



TECHNICAL MEMORANDUM

March 27, 2019

To: Windham Development, Inc.
c/o H. Lawson
36400 Woodward, Suite 205
Bloomfield Hills, Michigan 48304

From: Michael C. Alfieri, P.G.
Principal Hydrogeologist

Re: 2019 DWRMv3 Model Evaluation
Windham - Murphy Oaks Development
Sarasota County, Florida
WRA Project No. 1435

A District-Wide Regulatory Model version 3 (DWRMv3) focused telescopic mesh refinement (FTMR) model was constructed for this project in 2017-2018 before the project name change to Murphy Oaks. This model was updated in March 2019 to account for a slight change in the southern-most pond, Pond 1, schematic and updates to the bottom elevation of both on-site ponds. This technical memorandum documents the key components of the model and the model results in respect to impacts from construction dewatering.

DWRMv3 FTMR MODEL DESIGN

Model Grid

- 25-ft. by 25-ft. at the site to 2,000-ft. by 2,000-ft. at the model edge
- 223 Rows
- 223 Columns
- 6 Layers – area of interest in Layer 1 – Surficial Aquifer/PZ-1

Boundary Conditions

- Constant Head Cells – 8752 cells
- River Cells – 4640 cells
- Drain Cells – 3007 cells

At and near the site, Drain Cells represent wetland areas, River Cells represent Curry Creek, and Constant Head Cells to represent on-site ponds (**Figure 1** and **2**).

Hydraulic Parameters

No changes to assigned and simulated hydraulic parameters.

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MARCH 2019 DWRMv3 FTMR MODEL EVALUATION

Updating the prior 2019 groundwater flow modeling effort, the southern-most pond, Pond 1, now includes a small north-south orientation on the eastern side of the property in addition to the east-west orientation north of Fox Lea Drive. The model was updated to incorporate six stages of the pond construction:

1. Pre-development of the SWFWMD
2. 2014 model year average
3. 42-day construction of Pond 1 (dewater to elevation 3-ft.)
4. 14 days between construction of Pond 1 and Pond 2 (northern-most pond) – Pond 1 at elevation 11-ft.
5. 60-day construction of Pond 2 (dewater to elevation -6-ft.) with Pond 1 elevation held constant at elevation 11 ft.
6. 365 days post construction Pond 1 and Pond 2 set to elevation 11-ft.

The stages of interest for the on-site pond construction are Stage Nos. 3, 4, and 5. At the end of the 42-day construction of Pond 1 with dewatering simulated to elevation 3-ft. in Stage No. 3, the estimated drawdown at the Fox Lea Farms irrigation pond ranges between less than 0.1-ft to approximately 0.4-ft. (**Figure 3**).

At the end of the 14 days between end of construction of Pond 1 and the start of construction Pond 2 (northern-most pond), where Pond 1 is kept at elevation 11-ft. (Stage No. 4), the estimated drawdown at the Fox Lea Farms irrigation pond ranges remains between less than 0.1-ft. to approximately 0.4-ft. However, approximately 3-ft. in head rise is estimated in the vicinity of Pond 1 (**Figure 4**). This extends south into the Fox Lea Farms property.

At the end of the 60-day construction of Pond 2 with dewatering simulated to elevation -6-ft. and with Pond 1 elevation held constant at elevation 11-ft. (Stage No. 5), the estimated drawdown at the Fox Lea Farms irrigation pond ranges rebounds with a head rise between 0.1-ft. and 0.5-ft. (**Figure 5**). The estimated rebound ranges from approximately 0.1-ft. to 2-ft. across the Fox Lea Farms property during this simulated timeframe.

At completion of the simulated construction (Stage 6) with the on-site pond elevations set to 11-ft. has a positive impact on Fox Lea Farms at the end of a simulated year (**Figure 6**). The estimated rebound (head rise) across the Fox Lea Farms property ranges from 1 to 2.5-ft.



Figure 1. Site location. Proposed top of bank and pond bottom locations in blue.



Figure 2. DWRMv3 FTMR model cells and associated boundary conditions at and near the Site. Light Blue: River Cells; Yellow: Drain Cells; Dark Blue: Constant Head Cells.

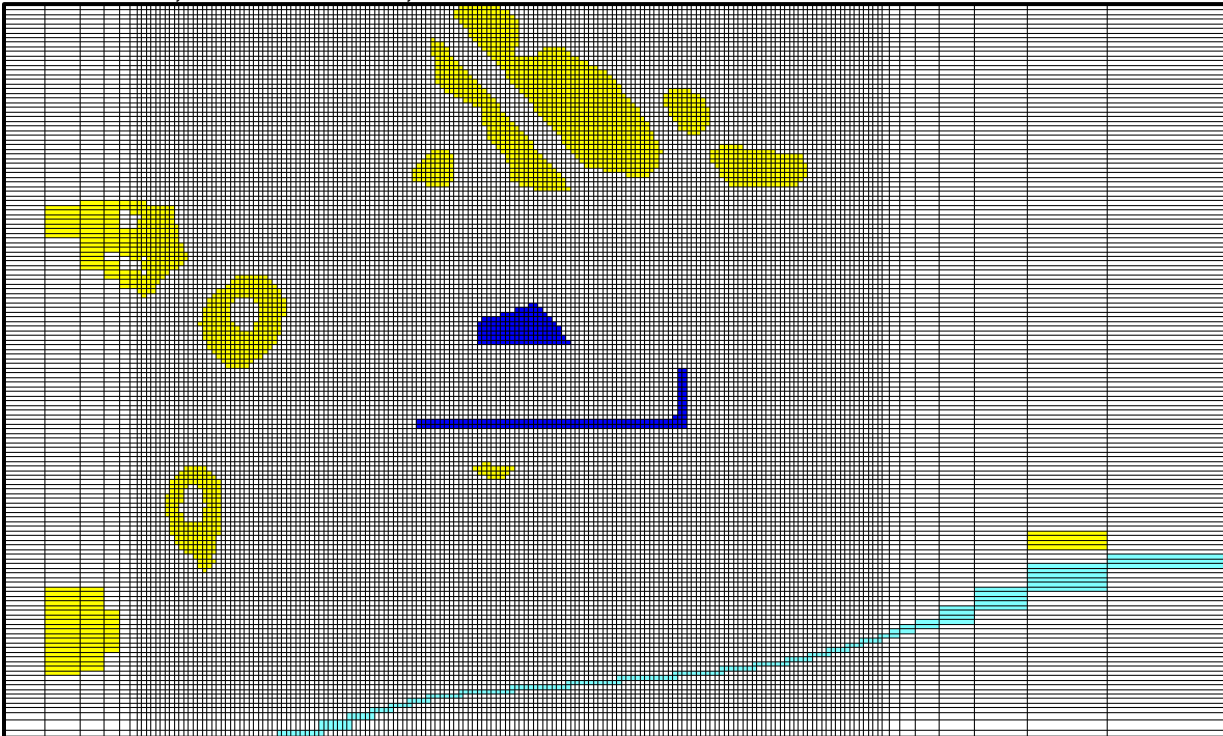


Figure 3. 42-day construction of Pond 1 (dewater to elevation 3-ft.)



Figure 4. 14 days between construction of Pond 1 and Pond 2 (northern-most pond). Pond 1 is set to elevation 11-ft.

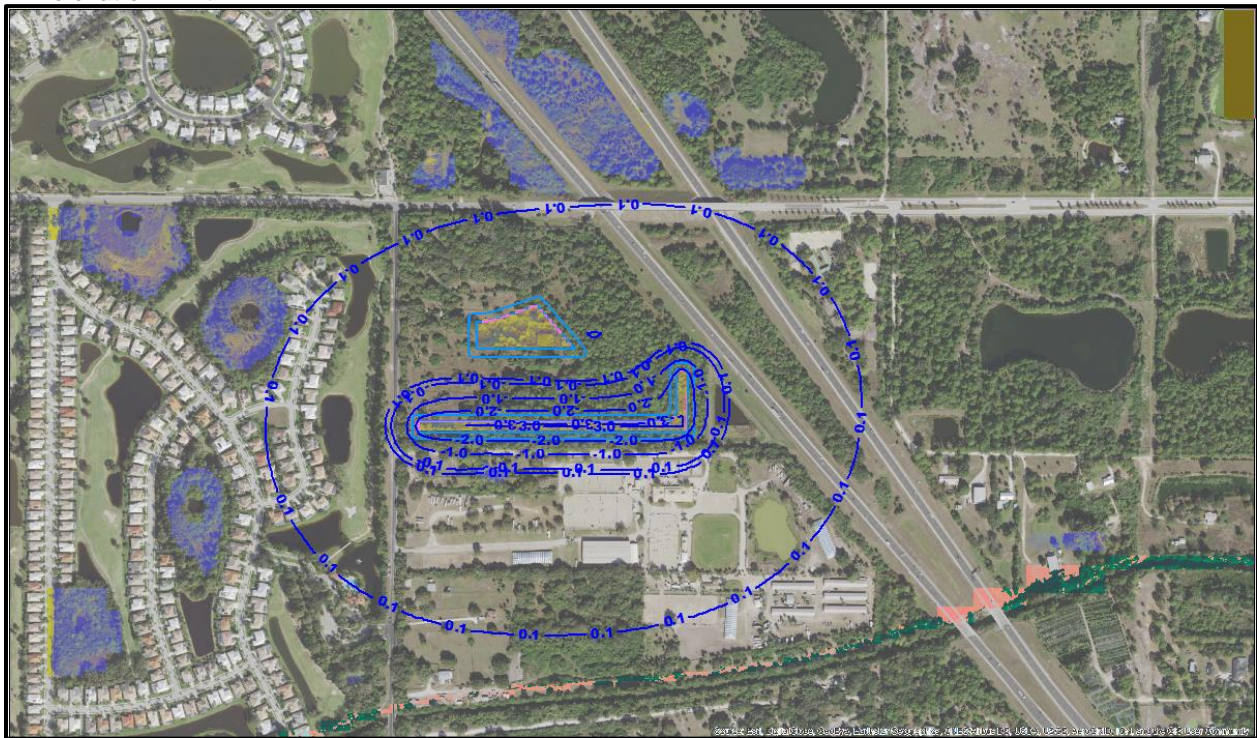


Figure 5. 60-day construction of Pond 2 (dewater to elevation -6 ft.) with Pond 1 elevation held constant at elevation 11-ft.

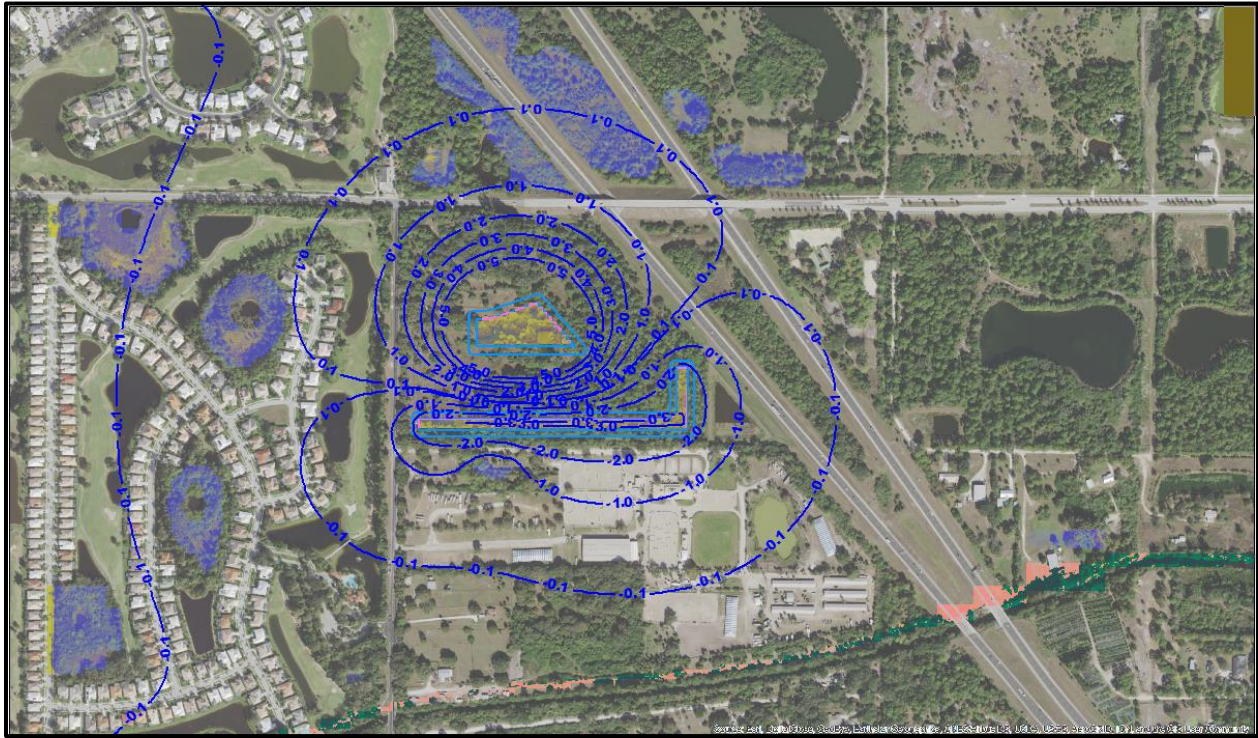


Figure 6. 365 days post construction Pond 1 and Pond 2 set to elevation 11-ft.

