Progressive Water Resources
Integrated Water Resource Consultants

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July 8, 2019

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Subject: Hydrologic Impact Analysis - Windham - Murphy Oaks Development 7-8-19

Mr. Boone:

Progressive Water Resources, LLC (PWR) has preliminarily reviewed potential hydrologic impacts from a proposed dewatering operation associated with a new development located immediately north of Fox Lea Farm's equestrian facility in Venice, Florida. The new development is referred to as "Murphy Oaks" and is proposed by Windham Development.

PWR's efforts included review of a March 27, 2019 Technical Memorandum by Water Resource Associates, LLC (WRA) entitled "DWRMv3 Model Evaluation, Windham - Murphy Oaks Development, Sarasota County, Florida, WRA Project No. 1435." The memorandum contains pertinent project parameters and modeling results but does not provide a high level of detail. WRA used the Southwest Florida Water Management District's (SWFWMD) "District-Wide Regulatory Model" version 3 (DWRMv3) to evaluate the groundwater drawdown impacts resulting from the proposed construction dewatering at the Murphy Oaks development upon the elevation of the Surficial Aquifer System (i.e. water table). PWR did not have access to the modeling electronic files and therefore, relied upon WRA's written report. WRA's model incorporated six stages of pond construction, the most pertinent of which are:

1. **Pond 1 (Southernmost Pond)**
   As shown in the attached **Figure 1**, Pond 1 is the southernmost and closest proposed pond to Fox Lea. Fox Lea's northern property boundary is located only about 100 Ft south of Pond 1. The model assumed 42 days of construction dewatering for Pond 1. WRA reports a Seasonal High Water Table (SHWT) elevation of 11.0 Ft NAVD for the site and that dewatering is proposed to occur to an elevation of 3.0 Ft NAVD, which translates to a water table drawdown of 8.0 Ft at Pond 1. Although a common practice in circumstances where concern exists regarding potential impacts upon offsite land uses, a hydraulic barrier is not proposed to be constructed, operated and maintained in order to prevent drawdown upon offsite properties during construction dewatering of Pond 1.

   Modeling predicts a water table drawdown of nearly **4.0 Ft** at Fox Lea's northern property boundary; between approximately **2.0 - 3.0 Ft** below Fox Lea's northernmost show arena, and between approximately **1.0 - 2.0 Ft** below the show arena located just south of, and adjacent to

exists for adverse impacts upon offsite land uses due to dewatering, it is common and accepted practice to properly construct, operate and maintain an effective hydraulic barrier to avoid impacts upon offsite water levels. Such barriers are coupled with a water table monitoring network to confirm the barrier's effectiveness. In the case of Fox Lea, such a coupled system would assist in providing reasonable assurance that dewatering at the Murphy Oaks Development will not cause adverse drawdown impacts upon the water table below Fox Lea's jumping, landing, and racing arenas, and their water supply pond.

Attached to this correspondence is a proposed Surficial Aquifer System Monitoring Plan that we believe should be incorporated into any potential approval of the Murphy Oaks Development. The monitoring plan would be used to verify the extent of dewatering drawdown impacts on Fox Lea's practice and show arenas as well as their water supply, and safeguard Fox Lea's equestrian operations during construction dewatering of both Pond 1 and Pond 2. It is also recommended that any approval of the proposed development include a requirement to properly construct, operate and maintain an effective hydraulic barrier during, and for a sufficient time after completion of construction of Pond 1. It is also recommended that any approval require the developer to effectively maintain water levels in Pond 1 in order to serve as an effective hydraulic barrier during construction of Pond 2.

Sincerely,

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Principal
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Sincerely,

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the northernmost show arena. The estimated drawdown at the Fox Lea Farms water supply pond is reported to range between about **0.1 Ft - 0.4 Ft**.

2. **Pond 2 (Northern Pond)**
Modeling for Pond 2 assumes a period of 14 days between construction of Pond 1 and Pond 2, and that Pond 1 will be raised to and maintained at an elevation of 11.0 Ft for the duration of Pond 2 dewatering, and for a period thereafter. Unlike construction of Pond 1, during a construction of Pond 2 a hydraulic barrier (i.e. Pond 1) is proposed to be maintained to prevent drawdown upon Fox Lea by maintaining water levels in Pond 1 at an elevation of 11.0 Ft NAVD. Upon completion of construction of Pond 2, modeling assumes maintenance of Ponds 1 and 2 at an elevation of 11.0 NAVD for 365 days.

Potential Impacts Upon Fox Lea's Land Use

Fox Lea operates an approximately 46-acre equestrian show and training facility, is recognized by the United States Equestrian Federation, and conducts up to twelve (12) nationally and six (6) regionally rated equestrian shows every year. Typically, throughout the year the Applicant will host approximately 36 equestrian shows, each lasting up to 5 days and provides year-round training and special event programs. Fox Lea Farm, Inc. provides a highly beneficial economic impact to the area.

To maintain the equestrian show and training facilities, diligent watering and reworking of the show and training ring soils is required, multiple times a day, to provide sure footing and protect the show horses from injury. Typically, a show horse can cost anywhere from $7,500 to $3 million. To safeguard the riders and horses from injury, a precise mixture of No. 13 ground limestone and 250 sand is mixed, graded, and watered continually throughout the day to create a firm, but cohesive cushion during jumping, landing, and flat race exercises. To maintain a proper balance of hydration to the soils of show and training ring soils, Fox Lea withdraws water daily from an approximately 1.4-acre onsite man-made lake to maintain the existing show and training ring soils. Maintenance of water levels in the pond is important to Fox Lea's ability to decrease downtime during water truck tank filling, especially during highly active equestrian events. Fox Lea maintains a Water Use Permit (WUP) and is considered an existing legal user of water under Florida water law.

As provided above, a hydraulic barrier is not proposed to be employed during construction of Pond 1, and modeling predicts water table drawdowns of between approximately **1.0 - 3.0 Ft** of drawdown below Fox Lea's show arenas, and as much as **0.4 Ft** at Fox Lea's water supply pond. Due to the vital importance of maintaining a proper degree of soil moisture for jumping, landing, and racing exercises, the proposed drawdown impacts upon the water table on Fox Lea's property have the potential to cause adverse impacts upon Fox Lea's equestrian operations. Such drawdowns have the potential to affect Fox Lea's ability to maintain sufficient soil moisture and their ability to rely on their water supply pond to provide sufficient rates and quantities of water supply.

Proposed Monitoring Plan

Groundwater flow models are widely-accepted hydrologic impact evaluation tools. However, all models include assumptions. Where actual field conditions or dewatering operations deviate from modeling assumptions, actual impacts will vary accordingly. For this reason, in circumstances where the potential

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Proposed Surficial Aquifer System Monitoring Plan

The proposed monitoring system is designed to verify the extent of the construction dewatering drawdown upon Fox Lea's practice and show arenas closest to the northern property owner's dewatering operation, and to safeguard Fox Lea's equestrian operations. **Figure 1** is a plan view that identifies the extent and magnitude of WRA's model-predicted drawdowns below Fox Lea's property and the location of proposed monitoring plan piezometers. **Figure 2** provides a simplified general cross-sectional conceptual diagram of the magnitude and extent of model-predicted drawdowns below Fox Lea's property.

As shown on **Figure 1**, one piezometer (well 3) is proposed to be installed immediately south the proposed excavation on the northern property owner's property. If this is not possible, this well will be moved to the south and the proposed locations for well Nos. 1 and 2 will be shifted to the east and west to maintain the integrity of the proposed monitoring system.

Dewatering is proposed to occur (per WRA's March 27, 2019 Technical Memorandum) over an approximate 100-day period.

Maintaining proper soil moisture is critical to Fox Lea's operations and could be adversely impacted if Surficial Aquifer System (water table) water levels are adversely lowered and maintained in a depressed condition. In addition, if the southern excavation (pond) becomes sedimented with silts and clays, it may become sealed off and its effectiveness as a hydraulic barrier for the northern excavation (Pond 2) diminished.

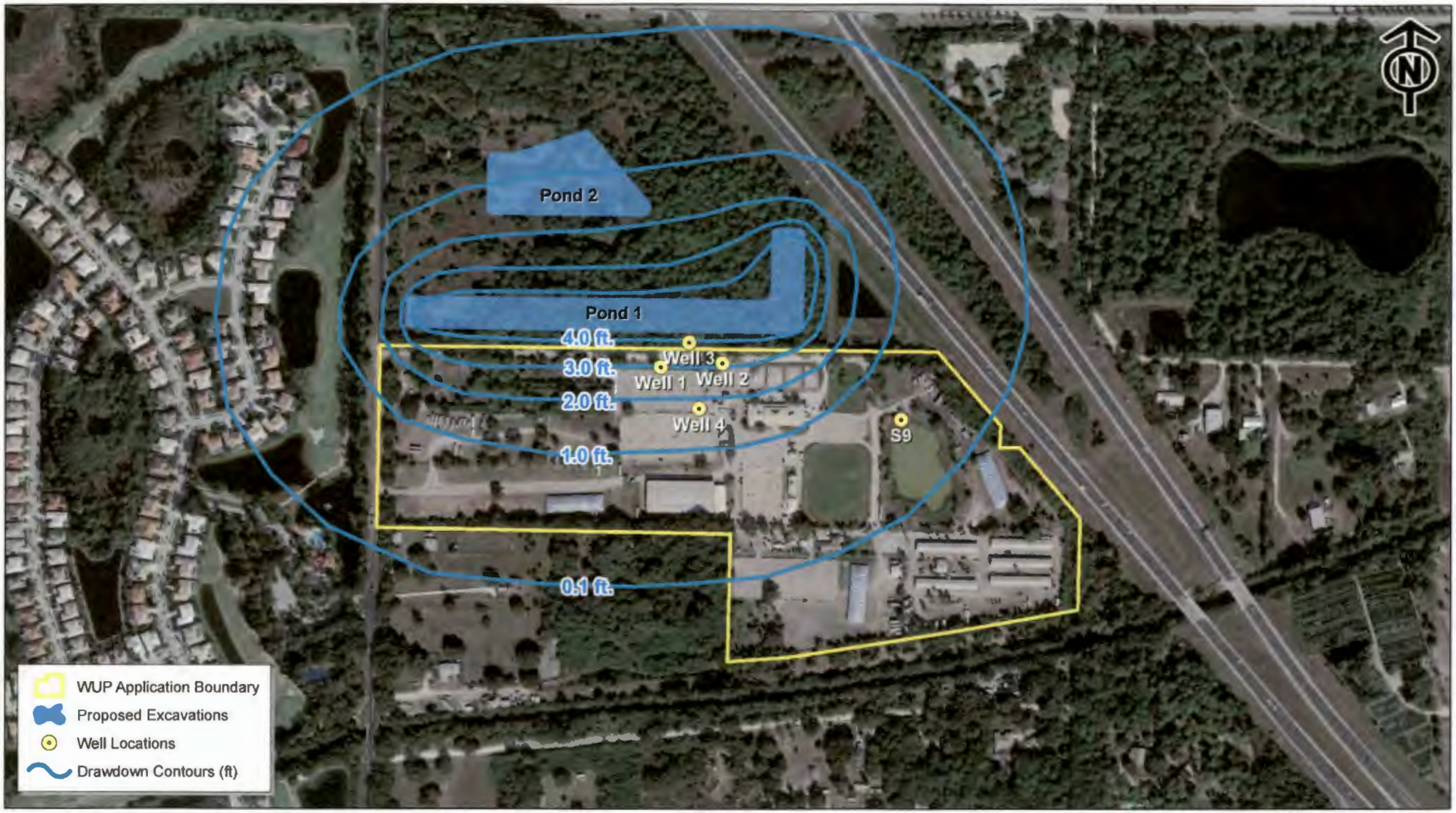
Up to four (4) shallow, 2-inch diameter piezometers are proposed that would extend to a depth of 15 feet below land surface (bls). Each piezometer is proposed to have 10 foot screen sections (0.010 inch slots). Each well is proposed and extend approximately three (3) feet above land surface and have a protective metal box. Wells are proposed to be installed by hollow stem auger and be developed to remove fine sediments that may have been introduced into the screens during installation. Each well is proposed to be outfitted with a water level data logger.

A single staff gauge is also proposed in Fox Lea's pond, used as a water supply source for arena soil hydration.

All piezometers and the staff gauge are proposed to be surveyed to a common datum.

Water levels are proposed to be monitored daily and monitoring is to be initiated no later than 2 weeks prior to the initiation of dewatering (for background water levels).

Water levels would continue to be obtained daily and downloaded weekly until all dewatering activities have been terminated and the newly excavated ponds rebound back to approximate natural water table conditions.



Scale: 1:4,000 7/8/2019 Image: ESRI World Imagery 0 250 500 1,000 Feet

Progressive Water Resources has provided the images or data presented in this map for informational purposes only. This data is not intended to be used in lieu of official survey data provided by a Professional Surveyor licensed by the State of Florida

Figure 1
Well Locations, Proposed Excavations and Dewatering Drawdown
Fox Lea Farm, Inc.
Sarasota County, Florida

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Figure 2 – Generalized Dewatering Cross-Section