

Texas Irrigation Expo  
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Installation of Rubicon Gates  
at  
Cameron County Irrigation District  
#2

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## Boundaries of the District



The southern border of the District is near the Rio Grande and extends from La Paloma westward to Los Indios. The Arroyo Colorado forms the northern boundary of the District which extends from near Harlingen on the west, to west of Arroyo City on the east. Included within the boundaries of the District are portions of the Cities of San Benito, Rio Hondo, and Harlingen. The District contains 58,885 irrigable acres.

## CCID#2 Conveyance system

The District's conveyance system consists of approximately 295 miles of canals and pipelines. Currently, the system includes 175 miles of unlined canals, which includes 15 miles of resaca, 18 miles of lined canals, and 102 miles of pipeline. Of the 295 miles, 137 miles are considered to be main canals and 158 miles are classified as lateral canals. The District's total reservoir storage capacity is approximately 7900 ac-ft.

## Previous Gate System



## Rubicon Gates

- Established in 1995 in Victoria, Australia
- Offices in Colorado, California, China, and Australia
- Collaboration with the University of Melbourne in Australia and Colorado State University for their research

## Rubicon Staff Consists Of:

- Mechanical Engineers
- Software Developers
- Instrumentation and Control Engineers
- Field Technicians

## Flume Control Gates

- Aluminum construction
  - 40-year design life
- “Overshot” gate
  - 3-panel gate assembly design
- Ultrasonic Water Level Sensors
  - +/- 1/16 of an inch accurate (set positions)
  - +/- 2% flow accuracy
- Pedestal with Controls (weatherproof)
  - Each pedestal includes a screen display
  - Set control modes
    - Manual mode
    - Remote mode (web based SCADA)
    - Upstream/downstream water level mode
    - Flow rates

## Flume Control Gates (cont'd)

- Password protected screen
- Lockable
- Solar powered
  - With 12 volt battery backup
- Can be connected to SCADA networks
- Flume gate used in large scale open canal systems

## Single Flume Gate In Operation



## Multiple Flume Gates In Operation



## Slip Control Gates

- Aluminum construction
  - 40-year design life
- “Under-shot” slide gate
- 3-sided double seal for leak prevention
- Ultrasonic Water Level Sensors
  - +/- 1/16 of an inch accurate (set positions)
  - +/- 2% flow accuracy
- Pedestal with Controls (weatherproof)
  - Each pedestal includes a screen display
  - Set control modes
    - Same as with flume gates
- Slip Gates are normally used in applications where an open canal and a pipe exist

## Installation

- Each gate was installed in locations where existing wooden or other type gates were located
- Each site is isolated and drained
- Frames are installed in existing concrete structure
- Due to age and condition of concrete, most sites required modifications
- Gates are later installed and calibrated even while canal is in use

## Installation of Flume Gate



## Installation of Slip Gate



## Gate Maintenance

- Cables do not require any grease
  - cable rolls onto grooved spool and do not rub
  - it moves very slowly therefore not generating any heat
- Basic maintenance such as:
  - checking gear oil
  - checking cables for frays and loose fasteners
  - testing radio strength, etc.
- Site check-up
  - Remote Telemetry Unit (RTU) continuously monitors the solar drive board
  - it also monitors Integrated Circuit Boards (ICB) which are responsible for controlling the start/stop of the motor
  - RTU and ICBs are in constant communication to update and run diagnostic checks

## Maintenance Schedule

- Monthly
  - Check solar panel voltage
  - Check battery voltage
  - General inspection
- Once a year site check up
  - Site self test (tests the motor drive)
  - Check cable tension and adjust if necessary
  - Clean ultra-sonic sensors
- Run diagnostics on upstream and downstream sensors
  - Check general operation of gate
  - Clean solar panels
- Periodically staff cleans corrosion in batteries

## SCADA

(Supervisory Control And Data Acquisition)

- Allows the District to remotely monitor and operate canal facilities on a real-time basis
- Control stations are set up at pumping plant in Los Indios, Texas and at the administration office in San Benito, Texas. However, the Canal Rider Superintendent operates all automated gates from a laptop computer
- Currently using “WonderWare” software
- Microsoft Windows based

## SCADA

(continued)

- Screen shot of each individual gate
- Site summary (for multiple gate locations)
- District map indicating all gate locations
- Historic Trend graphs
- Volumetric usage reports
- Alarm notifications

## Costs of Projects

- Phase I--Consisted of 11 gates

Cost of gates \$388,307.43

Cost of SCADA \$51,953.00

Plus engineering, environmental, and installation.

Project was a 50% cost share with Bureau of Reclamation who funded \$277,239 towards this project.

## Costs of Projects-Cont'd

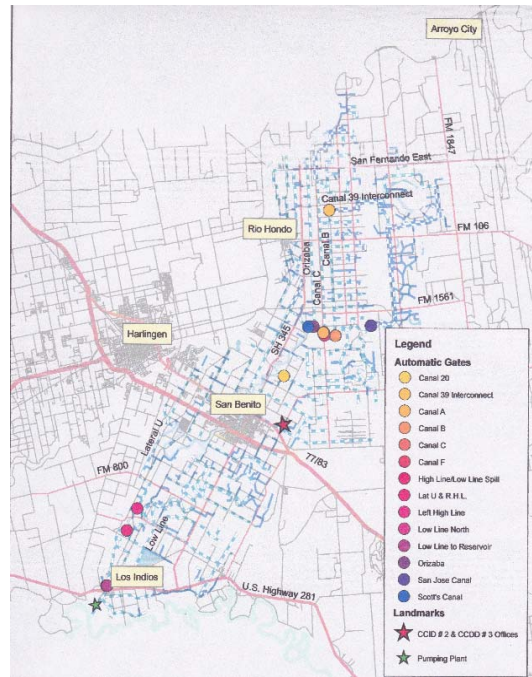
- Phase II---Consisted of 10 Gates

Cost of gates with SCADA \$413,255.00

Plus engineering, environmental, and installation.

Project was a 50% cost share with Bureau of Reclamation who funded \$261,923.00 towards this project.

## Gate Installation Locations in District



## Benefits

- Reduced losses due to gates adjusting to specified levels or flows
- Immediate notification when levels change
- Faster response to water demands
- Energy savings through use of solar panels

Thank You!

Any Questions?