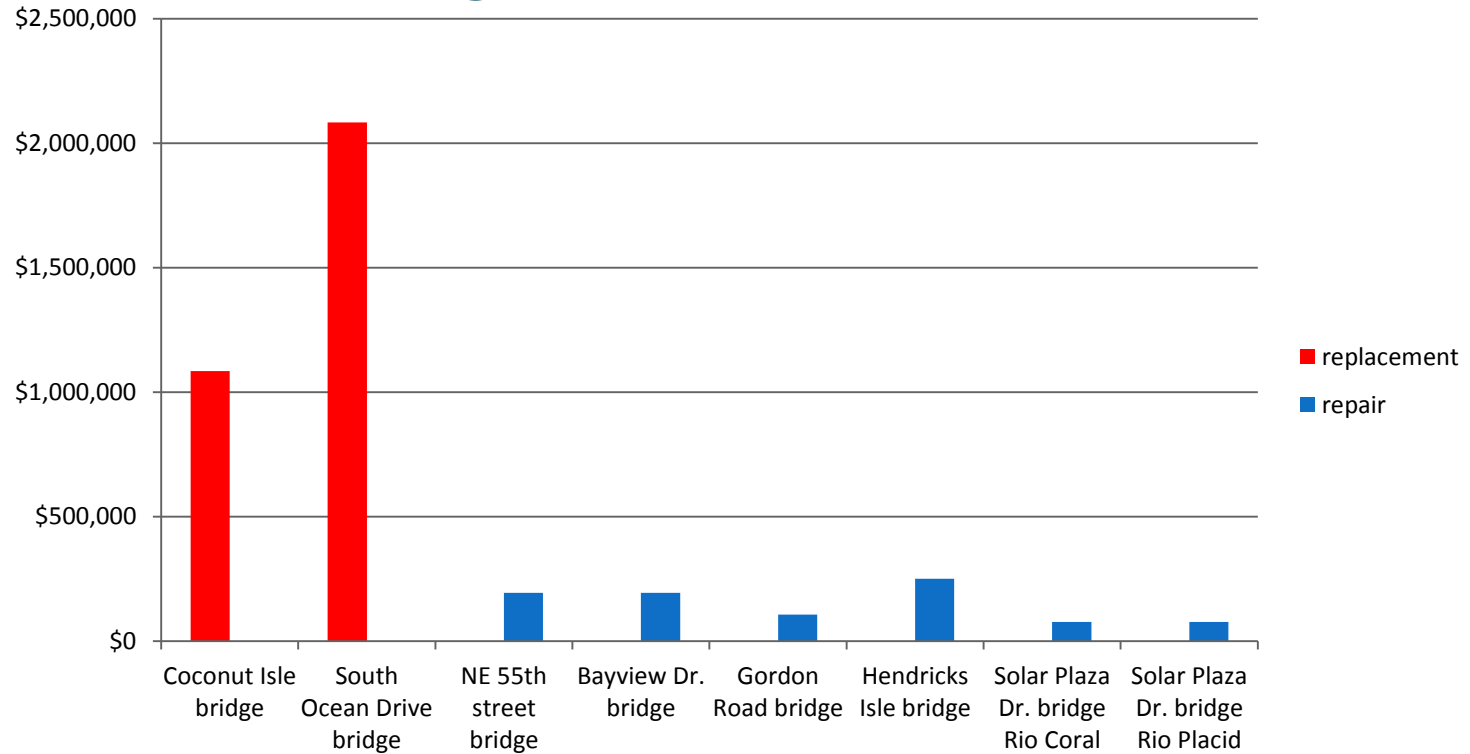
- Fall under 2 categories and are spread over a 20 year period:
 - Repair (Significant structural repair to extend the service life over 20 years)
 - Replacement
- 20 Year plan was based on service life, structural conditions, and location.

Long-term Recommended Activities over 20 years

Repair Type	0 - 5 years	6 - 10 years	11 - 15 years	16 - 20 years	Total
Repair	6	3	14	2	25
Replacement	2	0	4	11	17
Cost	\$4,066,600	\$432,050	\$9,253,040	\$21,384,668	\$35,136,308

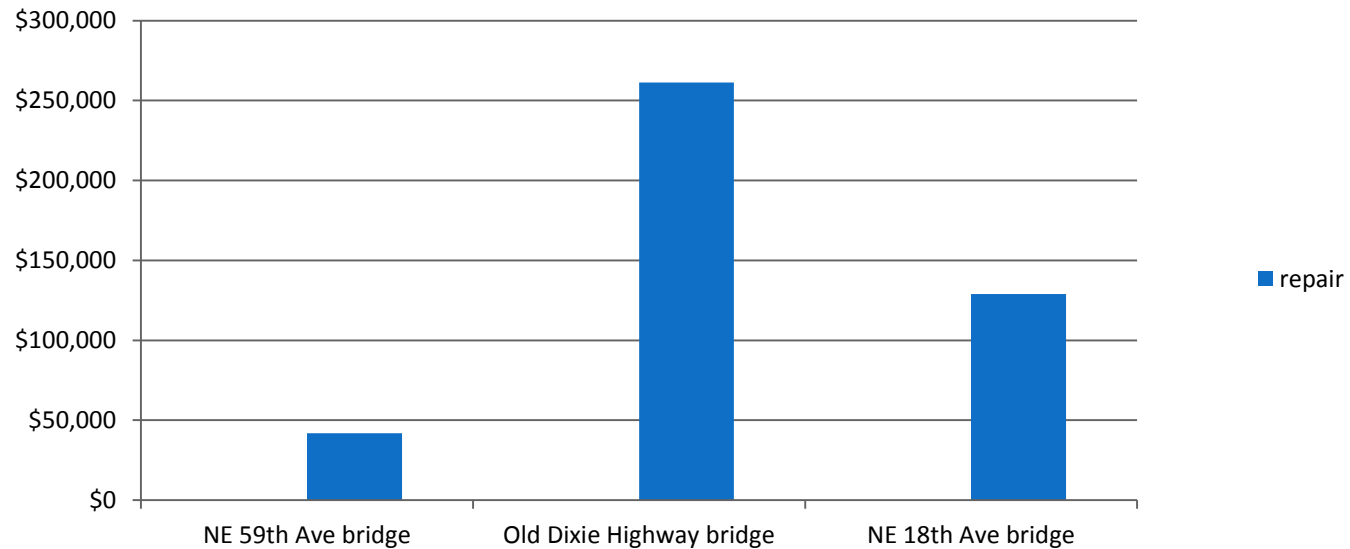
Twelve (12) bridges out of 51 do not require repair/replacement during this 20 year

Long-term 0-5 Year Period



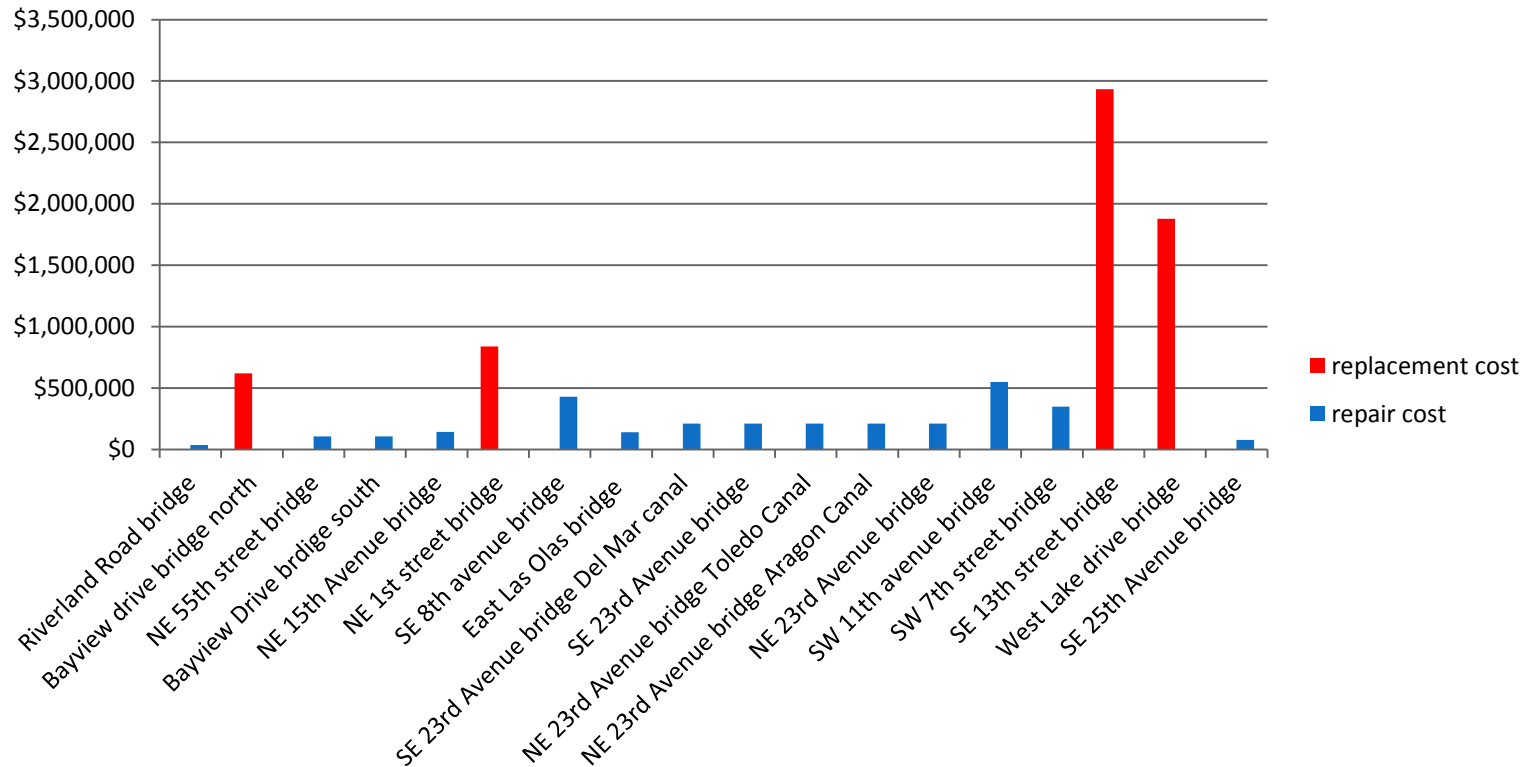
Total repair and replacement costs: \$4,066,600

Long-term 6-10 Year Period



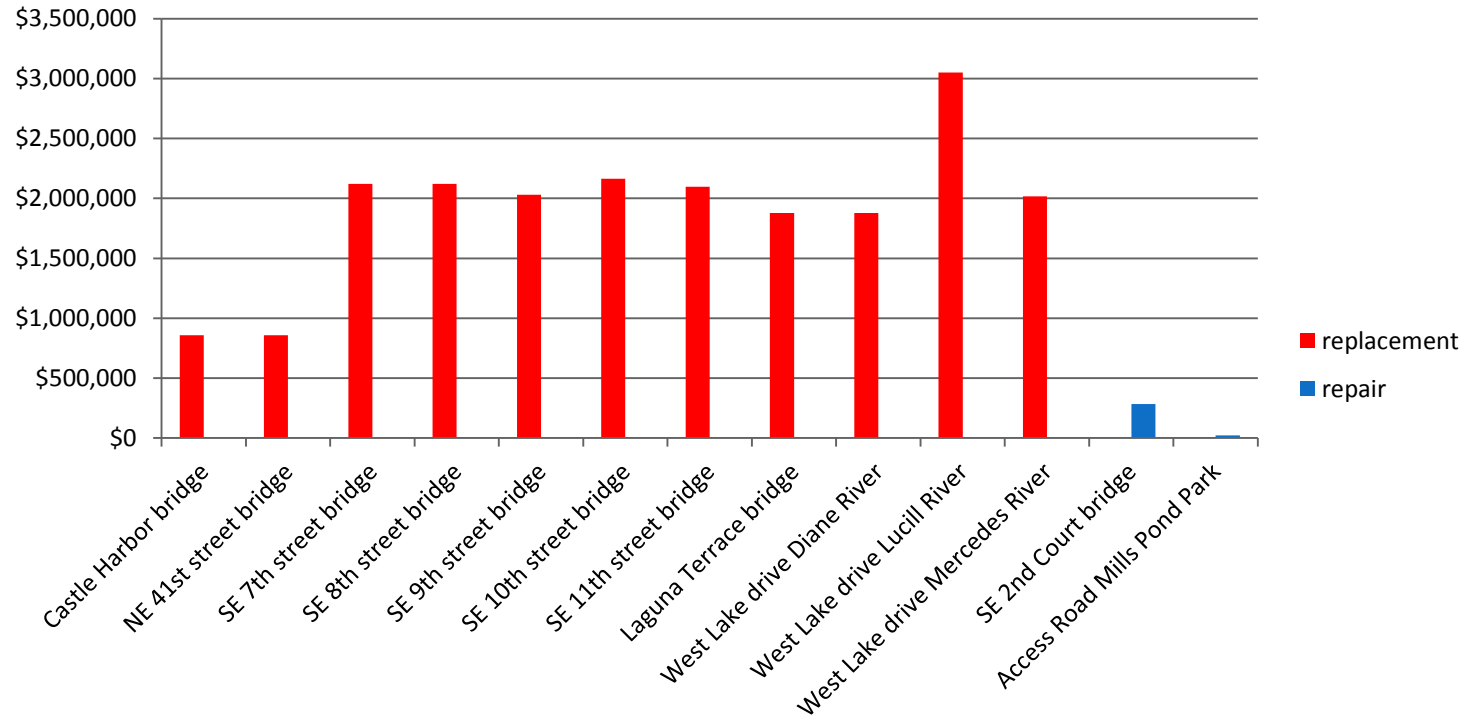
Total repair and replacement costs: \$432,050

Long-term 11-15 Year Period



Total repair and replacement costs: \$9,253,040

Long-term 16-20 Year Period



Total repair and replacement costs: \$21,384,667

Available Budget

		<u>Adopted Budget</u>		
Fiscal year	Annual Bridge Repair	Coconut Isle Bridge Replacement	South Ocean Dr. Bridge Replacement	Total
2014 Carry Over	\$267,287	\$0	\$0	\$267,287
2015	\$800,000	\$1,300,454	\$200,000	\$2,300,454
2016	\$280,000	\$0	\$650,000	\$930,000
2017	\$100,000	\$0	\$650,000	\$750,000
2018	\$100,000	\$0	\$650,000	\$750,000
2019	\$750,000	\$0	\$0	\$750,000
Total	\$2,297,287	\$1,300,454	\$2,150,000	\$5,747,741

Rev. Chart 2/16/15

Budget per CIP List

Funding Requirement for the First 5-Years

Short Term (this year)	= \$ 86,000
Long Term (0-5 years)	= <u>\$ 4,066,600</u>
Total (0-5 years)	= \$ 4,152,000
Current Funding Identified	= \$ 5,747,741

Rev. Chart 2/16/15

Identified funding includes replacement of Coconut Isle and South Ocean
Drive bridges

Potential Future FDOT funding is not included in this budget

Funding Challenge

6 – 20 Years

Budget Deficiency in 6-20

- Long term cost = \$31,069,757

Q&A

Bridge Locations

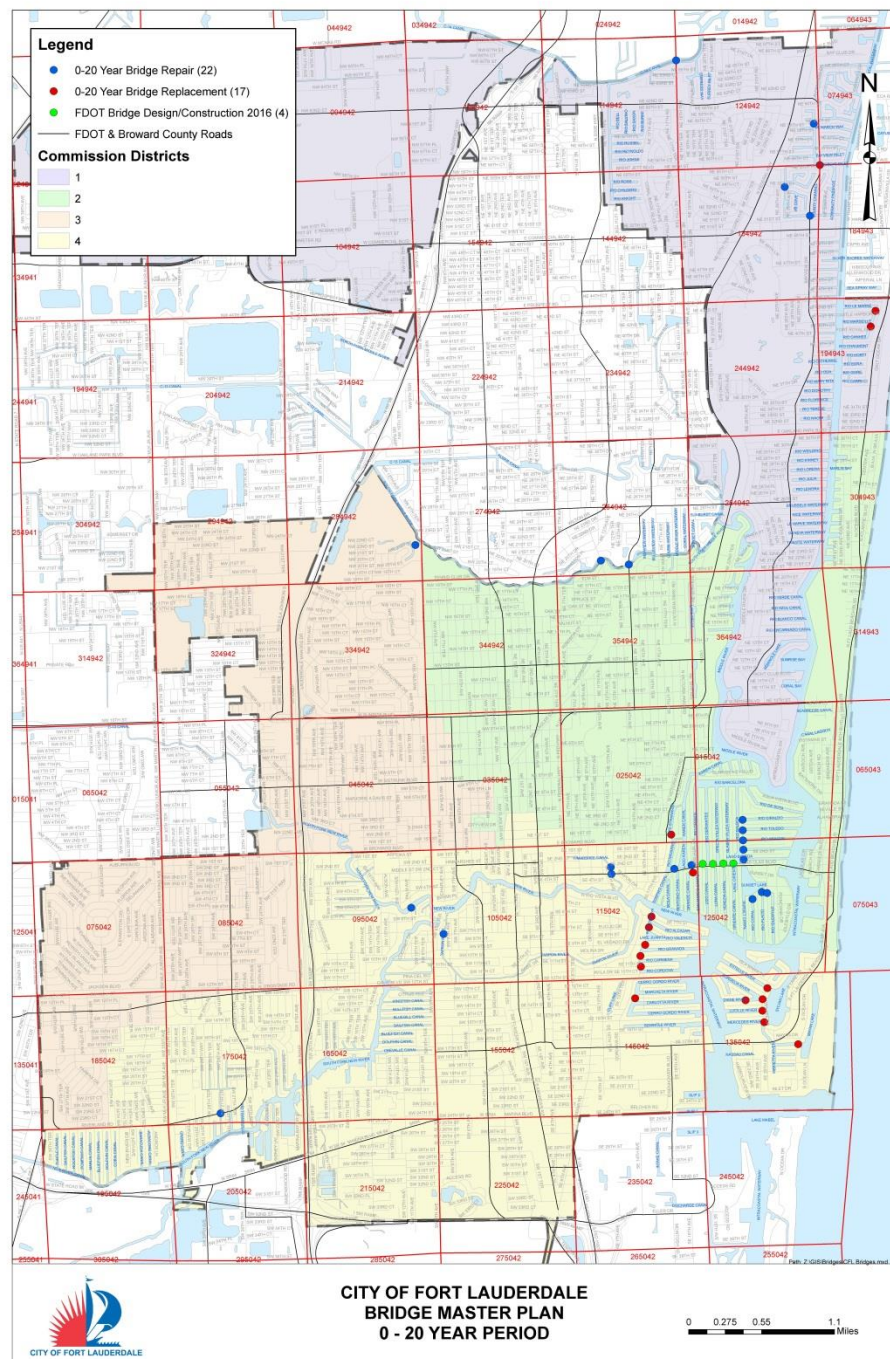


Exhibit 2 Bridge Master Plan 0-5 Year Recommendations CAM 15-0180

0-5 Year Short and Long Term Recommendations	Engineers Estimate					Staff Proposed Schedule				Budget		
	Construction Cost	Design	Construction Engineering and Inspection/ Admin.	Contingency	Total	Start Design	Start Bidding	Start Construction	End Construction	2015 CIP Budget	2015 Available Budget (2/9/15)	Budget 2016-2019
Misc. Bridge Repair Budget 331-P12010.331-6599, 331-P11530.331-6599, 331-P11530.345-6599										\$ 1,067,287	\$ 1,028,934	\$ 1,230,000
Long-term Replacement Recommendations												
Coconut Isle Drive	\$ 700,000	\$ 105,000	\$ 140,000	\$ 140,000	\$ 1,085,000	May 2015	Sep 2016	Mar 2017	May 2019	\$ 1,300,454	\$ 1,300,454	
South Ocean Drive	\$ 1,344,000	\$ 201,600	\$ 268,800	\$ 268,800	\$ 2,083,200	July 2015	Nov 2016	Dec 2017	Aug 2019	\$ 200,000	\$ 199,111	\$ 1,950,000
Scheduled for Repair					\$ -							
NE 55th Street	\$ 130,000	\$ 12,000	\$ 26,000	\$ 26,000	\$ 194,000	complete	complete	complete	complete			
Bayview Drive Bridge	\$ 130,000	\$ 12,000	\$ 26,000	\$ 26,000	\$ 194,000	Mar 2015	n/a	Jun 2015	Jan 2015			
South Gordon Road	\$ 65,000	\$ 15,000	\$ 13,000	\$ 13,000	\$ 106,000	Apr 2015	n/a	Jul 2015	Apr 2015			
Hendricks Isle Drive	\$ 150,000	\$ 40,000	\$ 30,000	\$ 30,000	\$ 250,000	Jul 2015	n/a	Nov 2015	Jul 2015			
Solar Plaza Drive - Rio Canal	\$ 48,000	\$ 10,000	\$ 9,600	\$ 9,600	\$ 77,200	Nov. 2014	n/a	Apr 2015	Sep 2015			
Solar Plaza Drive - Rio Placid Canal	\$ 48,000	\$ 10,000	\$ 9,600	\$ 9,600	\$ 77,200	Nov. 2014	n/a	Apr 2015	Sep 2015			
Sub- Total Estimate	\$ 2,615,000	\$ 405,600	\$ 523,000	\$ 523,000	\$ 4,066,600							
Short Term Recommendations												
NE 15th Avenue	\$ 25,000	\$ 15,000	\$ 5,000	\$ 5,000	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
South Gordon Road	\$ 25,000	-	-	-	\$ 50,000	Jul 2015	n/a	Aug 2016	Sep 2016			
Hendricks Isle Drive	\$ 3,000	-	-	-	\$ 25,000	Aug 2015	n/a	Aug 2016	Sep 2016			
NE 23rd Avenue	\$ 3,000	-	-	-	\$ 3,000	Sep 2015	n/a	Aug 2016	Sep 2016			
Solar Plaza Drive	-	-	-	-	\$ 3,000	Sep 2015	n/a	Aug 2016	Sep 2016			
SW 11th Avenue	-	-	-	-	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
SE 9th Avenue - Tarpon River	-	-	-	-	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
SE 9th Street - Tarpon River 2	-	-	-	-	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
SE 9th Street - Rio Cordova	-	-	-	-	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
SE 10th Street	-	-	-	-	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
SE 2nd Court	-	-	-	-	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
NE 18th Avenue	-	-	-	-	incidental	Jun 2015	n/a	Aug 2016	Sep 2016			
SE 25th Avenue	\$ 5,000	-	-	-	\$ 5,000	Sep 2015	n/a	Aug 2016	Sep 2016			
Sub-total Short-term Estimate	\$ 61,000	\$ 15,000	\$ 5,000	\$ 5,000	\$ 86,000							
Sub- Total All 0-5 Year Estimates	\$ 4,152,600											
Sub-Total 0-5 Year Budget										\$ 2,567,741	\$ 2,528,499	\$ 3,180,000
Total 0-5 Year 2015 CIP Budget												\$ 5,747,741