

STRUCTURE 7

This structure is a pumping plant with a gated spillway, which controls flows that bypass the pumps. This structure is located in the alignment of North New River Canal, at its intersection by Levees 5, 6, and 18, about 26 miles south of the town of Belle Glade and just east of U.S. Highway No. 27 at the Palm Beach - Broward County Line. The pumping station consists of a reinforced concrete and concrete block masonry superstructure with three (3) Fairbanks Morse, 144 inch diameter horizontal pumps each rated for 830 c.f.s. at 5.3 foot static head. Each pump unit is driven by a Fairbanks Morse Model 38D8-1/8, 800 horsepower, opposed piston, diesel engine connected to the pump through high over low reduction helical gear transmission type HOL, manufactured by Bradfoote Gearbox. Priming of the main pumps is accomplished by an electric motor-driven Nash Model K-6 vacuum pump. Power for the station is furnished by two 200 KW ONAN Model 200DFAA generators. A 10-ton manually operated overhead bridge crane is provided for general service and maintenance within the superstructure. An industrial Crane & Hoist, 20-Ton Outdoor Crane is provided for outside maintenance of the main pumps. Station service water system for washdown, a dewatering system for the intake bays for inspection and maintenance, and an electrically operated trash rack hoist for removing debris from the intake bay trash rack, are other furnished facilities.

PURPOSE

The purpose of the pumping station is to discharge drainage water via the North New River Canal from the agricultural area northwesterly of the pumping station into Conservation Area No. 2, at the rate of 3/4 inch per day from the 125 sq. mile tributary drainage area.

OPERATION

The pumping station will be operated whenever the water level in the North New River Canal within the agricultural area tributary to the pumping station exceeds 12.5 feet m.s.l. unless the water level in the conservation area is low enough to permit gravity discharge at a desirable rate through the adjacent spillway gate. Normally, pumping will draw and hold the intake water surface at elevation 10.0; moreover, it shall never be drawn below elevation 8.7. The pumps should be started and stopped slowly, one pump at a time, so that high velocities and surges will not occur in the canal.

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The Operation Chart defines the entire recommended range over which pumping can be accomplished. Inasmuch as the reduction ratio between engine and pump is fixed, all pump rotative speeds are expressed in terms of engine speeds which are indicated on the engine tachometer. The rated speed is 720 r.p.m. At this speed each pump has a design capacity of 830 c.f.s., or greater, with pool to pool heads not in excess of 5.3 feet and intake pool gauge between El. 13.0 and 8.7.

If, during a pumping operation, the water surface on the intake bay falls below 8.7 as indicated by the staff gauge, the speed of all pumps then operating should be reduced to not less than 640 r.p.m. If this does not restore the water surface in the intake pool to elevation 8.7, one or more of the pumping units should be shut down until the minimum pool elevation is re-established.

The pumps in this station are designed to pump drainage water containing a negligible amount of sediment or other material, which might damage the surface of the pump or bearings. All pump bearings are designed for grease lubrication and to exclude dirt and grit. However, the quantity of water being pumped by the station should be reduced at any time the water in the suction bay becomes moderately silted or if it appears that the approach velocities are carrying a bottom load of sand into the sump chambers.

The main pumping units installed at station 7 are entirely free from harmful criticals throughout the speed range from Zero to 720 r.p.m. Therefore, there are no speeds within the normal operating range of this equipment which must be avoided.

The gate at S-7 can release water from the North New River into WCA 2A or from WCA 2A into the North New River, as needed.

FLOOD DISCHARGE CHARACTERISTICS

	Pump Design
Discharge Rate	<u>2490</u> c.f.s.
	* <u> </u> % SPF
Headwater Elevation	<u>13.0</u> feet
Tailwater Elevation	<u>18.3</u> feet
Type Discharge	<u>pumped</u>

DESCRIPTION OF STRUCTURE

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Type Three pumping units and one gated box culvert spillway in a reinforced concrete and concrete block structure

Spillway

Number of barrels one
Size of barrel 14.7 feet wide by 13.2 feet high
Length of barrel 43 feet
Gate Sill elevation 2.8 feet
Culvert Invert elevation 1.75 feet
Clear Gate opening 10.7 feet high by 14.7 feet wide

*Design flow not related to Standard Project Flood

Gate

Size: 11.0 ft. high by 15.2 ft. wide
Type: vertical lift gates
Max. Gate Opening: 9.5 feet

Control: On-site manual and remote computer control

Lifting Mechanism

Type Hoist direct drive electric motor, gear
connected to stem operated gate lifts

Dewatering Facilities

Storage On-site
Type stoplogs
Size and number (per bay)
14" x 14"; 15'-6" long, 24 total

Pumping Station

Number of pumps 3
Size and Type of Pumps 144" horizontal propeller type
Design rating 830 c.f.s. each
Impeller Speed 68 r.p.m.
Pump Manufacturer Fairbanks Morse

Engine Make & Type Fairbanks Morse, 5-cylinder opposed cylinder diesel

Engine Horsepower 800 each

Engine Speed 720

Dewatering Facilities

Storage On-site

Type Bulkhead gates

Size (Upstream & Downstream)

Number 5

Width 1'-9"

Height 3' -3"

Length 27' -1"

Date of Transfer: January 15, 1960 (beneficial occupancy); February 10, 1961

ACCESS: Structure located on U.S. Highway No. 27

HYDRAULIC AND HYDROLOGIC MEASUREMENTS

Water Level: On-site, analog and remote digital headwater & tailwater recorders

Gate Position Recorder: On-site analog & remote digital recorder

Rain Gauge: Remote, digital recorder

Engine Tachometers: Digital, on-site and remote

POWER SOURCE

Prime Movers: Diesel engine

Station Power: Normal - Commercial electricity

Emergency - Diesel engine driven electric generator