

October 27, 2020

Chuck Adams  
Director of Operations  
Wrathell, Hunt and Associates  
9220 Bonita Beach Road, Suite 214  
Bonita Springs, FL 34135

**Re: Wet Season 2020 Water Quality Monitoring Report  
Mediterra CDD Pond Sampling, Analysis, and Reporting**

Dear Chuck:

This letter provides the results of the wet season 2020 water quality (WQ) sampling of four (4) outfall ponds (L-24, L-37, L-52, and L-55) and one (1) additional water treatment pond (L-35) located in the Mediterra CDD. Copies of the laboratory analytical reports for the water quality samples are attached in Appendix A.

## **I. PURPOSE & SCOPE OF WORK**

This work was conducted as Task 01: Wet Season Surface Water Sampling of our existing contract. One (1) wet season surface water sampling event was conducted at each of the five (5) ponds when discharge occurred over their respective control structures. The locations of the ponds sampled are shown on the attached sampling map. L-37 and L-52 to the North discharge to Oak Creek, L-24 and L-55 to the South discharge to the Cocohatchee River, and L-35 was selected by the CDD.

## **II. METHODOLOGY**

The water quality sampling event was conducted on August 12, 2020. Field parameters including dissolved oxygen, temperature, specific conductance, pH, and turbidity were monitored and recorded using a multi-parameter meter and turbidimeter. In addition to field readings and sampling, field personnel conducted visual inspections and took photographs. Littorals and aerators were observed at all the ponds. Photos of each pond are provided in Appendix B.

Water quality samples and readings were collected from water discharging over the outfall structures from ponds L-37, L-52, and L-55. The sample and readings for pond L-35 were collected from the pond near the bank. No sample was collected from pond L-24 because there was no discharge over the outfall structure. A second attempt to sample from pond L-24 was made on September 21, 2020, but there was no discharge at that time either.

The samples were collected in accordance with Florida Department of Environmental Protection (FDEP) Standard Operating Procedures. Benchmark EnviroAnalytical Laboratory (BEA) provided sample containers and performed the laboratory analytical services. The samples were analyzed for total nitrogen (TN) and total phosphorus (TP).

### III. RESULTS

The laboratory analytical results and dissolved oxygen readings for the one (1) wet season 2020 sampling event were compared to each other and to State Lakes Water Quality (WQ) standards. Those comparisons are shown in Table 1. All the results from the samples collected were at or below the nutrient thresholds for TN (1.27 mg/L) and TP (0.05 mg/L). All the dissolved oxygen readings were above the Lake criteria threshold of 38%. Comparisons are made to standards for lakes in this part of Florida. While the water in these ponds does not have to meet the water quality standards for lakes, water leaving any of these ponds through the outfall structures must meet that standard.

**Table 1: 2020 Wet Season Mediterra CDD TN, TP, and DO Values**

Site	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Dissolved Oxygen (%)
	August 12, 2020		
L-24	No discharge over outfall structure during sampling events (8/12/20 & 9/21/20)		
L-35	1.15	0.05	57.8
L-37	0.99	0.04	76.9
L-52	0.69	0.02	53.2
L-55	1.05	0.03	64.4
Lake Criteria	≤1.27 <sup>(1)</sup>	≤0.05 <sup>(1)</sup>	≥38 <sup>(2)</sup>

(1) Annual geometric mean not to be exceeded more than once in any consecutive three-year calendar period, 62-302.530, F.A.C.

(2) No more than 10% of the values shall be below the standard, 62-302.530, F.A.C.

Field measured parameters for the one (1) wet season 2020 sample event are shown in Table 2.

**Table 2: 2020 Wet Season Mediterra CDD Field Data**

Site	Temperature (°C)	Specific Conductance (mS/cm)	pH	Turbidity (NTU)
	August 12, 2020			
L-24	No discharge over outfall structure during sampling events (8/12/20 & 9/21/20)			
L-35	30.2	0.63	7.31	2.77
L-37	31.4	0.58	7.72	4.02
L-52	31.7	0.45	7.64	1.71
L-55	30.1	1.15	7.41	5.19

#### IV. CONCLUSIONS

Field measurements taken during the one (1) wet season 2020 surface water sampling event showed that all the ponds sampled are fresh with good levels of dissolved oxygen. Total nitrogen and total phosphorus levels in samples collected from the ponds were at or lower than the Class III Lakes State WQ threshold reference value. Total phosphorus levels in samples collected from L-52 and L-55 were very low. Overall, each of the ponds sampled appear to have good nutrient levels and pond L-52 appears to have the best nutrient levels.

Please feel free to contact me if you have any questions regarding these sampling activities.

Sincerely,

JOHNSON ENGINEERING, INC.

A handwritten signature in black ink, appearing to read 'Tim Denison', written over a white background.

Tim Denison  
Environmental Scientist



June 23, 2020

Chuck Adams  
Director of Operations  
Wrathell, Hunt and Associates  
9220 Bonita Beach Rd, Suite 214  
Bonita Springs, FL 34135

**Re: 2020 Annual Sediment Sampling  
Mediterra CDD Pond Health Testing, Analysis and Report**

Dear Chuck:

This letter provides the results of the 2020 dry season (February 2020 to May 2020) sediment sampling of five (5) stormwater treatment ponds within the bounds of the Mediterra CDD. A copy of the laboratory analytical report for the collected sediment samples is attached in Appendix A.

## **I. PURPOSE & SCOPE OF WORK**

This work was conducted as Task 02: Dry Season Sediment Sampling of our existing contract. One (1) dry season sediment sampling was conducted at four (4) outfall ponds and one (1) additional pond (L-35) that were provided by the CDD, along with a recommendation from the District Engineer. Each of the ponds sampled are shown on the attached sampling map.

## **II. METHODOLOGY**

One (1) annual sediment sampling event was conducted on April 22<sup>nd</sup> & 23<sup>rd</sup>, 2020 at all five (5) ponds. Sediment samples were collected from one (1) location in L-37, two (2) locations in L-24, L-35, L-55, and three (3) location in L-52 from a vessel (boat). Sampling was conducted by pushing PVC tubes through the muck layer into the sandy layer below and then capping the tubes. Water was drained off from the top of each tube, leaving just the muck and bottom material. The tops of the tubes were cut down to the top of the muck layer, and the top of each tube was labeled with an arrow indicating the top of the sample and the sample (lake) ID.

Each sediment sample was inspected in-house by Johnson Engineering for core composition, core length, and muck thickness. The samples that contained muck were transported to Benchmark EnviroAnalytical (BEA) laboratory for analysis following chain-of-custody procedures. The sediment samples were laboratory analyzed for nitrate + nitrite, total Kjeldahl nitrogen, total

nitrogen, total phosphorus, and total solids (% dry weight). Photographs of the sediment cores and a description of the core samples are provided in Appendix B.

### III. RESULTS

**Table 1** below shows the lab results for each sediment sample, along with the amount of muck (dark organic material) measured. The sample IDs shown in bold represent locations that had muck present in the sample collected as part of this event

**Table 1: 2020 Mediterra CDD Dry Season Sediment Sample Results**

<b>Sample ID</b>	<b>Total Nitrogen (% Dry/Weight)</b>	<b>Total Phosphorus (% Dry/Weight)</b>	<b>Total Solids (% Dry/Weight)</b>	<b>Muck (inches)</b>
<b>L-24</b>	0.26	0.053	34.6	<b>1-2</b>
<b>L-35</b>	0.30	0.123	30.5	<b>3</b>
<b>L-37</b>	0.31	0.250	27.6	<b>5</b>
L-52	Sample was not sent to lab; no muck present			0
<b>L-55</b>	0.42	0.203	20.5	<b>3-4</b>

### CONCLUSIONS

Sediment samples from four (4) of the ponds showed presence of muck in the samples collected. Ponds L-24, L-35, L-37, and L-55 had thickness of muck ranging from 1” thick to 5” thick with relatively high levels of nutrients. Sediment samples from pond L-52 did not have presence of muck from the three (3) different locations sampled and did not get analyzed by the lab.

**Table 2** shows comparisons between the amount of muck found in the five (5) stormwater treatment ponds collected for four (4) consecutive years (2017, 2018, 2019, and 2020). The sediment samples collected from ponds L-37 and L-55 in 2019 showed no presence muck, in 2020 L-37 had five (5) inches and L-55 had three to four (3-4) inches of muck in the samples collected. Samples collected in 2020 have shown a steady to slightly increasing trend in presence of muck to previous years, pond L-52 has been consistent for three (3) years in not having a presence of muck in sediment samples when collected. Johnson Engineering recommends another year of sediment sampling at the same five (5) stormwater treatment ponds in the dry season for further comparison.

**Table 2: 2017, 2018, 2019, and 2020 Sediment Sample Comparisons Results**

<b>Sample ID</b>	<b>2017 Muck (inches)</b>	<b>2018 Muck (inches)</b>	<b>2019 Muck (inches)</b>	<b>2020 Muck (inches)</b>
L-24	1	2	4	1.5
L-35	0	0	5	3
L-37	0	2	0	5
L-52	6	0	0	0
L-55	0	0	0	3.5

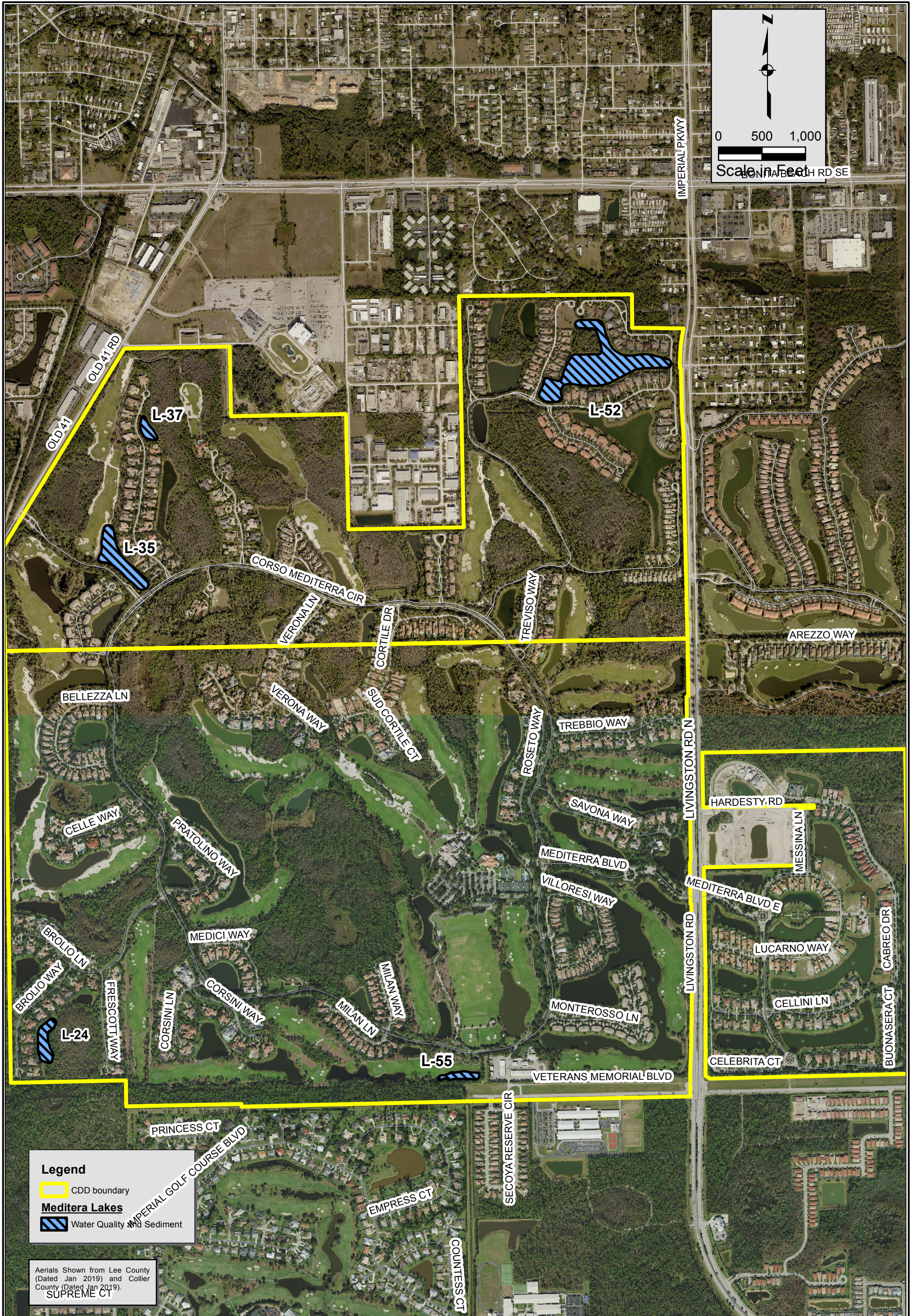
Please feel free to contact me if you have any questions regarding these sampling activities.

Sincerely,

JOHNSON ENGINEERING, INC.



Tim Denison  
Environmental Scientist



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Mediterra South CDD Pond Health  
Lee-Collier County, Florida

**JOHNSON ENGINEERING**

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Sampling Map

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
March 2020	20023589-020		AS SHOWN	1



Photo 1: L-24 (north)

Photo 2: L-24 (south)





Photo 3: L-35 (west)



Photo 4: L-35 (east)

Appendix B: Mediterra South CDD Pond Health (Sediment 2020)



Photo 5: L-37



Photo 6: L-52 (west)



Photo 7: L-52 (mid)



Photo 8: L-52 (east)



Photo 9: L-55 (west)



Photo 10: L -55 (east)