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September 27, 2012

Mr. Gardner Strasser, P.G.
Florida Department of Environmental Protection
400 N. Congress Ave, Suite 200
West Palm Beach, FL 33401

Ref. No. A9021.02
Subject: Lake Worth – Operating Permit Application for Class 1 Injection Well and Dual Zone Monitoring Well System, Permit No. 0297969-002-UO

Dear Mr. Strasser:

The purpose of this letter is to provide a response to the Departments request for information (RFI) dated August 22, 2012 related to an operating permit application for deep injection well IW-1 at the City of Lake Worth Water Treatment Plant. For ease of review, each RFI question or comment is provided below in italics, with the response immediately following.

1. *The application should include the cross section figures that are referenced for the regional deep injection wells and provide details of the area geology and hydrogeology. Please include this information in the application.*

   Response: Data collected during construction of IW-1 were used to prepare the geologic and hydrogeologic column for the IW-1 presented in Figure 1. Interpretation of data collected during construction and testing of IW-1 indicates that the Surficial Aquifer is present at the site to a depth of approximately 270 feet below land surface (bls). The confining strata of the Hawthorn Group separating the Surficial Aquifer from the Floridan Aquifer are present from approximately 270 to 940 feet bls at the site. The base of the Underground Source of Drinking Water (USDW) was identified at a depth of 1,680 feet bls. The primary confining unit separating the base of the USDW from the injection zone is present from approximately 1,940 to 2,860 feet bls. The injection zone is present from a depth of 2,860 feet bls to the total depth of the well at 3,303 feet bls. Figure 2 provides a local cross section location map. Figures 3 and 4 provide geologic and hydrogeologic cross sections for the site. Figure 5 provides a regional cross section

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location map. Figures 6 and 7 provide regional geologic and hydrogeologic cross sections for the site.

2. *The Department awaits the proof that the existence of the injection well has been recorded in Palm Beach County Clerk of Records.*

   Response: Please see the proof that the existence of IW-1 has been recorded in Attachment A.

3. *The City of Lake Worth Concentrate Disposal System – Operational and Maintenance (O & M) Manual submitted along with the application to operate was not signed and sealed by the engineer of record. Please have the engineer of record sign and seal a cover page to be inserted into the O & M manual. Please send one copy of the cover letter to FDEP West Palm Beach and one copy to Tallahassee UIC Section, attention George Heuler, P.G.*

   Response: Attached is a signed and sealed internal cover sheet for the Operation and Maintenance Manual.

4. *In the O & M manual, Appendix B (Deep Injection Well and Site Location Survey) and Appendix C (Dual Zone Monitor Well) signed and sealed as-built drawings were not included. The application to operate should be a stand-alone document supporting the application for operation of the reverse-osmosis facility. Please reference the as-built drawing submitted on July 15, 2011, City of Lake Worth Reverse Osmosis Concentrate Injection Well System Report, Appendix I. Please provide the FDEP West Palm Beach and the FDEP Tallahassee UIC Section with two copies for each office, of the as-built drawings and site location survey, to be inserted into the application to operate and O & M manual.*

   Response: Enclosed are two signed and sealed copies of Appendix B, Figures 3 through 6 and Appendix C, Figures 6 through 8 to be inserted into the O & M Manual. Two signed and sealed copies are included in the submission to FDEP Tallahassee as requested.

5. *In reference to the engineer's drawing, Sheet C1-2, dated June 29, 2011, the drawing shows a shaded out area on the drawing (see attached). The concern is the "16-inch concentrate" lines going to the injection well. At the location of the wet well on the drawing, below the wet well, is a 16-inch tee and valve going to the wet well and from the pumps a 16-inch tee going back into the 16-inch concentrate line to the injection well. Also, between these two tee connections is a connection to the 30-inch PVC RWM.*

Further along the 16-inch concentrate line going to the injection well is an unidentified box structure and to the left is another 16-inch tee and valve connection (see attached drawing).

Please provide the Department with the signed and sealed drawing of these structures and installation and the reason for the by-pass valves and tee structures.

Response: In reference to the questions on drawing C1-2 the following explanations are provided:

The shaded or hatched areas generally represent areas to be paved. The concentrate flow from the reverse osmosis (RO) plant is normally discharged to the concentrate pump station wetwell. For alternate operations the concentrate flow may bypass the concentrate pump station and be piped directly to the deep injection well. Note that this method of operation is not normally recommended, but is available if needed.

The 30-inch PVC raw watermain furnishes raw water from the Floridan wells to the RO plant. When the Floridan wellfield is out of service for an extended time period, it must be flushed extensively prior to furnishing raw water to the RO plant. This was the case with the Floridan wells when the RO plant was ready to startup in July 2011. The wells were flushed to tide under a general permit to discharge formation fluids. This connection is protected by a RPZ backflow preventer. The piping is located below ground where as the RPZ backflow preventer and associated isolation valves are located above ground for routine inspection, testing, and annual certification.

The box in question and several other items were not labeled because they were not in the construction contract for the deep injection well. Instead, they were in the construction contract for the reverse osmosis plant. The box is the concentrate flow meter vault that houses the magnetic flow meter for the concentrate flow and has been so labeled on the drawing.

The tee and valve connection located just south of the concentrate flow meter vault is to route the raw Floridan waters to discharge for flushing the Floridan wells as discussed above. A signed and sealed updated record drawing copy of sheet C1-2 with the above labels added is attached. Reference Sheet C1-2, Drawing No. 44-43-28-288 dated October 2009, last revised September 2012.

The requirement for the internal MIT due before September 2013 is acknowledged and preliminary plans are being developed to accomplish this.

If you have any additional questions or comments, please contact me at 683-3113, extension 258, or David McNabb at (561) 891-0763.

Sincerely,

MOCK, ROOS & ASSOCIATES, INC.

John R. Leemon, P.E.
Senior Project Manager

JRL:jeh
Enclosure
Copies: George Heuler/FDEP-Tallahassee (w/encl.)
Emily Richardson/SFWMD (w/encl.)
Ron Reese, USGS/MIA (w/encl.)
Tom Le Fevre, PBCHD (w/encl.)
Monica Morandi, P.E. (w/encl.)
Doug Lovelace/Mary Pape (w/encl.)
David McNabb, MHC, Inc. (w/encl.)

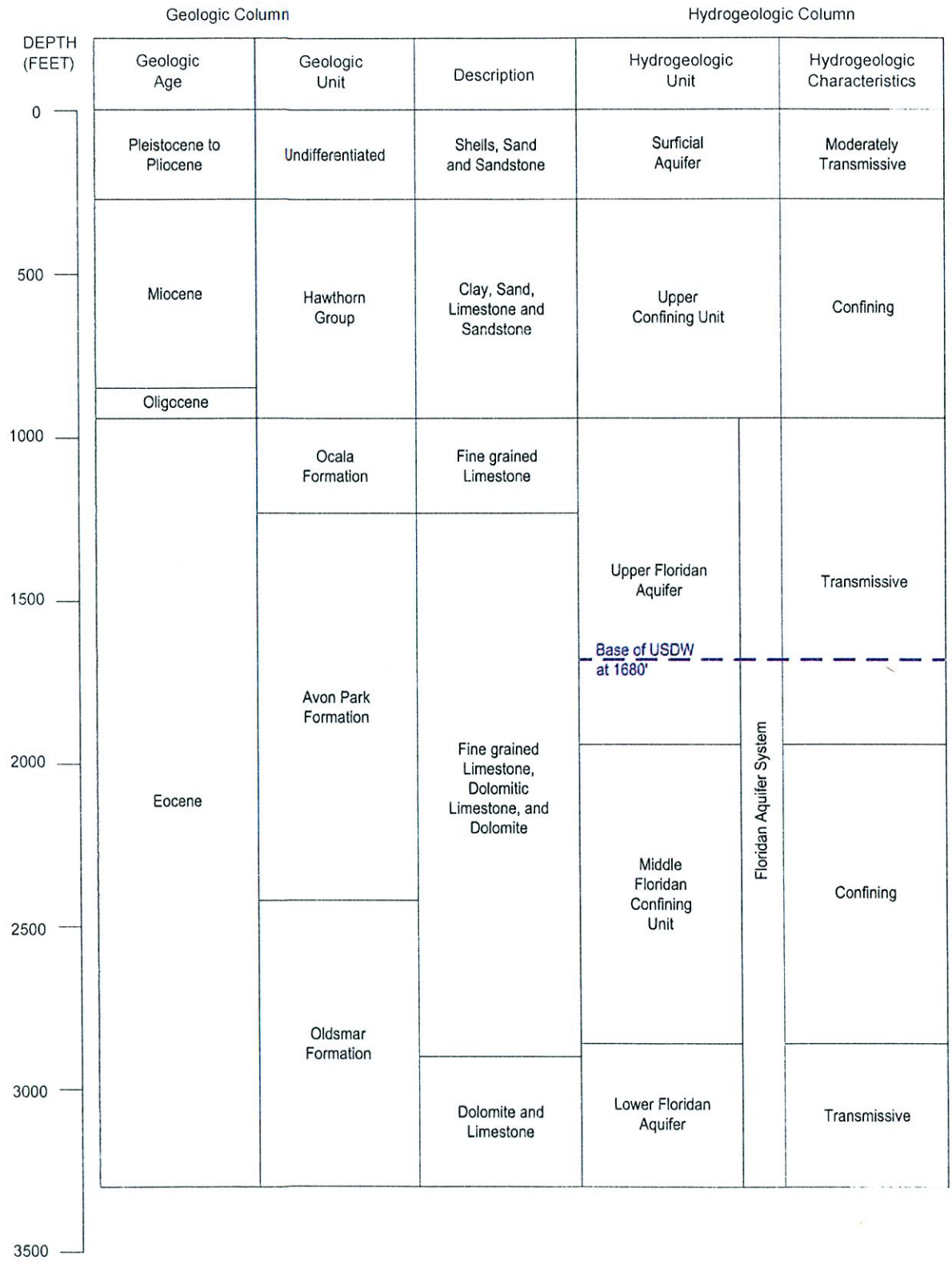
City of Lake Worth

Operating Permit Application for Class 1 injection Well

and Dual Zone Monitoring Well System

Response to FDEP Comment 1

Figures 1 through 7



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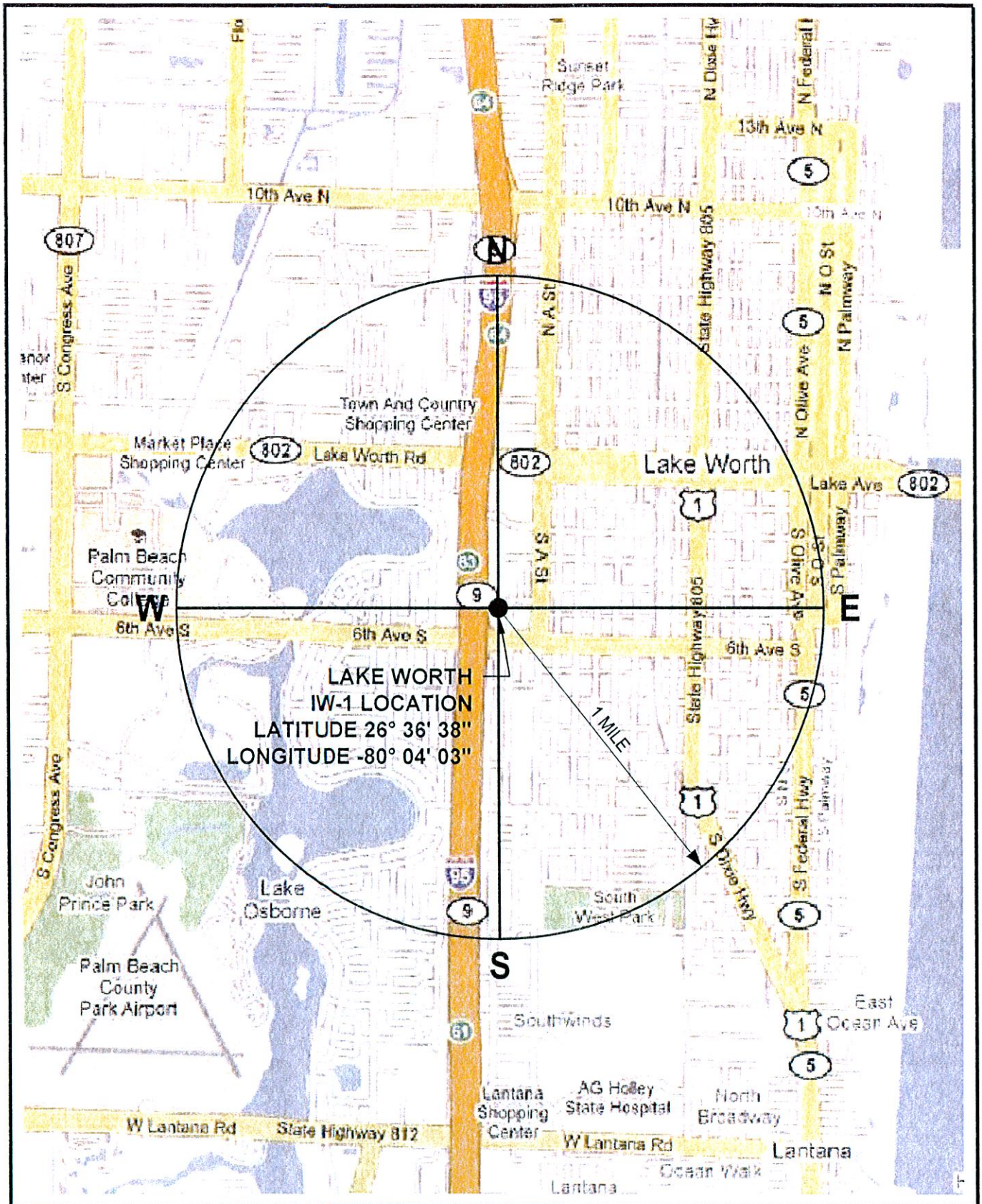
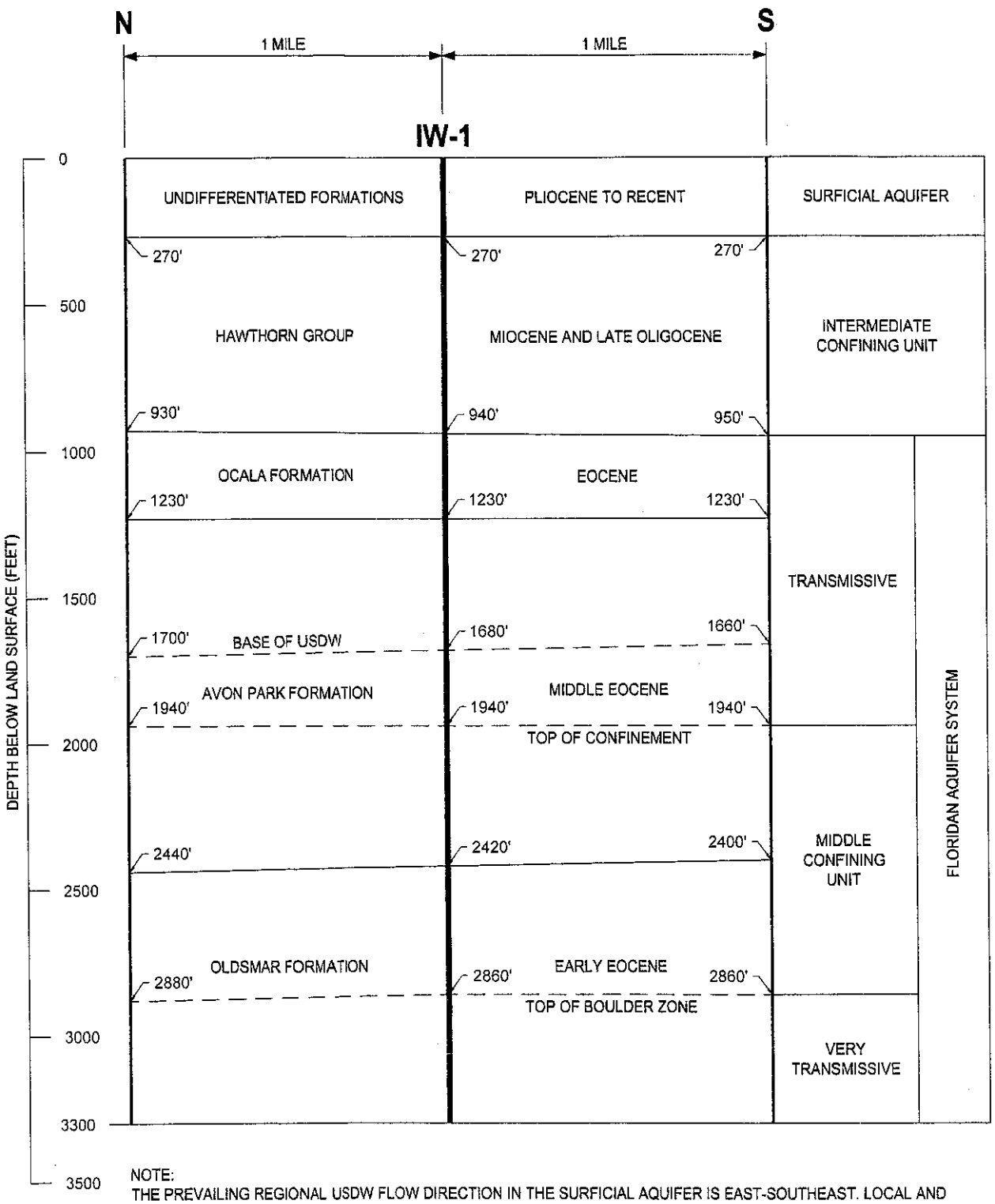
LAKE WORTH WTP
GEOLOGIC AND
HYDROGEOLOGIC COLUMN

FIGURE 1



MHC McNabb Hydrogeologic Consulting, Inc.	FL. E.B. NO. 48 FL. L.B. NO. 48 MOCK • ROOS ENGINEERS • SURVEYORS • PLANNERS 5720 Corporate Way, West Palm Beach, Florida 33407 (561) 683-3113, fax 478-7248	LAKE WORTH WTP LOCAL CROSS SECTIONS LOCATION MAP FIGURE 2



NOTE:
THE PREVAILING REGIONAL USDW FLOW DIRECTION IN THE SURFICIAL AQUIFER IS EAST-SOUTHEAST. LOCAL AND REGIONAL FLOW DIRECTION IN THE FLORIDAN AQUIFER IS EAST-SOUTHEAST.

MHC McNabb Hydrogeologic Consulting, Inc.
3611 Heritage Drive, Suite 110
Jupiter, Florida 33458
Phone 561.391.0783 - Fax 561.743.8489

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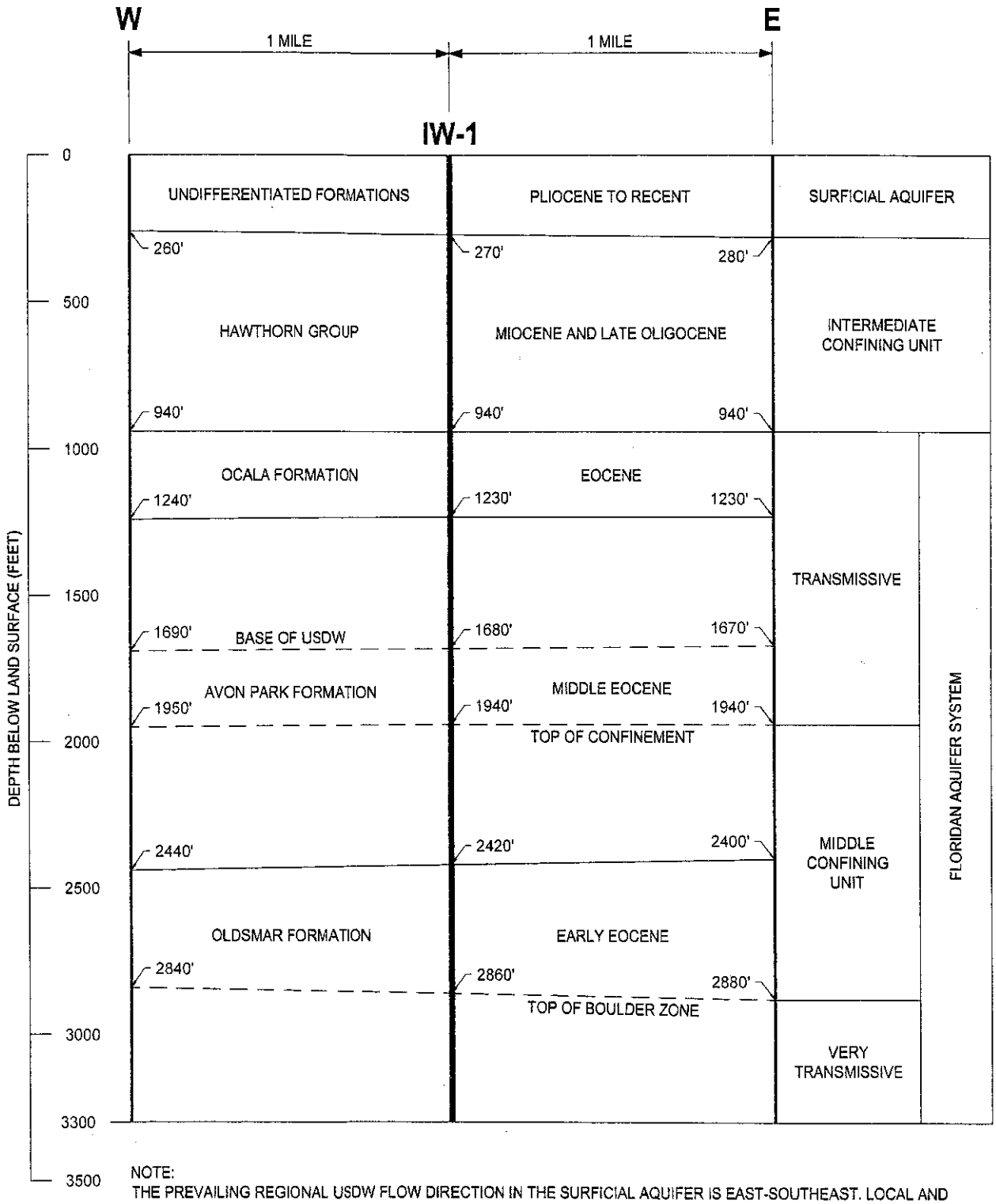
LAKE WORTH WTP
NORTH-SOUTH LOCAL
CROSS SECTION

FIGURE 3



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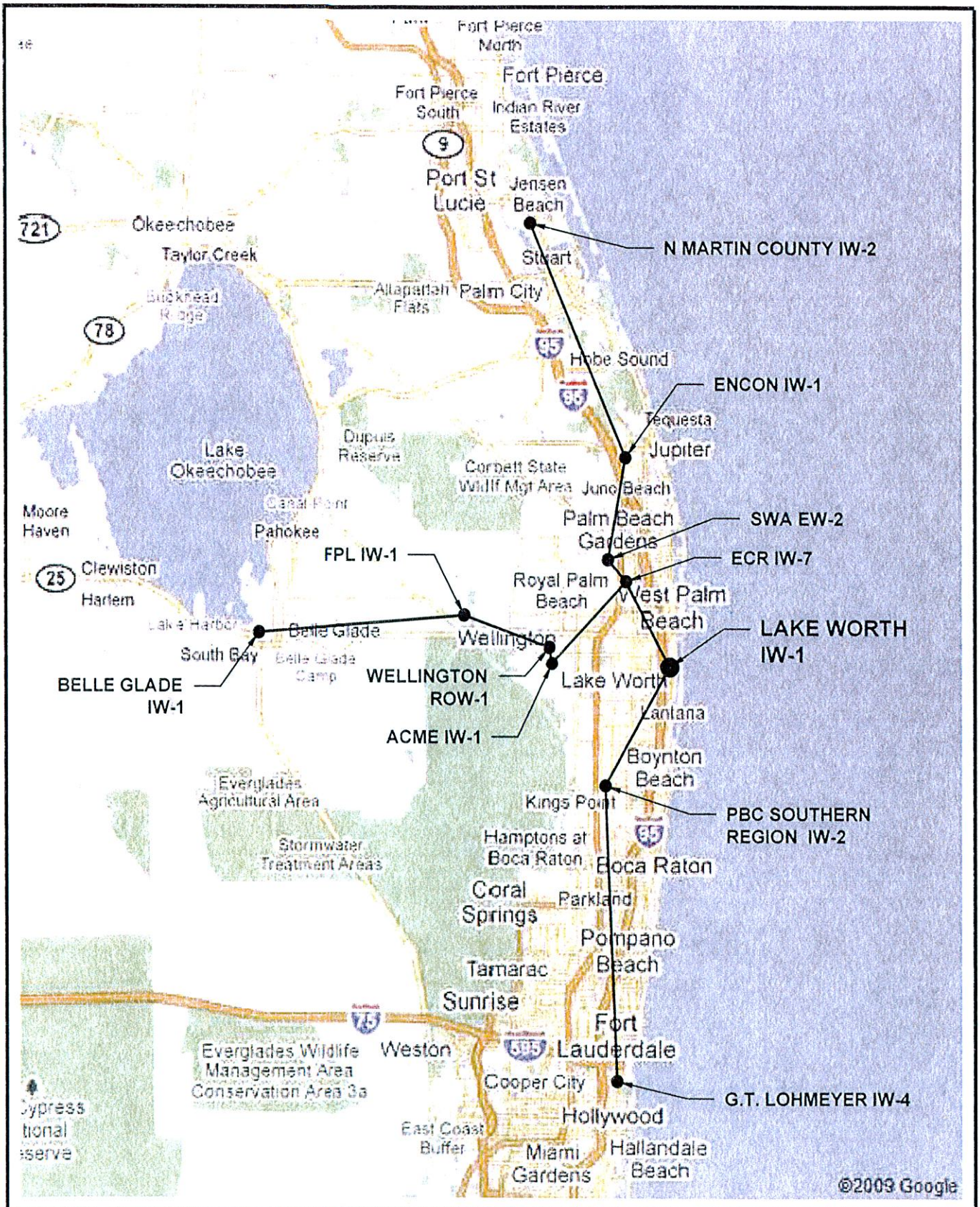
LAKE WORTH WTP
EAST-WEST LOCAL
CROSS SECTION

FIGURE 4



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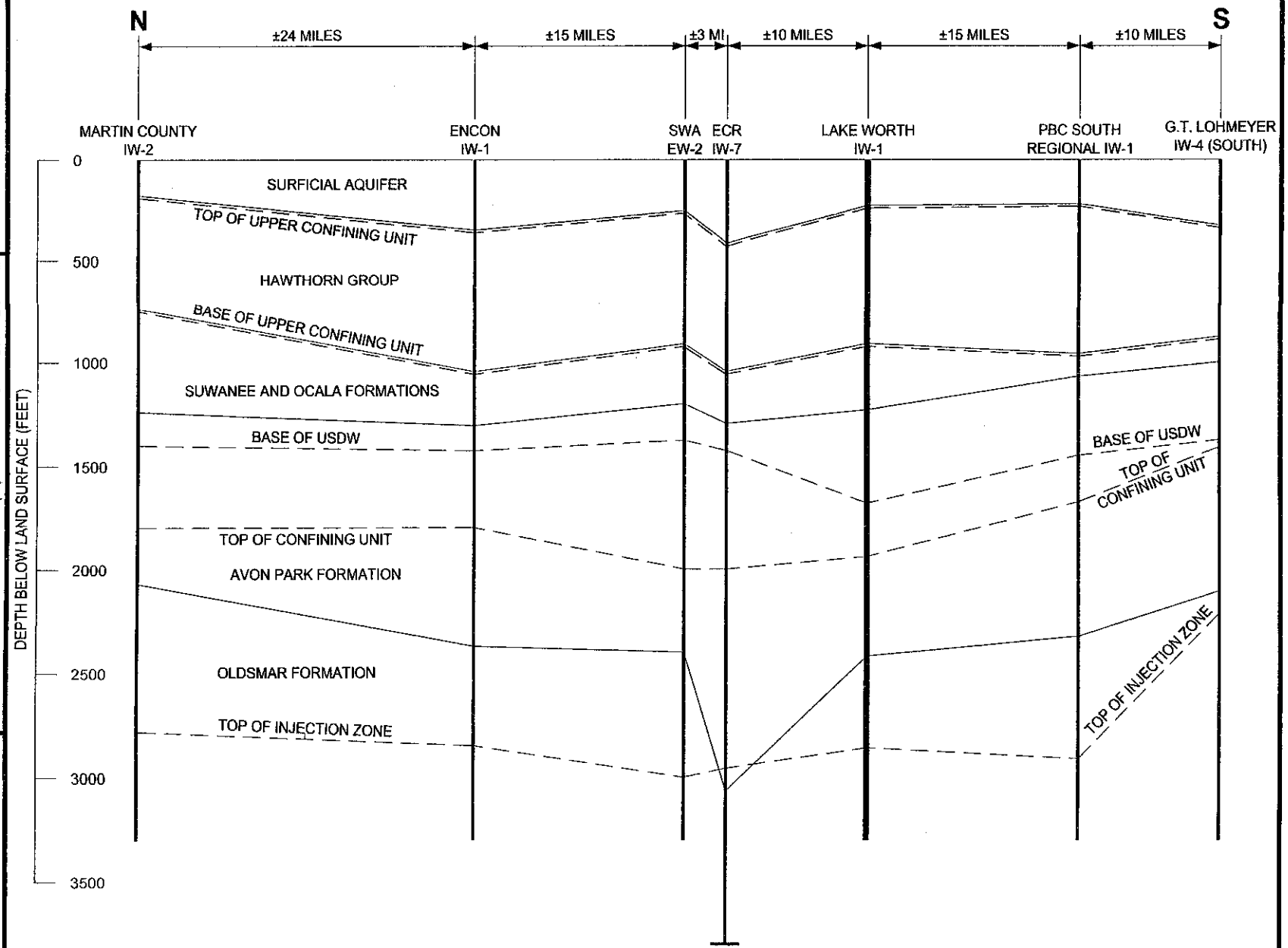
LAKE WORTH WTP
REGIONAL CROSS SECTIONS
LOCATION MAP

FIGURE 5



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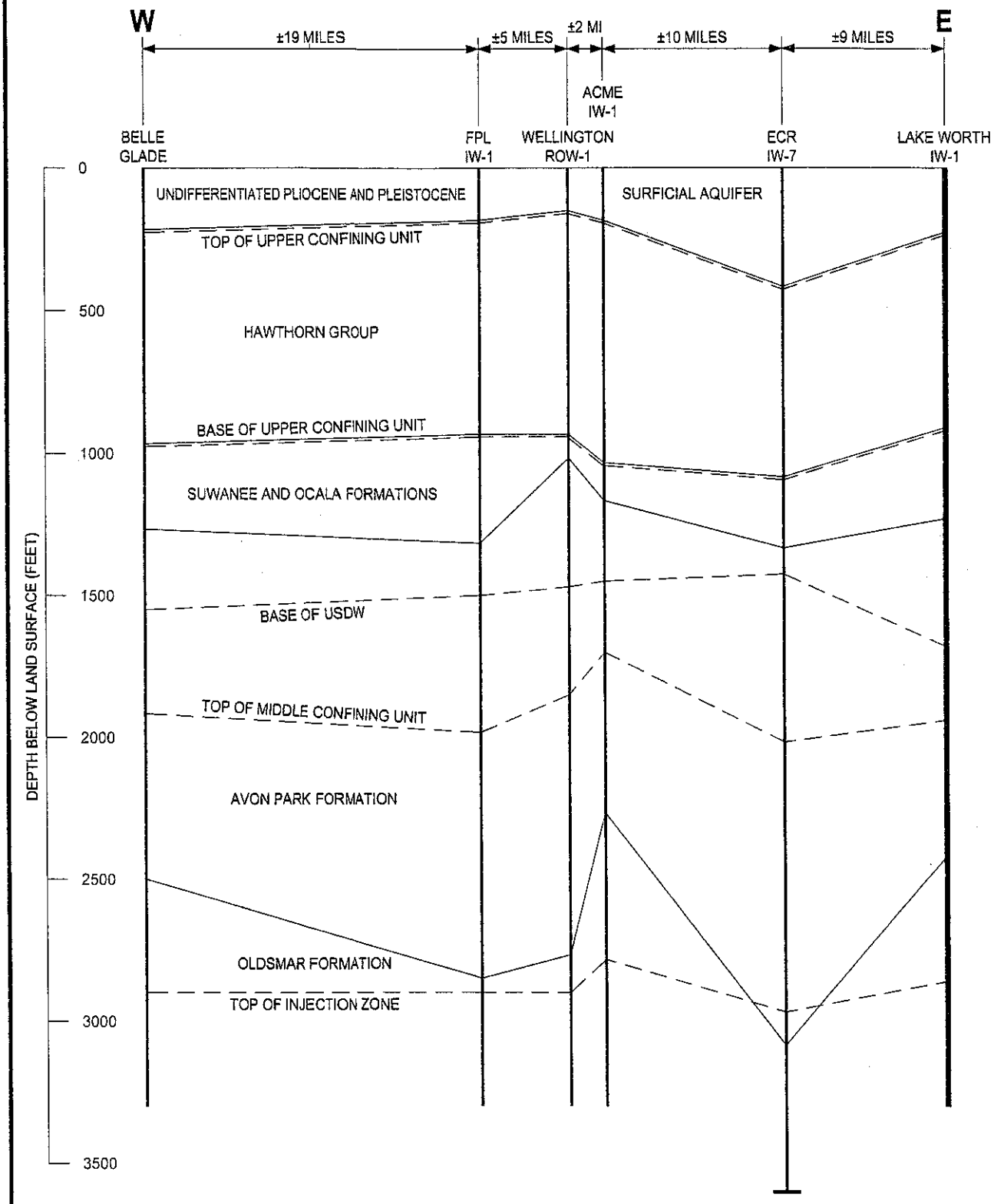
LAKE WORTH WTP
NORTH-SOUTH REGIONAL
CROSS SECTION

FIGURE 6



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LAKE WORTH WTP
WEST-EAST REGIONAL
CROSS SECTION

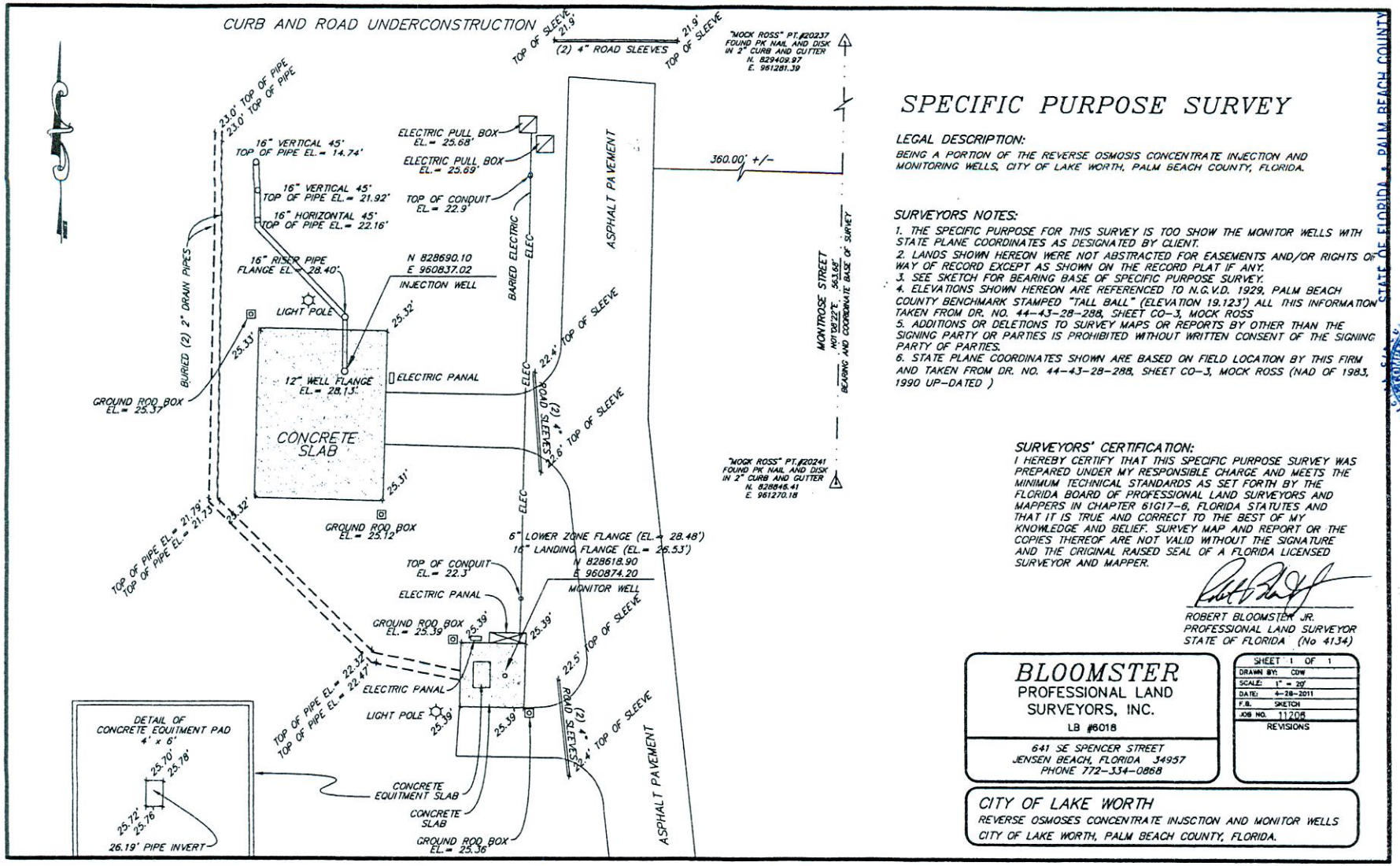
FIGURE 7

City of Lake Worth

Operating Permit Application for Class 1 injection Well and Dual Zone Monitoring Well System

Response to FDEP Comment 2

Attachment A – Proof of Recording



SPECIFIC PURPOSE SURVEY

LEGAL DESCRIPTION:

BEING A PORTION OF THE REVERSE OSMOSIS CONCENTRATE INJECTION AND MONITORING WELLS, CITY OF LAKE WORTH, PALM BEACH COUNTY, FLORIDA.

SURVEYORS NOTES:

1. THE SPECIFIC PURPOSE FOR THIS SURVEY IS TOO SHOW THE MONITOR WELLS WITH STATE PLANE COORDINATES AS DESIGNATED BY CLIENT.
2. LANDS SHOWN HEREON WERE NOT ABSTRACTED FOR EASEMENTS AND/OR RIGHTS OF WAY OF RECORD EXCEPT AS SHOWN ON THE RECORD PLAT IF ANY.
3. SEE SKETCH FOR BEARING BASE OF SPECIFIC PURPOSE SURVEY.
4. ELEVATIONS SHOWN HEREON ARE REFERENCED TO N.G.V.D. 1929, PALM BEACH COUNTY BENCHMARK STAMPED "TALL BALL" (ELEVATION 19.123') ALL THIS INFORMATION TAKEN FROM DR. NO. 44-43-28-288, SHEET CO-3, MOCK ROSS
5. ADDITIONS OR DELETIONS TO SURVEY MAPS OR REPORTS BY OTHER THAN THE SIGNING PARTY OR PARTIES IS PROHIBITED WITHOUT WRITTEN CONSENT OF THE SIGNING PARTY OF PARTIES.
6. STATE PLANE COORDINATES SHOWN ARE BASED ON FIELD LOCATION BY THIS FIRM AND TAKEN FROM DR. NO. 44-43-28-288, SHEET CO-3, MOCK ROSS (NAD OF 1983, 1990 UP-DATED)

SURVEYORS' CERTIFICATION:

I HEREBY CERTIFY THAT THIS SPECIFIC PURPOSE SURVEY WAS PREPARED UNDER MY RESPONSIBLE CHARGE AND MEETS THE MINIMUM TECHNICAL STANDARDS AS SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL LAND SURVEYORS AND MAPPERS IN CHAPTER 61G17-6, FLORIDA STATUTES AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. SURVEY MAP AND REPORT OR THE COPIES THEREOF ARE NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

ROBERT BLOOMSTER JR.
PROFESSIONAL LAND SURVEYOR
STATE OF FLORIDA (No 4134)

BLOOMSTER
PROFESSIONAL LAND SURVEYORS, INC.
LB #6018
641 SE SPENCER STREET
JENSEN BEACH, FLORIDA 34957
PHONE 772-334-0868

SHEET	1 OF 1
DRAWN BY:	CDW
SCALE:	1" = 20'
DATE:	4-28-2011
F.B.	SKETCH
JOB NO.	11208

REVISIONS

CITY OF LAKE WORTH
REVERSE OSMOSES CONCENTRATE INJSCTION AND MONITOR WELLS
CITY OF LAKE WORTH, PALM BEACH COUNTY, FLORIDA.

STATE OF FLORIDA • PALM BEACH COUNTY

I hereby certify that the foregoing is a true copy of the record in my office with redactions, if any as required by law.

DAY OF 20

SHARON R. BOCK
CLERK & COMPTROLLER

By DEPUTY CLERK

City of Lake Worth

Operating Permit Application for Class 1 injection Well

and Dual Zone Monitoring Well System

Response to FDEP Comment 3

Operation and Maintenance Manual Internal Cover Sheet

with Engineer's Signature and Seal

Concentrate Disposal System
Operation and Maintenance Manual
The City of Lake Worth
Reverse Osmosis Water Treatment Plant
July 2012

Engineer's Statement

I hereby state, as a Professional Engineer in the State of Florida, that the information in this *Operation and Maintenance Manual* was assembled under my direct responsible charge. Much of the information presented herein was furnished by others, including many of the manufactures data sheets. While the Engineer has made every reasonable attempt to determine that this information is accurate, there is no assurance made herein as to the information provided by others.

This *Operation and Maintenance Manual* is for the City of Lake Worth only and is not intended or represented to be suitable for any other use by others without specific verification or adaptation by the City of Lake Worth or Mock, Roos & Associates, Inc. Any use of the information provided in this document will be at the user's sole risk and without liability or legal exposure to the City of Lake Worth or Mock, Roos & Associates, Inc.

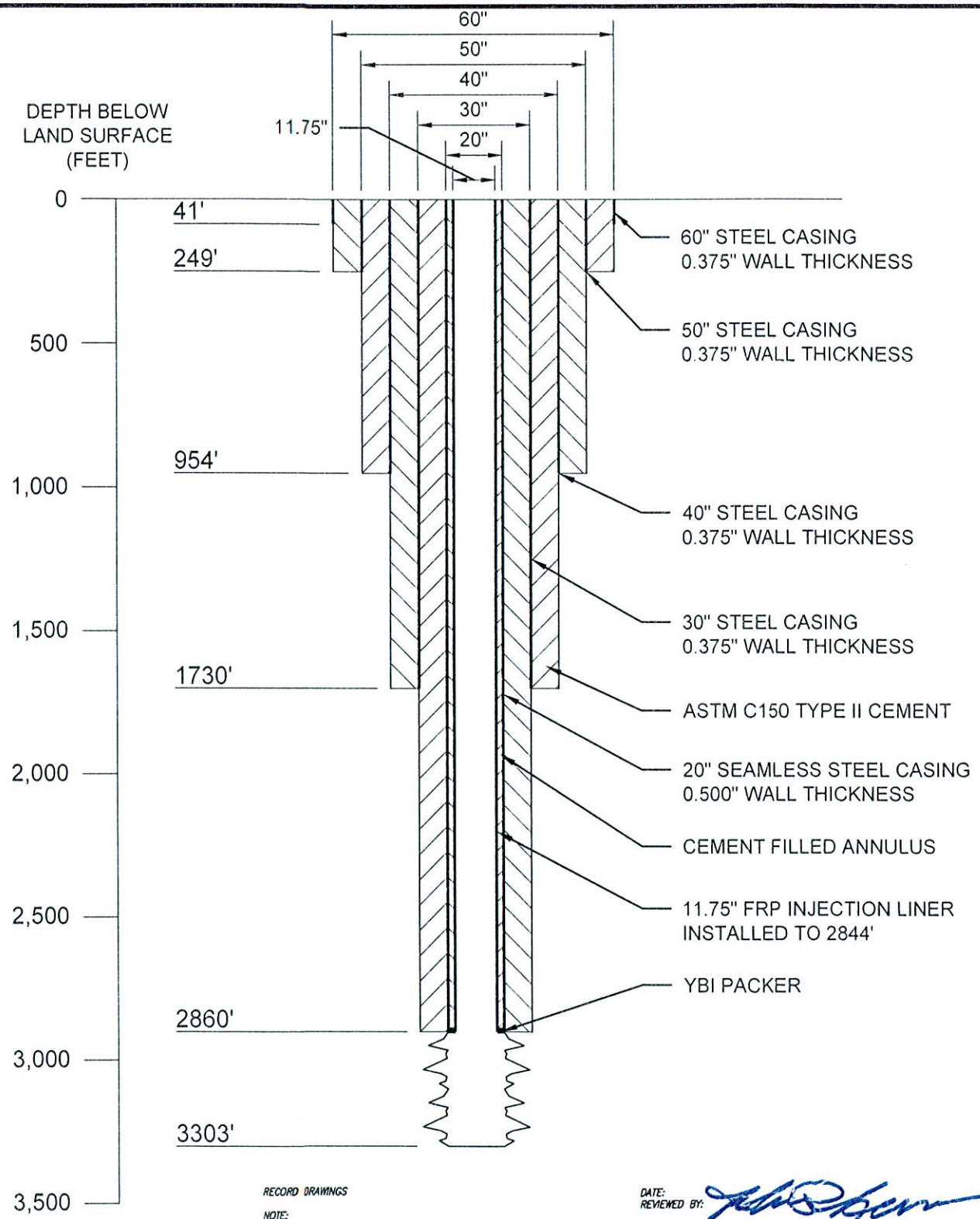
John R. Leemon, P.E.
Senior Project Manager
Mock, Roos & Associates, Inc.

(Engineer's Signature)

9/26/12

(Date and Engineer's Seal)

(Reproductions are not valid unless signed, dated, and embossed with an Engineer's seal.)



RECORD DRAWINGS

NOTE:
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REVIEWED BY:
41645
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DATE:

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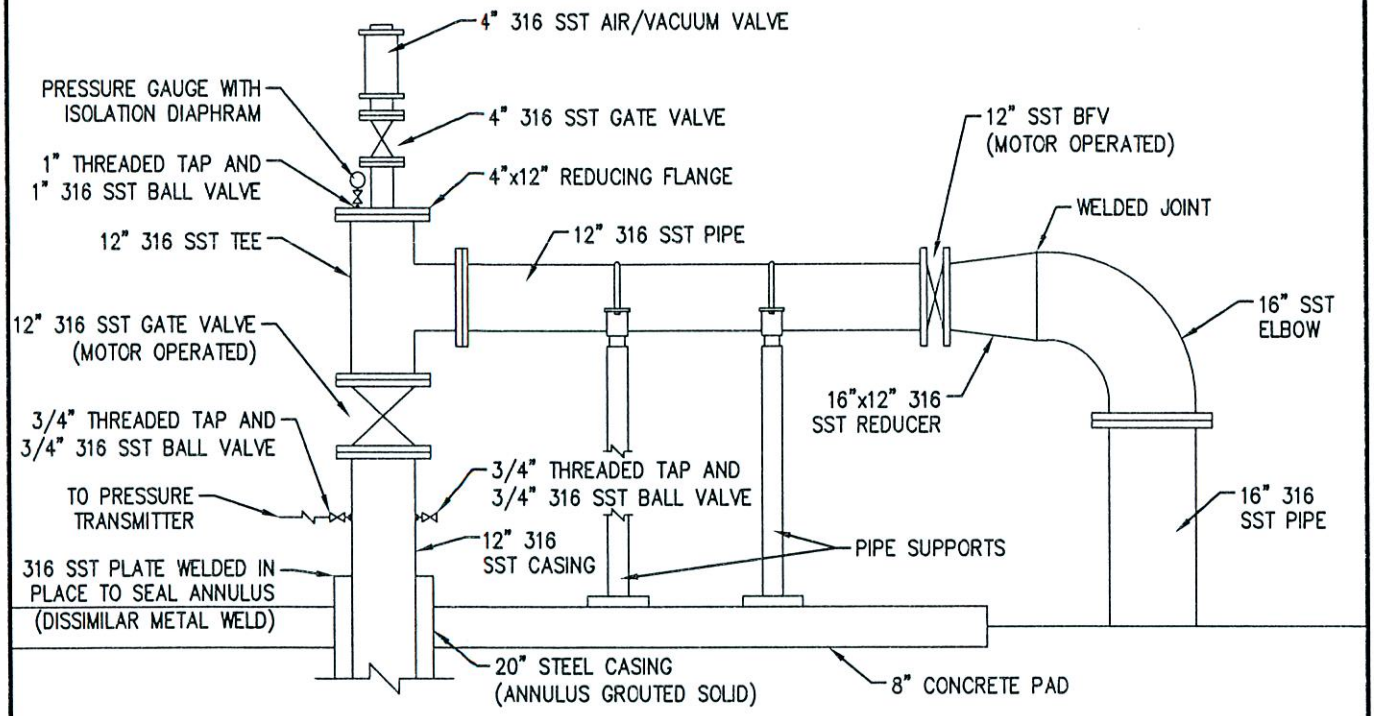
LAKE WORTH WTP
DEEP INJECTION WELL
COMPLETION DIAGRAM

FIGURE 3



RECORD DRAWINGS

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DATE:

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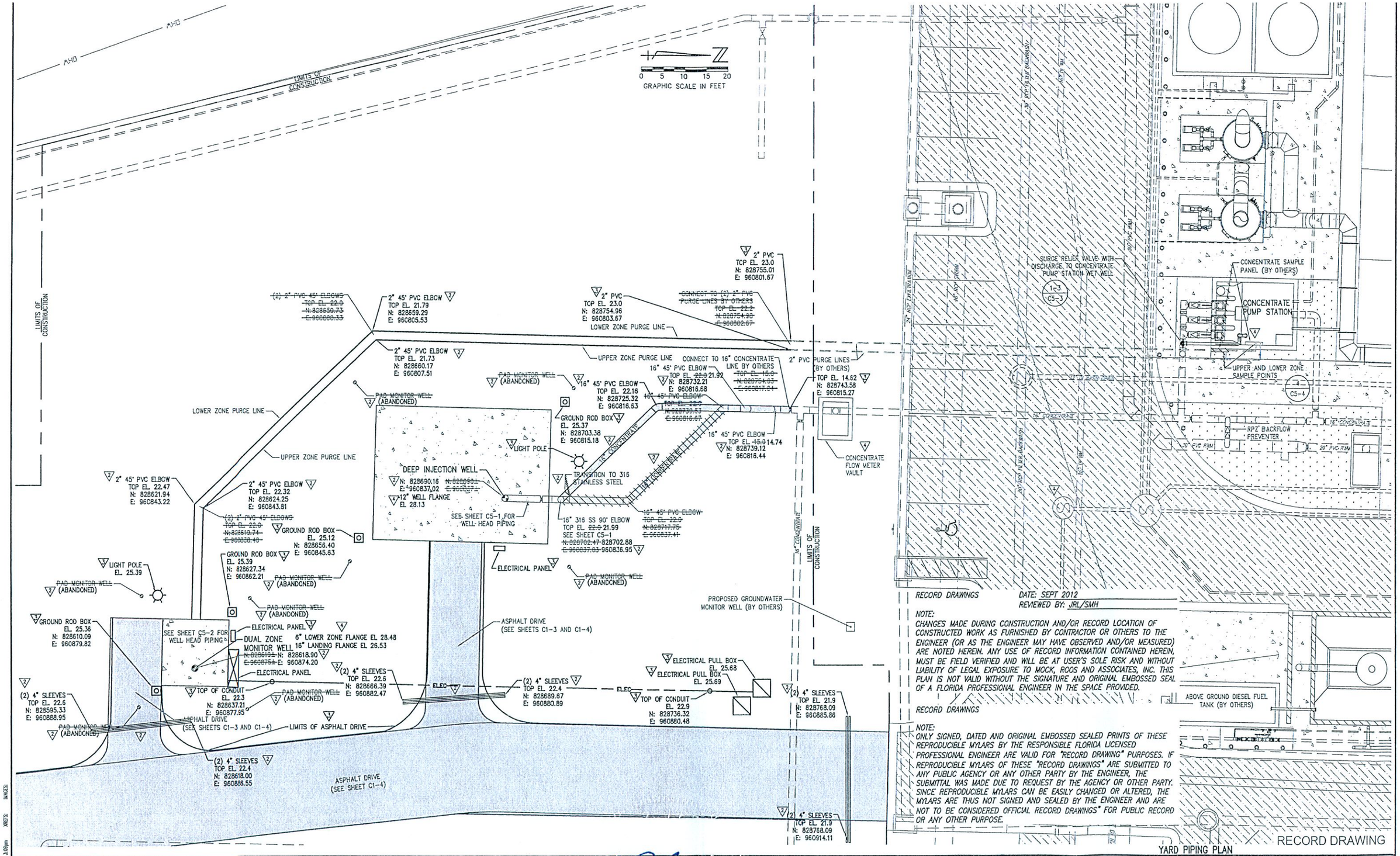
LAKE WORTH WTP
DEEP INJECTION WELL
WELLHEAD DIAGRAM

FIGURE 4



NO.	DATE	BY	REVISION
5	09/24/2012	SMH	ADDED RECORD INFORMATION
4	11/04/2011	YM	ADDED RECORD INFORMATION
3	6/15/2011	SMS	ADDED RECORD INFORMATION
2	12/11/2009	SMS	ADDED SHEET PER FDEP COMMENTS

CADD FILE: K:\wu_\wu_dv_\dwg\RECORD\dv_cn01_C1-2.dwg

PLOT DATE: Sep 26, 2012 - 3:09pm

JOHN R. LEEMON, FLORIDA P.E. NO. 41545, DATE 9/26/12

FLORIDA E.B. NO. 48 — FLORIDA L.B. NO. 48

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FIELD:	B. HUGHES
DRAWN:	SMS
DESIGN:	SMS
APPR:	JRL
SCALE:	1" = 10'

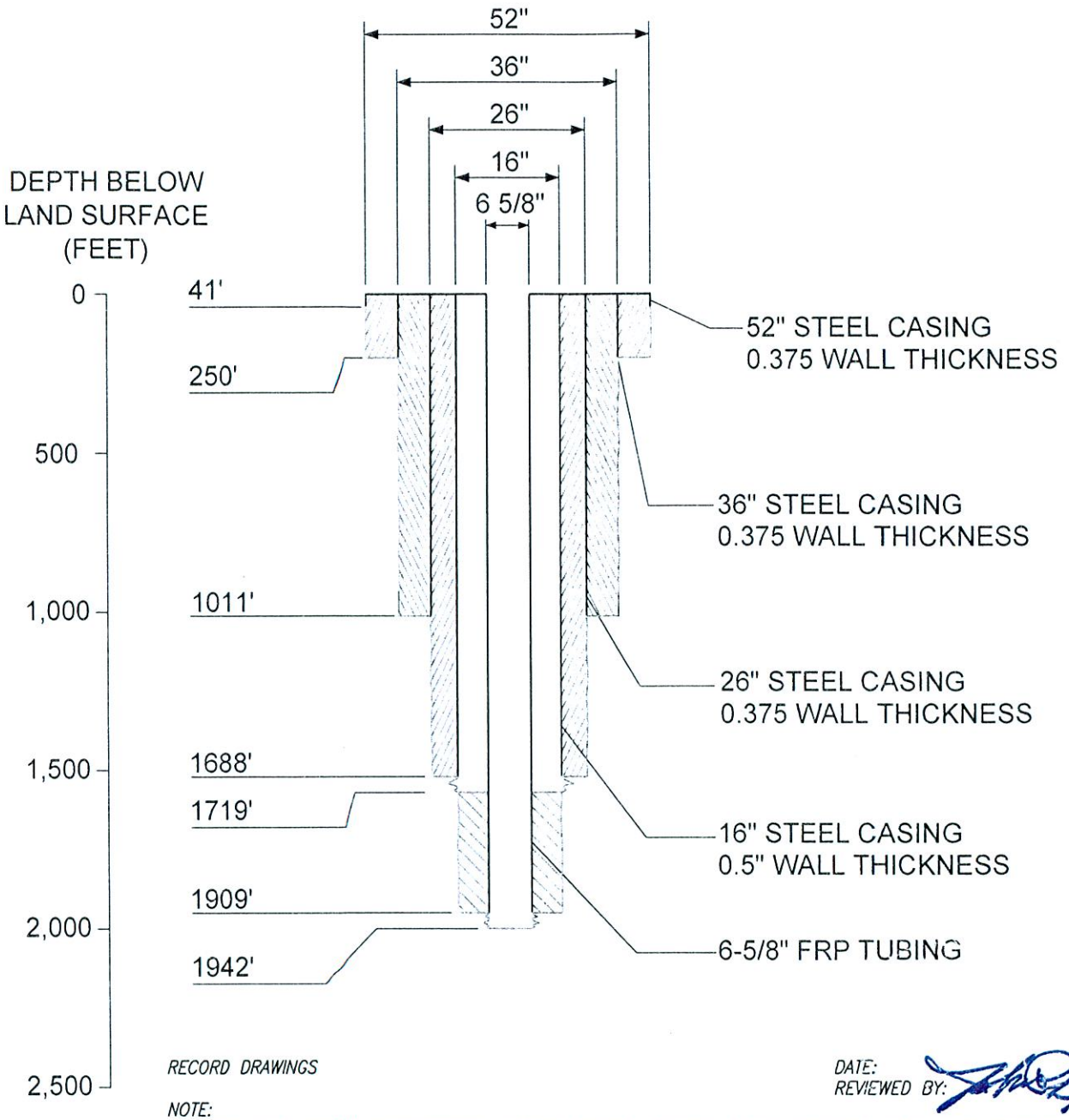
REVERSE OSMOSIS CONCENTRATE INJECTION AND MONITORING WELLS

PREPARED FOR
CITY OF LAKE WORTH
PALM BEACH COUNTY, FLORIDA

DATE:	OCTOBER 2009
P.A. NO.	A9021.00
DR. NO.	44-43-28-288
SHEET	C1-2

FIGURE 5

MONITOR WELL DZMW-1



RECORD DRAWINGS

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REVIEWED BY:

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FLORIDA PE NO.
9-26-12
DATE:

MHC McNabb Hydrogeologic Consulting, Inc.

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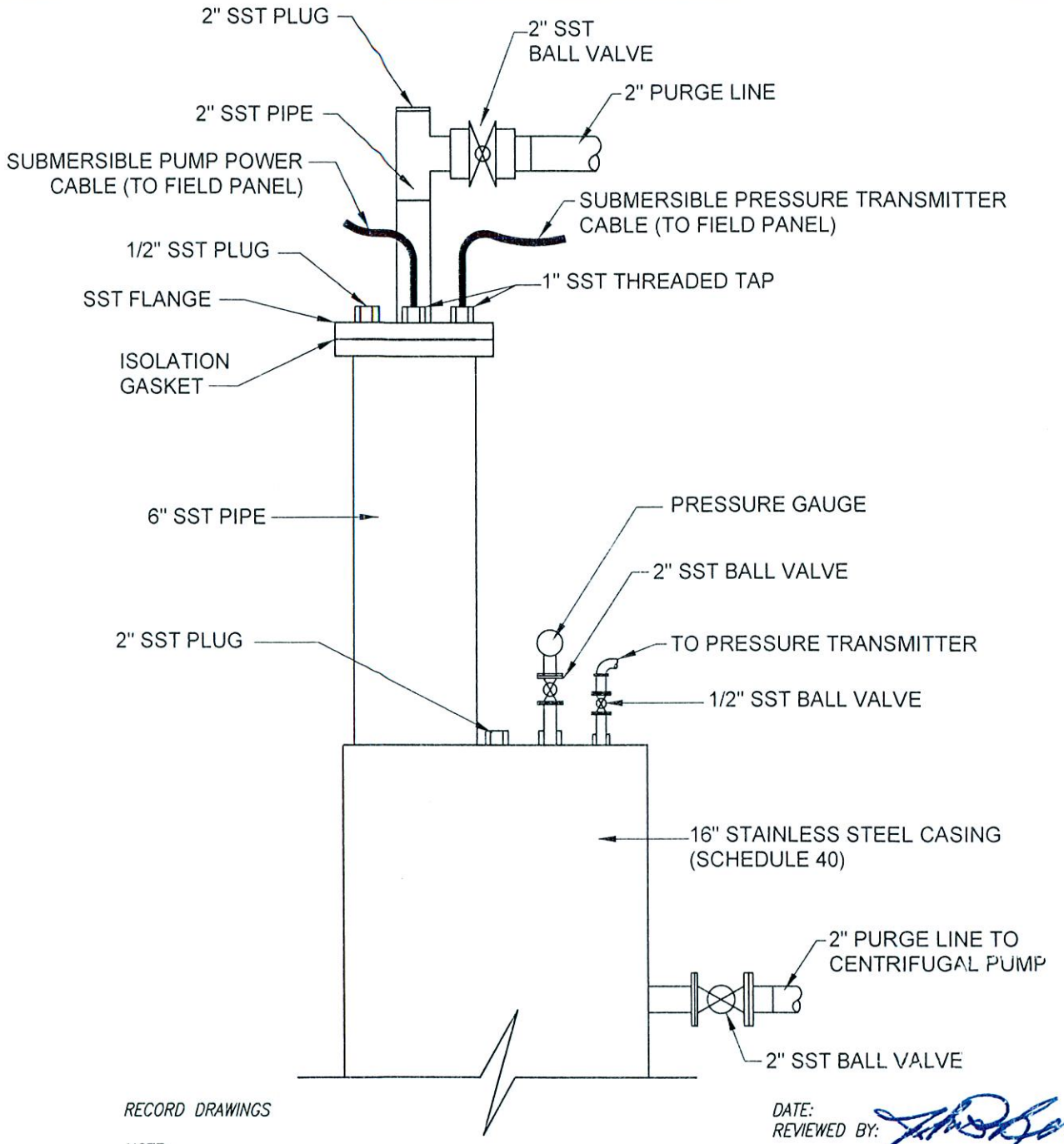
LAKE WORTH WTP
DUAL ZONE MONITOR WELL
COMPLETION DIAGRAM

FIGURE 6



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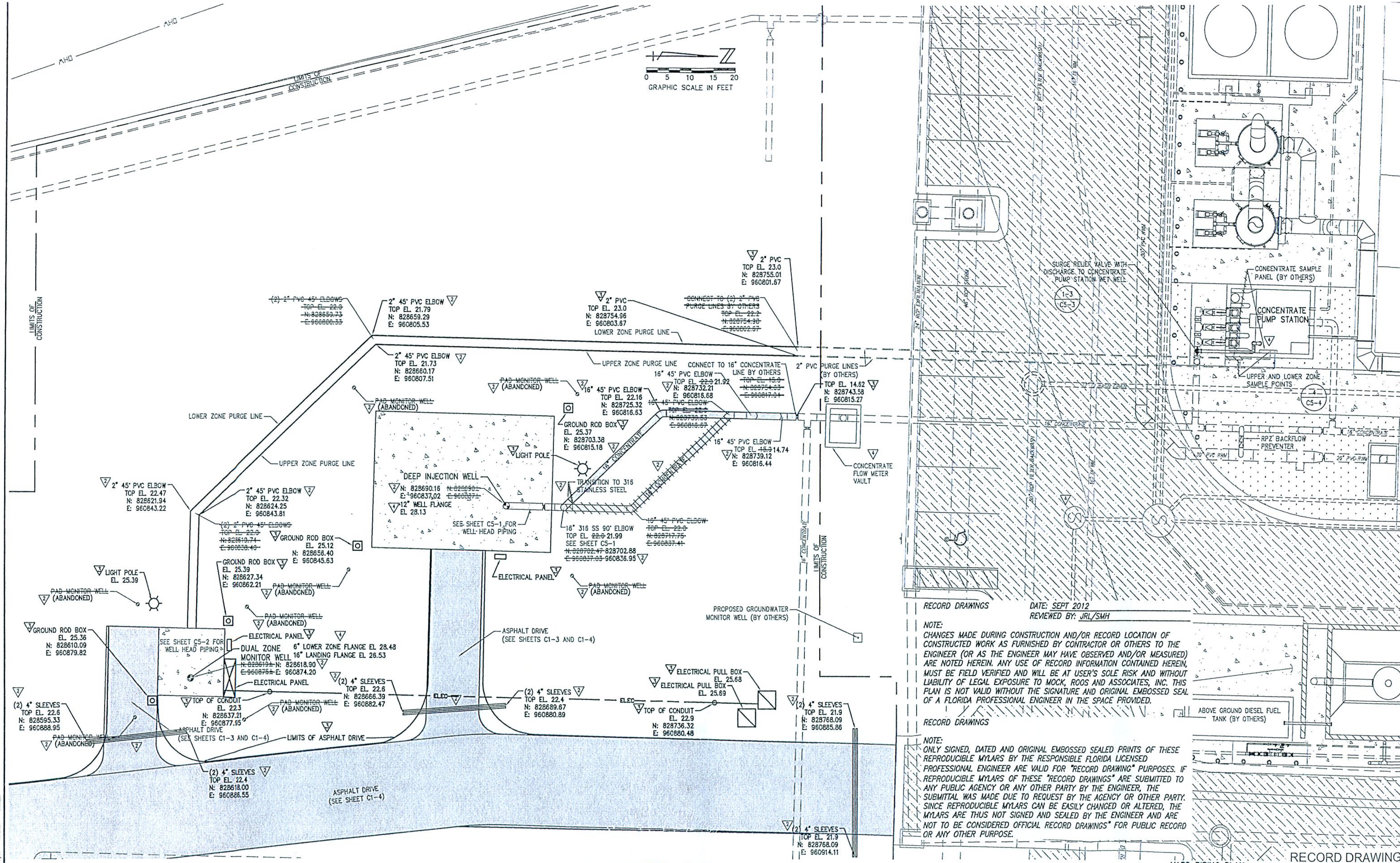
LAKE WORTH WTP
DUAL ZONE MONITOR WELL
WELLHEAD DIAGRAM

FIGURE 7



RECORD DRAWINGS DATE: SEPT 2012
REVIEWED BY: JRL/SMH

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RECORD DRAWINGS

NOTE:
ONLY SIGNED, DATED AND ORIGINAL EMBOSSED SEALED PRINTS OF THESE REPRODUCIBLE MYLARS BY THE RESPONSIBLE FLORIDA LICENSED PROFESSIONAL ENGINEER ARE VALID FOR "RECORD DRAWING" PURPOSES. IF REPRODUCIBLE MYLARS OF THESE "RECORD DRAWINGS" ARE SUBMITTED TO ANY PUBLIC AGENCY OR ANY OTHER PARTY BY THE ENGINEER, THE SUBMITTAL WAS MADE DUE TO REQUEST BY THE AGENCY OR OTHER PARTY. SINCE REPRODUCIBLE MYLARS CAN BE EASILY CHANGED OR ALTERED, THE MYLARS ARE THUS NOT SIGNED AND SEALED BY THE ENGINEER AND ARE NOT TO BE CONSIDERED OFFICIAL RECORD DRAWINGS" FOR PUBLIC RECORD OR ANY OTHER PURPOSE.

NO.	DATE	BY	REVISION
4	09/24/2012	SMH	ADDED RECORD INFORMATION
3	11/04/2011	YM	ADDED RECORD INFORMATION
2	6/15/2011	SMS	ADDED RECORD INFORMATION
1	12/11/2009	SMS	ADDED SHEET PER FDEP COMMENTS

CADD FILE:

SEAL
JOHN R. LEEMON
FLORIDA P.E. NO. 416
9/24/12

FLORIDA E.B. NO. 48 FLORIDA L.B. NO. 48

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DESIGN:	SMS
APPR:	JRL
SCALE:	1" = 10'

REVERSE OSMOSIS CONCENTRATE INJECTION AND MONITORING WELLS

PREPARED FOR
CITY OF LAKE WORTH
PALM BEACH COUNTY, FLORIDA

DATE:	OCTOBER 2009
P.A. NO.	A9021.00
DR. NO.	44-43-28-288
SHEET	C1-2

FIGURE 8

City of Lake Worth

Operating Permit Application for Class 1 injection Well

and Dual Zone Monitoring Well System

Response to FDEP Comment 5

Updated Record Drawing Sheet C1-2

With Engineer's Signature and Seal

GRAPHIC SCALE IN FEET
0 5 10 15 20

LIMITS OF CONSTRUCTION

~~(2) 2" PVC 45° ELBOWS TOP EL. 22.9 N: 828859.73 E: 960860.33~~

2" 45° PVC ELBOW TOP EL. 21.79 N: 828659.29 E: 960805.53

2" 45° PVC ELBOW TOP EL. 21.73 N: 828660.17 E: 960807.51

2" PVC TOP EL. 23.0 N: 828755.01 E: 960801.67

2" PVC TOP EL. 23.0 N: 828754.96 E: 960803.67

LOWER ZONE PURGE LINE

~~CONNECT TO (2) 2" PVC PURGE LINES BY OTHERS TOP EL. 22.2 N: 828754.30 E: 960862.07~~

UPPER ZONE PURGE LINE

CONNECT TO 16" CONCENTRATE LINE BY OTHERS

2" PVC PURGE LINES (BY OTHERS)

~~PAD MONITOR WELL (ABANDONED)~~

16" 45° PVC ELBOW TOP EL. ~~22.0~~ 21.92 N: 828732.21 E: 960816.68

16" 45° PVC ELBOW TOP EL. 22.16 N: 828725.32 E: 960816.63

~~15" 45° PVC ELBOW TOP EL. 22.2 N: 828739.53 E: 960816.67~~

~~TOP EL. 15.0 N: 828754.63 E: 960817.04~~

TOP EL. 14.62 N: 828743.58 E: 960815.27

~~PAD MONITOR WELL (ABANDONED)~~

GROUND ROD BOX EL. 25.37 N: 828703.38 E: 960815.18

16" 45° PVC ELBOW TOP EL. ~~15.0~~ 14.74 N: 828739.12 E: 960816.44

LIGHT POLE

TRANSITION TO 316 STAINLESS STEEL

16" CONCENTRATE

CONCENTRATE FLOW METER VAULT

DEEP INJECTION WELL N: 828690.16 ~~N: 828690.1~~ E: 960837.02 ~~E: 960837.1~~

12" WELL FLANGE EL 28.13

SEE SHEET C5-1 FOR WELL HEAD PIPING

16" 316 SS 90° ELBOW TOP EL. ~~22.0~~ 21.99 SEE SHEET C5-1 ~~N: 828702.47~~ 828702.88 ~~E: 960837.53~~ 960836.95

~~16" 45° PVC ELBOW TOP EL. 22.0 N: 828717.75 E: 960837.41~~

ELECTRICAL PANEL

~~PAD MONITOR WELL (ABANDONED)~~

LIMITS OF CONSTRUCTION

PROPOSED GROUNDWATER MONITOR WELL (BY OTHERS)

2" 45° PVC ELBOW TOP EL. 22.47 N: 828621.94 E: 960843.22

2" 45° PVC ELBOW TOP EL. 22.32 N: 828624.25 E: 960843.81

~~(2) 2" PVC 45° ELBOWS TOP EL. 22.0 N: 828819.74 E: 960838.48~~

GROUND ROD BOX EL. 25.12 N: 828656.40 E: 960845.63

GROUND ROD BOX EL. 25.39 N: 828627.34 E: 960862.21

LIGHT POLE EL. 25.39

~~PAD MONITOR WELL (ABANDONED)~~

GROUND ROD BOX EL. 25.36 N: 828610.09 E: 960879.82

SEE SHEET C5-2 FOR WELL HEAD PIPING

DUAL ZONE MONITOR WELL ~~N: 828619.1~~ N: 828618.90 ~~E: 960875.1~~ E: 960874.20

6" LOWER ZONE FLANGE EL 28.48

16" LANDING FLANGE EL 28.53

ELECTRICAL PANEL

ASPHALT DRIVE (SEE SHEETS C1-3 AND C1-4)

(2) 4" SLEEVES TOP EL. 22.6 N: 828595.33 E: 960888.95

TOP OF CONDUIT EL. 22.3 N: 828637.21 E: 960877.95

(2) 4" SLEEVES TOP EL. 22.6 N: 828666.39 E: 960882.47

ELEC

(2) 4" SLEEVES TOP EL. 22.4 N: 828689.67 E: 960880.89

ELECTRICAL PULL BOX EL. 25.68

ELECTRICAL PULL BOX EL. 25.69

TOP OF CONDUIT EL. 22.9 N: 828736.32 E: 960880.48

(2) 4" SLEEVES TOP EL. 21.9 N: 828768.09 E: 960885.86

(2) 4" SLEEVES TOP EL. 22.4 N: 828618.00 E: 960888.55

ASPHALT DRIVE (SEE SHEET C1-4)

(2) 4" SLEEVES TOP EL. 21.9 N: 828768.09 E: 960914.11

SURGE RELIEF VALVE WITH DISCHARGE TO CONCENTRATE PUMP STATION WET WELL

1-3 C5-3

CONCENTRATE SAMPLE PANEL (BY OTHERS)

CONCENTRATE PUMP STATION

UPPER AND LOWER ZONE SAMPLE POINTS

C5-4

RPZ BACKFLOW PREVENTER

ABOVE GROUND DIESEL FUEL TANK (BY OTHERS)

RECORD DRAWINGS

DATE: SEPT 2012

REVIEWED BY: JRL/SMH

NOTE:
CHANGES MADE DURING CONSTRUCTION AND/OR RECORD LOCATION OF CONSTRUCTED WORK AS FURNISHED BY CONTRACTOR OR OTHERS TO THE ENGINEER (OR AS THE ENGINEER MAY HAVE OBSERVED AND/OR MEASURED) ARE NOTED HEREIN. ANY USE OF RECORD INFORMATION CONTAINED HEREIN, MUST BE FIELD VERIFIED AND WILL BE AT USER'S SOLE RISK AND WITHOUT LIABILITY OF LEGAL EXPOSURE TO MOCK, ROOS AND ASSOCIATES, INC. THIS PLAN IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL EMBOSSED SEAL OF A FLORIDA PROFESSIONAL ENGINEER IN THE SPACE PROVIDED.

RECORD DRAWINGS

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RECORD DRAWING

YARD PIPING PLAN

NO.	DATE	BY	REVISION
4	09/24/2012	SMH	ADDED RECORD INFORMATION
3	11/04/2011	YM	ADDED RECORD INFORMATION
2	6/15/2011	SMS	ADDED RECORD INFORMATION
1	12/11/2009	SMS	ADDED SHEET PER FDEP COMMENTS

CADD FILE: K:\wv_\wv_dr_\dwg\RECORD\dr_cs01_C1-2.dwg

PLOT DATE: Sep 26, 2012 - 3:09pm

XREFS: IMAGES:

STATE OF FLORIDA
JOHN R. CLEMON
FLORIDA P.E. NO. 41545
9-26-12
DATE

FLORIDA E.B. NO. 48

MOCK • ROOS
ENGINEERS • SURVEYORS • PLANNERS

FLORIDA L.B. NO. 48

5720 Corporate Way, West Palm Beach, Florida 33407 (561) 683-3113, fax 478-7248

FIELD: B. HUGHES
DRAWN: SMS
DESIGN: SMS
APPR: JRL
SCALE: 1" = 10'

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