



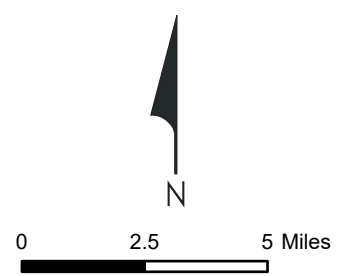


LEGEND:

-  Las Vegas Valley Hydrologic Basin
-  NERT RI Study Area

Notes:

-  The approximate area of highest groundwater withdrawal and recharge is based on data presented in USGS Water-Resources Information Report 35 (Wood, 2000). This area encompasses the Las Vegas Valley Water District (LVVWD) main well field, LVVWD auxiliary well fields to the west and northwest, and City of North Las Vegas production wells to the north.
-  The majority of the City of North Las Vegas production wells are located within the area indicated.



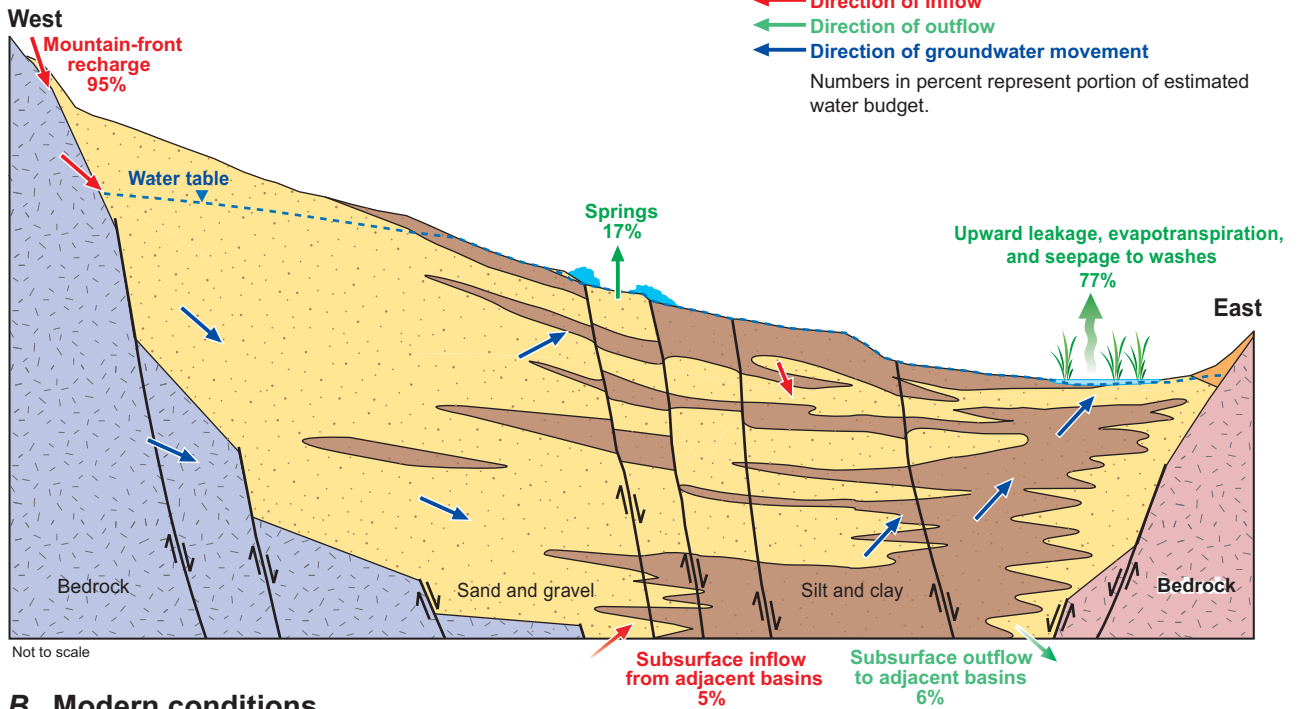
Las Vegas Valley Hydrologic Basin
Nevada Environmental Response Trust Site
Henderson, Nevada

Date: 2023-06-12	Contract Number: 169002 9369	Figure
Drafter: RS	Approved:	Revised:

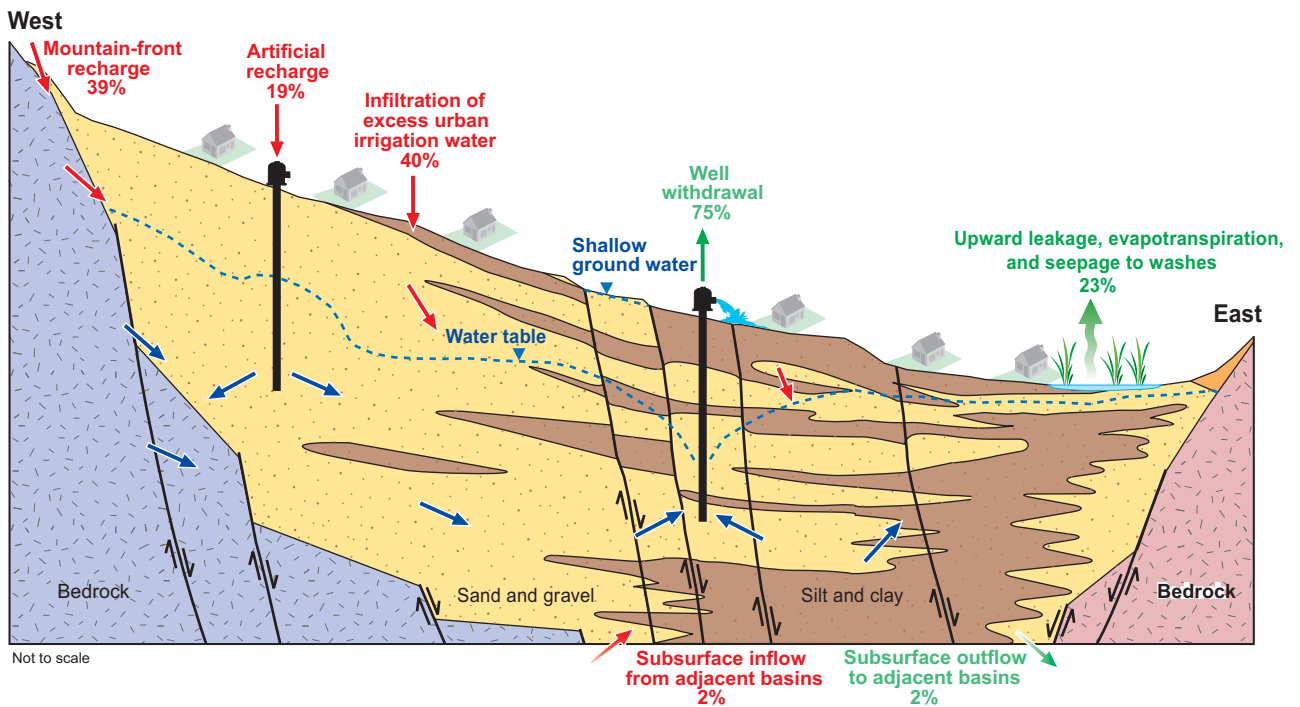
Path: H:\Petroleum\NERT\GIS\RI Report for OU-3\Section5\Sections5_Part2\Sections5_Part2.aprx

Service Layer Credits: World Topographic Map; City of Henderson, Clark County, NV; Bureau of Land Management; Esri; HERE; Garmin; USGS; NGA; EPA; USDA; NPS

A Predevelopment conditions
 Estimated recharge and discharge 34,600 acre-feet per year



B Modern conditions
 Estimated recharge 84,500 acre-feet per year
 Estimated discharge 83,800 acre-feet per year



Generalized cross-sections for Las Vegas Valley, Nevada, showing the basin-fill deposits and components of the groundwater flow system under (A) predevelopment conditions and (B) modern conditions.

Source: USGS Professional Paper 1781, December 2010. Section 6. Conceptual Understanding and Groundwater Quality of the Basin-Fill Aquifer in Las Vegas Valley, Nevada by Jena M. Huntington.

C:\DRAWING\11690006943\NERT OU-3 SECTION 5 DIAGRAM.CDR



Generalized Cross-Sections for Central Las Vegas Valley
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-13

Drafter: RS

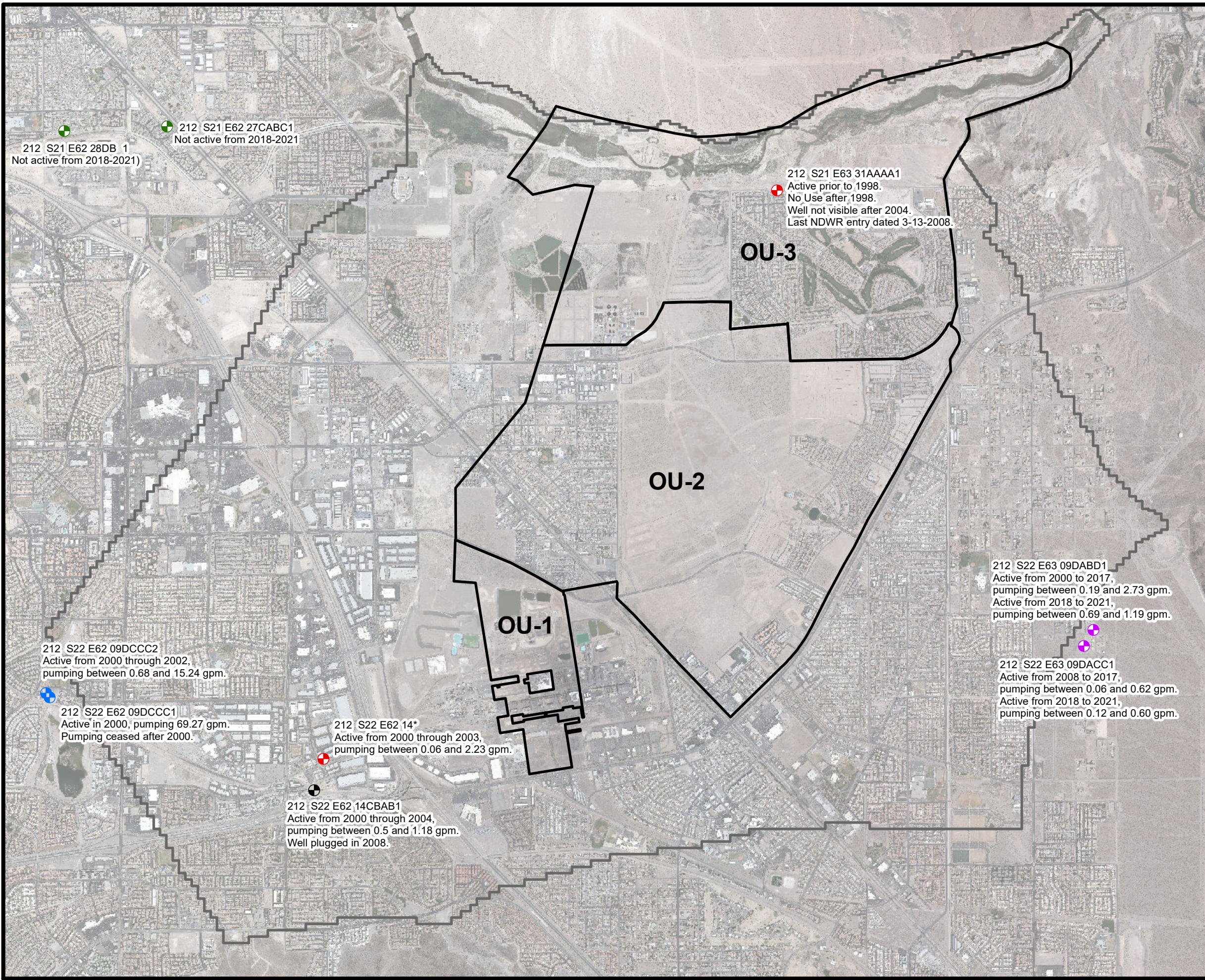
Date: 8/31/22

Contract Number: 169002 5040-016

Approved by:

Revised:

Path: H:\Pelomane\NERT\Modelling\Phase 6 Model\Report\Figures\Final_MXD\Figure - Non-Remediation Pumping in Groundwater-3.mxd



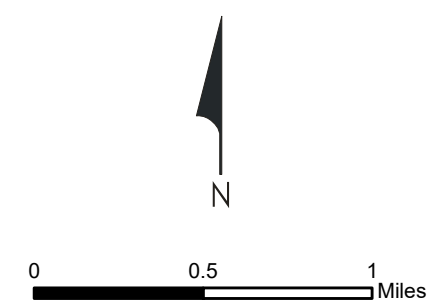
LEGEND:

- Mining
- Irrigation
- Quasi-Municipal
- Industrial
- Commercial
- NERT RI Study Area
- Operable Units
- Phase 6 Model Extent

Notes:
 * Industrial well location is approximated using the center of its listed section.

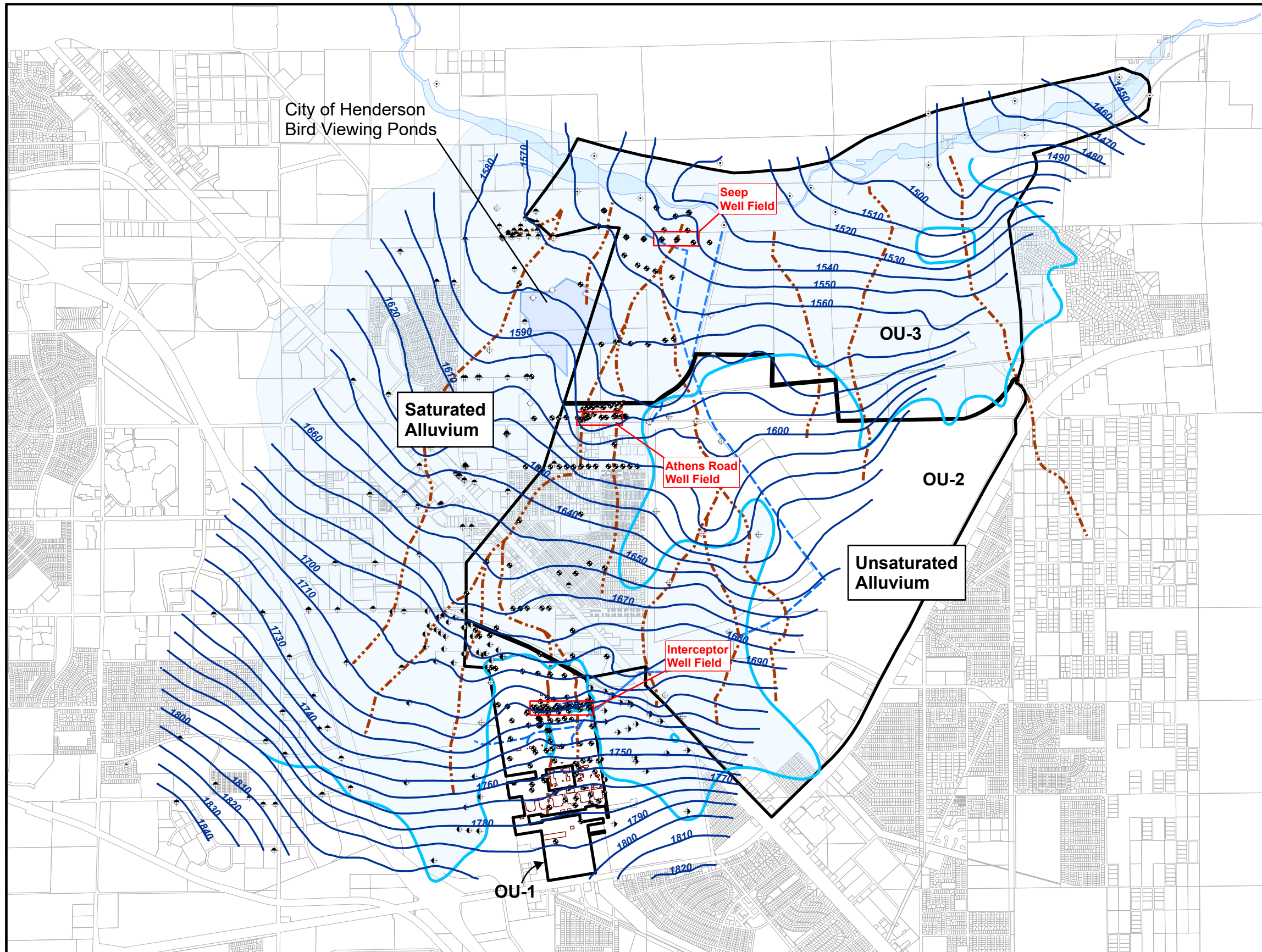
gpm = gallons per minute

Nevada Division of Water Resources (NDWR) Groundwater Pumpage Inventory record review periods:
 2000 - 2017
 2018 - 2021



Non-Remediation Pumping Near the NERT RI Study Area
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Date: 11/22/2022	Contract Number: 169002 5040-016	Figure
Drafter: RS	Approved:	Revised:
		5-14



LEGEND

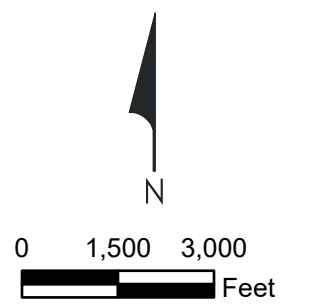
- Groundwater Elevation Contour (feet, MSL Datum)
- Saturated Alluvium
- Approximate Location of Paleochannel Centerline
- Operable Unit Boundary
- Saturated Alluvium
- Former Ditch
- Former BMI Siphon
- Site Features (Buildings and Tanks)

Wells Used to Estimate Potentiometric Surface

- + NERT
- + AMPAC/Endeavour
- + BRC
- + City of Henderson
- + OSSM
- + SNWA
- + TIMET
- + Owner Unknown

Notes:

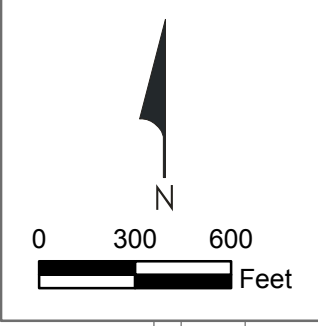
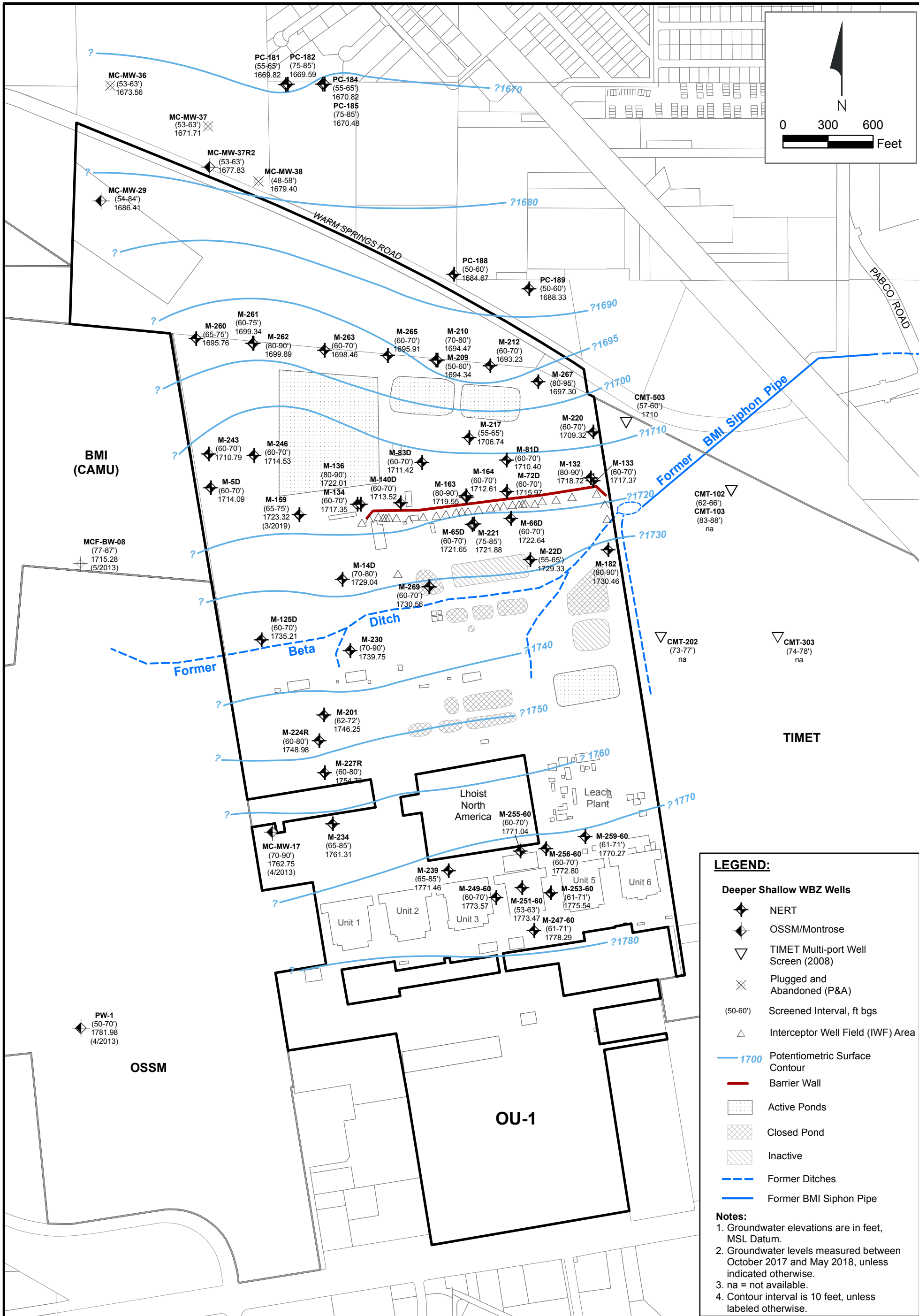
1. Groundwater levels measured in Second Quarter 2018.
2. Contour interval is 10 feet.
3. Source: Annual Remedial Performance Report for Chromium and Perchlorate, Nevada Environmental Response Trust Site, Henderson, Nevada, November 9, 2018. Plate 1, Potentiometric Surface Map, Shallow Water-Bearing Zone, Second Quarter 2018.



Groundwater Table Contour Map, Second Quarter 2018
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-16a

Path: H:\LePei\mane\NERT\RI_Evaluation\GIS\Chemical Maps\55-90_Perchlorate map_9-6-19.mxd



LEGEND:

Deeper Shallow WBZ Wells

- ◆ NERT
- ◆ OSSM/Montrose
- ▽ TIMET Multi-port Well Screen (2008)
- ⊗ Plugged and Abandoned (P&A)
- (50-60') Screened Interval, ft bgs
- △ Interceptor Well Field (IWF) Area

— 1700 Potentiometric Surface Contour

— Barrier Wall

- ▨ Active Ponds
- ▨ Closed Pond
- ▨ Inactive
- - - Former Ditches
- Former BMI Siphon Pipe

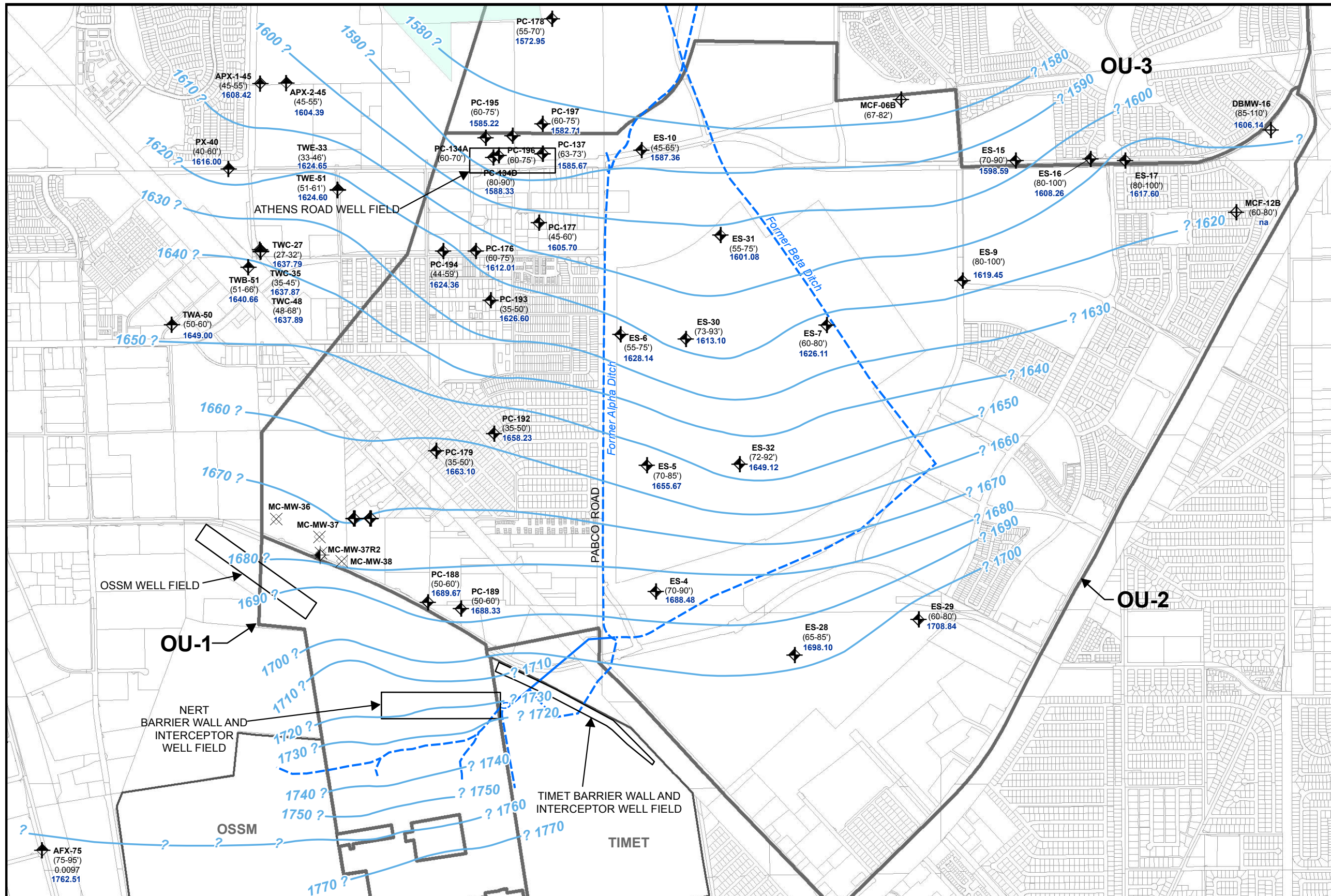
Notes:

1. Groundwater elevations are in feet, MSL Datum.
2. Groundwater levels measured between October 2017 and May 2018, unless indicated otherwise.
3. na = not available.
4. Contour interval is 10 feet, unless labeled otherwise.



Potentiometric Surface Map, Shallow WBZ (55-90 ft bgs), OU-1
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-16b



LEGEND:

- Deeper Shallow WBZ Wells**
- ◆ NERT
 - ◆ OSSM
 - ◆ BRC
 - ◆ AMPAC
 - ⊗ Plugged and Abandoned (P&A)
 - (50-60') Screened Interval, ft bgs
 - ▭ Operable Units
 - 1700 Potentiometric Surface Contour
 - - - Former Ditches
 - Former BMI Siphon Pipe

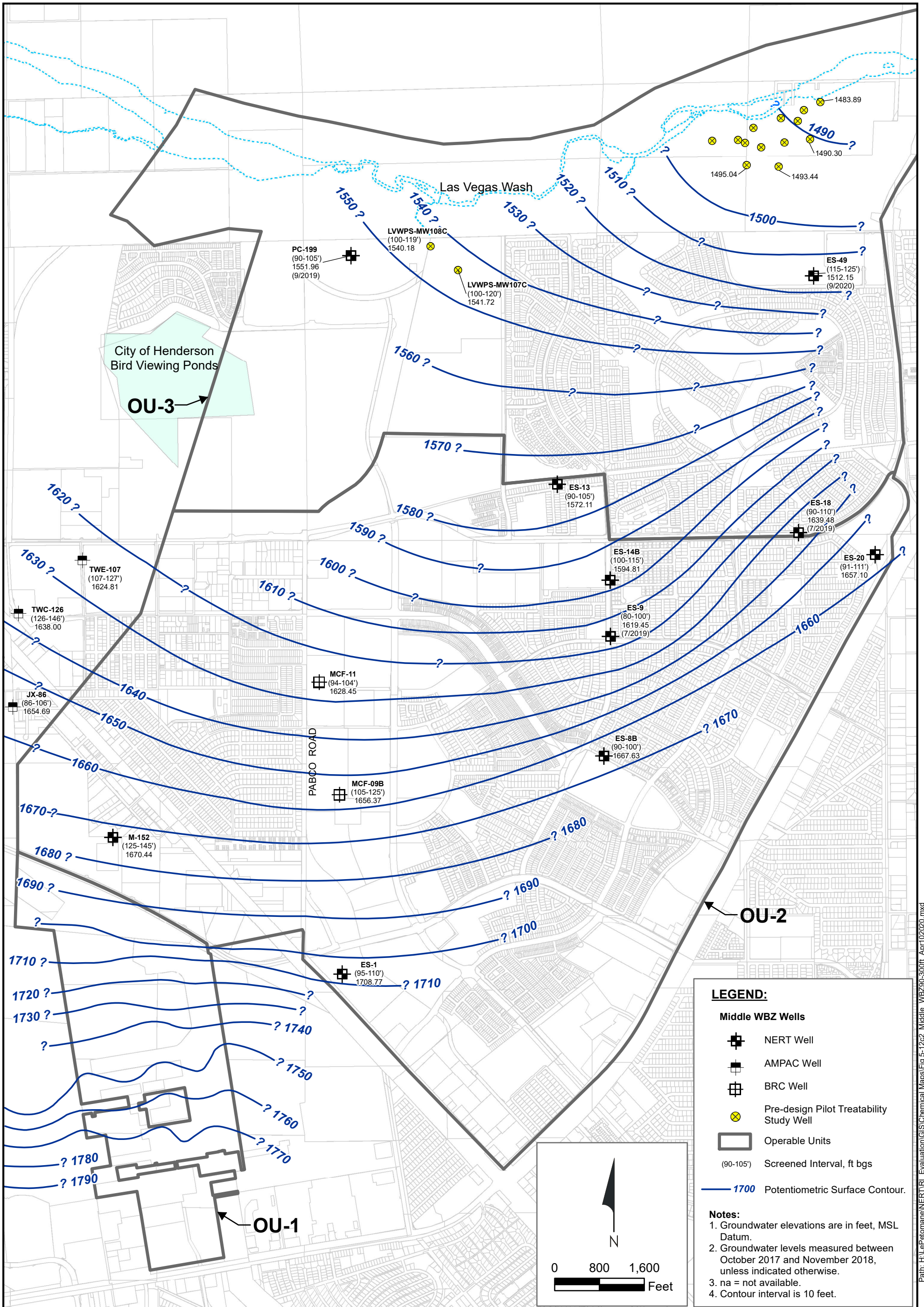
Notes:

1. Groundwater elevations are in feet, MSL Datum.
2. Groundwater levels measured between October 2017 and May 2018, unless indicated otherwise.
3. na = not available.
4. Contour interval is 10 feet.



Potentiometric Surface Map, Shallow WBZ (~55-90 ft bgs)
 Nevada Environmental Response Trust Site
 Henderson, Nevada

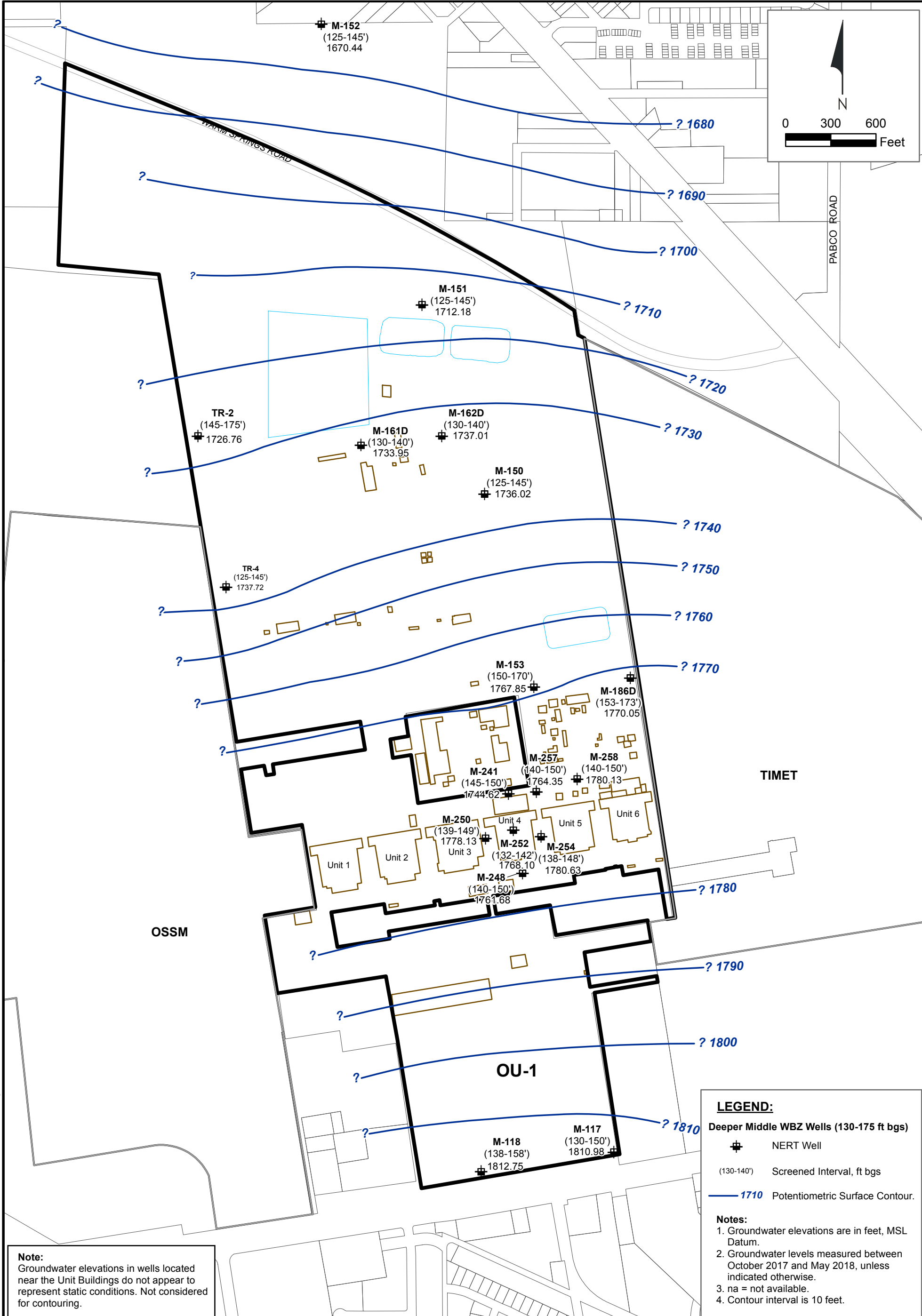
Figure
5-16c



Potentiometric Surface Map, Middle WBZ (90-130 ft bgs)
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-17b

Path: H:\Petomane\NERT\RI_Evaluation\GIS\Chemical Maps\Fig 5-12c2_Middle_WBZ90-300ft_Apr102020.mxd



Note:
Groundwater elevations in wells located near the Unit Buildings do not appear to represent static conditions. Not considered for contouring.

LEGEND:

- Deeper Middle WBZ Wells (130-175 ft bgs)
- ⊕ NERT Well
- (130-140') Screened Interval, ft bgs
- 1710 Potentiometric Surface Contour.

Notes:

1. Groundwater elevations are in feet, MSL Datum.
2. Groundwater levels measured between October 2017 and May 2018, unless indicated otherwise.
3. na = not available.
4. Contour interval is 10 feet.

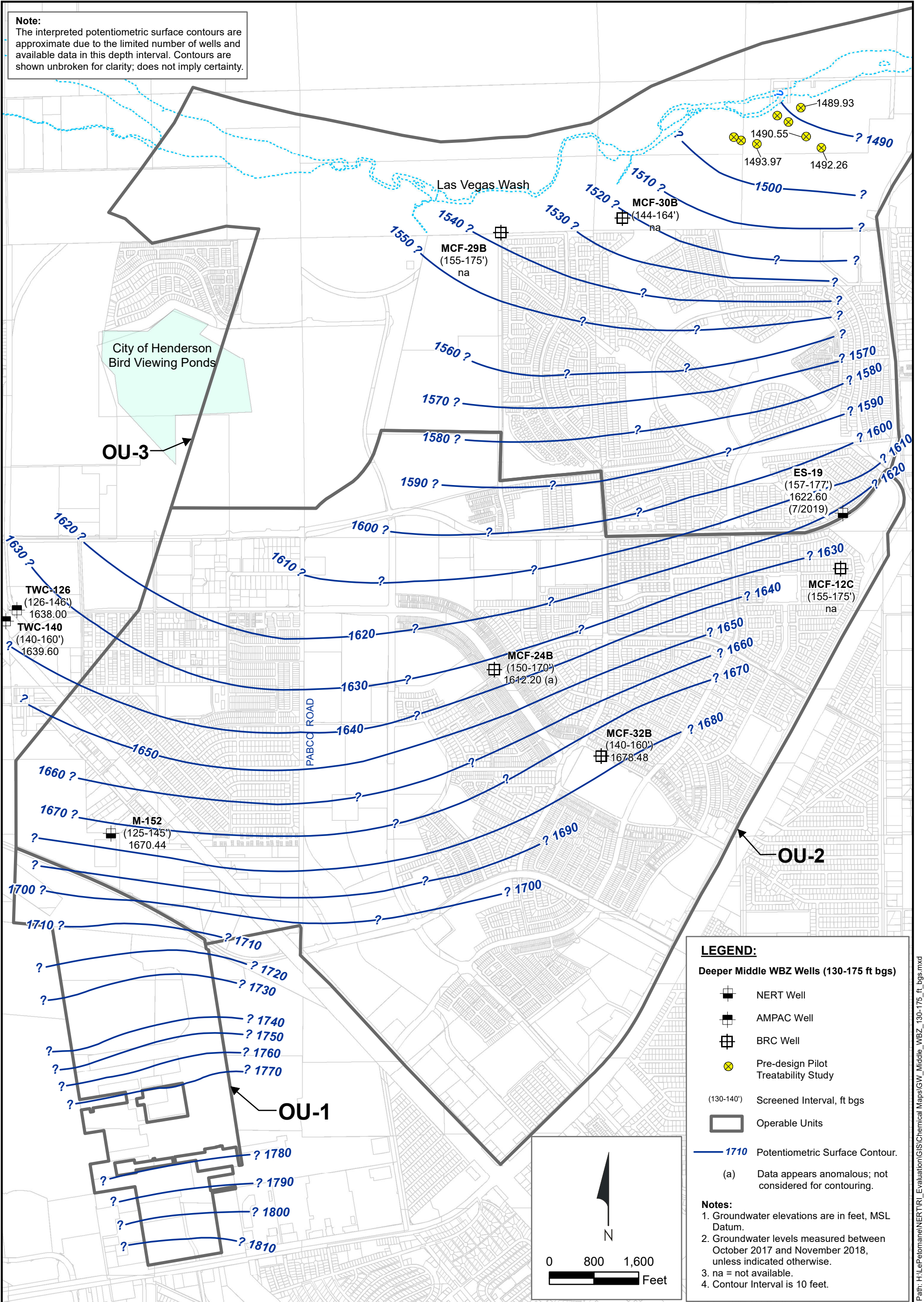
Path: H:\LePalomane\NERT\RI_Evaluation\GIS\Chemical Maps\Fig 1c_Middle_WBZ\130-175ft.mxd



Groundwater Elevations, Middle WBZ (130-175 ft bgs), OU-1
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
5-17c

Note:
The interpreted potentiometric surface contours are approximate due to the limited number of wells and available data in this depth interval. Contours are shown unbroken for clarity; does not imply certainty.



LEGEND:

Deeper Middle WBZ Wells (130-175 ft bgs)

- NERT Well
- AMPAC Well
- BRC Well
- Pre-design Pilot Treatability Study

(130-140') Screened Interval, ft bgs

Operable Units

1710 Potentiometric Surface Contour.

(a) Data appears anomalous; not considered for contouring.

Notes:

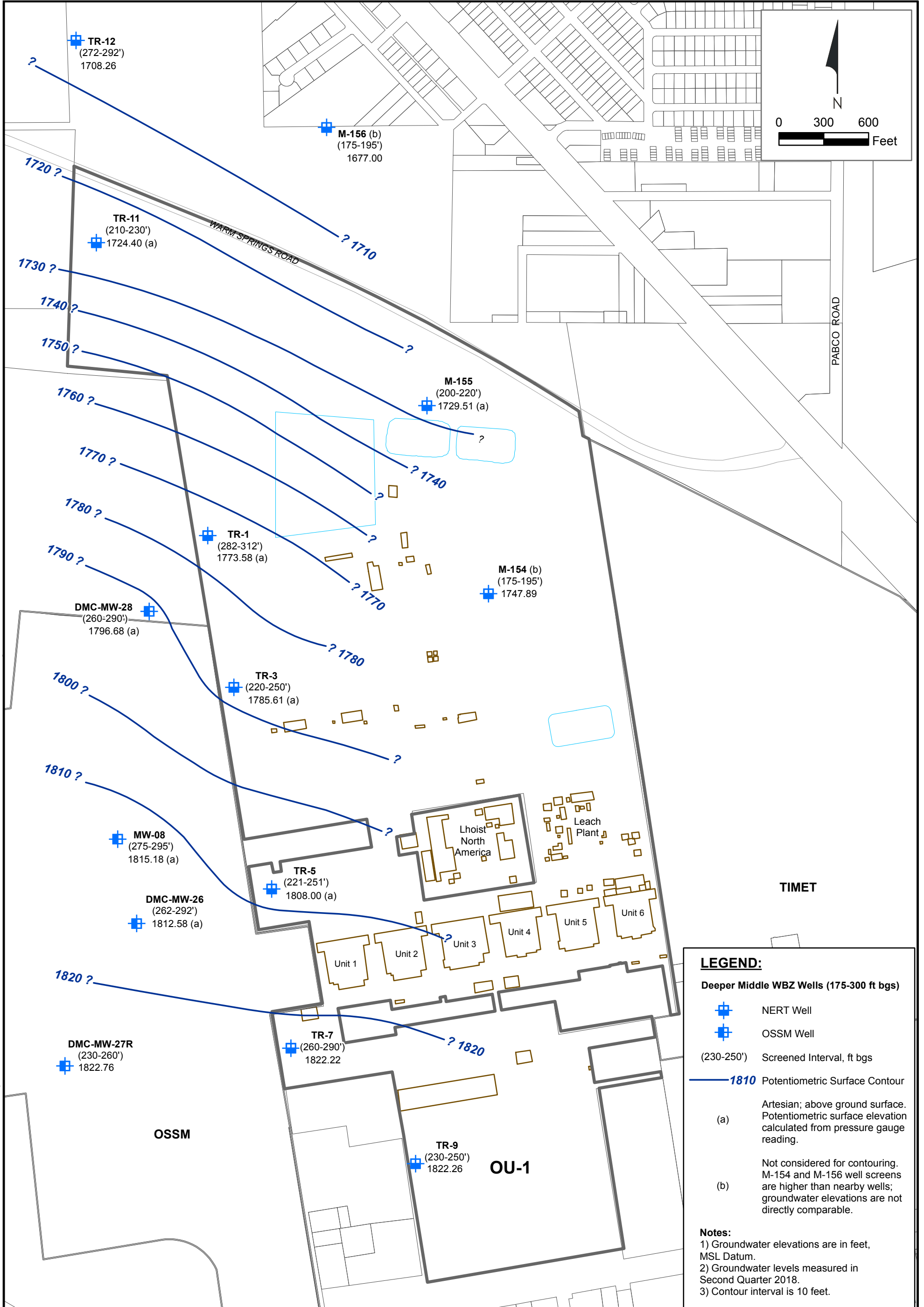
1. Groundwater elevations are in feet, MSL Datum.
2. Groundwater levels measured between October 2017 and November 2018, unless indicated otherwise.
3. na = not available.
4. Contour Interval is 10 feet.



Groundwater Elevations, Middle WBZ (130-175 ft bgs)
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
5-17d

Path: H:\LePetomane\NERT\RI\Evaluation\GIS\Chemical Maps\GW_Middle_WBZ_130-175_ft_bgs.mxd



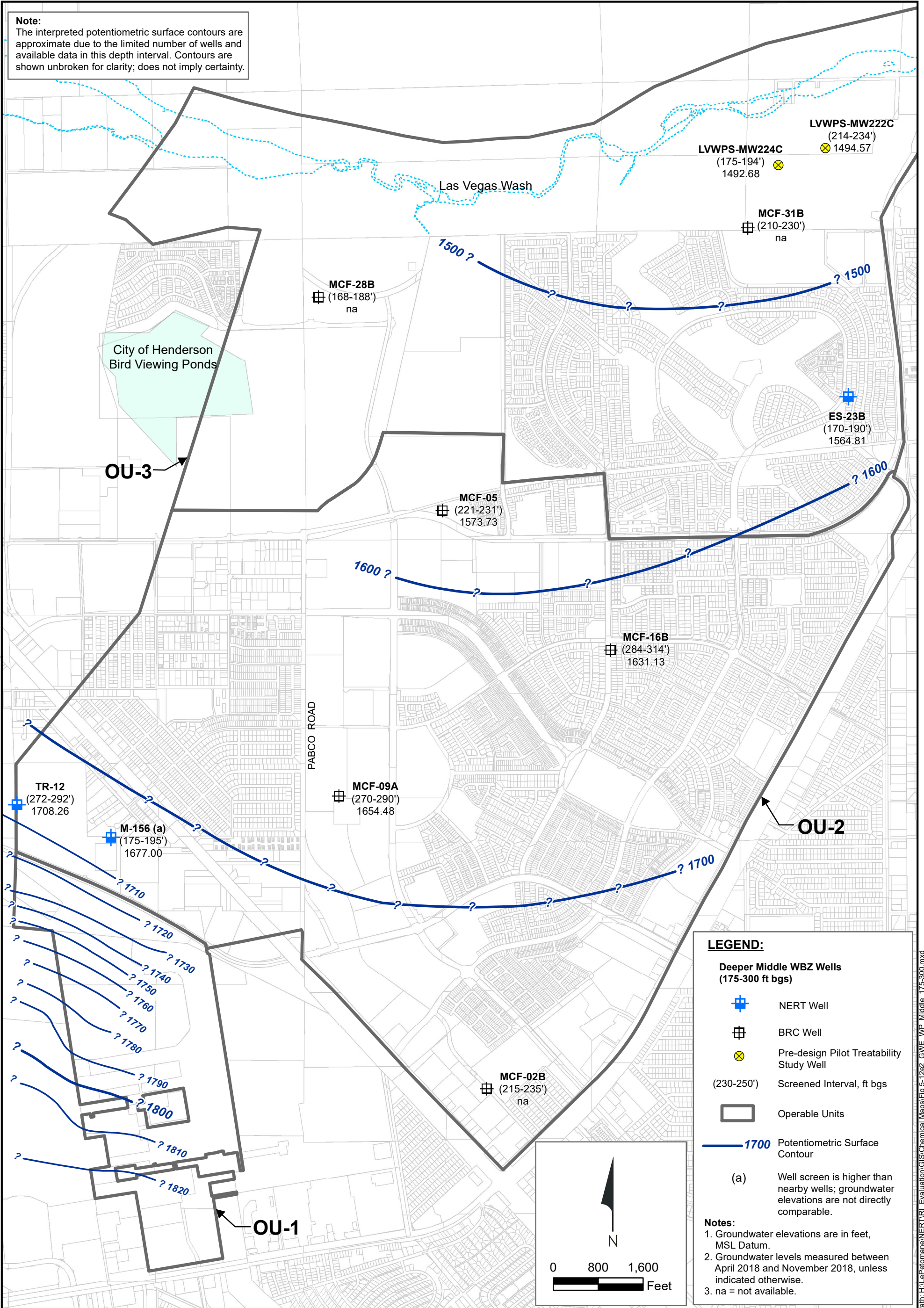
Path: H:\LePalomane\NERT\RI_Evaluation\GIS\Chemical Maps\Fig 5-12e_1_Middle_WBZ175-300ft-2.mxd



Groundwater Elevations, Middle WBZ (175-300 ft bgs), OU-1
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-17e

Note:
The interpreted potentiometric surface contours are approximate due to the limited number of wells and available data in this depth interval. Contours are shown unbroken for clarity; does not imply certainty.



LEGEND:

- NERT Well
- BRC Well
- Pre-design Pilot Treatability Study Well
- (230-250') Screened Interval, ft bgs
- Operable Units
- 1700 Potentiometric Surface Contour
- (a) Well screen is higher than nearby wells; groundwater elevations are not directly comparable.

Notes:

- Groundwater elevations are in feet, MSL Datum.
- Groundwater levels measured between April 2018 and November 2018, unless indicated otherwise.
- na = not available.

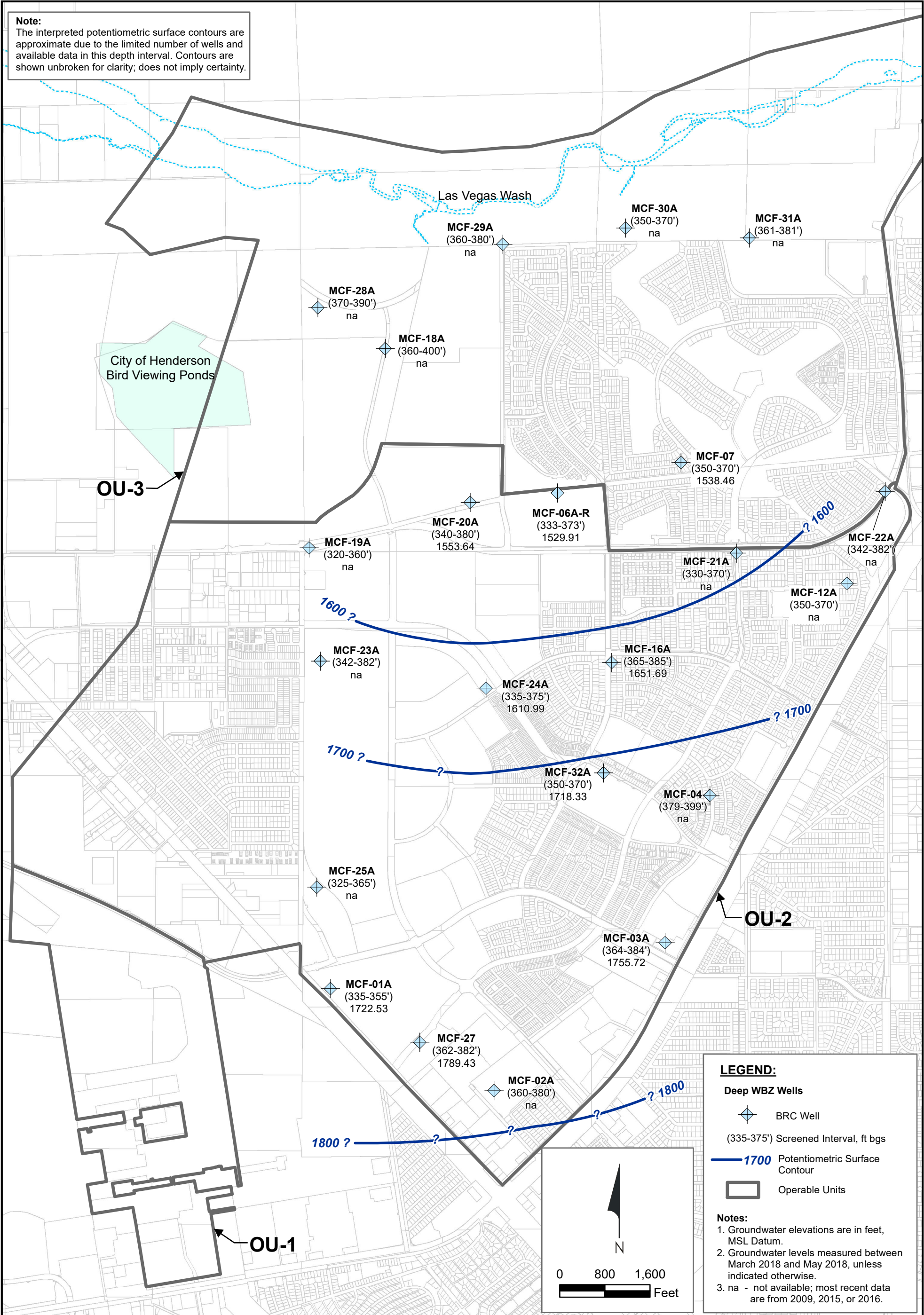


Groundwater Elevations, Middle WBZ (175-300 ft bgs)
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
5-17f

Path: H:\Leromane\NERT\TR1_Evaluation\GIS\Chemical Maps\Fig 5-1262_GWE_WBZ_Middle_175-300.mxd

Note:
 The interpreted potentiometric surface contours are approximate due to the limited number of wells and available data in this depth interval. Contours are shown unbroken for clarity; does not imply certainty.

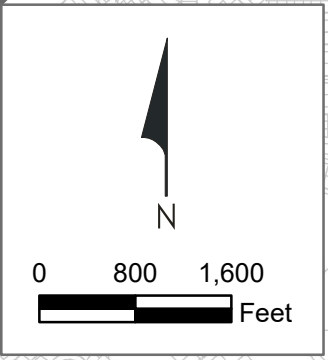


LEGEND:

- Deep WBZ Wells
- ◆ BRC Well
- (335-375') Screened Interval, ft bgs
- 1700 Potentiometric Surface Contour
- Operable Units

Notes:

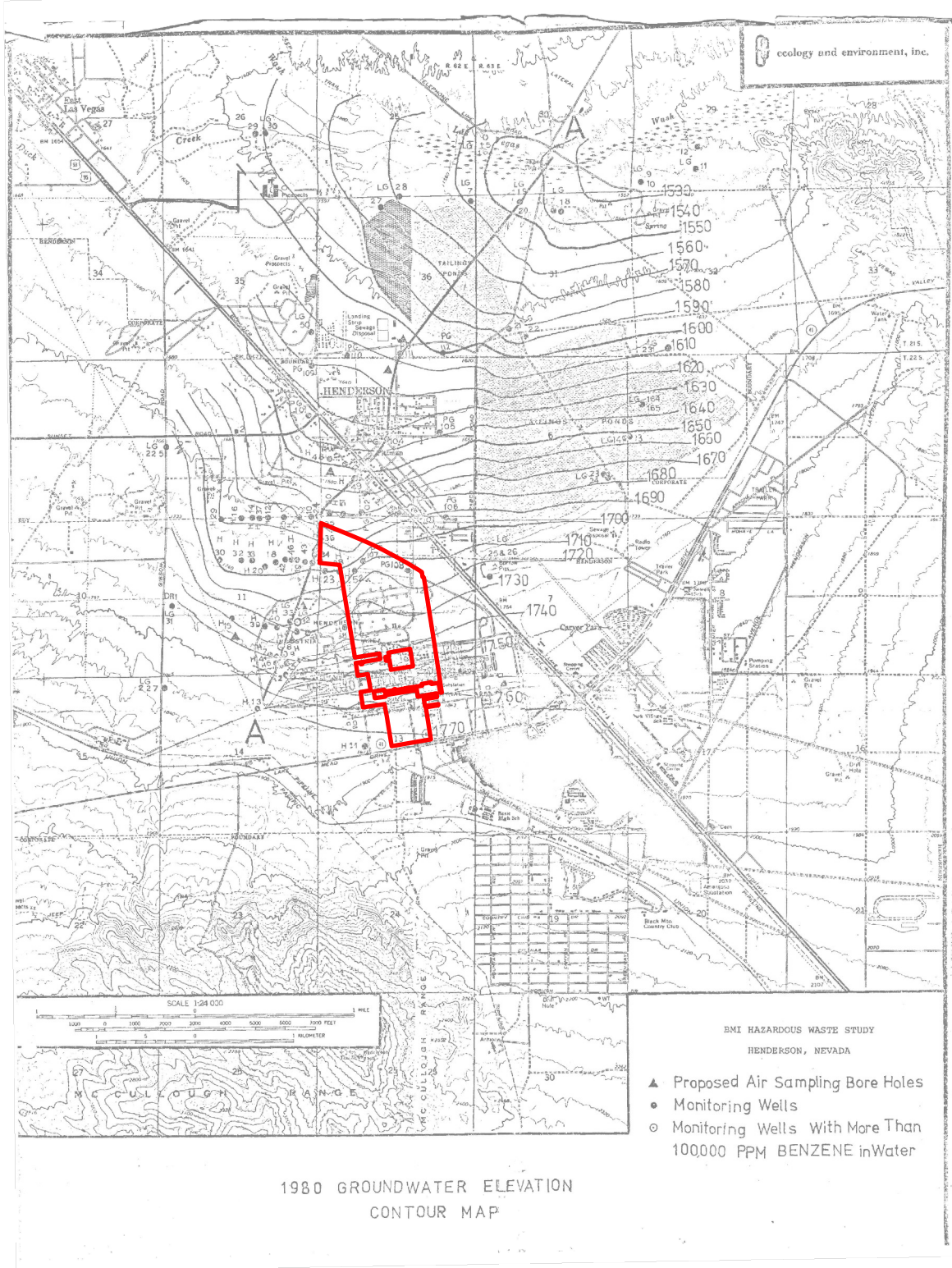
1. Groundwater elevations are in feet, MSL Datum.
2. Groundwater levels measured between March 2018 and May 2018, unless indicated otherwise.
3. na - not available; most recent data are from 2009, 2015, or 2016.



Groundwater Elevations, Deep WBZ (>300 ft bgs)
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-18

Path: H:\LePetomane\NERT\TR\Evaluation\GIS\Chemical Maps\OU2_Deep_WBZ_300_ft_bgs.mxd

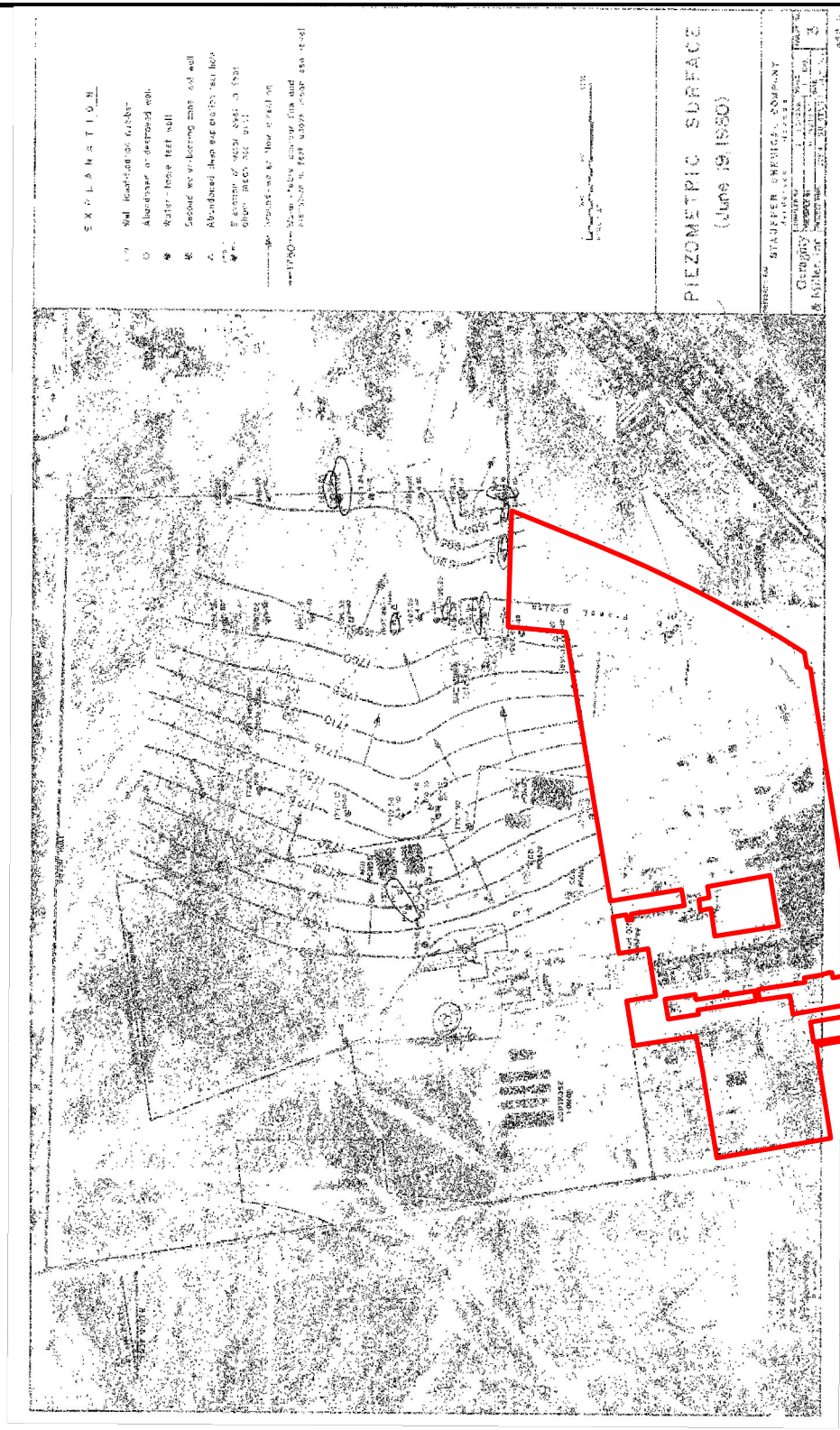


Source:
 Basic Management Inc. (BMI) Comprehensive Site Manage Plan
 Draft III, March 31, 1983



1980 Groundwater Contour Map
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-19a



OU-1 Boundary

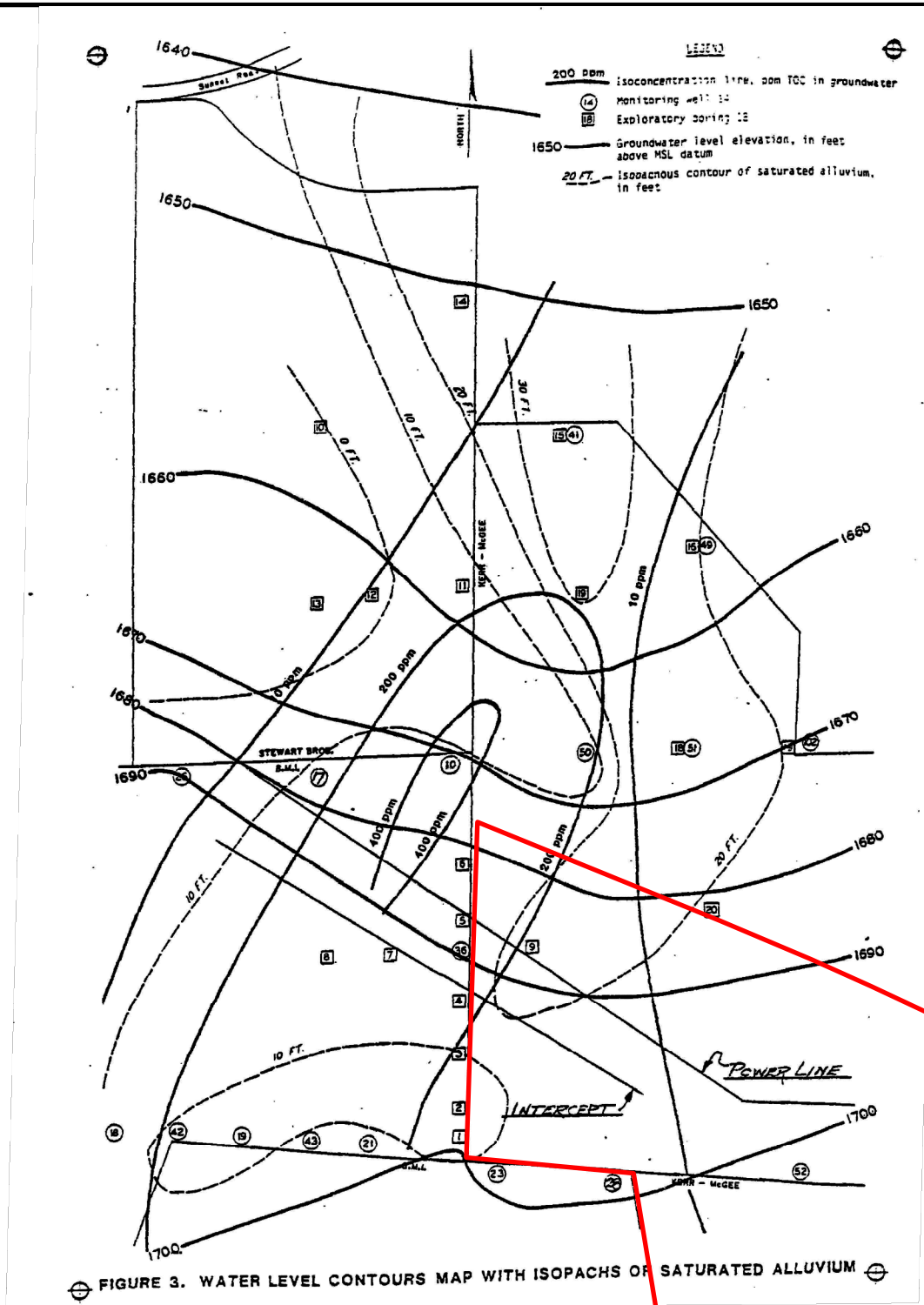


Source:
Geraghty and Miller, Inc.: Ground-Water Investigation,
Stauffer Chemical Company, Henderson, Nevada - October 1980



1980 Groundwater Contour Map - Stauffer Area
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
5-19b



OU-1 Boundary



Source:
Henderson Groundwater Project
Quarterly Report for Third Quarter 1982

Path: H:\LePetomane\NERT\RI\OU-1_OU-2\RI\Report\GIS\revision1\figures_5-19\figures_5-19.aprx\Figure 5-19c 1982



1982 Groundwater Contour Map
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
5-19c

Drafter: JC

Date: 2023-06-12

Contract Number: 169002 9369


Approved:

Revised:

Last Saved By:



Water Table
Elevation Contours
(Feet above MSL)

 OU-1 Boundary



Source:

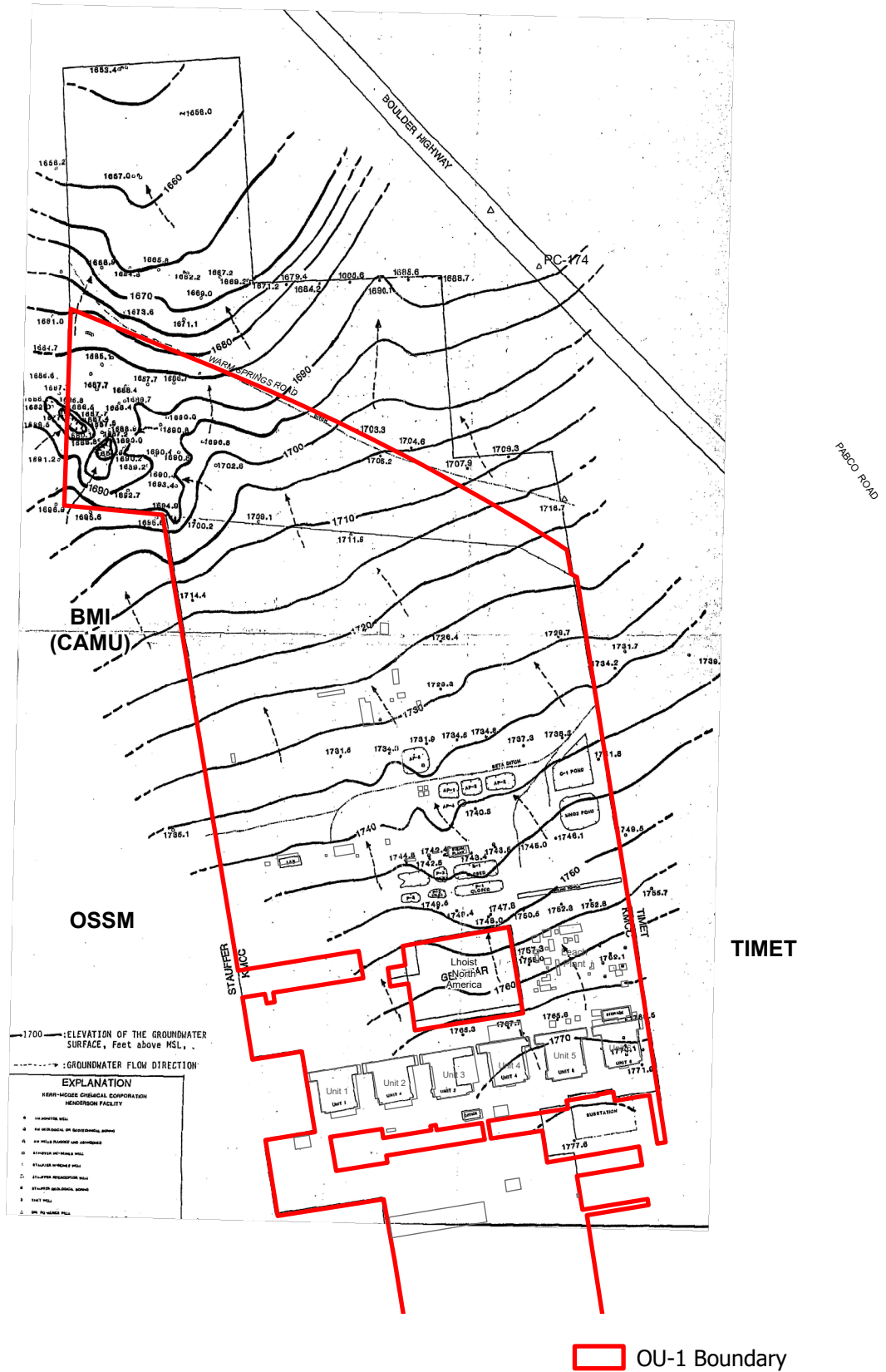
Geohydrological Description
Post-Closure Permit Hazardous Waste Landfill,
Kerr-McGee Chemical Corporation, Henderson Facility,
Henderson, Nevada, June 19, 1987



1984 Groundwater Contour Map
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure

5-19d

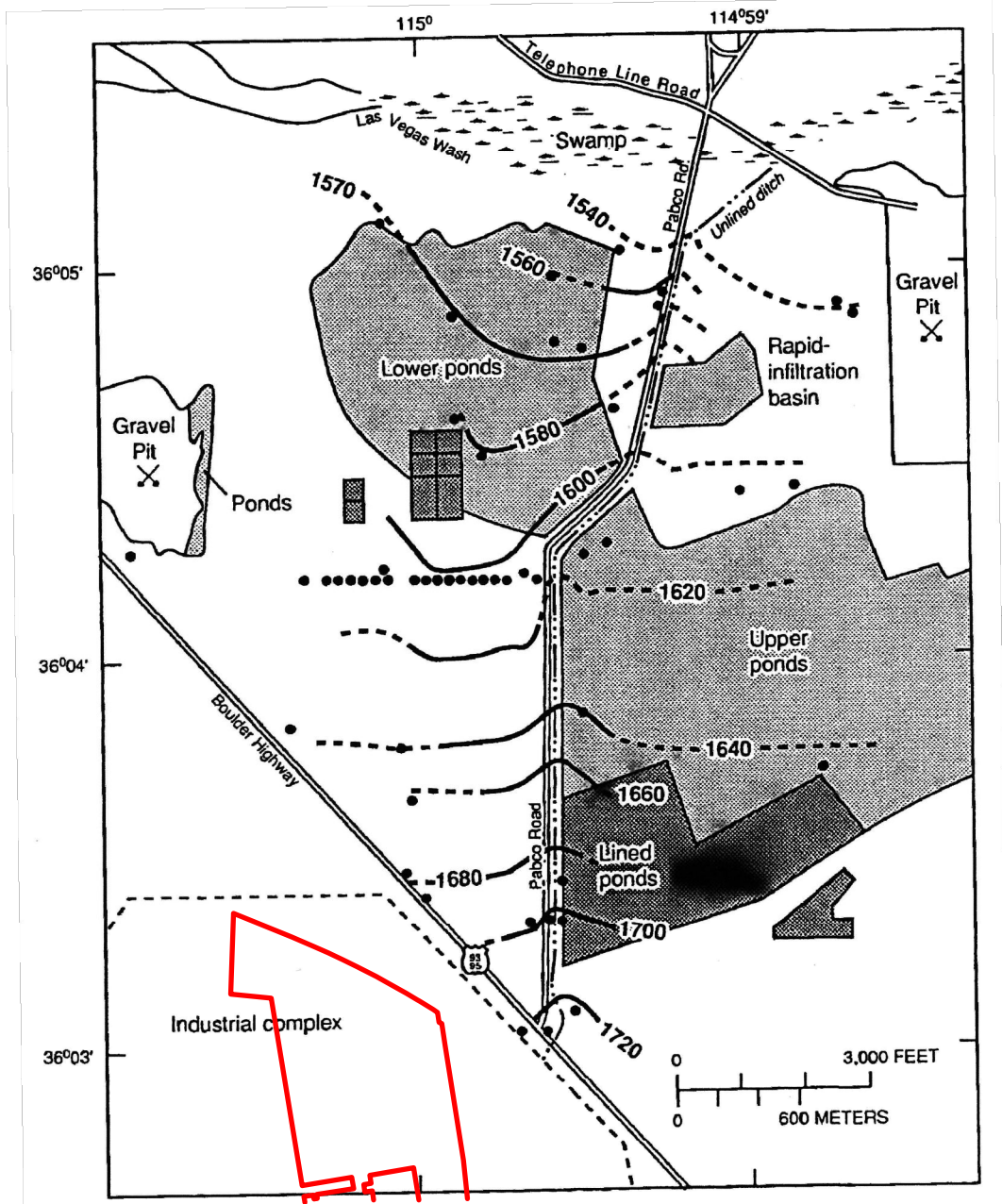


Source:
 Geohydrological Investigation, Kerr-McGee Chemical Corporation,
 Henderson Facility, July 1985



1985 Groundwater Contour Map
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-19e



EXPLANATION

— 1640 — WATER-LEVEL CONTOUR—Shows altitude of water level in near-surface sands and gravels. Dashed where approximately located. Contour interval 20 feet, with supplemental contour at 1,570 feet. Datum is sea level

• MEASURED WELL

FIGURE 5.--Altitude of ground-water levels in the near-surface sands and gravels for June 1984.

OU-1 Boundary

Source:
 Changes in Water Levels and Water Quality in Shallow Ground Water, Pittman-Henderson Area, Clark County, Nevada, Resulting from Diversion of Industrial Cooling Water from Ditch to Pipeline in 1985
 US Geological Survey Water-Resources Investigations Report 89-4093



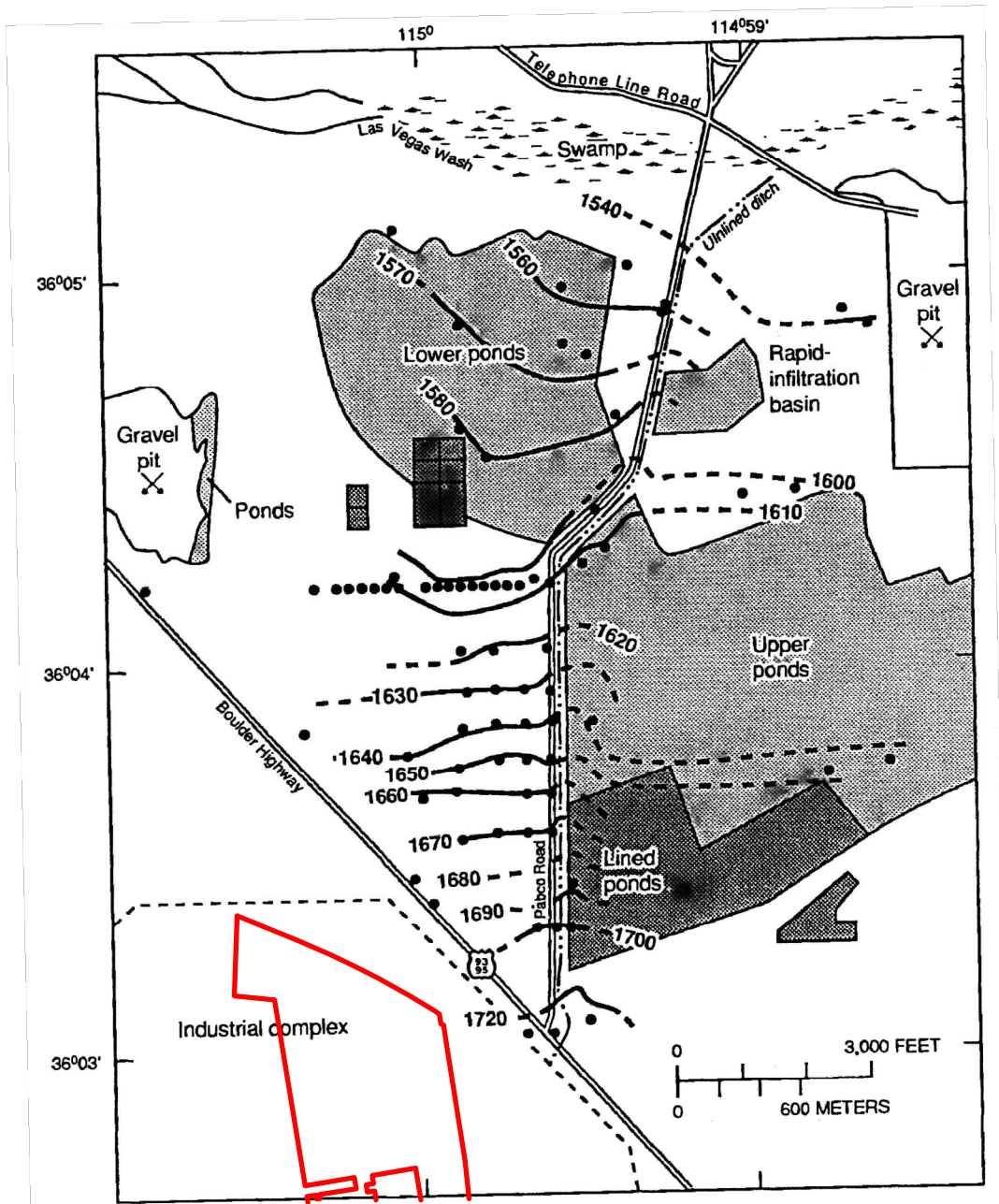
Path: H:\LePetomane\NERTRI\OU-1_OU-2\RI\Report\GIS\revision1\figures_5-19\figures_5-19.aprx\Figure 5-19 June 1984



June 1984 Groundwater Contour Map
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

5-19f



EXPLANATION

— 1540 — WATER-LEVEL CONTOUR—Shows altitude of water level in near-surface sands and gravels. Dashed where approximately located. Contour interval 10 feet, except in areas of little control where interval is 20 feet. Datum is sea level

• MEASURED WELL

FIGURE 6.--Altitude of ground-water levels in the near-surface sands and gravels for June 1985.

OU-1 Boundary

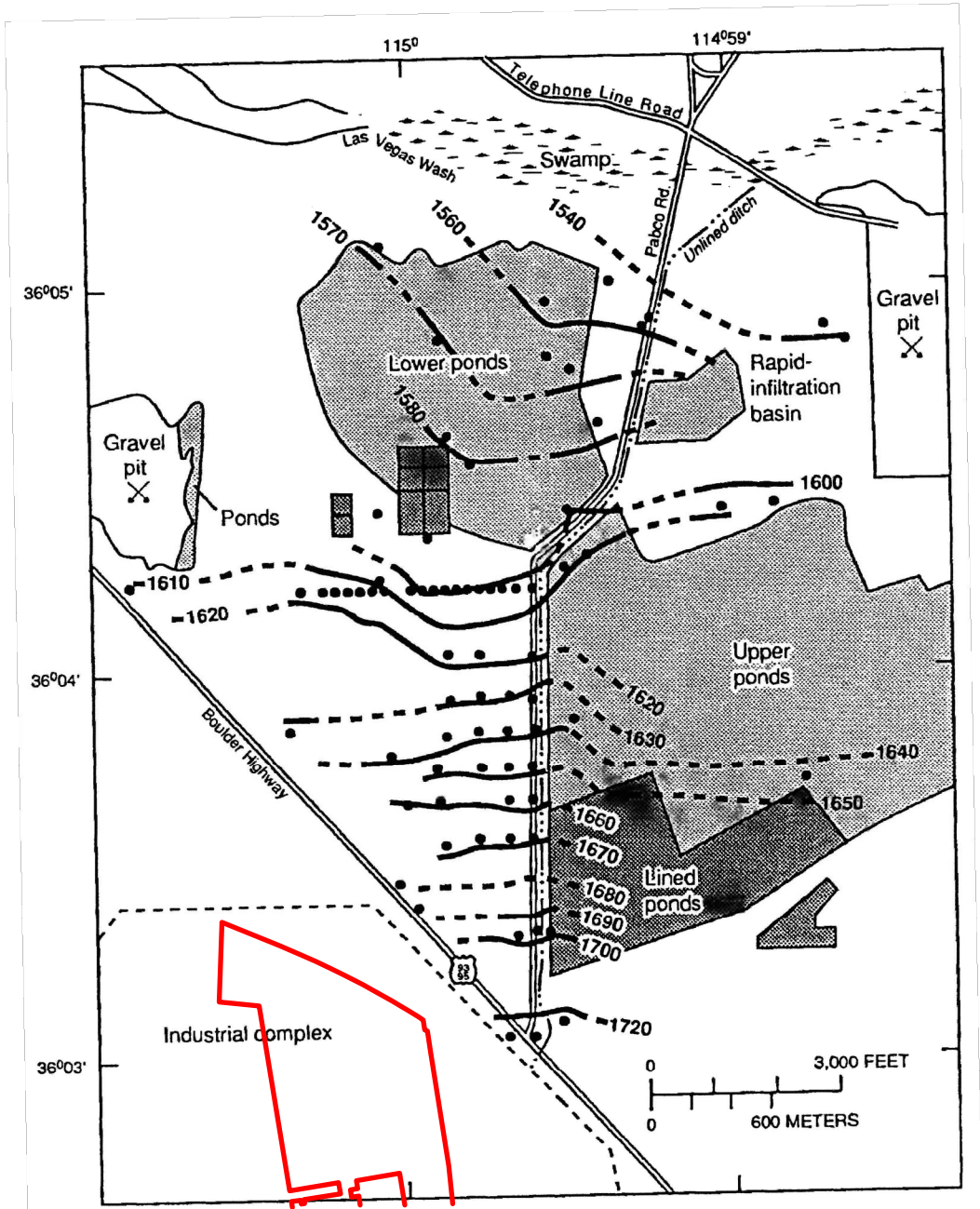
Source:
 Changes in Water Levels and Water Quality in Shallow Ground Water, Pittman-Henderson Area, Clark County, Nevada, Resulting from Diversion of Industrial Cooling Water from Ditch to Pipeline in 1985
 US Geological Survey Water-Resources Investigations Report 89-4093



June 1985 Groundwater Contour Map
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-19g

Path: H:\LePetomane\NERTR\OU-1_OU-2 RI Report\GIS\revision1\figures_5-19\figures_5-19.aprx\Figure 5-19g June 1985



EXPLANATION

- 1640 — WATER-LEVEL CONTOUR—Shows altitude of water level in near-surface sands and gravels. Dashed where approximately located. Contour interval 10 feet except in areas of little control, where interval is 20 feet. Datum is sea level
- MEASURED WELL

FIGURE 8.--Altitude of ground-water levels in the near-surface sands and gravels for June 1986.

OU-1 Boundary

Source:

Changes in Water Levels and Water Quality in Shallow Ground Water, Pittman-Henderson Area, Clark County, Nevada, Resulting from Diversion of Industrial Cooling Water from Ditch to Pipeline in 1985 US Geological Survey Water-Resources Investigations Report 89-4093

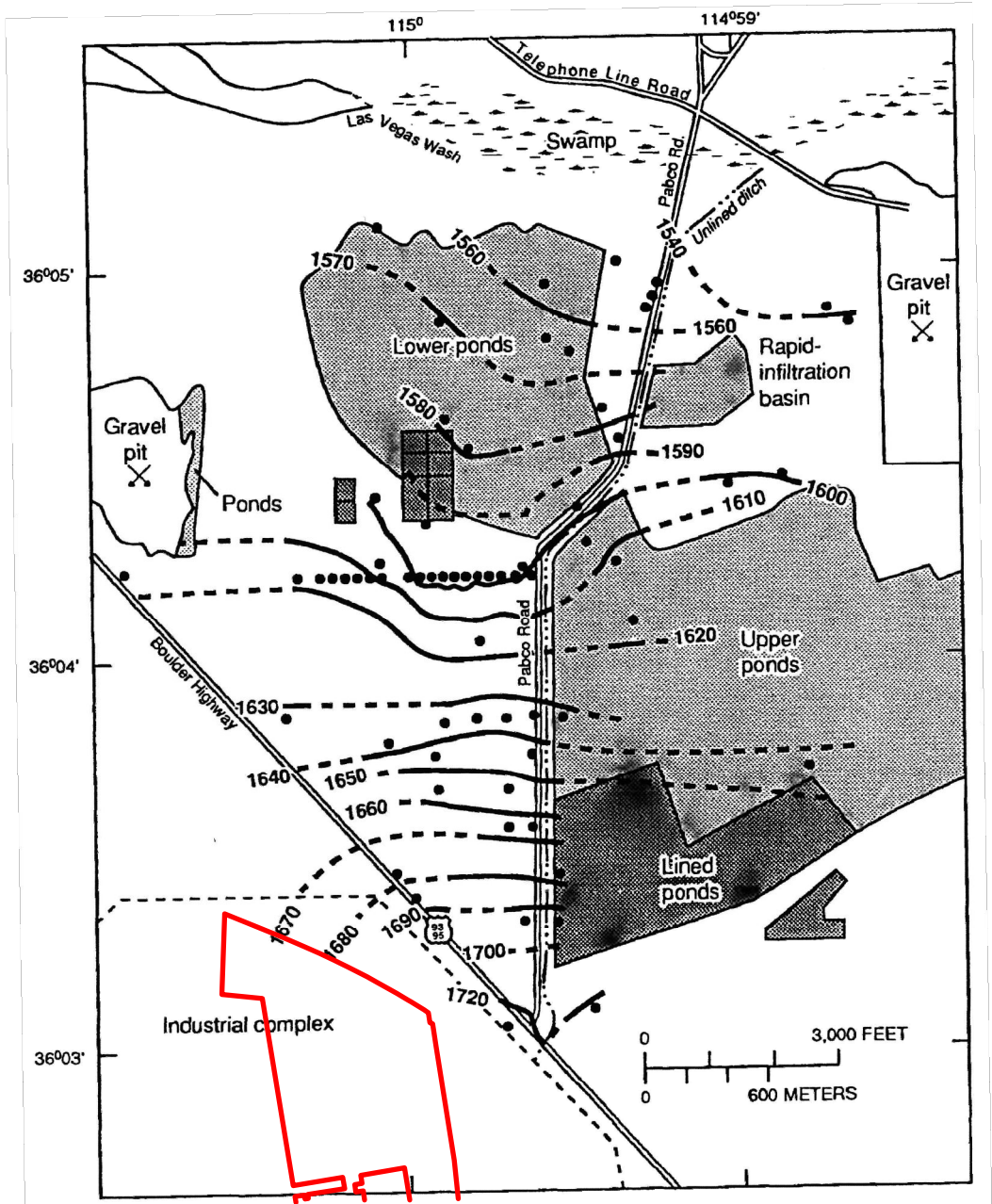


Path: H:\LePetomane\NERT\RI\OU-1_OU-2\RI\Report\GIS\revision1\figures_5-19\figures_5-19.aprx\Figure 5-19h June 1986



June 1986 Groundwater Contour Map
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-19h



EXPLANATION

— 1640 — WATER-LEVEL CONTOUR--Shows altitude of water level in near-surface sands and gravels. Dashed where approximately located. Contour interval 10 feet except in areas of little control, where interval is 20 feet. Datum is sea level

● MEASURED WELL

FIGURE 9.--Altitude of ground-water levels in the near-surface sands and gravels for June 1987.

OU-1 Boundary

Source:

Changes in Water Levels and Water Quality in Shallow Ground Water, Pittman-Henderson Area, Clark County, Nevada, Resulting from Diversion of Industrial Cooling Water from Ditch to Pipeline in 1985 US Geological Survey Water-Resources Investigations Report 89-4093



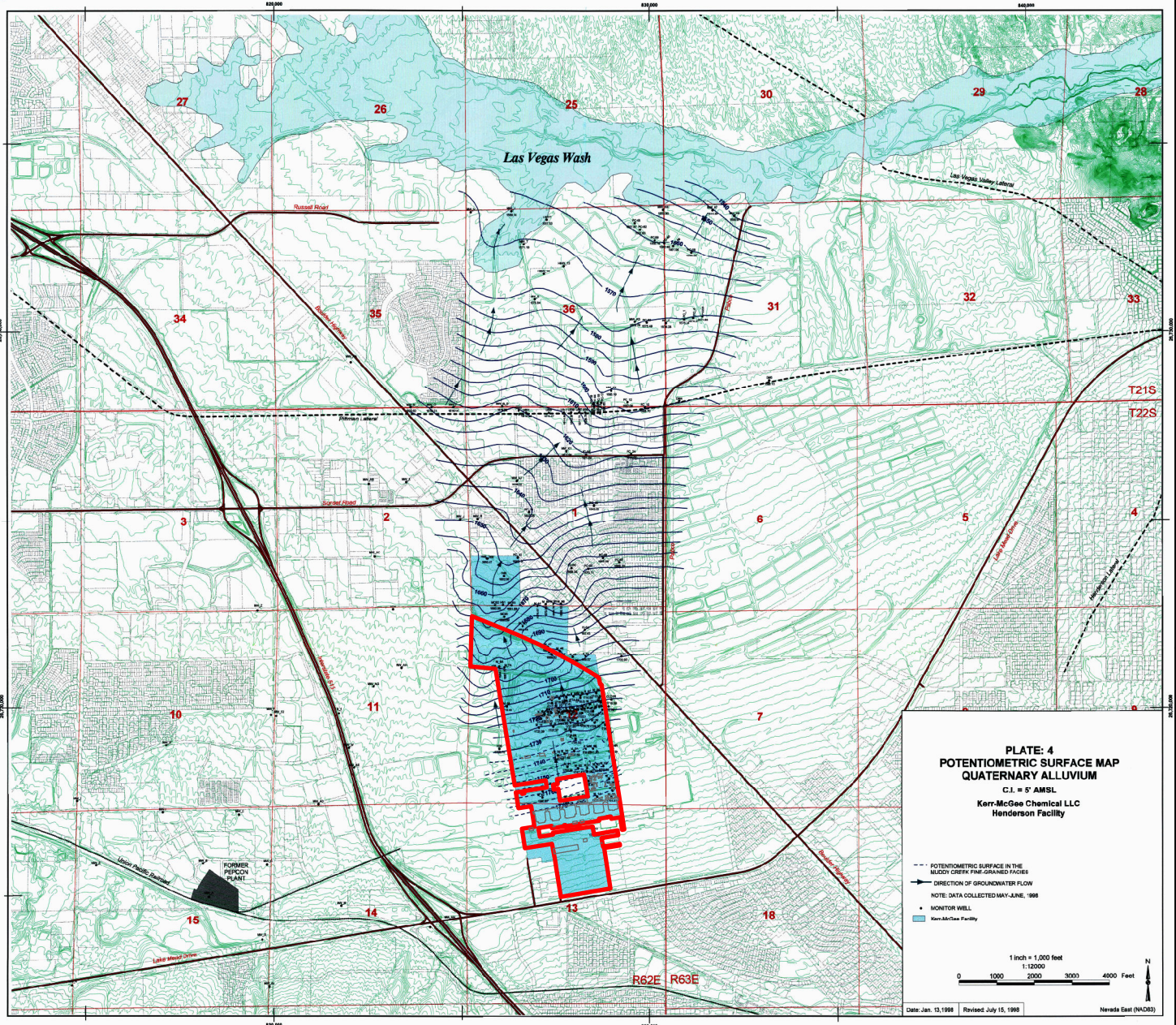
Path: H:\LePetomane\NERT\RI\OU-1_OU-2\RI\Report\GIS\revision1\figures_5-19\figures_5-19.aprx\Figure 5-19 June 1987



June 1987 Groundwater Contour Map
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-19i

Path: H:\LePetomane\NERT\RI\OU-1_OU-2\RI\Report\GIS\revision1\figures_5-19\figures_5-19.aprx | Figure 5-19 | 1998



OU-1 Boundary



Source:
Phase II Groundwater Perchlorate Investigation Report
Kerr-McGee Chemical LLC, Henderson, Nevada Facility, July 15, 1998



1998 Groundwater Contour Map
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
5-19j

Drafter: RS/JC

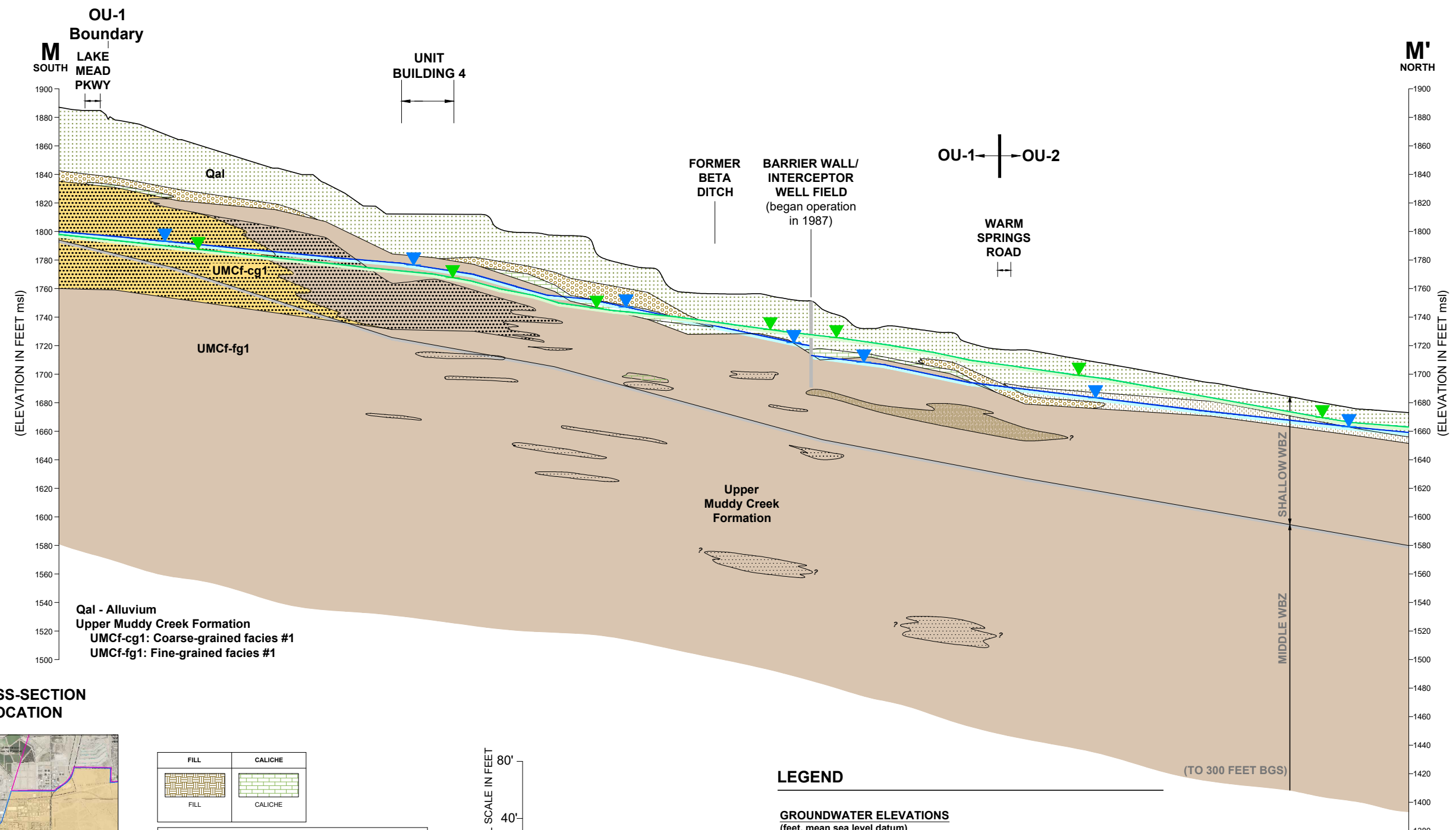
Date: 2023-06-12

Contract Number: 169002 9369

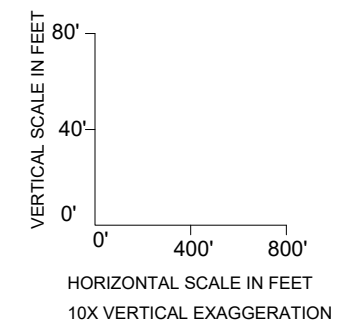
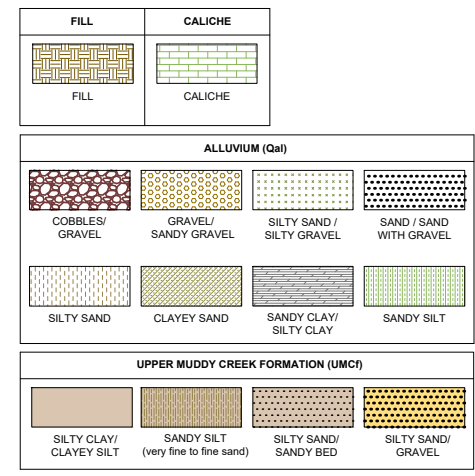
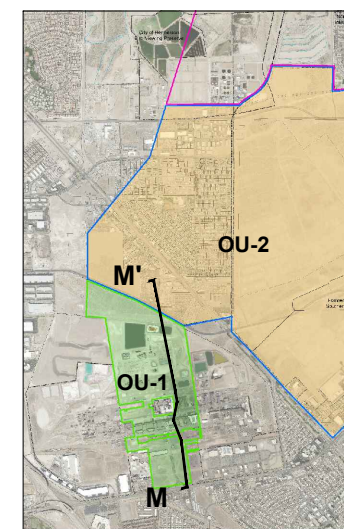
Approved:

Revised:

Last Saved By:



CROSS-SECTION LOCATION



NOTE:
Stratigraphic interpretation is based in part on available boring logs from previous investigations conducted by others. Lithologic contacts are shown unbroken for clarity, but this does not imply certainty. Interpreted contact shown may be affected by projected borings. Actual subsurface conditions along the cross-section alignment may vary.

LEGEND

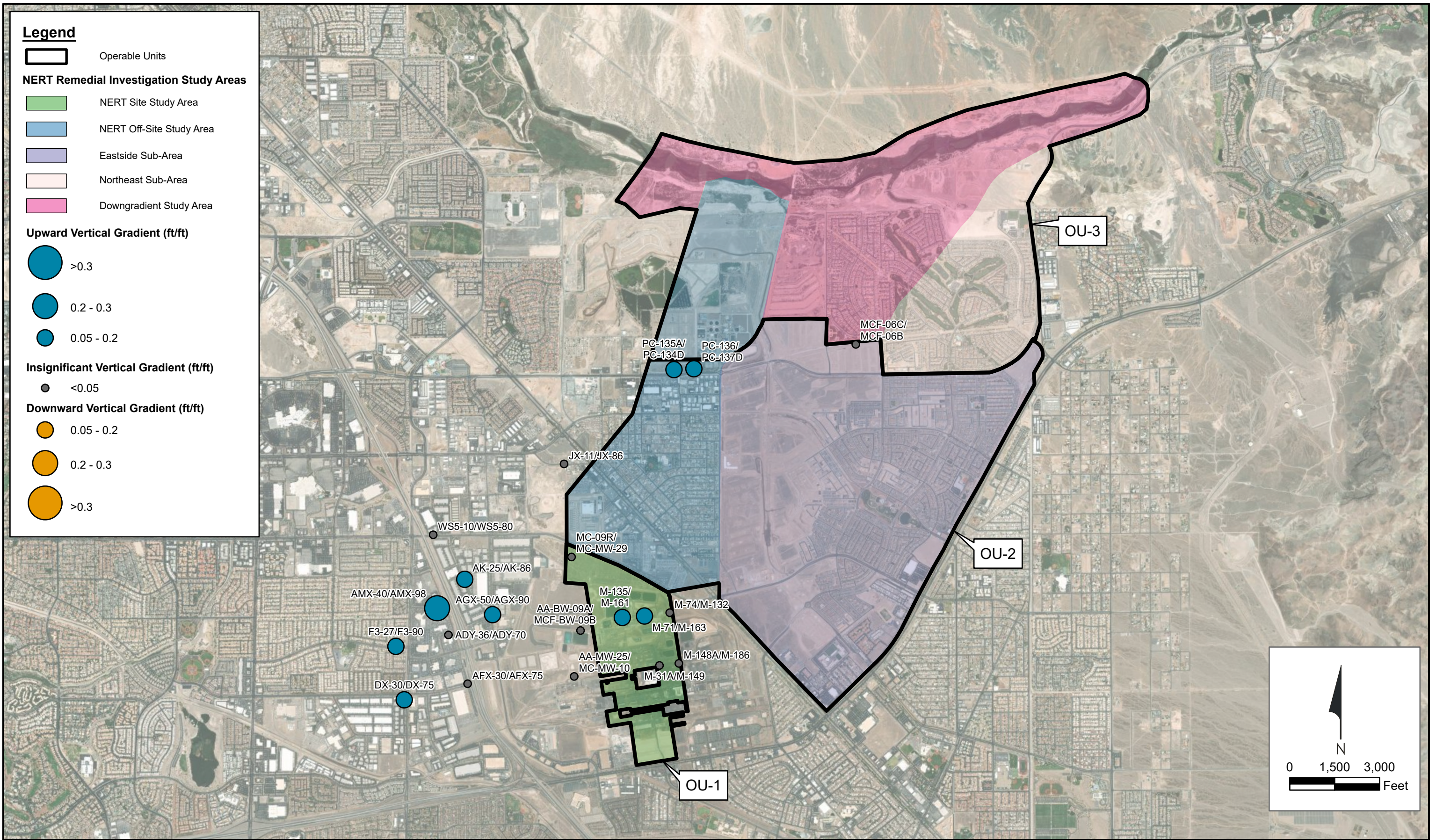
- GROUNDWATER ELEVATIONS**
(feet, mean sea level datum)
- Shallow Water-Bearing Zone (0-90 ft)**
- 2017-2018 Water Table
 - 1985 Water Table
 - Groundwater elevations measured October 2017 - May 2018
 - Groundwater elevations measured June-July 1985
- Barrier Wall/ Interceptor Well Field (IWF):**
The IWF began operation in mid-1987. Recharge trenches on the downgradient (north) side of the barrier wall operated from mid-1987 through September 2010.



Comparison of 1985 and 2017-2018 Groundwater Elevations
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
5-19k

C:\Users\msol\OneDrive - Ramboll\Desktop\drawing\1169000694\1690029369 - 1985compare-Cross_Section\MM.DWG Layout: 11x17 User: RMSO Jun 13, 2023 - 4:55pm



Legend

Operable Units

NERT Remedial Investigation Study Areas

- NERT Site Study Area
- NERT Off-Site Study Area
- Eastside Sub-Area
- Northeast Sub-Area
- Downgradient Study Area

Upward Vertical Gradient (ft/ft)

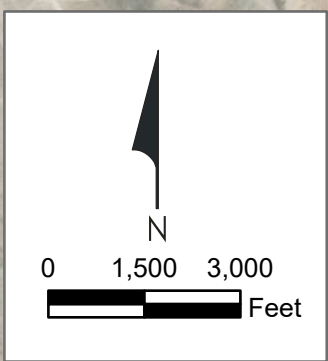
- >0.3
- 0.2 - 0.3
- 0.05 - 0.2

Insignificant Vertical Gradient (ft/ft)

- <0.05

Downward Vertical Gradient (ft/ft)

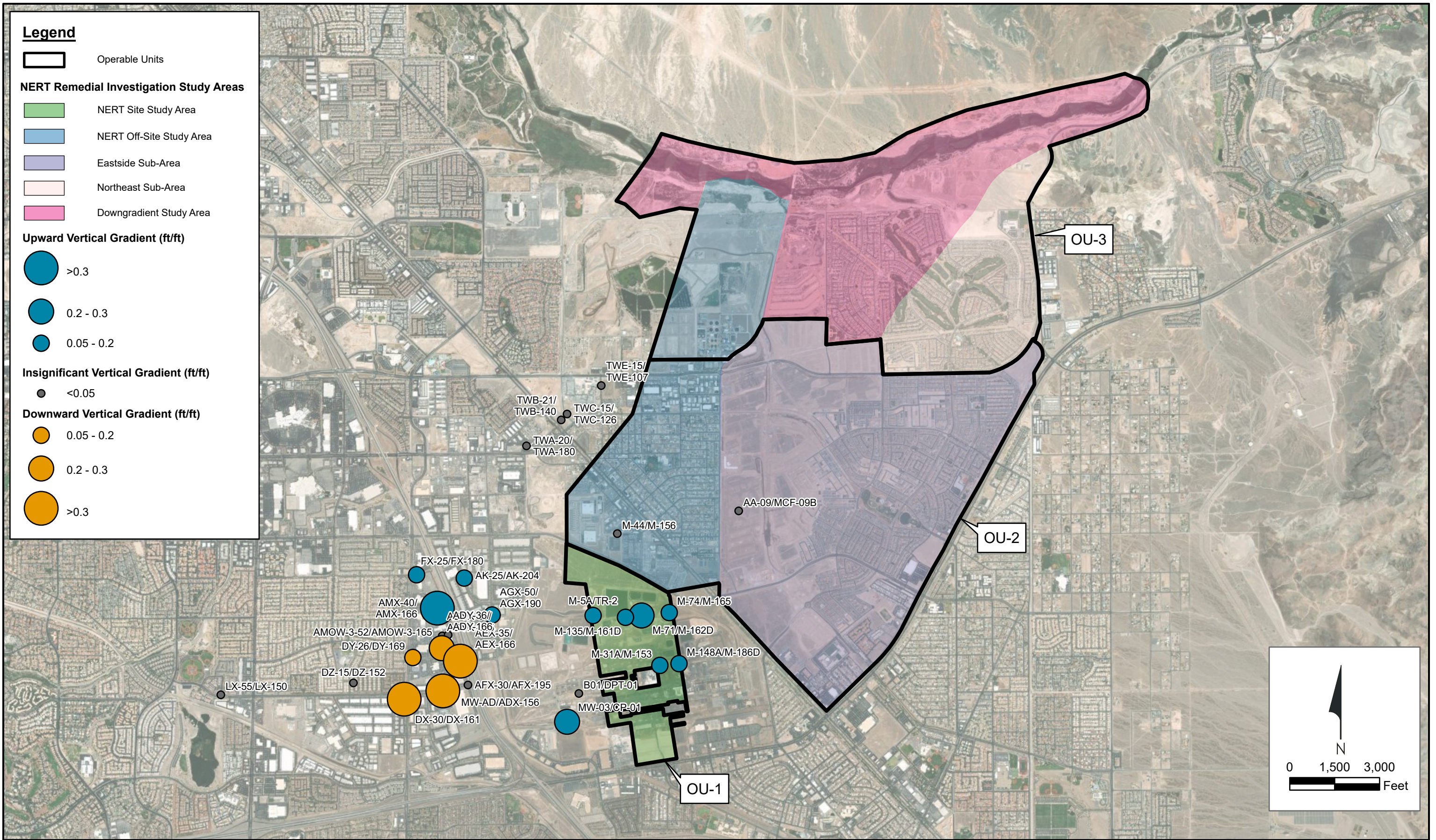
- 0.05 - 0.2
- 0.2 - 0.3
- >0.3



Vertical Gradient Evaluation – Shallow WBZ and Middle WBZ (90-110 ft bgs)
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
5-20a

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Legend

- Operable Units

NERT Remedial Investigation Study Areas

- NERT Site Study Area
- NERT Off-Site Study Area
- Eastside Sub-Area
- Northeast Sub-Area
- Downgradient Study Area

Upward Vertical Gradient (ft/ft)

- >0.3
- 0.2 - 0.3
- 0.05 - 0.2

Insignificant Vertical Gradient (ft/ft)

- <0.05

Downward Vertical Gradient (ft/ft)

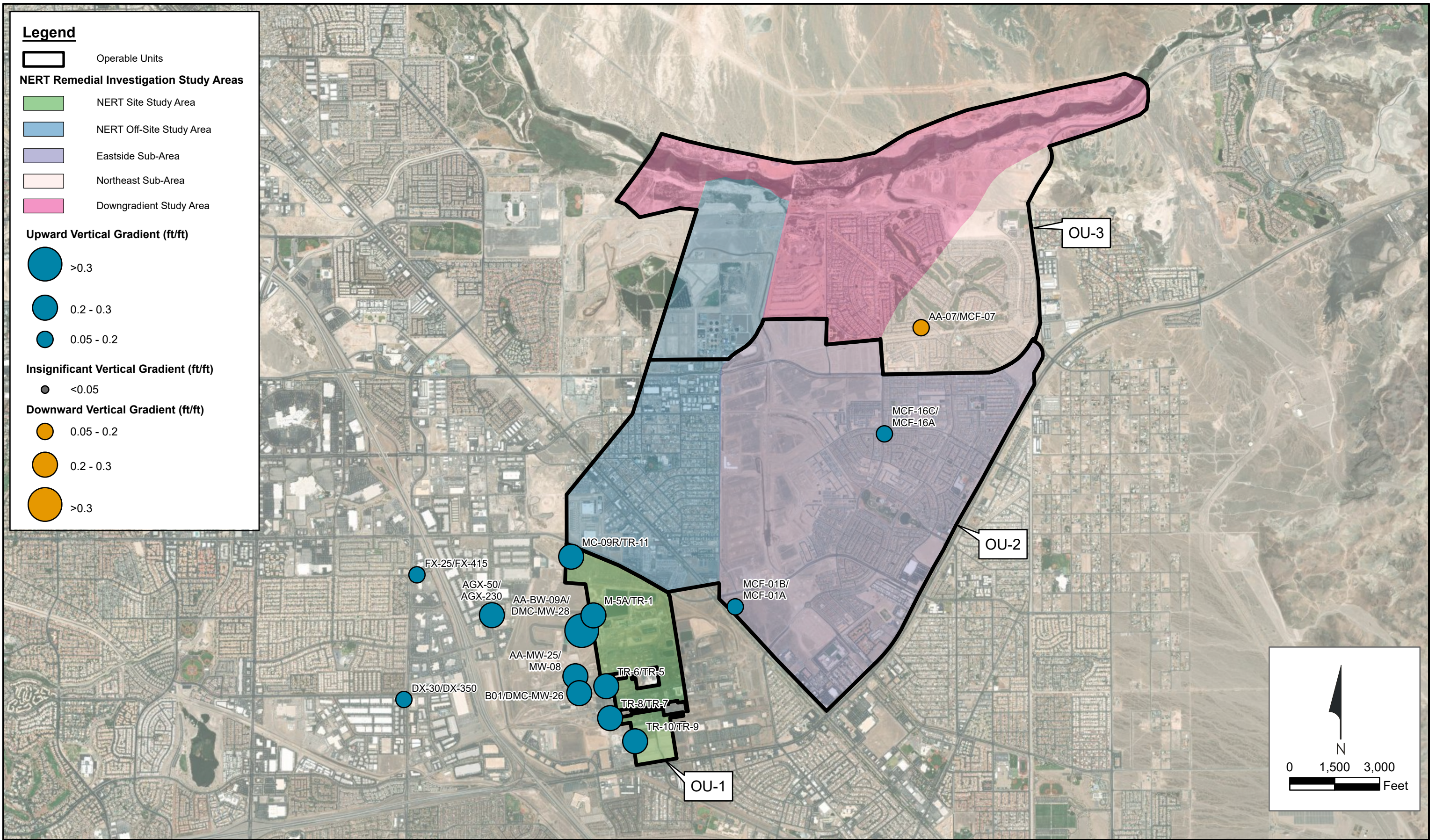
- 0.05 - 0.2
- 0.2 - 0.3
- >0.3

Vertical Gradient Evaluation – Middle WBZ (110 - 220 ft bgs)
 Nevada Environmental Response Trust Site
 Henderson, Nevada



Figure
5-20b

Path: H:\LePetomane\NERT\RI_OU-1_OU-2\RI_Report\GIS\Revision1\revision1.aprx

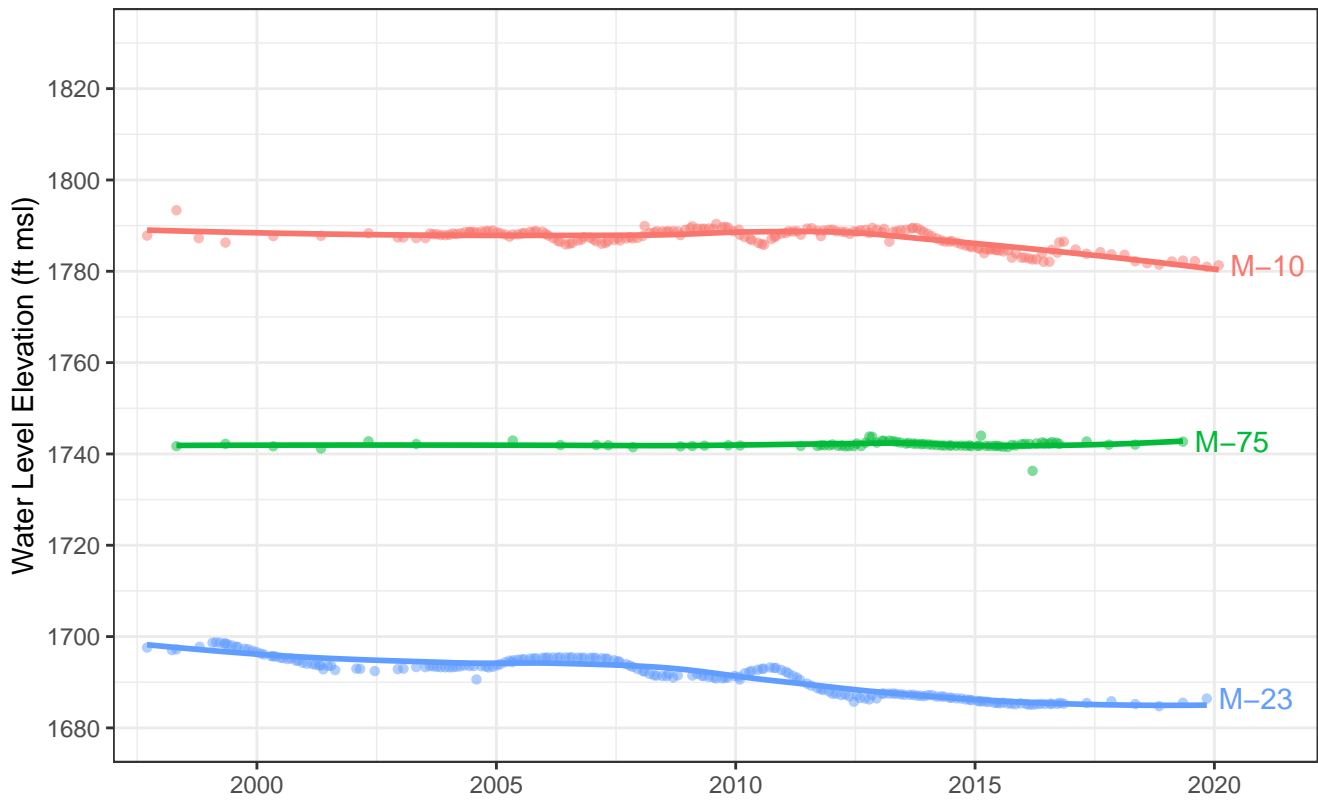


Vertical Gradient Evaluation – Middle WBZ (220-300 ft bgs) and Deep WBZ
 Nevada Environmental Response Trust Site
 Henderson, Nevada

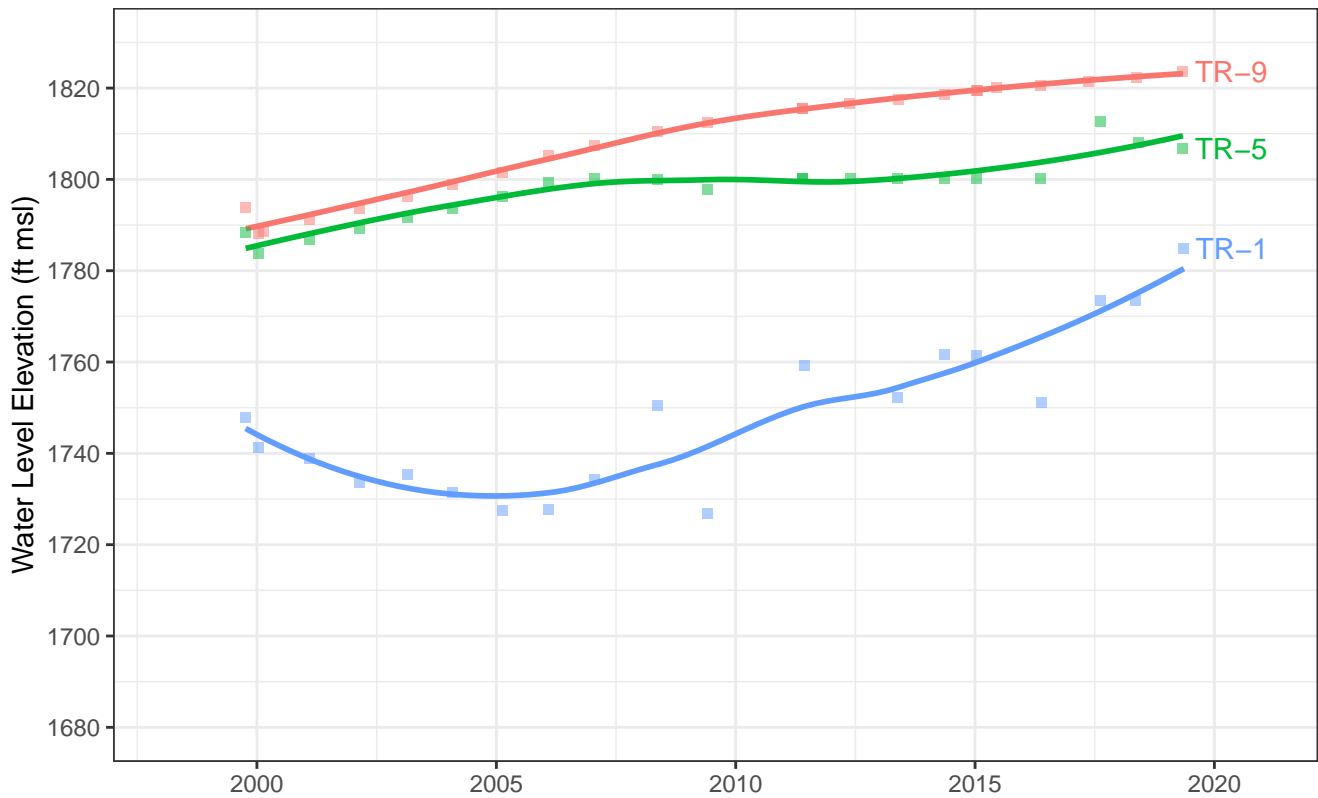
Figure
5-20c

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OU-1 Shallow WBZ (0-90 ft bgs)



OU-1 Middle WBZ (175-300 ft bgs)

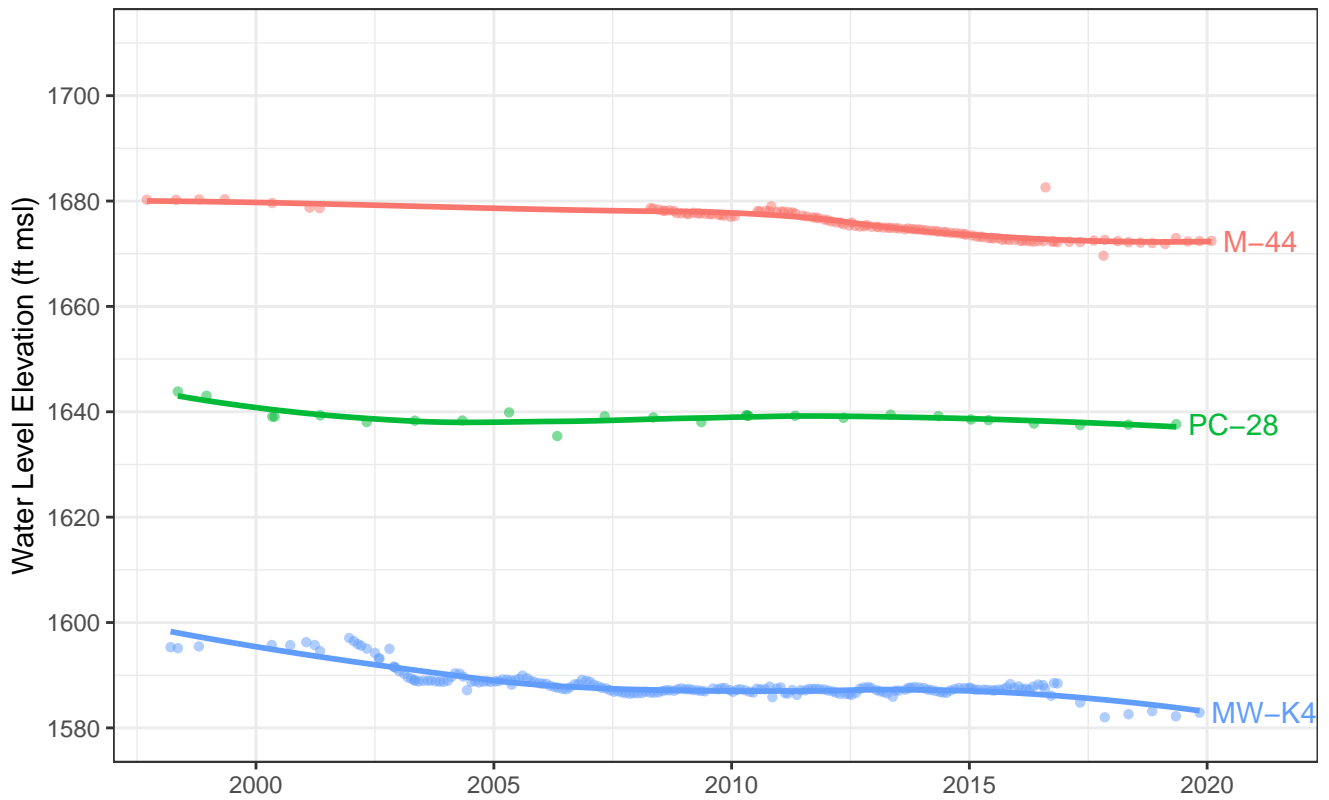


Groundwater Level Trends in OU-1
Nevada Environmental Response Trust Site
Henderson, Nevada

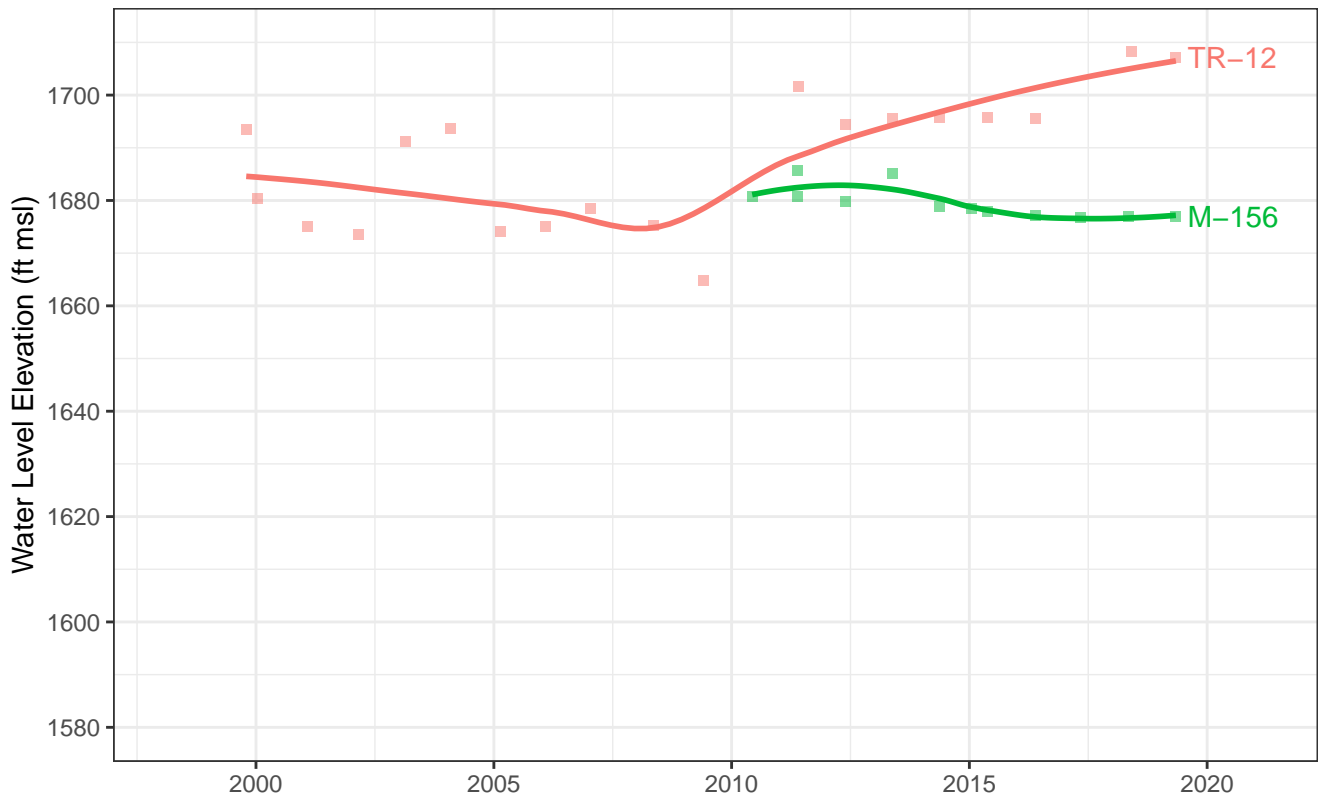
Figure

5-21a

OU-2 Shallow WBZ (0-50 ft bgs)



OU-2 Middle WBZ (175-300 ft bgs)



Groundwater Level Trends in OU-2
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure

5-21b