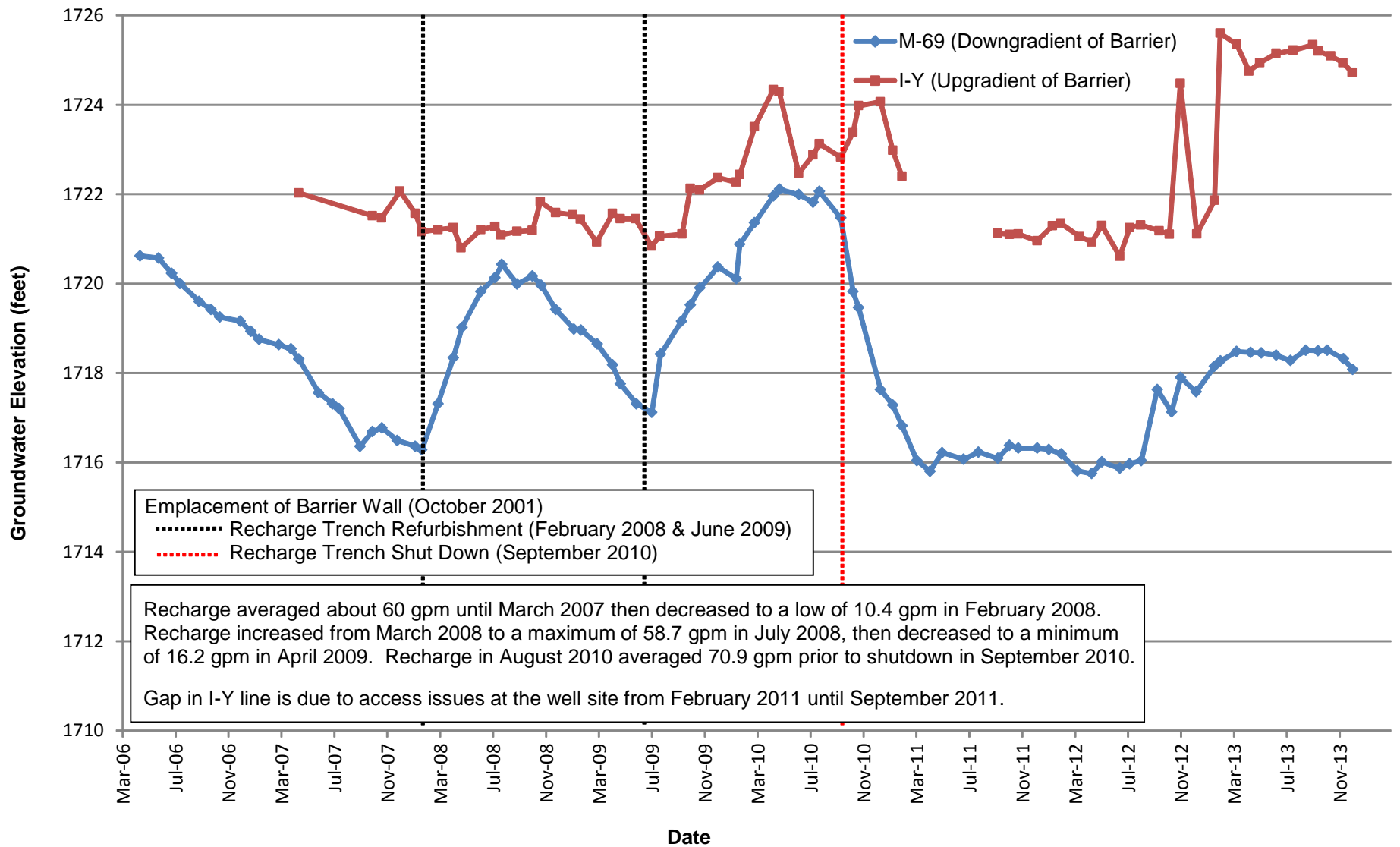


Path: H:\LePomane\NERT\IGWMA\Annual Performance Reports\2013 Semi-Annual\Figures\GIS Files\Fig1.mxd

Figure 1
LOCATION MAP
 Semi-Annual Remedial Performance Report
 Nevada Environmental Response Trust Site
 Henderson, Nevada

DESIGNED BY:		REVISIONS			
DESIGNED BY:	No.	DESCRIPTION:	DATE:	BY:	
EJK	0	GENERATE APPROVED MAP	2/28/2014	RS	
DRAWN BY:					
RS					
CHECKED BY:					
CJR					
APPROVED BY:					
CJR/KPL					





Emplacement of Barrier Wall (October 2001)
 - - - - - Recharge Trench Refurbishment (February 2008 & June 2009)
 Recharge Trench Shut Down (September 2010)

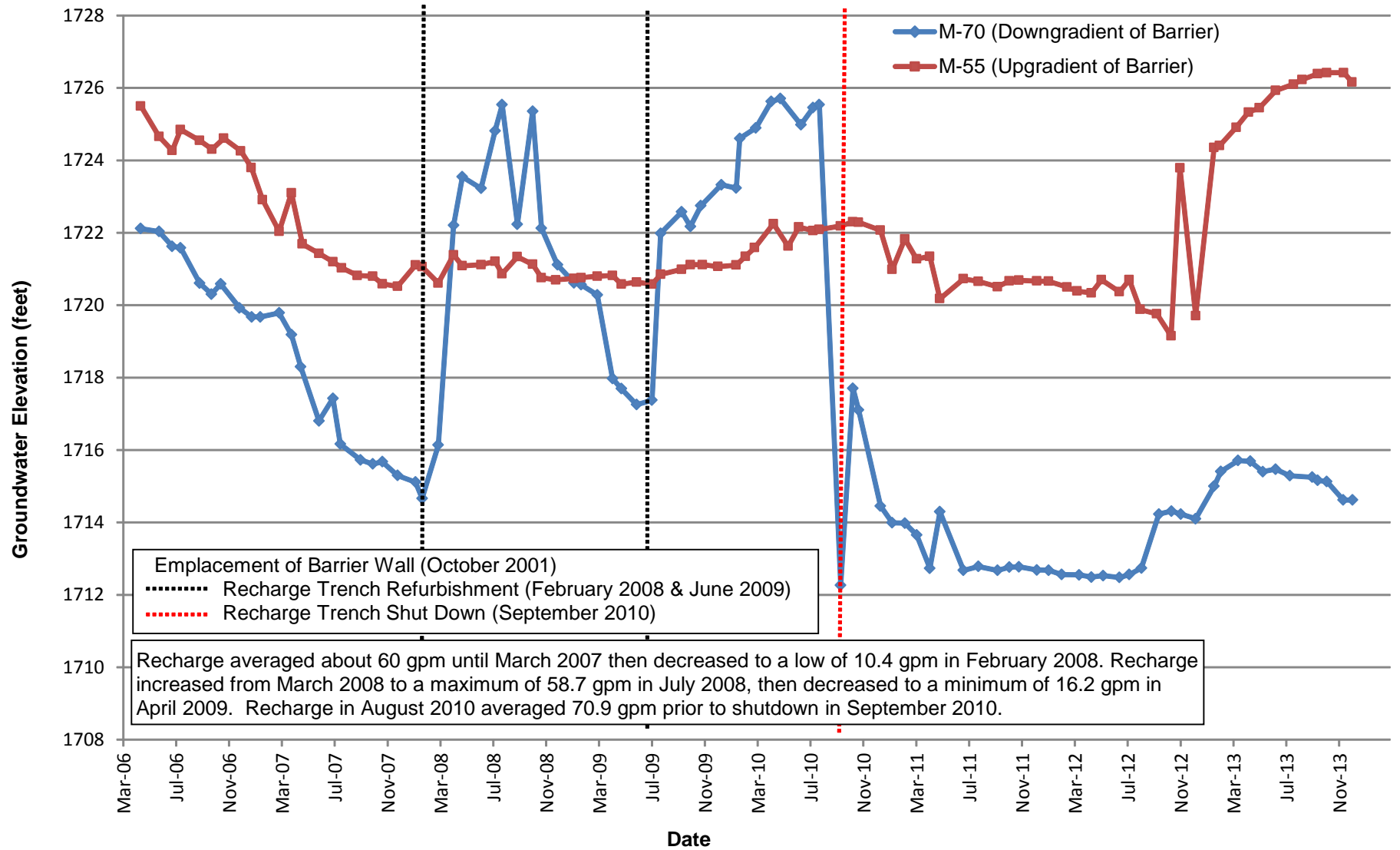
Recharge averaged about 60 gpm until March 2007 then decreased to a low of 10.4 gpm in February 2008. Recharge increased from March 2008 to a maximum of 58.7 gpm in July 2008, then decreased to a minimum of 16.2 gpm in April 2009. Recharge in August 2010 averaged 70.9 gpm prior to shutdown in September 2010. Gap in I-Y line is due to access issues at the well site from February 2011 until September 2011.



Hydrograph Pair Across the Barrier Wall - M-69 and I-Y
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

2a



Emplacement of Barrier Wall (October 2001)
 Recharge Trench Refurbishment (February 2008 & June 2009)
 Recharge Trench Shut Down (September 2010)

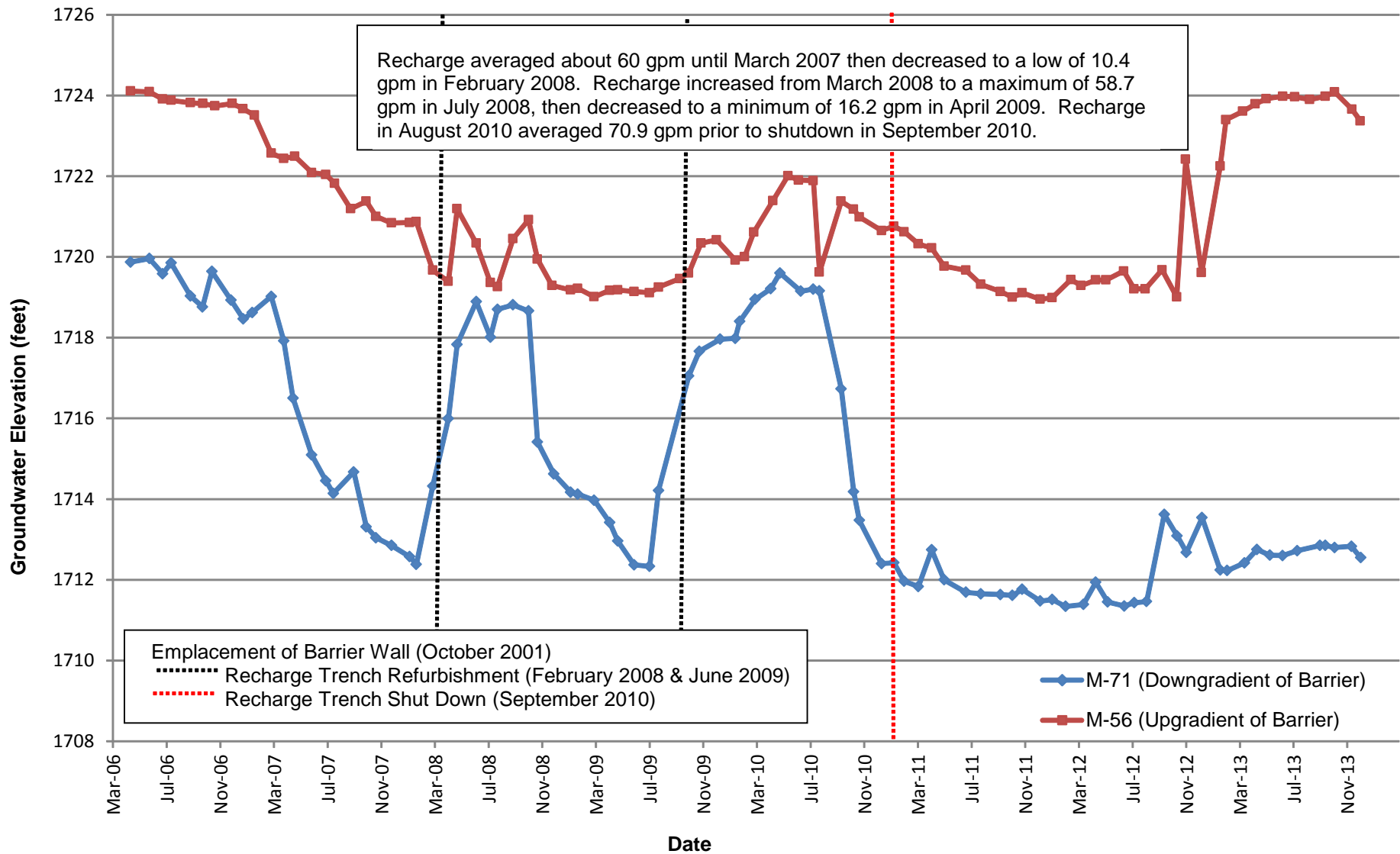
Recharge averaged about 60 gpm until March 2007 then decreased to a low of 10.4 gpm in February 2008. Recharge increased from March 2008 to a maximum of 58.7 gpm in July 2008, then decreased to a minimum of 16.2 gpm in April 2009. Recharge in August 2010 averaged 70.9 gpm prior to shutdown in September 2010.



Hydrograph Pair Across the Barrier Wall - M-70 and M-55
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

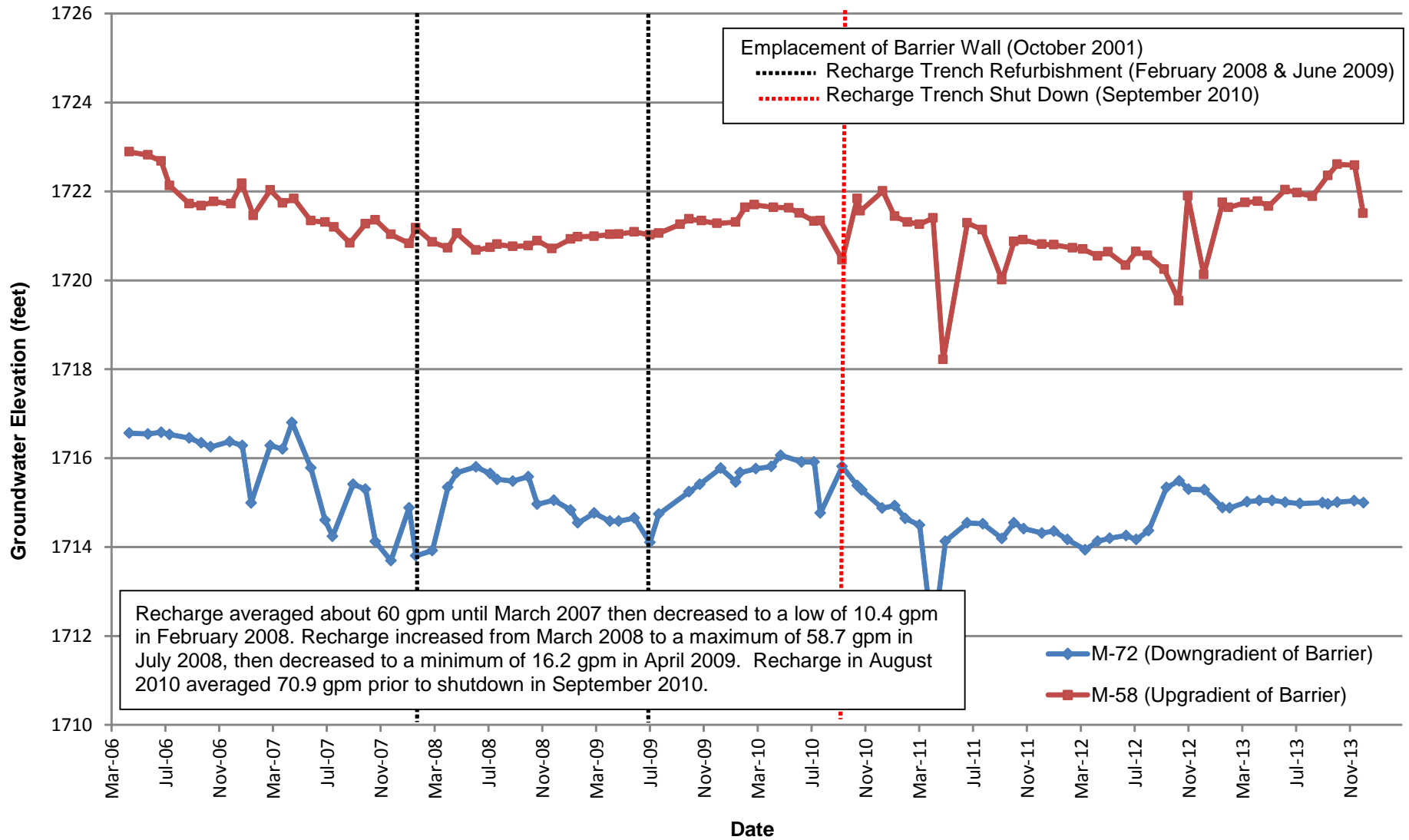
2b



Hydrograph Pair Across the Barrier Wall - M-71 and M-56
 Nevada Environmental Response Trust Site
 Henderson, Nevada

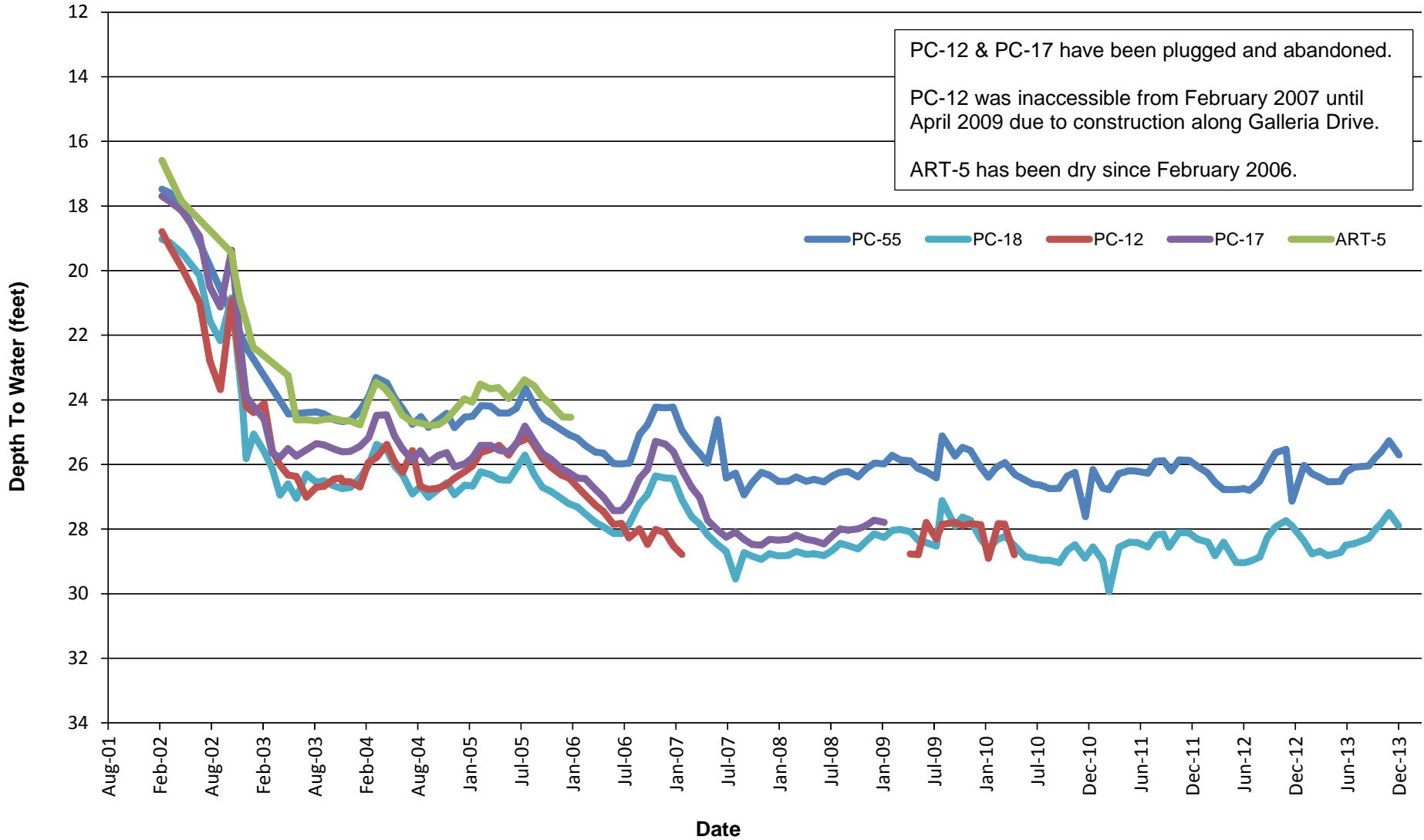
Figure

2c



Hydrograph Pair Across the Barrier Wall - M-72 and M-58
 Nevada Environmental Response Trust Site
 Henderson, Nevada

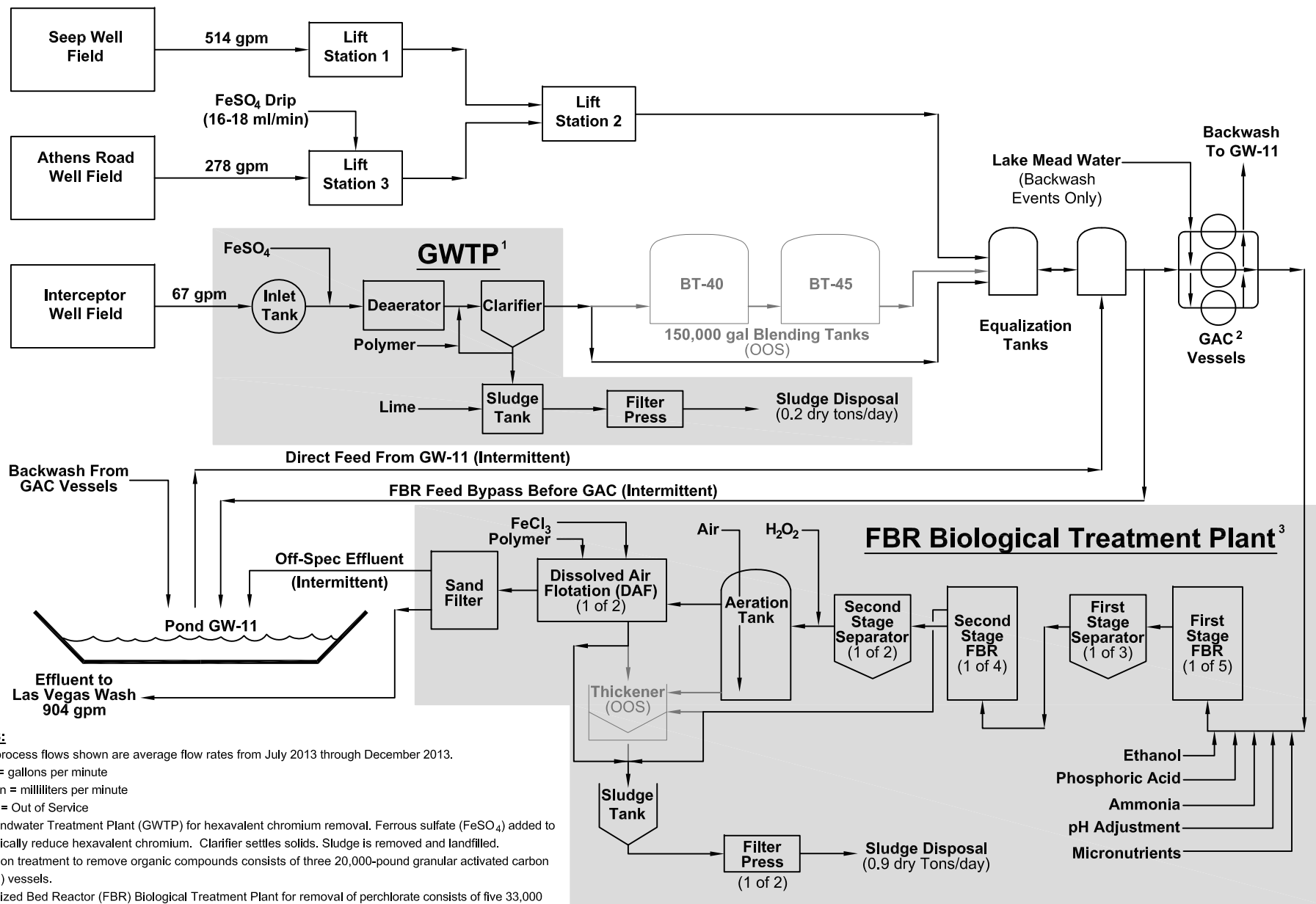
Figure
2d



Athens Road Well Field Drawdown
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

3



NOTES:

- The process flows shown are average flow rates from July 2013 through December 2013.
 gpm = gallons per minute
 ml/min = milliliters per minute
 OOS = Out of Service
- 1) Groundwater Treatment Plant (GWTP) for hexavalent chromium removal. Ferrous sulfate (FeSO₄) added to chemically reduce hexavalent chromium. Clarifier settles solids. Sludge is removed and landfilled.
 - 2) Carbon treatment to remove organic compounds consists of three 20,000-pound granular activated carbon (GAC) vessels.
 - 3) Fluidized Bed Reactor (FBR) Biological Treatment Plant for removal of perchlorate consists of five 33,000 gallon first-stage FBRs, four 28,800 gallon second-stage FBRs, aeration (air and hydrogen peroxide, H₂O₂), dissolved air flotation (DAF), two plate and frame filter presses, and a sand filter.



Groundwater Extraction and Treatment System (GWETS) Flow Diagram
 Nevada Environmental Response Trust
 Henderson, Nevada

Figure

4

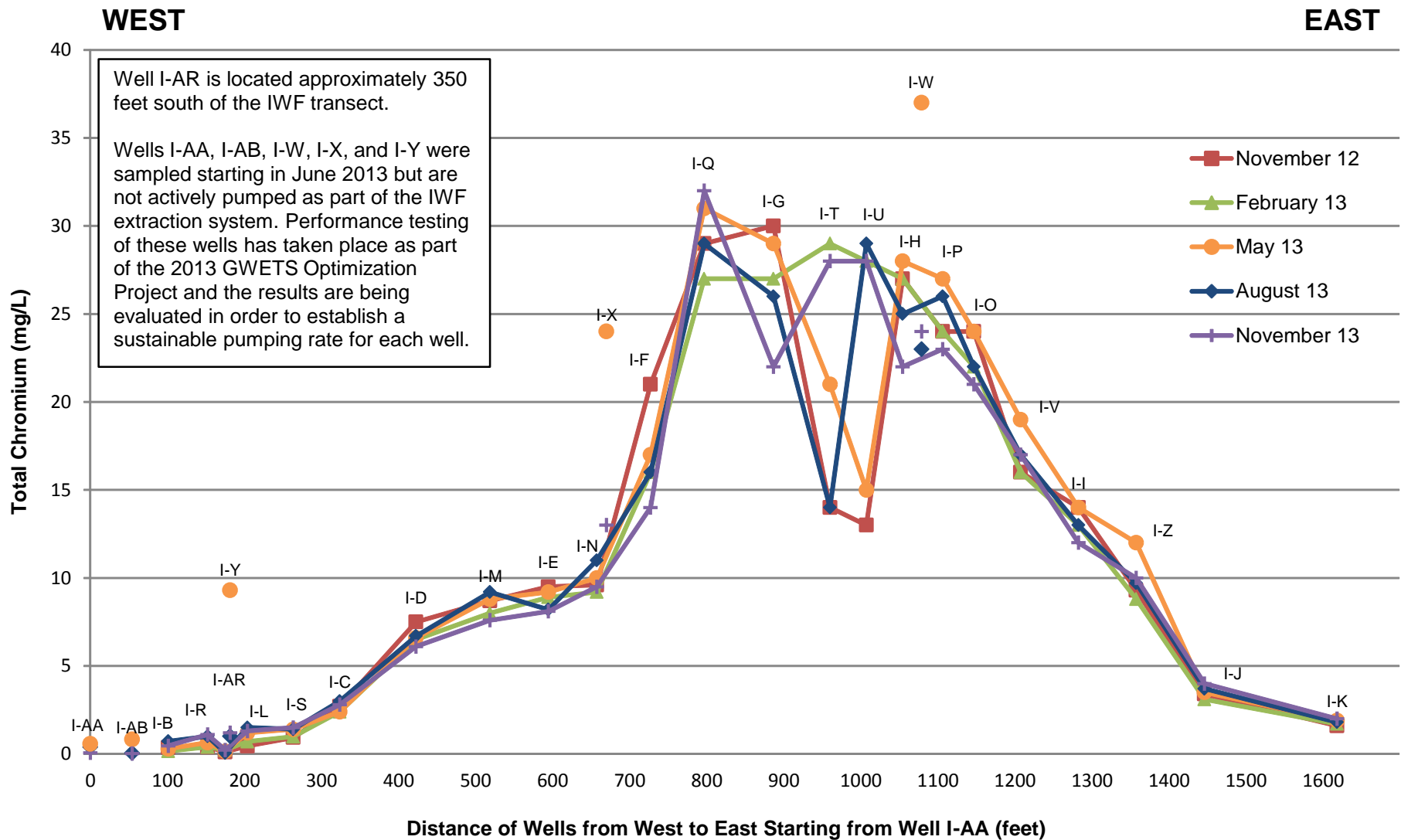
Drafter: RS

Date: 2/7/14

Contract Number: 21-34800H

Approved:

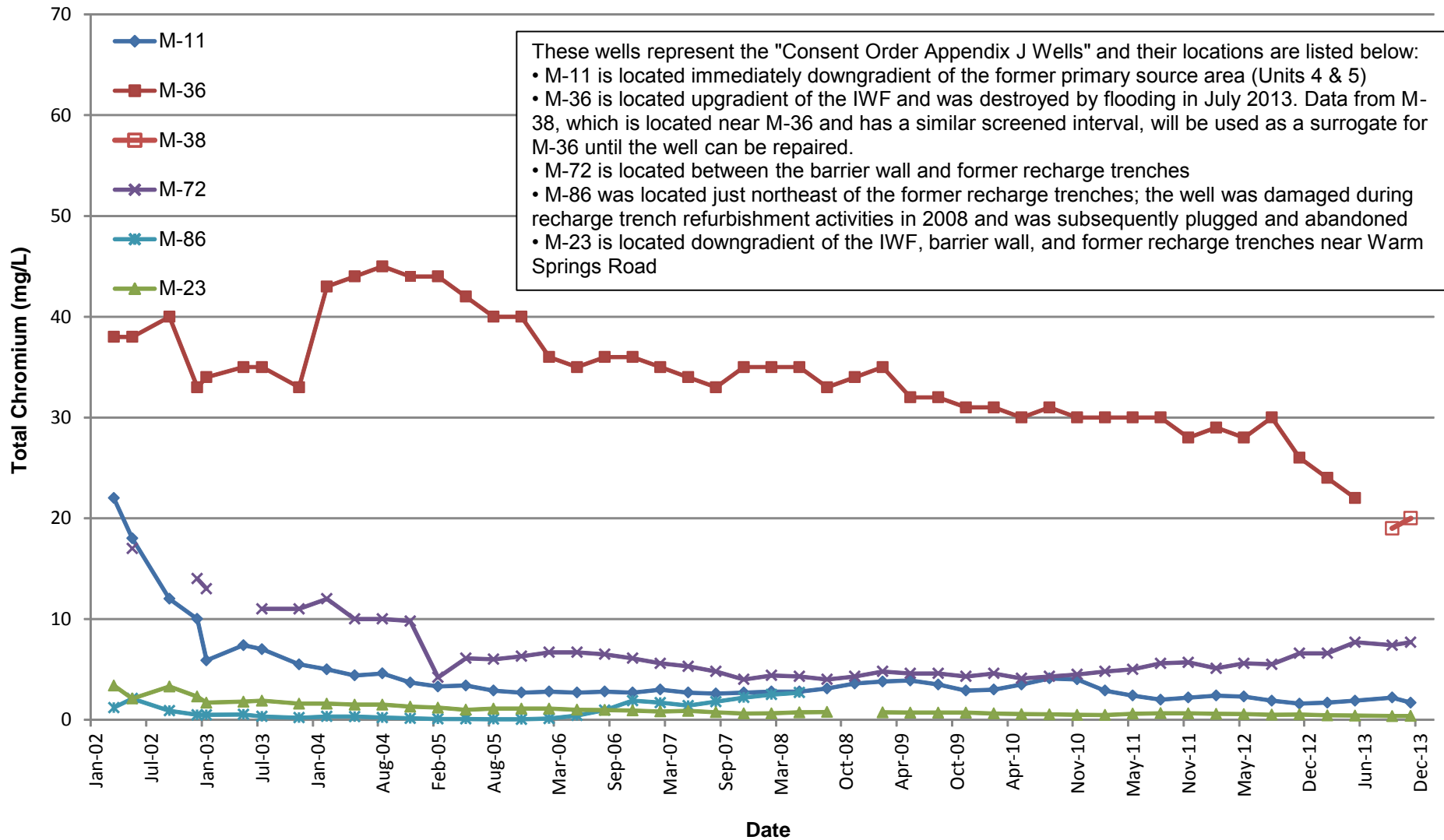
Revised:



Interceptor Well Field Total Chromium Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

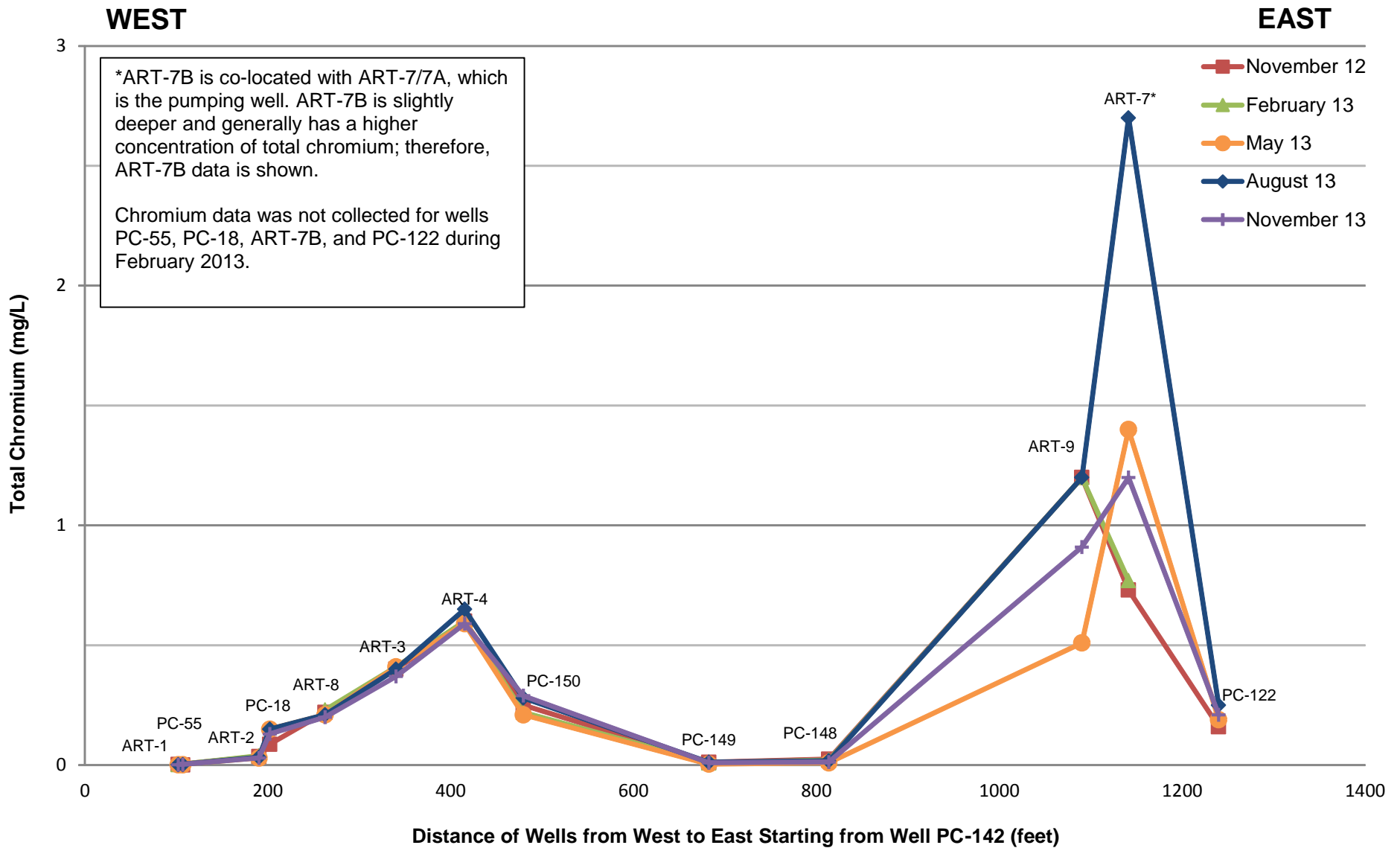
5



Total Chromium Concentration Trends in Select Wells
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

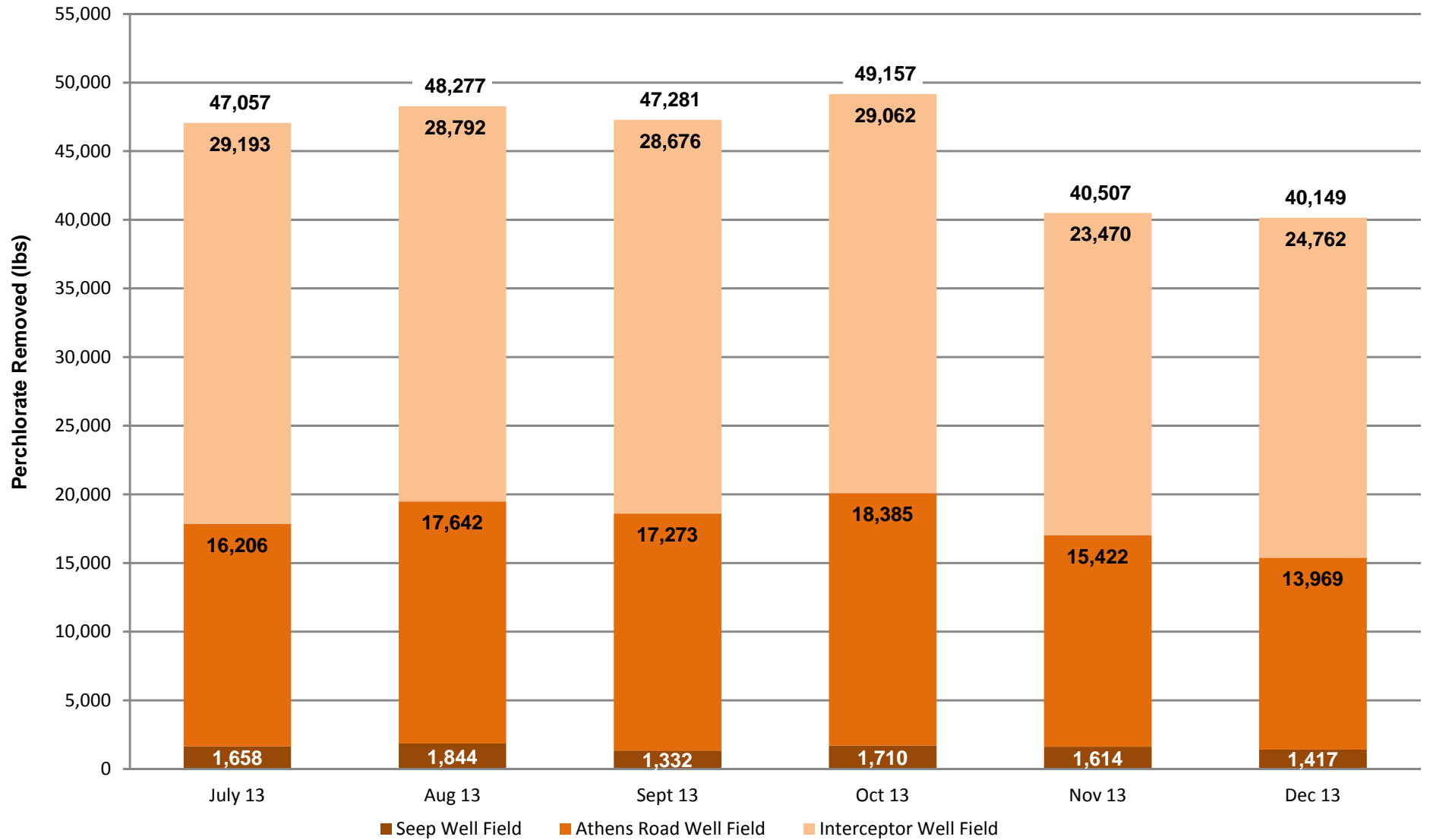
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Athens Road Well Field Total Chromium Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

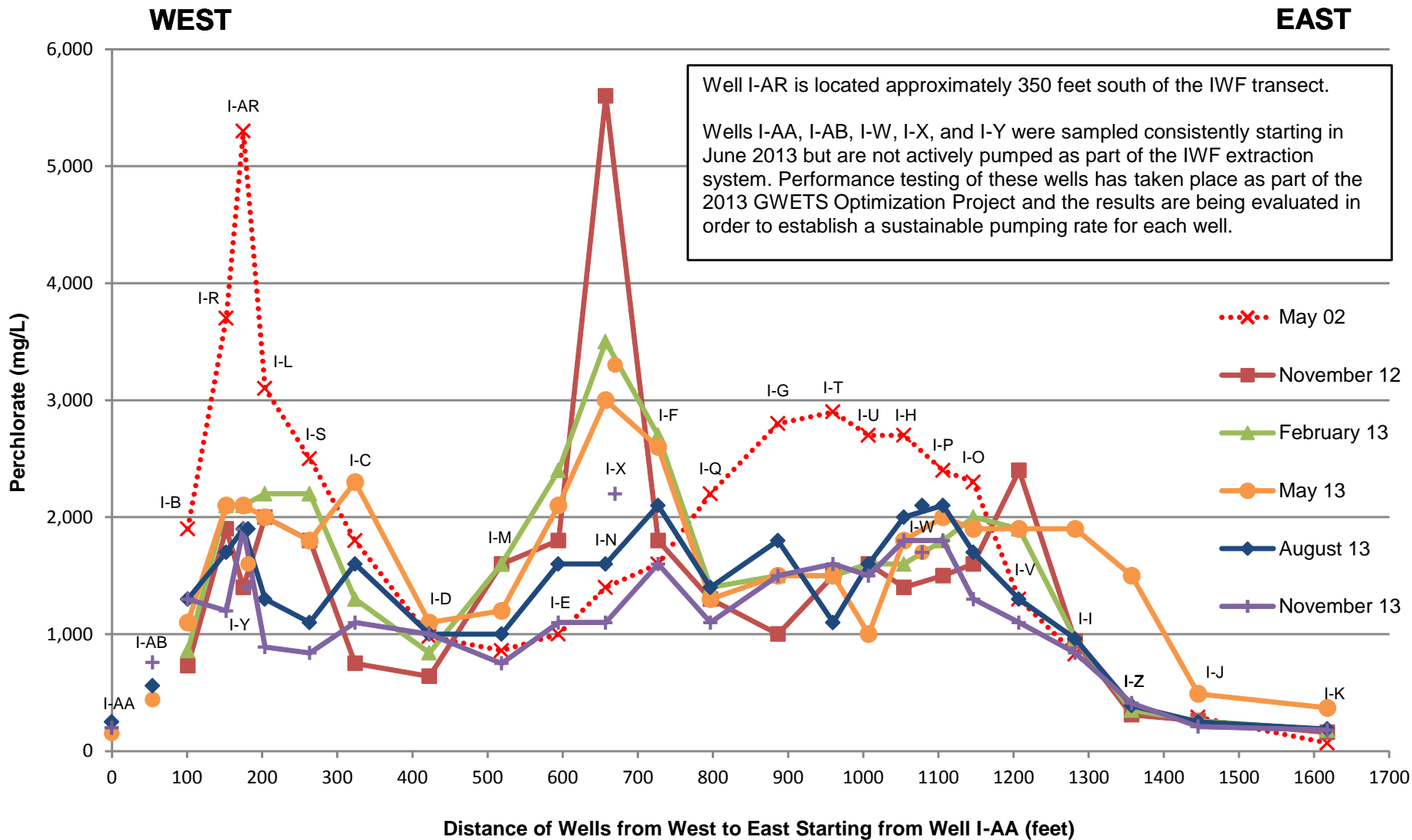
7



Perchlorate Removed from the Environment July - December 2013
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

8



Interceptor Well Field Perchlorate Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

9

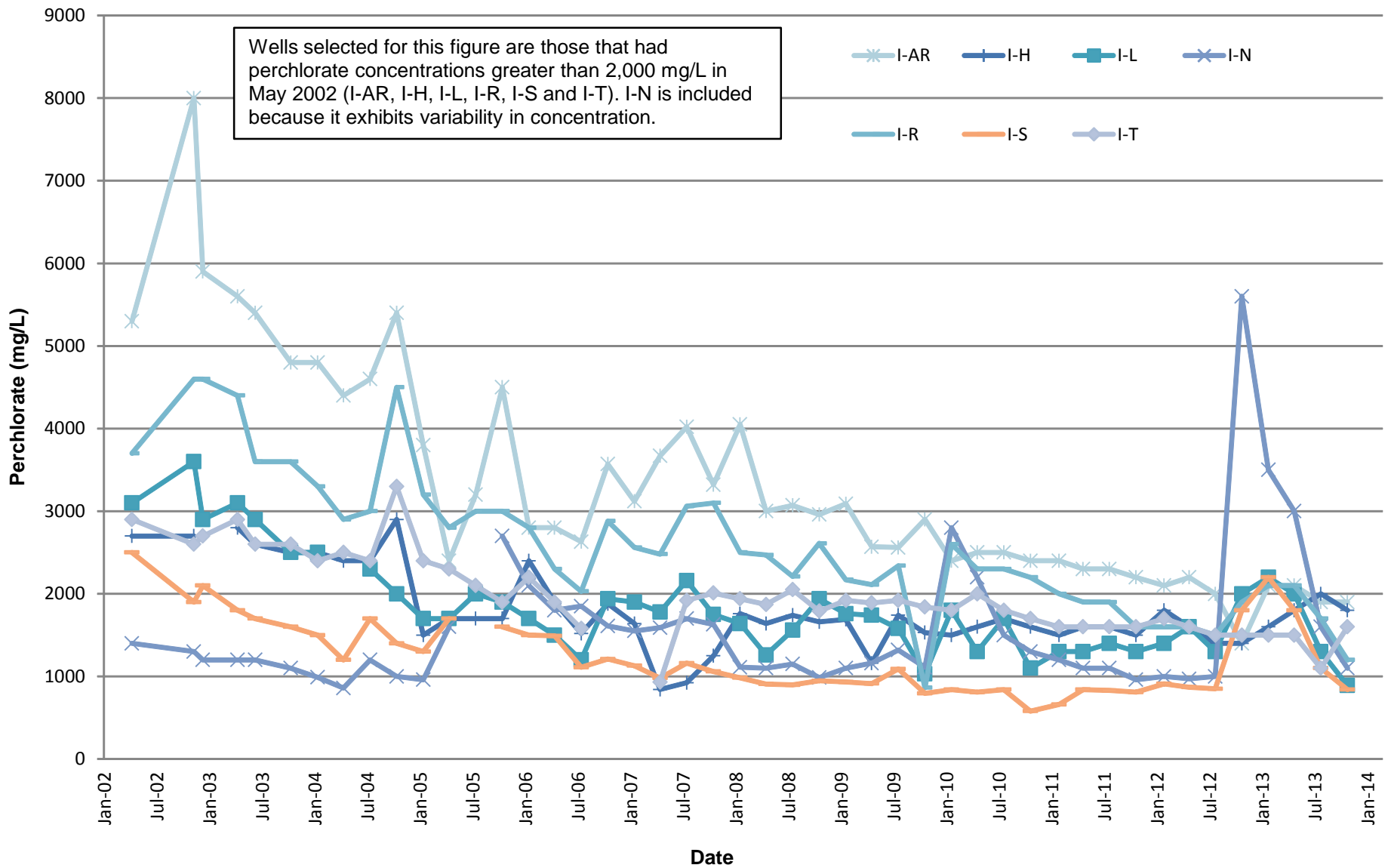
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Date: 2/28/2014

Contract Number: 21-34800H

Approved:

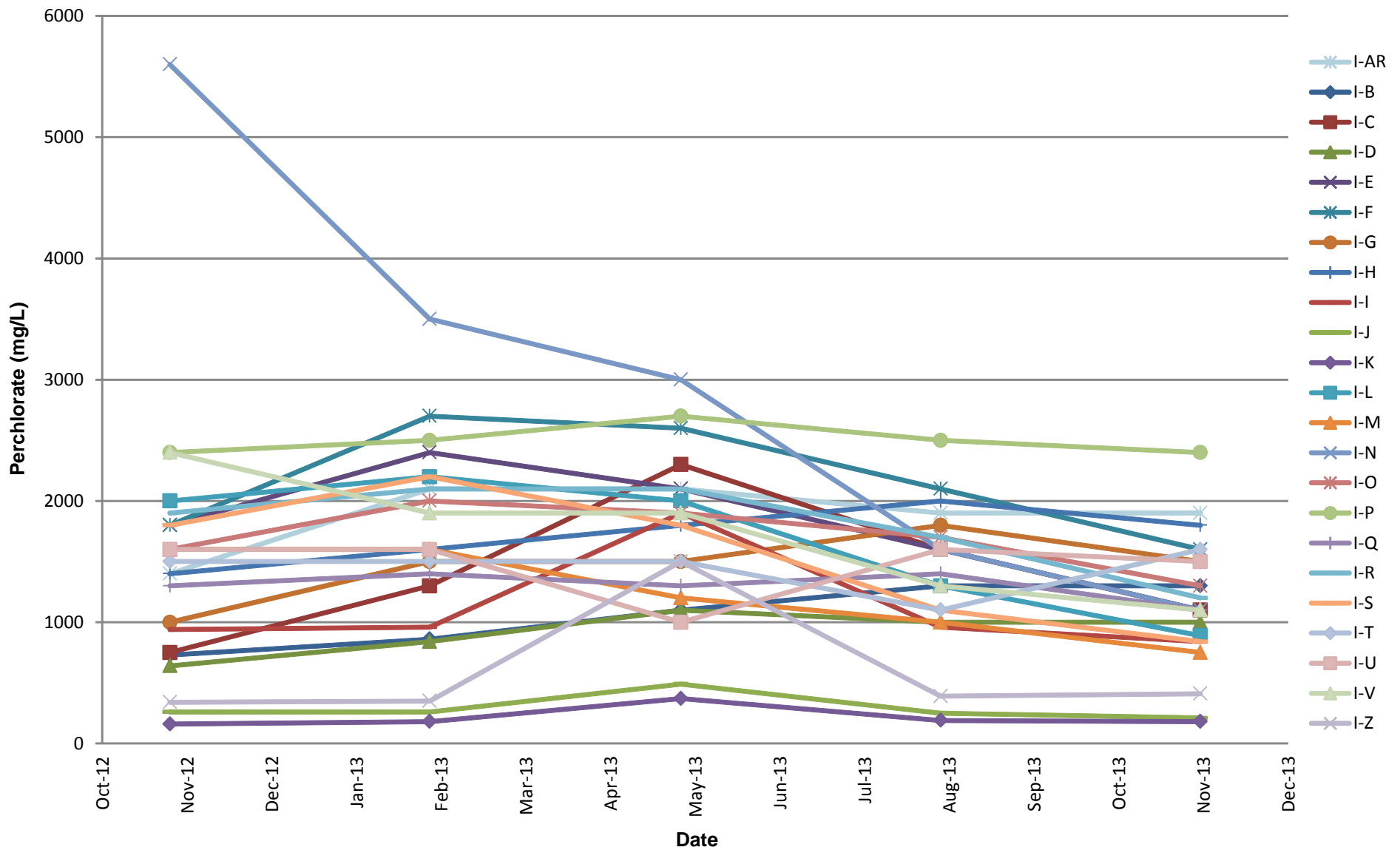
Revised:



Interceptor Well Field Perchlorate Concentration Trends for Select Wells
 Nevada Environmental Response Trust Site
 Henderson, Nevada

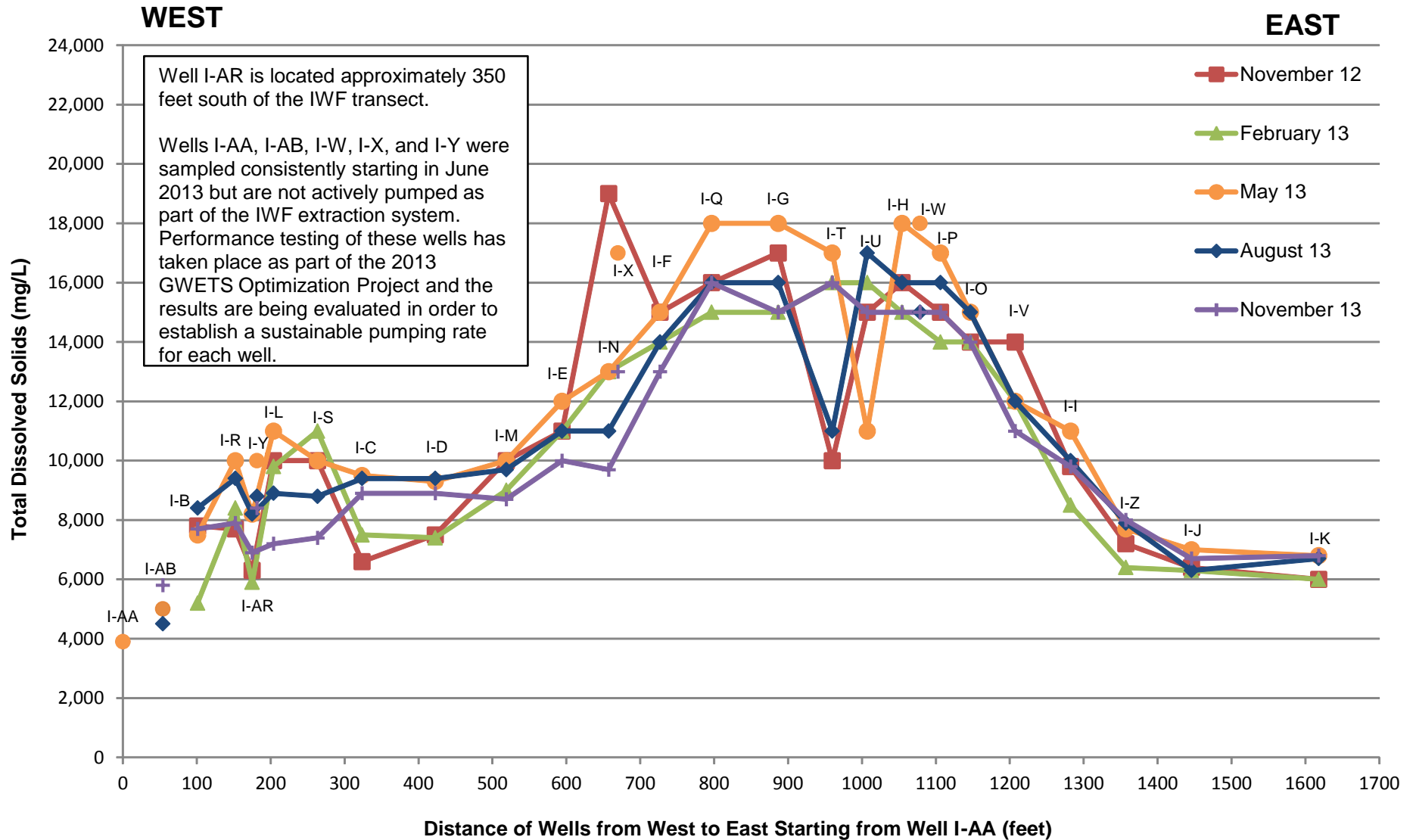
Figure
10





Interceptor Well Field Perchlorate Concentration Trends, November 2012 - November 2013
 Nevada Environmental Response Trust Site
 Henderson, Nevada

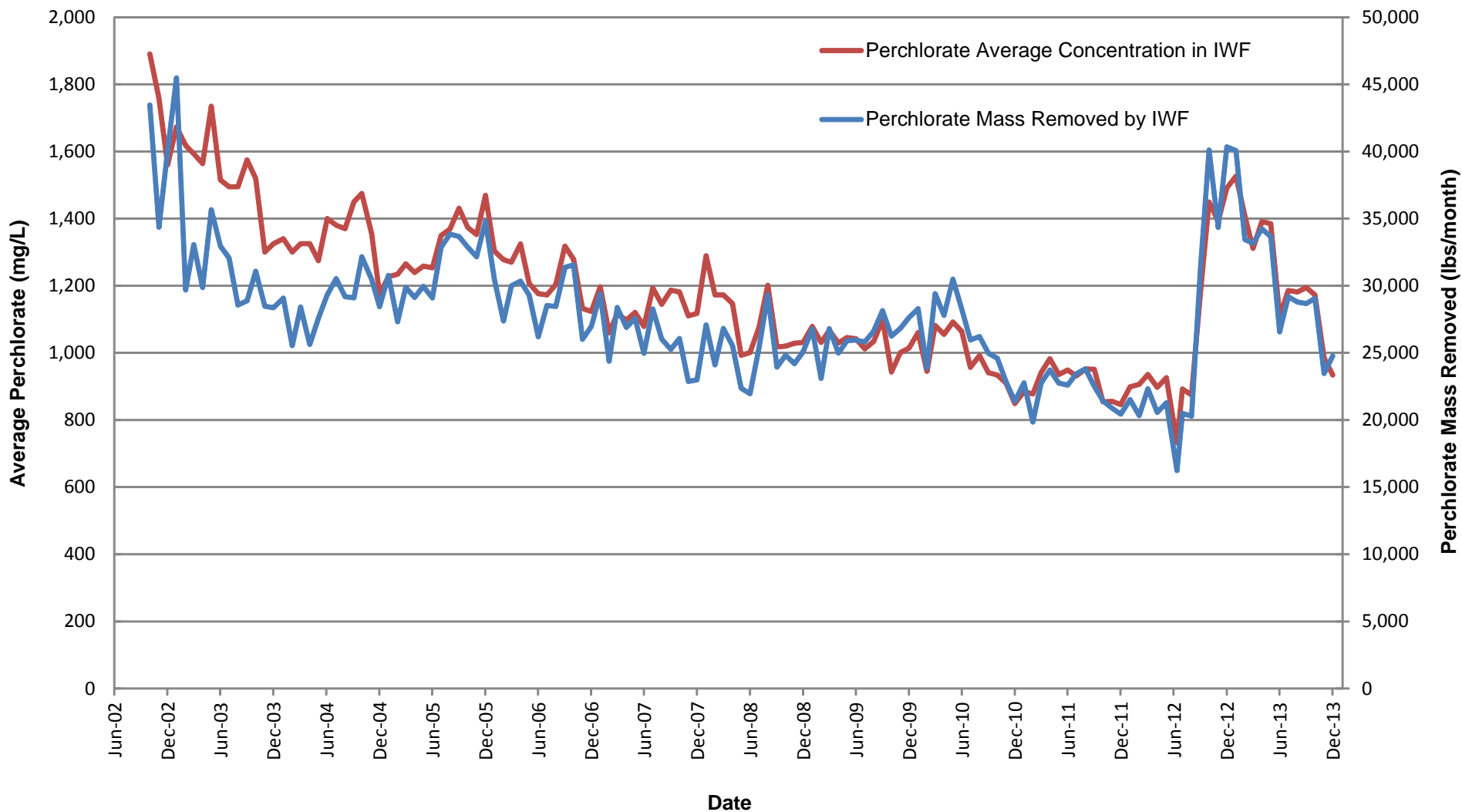
Figure
10a



Interceptor Well Field Total Dissolved Solids Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

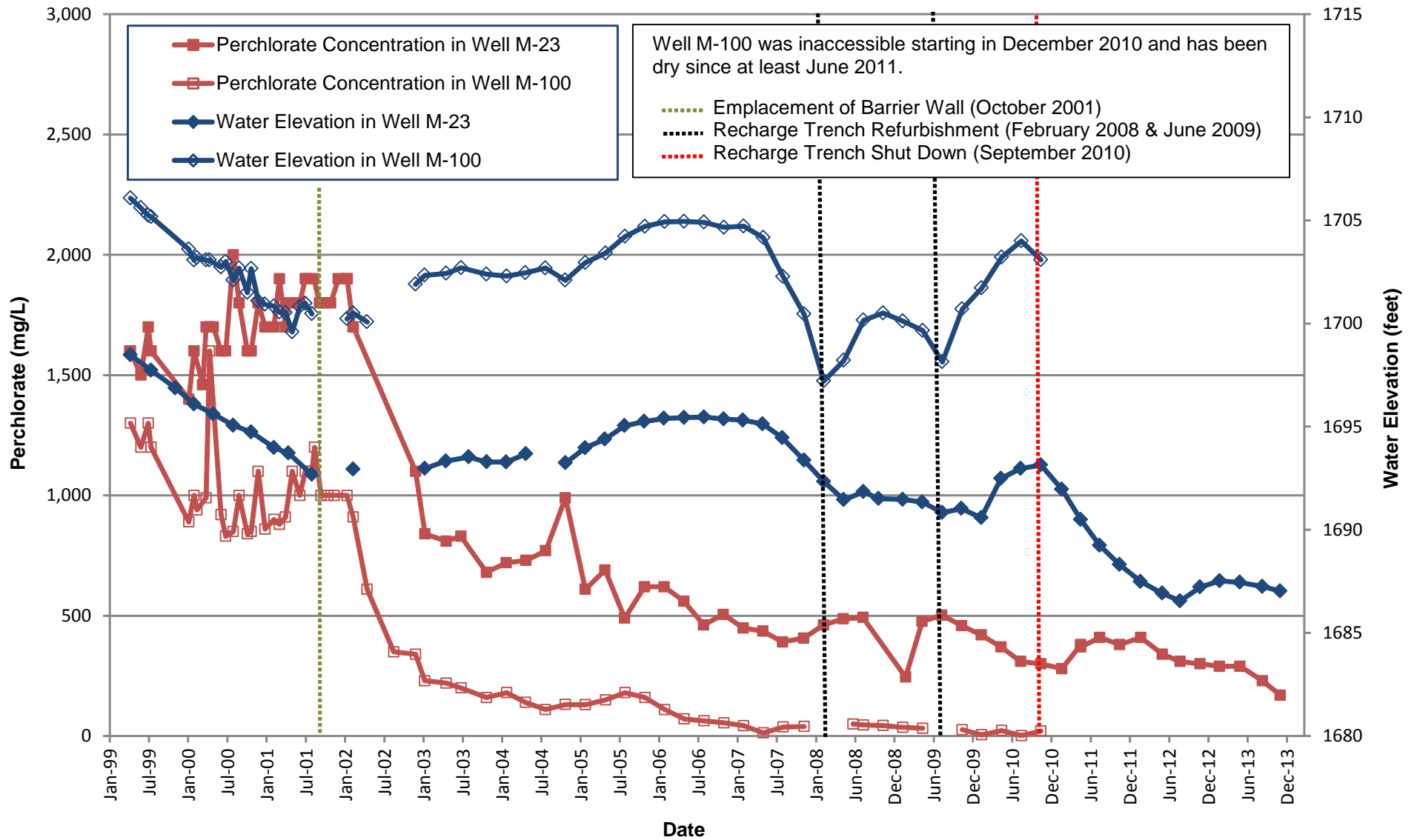
11



Interceptor Well Field Average Perchlorate Concentration and Mass Removed
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

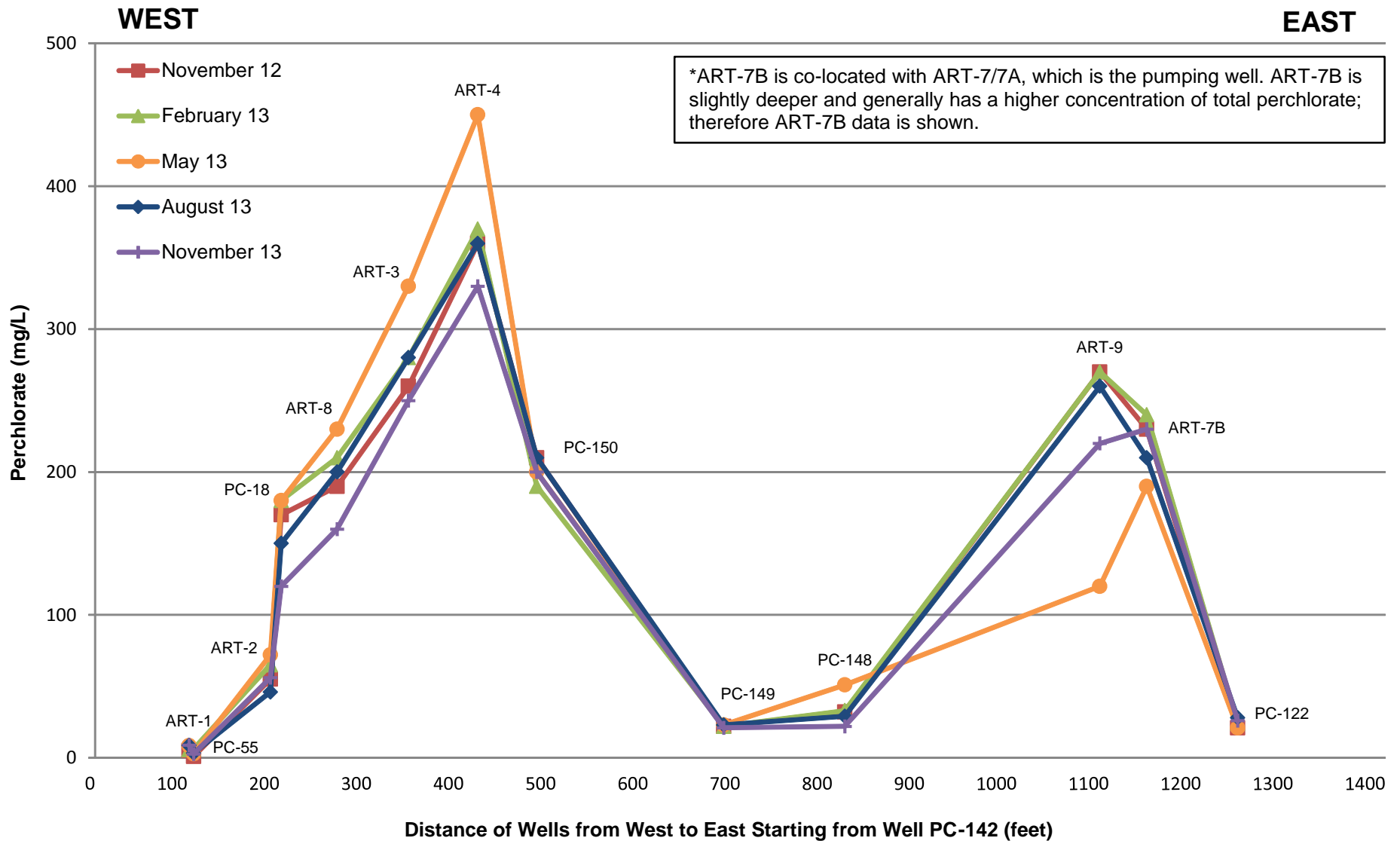
12



Wells M-23 and M-100 Perchlorate Concentration vs. Water Elevation Trends
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

13



Athens Road Well Field Perchlorate Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

14

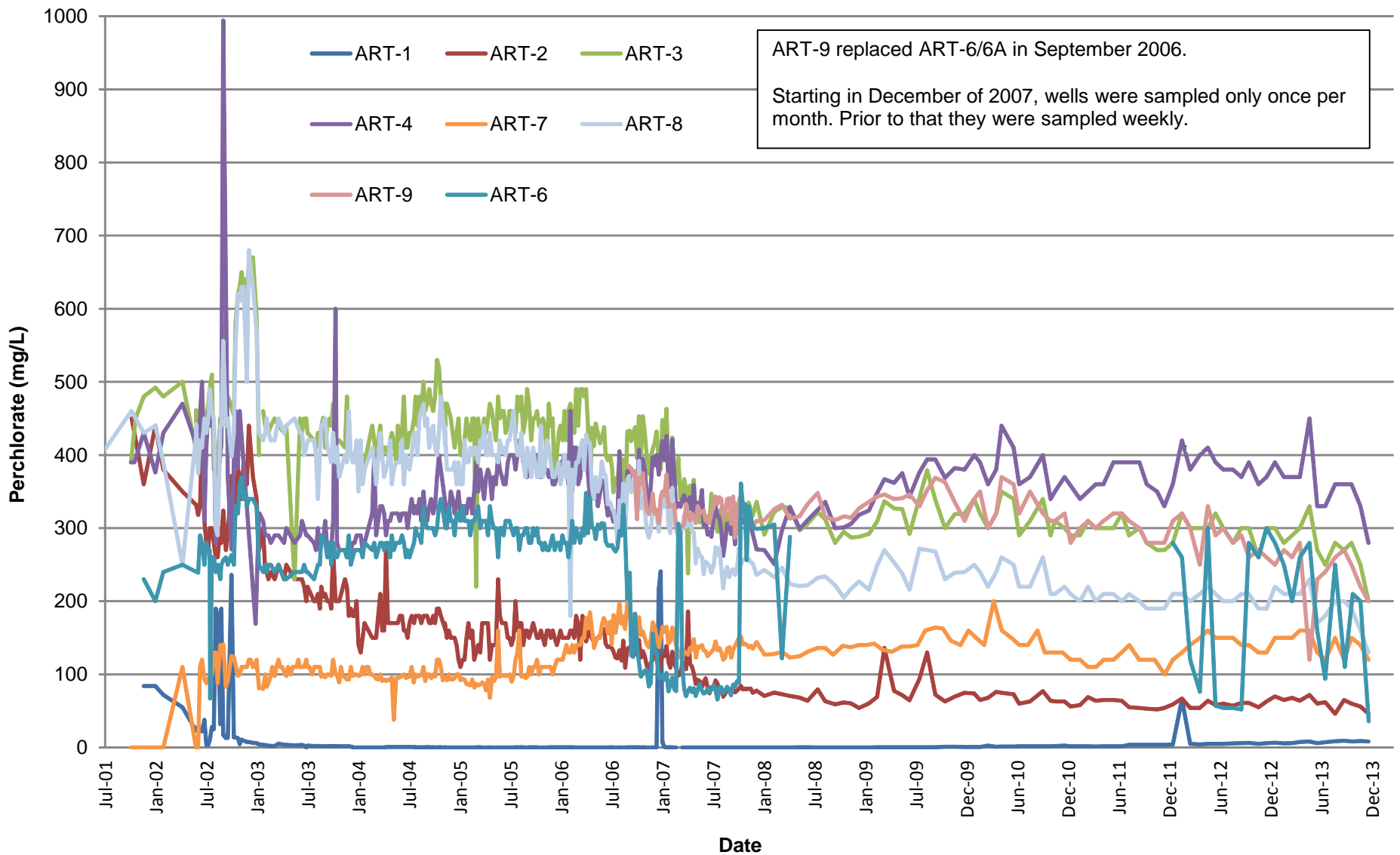
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Date: 2/28/2014

Contract Number: 21-34800H

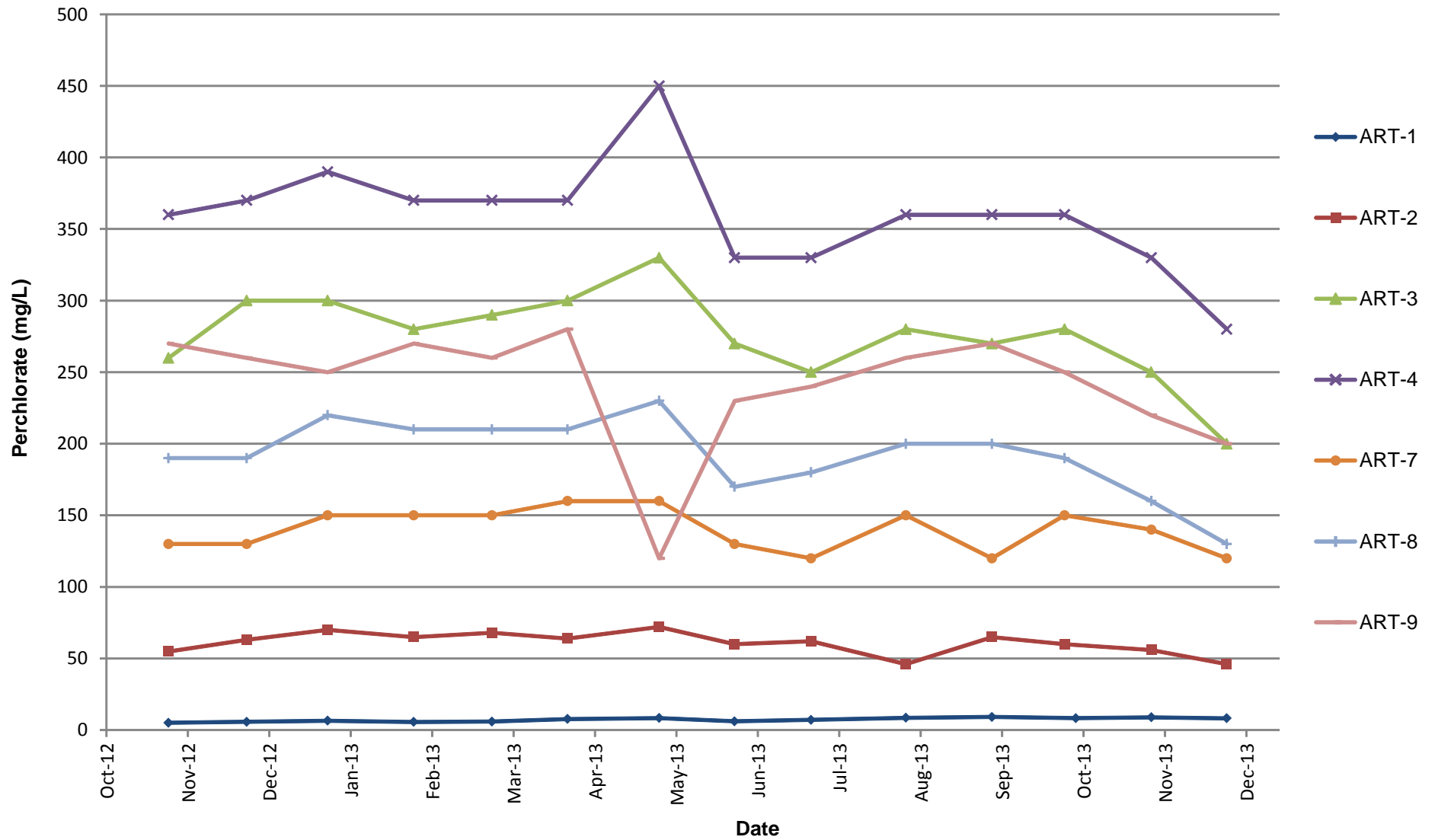
Approved:

Revised:



Athens Road Well Field Perchlorate Concentration Trends
 Nevada Environmental Response Trust Site
 Henderson, Nevada

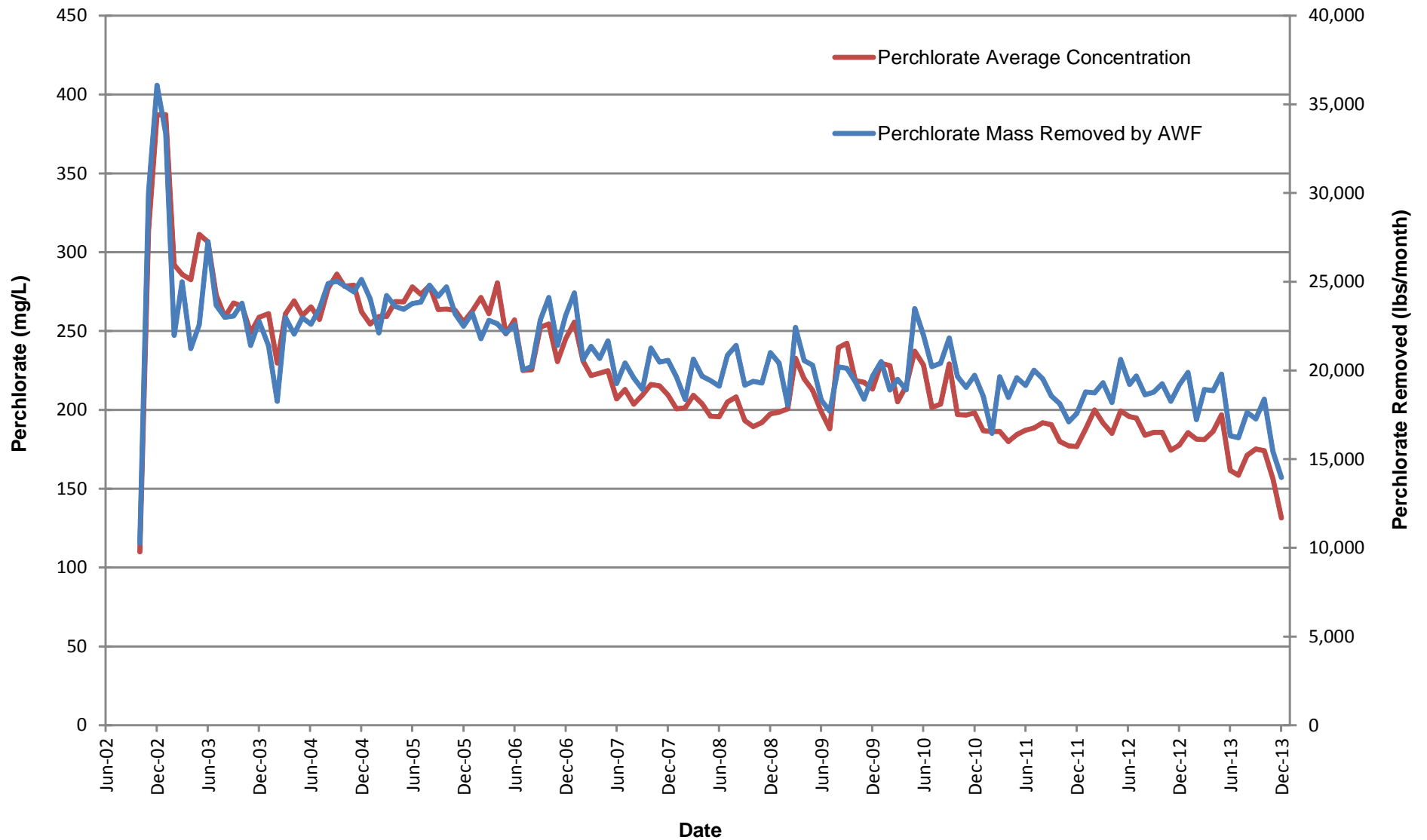
Figure



Athens Road Well Field Perchlorate Concentration Trends, November 2012 - December 2013
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

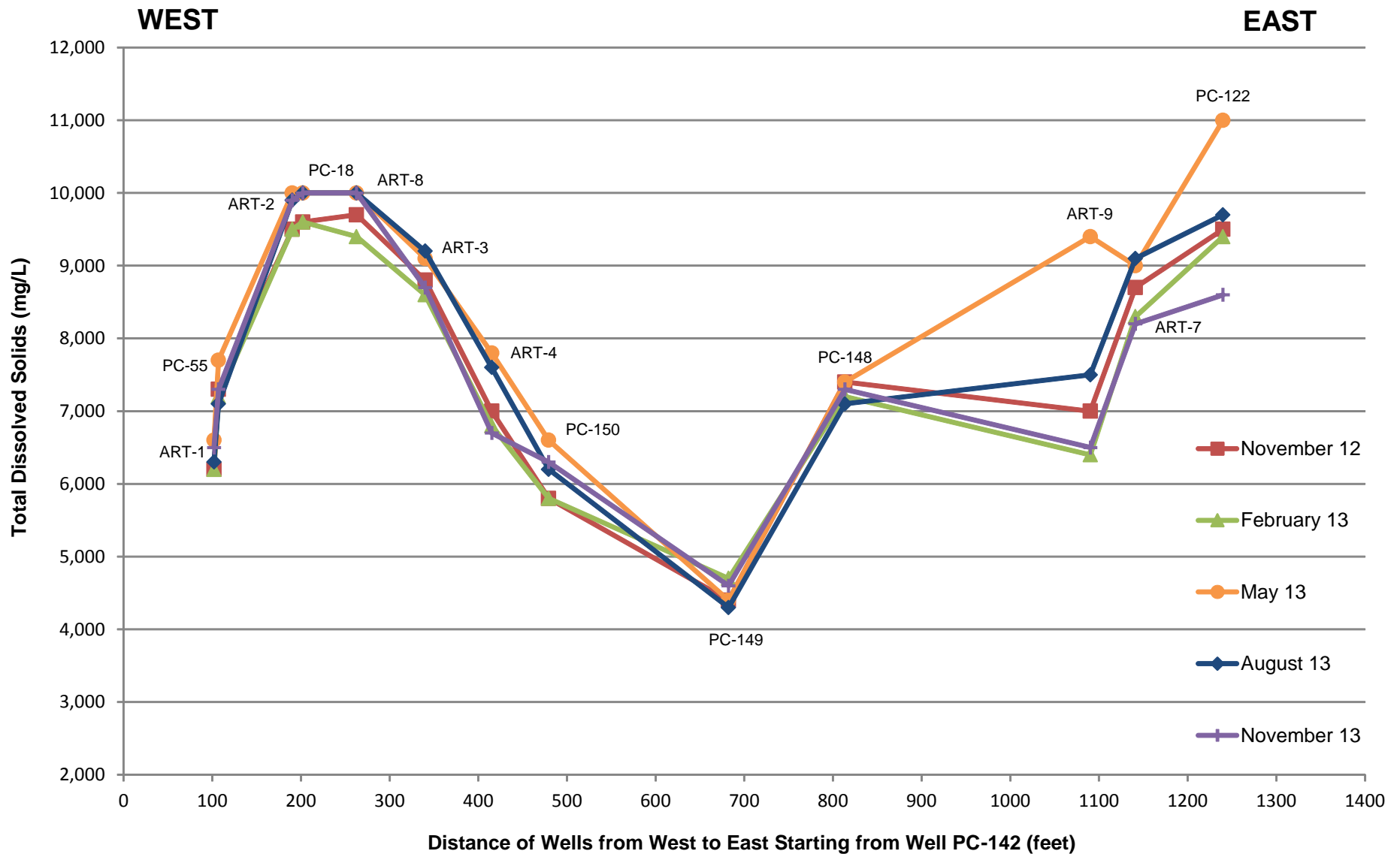
15a



Athens Road Well Field Average Perchlorate Concentration and Mass Removed
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

16



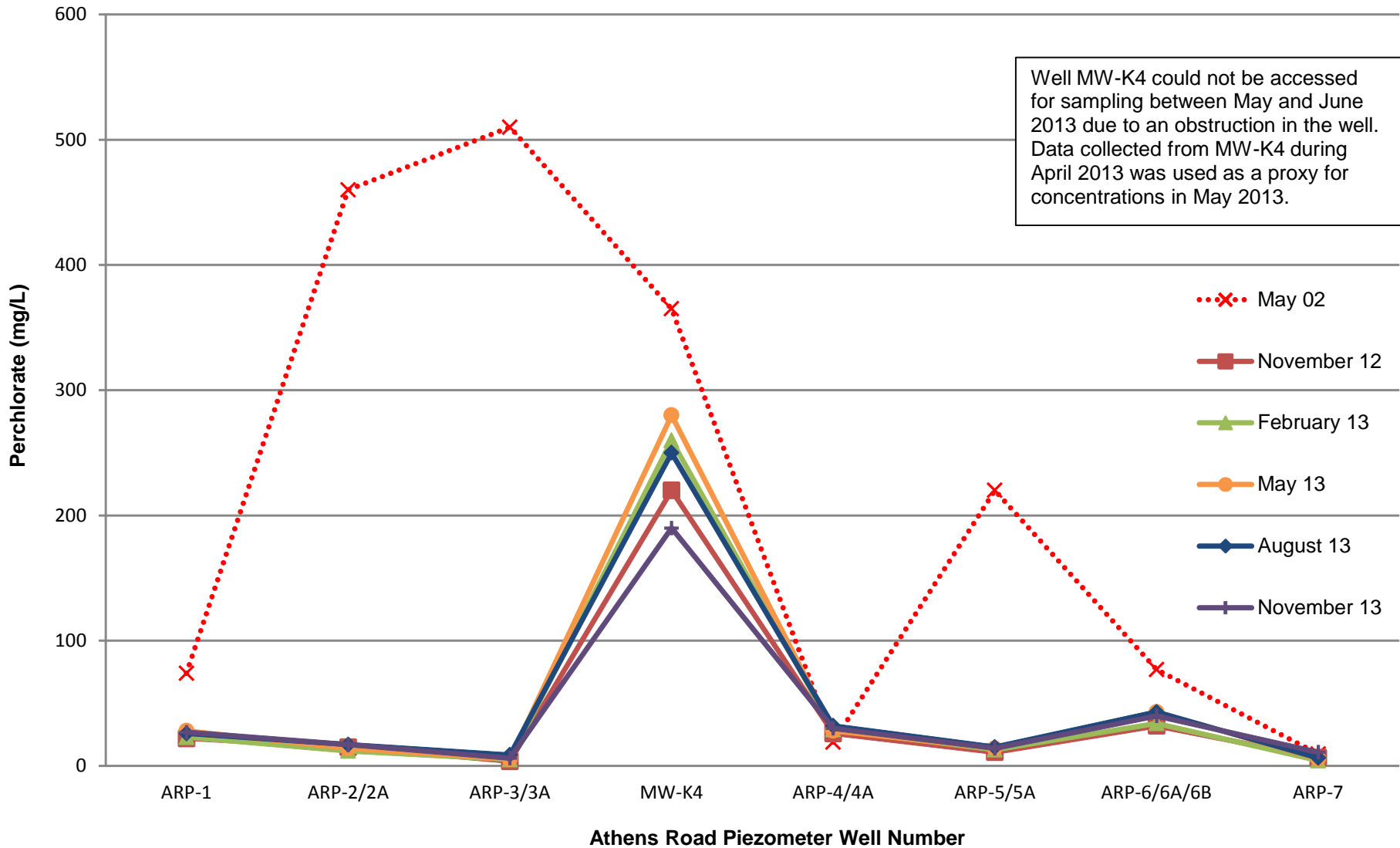
Athens Road Well Field Total Dissolved Solids Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

17

WEST

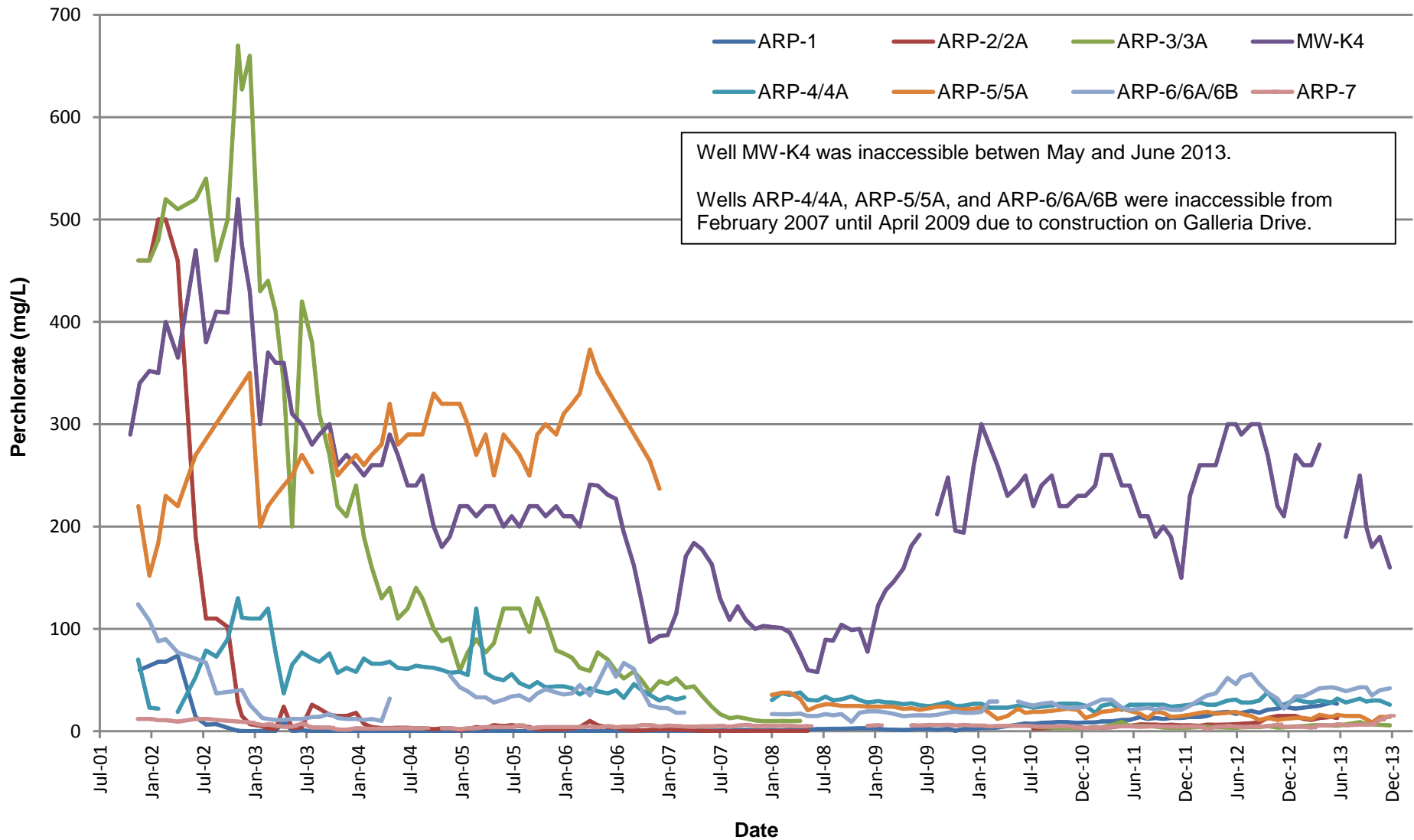
EAST



Athens Road Piezometer Well Line Perchlorate Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

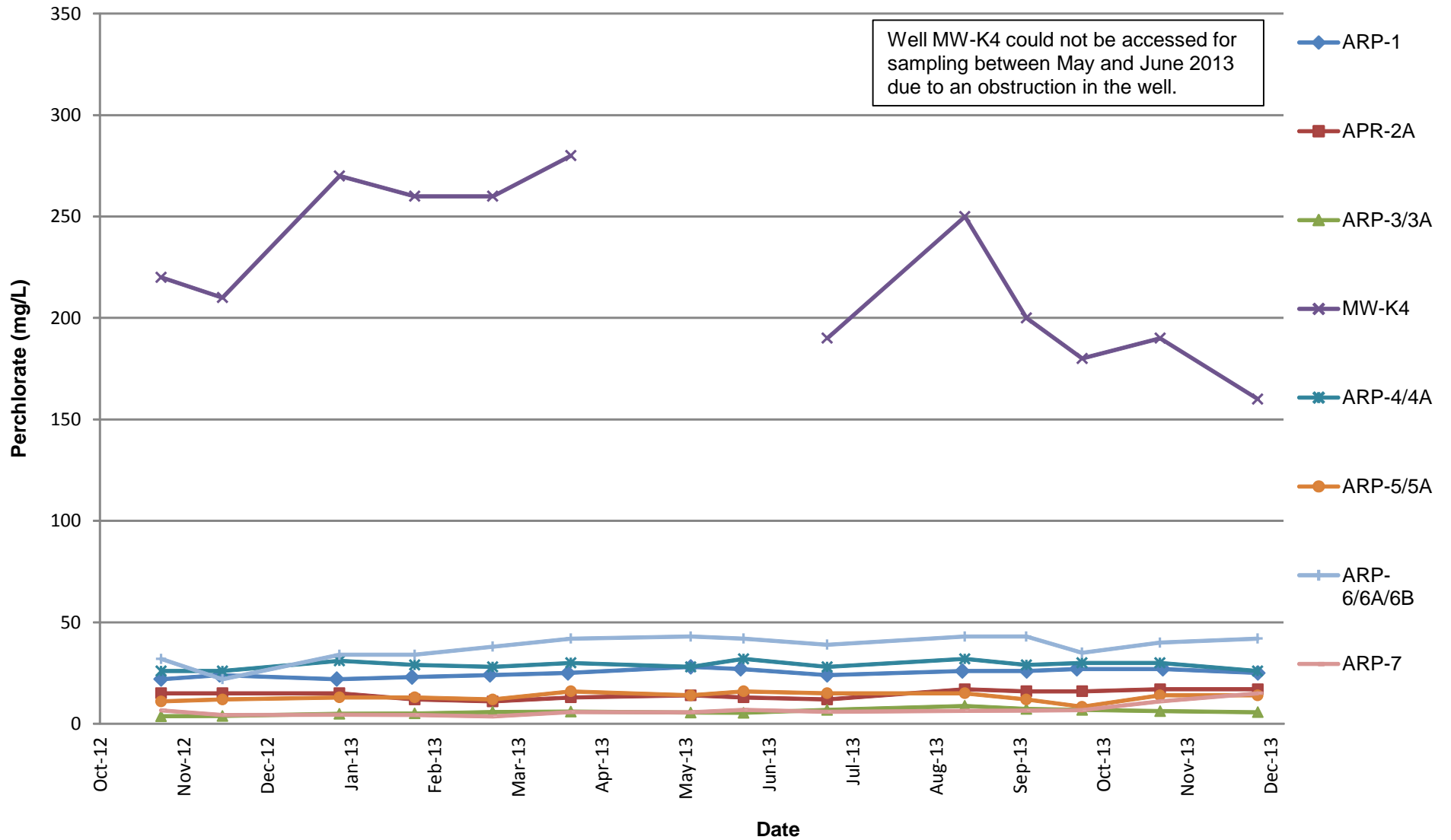
18



Athens Road Piezometer Well Line Perchlorate Concentration Trends
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

19



Athens Road Piezometer Well Line Perchlorate Concentration Trends, Nov 2012 - Dec 2013
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

19a

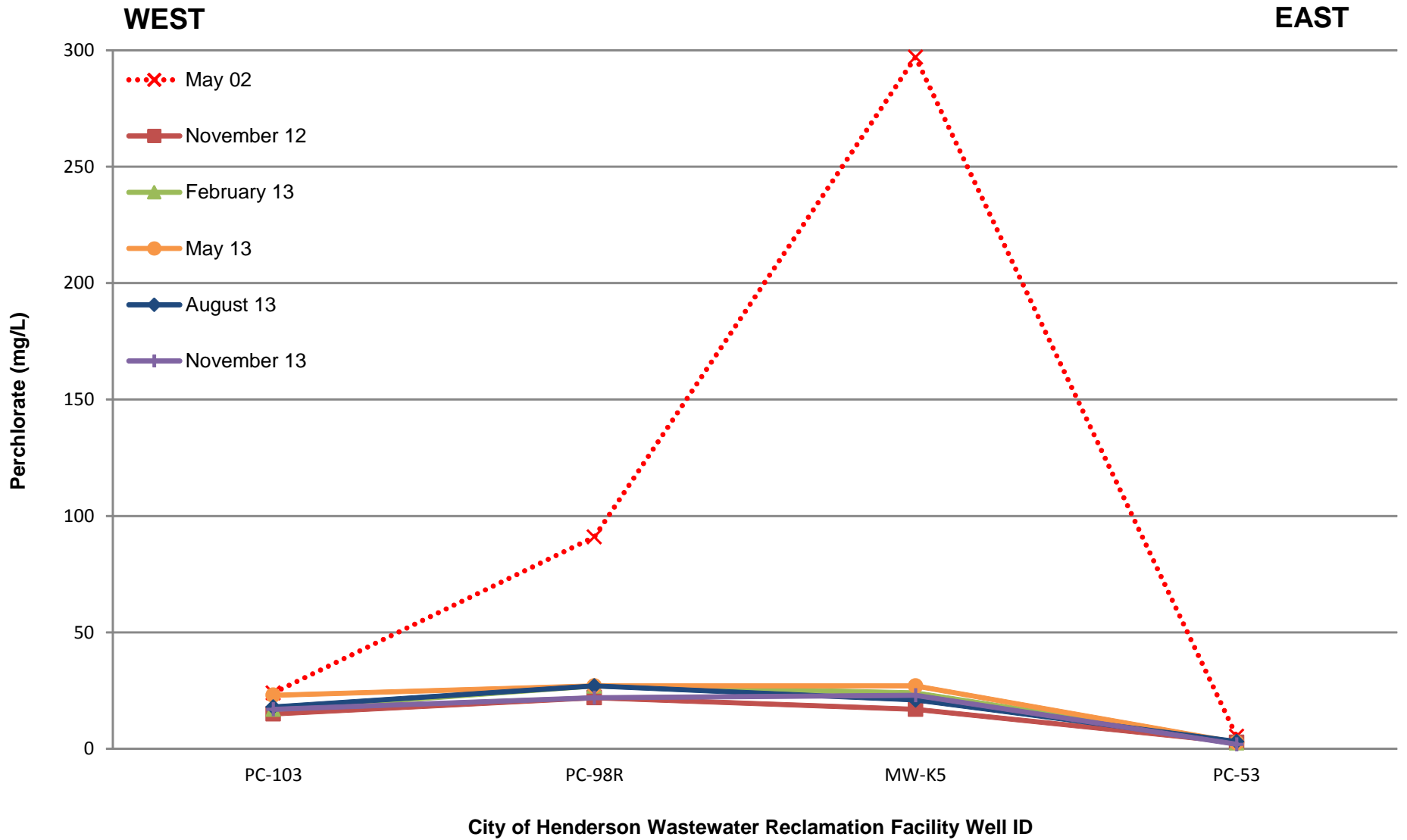
Drafter: RS

Date: 2/28/2014

Contract Number: 21-34800H

Approved:

Revised:



City of Henderson WRF Well Line Perchlorate Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

20

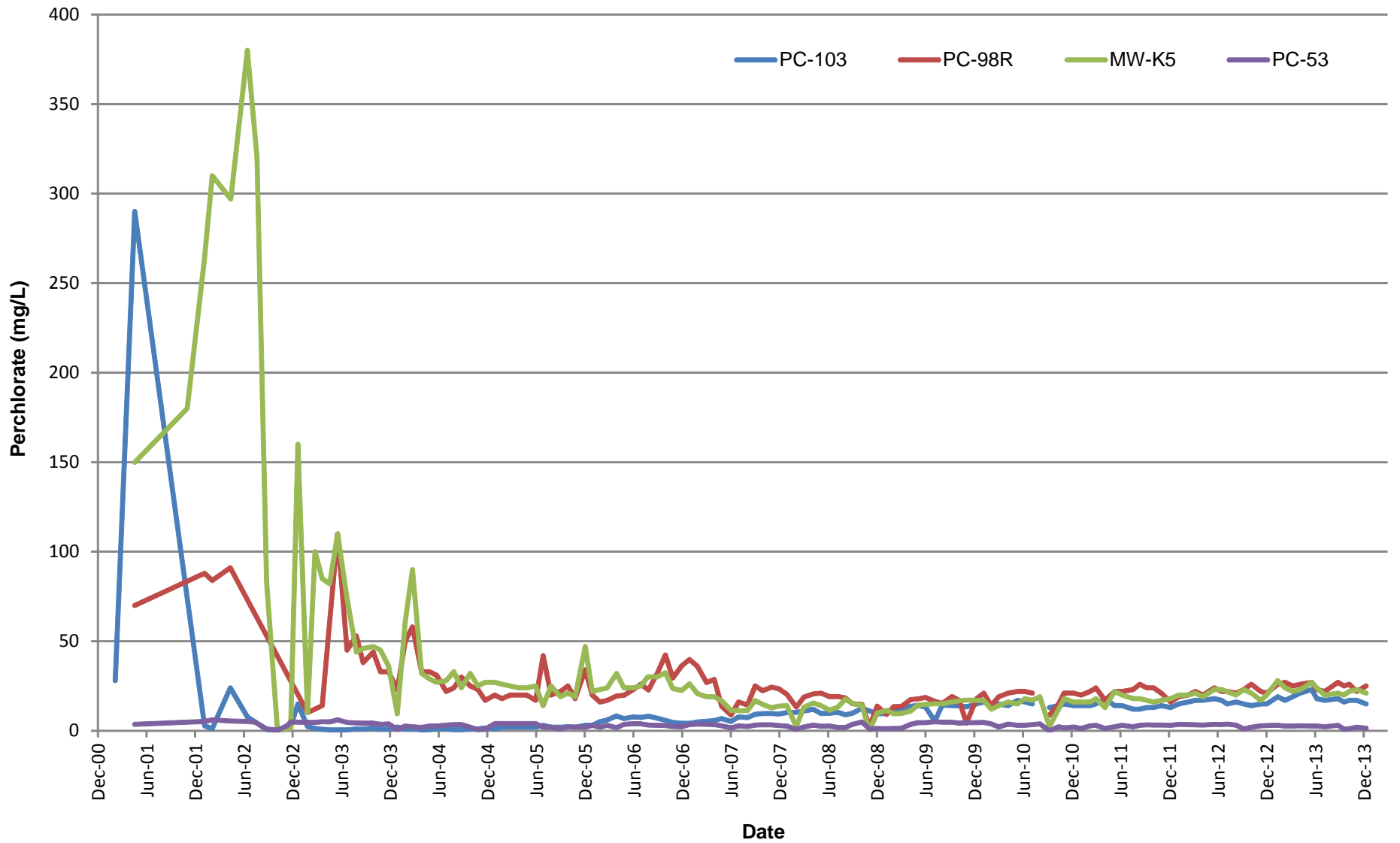
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Date: 2/28/2014

Contract Number: 21-34800H

Approved:

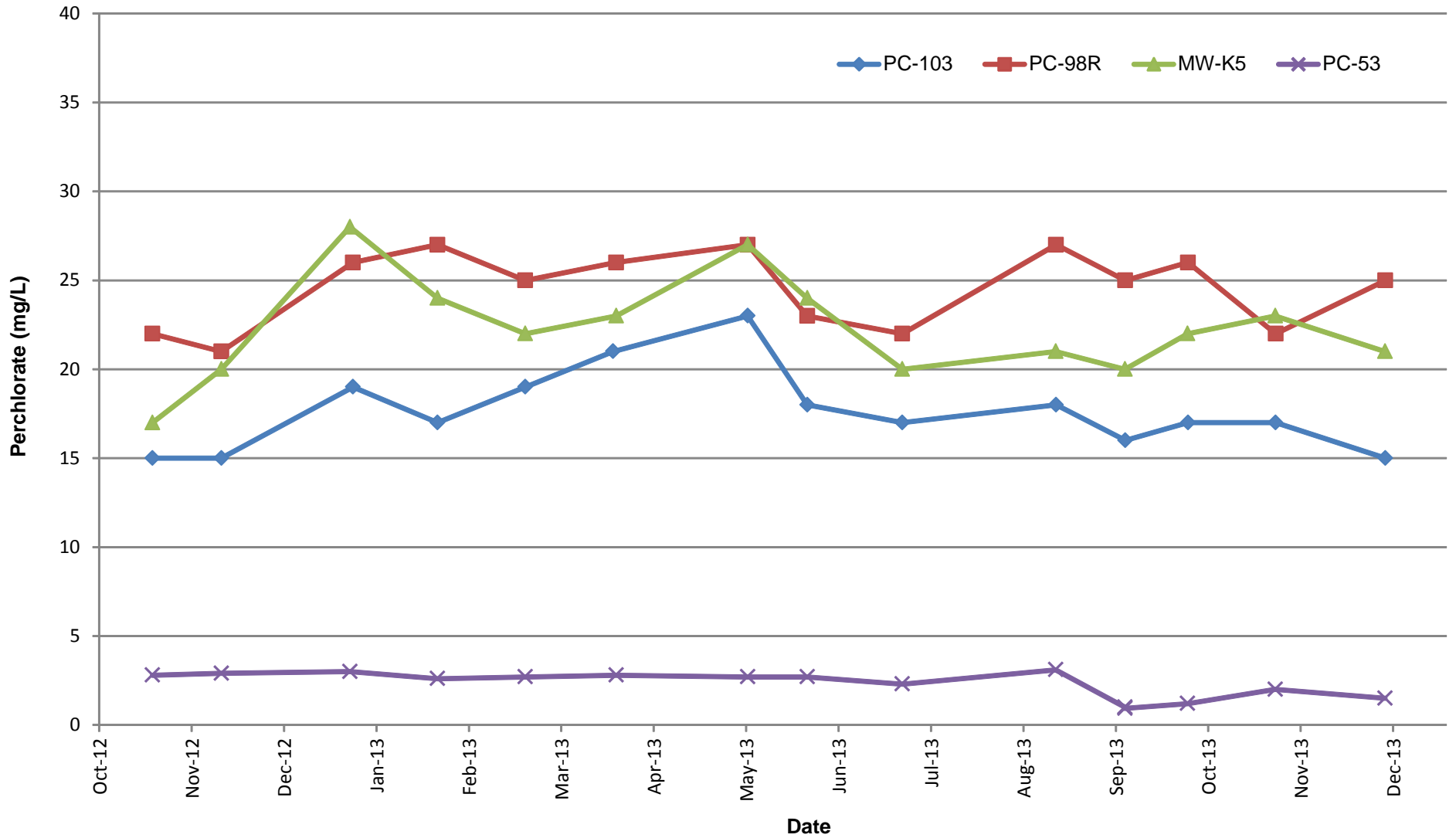
Revised:



City of Henderson WRF Well Line Perchlorate Concentration Trends
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

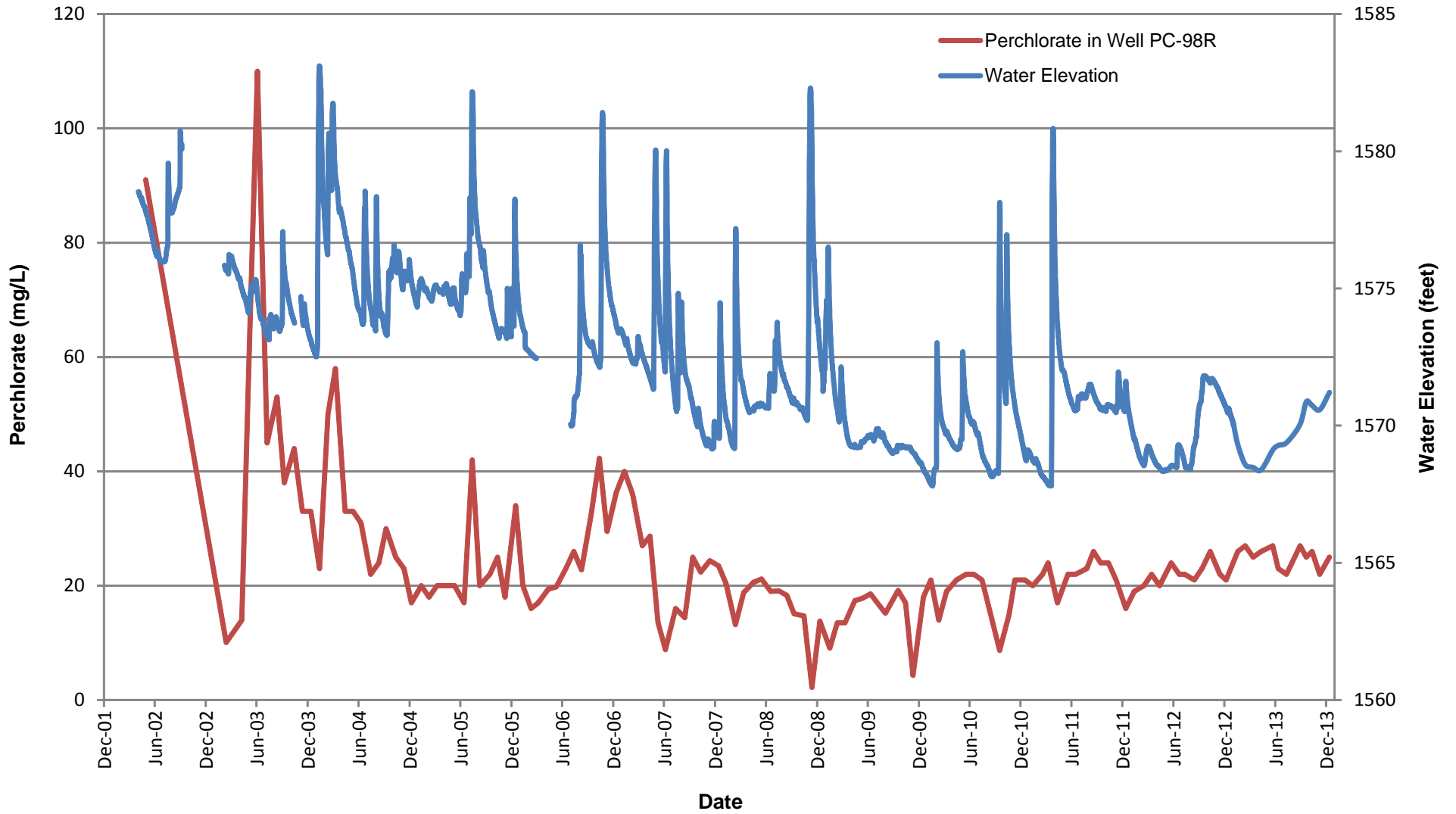
21



City of Henderson WRF Well Line Perchlorate Concentration Trends, Nov 2012 - Dec 2013
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

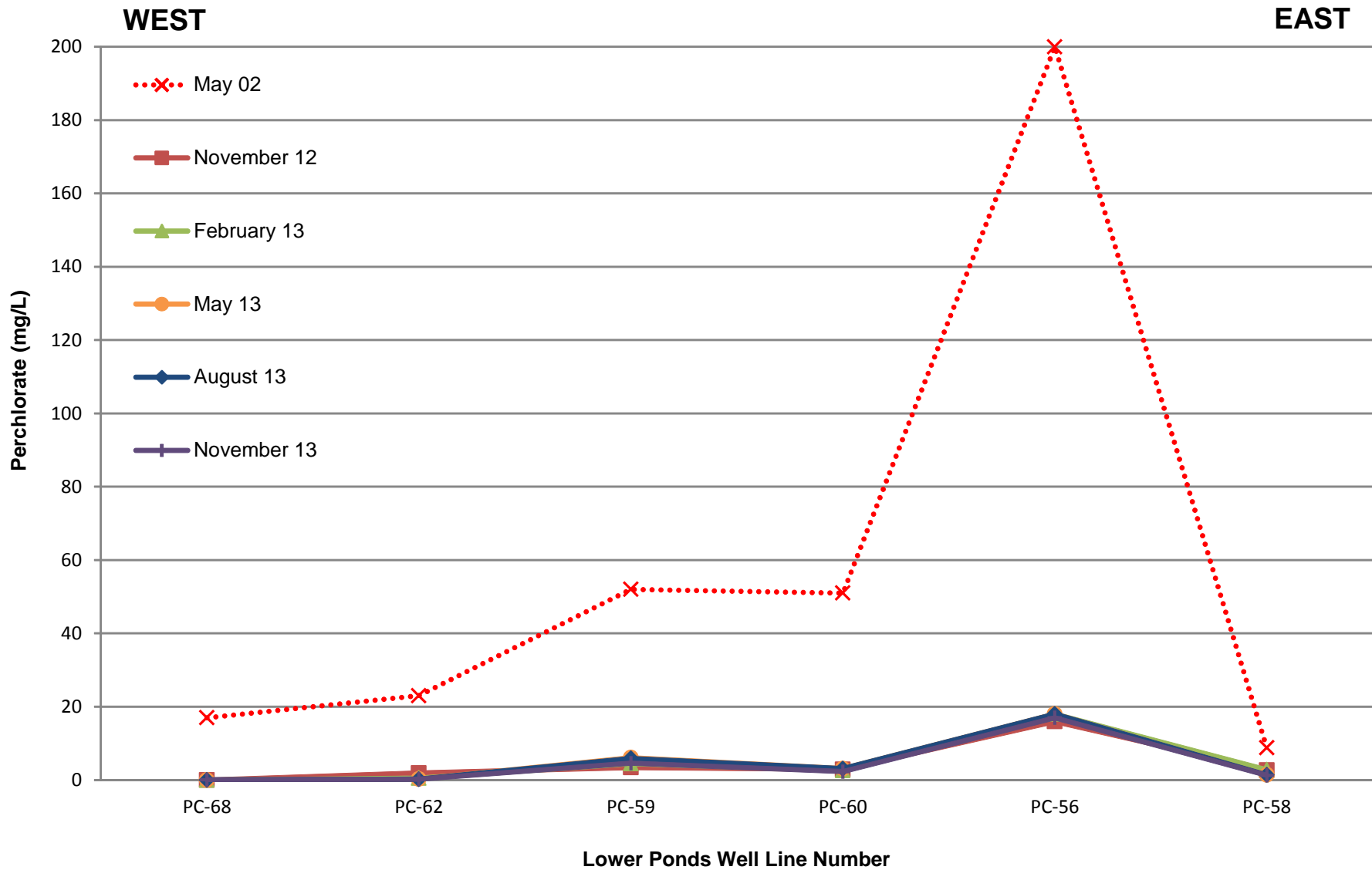
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Well PC-98R Perchlorate Concentration vs. Water Elevation Trends
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

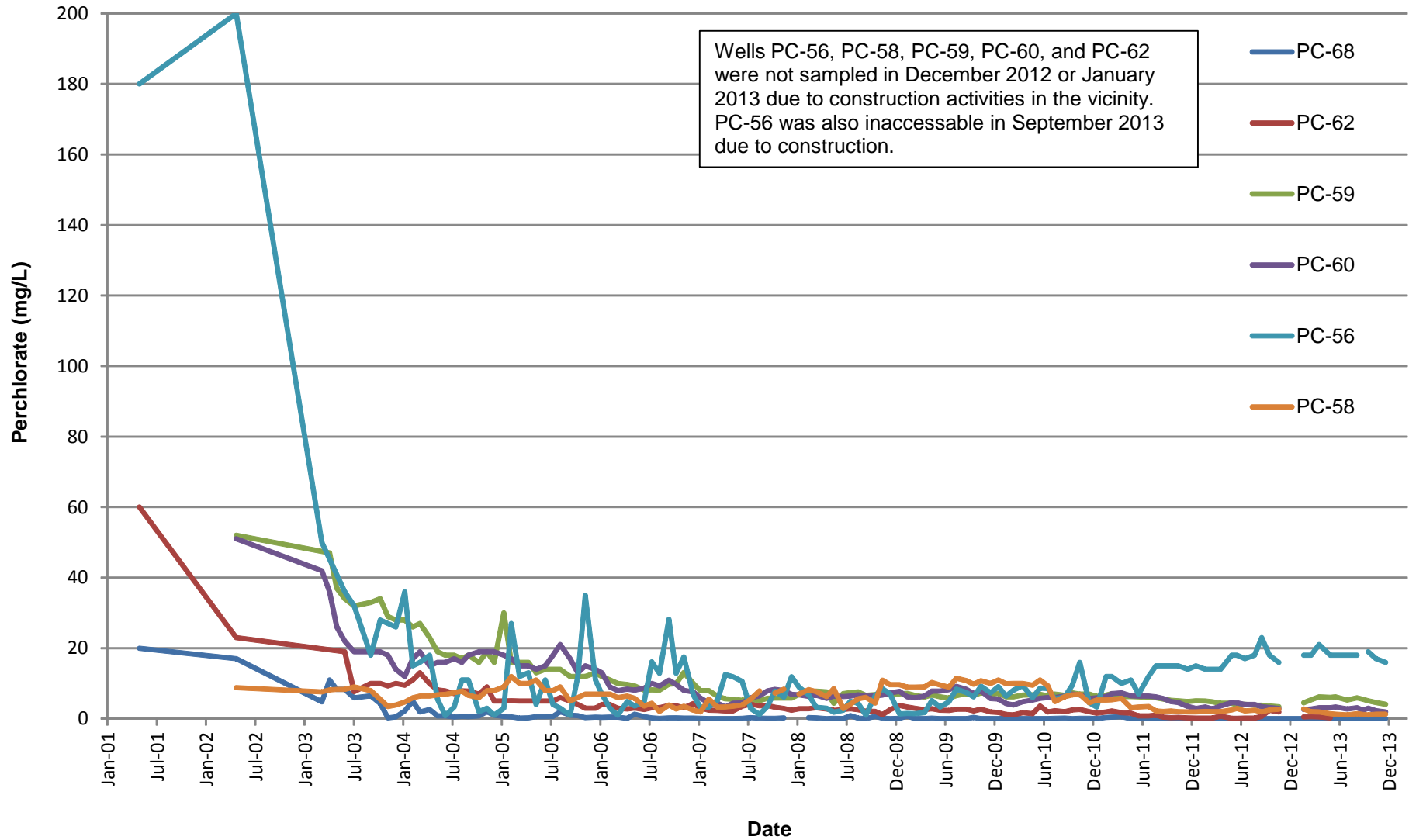
22



Lower Ponds Well Line Perchlorate Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

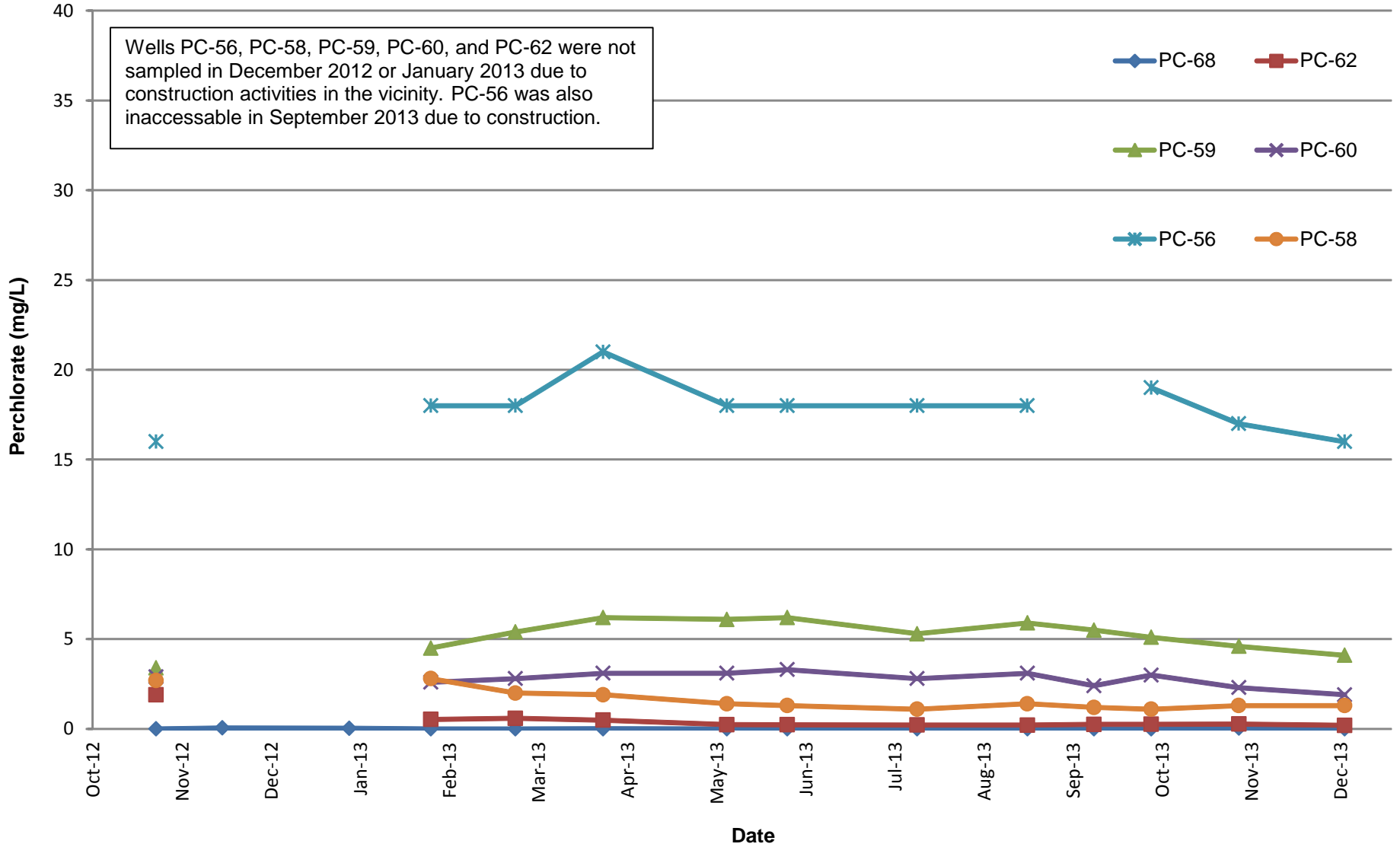
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Lower Ponds Well Line Perchlorate Concentration Trends
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

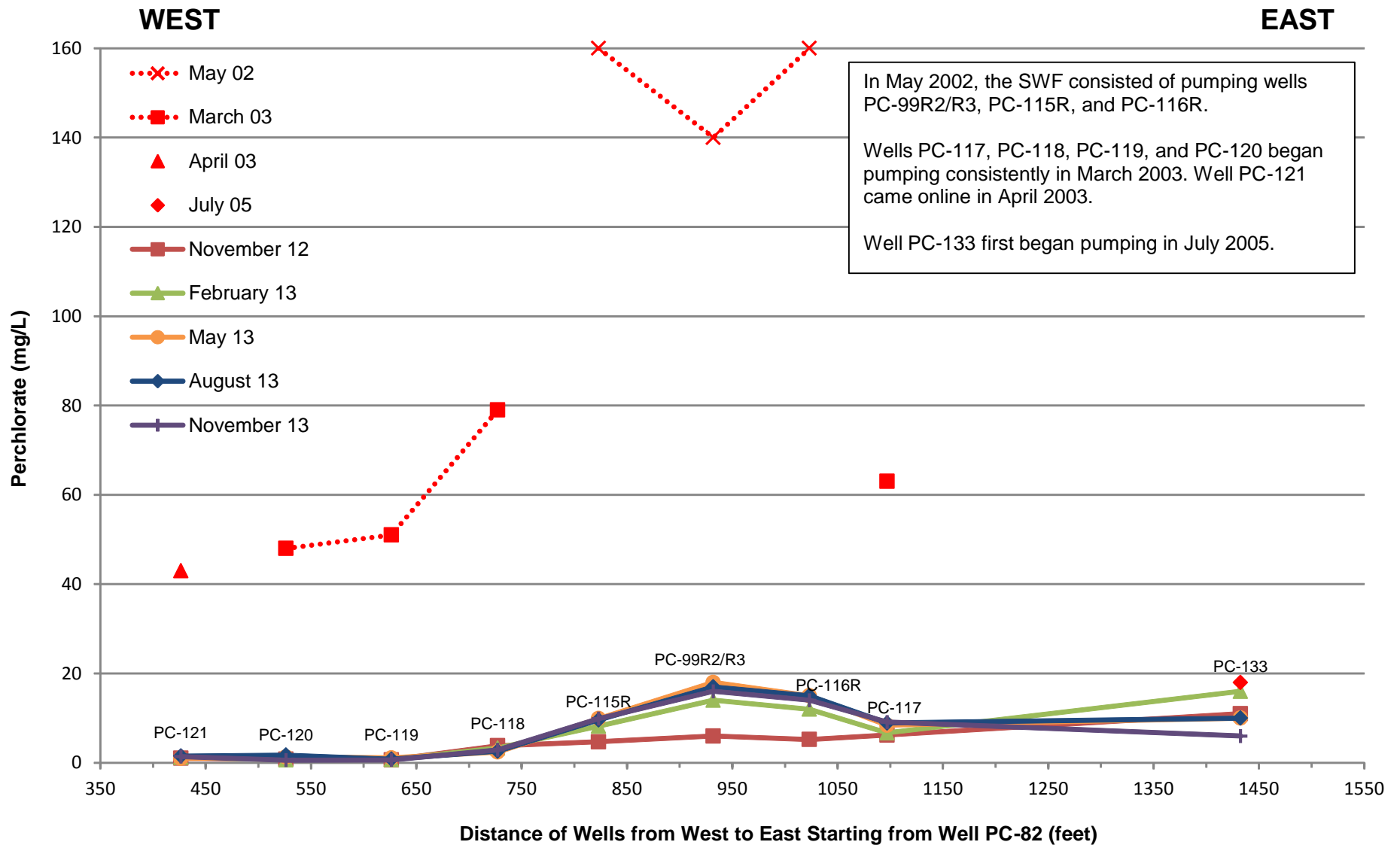
24



Lower Ponds Well Line Perchlorate Concentration Trends, Nov 2012 - Dec 2013
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

24a



Seep Well Field Perchlorate Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

25

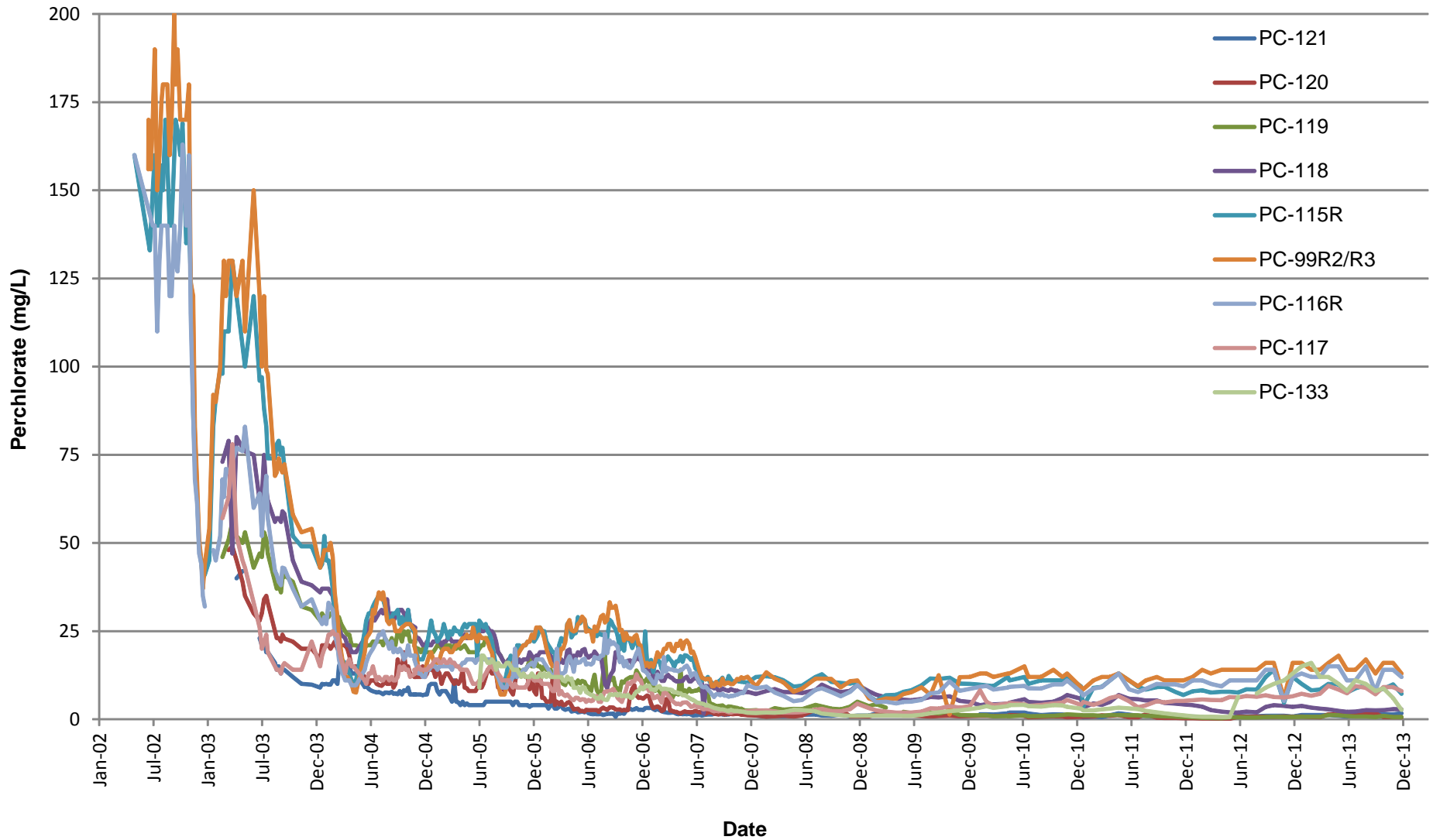
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Date: 2/28/2014

Contract Number: 21-34800H

Approved:

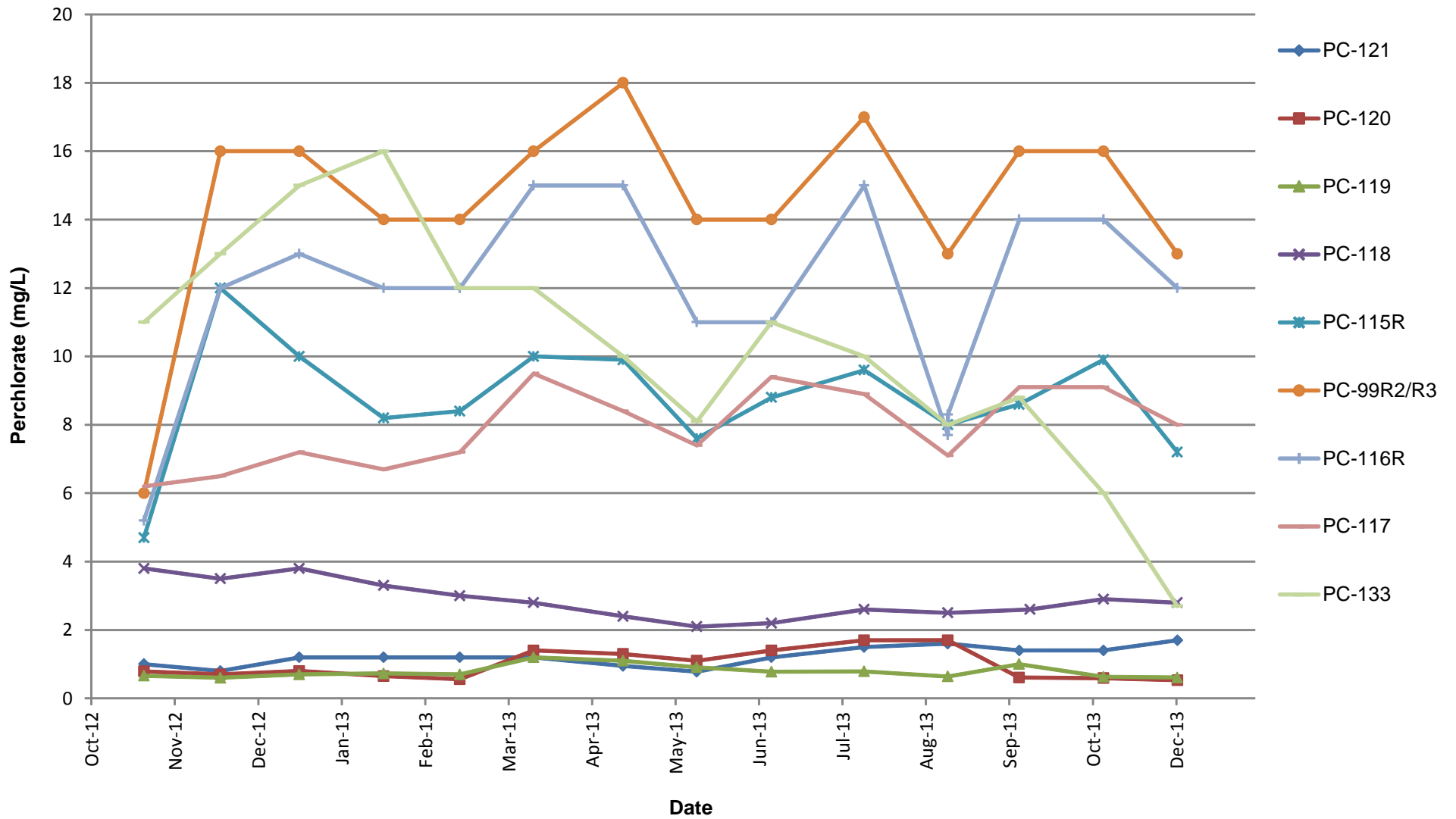
Revised:



Seep Well Field Perchlorate Concentration Trends
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure

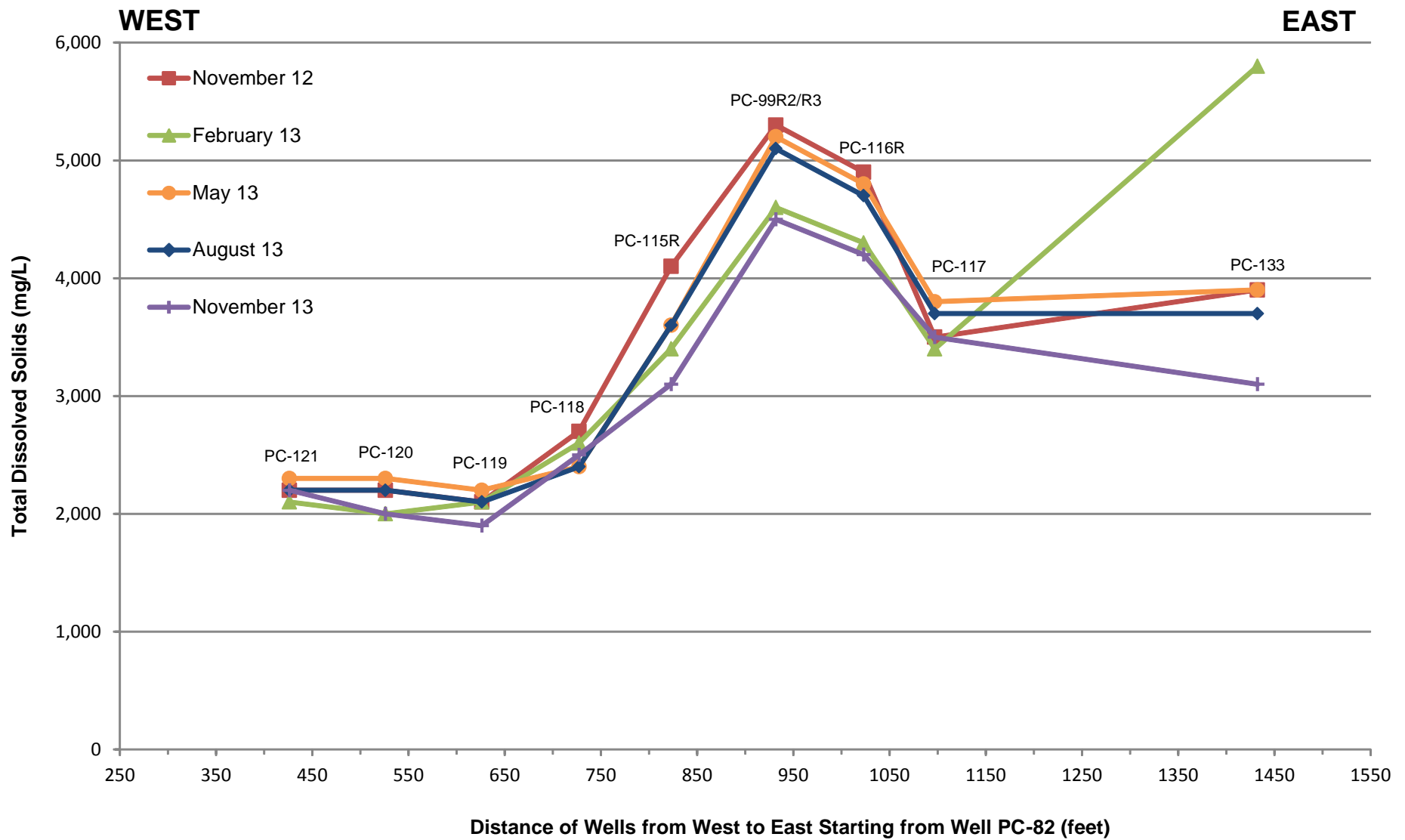
26



Seep Well Field Perchlorate Concentration Trends, November 2012- December 2013
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

26a



Seep Well Field Total Dissolved Solids Concentrations
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure

27

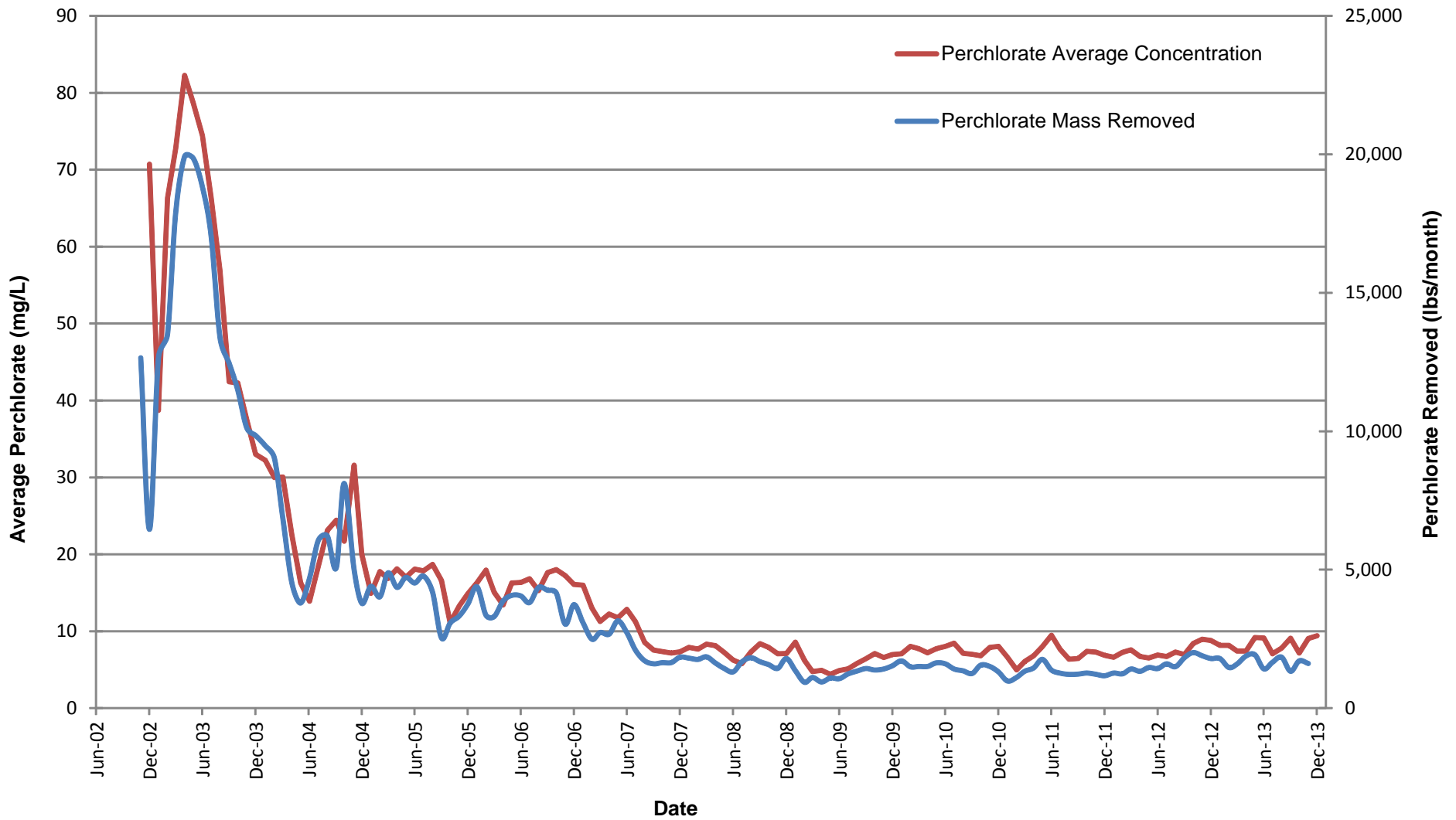
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Date: 2/28/2014

Contract Number: 21-34800H

Approved:

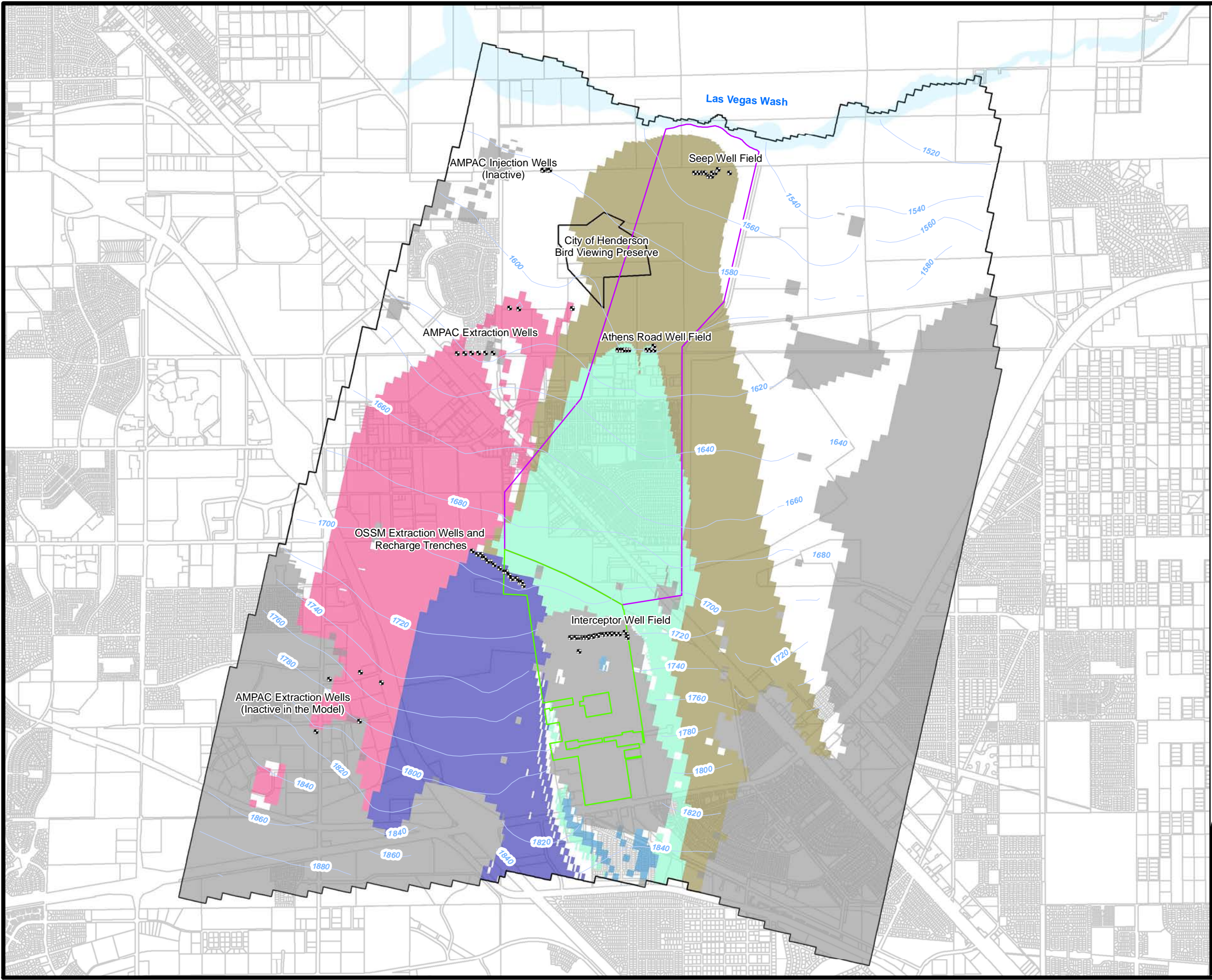
Revised:



Seep Well Field Average Perchlorate Concentration and Mass Removed
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Figure
28

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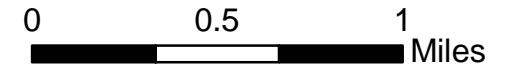
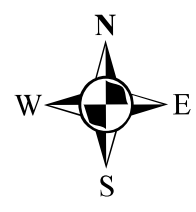
EXPLANATION

- ✦ Extraction Wells
- Simulated heads (ft msl)
- Las Vegas Wash Area
- Dry Zone
- Site Boundary
- Downgradient Plume Area

Capture Zone

- Interceptor Well Field
- Athens Well Field
- Seep Well Field
- OSSM Well Field
- AMPAC Well Field

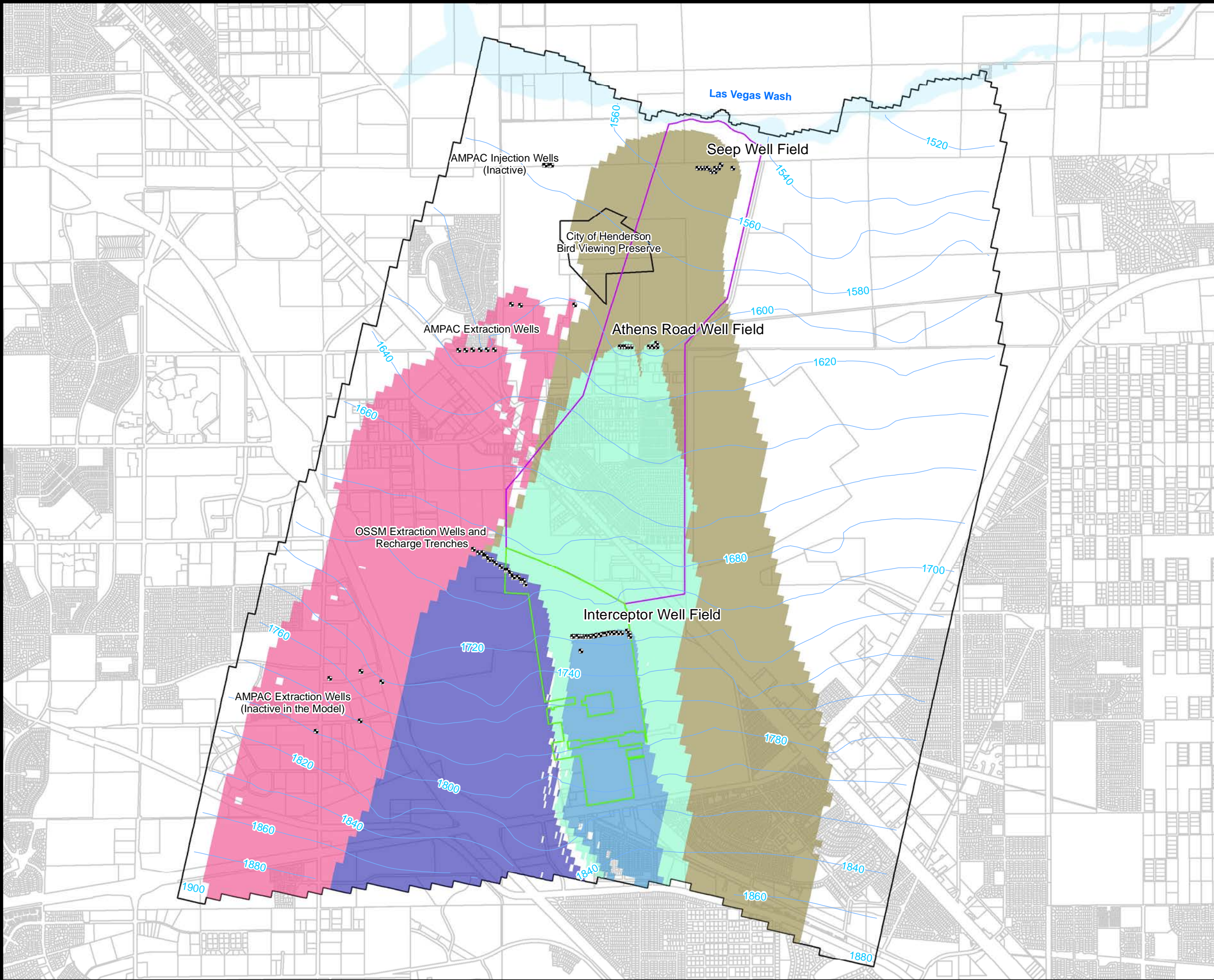
NERT = Nevada Environmental Response Trust
 AMPAC = American Pacific Corporation
 OSSM = Olin/Stauffer/Syngenta/Montrose



Capture Zones - Alluvium
 Nevada Environmental Response Trust Site
 Henderson, Nevada

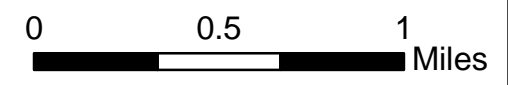
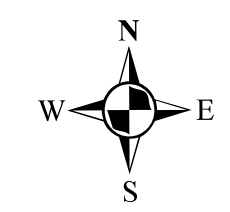
Date: 2/28/2014	Contract Number: 21-34800H	Figure
Drafter: AS	Approved:	Revised:

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- EXPLANATION**
- ✱ Extraction Wells
 - Simulated heads (ft msl)
 - Las Vegas Wash Area
 - Site Boundary
 - Downgradient Plume Area
- Capture Zone**
- Interceptor Well Field
 - Athens Well Field
 - Seep Well Field
 - OSSM Well Field
 - AMPAC Well Field
 - Model Boundary

NERT = Nevada Environmental Response Trust
 AMPAC = American Pacific Corporation
 OSSM = Olin/Stauffer/Syngenta/Montrose

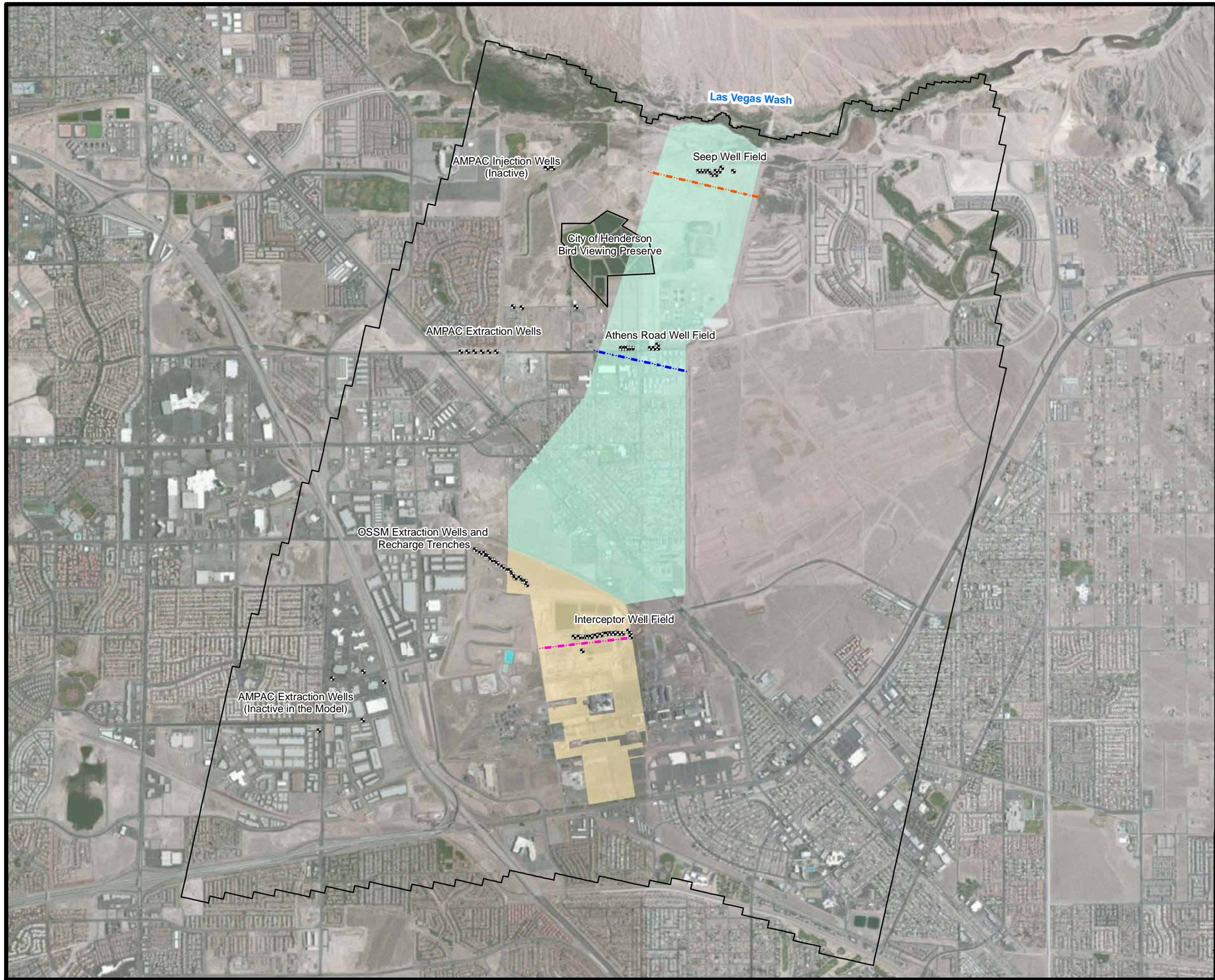


Capture Zones - UMCf
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Date: 2/28/2014	Contract Number: 21-34800H	Figure
Drafter: AS	Approved:	Revised:

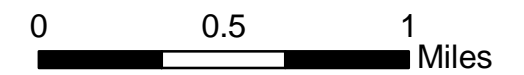
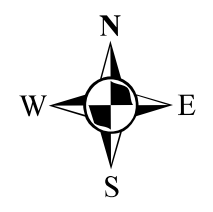
29b

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EXPLANATION

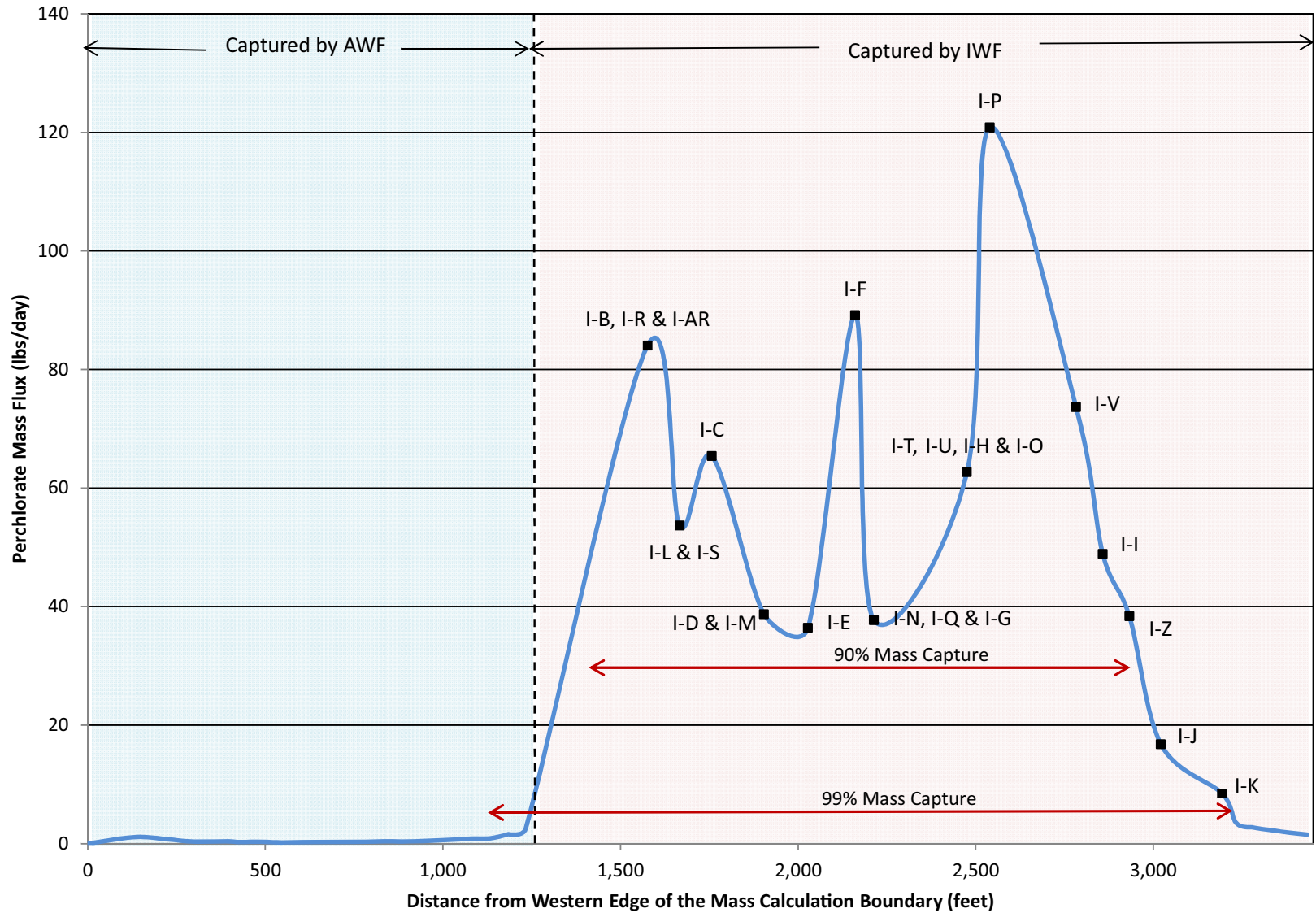
- ✦ Extraction Wells
- Transect - Interceptor Well Field
- Transect - Athens Road Well Field
- Transect - Seep Well Field
- ▭ Model Boundary
- ▭ Site Boundary
- ▭ Downgradient Plume



Mass Flux Transect Location
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Date: 2/28/2014	Contract Number: 21-34800H	Figure
Drafter: AS	Approved:	Revised:

30a



Perchlorate Mass Flux at Interceptor Well Field
 Nevada Environmental Response Trust (NERT) Site
 Henderson, Nevada

Figure

30b

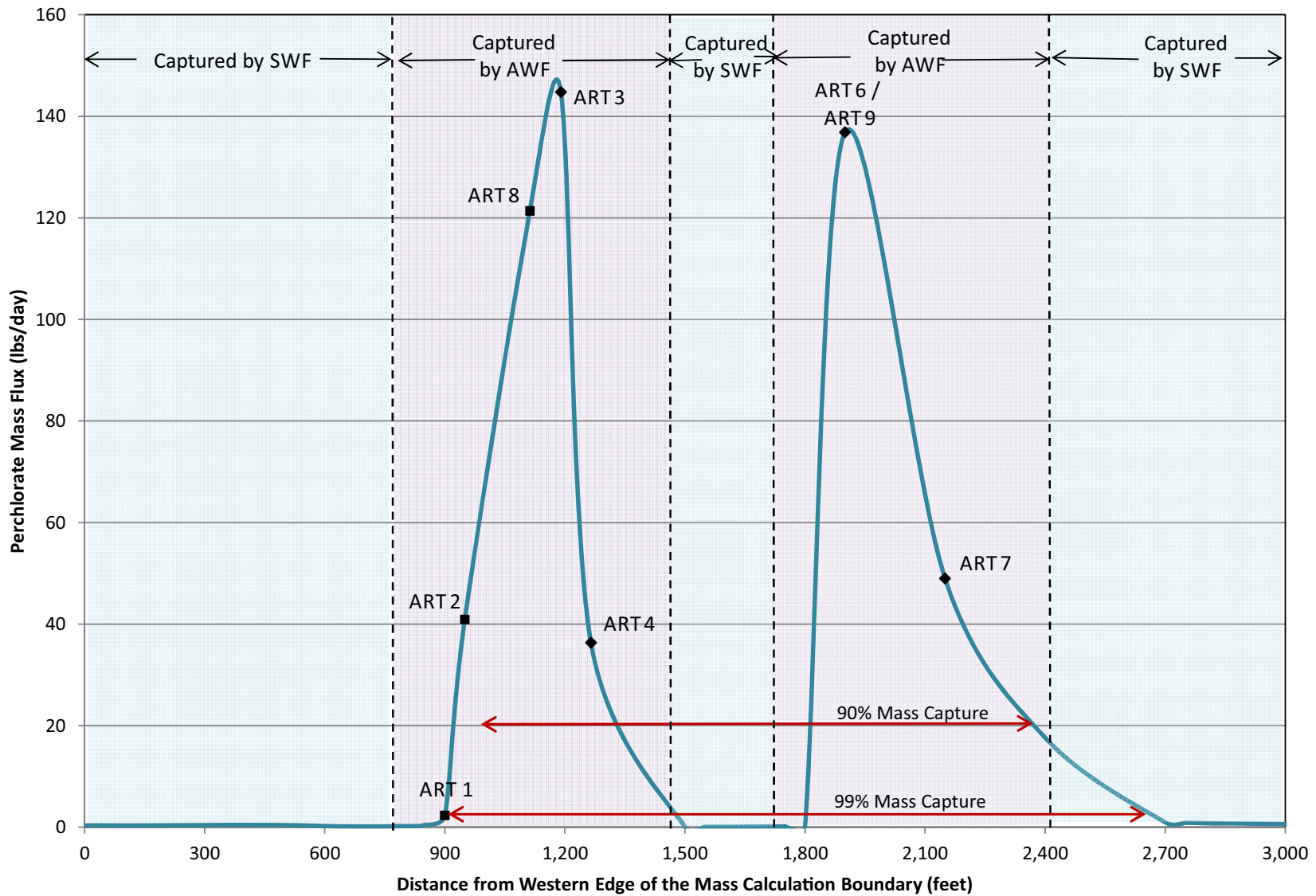
Drafter: RS

Date: 2/10/14

Contract Number: 21-34800H

Approved:

Revised:



Perchlorate Mass Flux at Athens Well Field
 Nevada Environmental Response Trust (NERT) Site
 Henderson, Nevada

Figure

30c

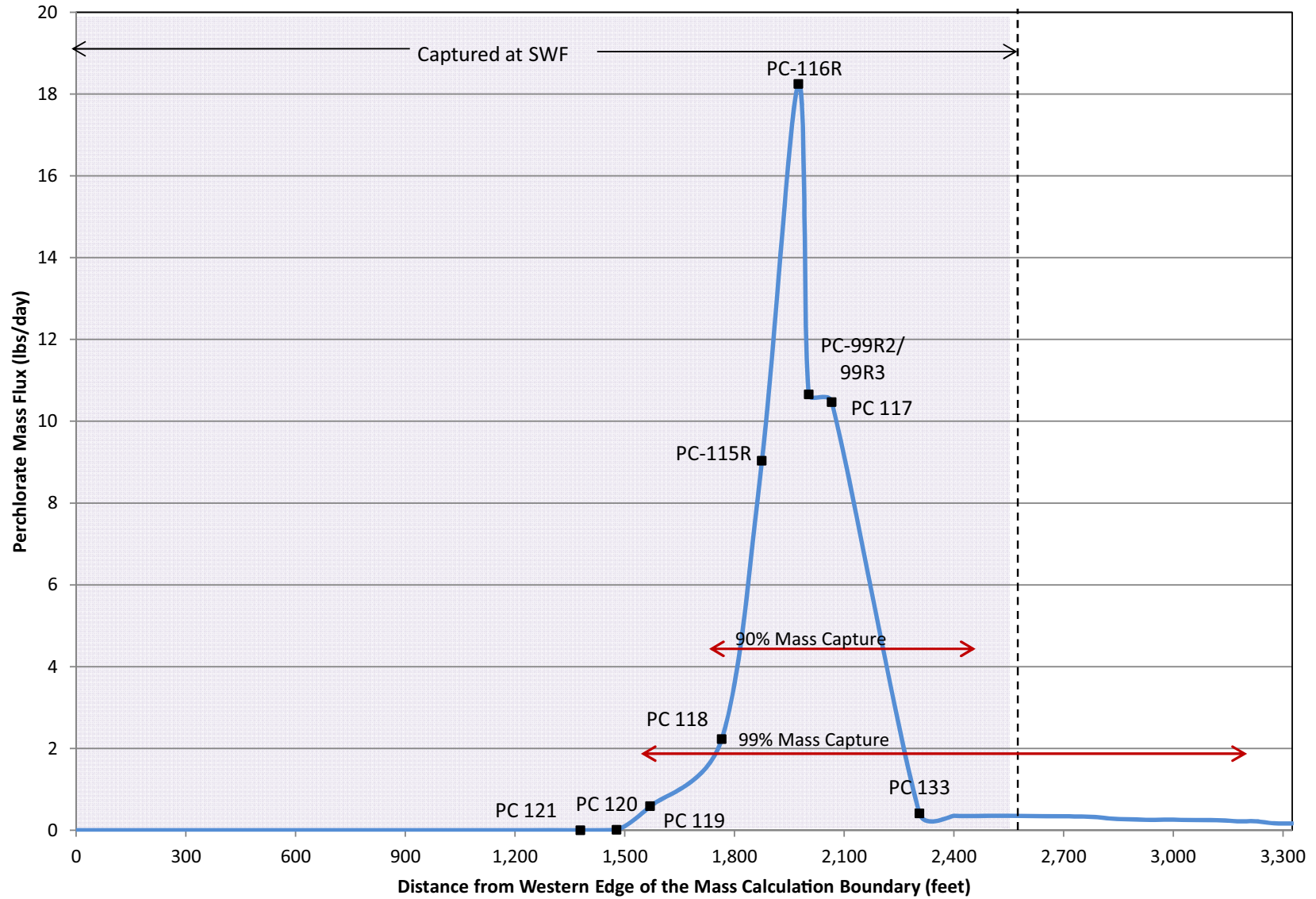
Drafter: RS

Date: 2/10/14

Contract Number: 21-34800H

Approved:

Revised:



Perchlorate Mass Flux at Seep Well Field
 Nevada Environmental Response Trust (NERT) Site
 Henderson, Nevada

Figure

30d

Drafter: RS

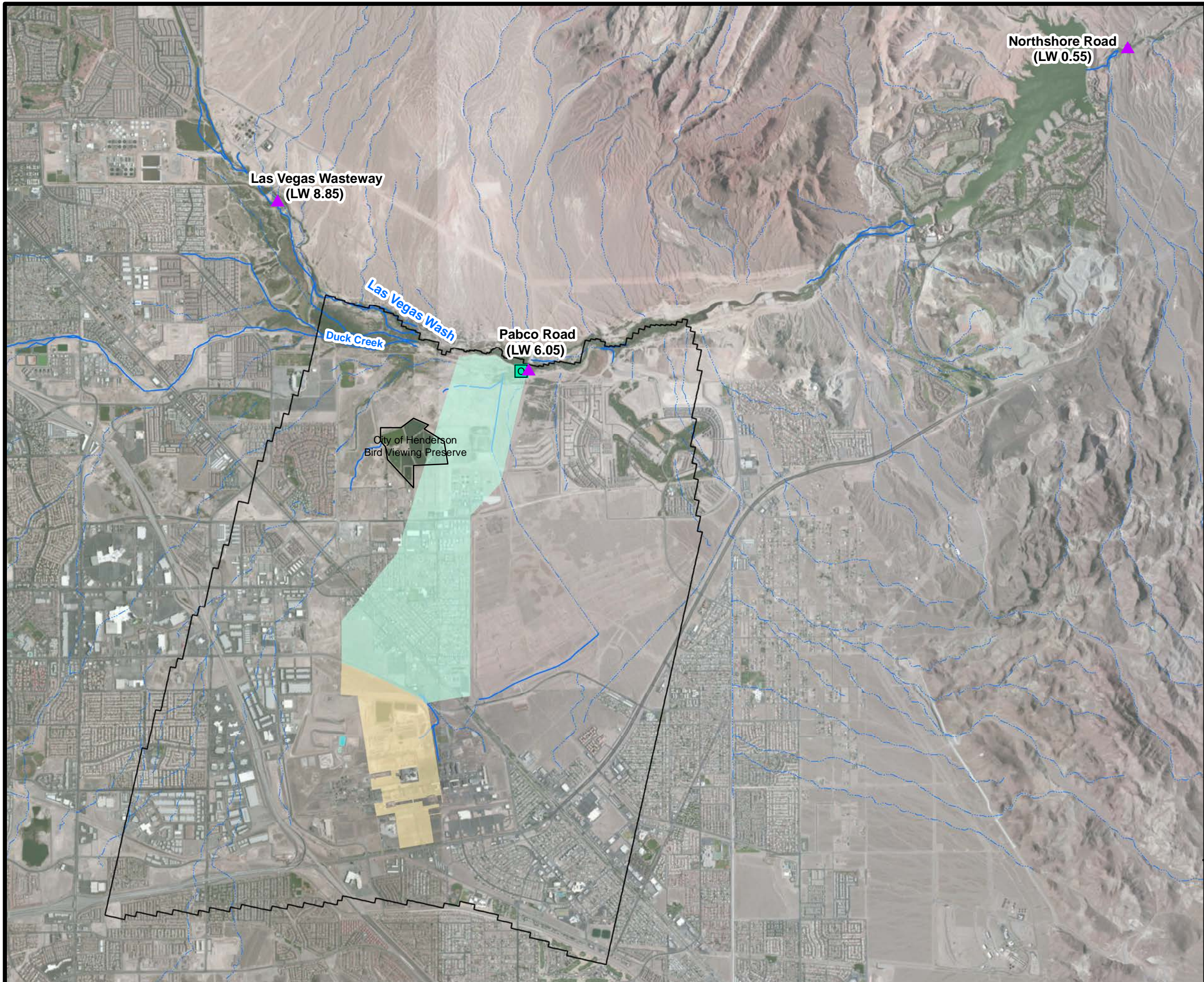
Date: 2/10/14

Contract Number: 21-34800H






Approved:

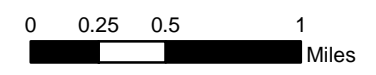
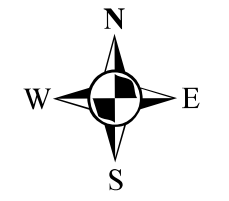
Revised:

Path: H:\LePeromani\NERT\Modelling\Semi-Annual Report 2013\GWETS Performance\GIS\Fig 31a-Las Vegas wash Sampling Location.mxd



Legend

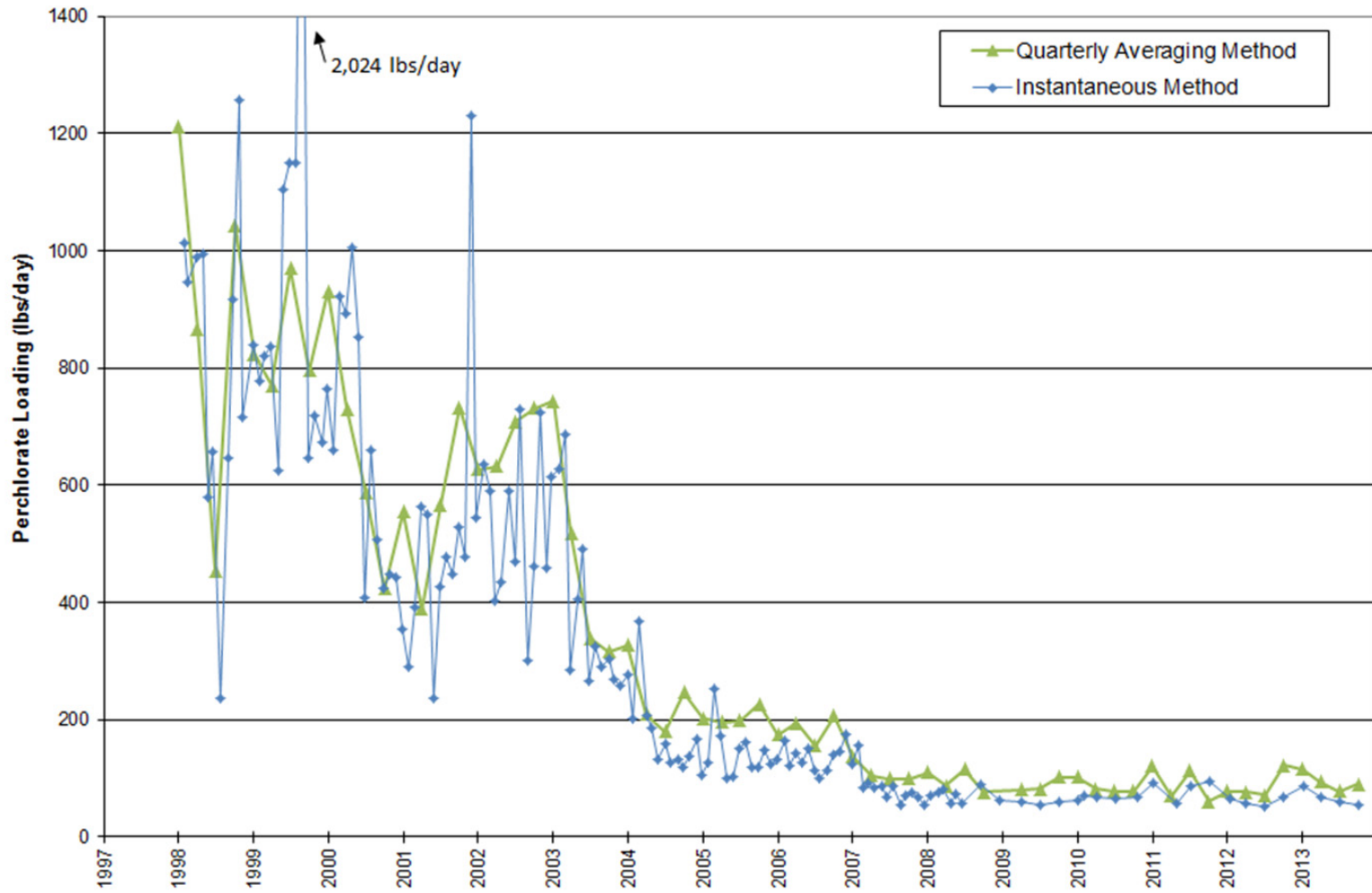
-  USGS Stream Gauge Station
-  NERT/AMPAC/TIMET Outfall Location
-  Site Boundary
-  Downgradient Plume
-  Model Boundary



Sampling Locations in Las Vegas Wash

Nevada Environmental Response Trust Site
Henderson, Nevada

Date: 2/28/2014	Contract Number: 21-34800H	Figure
Drafter: AS	Approved:	Revised:



Historical Perchlorate Loading in the Las Vegas Wash at Northshore Road
Nevada Environmental Response Trust (NERT) Site
Henderson, Nevada

Figure

31b

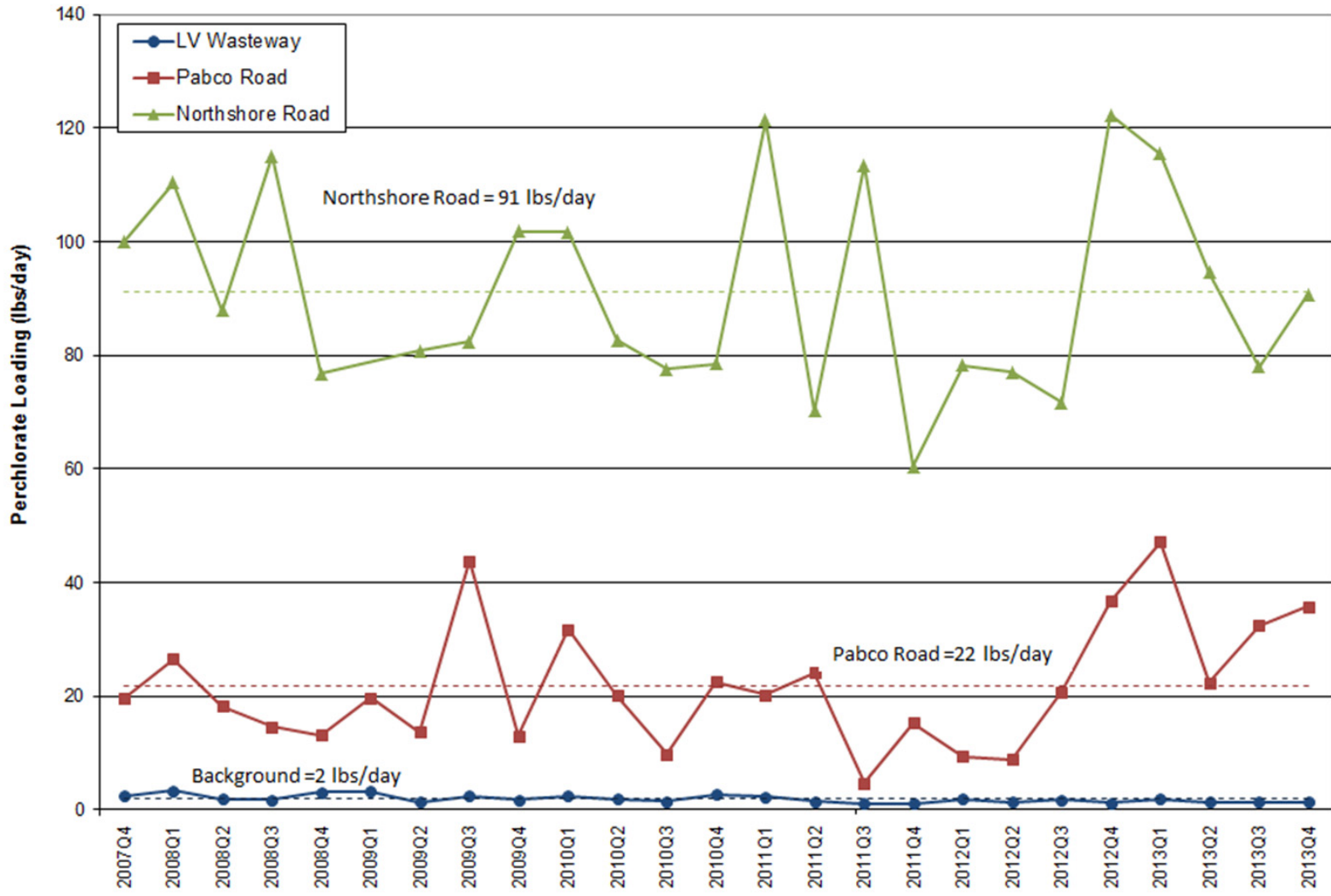
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Date: 2/28/2014

Contract Number: 21-34800H

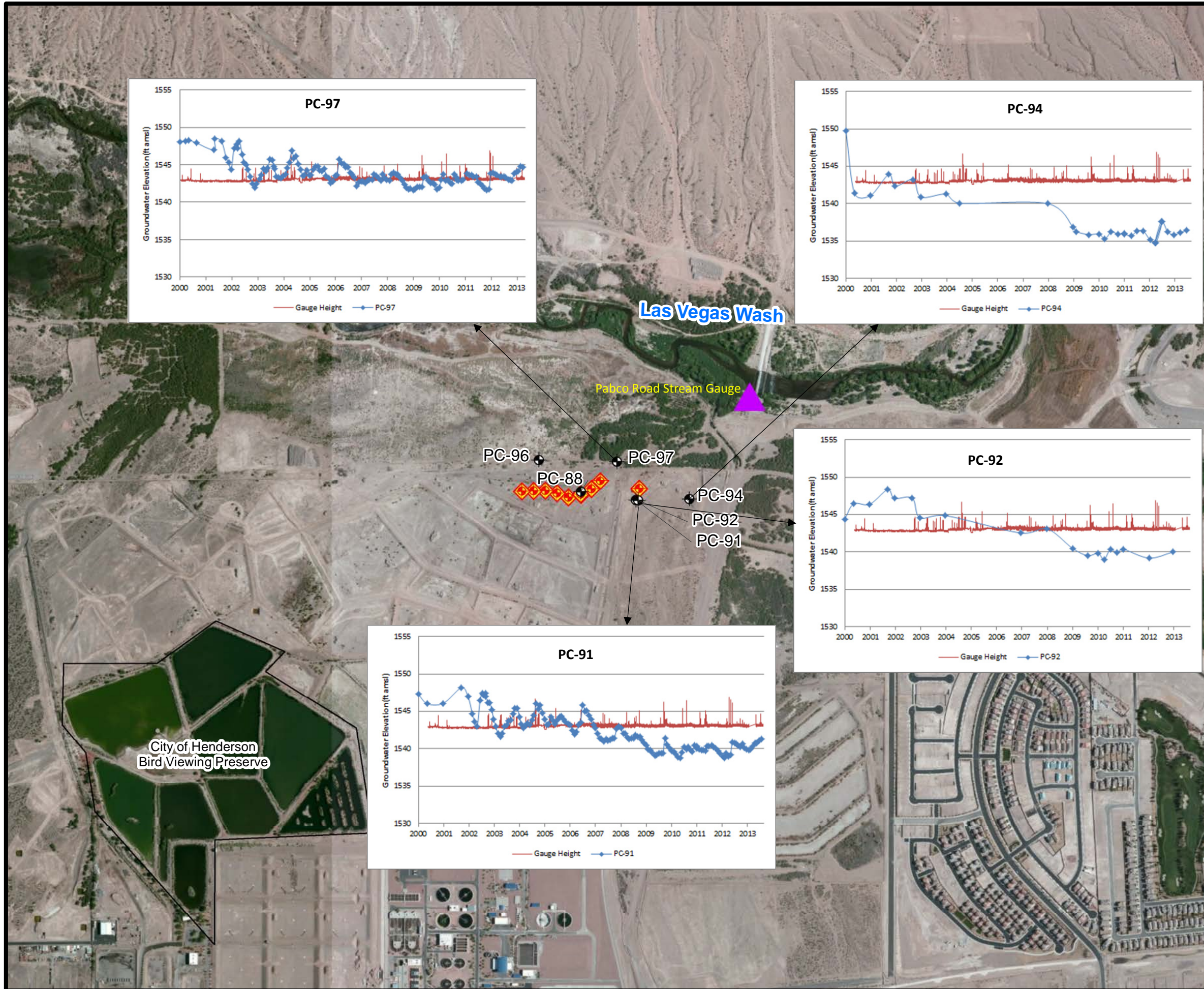
Approved:

Revised:



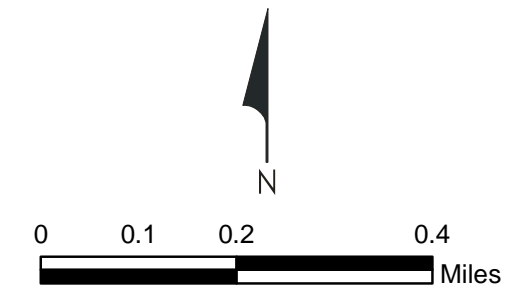
Recent Quarterly Average Perchlorate Loading in the Las Vegas Wash
 Nevada Environmental Response Trust (NERT) Site
 Henderson, Nevada

Figure
31c



EXPLANATION

- ◆ Groundwater Monitoring Wells
- ◆ Seep Well Field Extraction Well
- ▲ USGS Stream Gauge Station



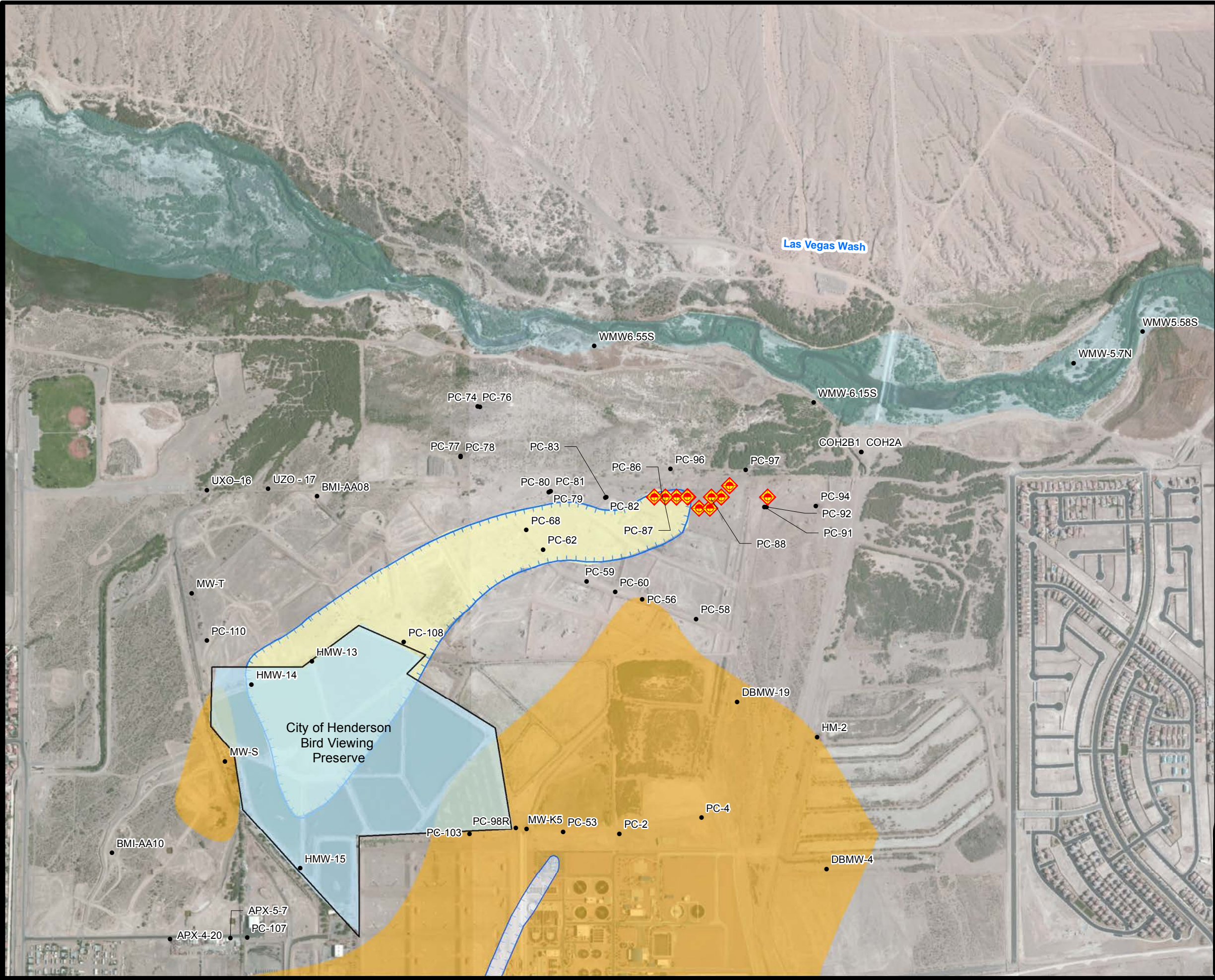


**Groundwater Levels and Stream Stage
at Pabco Road**
Nevada Environmental Response Trust Site
Henderson, Nevada

Date: 2/28/2014	Contract Number: 21-34800H	Figure
Drafter: AS	Approved:	Revised:

32

Path: H:\LePetome\NERT\Modeling\Sem-Annual Report 2013\Appendix - Modeling Report\Capture_Zones\TDS_Plume.mxd

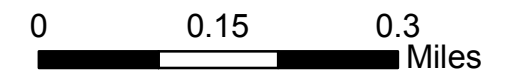
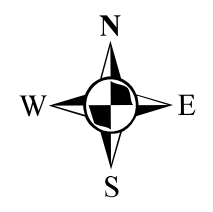


EXPLANATION

- Seep Well Field Extraction Well
- Shallow Water-Bearing Zone Well

Total Dissolved Solids, mg/L

- 5,000-10,000
- 2,500 - 5,000
- <2,500



Total Dissolved Solids in Shallow Groundwater, May - June 2012
 Nevada Environmental Response Trust Site
 Henderson, Nevada

Date: 2/28/2014	Contract Number: 21-34800H	Figure
Drafter: AS	Approved:	Revised: