

**MINOR MODIFICATION TO PERMIT NO. CA10600002
ISSUED TO IMPERIAL IRRIGATION DISTRICT**

In accordance with 40 CFR §144.41, it is understood and agreed that this permit is hereby modified to establish a maximum allowable injection pressure (MAIP) as well as a maximum allowable injection rate (MAIR), based on results of a step-rate test conducted on December 8, 2011. In addition, several clarifications to existing permit terms are included in this minor modification, based on communications with Imperial Irrigation District (IID).

Portions of pages 6, 16-18, 20, 22 and 26 of the permit are revised to incorporate the above changes and now read as follows (for clarity, changes are shown with removals struck out and with new additions **emboldened and underlined**):

...

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2. Testing during Drilling and Construction (See Appendix D, Permit Application Attachment L, Appendix C, Geophysical Logging)

...

Before surface, intermediate, and long string casings are set, dual induction/spontaneous potential/gamma ray/caliper (DIL/SP/GR/CAL) logs will be run over the course of the entire open hole sequence after the well is drilled to each respective terminal depth. After each casing is set and cementing is completed, a ~~spherically focused~~ cement bond evaluation log (~~CBL~~) will be ~~run~~ **conducted** over the course of the entire cased hole sequence (See Section D.2.a.iv of this part). **This cement bond evaluation shall enable the analysis of bond between cement and casing as well as between cement and formation, and shall allow detection and assessment of any micro-annulus between the casing and cement as well as any cement channeling in the borehole annulus.**

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1. Initial Zone of Endangering Influence (“ZEI”) re-evaluation with Field Data resulting from testing performed **in this part** under Section B paragraphs 2 and 3, or Section D paragraph 2, ~~in this part~~ will be used by the Permittee to confirm or modify assumptions used to calculate the original ZEI (see Section II.B.3.c) and to set the AOR.

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iv. Cement Evaluation Analysis

After installing and cementing casing, conducting a cement squeeze job, or any well cement repair, for any well constructed under this permit, the Permittee shall submit cementing records and cement evaluation logs that demonstrate isolation of the injection interval and other formations from underground sources

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of drinking water. Surface casing and long string casing well bore annuli shall be cemented to surface. Analysis shall include a ~~spherically focused~~ cement evaluation tool, run after the long-string casing is set and cemented, ~~which enables the evaluation of the bond between cement and casing as well as of the bond between cement and formation.~~ Acceptable cement evaluation must assess the following four objectives:

- 1) Bond between casing and cement;
- 2) Bond between cement and formation;
- 3) Detection and assessment of any micro-annulus (small gaps between casing and cement); and
- 4) Identification of any cement channeling in the borehole annulus.

The Permittee may not commence or recommence injection until it has received written notice from EPA that such a demonstration is satisfactory.

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c. Loss of Mechanical Integrity

The Permittee shall notify EPA, in accordance with Part III, Section E paragraph 10 of this permit, under any of the following circumstances:

...

- iii. A significant change in the annulus or injection pressure occurs during normal operating conditions. See Section D.56.b of this ~~part~~section.

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3. Injection Pressure Limitation

- a. Maximum allowable injection pressure measured at the wellhead, **to be applied to each permitted injection well**, shall be based on the Step-Rate Test conducted under Section B paragraph 3.b of this part. EPA will provide the Permittee written notification of the maximum allowable injection pressure for each injection well constructed and operated under this permit, along with a minor modification of the permit under 40 CFR §144.41(e).

- i. As determined by the step-rate test conducted under Section B paragraph 3.b of this part, injection pressure measured at any individual permitted wellhead shall not exceed two hundred and ten (210) pounds per square inch gauge (psig).**

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4. Injection Volume (Rate) Limitation

- a. The injection rate **for any individual permitted** wells ~~LEC 1 and LEC 2~~ shall not exceed the volume determined appropriate through the demonstrations conducted in this section and justified by measured friction factors. EPA will provide written notification of the maximum injection volume allowed under this permit prior to any injection conducted after an approved SRT (see Section B.3.b).

- i. Injection rate shall not exceed forty-seven million nine-hundred thousand (47,900,000) gallons per month and one million seven hundred and ten thousand (1,710,000) gallons per day at any time, based on the step-rate test conducted under Section B paragraph 3.b of this part. This rate limitation may be reduced based on the annual review of the FOT results completed under Section B paragraph 3.c of this part.**

...

- d. The injection rate shall not cause an exceedance of the injection pressure limitation established under item 3(a)(i) of this section.**

...

6. Tubing/Casing Annulus Requirements

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- b. A minimum pressure of one hundred (100) psi at shut-in conditions shall be maintained on the tubing/casing annulus. Within the first quarter of normal injection operations, the Permittee shall **monitor and** determine the cyclic range of ~~fluctuation of injection operations pressures to determine the cyclic range of annular pressure~~ **fluctuation** for the well ~~during periods of normal operation~~. This ~~normal~~ pressure range shall be submitted with the first quarterly report after injection ~~has commenced~~. Any annular pressure **measured** outside of the ~~is~~ **established** normal pressure range shall be ~~considered~~ **reported orally within twenty-four (24) hours, followed by a written submission within five (5) days, as a potential** loss of mechanical integrity and shall be reported per paragraph 2.c of this section **and Part III.E.10. Event details, including associated injection pressures and temperatures, shall be submitted to EPA for review and consultation as to whether a loss of mechanical integrity occurred.**

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3. Monitoring Devices

- a. Continuous monitoring devices

Temperature, annular pressure, and injection pressure shall be measured at the wellhead using equipment of sufficient precision and accuracy. All measurements must be recorded at minimum to a resolution of one tenth of the unit of measure (e.g. injection rate and volume must be recorded to a resolution of a tenth of a gallon; pressure must be recorded to a resolution of a tenth of a psig; injection fluid temperature must be recorded to a resolution of a tenth of a degree Fahrenheit). Exact dates and times of measurements, when taken, must be recorded and submitted. ~~Injection rate shall be measured in the supply line immediately before the wellhead~~ **Each well shall have a dedicated flow meter, installed so as to record total injection flow.** The Permittee shall ~~continuously~~ monitor and record the following parameters at the prescribed frequency, **using the required instruments; for this permit, continuous monitoring requires a minimum frequency of at least one data point every thirty (30) seconds:**

Monitoring Parameter	Frequency	Instrument
Injection rate (gallons per minute)	Hourly Continuous	digital recorder
Daily Injection Volume (gallons)	Daily	digital totalizer
Total Cumulative Volume (gallons)	Daily Continuous	digital totalizer
Well head injection pressure (psig)	Hourly Continuous	digital recorder
Annular pressure (psig)	Hourly Continuous	digital recorder
Injection fluid temperature (degrees Fahrenheit)	Hourly Continuous	digital recorder

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- f. The Permittee shall only discard the records described in paragraphs a through d if:
 - i. The records are either delivered to the ~~Regional Administrator~~ **EPA**, or
 - ii. Written approval from the Regional Administrator to discard the records is obtained.

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G. FINANCIAL RESPONSIBILITY

1. Demonstration of Financial Responsibility

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- (c) The Permittee must provide proof to EPA of its bond rating or renewal every year by ~~March 31~~ **January 28**.

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APPENDIX A - Project Map(s)

Figure E1, Application Attachment E

Figure B1, Application Attachment B

Figure 1, Location Map, IW-1 and IW-3

Figure 2, Site Plan, IW-1 and IW-3

IW-1 Location Survey, November 28, 2011

IW-3 Location Survey, March 12, 2012

APPENDIX B – Lithology and ~~Proposed~~ Well Schematic(s)

Figure G1, Application Attachment G

Figure E2, Application Attachment E

Figures F1 and F3, Application Attachment F

Figures M1 and M2, Application Attachment M

Figure 4, Injection Well IW-1 Completion Diagram

Figure 4, Injection Well IW-3 Completion Diagram

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All other permit conditions remain unchanged.

This minor modification is effective on

[original signed 21 August 2012]

[by Laura Tom Bose for]

Nancy Woo, Acting Director
Water Division

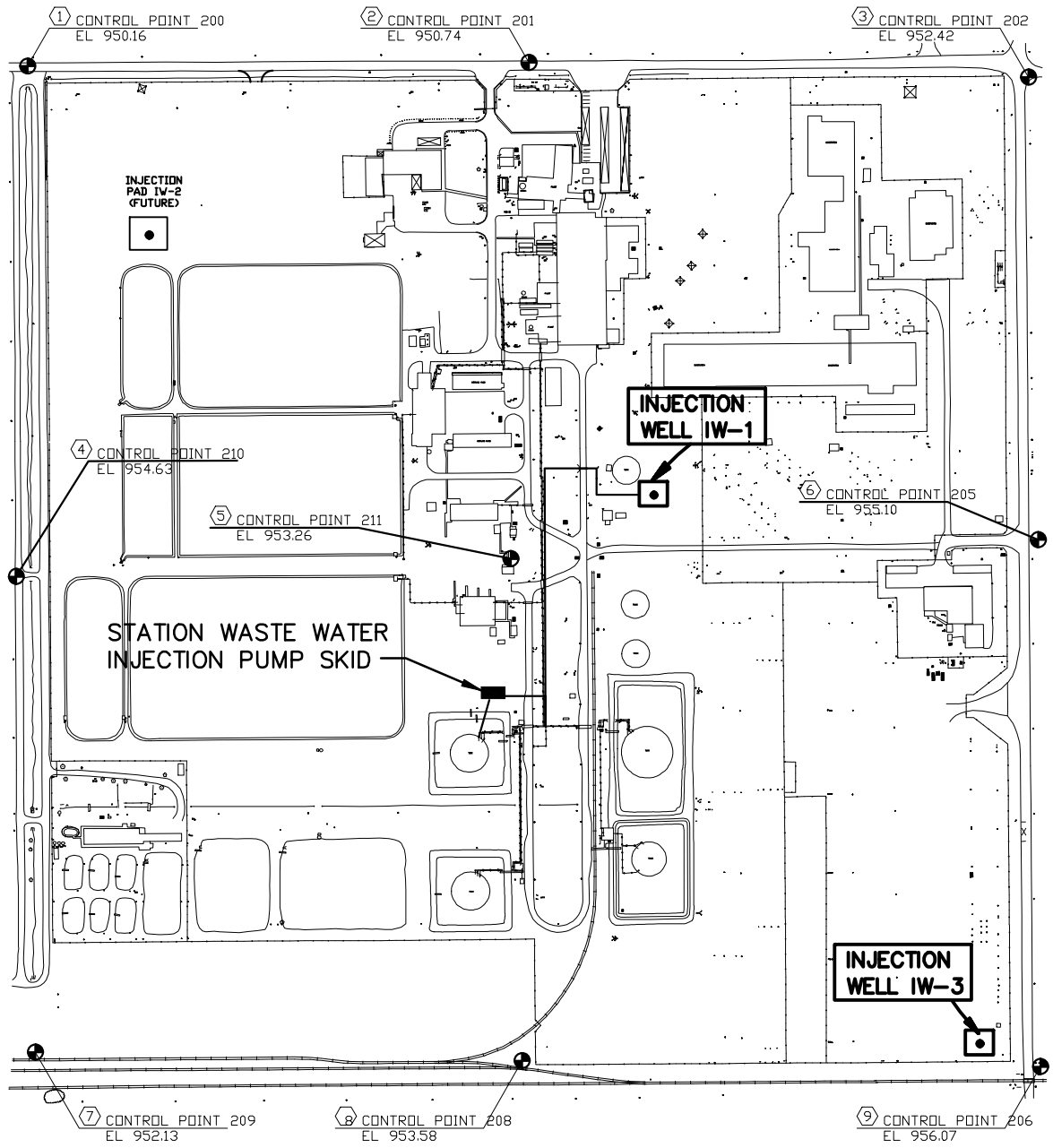


IMPERIAL IRRIGATION
DISTRICT ECES

LOCATION MAP

FIGURE 1

C:\DAVID McNABB\DISTRICT ECGS\FIGURES.dwg, 3/19/2012 9:08:32 AM, DWG To PDF.pc3



IMPERIAL IRRIGATION
DISTRICT ECGS

SITE PLAN

FIGURE 2

TR 48

N1/2 TR 47

VILLA ROAD
N89°35'22"E 2641.65'

FOUND
NE COR
S1/2 TR 47

FOUND
NW COR
S1/2 TR 47

NW1/4 S1/2

NE1/4
NE1/4 S1/2



NOTE: BEARINGS ARE NAD83 (GCS 83, ZONE 8)
DISTANCES ARE GROUND

500°24'38"E 1118.93'

S89°57'41"W 980.96'

AS BUILT WELL IW-1
N 1871875.4096
E 6780214.3054
LAT. 35°48'02.749"
LONG: 115°32'19.692

ROAD
1119.58'
500°22'19"E 2641.66'
DOGWOOD
1522.07'

FOUND
SE COR
S1/2 TR 47

48 TR

LOT 23

LOT 27

LOT 19

TRACT LINE TIES



HALE ENGINEERING & SURVEYING
DBS **TESCO**
242 N. 29th Street
El Centro, CA 92243
Tel: (760) 252-2716 Fax: (760) 892-2017

I.I.D. WELL IW-1
(POR SW4 NE4 S2 TRACT 47 (15-14))
CITY OF EL CENTRO, COUNTY OF IMPERIAL
STATE OF CALIFORNIA
CLIENT: LAYNE
JOB NO: 11325 TIES SHEET 1 OF 1

DRAWN BY: RA
DATE: 11/28/11
CHECKED: HPE
RETER:
JOB NO: 11325



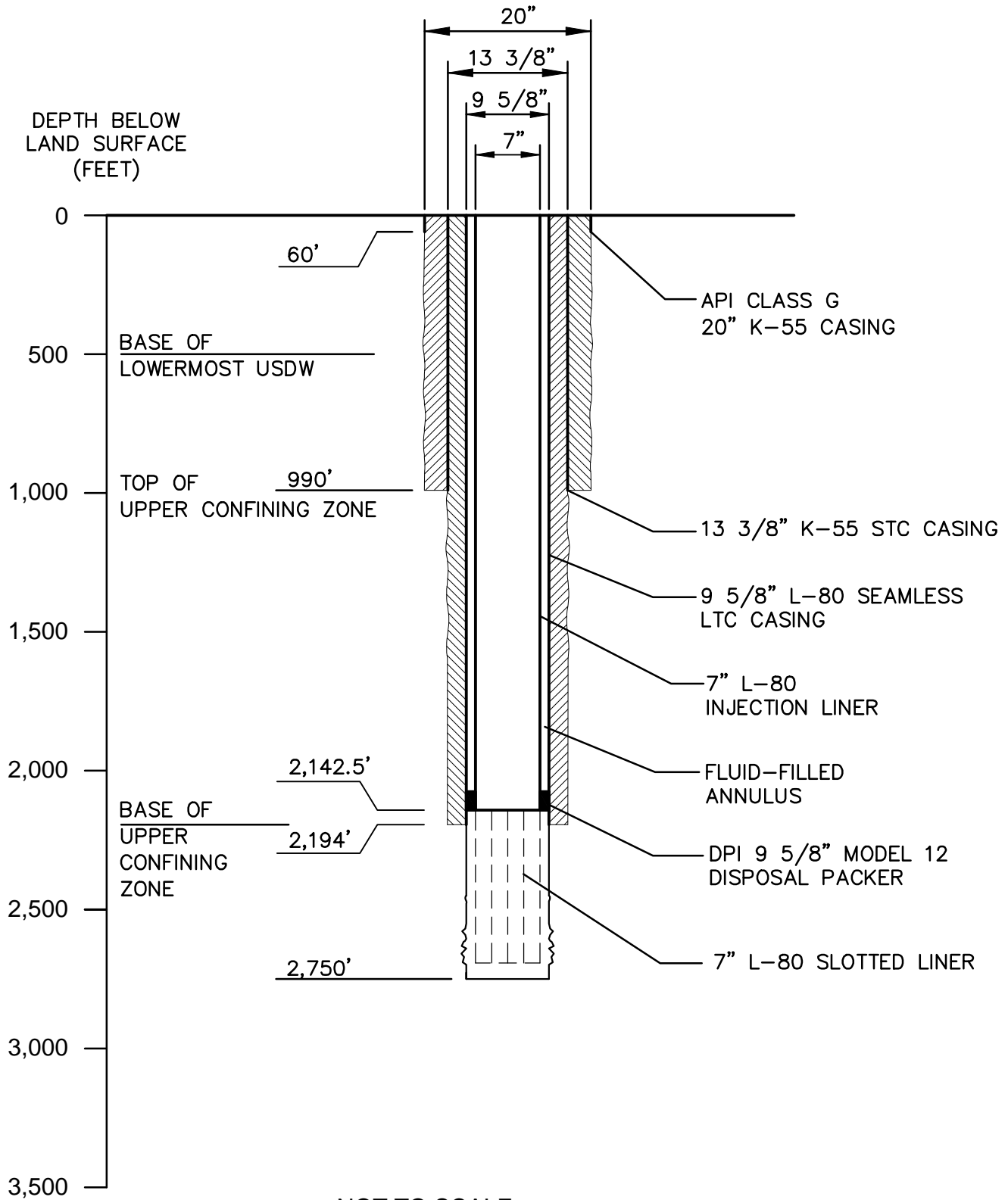
LOT 23

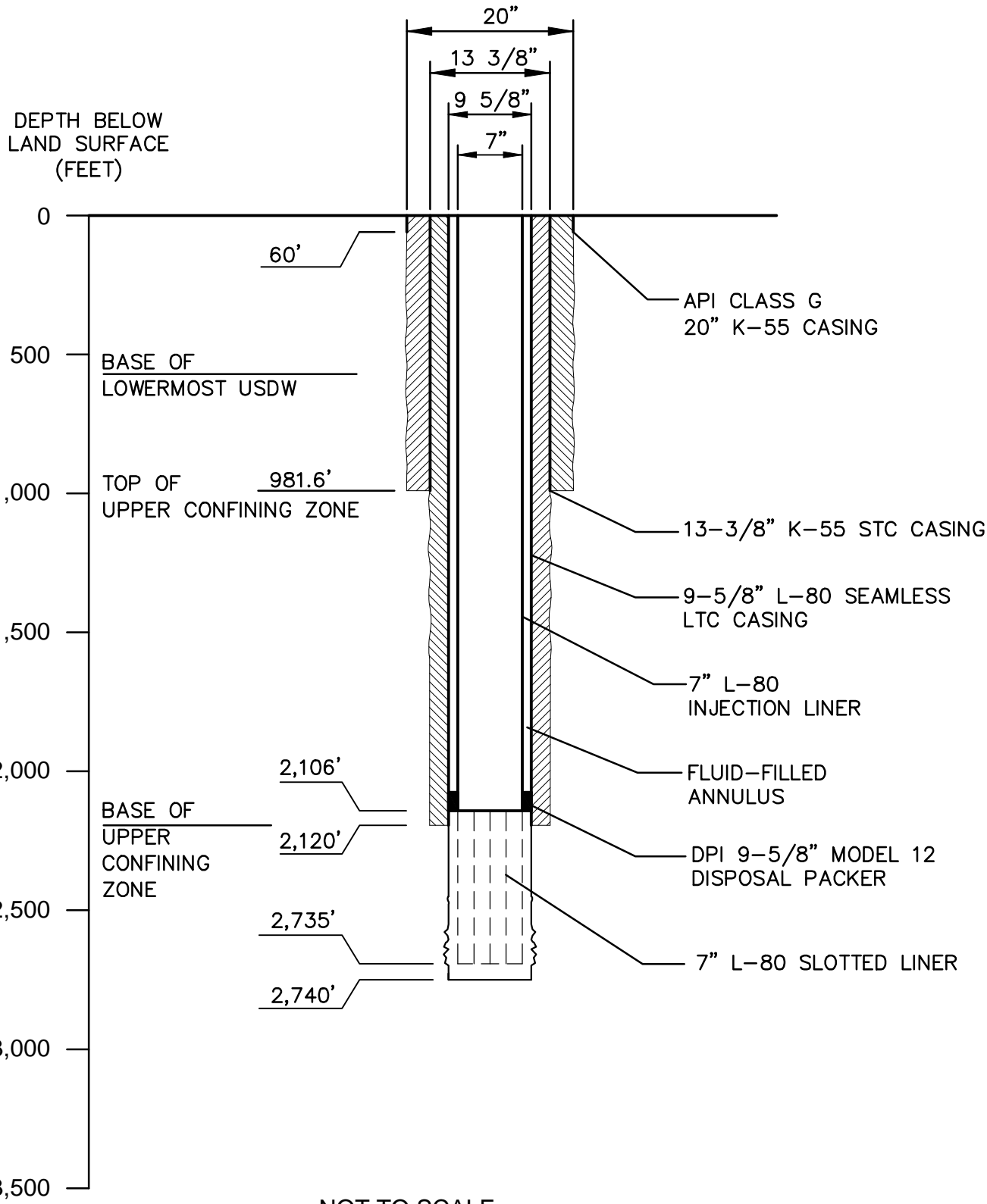
LOT 27

LOT 19

TRACT LINE TIES

<p>HALE ENGINEERING & SURVEYING TESCO 240 N. 28th Street El Centro, CA 92243 Tel: (760) 362-2118 Fax: (760) 362-2977</p>	I.I.D. WELL W-3 FOR SEA SEA S2 TRACT 47 (15-14) CITY OF EL CENTRO, COUNTY OF IMPERIAL STATE OF CALIFORNIA	DATE: 3/12/12 CHECKED: HPB
	CLIENT: LAYNE	SHEET NO: 11325 TIES SHEET 1 OF 1
	DRAWN BY: RA	DATE: 3/12/12
	BY NO: 11325 TIES	SHEET 1 OF 1





NOT TO SCALE



IMPERIAL IRRIGATION DISTRICT ECGS

INJECTION WELL IW-3 COMPLETION DIAGRAM

FIGURE 4