

S-197 Structure Replacement Project Overview

South Miami-Dade Water Issues Coordination Roundtable

March 1, 2011

N. Davies Mtundu, Ph.D., P.E., PMP

Everglades Restoration & Capital Projects

Project Engineering Division

S-197 Structure Replacement Project Objectives

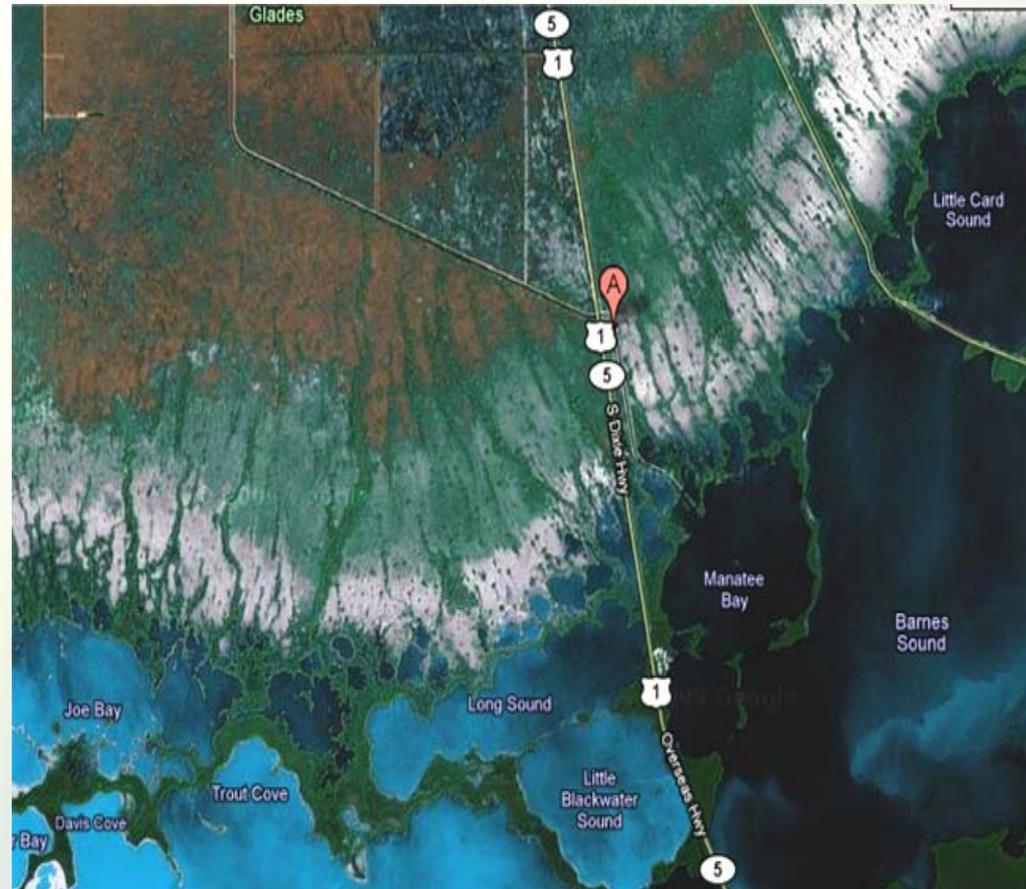
- Due to inoperable conditions, the District is replacing the S-197 Structure to ensure that it continues:
 - to be an effective component of flood control operations in the C-111 Canal
 - to provide important environmental benefits
 - to provide water resource protection by preventing saline intrusion to coastal fresh waters, particularly during high tides



S-197 Structure Replacement

Structure Functions

- Maintains optimally high water levels in the C-111 Canal upstream of the structure.
- Flood protection only in extreme weather conditions, e.g., hurricane events (not a primary role).
- Preventing saline intrusion into fresh waters and aquifers, especially during high tides.
- Otherwise, structure is seldom operated.



S-197 Structure Replacement

Existing Structural Components

- Thirteen 84-inch corrugated-metal-pipe (CMP) culverts were initially constructed in 1969 with three single-gated culverts (Culverts 1-3)
- In 1990, ten double-gated culverts were added (Culverts 4-13) with design discharge of 2,400 cfs, manually operated, and no dewatering facilities.



S-197 Structure Replacement

Reasons for Replacement

- The District's Strategic Plan includes agency-wide plans for structural maintenance and upgrades to the flood control system. For instance, in FY10, \$60M was budgeted for this purpose.
- The District regularly conducts a Structure Inspection Program to identify structures that require upgrades or replacement. Starting FY11, \$5M will be allocated for replacing the S-197 Structure over a period of approximately two years.



S-197 Structure Replacement

Conditions of Existing Structure

- In 2007, our Structure Inspection Program identified 100 percent structural damage in the form of holes in sections of the top of the culverts, and cracks on the gates, gate-tracks, and risers.
- This damage is caused by corrosion in this saline environment.
- *Photo shows damage to gate and riser due to corrosion.*



S-197 Structure Replacement

Conditions of Existing Structure

- In 2009, an underwater video revealed 100 percent structural losses throughout all the culverts.
- Structural losses appeared as advanced corrosion throughout all culverts, gates and risers, rendering the structure inoperable as intended.
- Flow through the closed gates could clearly be seen (gates are leaking significantly).
- *Photo shows structural loss to one of the gates.*



S-197 Structure Replacement

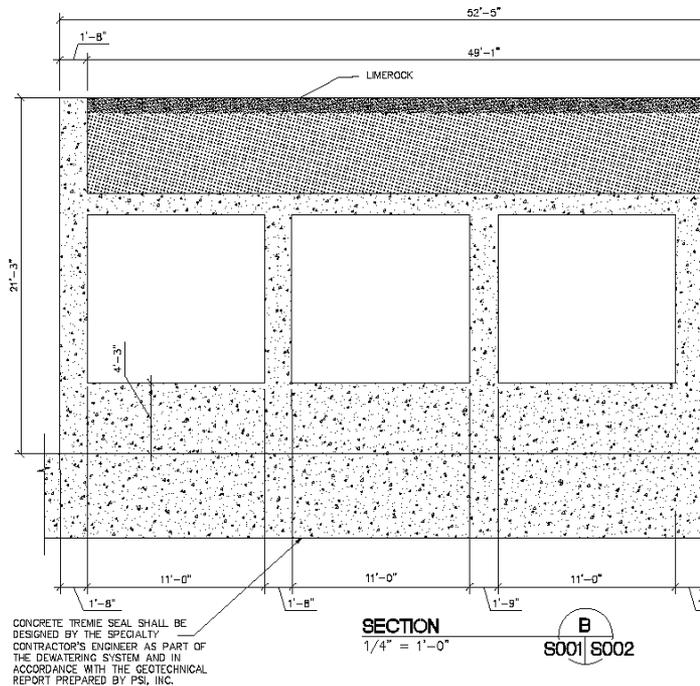
Conditions of Existing Structure

- Evidence of erosion of the earthen-plug material holding the culverts together.
- If this structure were needed during a storm event, the likelihood of failure would be very high.
- *Photo shows corrosion damage in one of the culverts.*



S-197 Structure Replacement Proposed New Structure

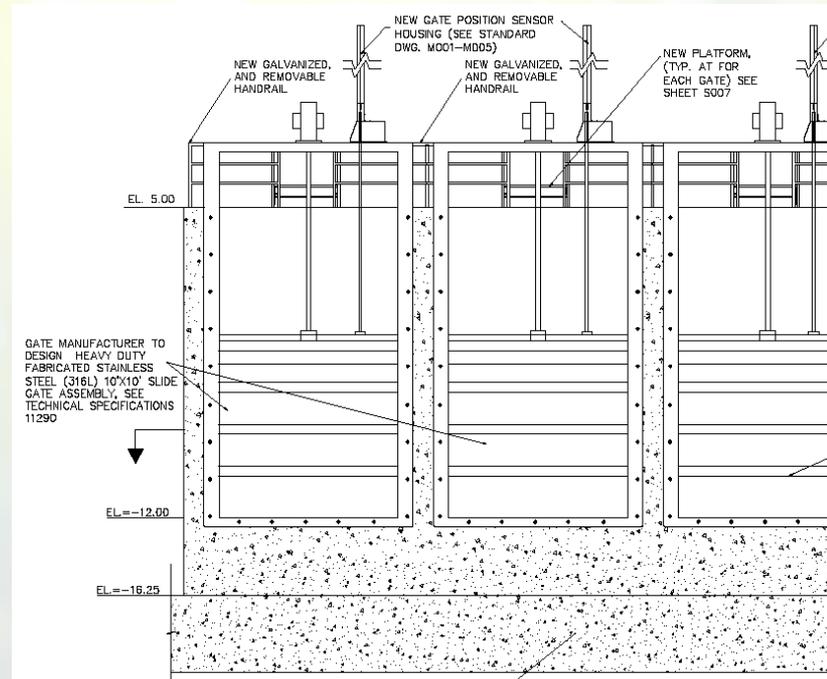
- Four box -culverts along the centerline of the C-111 Canal
- Cast-in-place (CIP) reinforced concrete
- 10 ft. in depth by 11 ft. in width
- Capacity: 2,400 cfs (as in existing structure)



S-197 Structure Replacement

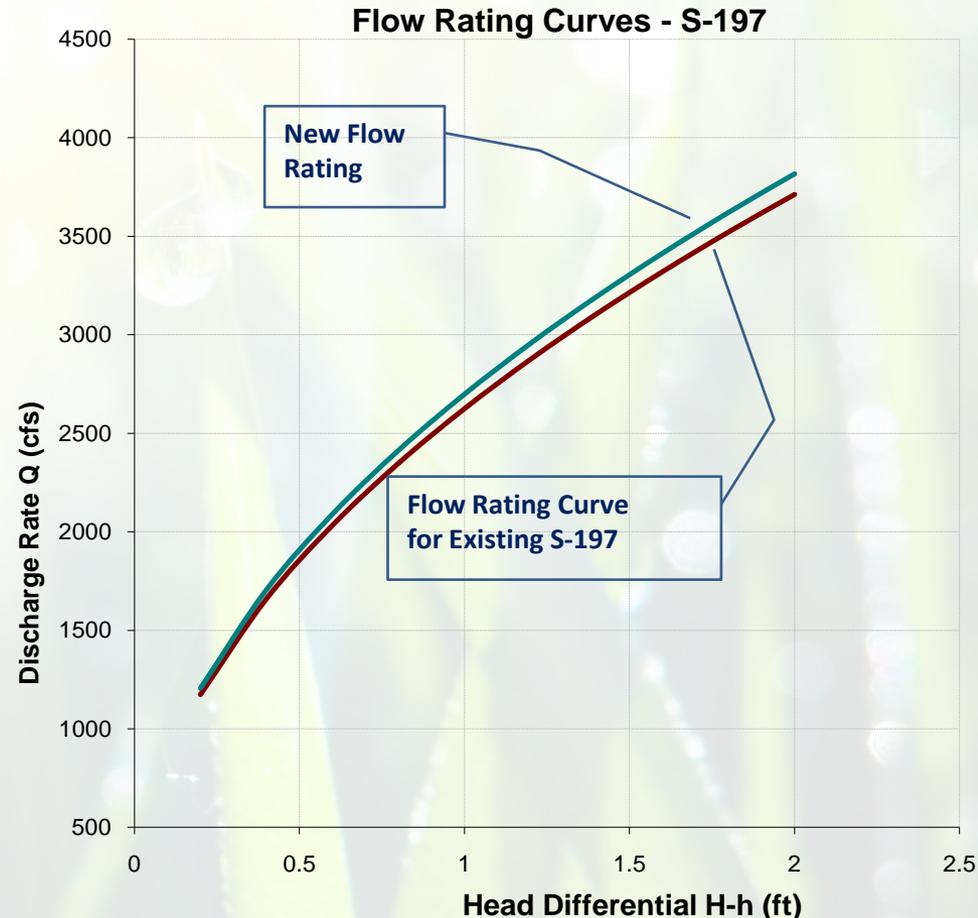
Proposed New Structure

- Manually operated stainless steel slide gates
- Dewatering facilities
- Floating trash barriers
- New staff gages



S-197 Structure Replacement Operational Plan

- New structure
 - will be manually operated
 - will not deviate from the existing operational plan
- By applying the same operational criteria as before, new structure will provide the same level of
 - environmental benefits
 - flood-control during storm events



S-197 Structure Replacement

Operational Criteria

Existing Structure

- S-177 HW > 4.10 feet NGVD after S-177 gates have been fully opened (gates out of the water) or if S-18C HW > 2.80 feet NGVD;
- Then, open 3 culverts fully to obtain:
 - Q~540 cfs or 350 MGD at 0.80 feet of head

New Structure

- S-177 HW > 4.10 feet NGVD after S-177 gates have been fully opened (gates out of the water) or if S-18C HW > 2.80 feet NGVD;
- Then, open 2 culverts by 3.7 feet to obtain:
 - Q~550 cfs or 355 MGD at 0.80 feet of head

S-197 Structure Replacement Operational Criteria

Existing Structure

- S-177 HW > 4.20 feet NGVD for 24 hours or S-18C HW > 3.0 feet NGVD;
- Then, open 7 culverts fully to obtain:
 - Q ~ 1,300 cfs or 840 MGD at 0.80 feet of head)

New Structure

- S-177 HW > 4.20 feet NGVD for 24 hours or S-18C HW > 3.0 feet NGVD;
- Then, open 4 culverts by 4.3 feet to obtain:
 - Q ~ 1,300 cfs or 840 MGD at 0.80 feet of head)

S-197 Structure Replacement Operational Criteria

Existing Structure

- S-177 HW > 4.30 feet NGVD or S-18C > 3.30 feet NGVD;
- Then, open all 13 culverts fully to obtain:
 - Q ~ 2,400 cfs or 1550 MGD

New Structure

- S-177 HW > 4.30 feet NGVD or S-18C > 3.30 feet NGVD;
- Then, open all 4 gates by 10.0 feet (fully) to obtain:
 - Q ~ 2,400 cfs or 1550 MGD

S-197 Structure Replacement Permit Requirements

- **USACE**
 - CWA Section-404 Nationwide Permit (dredge & fill)
 - JAX Office Section-408 Authorization
- **FDEP**
 - Non-ECP Permit
- Permit applications already submitted.
- Replacing an existing structure requires only a lower level of review than that for a new structure.
- Therefore, expecting a more streamlined and expedited review and approval.

S-197 Structure Replacement Permit Requirements

- **Miami-Dade County**
 - Class-I Environmental Permit (DERM)
 - Planning & Zoning Approval
 - Demolition Permit
 - Building Permit
- Permit applications already submitted.
- Issues to account for:
 - Mangroves
 - Wetlands
 - Mitigation
 - Manatee Protection
- Expecting a streamlined and expedited review and approval

S-197 Structure Replacement Environmental Protection Measures

During construction:

- Type II turbidity barriers
- Silt fence
- Manatee Protection
- Preserve existing mangroves wherever possible



S-197 Structure Replacement Access and Recreation

- **Floating barriers installed both upstream and downstream will limit public access through the structure**
- **Florida Department of Transportation constructing a boat-ramp upstream of Structure S-197 to permit recreational activities in the waters around the structure**



S-197 Structure Replacement

- Questions?

