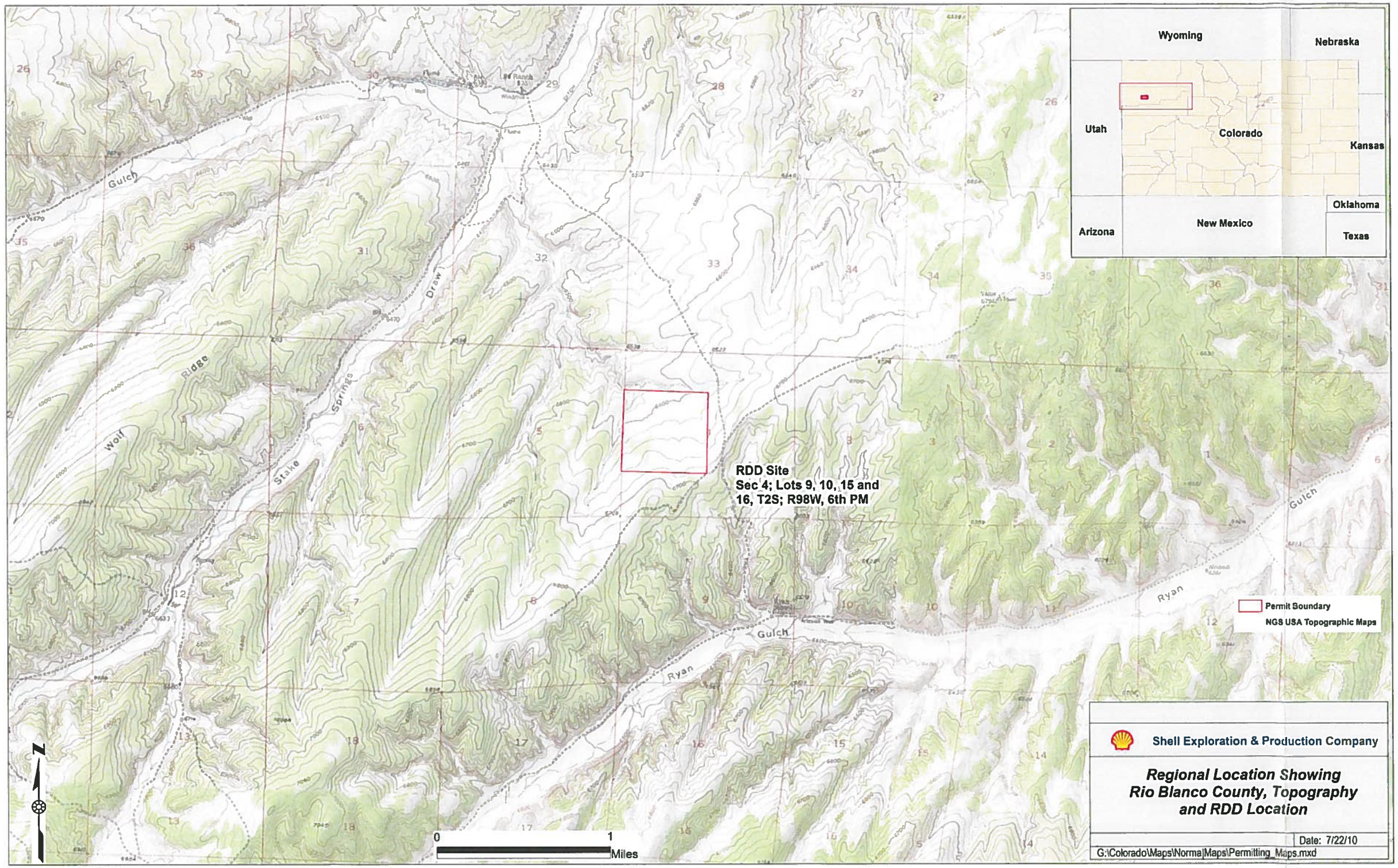


Figure 1: **Regional Location Map.**

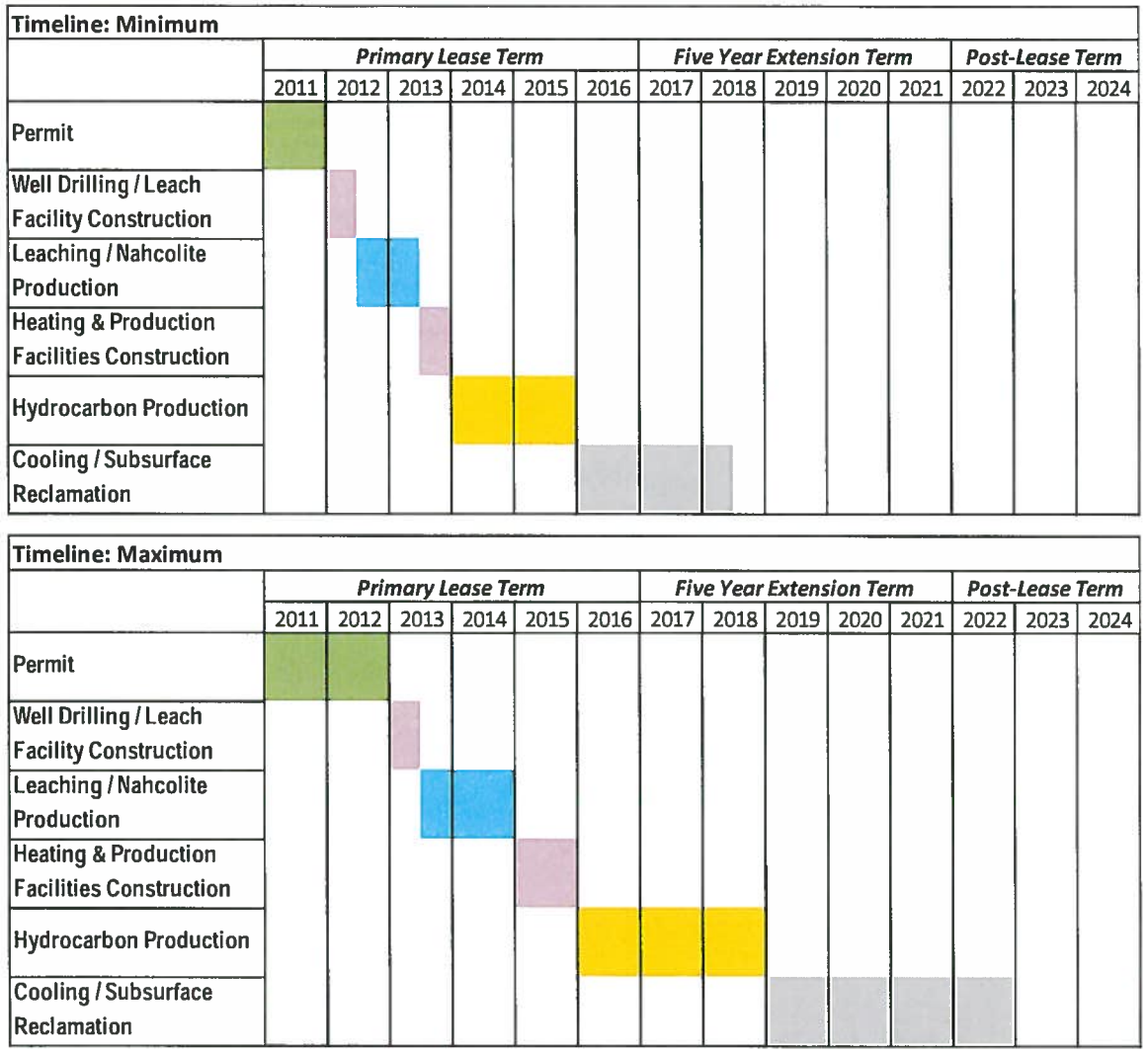


Figure 2: **Timelines showing minimum and maximum range of time for the East RDD Pilot construction, production and subsurface reclamation activities. Surface reclamation timelines are not shown on these diagrams.**

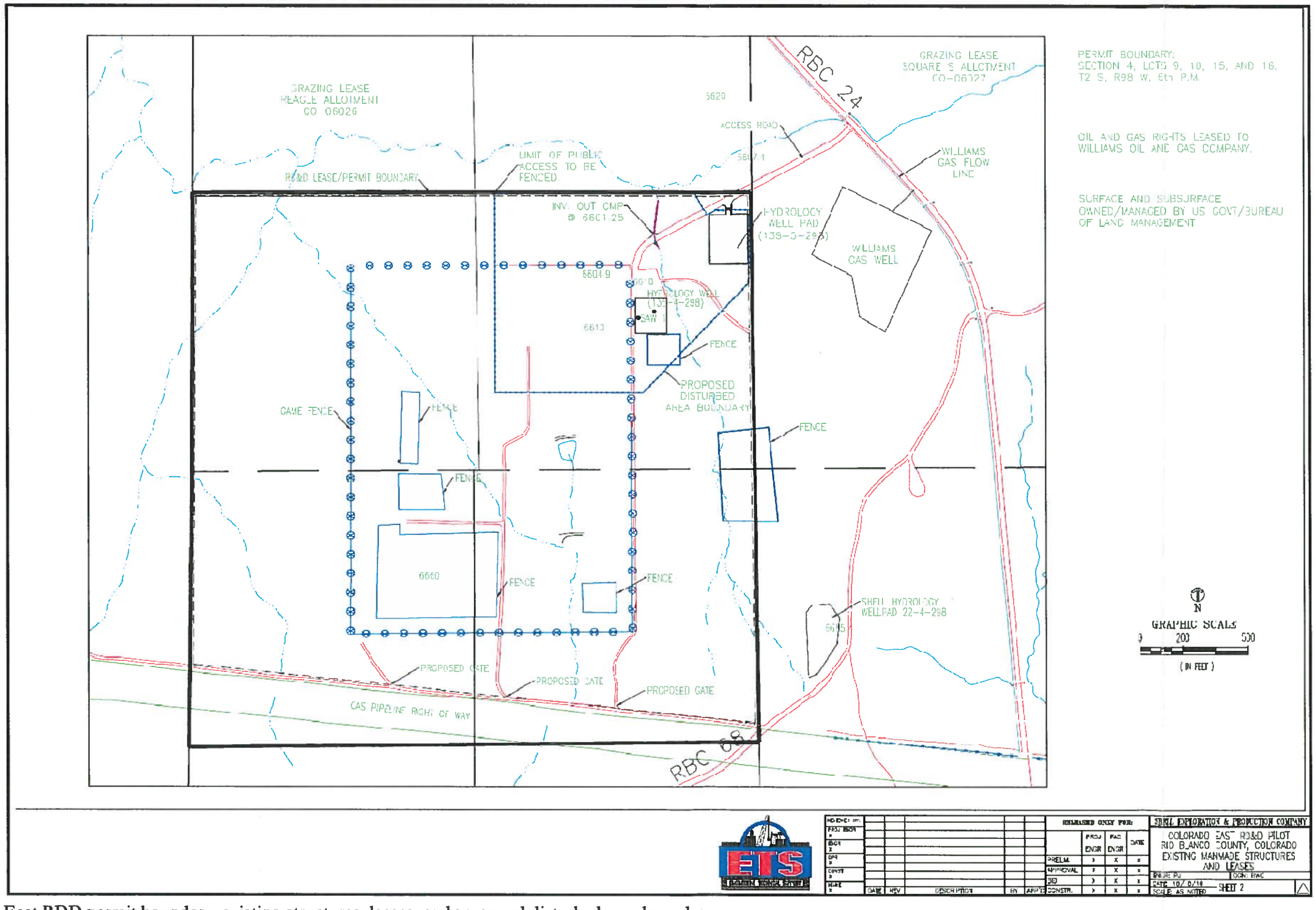
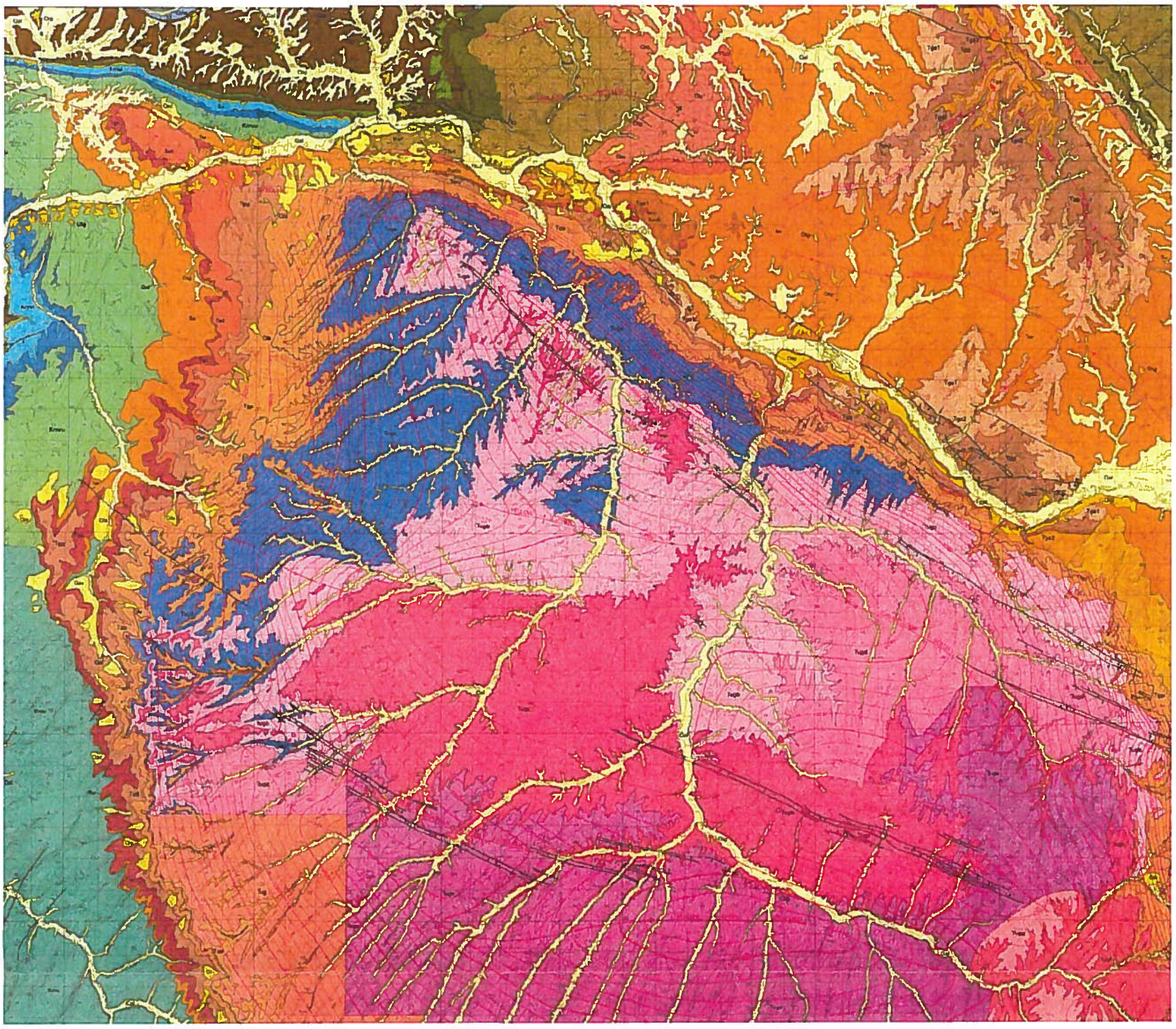
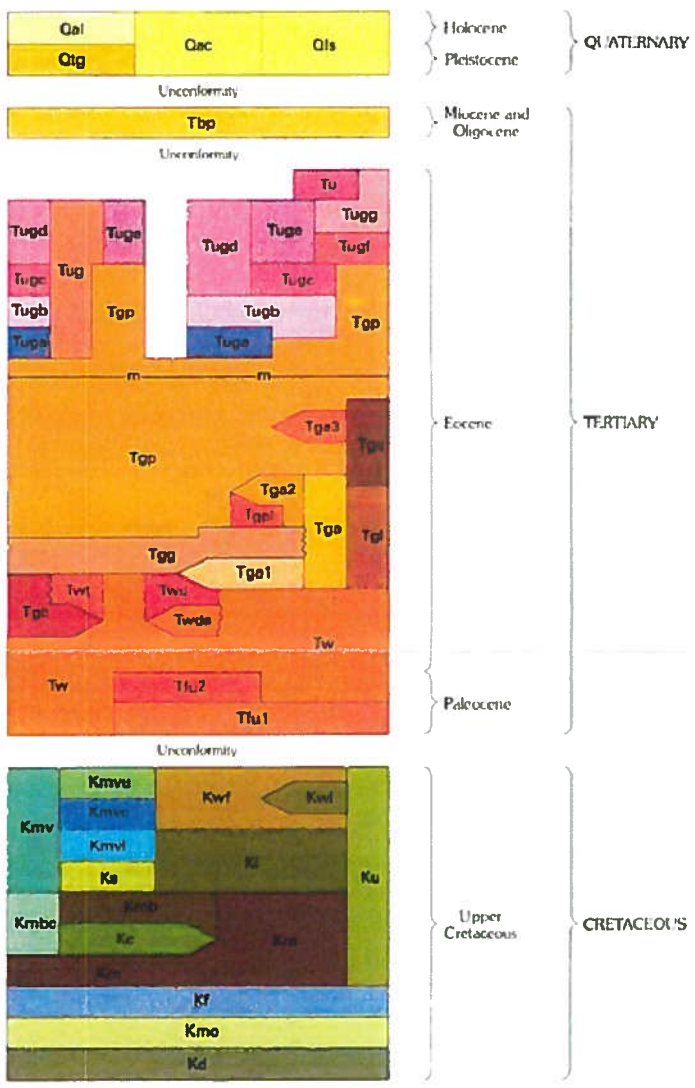


Figure 3: East RDD permit boundary, existing structures, leases, and proposed disturbed area boundary.



CORRELATION OF MAP UNITS



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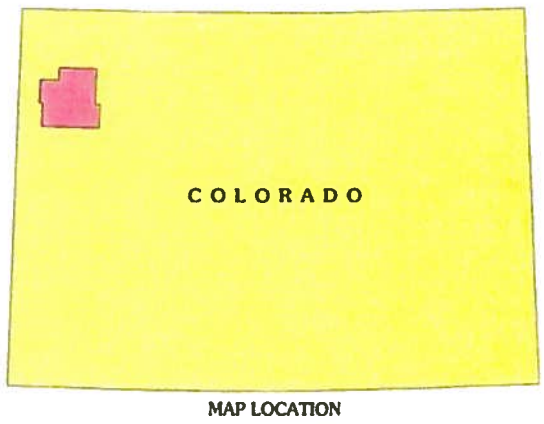
U.S. GEOLOGICAL SURVEY



MAP LOCATION

Figure 4: Regional Piceance Basin Geology (Hail and Smith, 1994).

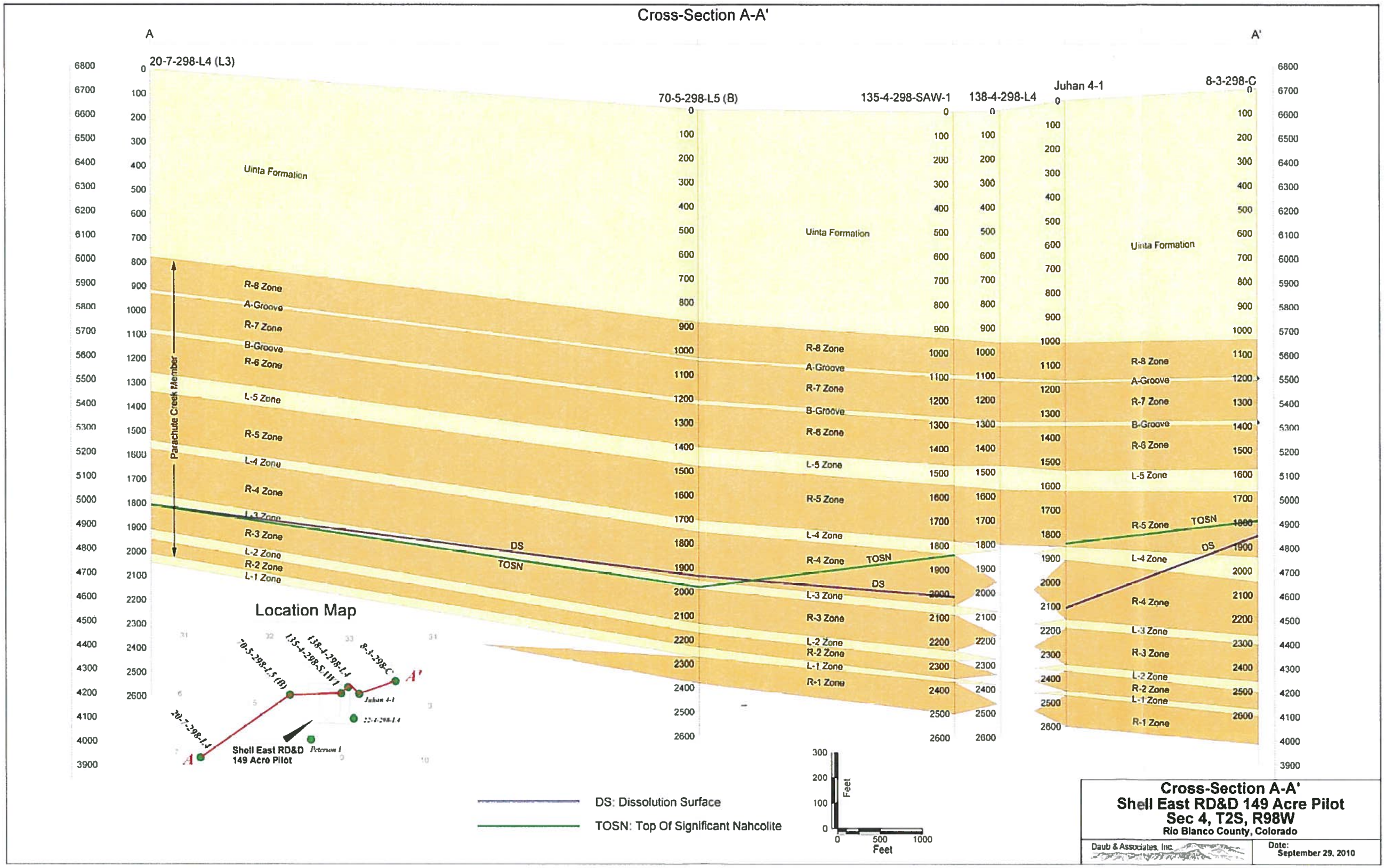


Figure 5: Cross-section A – A'. Shell East RDD 149 Acre Pilot.

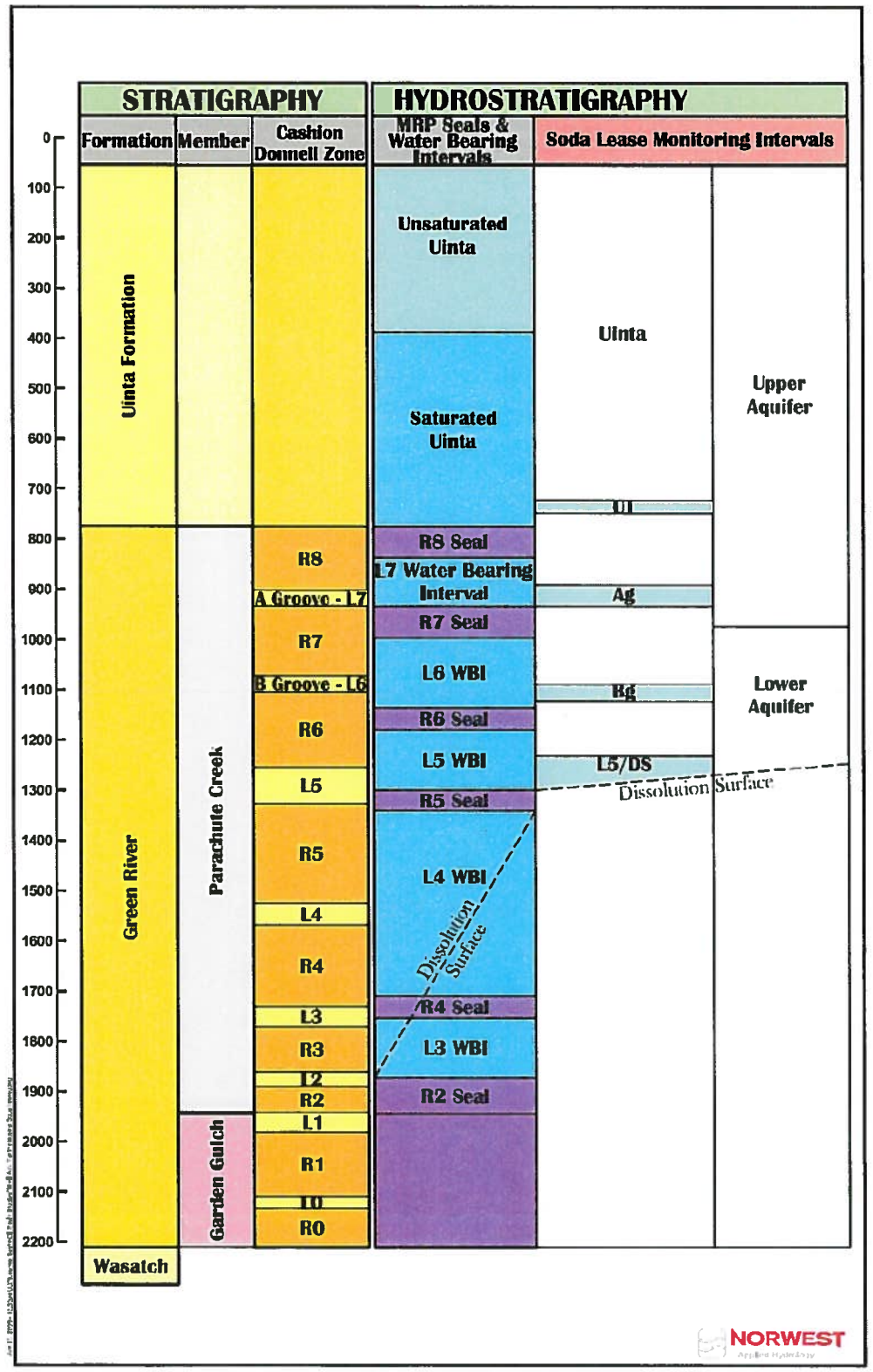


Figure 6: General West-Central Piceance Basin Stratigraphic and hydrostratigraphic section. Dissolutions surface intersects shallower water-bearing intervals in eastern part of basin than in west.

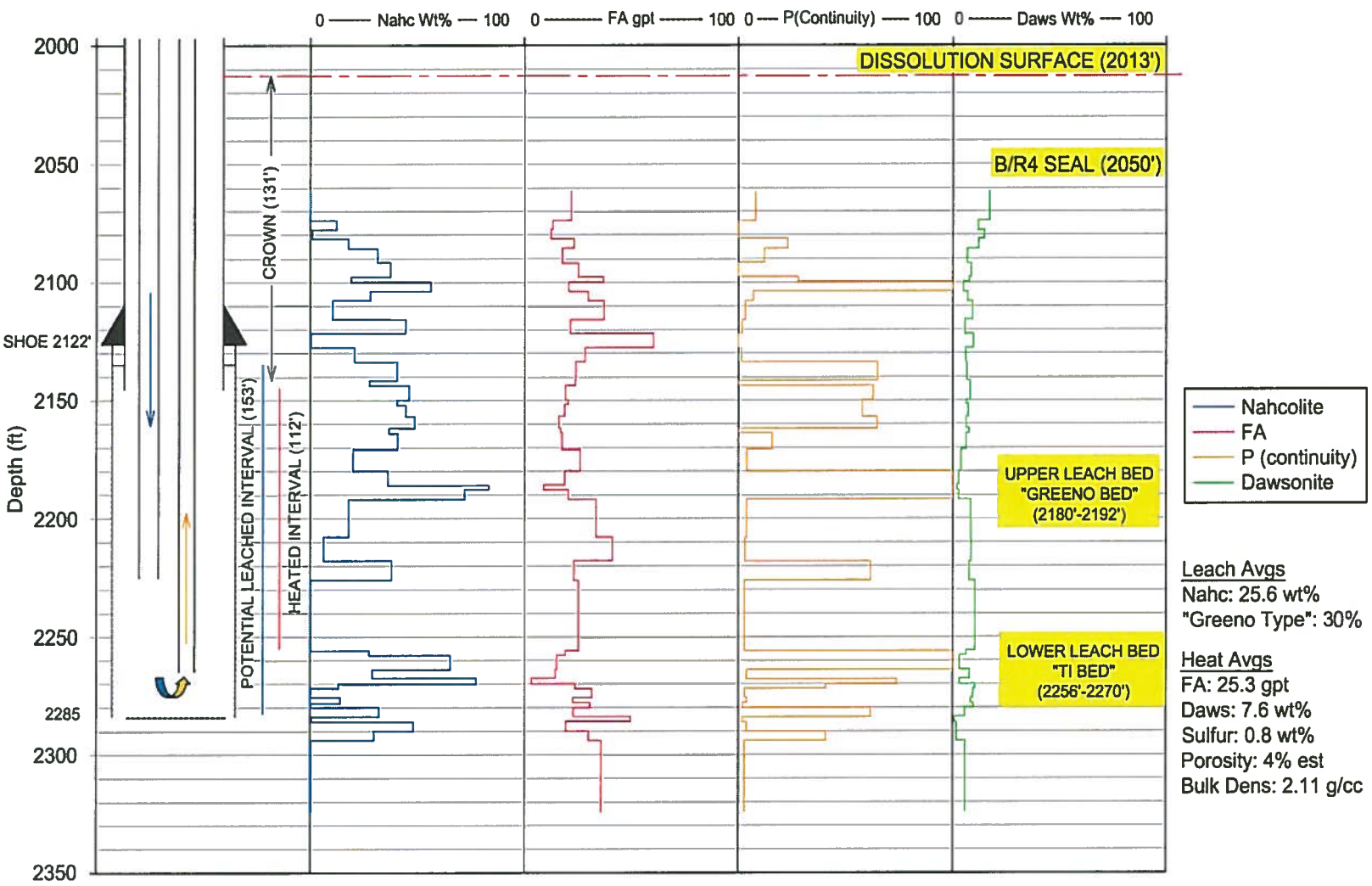


Figure 7: Static model showing nahcolite wt %, Fischer Assay, probability of nahcolite continuity (leachability), and dawsonite wt %.

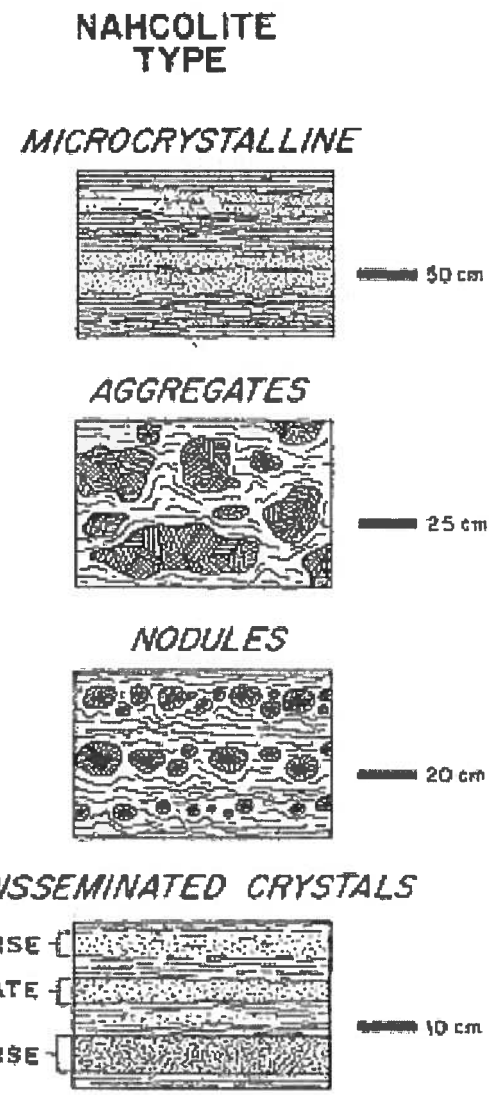


Figure 8: **Nahcolite morphologies (after Dyni, 1974.)**

Nahcolitic Morphologies

From SIFT Well O-1

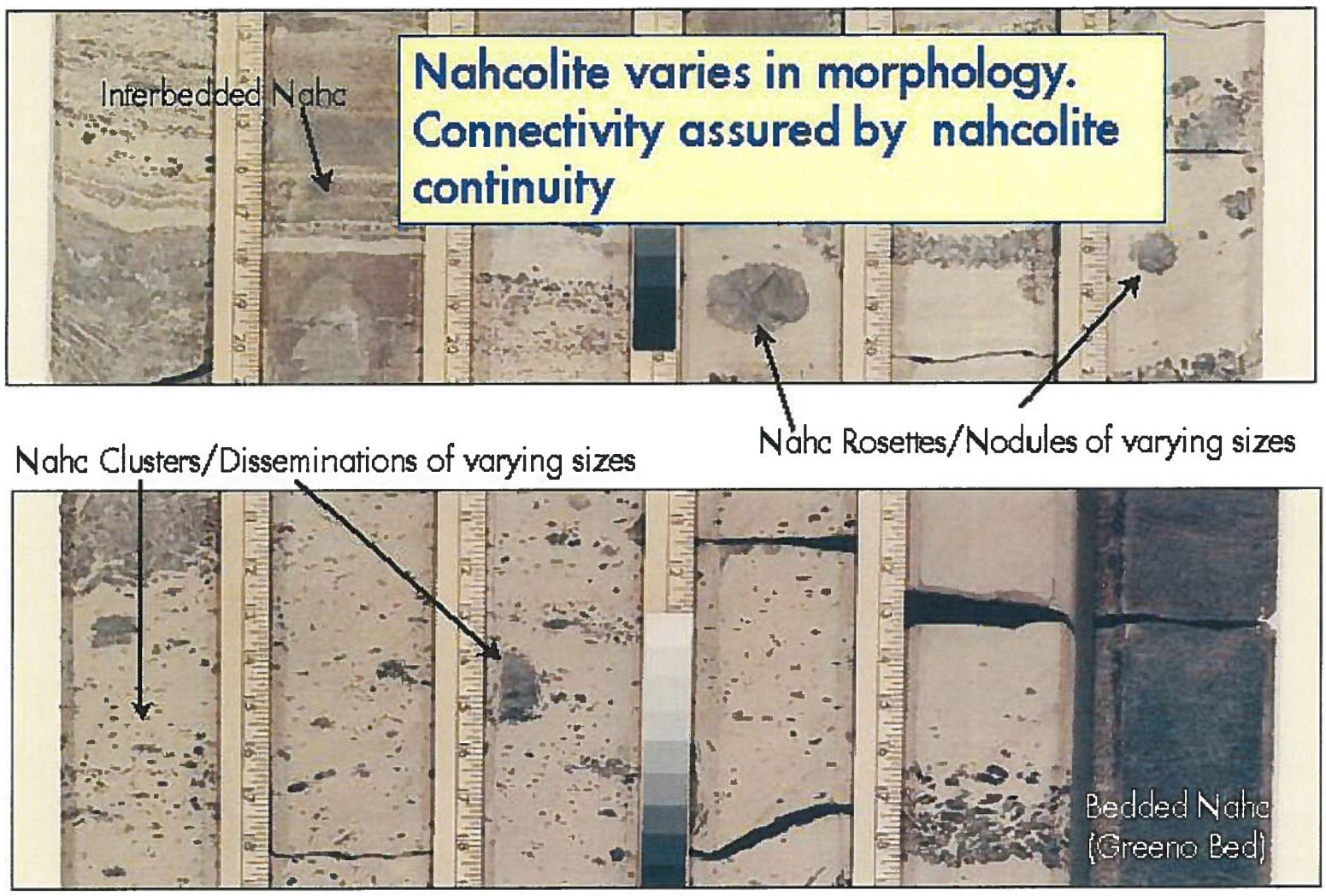


Figure 9: **Nahcolite morphologies as seen in cores.**

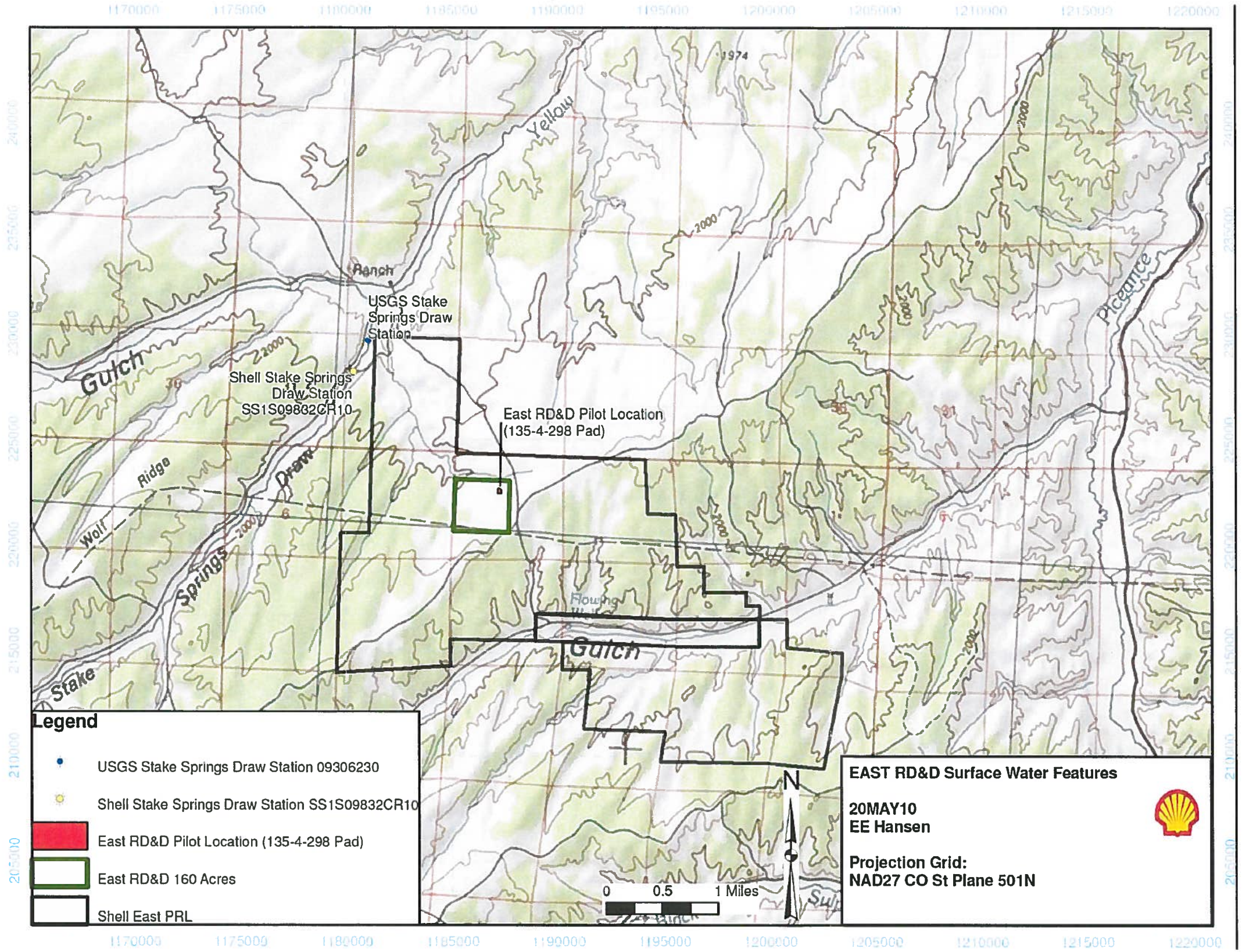


Figure 10: East RD&D surface water features.

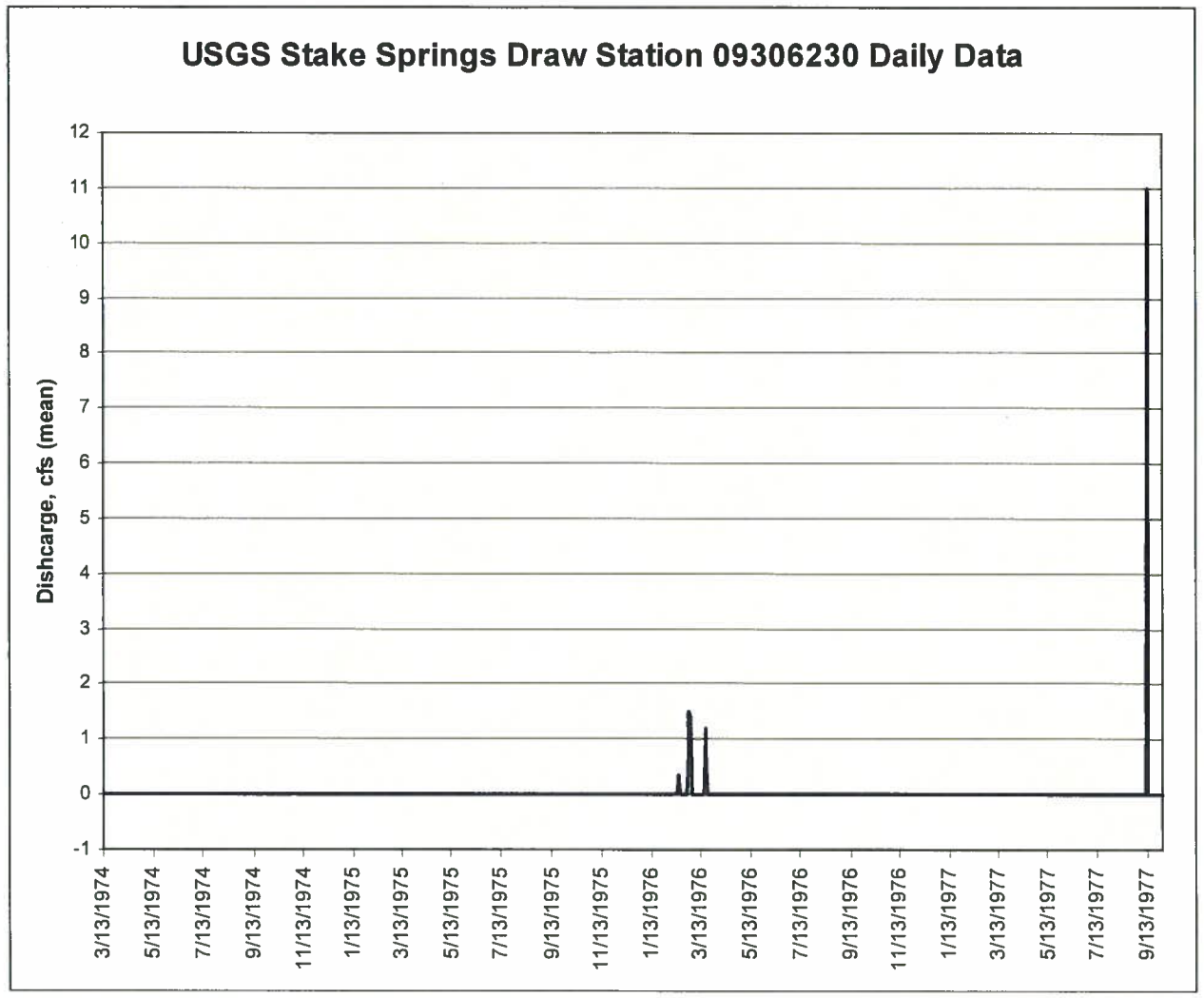


Figure 11: USGS Stake Springs Draw Flow Data

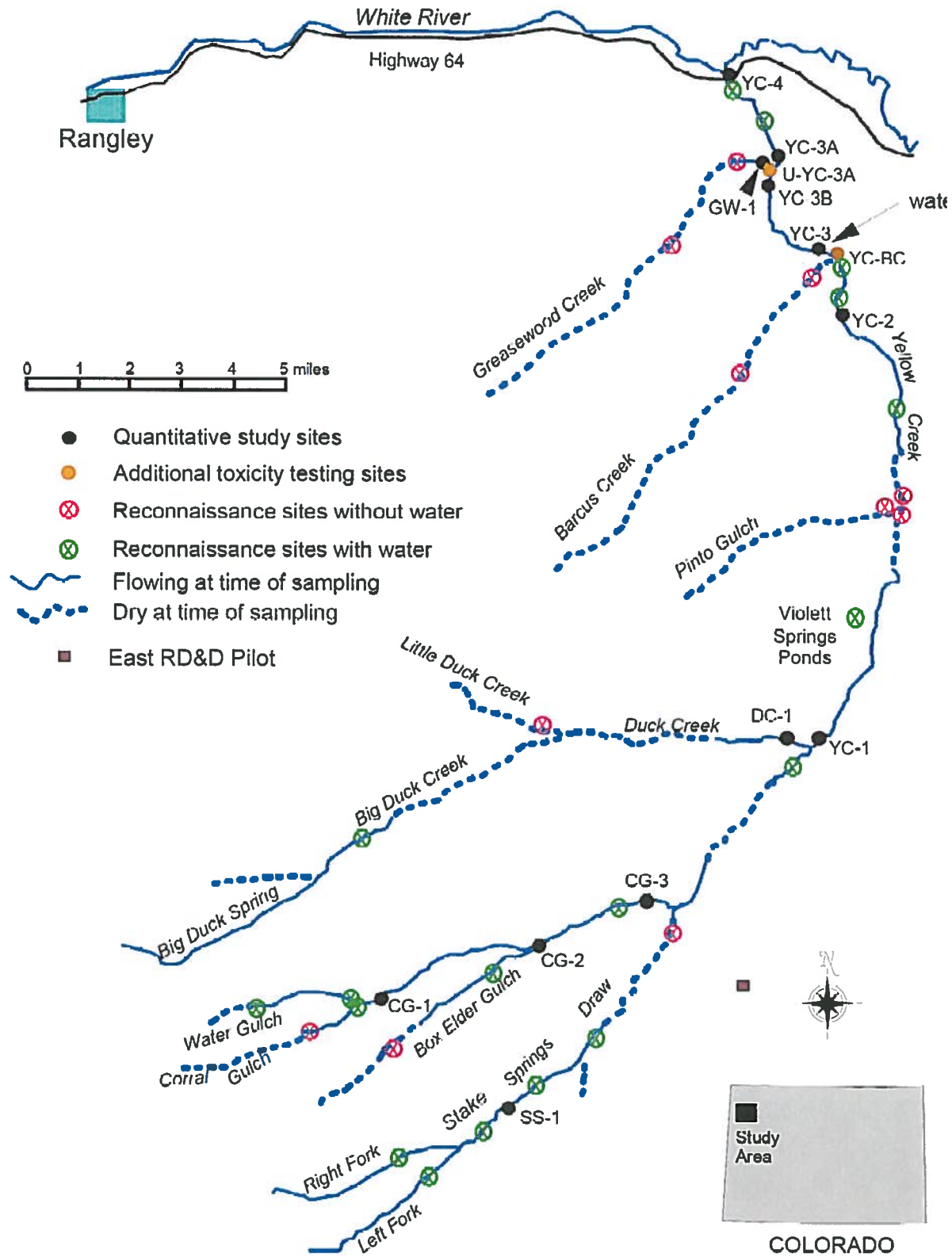


Figure 12: Locations of UAA Study/Reconnaissance in Yellow Creek Basin 2001-2007.

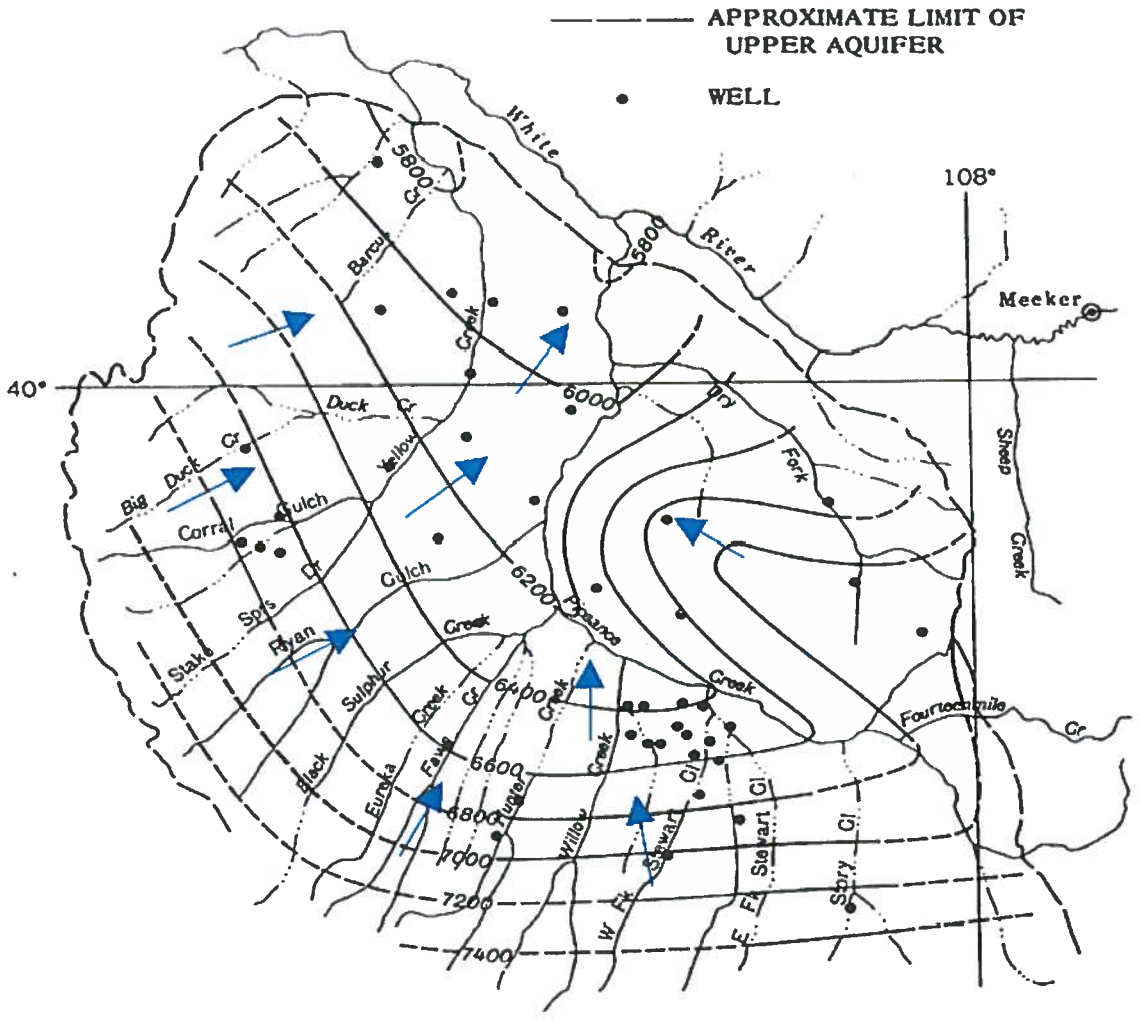


Figure 13: Potentiometric Surface for the Upper Aquifer (after Robson and Saulnier, 1981).

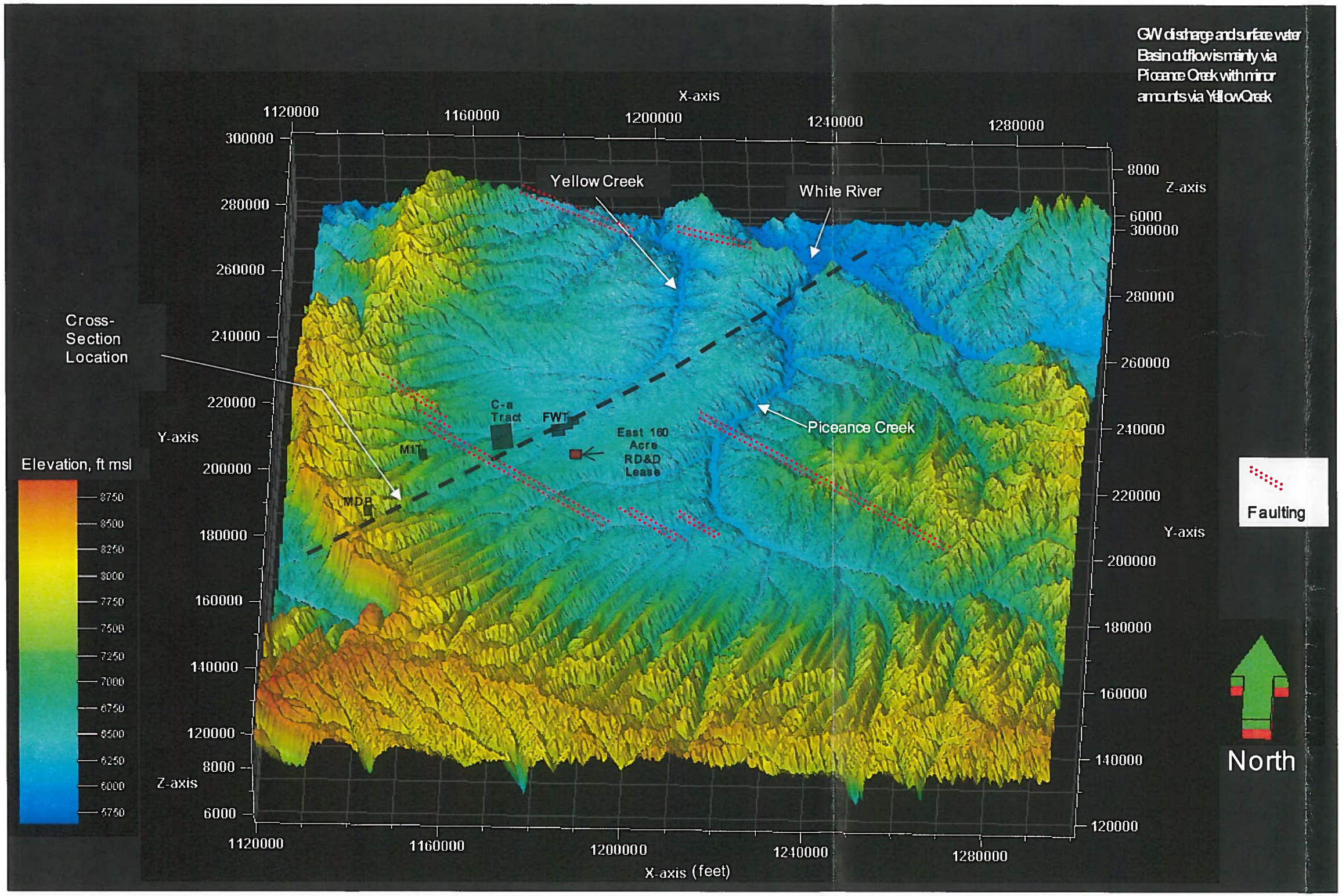


Figure 14: Piceance Basin topography and features.

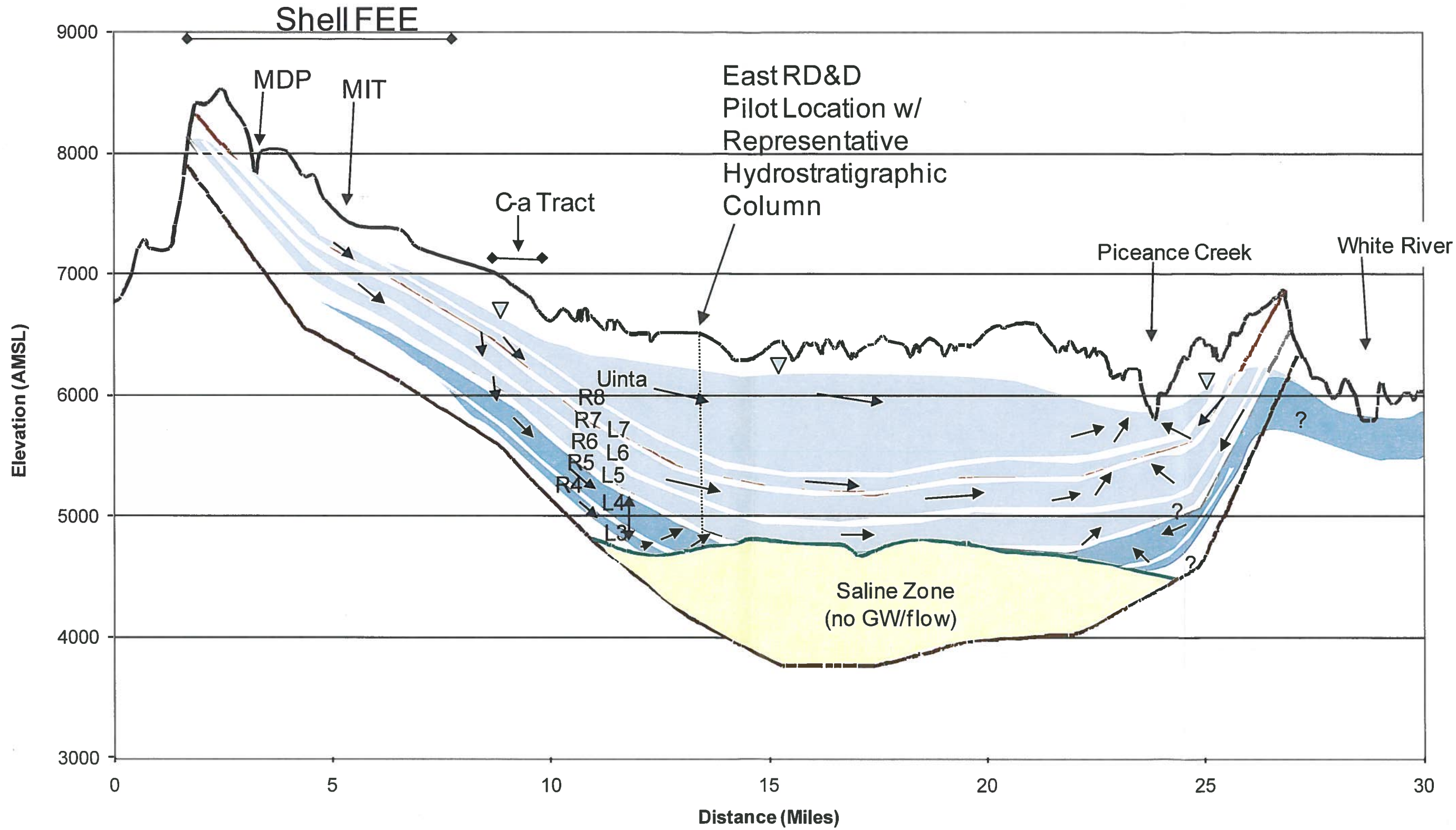


Figure 15: General hydrostratigraphic cross-section across Piceance Basin.

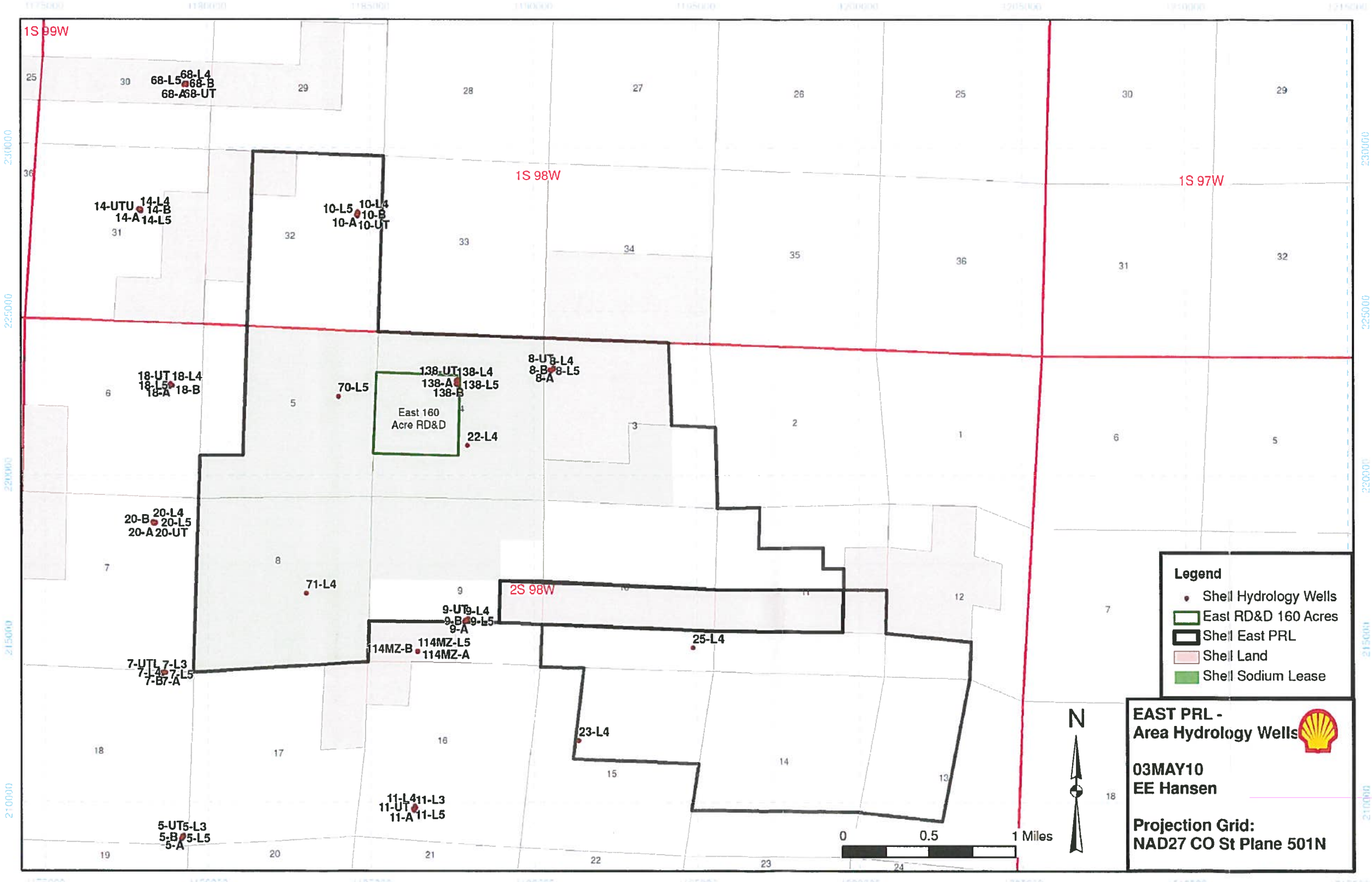


Figure 16: East PRL Area Hydrology Wells.

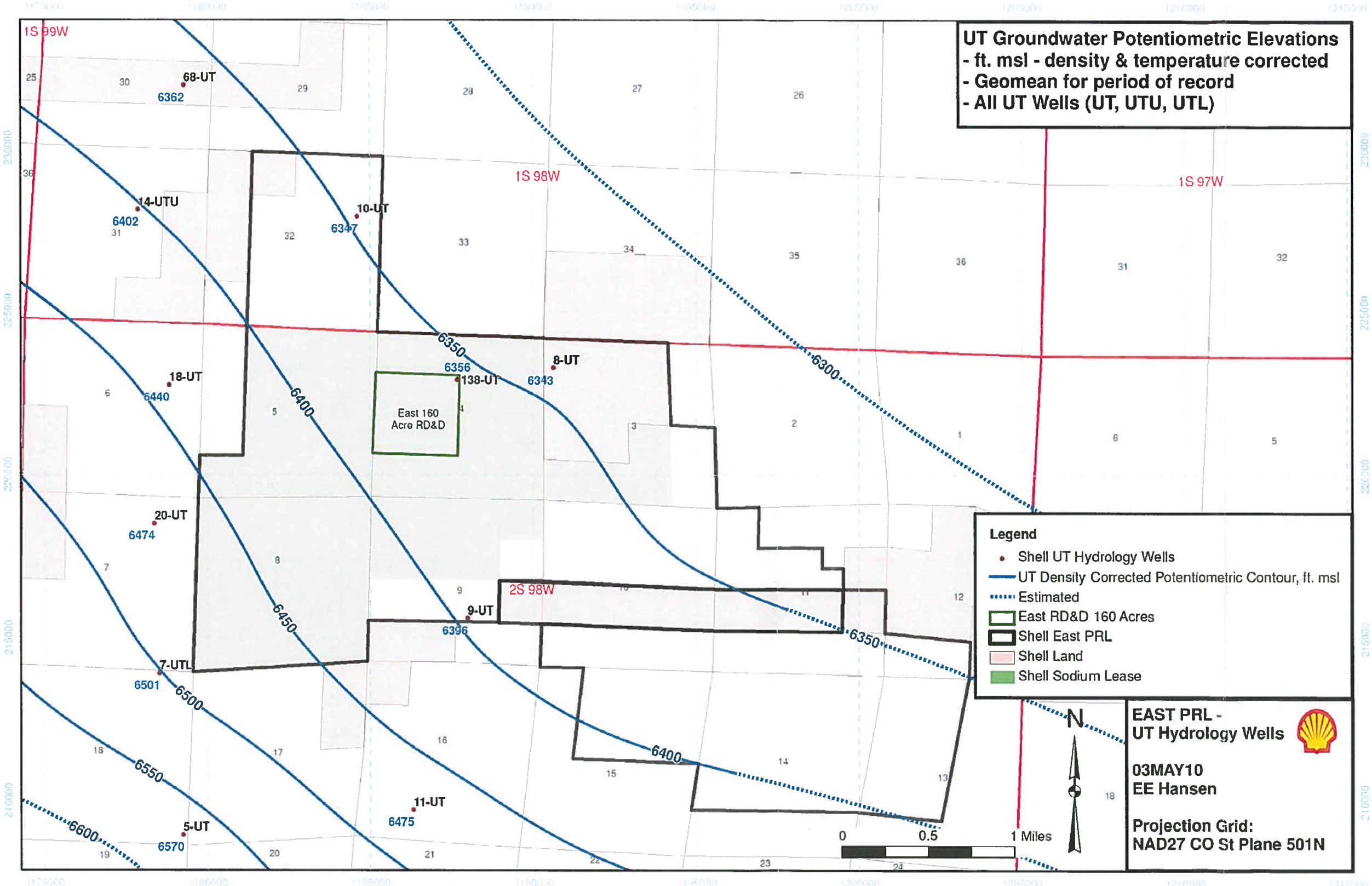


Figure 17: UT Ground water potentiometric elevations.

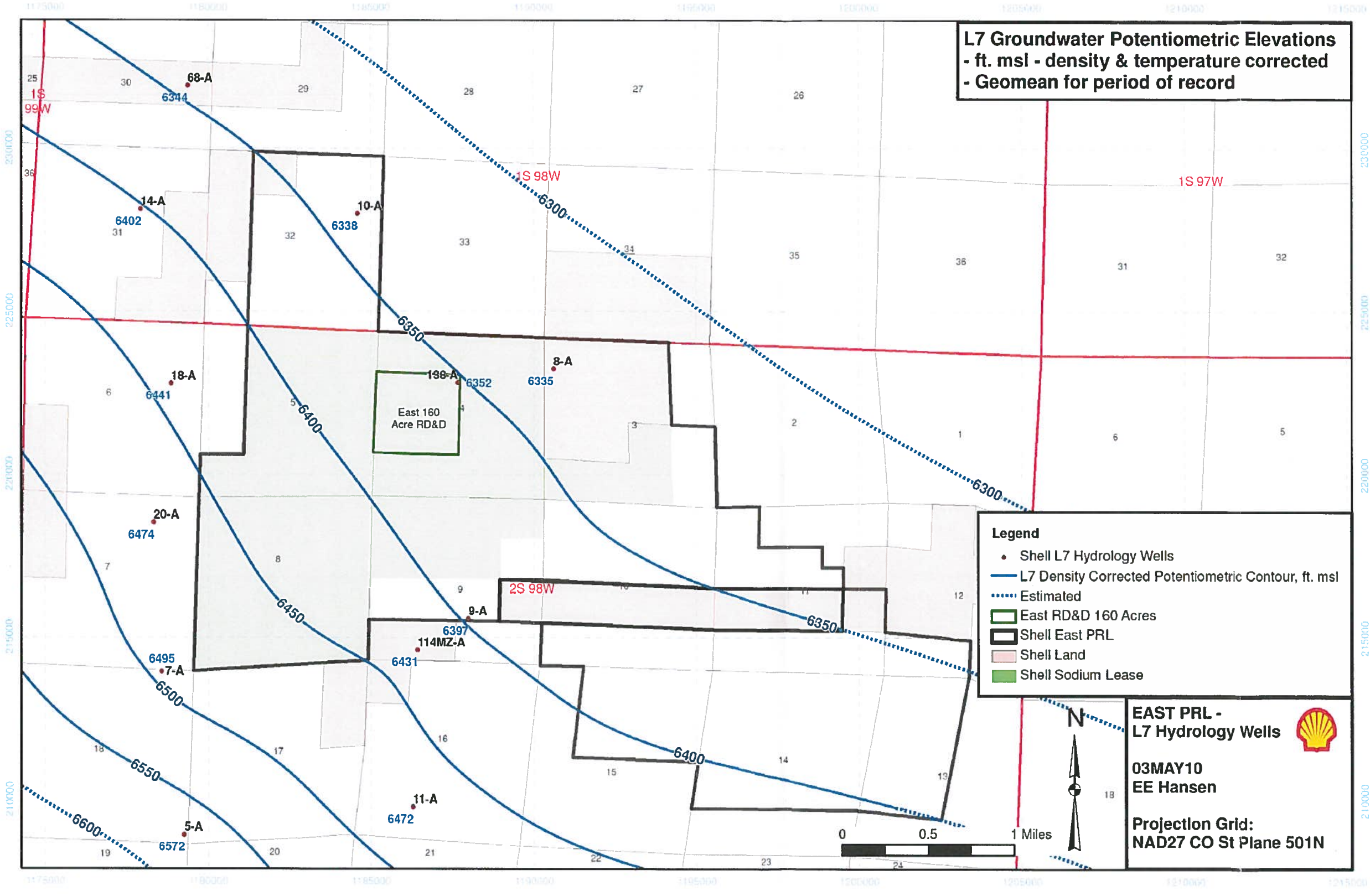


Figure 18: L7 Ground water potentiometric elevations.

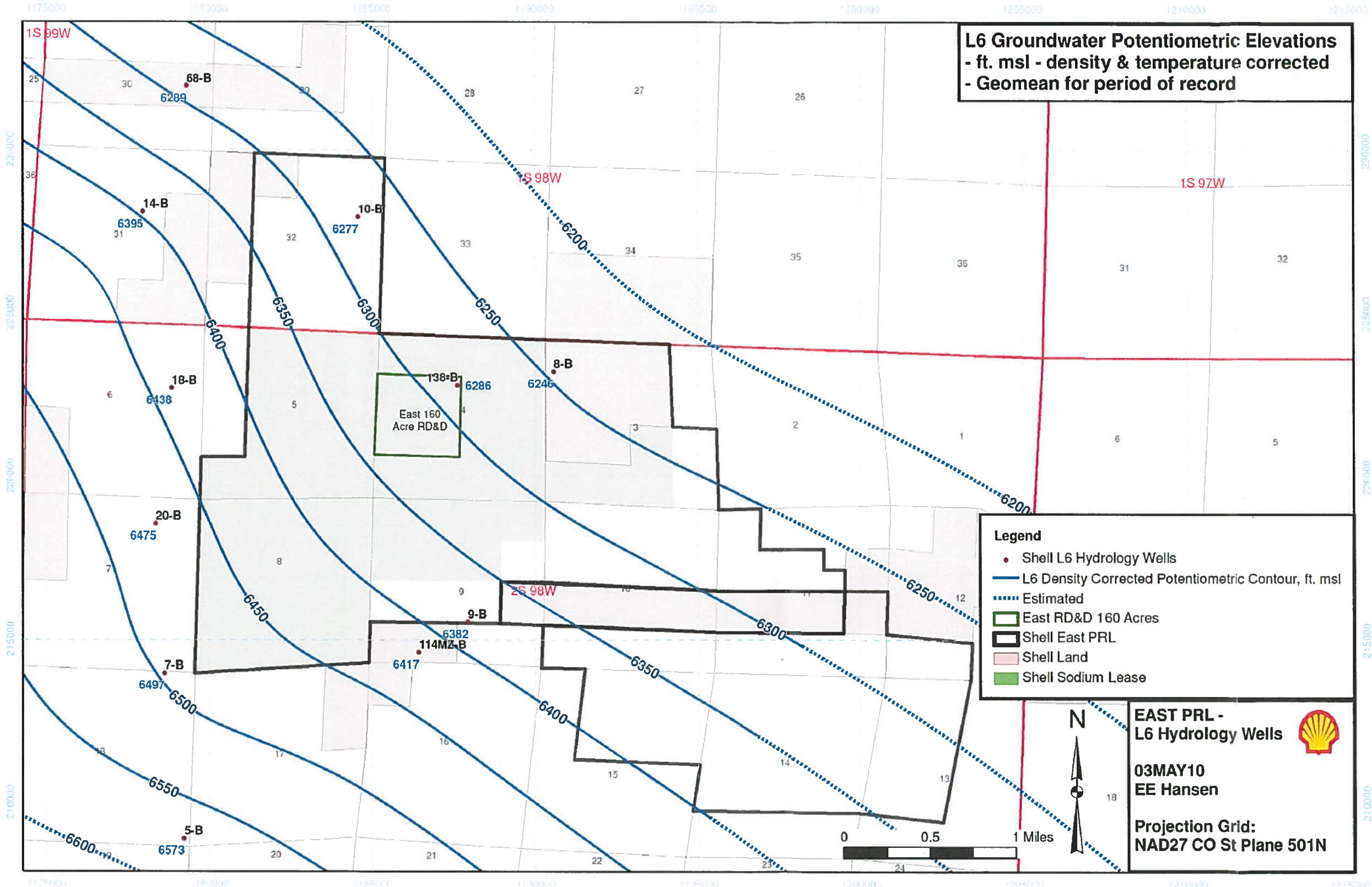


Figure 19: L6 Ground water potentiometric elevations.

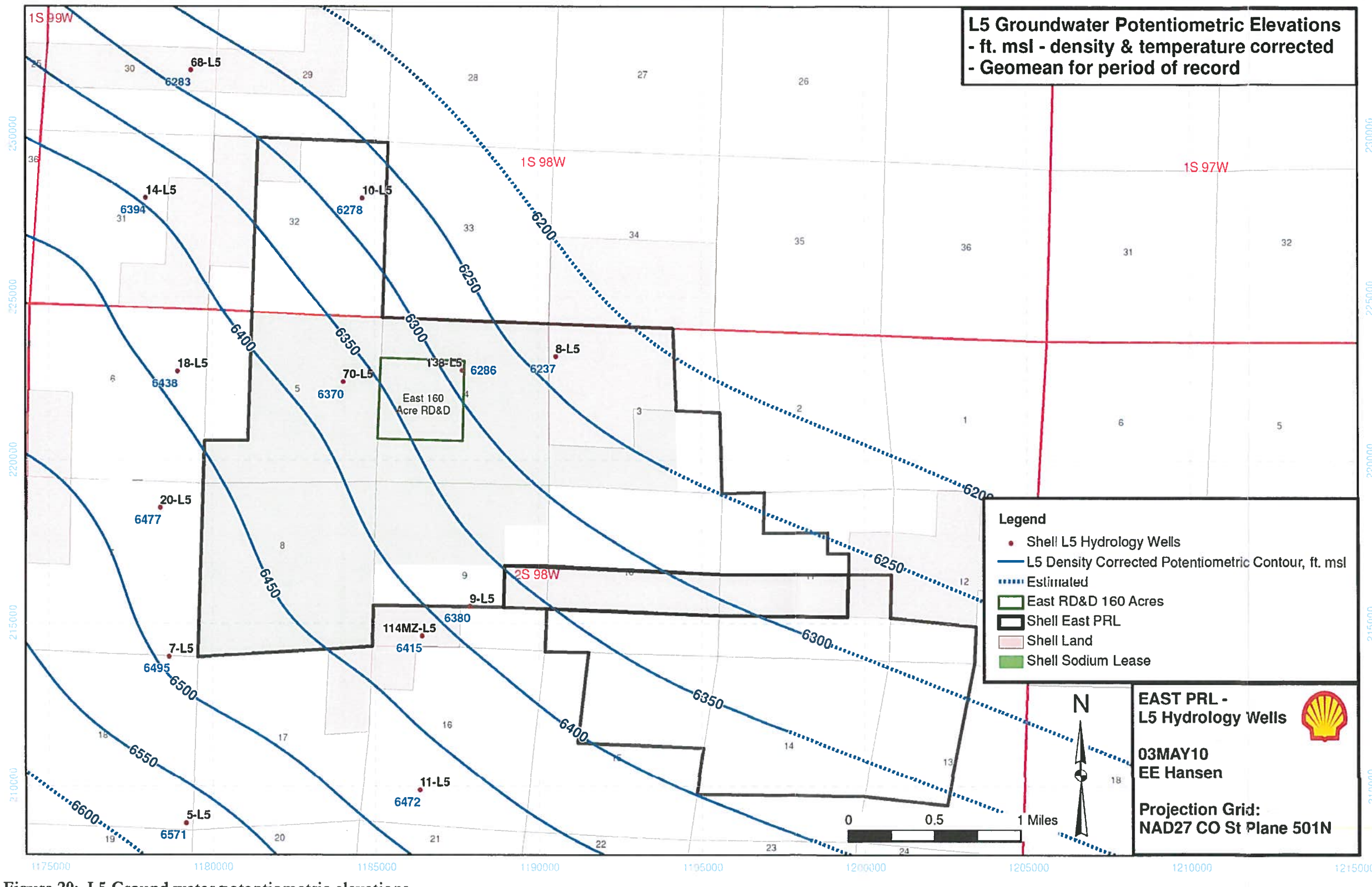


Figure 20: L5 Ground water potentiometric elevations.

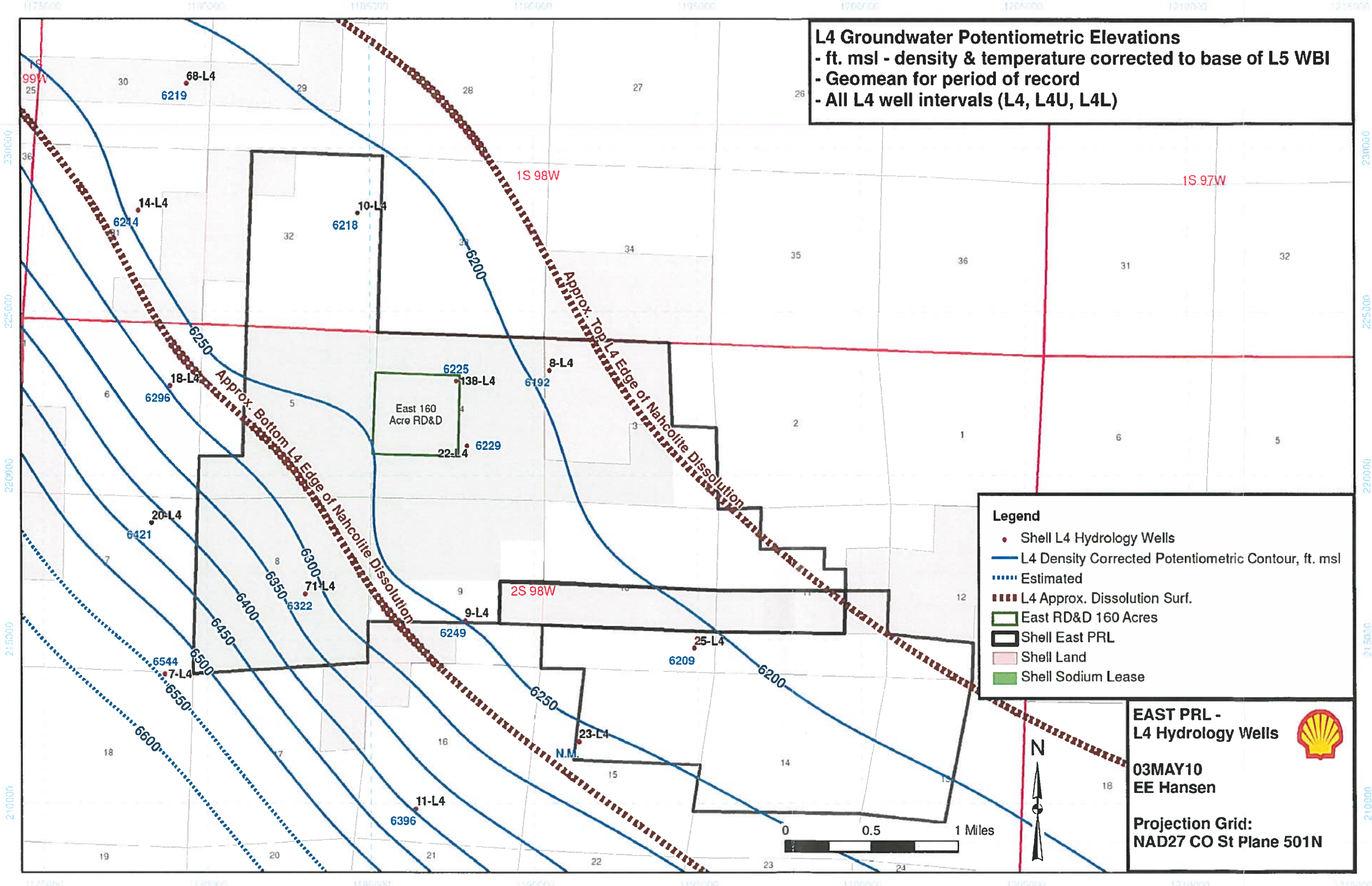


Figure 21: L4 Ground water potentiometric elevations.

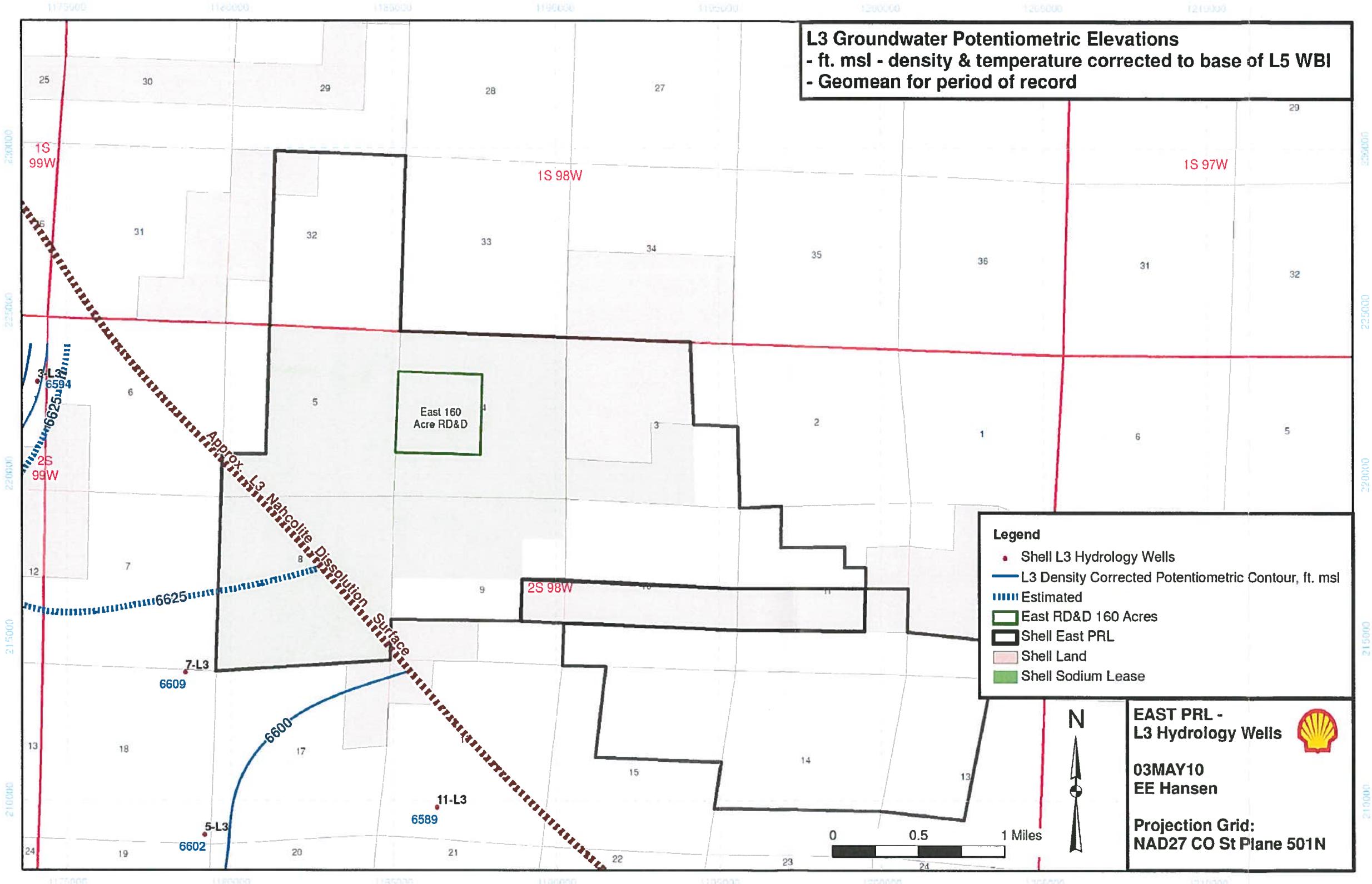


Figure 22: L3 Ground water potentiometric elevations.

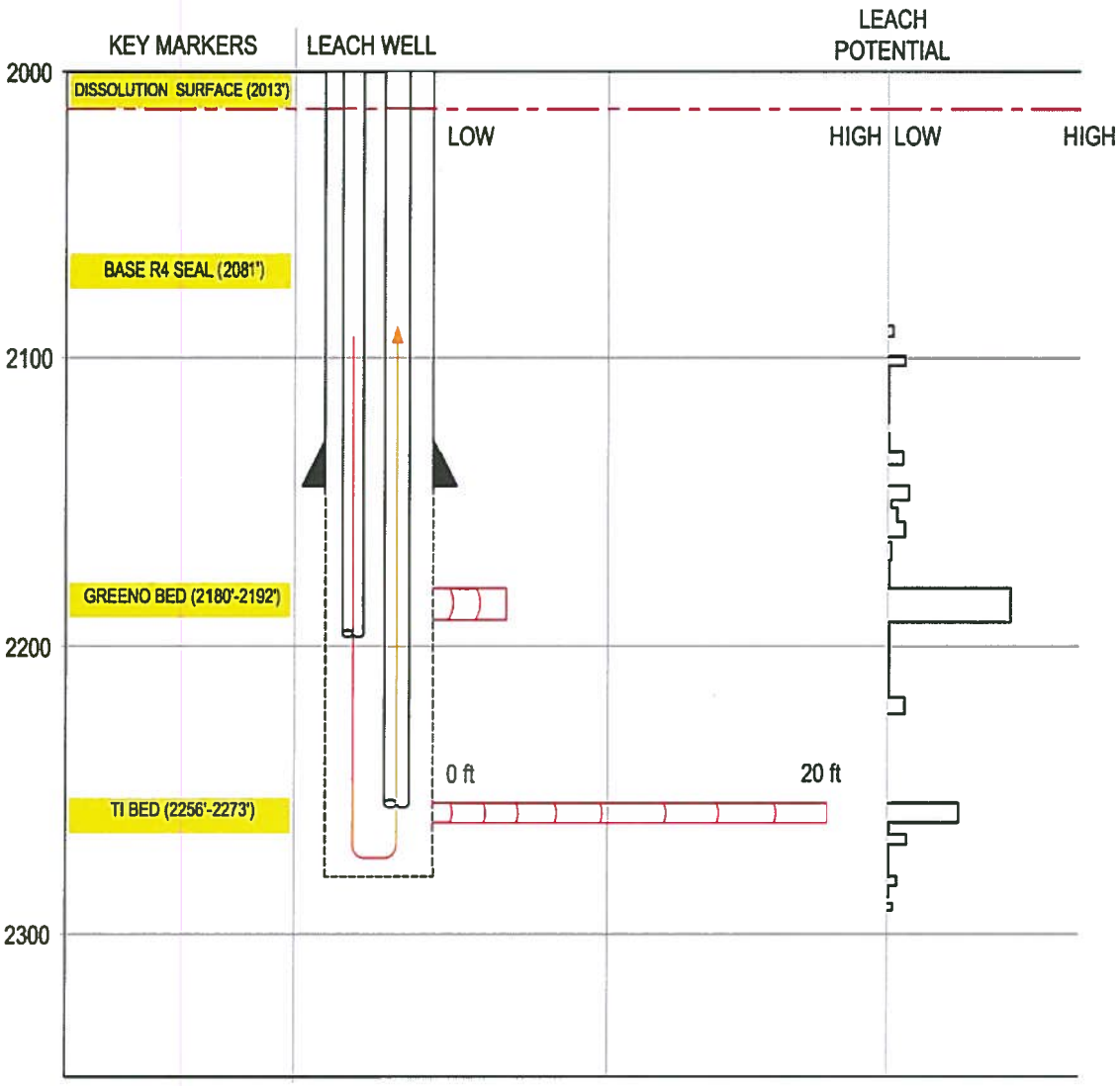


Figure 23: East RDD Pilot Leaching Visualization.

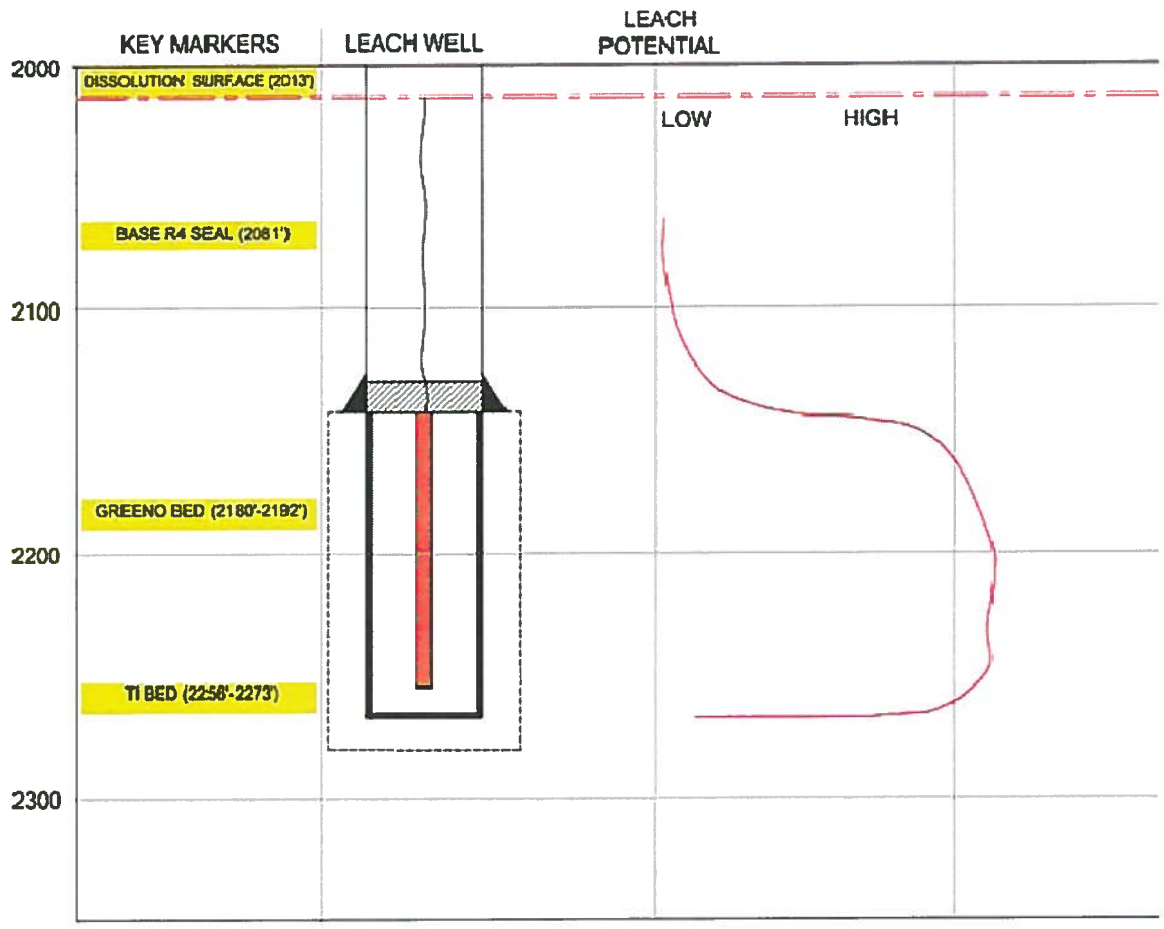
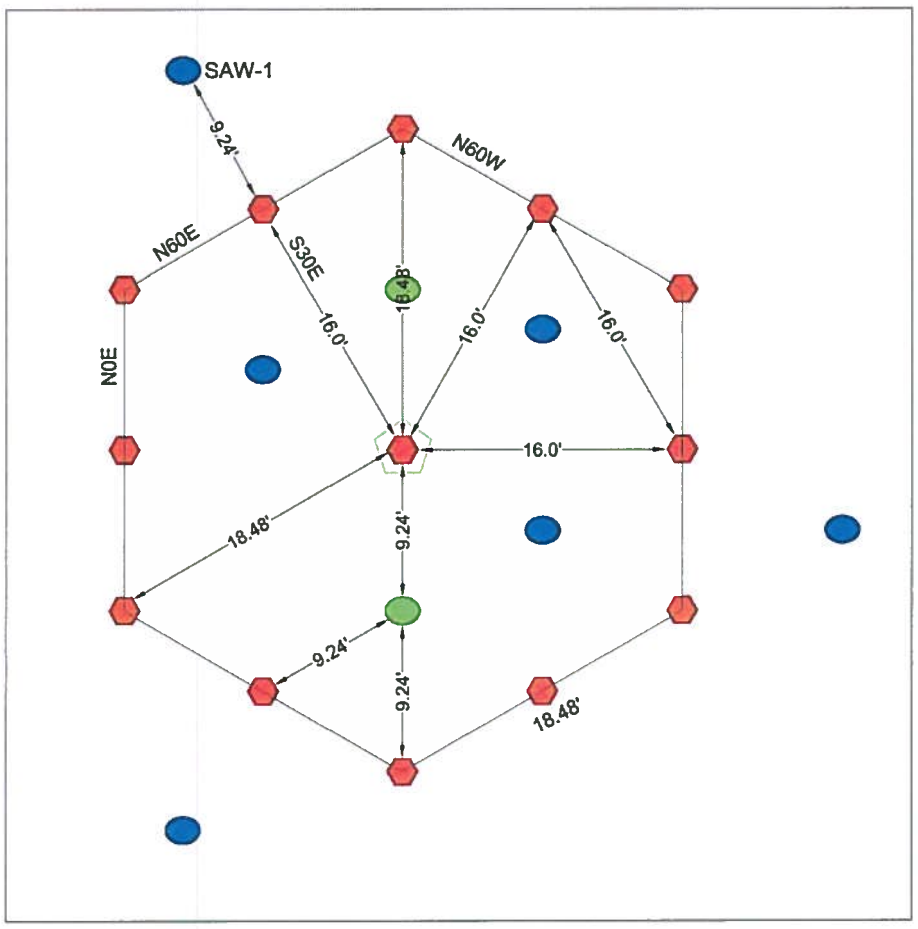


Figure 24: East RDD Pilot Heating Visualization.



LEGEND

- HEATER WELL
- OBSERVATION WELL
- PRODUCER WELL
- LEACH WELL AND HEATER WELL

Figure 25: Well pattern East RDD Pilot.

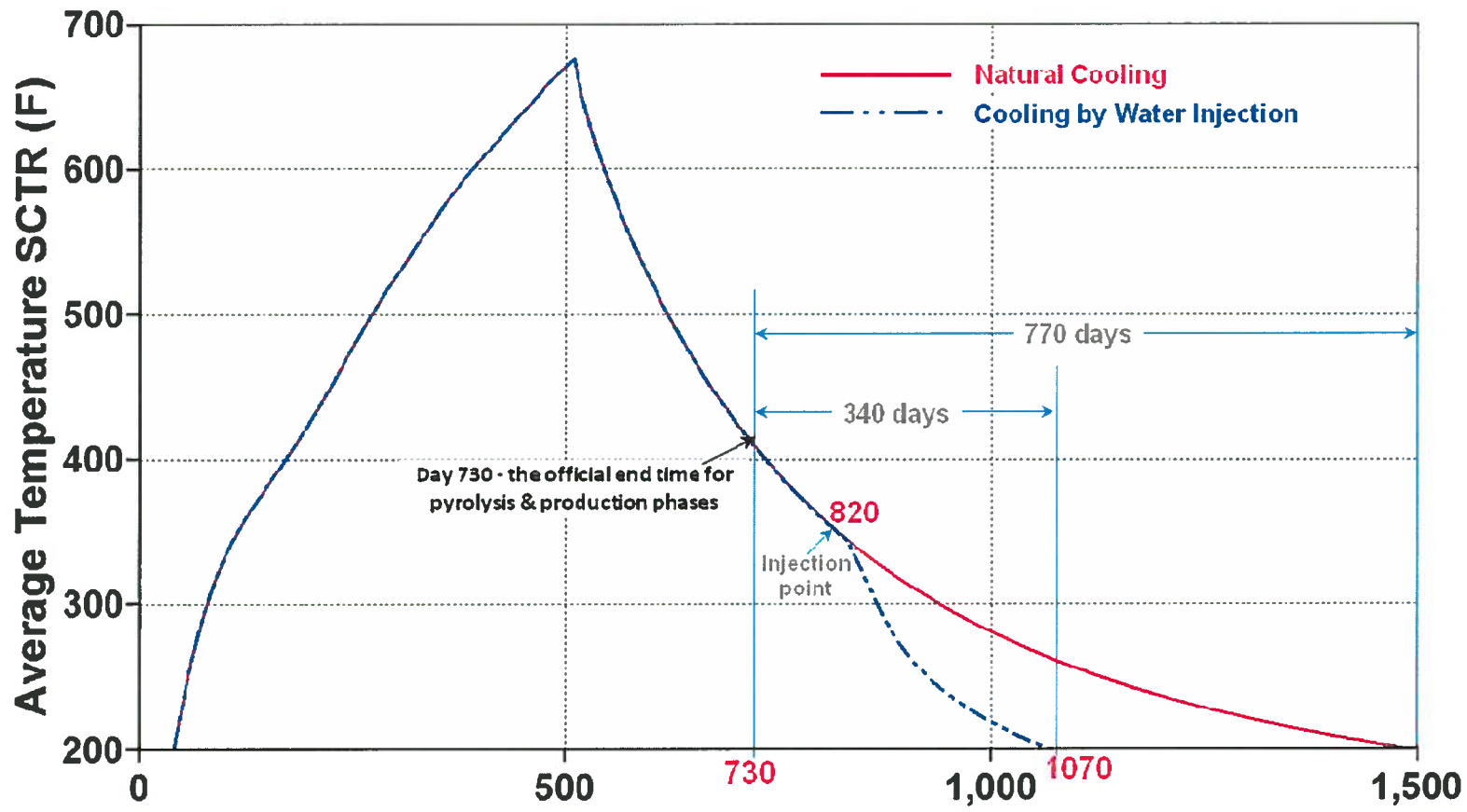


Figure 26: **Temperature profiles for heating, natural cooling, and water-assisted cooling. 500 days is assumed for the pyrolysis phase, at which point (A) heaters are turned off and oil production continues to ~ day 730. By natural cooling, the reservoir temperature will fall to <200 F after 1400 days (from imitation of pyrolysis). Cool water injected immediately after the heating phase (pink dashed line) cools reservoir to <200 F by after 700 days. Water injected between 700 days and 750 cool the reservoir to <200 F by approximately 860 and 935 days, respectively.**

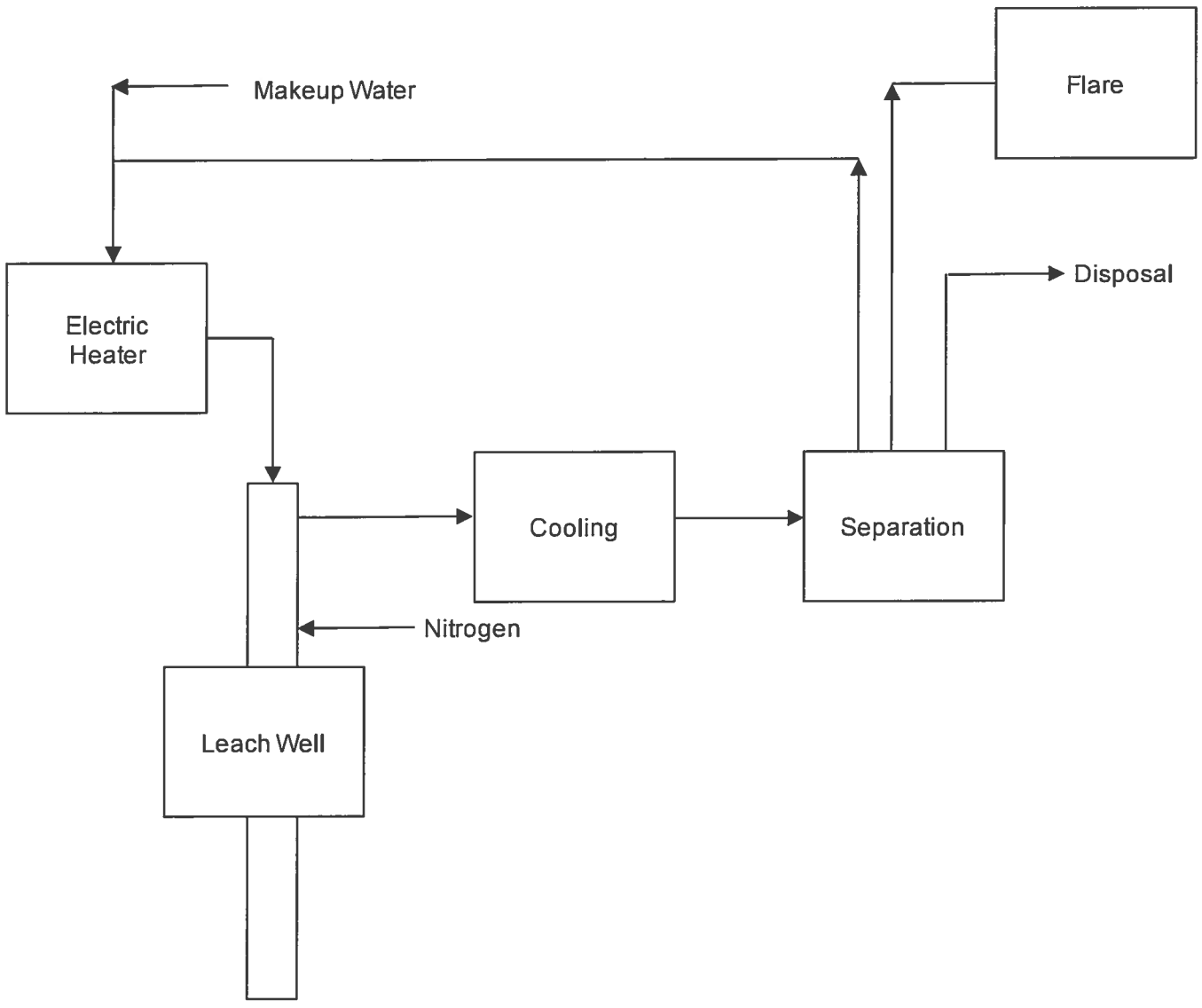


Figure 27: Schematic of leaching phase process facilities.

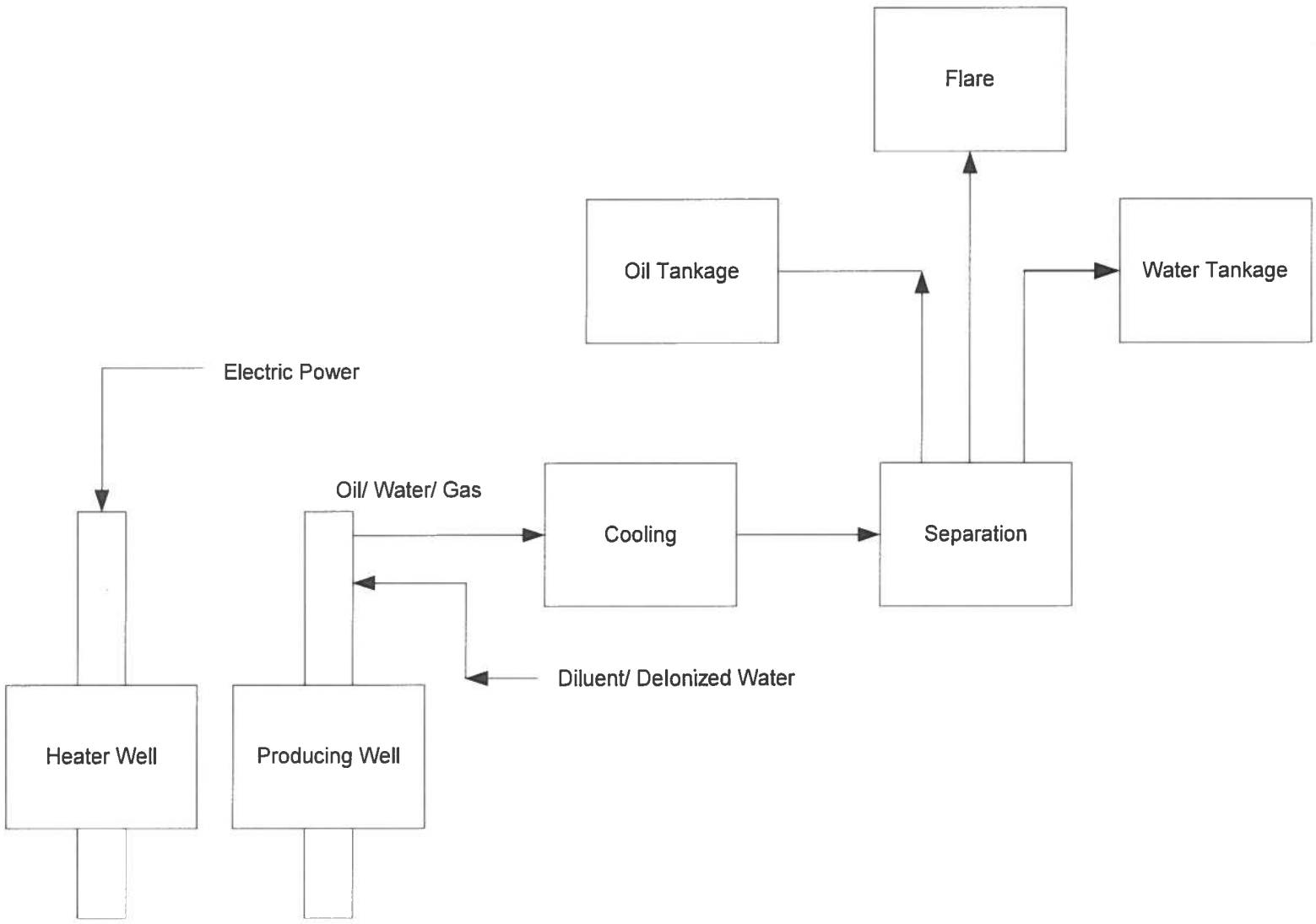


Figure 28: Schematic of pyrolysis phase process facilities.

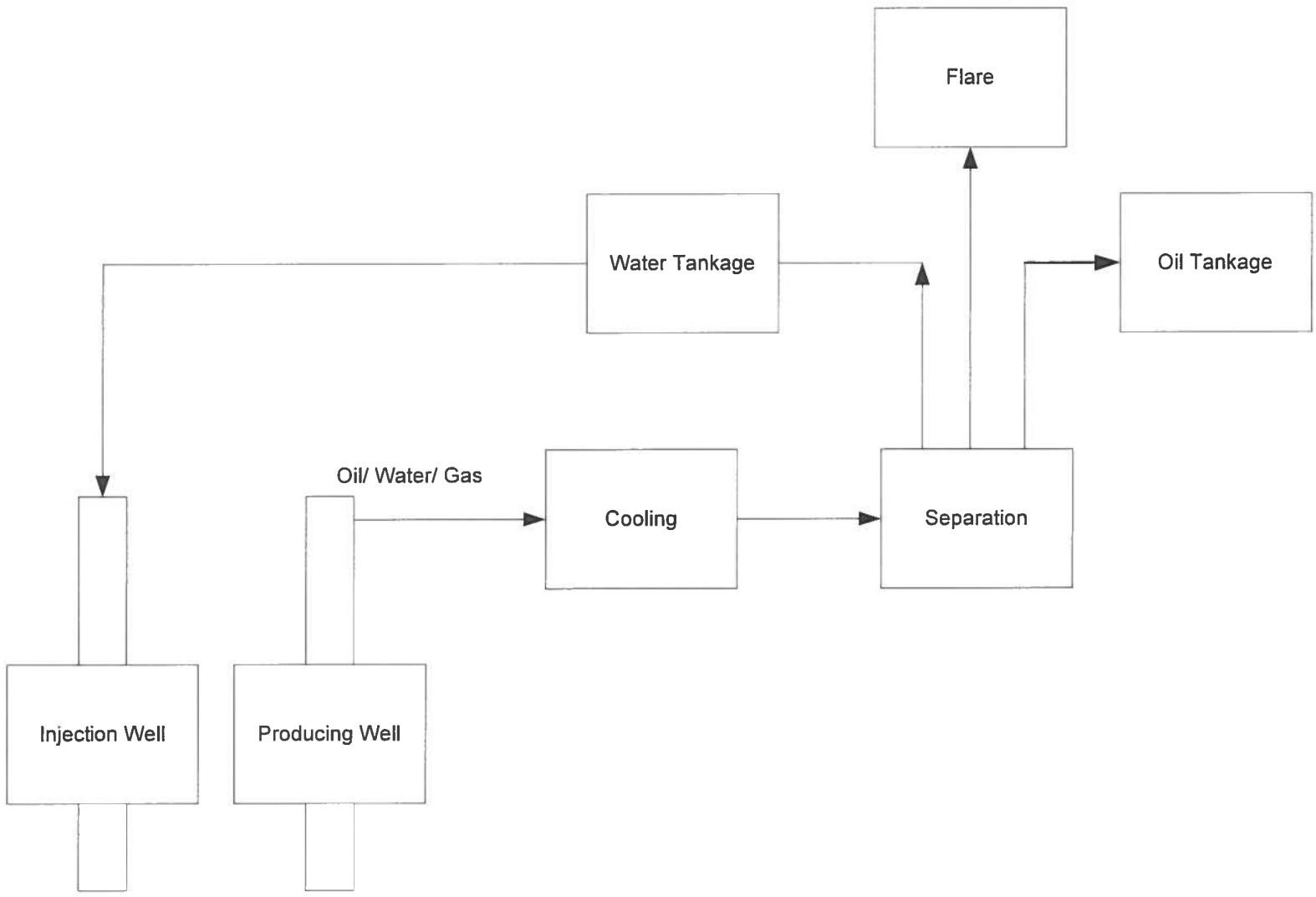
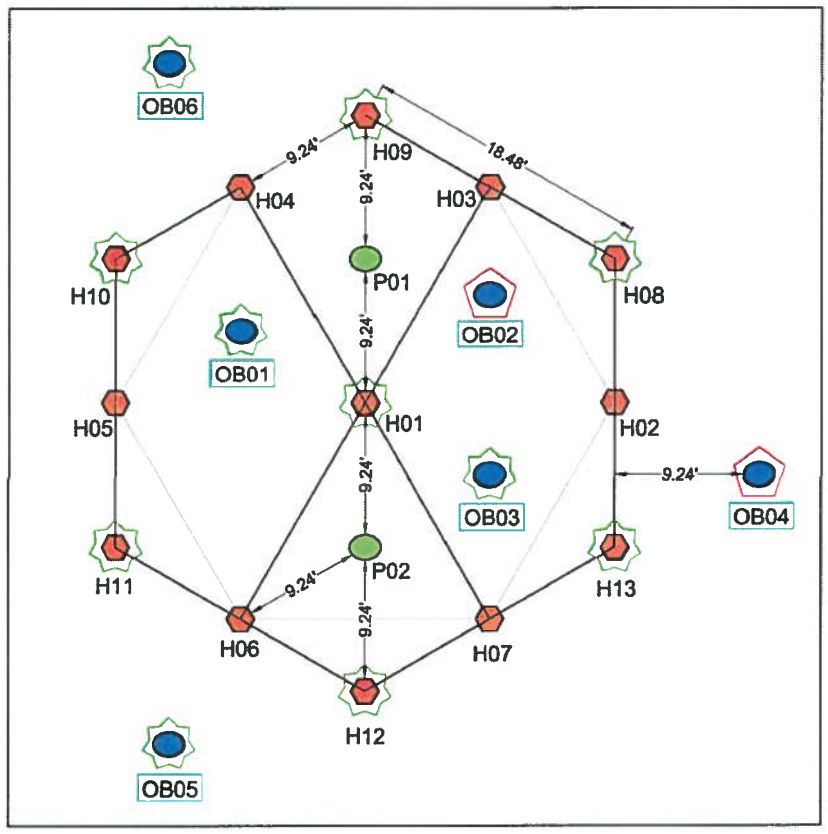


Figure 29: Schematic of reclamation phase process facilities.



LEGEND

- HEATER WELL
- OBSERVATION WELL
- PRODUCER WELL
- TRANSDUCER INSTALLED TO MONITOR TEMPERATURE AND PRESSURE
- GEOMECHANICS MONITORING

OB1, OB3, OB5, AND OB6 ARE DRILLED TO 2285' AND USED FOR PYROLYSIS MONITORING. OB2, AND OB4 ARE DRILLED TO 2342' FOR GEOMECHANICS MONITORING.

Figure 30: East RDD pilot well pattern showing pressure, temperature and geomechanics monitoring.

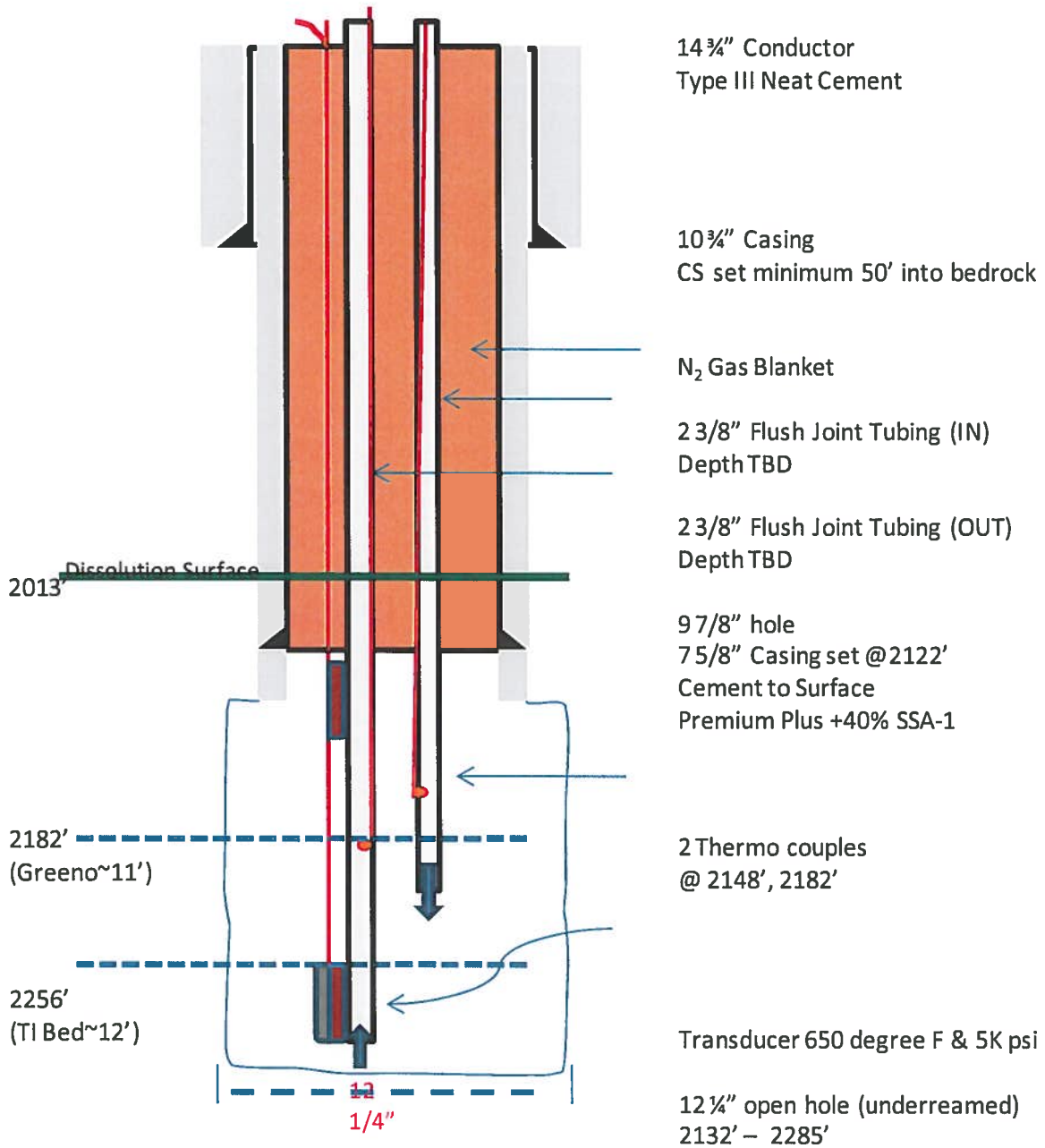


Figure 31: Nahcolite dissolution well in the leaching configuration. Well will be converted to heater well after leaching.

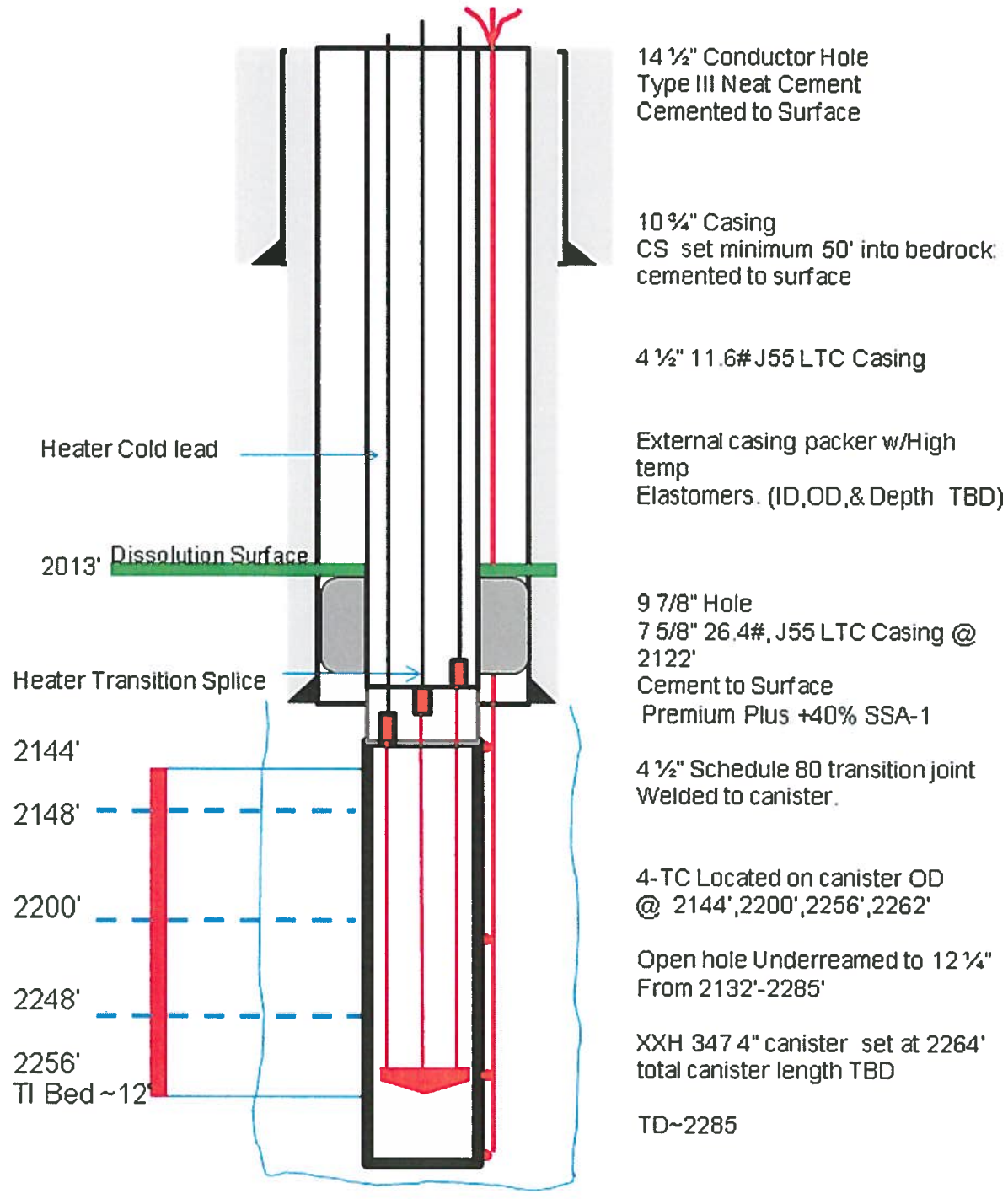


Figure 32: Heater well. 13 heater wells will comprise the heating pattern.

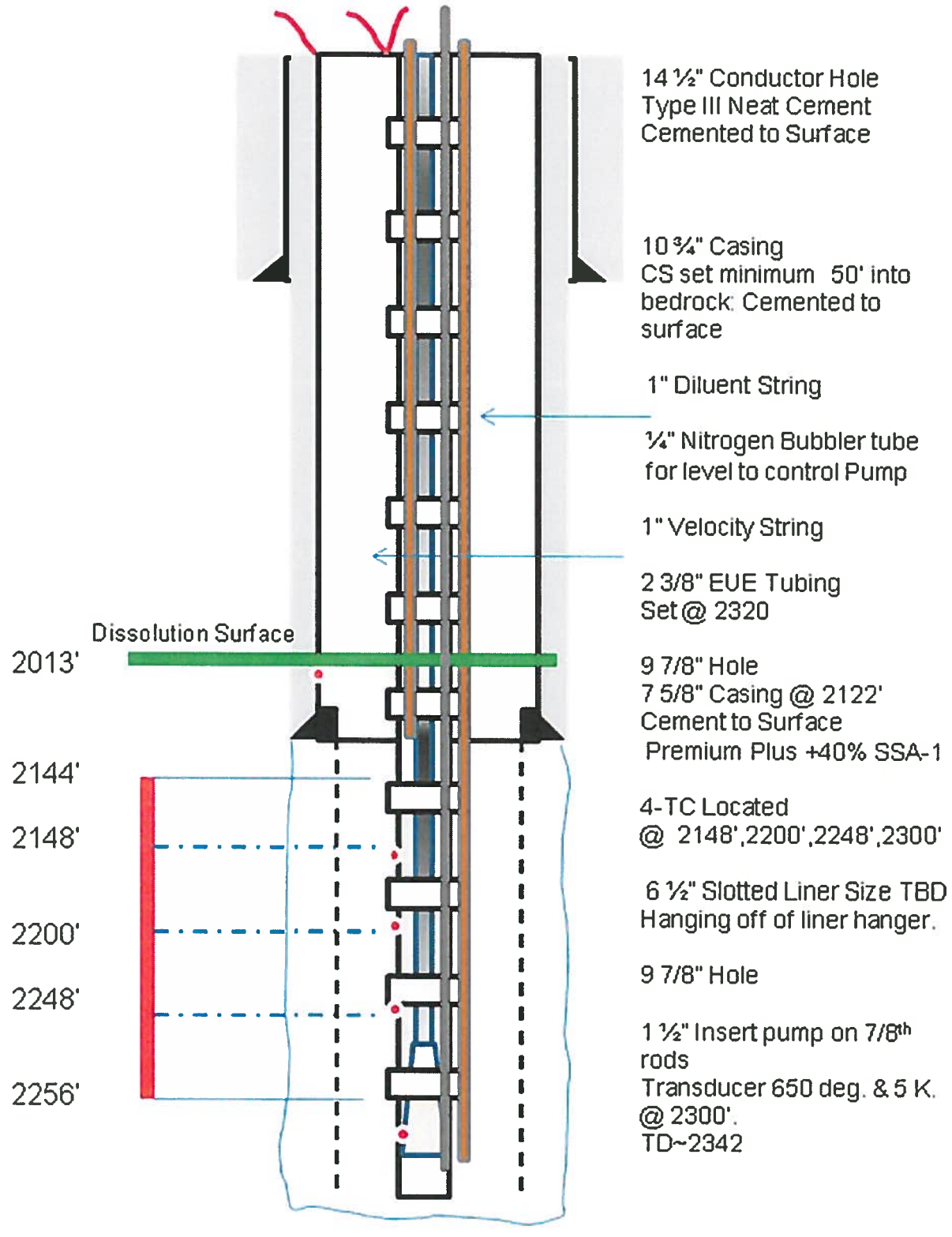


Figure 33: Producer well. Two producer wells to the pattern.

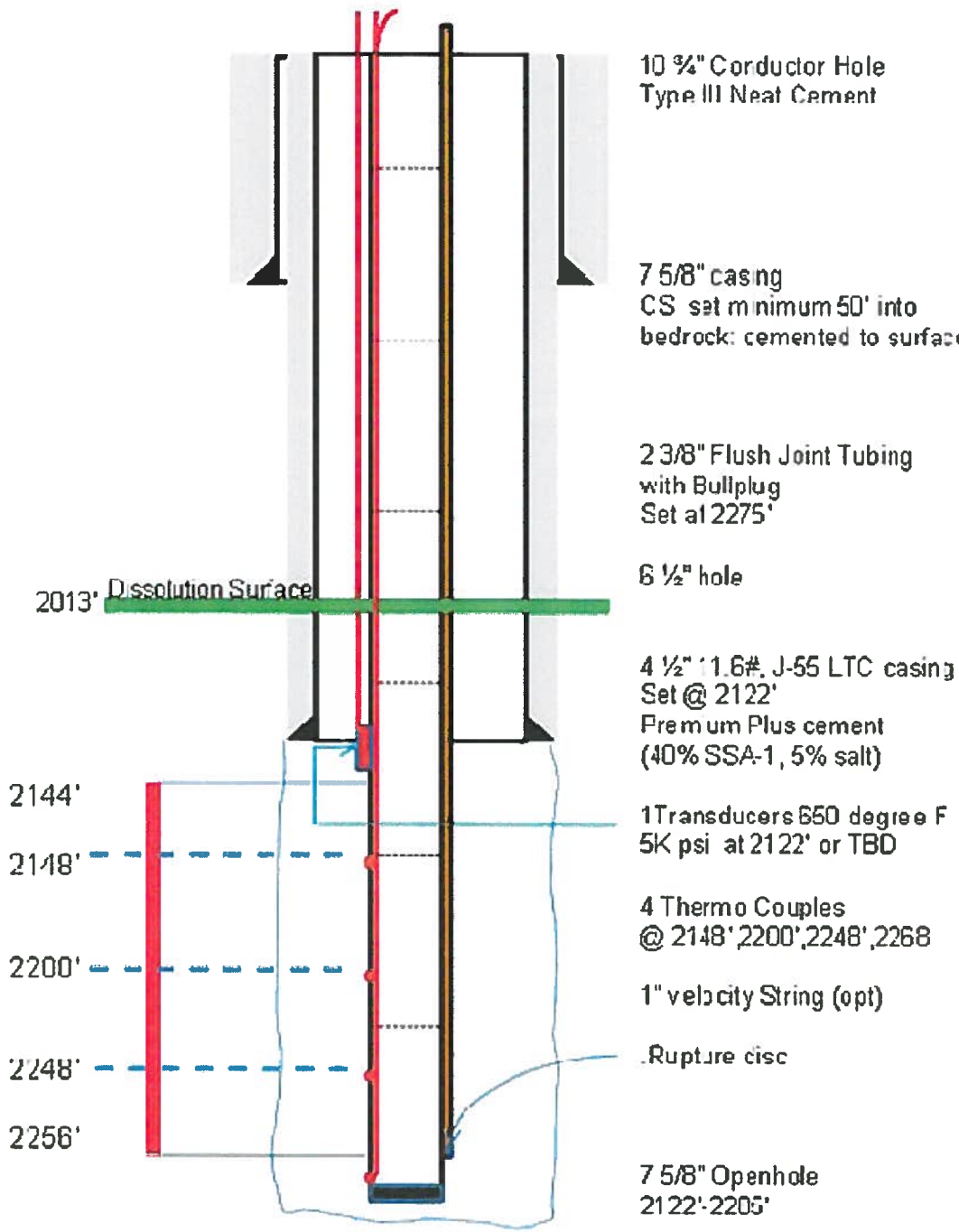


Figure 34: Observer well for interior area, showing possible location of monitoring devices. Exterior observer wells will be similar.

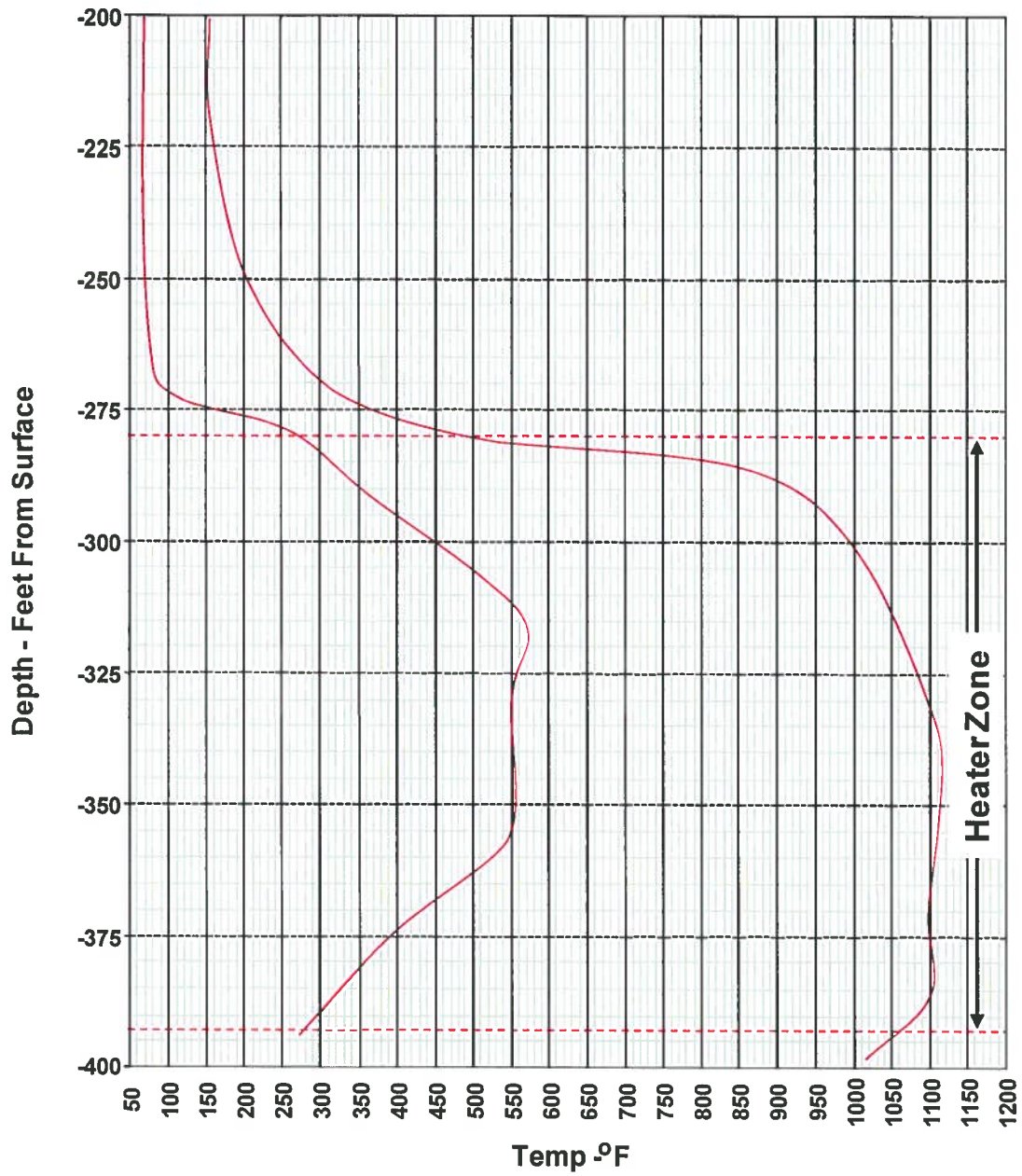


Figure 35: Temperature profile observed at Shell ICP experiment (MDP-south) representing changes in temperature with time during ICP heating. Area between red dotted horizontal lines represents the heater length. Note that temperatures at top and base of heater are lower than more typical high temperatures adjacent to the more central portions of the heater, due to sorption of thermal mass from over and underlying strata.

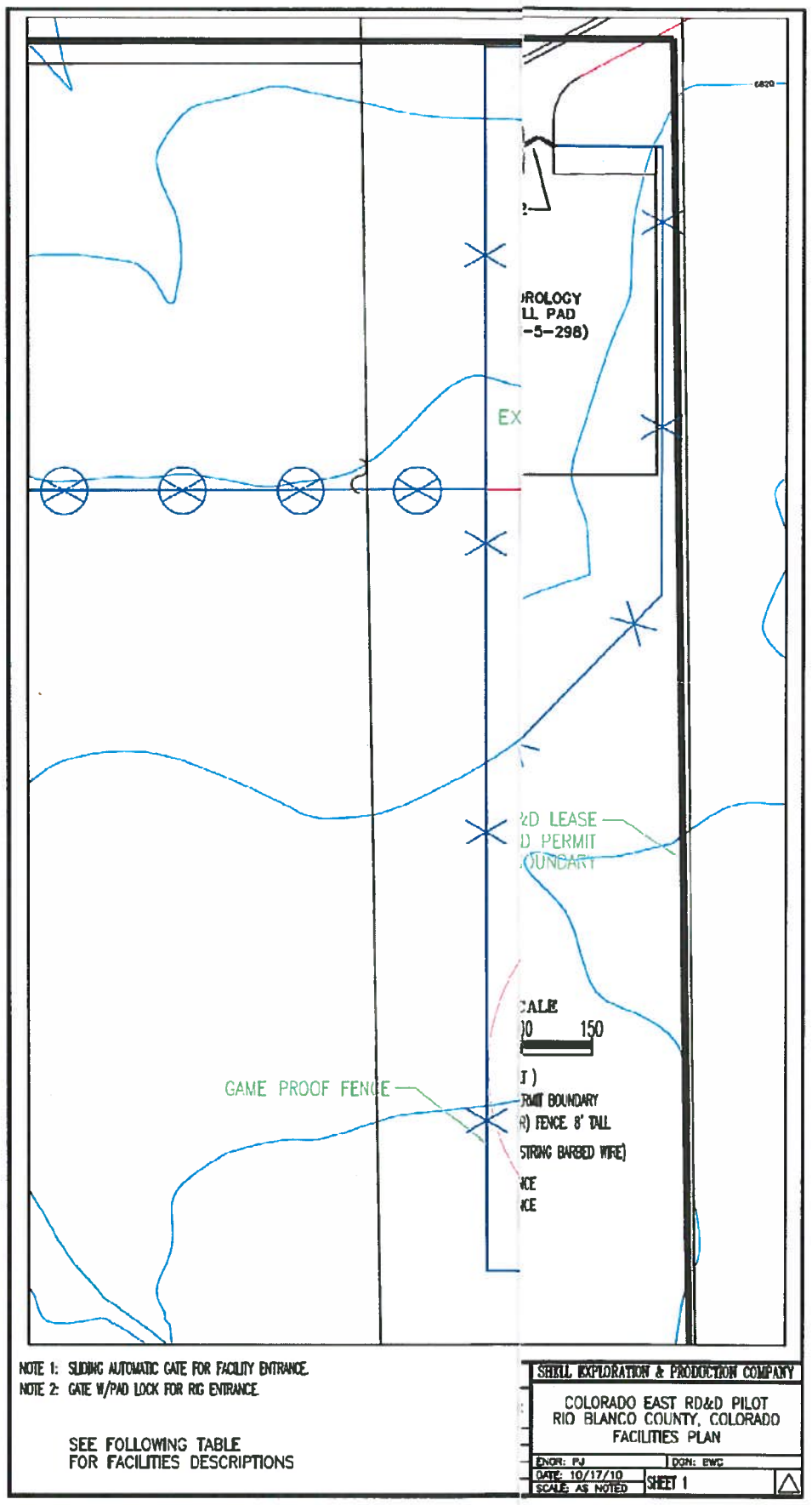


Figure 36: Facilities Layout

Facilities Table. Accompanies Figure 36: Facilities Layout

	Equipment Tag No.	Equipment Description	Leach Phase	Pyrolysis Phase	Reclamation Phase
HEATERS	H-8401/8402/8403	Nahcolite Heater	X		
	Exchanger				
	E-8201/E-8202	Inlet coolers	X	X	X
	E-8203	Nahcolite Cooler	X		
PUMPS	P-8221	Rich nahcolite transfer pump (1) Produced Water Pump (2)	X(1)	X(2)	X(2)
	P-8231	Rich nahcolite transfer pump (1) Produced Water Pump (2)	X(1)	X(2)	X(2)
	P-8222	Wet Oil Pump		X	X
	P-8232	Wet Oil Pump		X	X
	P-8223	Rich Nahcolite Slipstream Pump (1) Oil Transfer Pump (2)	X(1)	X(2)	
	P-8224	Lean Nahcolite Injection Pump	X		
	P-8225	Nahcolite Loadout Pump (1) Water Loadout Pump (2)	X(1)	X(2)	X(2)
	P-8226	Recycle Pump Water/Nahcolite (1) / Oil (2)	X	X	X
	P-8227	Water Supply Pump	X		X
	P-8228	Water Makeup Pump (1) Slop Oil Pump (2)	X(1)	X(2)	X
	P-8229	Water Transfer Pump		X	
	P-8721	Flare KO Drum Recycle Pump	X	X	X
	P-8722	DI Water		X	
	P-8240	Reclamation Injection Pump	X	X	X
	P-8723	Diluent Pump		X	
VESSELS	V-8211/8212	Inlet Separators	X	X	X
	V-8711	Flare KO Drum	X	X	X
	V-8712	Blanket Gas Scrubber		X	X
	V-8712	Propane Bottle	X	X	X
TANKS	T-8301	Rich Nahcolite Transfer Tank Produced Water Tank	X	X	X
	T-8302	Rich Nahcolite Transfer Tank Produced Water Tank	X	X	X
	T-8303	Rich Nahcolite Transfer Tank Skim Tank	X	X	X
	T-8304	Lean Nahcolite Injection Tank Oil Storage Tank	X	X	X
	T-8305	Lean Nahcolite Injection Tank Oil Storage Tank	X	X	X
	T-8306	Fresh Water Makeup Oil Storage Tank	X	X	X
	T-8307	Fresh Water Makeup Tank Slop Oil Tank	X	X	X
	T-8308	Fresh Water Makeup Tank Wet Oil Tank	X	X	X
OTHER	VE-8751	Tank Vent Stack	X	X	X
	FL-8752	Flare Stack	X	X	X
	K-8761	Instrument Air Compressor	X	X	X
	K-8762	Instrument Air Compressor	X	X	X
	D8761	" Filter/Dryer	X	X	X
	D8762	" Filter/Dryer Nitrogen Bottle Rack	X	X	X
	G-8701	Diesel Gen w Built in Tank	X	X	X