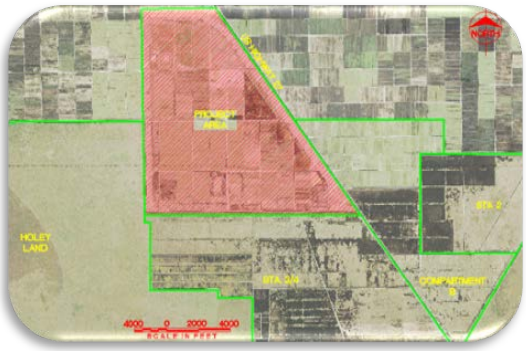
EAA A-1 FLOW EQUALIZATION BASIN (FEB)

CLIENT	South Florida Water Management District (SFWMD)
LOCATION	Palm Beach Co, FL
VALUE	$ 60 M
DATE	Design: July 2013 - July 2013 Construction: July 2013 - Ongoing
SAFFTY	Zero OSHA Recordables

Design Engineering Services and Engineering During Construction Services

NorthStar provided design engineering services for the Everglades Agricultural Area (EAA) A-1 Flow Equalization Basin (FEB) from conceptual through Corrected Final / Ready to Advertise design, and engineering during construction (EDC) services. The 15,000 acre EAA A-1 FEB will temporarily detain up to 60,000 ac ft of peak stormwater runoff flows for later controlled release. The concept and implementation of a flow equalization basin is a "first of its kind" project for SFWMD.

The key components of the NorthStar design include:



- 15,000 acre FEB with a 60,000 ac-ft attenuation capacity at an average depth of 4 ft
- 13 miles of perimeter levees (11 ft tall with 14 ft crest), 6.7 miles of flow conveyance levees (8 ft tall)
- ¾ mile of canal extensions; 2,700 linear ft collection and conveyance canal
- two multi-bay roller-gated spillway structures
- one 3-barrel slide gate culvert structure, 600 linear ft 3 barrel bypass box culvert
- one single barrel seepage collection culvert with two inlet structures
- 10 single barrel culverts with solar powered slide gates (first full-scale implementation for SFWMD)
- demolition & disposal of 60 miles of roadways, 3.1M cy of muck, and two agricultural pump stations
- 5 boat/access ramps, four 6,000 to 11,000 sf parking areas

NorthStar work activities are highlighted below.

- *Data review* - Review of reports, studies, models, and databases pertaining to the site, local hydrology and hydraulics, and operation of connecting conveyance systems in order to optimize the design.
- *Geotechnical investigation* - Characterization of stratigraphy, soil types, gradation (to evaluate suitability for embankment materials), consolidation, percolation rate, hydraulic conductivity, and groundwater levels.
- *Land surveying* - Surveys of topography, ROW, and boundary for modeling and design purposes.
- *Hydrologic & hydraulic modeling* - Modeling included use of TuFLOW (2-D flow modeling), HEC-RAS (conveyance structures), FEMA (wave setup), and MODFLOW (seepage).
- *Civil design* - Engineering design of 13 miles of perimeter levees with maintenance roads, 6.7 miles of flow conveyance levees, and appurtenant structures. Levee design included dam breach analysis and modeling.
- *Structural design* - Engineering design of reinforced concrete water control structures, including cost-saving construction options for cast-in-place concrete using HDPE and other alternative materials.
- *Electrical design* - Electrical, instrumentation, monitoring and control, SCADA, and telemetry design for water control gate structures; and monitoring instrumentation within the FEB.
- *Engineering during construction* - Observe construction, oversee RFI responses, review contractor submittals, attend progress meetings, and sign and seal as-built drawings as Engineer of Record.

NorthStar refined design parameters, configurations, and other options at every opportunity to optimize estimated costs and materials. Our design team identified $2M in design optimizations/cost reductions, and our opinion of probable construction cost (OPCC) was within 7% of the actual construction bid of $60M.