

## **STRUCTURE 21A**

This structure is a reinforced concrete, gated spillway, with discharge controlled by two cable operated, vertical lift gates. Operation of the gates is automatically controlled so that the gate hydraulic operating system opens or closed the gates in accordance with the seasonal operational criteria. The structure is located near the mouth of Canal 102 at its junction with Levee 31E and about a mile from the shore of Biscayne Bay.

### **PURPOSE**

This structure maintains optimum water control stages upstream in Canal 102; it passes the design flood (40 percent of the Standard Project Flood) without exceeding upstream flood design stage, and restricts downstream flood stages and discharge velocities to non-damaging levels; and it prevents saline intrusion during periods of high flood tides.

### **OPERATION**

This structure will be operated to maintain an optimum headwater elevation which varies seasonally from a low during the dry season of 1.4 to a maximum during the flood season of 2.2 feet, when sufficient water is available to maintain this level. The automatic controls on gates function as follows:

#### High Range

When the headwater elevation rises to 2.20 feet, the gates will open at six inches per minute;

When the headwater elevation rises or falls to 2.0 feet, the gates will become stationary;

When the headwater elevation falls to 1.8 feet, the gates will close at six inches per minute.

#### Intermediate Range

When the headwater elevation rises to 1.8 feet, the gates will open at six inches per minute;

When the headwater elevation rises or falls to 1.6 feet, the gates will become stationary;

When the headwater elevation falls to 1.4 feet, the gates will close at six inches per minute.

Low Range

When the headwater elevation rises to 1.40 feet, the gates will open at six inches per minute;

When the headwater elevation rises or falls to 1.20 feet, the gates will become stationary;

When the headwater elevation falls to 1.0 feet, the gates will close.

The selection of operational range will be based on field conditions and agricultural activity.

The approximate periods for the three modes of operation are:

High Range Operation (April 30th to October 15th)

Intermediate Range Operation (December 30th to April 30th)

Low Range Operation (October 15th to December 30th)

Note: As long as rainfall persists within the basin, the low range setting will remain in effect until the water table within the basin recedes below the root zone of seasonal crops. This operating criteria is used for seasonal agriculture. It does not provide any protection for year-round agriculture below the high range settings, from April 30th to October 15th.

Salinity Regulation

In addition to maintaining optimum upstream fresh water control, as described above under Flood Control Regulation, the automatic controls on this structure have an over-riding control which closes the gates, regardless of the upstream water level in the rare event of a high flood tide, whenever the differential between the head and tailwater pool elevations reaches 0.2 feet.

**FLOOD DISCHARGE CHARACTERISTICS**

	Design	Standard Project Flood
Discharge Rate	<u>1330</u> cfs	<u>2500</u> cfs
	<u>40%</u> SPF	<u>100%</u> SPF

Headwater Elevation	<u>1.9</u> feet	<u>3.0</u> feet
Tailwater Elevation	<u>1.4</u> feet	<u>2.0</u> feet
Type Discharge	uncontrolled <u>submerged</u>	uncontrolled <u>submerged</u>
Estimated Maximum Hurricane Tide	<u>15.9</u> feet m.s.l.	

## DESCRIPTION OF STRUCTURE

Type Fixed crest, reinforced concrete gated spillway

Weir Crest

Net Length 40.0 feet

Elevation -7.8 feet

Service bridge elevation 7.0 feet

Water level elevation which will by-pass structure 7.0 feet

Gates

Number 2

Size 11.8 ft. high X 20.8 ft. wide

Type Vertical lift

Bottom elevation of gates full open 5.6 feet

Top elevation of gates full closed 4.0 feet

Control Automatic, on-site upstream control with over-ride  
differential water surface control sensed by  
bubbler system and remote computer control.

Lifting mechanism

Normal power source commercial electricity

Emergency power source L.P. gas driven generator

Type hoist hydraulic cylinder actuated by electric  
motor driven pump, with emergency hand pump;  
connected to gate by steel cables.

Date of Transfer: September 15, 1966

**ACCESS:** from U.S. Highway #1 via Moody Drive to the structure site

**HYDRAULIC AND HYDROLOGIC MEASUREMENTS**

Water Level Remote digital upstream and downstream recorders

Gate Position Recorder Remote digital recorders on both gates.

Rain Gauge: Remote digital recorder.

**DEWATERING FACILITIES**

Storage needles at Homestead Field Station, beams at West Palm Beach Field Station

Type needle beams and vertical aluminum needles

Size & Number (per bay)

Upstream & Downstream

Number 1 beam; needles, 5 @ 4'

Size beam 24WF145, length 21' -10"

needles 20' long