Location Restriction Criteria - Certification Report

Public Service Company of Colorado – Pawnee Station

CCR Landfill

Morgan County, Colorado

October 2018

Prepared For:

Public Service Company of Colorado

HDR
1670 Broadway, Suite 3400, Denver, CO 80202
303.764.8800

This page intentionally left blank.

Contents

List of Figures

This page intentionally left blank.

LIST OF ABBREVIATIONS AND ACRONYMS

AMSL Above Mean Sea Level
CCR Coal Combustion Residuals
CDPHE Colorado Department of Public Health and Environment
CFR Code of Federal Regulations
CGS Colorado Geological Survey
EDOP Engineering Design and Operations Plan
EPA U.S. Environmental Protection Agency
HDPE high density polyethylene
PSCo Public Service Company of Colorado
RCRA Resource Conservation and Recovery Act
USGS United States Geological Survey

Qualified Professional Engineer Certification

I hereby certify, as a Professional Engineer in the State of Colorado, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by PSCo or others without specific verification or adaptation by the Engineer.

I hereby certify, as a Professional Engineer in the State of Colorado, that the information contained in this report has been prepared in accordance with the requirements of 40 CFR §257. I further certify that a satisfactory demonstration of the requirements of 40 CFR Sections §257.60, §257.61, §257.62, §257.63 and §257.64 have been made.

SIGNATURE:

16OCT2018

Matthew M Rohr, PE
Colorado Licensed Professional Engineer No. 0053467
My license renewal date is October 31, 2019

1 Introduction

This Location Restriction Certification report has been prepared for the CCR landfills located at the Public Service Company of Colorado (PSCo) - Pawnee Station (the Site). This report conforms to 40 (CFR) Part 257. This report was prepared to address the federal CCR regulations for disposal of ash under subtitle D of the Resource Conservation and Recovery Act (RCRA). The final rule was published in the Federal Register, Volume 80 Number 74 on April 17, 2015, and became effective on October 19, 2015.

1.1 General Information

Figure 1, Facility Location shows the Pawnee Station location on Morgan County Road 24 approximately three miles south of U.S. Interstate 76 in an unincorporated portion of Morgan County approximately three miles southwest of Brush, Colorado. The Station is located in the southeast quarter of Section 17 and the southwest quarter of Section 20, Township 3 North, Range 56 West of the 6th Principal Meridian, Morgan County, Colorado. The North CCR Landfill is located approximately ½ mile southwest of the main power plant building, and the East CCR Landfill is located approximately ¾ mile southeast of the main power plant building. Figure 2, Pawnee Station Layout shows the various facilities and infrastructure located at Pawnee Station. The South Landfill shown on Figure 2 is not a CCR landfill.

1.2 Type of Facility

Current ash disposal operations take place at the North landfill. The North Landfill is anticipated to reach its capacity in September 2019.

The North landfill was permitted through Morgan County as part of construction of Pawnee station, and has been in service since 1981. From 1996 through the end of 2013, the majority of the fly and bottom ash was beneficially reused/recycled, with minimal amounts of ash disposed. Sale of CCR ceased in 2014, and all CCR since has been disposed in the North Landfill.

A new CCR landfill, the East Landfill, is located to the east of Evaporation Pond D in order to provide additional disposal capacity for ash beginning in 2018. The East Landfill will consist of two cells; the first cell will be constructed in the footprint of the former Bottom Ash Storage Pond. The Bottom Ash Storage Pond had all CCR removed in 2017 and was closed under Section 9 of Colorado Department of Public Health and Environment's (CDPHE) Solid Waste Regulations (6-CCR 1007-2, Part 1). Approval for the closure certification was received from CDPHE in 2018. The second cell will be constructed to the east of the first cell. The overall East landfill footprint is approximately 27 acres.

2 Location Restrictions

40 CFR §257.60-64 applies to new CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units. 40 CFR §257.64 (Unstable Areas) also applies to existing landfills. As such, the descriptions below apply to the new East Landfill for 40 CFR §257.60-63 and 40 CFR §257.64 applies to both the North and East Landfills.

2.1 Placement Above The Uppermost Aquifer 40 CFR §257.60

The 40 CFR §257.60 places restrictions on locating the base of a CCR landfill or surface impoundment within 5 feet of the uppermost aquifer. It states the following:

"New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be constructed with a base that is located no less than 1.52 meters (5 feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table)."

The base of the East landfill will be greater than 5 feet above the uppermost aquifer beneath the landfill.

Hydrogeology

The stratigraphic units present at Pawnee Station include competent bedrock of the Pierre Shale, overlain by a transition zone of weathered Pierre Shale and the overlying sandy silt, derived from in-situ weathering of the Pierre Shale. The sandy silt (referred as residual soil in previous reports) is overlain by dune sand deposits at the surface. The sandy silt unit is laterally continuous and varies in thickness from approximately 8 to 45 feet. The transition zone bedrock varies between less than 5 feet to greater than 20 feet thick and consists of friable, siltstone with interbedded fine sands. Dune sand overlies the sandy silt and ranges in thickness from 8 to 70 feet. The thickest deposit of dune sand is south of the East Landfill.

Saturated conditions occur in the sandy silt and the transition zone bedrock, perched above the Pierre Shale. The dune sand generally does not contain groundwater but can act as a recharge source via infiltration of precipitation to underlying units. Groundwater contours and flow directions are shown on Figure 3 from February 2017. These contours were derived from groundwater level measurements collected from monitoring wells screened in the transition zone bedrock (weathered bedrock) and sandy silt zones. Groundwater flow mimics surface topography of the underlying competent Pierre Shale bedrock, in which a ridge trending from the northwest to the southeast is present beneath the southwestern portion of the Site. Groundwater flows radially northeast, east, and southeast away from this bedrock ridge. Groundwater flow under the East Landfill is generally east.

Landfill and Uppermost Aquifer Separation

The lowest base grade occurs within the East Landfill Cell 1 sump at approximately 4,300 feet AMSL at the south end of the landfill (Figure 4).

Monitoring wells around the East Landfill and farther upgradient to the west were monitored for water levels between February 2017 and October 2017. Figure 3 displays the locations of monitoring wells and piezometers around the landfill and the groundwater potentiometric surface in February 2017. The seasonal water fluctuation under the East Landfill is minor. Monitoring points PNMW-21, PNMW-23, and PZ-3 fluctuate less than 0.5 foot; and PNMW-22 fluctuates a maximum of 2.2 feet over the 9 month monitoring period between February and

October 2017 (Figure 5). Based on the gradient between the upgradient wells and piezometers west of the landfill and downgradient wells east of the landfill, the groundwater level under the deepest part of the landfill would be approximately 4284.89 feet AMSL in February 2017. Thus the approximate separation between the deepest part of the landfill base (4,300 feet AMSL) and the water table when it is at its measured seasonal high in February 2017 (4284.89 feet) is approximately 15 feet. Therefore there is approximately 15 feet, or greater, of separation between the water table and the landfill base.

Figures 6 and 7 show cross sections of the landfill design displaying the water table and geologic units beneath the landfill. The water table displayed in these cross sections are water elevations from depths to water encountered during drilling of geotechnical borings in February 2017. Therefore these water levels may vary slightly from monitored static water levels in monitoring wells and piezometers. Regardless, the cross sections illustrate that the base of the landfill is at least 10 feet above the water table illustrated in the cross sections.

2.2 Wetlands 40 CFR §257.61

The 40 CFR §257.61 places restrictions on locating CCR landfills and surface impoundments in areas designated as wetlands. It states the following:

"New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in §232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (5) of this section."

Definition of Wetlands

The CFR Regulations (40 CFR *§232.2*) defines wetlands and other waters of the U.S. as:

- *All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.*
- *All interstate waters including interstate wetlands.*
- *All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:*
    - *Which are, or could be, used by interstate or foreign travelers for recreational or other purposes; or*
    - *From which fish or shellfish are, or could be, taken and sold in interstate or foreign commerce; or*
    - *Which are used, or could be used, for industrial purposes by industries in interstate commerce.*
- *All impoundments of waters otherwise defined as waters of the U.S. under the definition.*
- *Tributaries of waters of the U.S. identified above.*

- *The territorial seas.*
- *Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in the paragraphs above. The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by human-made dikes or barriers, natural river berms, beach dunes, and the like are "adjacent wetlands.*

Wetlands can be waters of the U.S. and are defined by 40 CFR *§232.2 (3)(iv)* as areas that are *inundated or saturated by surface or ground water at a frequency and duration sufficient to support—and that under normal circumstances do support—a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas*.

No wetlands or other waters of the U.S. were identified within the project study area. Topographic, National Hydrology Dataset, and National Wetlands Inventory maps within and near the project study area are provided in Figure 8.

Based on the site reconnaissance, the new East CCR landfill is not located within any known wetlands.

The Fort Morgan Canal, a local irrigation ditch owned by the Fort Morgan Irrigation Company, transverses the Pawnee Station property from west to east and is contained within a concrete channel through most of the Station. There are a number of augmentation ponds both on and adjacent to the Station property. The Fort Morgan Canal is used, in part, to fill these ponds, which are used for groundwater recharge. These aquatic features at Pawnee Station are isolated from offsite aquatic resources and are not wetlands. The proposed landfill is not in contact with these waters.

2.3 Fault Areas 40 CFR §257.62

The 40 CFR §257.62 places restrictions on locating CCR landfills and surface impoundments in close proximity to active fault areas. It states the following:

"New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that an alternative setback distance of less than 60 meters (200 feet) will prevent the damage to the structural integrity of the CCR unit."

The Holocene time period is defined in the CCR Rule (40 CFR § 257.53, 2015) as the most recent epoch of the Quaternary period, extending from the end of the Pleistocene Epoch, at 11,700 years before present, and continues to present.

The proximity of the Pawnee Station to faults that have been active in Holocene time was investigated through research conducted for identifying such fault zones. The results of this research documented the absence of Holocene time fault zones within 200 feet from the Pawnee Station and the East landfill.

This conclusion is supported by a review of project reports and published literature that included:

Regional Topographic and Geologic Maps and Hydrogeologic Study

Topographically, the Pawnee Station is located on a gently sloping upland area south of the South Platte River as shown by the *U.S. Geological Survey*, *2010* map (Reference 7). Elevations vary from a high of 4,400 feet AMSL on the southwest corner of the Station property to a low of 4,260 feet AMSL on the northeast corner. Geologically, the Station resides in unconsolidated materials consisting of Quaternary-age alluvial valley fill and windblown cover deposits as shown in the *Scott, 1978* map (Reference 5). The thickness of unconsolidated materials varies, increasing from south to north. The first consolidated layer beneath the Station property is the Cretaceous-age Pierre Shale. The Pierre shale is claystone/siltstone bedrock, which acts as a confining layer. It is approximately 5,000 feet thick in this area and is underlain by older Mesozoic and Paleozoic rocks. The Pierre Shale represents sediments of the Denver Basin, which is quite stable and has not shown significant geologic activity since before the formation of the Rocky Mountains. Furthermore, the hydrogeologic investigation performed for the Pawnee Station (*Henslee, 2001*) did not identify any geologic hazards. The investigation indicated that the region is very stable and is not subject to volcanism or earthquakes.

Maps and Reports by the Colorado Geological Survey (CGS), and the United States Geological Survey (USGS) relative to faulting in the area.

Using information from a variety of sources, the Colorado Geological Survey compiled information on nearly 100 potentially hazardous faults in Colorado that ruptured the earth's surface during the past 2 million years (*Widmann et al., 1998*). These faults are shown as wide lines on the map in Figure 9. Faults with evidence of movement during the past 130,000 years are often considered active faults. These faults are shown in red on Figure 9. Similar information, while further dividing the Quaternary faults into late Quaternary, latest Quaternary, middle and late Quaternary, is depicted by the interactive Quaternary Fault and Fold Database released by the *U.S. Geological Survey and Colorado Geological Survey, 2006*. In addition to identifying well-constrained or inferred locations of faults, this interactive database also provides information, such as geologic setting, fault orientation, fault type, sense of movement, slip rate, recurrence interval, and the time of the most recent surface-faulting event, on faults and associated folds that are believed to be sources of earthquakes greater than magnitude 6 (M>6). These faults are shown as color-coded lines on the map in Figure 10, with the latest Quaternary (<15,000 years) being denoted by orange. Figures 9 and 10 document that there are not any faults in the proximity of the Pawnee project location, that have been active in Holocene or previous time (epoch).

2.4 Seismic Impact Zones 40 CFR §257.63

The 40 CFR §257.63 places restrictions on locating CCR landfills and surface impoundments in seismic impacted zones. It states the following:

"New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impacted zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for site."

The Federal Register Volume 80 No. 74 defines a seismic impact zone as the following:

"A Seismic impact zone means an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of earth's gravitational pull (g), will exceed 0.10 g in 50 years."

Based on the subsurface information (Figure 11) and seismic hazard deaggregation charts, the peak ground acceleration at the Site is less than the threshold value of 0.10 g in 50 years; indicating the East landfill is not located in a seismic impact zone.

2.5 Unstable Areas 40 CFR §257.64

The 40 CFR §257.64 places restrictions on locating CCR landfills and surface impoundments in unstable areas. It states the following:

"An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted. The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable (1) on-site or local soil conditions that may result in significant differential settling; (2) On-site or local geological or geomorphologic features; and (3) On-site or local human-made features or events (both surface and subsurface)."

Based on the geotechnical investigations (Figure 11) performed at the North and East CCR sites, and the anticipated differential settlements resulting from geologic/geomorphologic features and/or proposed final grades, the long term settlements within the hard residual soil layers underlying the surficial sandy soils are expected to be minimal.

The land surface in the vicinity of both landfills is relatively flat, and lacking in characteristics that could result in instability. Slope stability analyses performed at critical cross-sections with proposed final grades and slope configurations, resulted in factors of safety greater than the required minimum values. The analyses were performed in accordance with Section 2.7.3 of the *EPA Technical Manual for Solid Waste Disposal Facility Criteria,* 40 CFR Part 258, dated November 1993 (EPA530-R-93-017).

Subsidence of the waste mass in the North Landfill has not been reported, and it is anticipated to be minimal considering that the base grades are underlain by bedrock, and that the CCR materials exhibit low compressibility characteristics. Considering the low compressibility characteristics of the subsurface materials underlying the North Landfill, it is not located in an unstable area.

The anticipated settlement beneath the East Landfill will be primarily elastic and will occur as the landfill is being built up. The settlement of the East Landfill waste mass is anticipated to be minimal enough to avoid adverse impact on the operation of the landfill leachate collection system.

3 Summary

The Pawnee Station North Landfill meets and/or exceeds location restriction requirements required for existing landfills detailed in 40 CFR Part 257. The specific rule evaluated for the North Landfill from 40 CFR Part 257 is listed below:

40 CFR §257.64 – Unstable Areas

The Pawnee Station East Landfill (Cells 1 and 2) meets and/or exceeds all location restriction requirements required for new landfills and lateral expansions of CCR units detailed in 40 CFR Part 257. The specific rules evaluated for the East Landfill from 40 CFR Part 257 are listed below:

40 CFR §257.60 – Upper Most Aquifer

40 CFR §257.61 – Wetlands

40 CFR §257.62 – Fault Areas

40 CFR §257.63 – Seismic Impact Zones

40 CFR §257.64 – Unstable Areas

4 References

1) Henslee, 2001, Geohydrology Report, Xcel Energy (contained in EDOP for Pawnee Station Evaporation Ponds).
2) Pawnee Landfill Evaluation, Pawnee Station, Brush Colorado, URS 2009
3) Pawnee Station East Landfill Engineering Design and Operations Plan, Brush, Colorado, HDR August 2017, Revised December 2017
4) Pawnee Station Landfill Engineering Design and Operations Plan, Brush, Colorado, HDR March 2017, Revised January 2018, Rev. 3.0
5) Scott, G.R., 1978, Map showing geology, structure, and oil and gas fields in the Sterling 1°×2° quadrangle, Colorado, Nebraska, and Kansas: U.S. Geological Survey Miscellaneous Investigations Series Map I–1092, scale 1:250,000. [Also available at http://pubs.er.usgs.gov/publication/i1092.]
6) U.S. Geological Survey and Colorado Geological Survey, 2006, Quaternary fault and fold database for the United States, accessed April 19, 2018, from USGS web site: http://earthquake.usgs.gov/hazards/qfaults/.
7) U.S. Geological Survey, 2010, Brush West, Morgan County, Colorado - 7.5 Minute Topographic Map Series, 1:24,000.
8) Widmann, B.L., Kirkham, R.M., and Rogers, W.P., 1998, Preliminary Quaternary fault and fold map and database of Colorado: Colorado Geological Survey Open-File Report 98-8, 331 p.

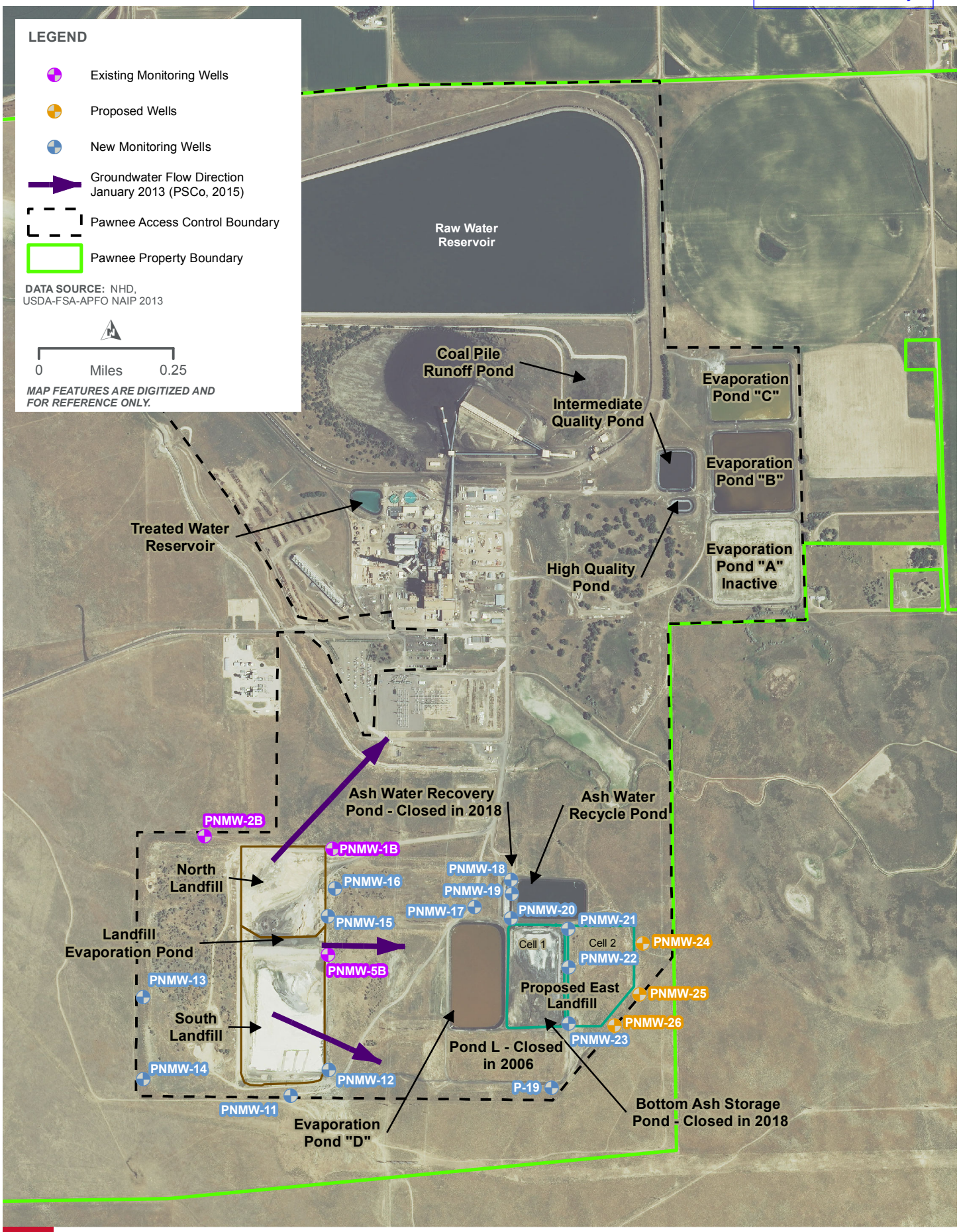
Figures

This page intentionally left blank.

For Reference Only

FIGURE 1: - Facility Location

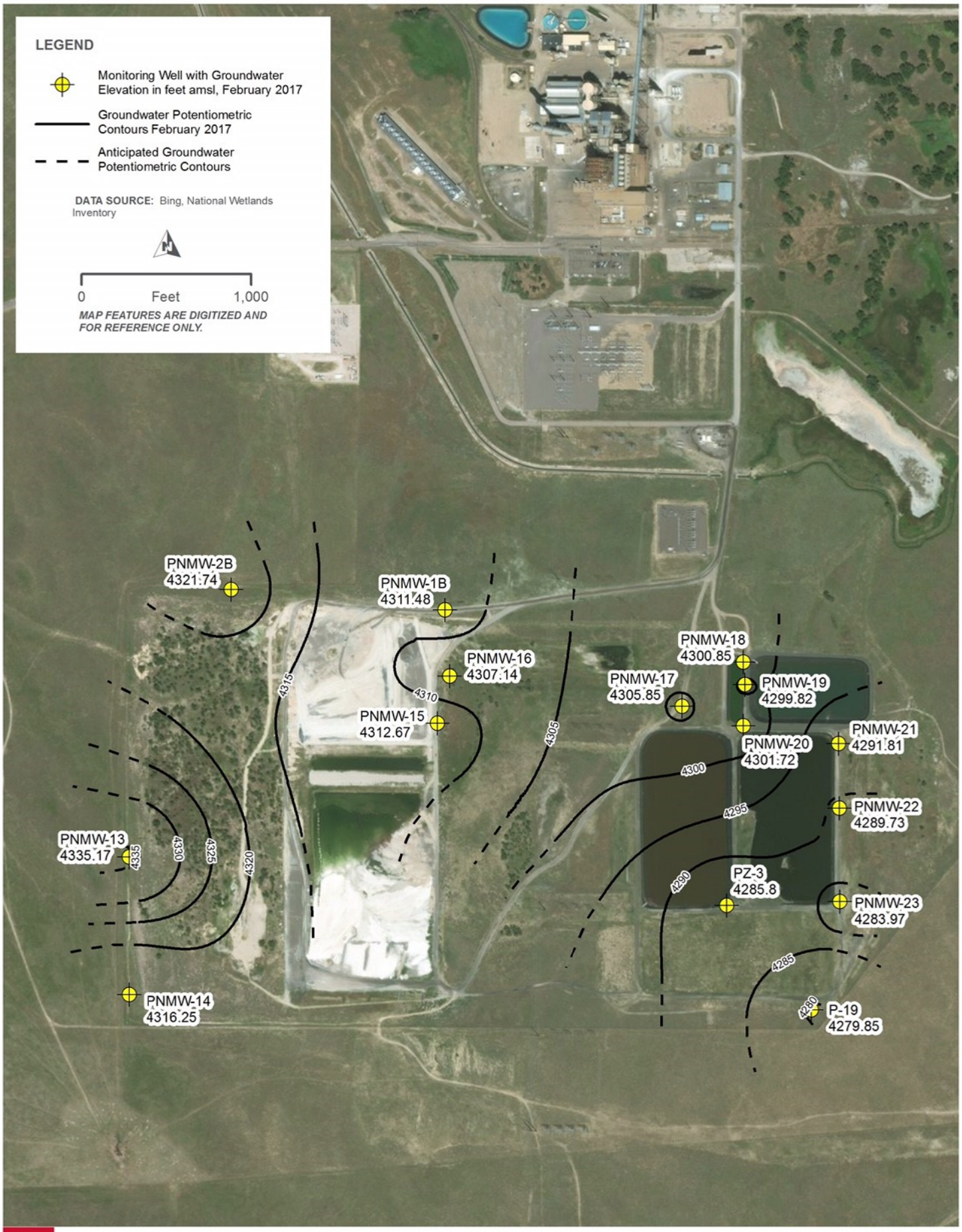
For Reference Only



Xcel Energy℠

PAWNEE POWER STATION
MORGAN COUNTY, CO

FIGURE 2: Pawnee Station Layout



Xcel Energy℠

PAWNEE POWER STATION
MORGAN COUNTY, CO

PATH: J:\2015\15-115_XCEL_CORE_SAMPLING_TESTING_(WALTHER)\MAP_DOCS\GROUNDWATER_CONTROURS\PAWNEE_POWER_STATION_PORTAIT_GW_WELL_CERT_GWELEV201702B_5FTCONTOURS.MXD - USER: GMILLERF - DATE: 4/25/2018

FIGURE 3:Potentiometric Map

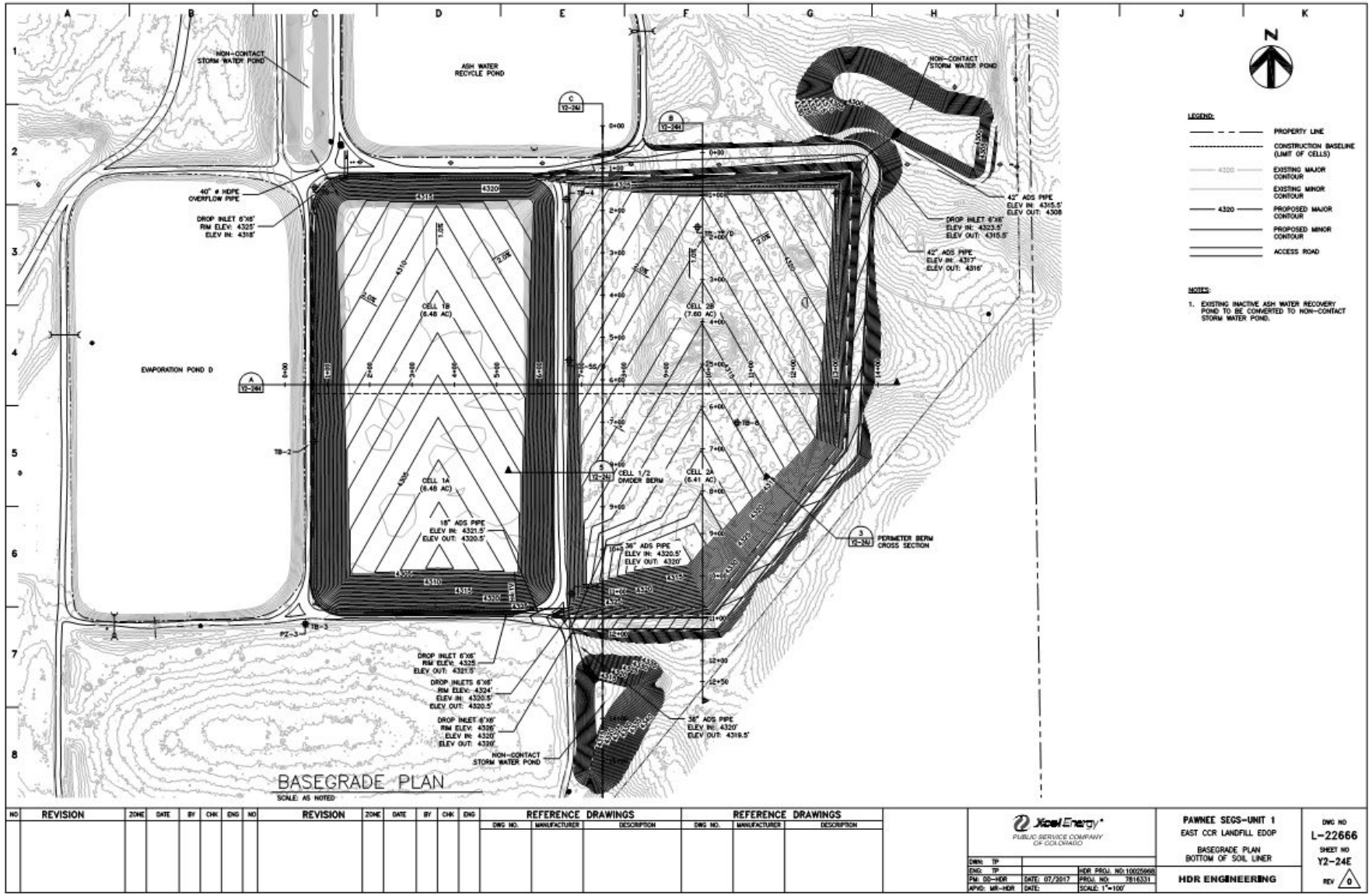


FIGURE 4: – East Landfill design displaying the deepest part of Cell 1 is in the south-central part with an elevation of 4302 feet amsl. From East Landfill EDOP.

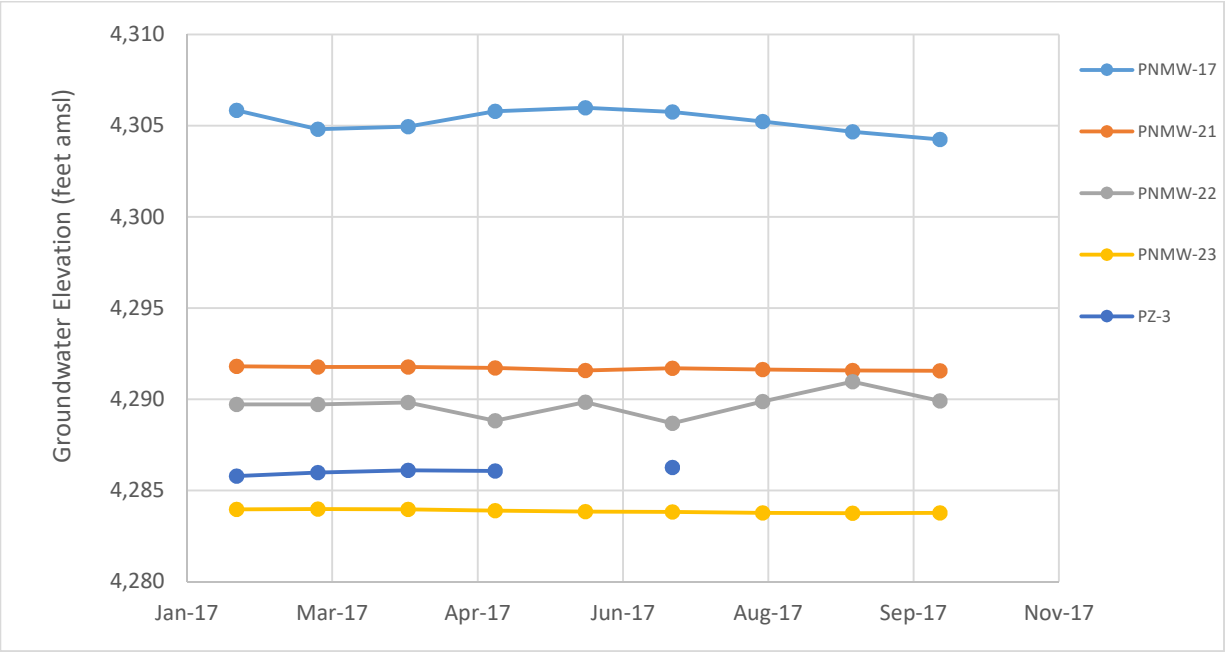


FIGURE 5: . Groundwater elevations measured in monitoring wells and piezometers around the Pawnee East Landfill.

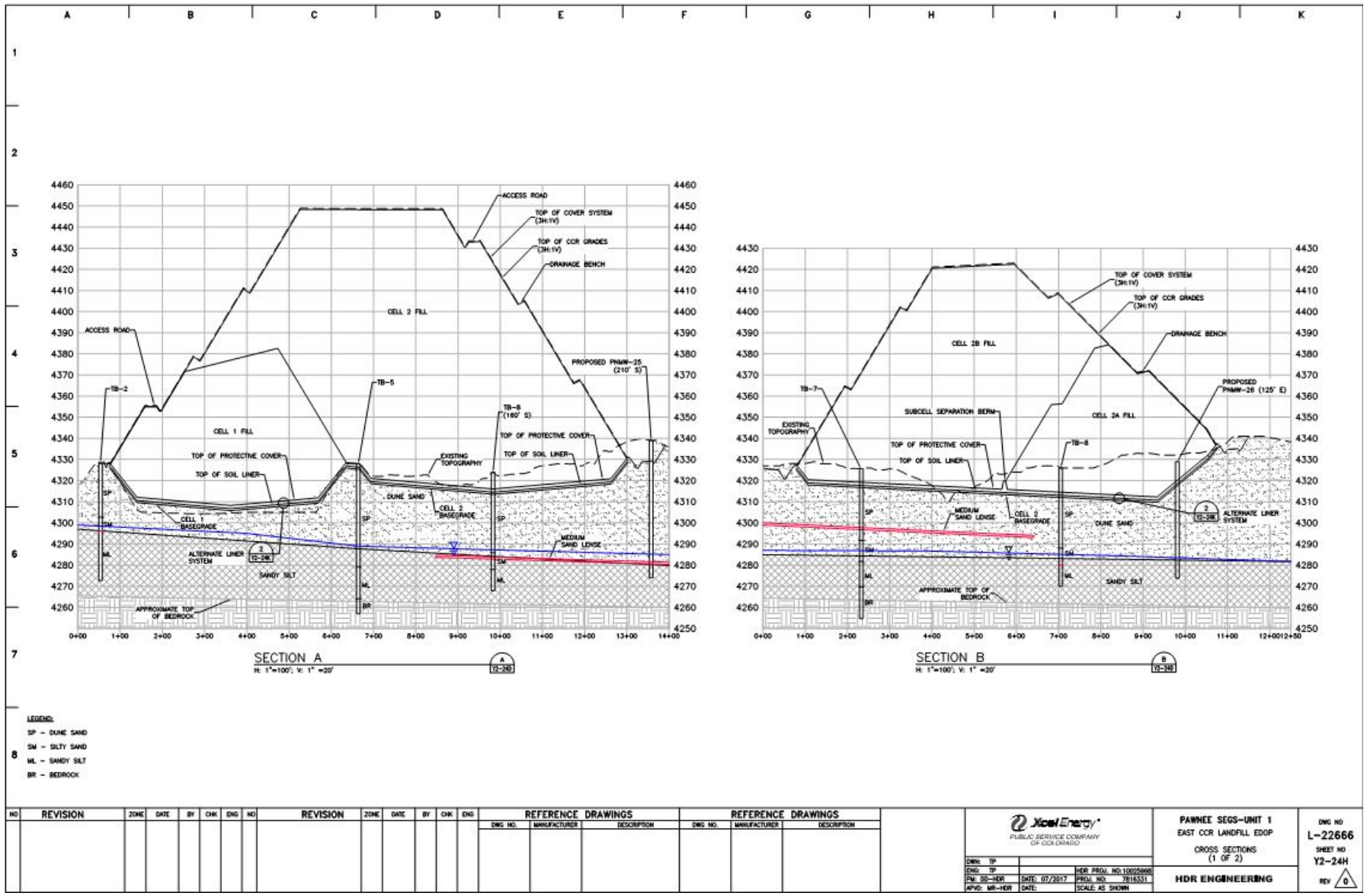


FIGURE 6: – East Landfill Cross-Section A-A' and B-B' (cross section lines shown on Figure 4). From East Landfill EDOP.

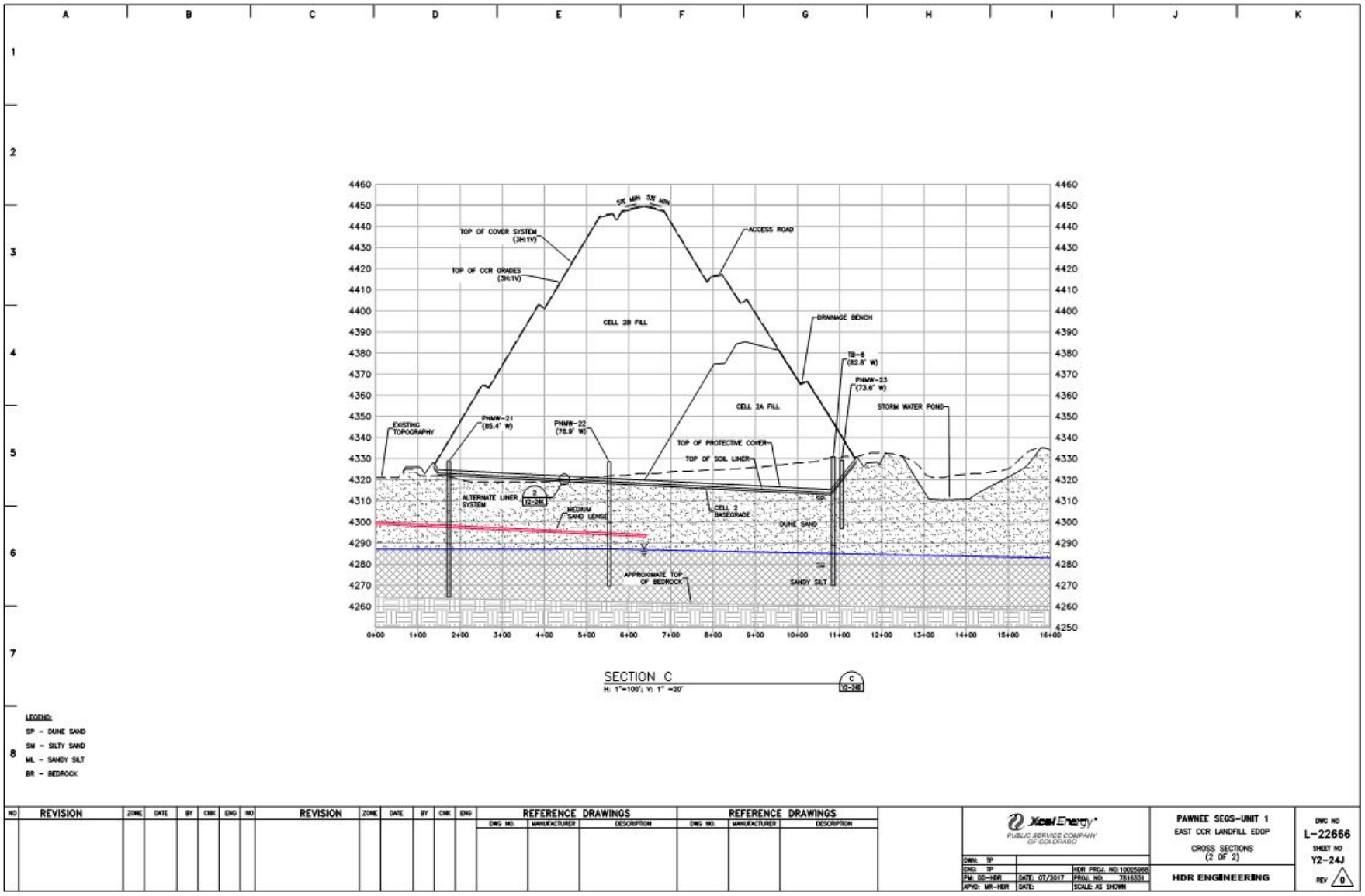
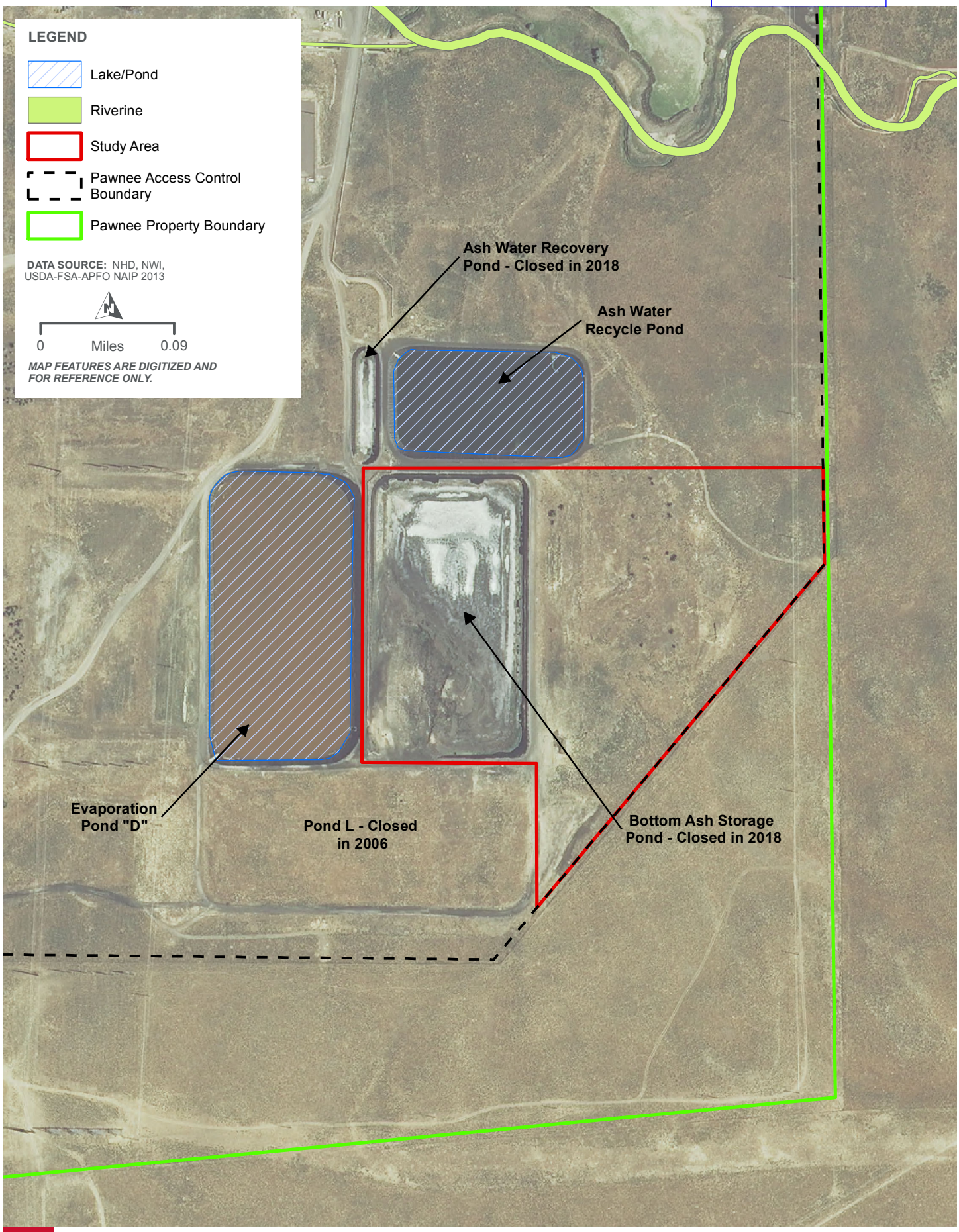


FIGURE 7: – East Landfill Cross-Section C-C' (cross section line shown on Figure 4). From East Landfill EDOP.

For Reference Only



Xcel Energy℠

PAWNEE POWER STATION
MORGAN COUNTY, CO

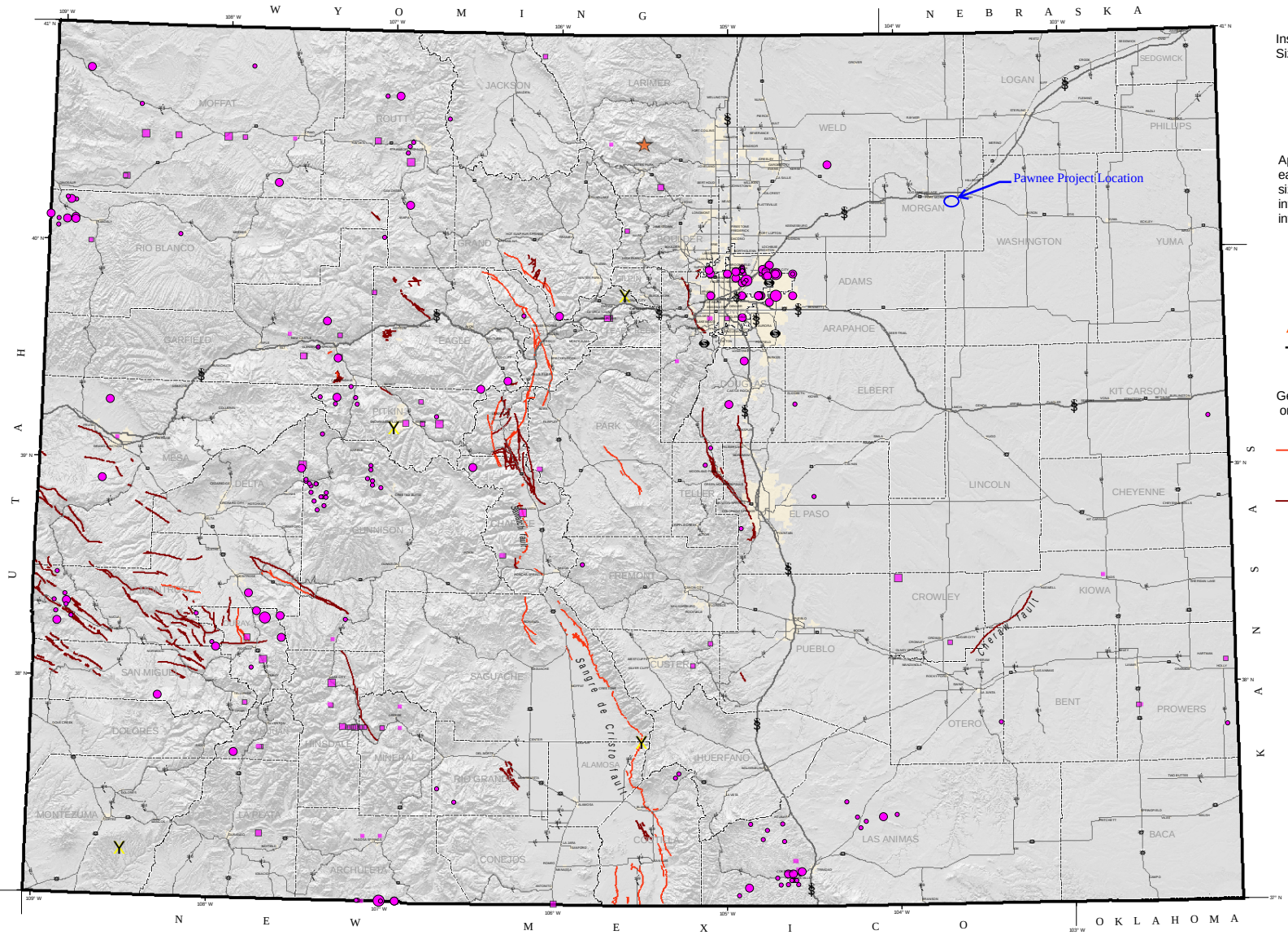
Source:

FIGURE 8: National Hydrology Dataset, and National Wetlands Inventory map near Pawnee Station

For Reference Only

COLORADO'S EARTHQUAKE and FAULT MAP

Showing Locations of Historical Earthquakes and Known or Suspected Geologically Young Faults



EARTHQUAKE EPICENTERS

Instrumentally located epicenters (~1962 to 2006)
Size of dot indicates magnitude.

- 5-5.5
- 4-4.9
- 3-3.9

Approximate location of pre-instrumental earthquake epicenters (~1867 to 1961). Square size indicates the maximum Modified Mercalli intensity for the earthquake (see back of map for intensity scale).

- VII
- VI
- V
- IV
- I-III

1882 Earthquake; magnitude estimated at 6.6 +/- 0.6 (Spence and others, 1996)

QUATERNARY FAULTS

Geologically young faults that displace sediments or rocks deposited during the Quaternary Period (approximately past 2 million years).

- Known or suspected fault displacement of late Quaternary deposits (approximately past 130,000 years)
- Known or suspected fault displacement of middle to early Quaternary deposits (approximately past 130,000 to 2 million years old)

Permanent Seismic Stations - Includes four seismographs currently operated by the U.S. Geological Survey as part of the Advanced National Seismic System.

Cities and Towns

DATA SOURCES
Earthquake epicenters:
U.S. Geological Survey; Colorado Geological Survey; Kirkham and others, 2004; Kirkham and Rogers, 2000
Faults: *Colorado Geological Survey; Widmann and others, 1998*
Seismic Stations:
U.S. Geological Survey

This map does not meet U.S. National Map Accuracy Standards and is intended for general reference only.

Scale 1:1,150,000

0 5 10 20 30 40 50
Miles

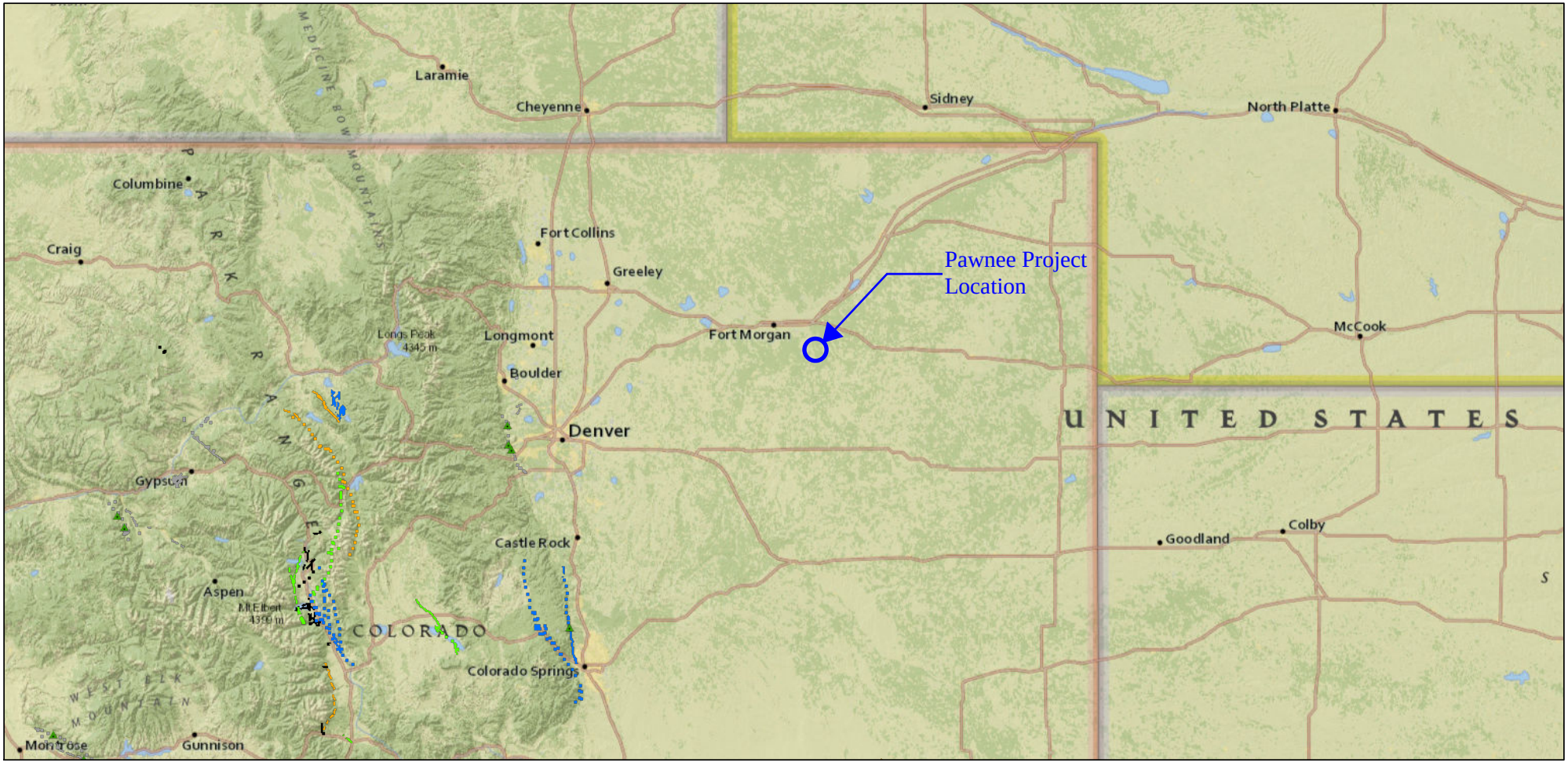
0 10 20 40 60 80
Kilometers

Map Compilation by
Matthew L. Morgan,
Colorado Geological Survey,
2006-2007

FIGURE 9: . Earthquake and Fault Map

For Reference Only

USGS Quaternary Faults and Folds Database



April 19, 2018

1:1,772,336

0 20 40 80 mi

0 30 60 120 km

- Site Investigations

Quaternary Faults

- historical (<150 years), well constrained location
- historical (<150 years), moderately constrained location
- historical (<150 years), inferred location
- latest Quaternary (<15,000 years), well constrained location
- latest Quaternary (<15,000 years), moderately constrained location
- latest Quaternary (<15,000 years), inferred location
- late Quaternary (<130,000 years), well constrained location
- late Quaternary (<130,000 years), moderately constrained location
- late Quaternary (<130,000 years), inferred location
- middle and late Quaternary (<750,000 years), well constrained location
- middle and late quaternary (<750,000 years), moderately constrained location

Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

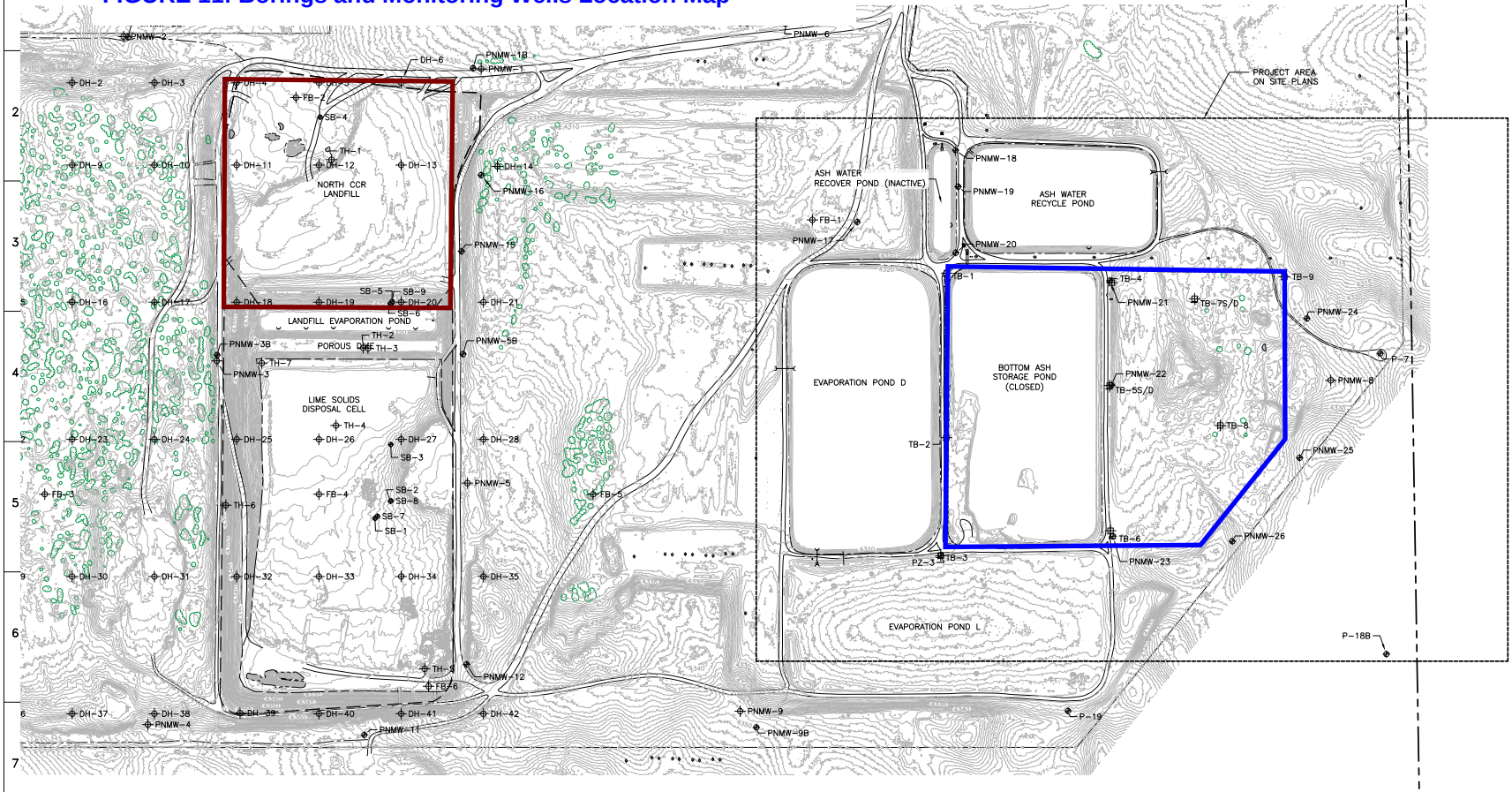
U.S. Geological Survey

Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. |

FIGURE 10: USGS Quaternary Faults Map

For Reference Only

FIGURE 11: Borings and Monitoring Wells Location Map



N

LEGEND:

- CONSTRUCTION BASELINE (LIMIT OF CELLS)
- LIMIT OF CCR WASTE (APPROXIMATE)
- LIMIT OF LIME SOLIDS (APPROXIMATE)
- EXISTING POND LIMITS
- PNMW-12 EXISTING MONITORING WELLS
- DH-13 EXISTING TEST BORING
- TB-3 2017 TEST BORING
- 4320 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

NOTES:

1. FIELD BORING LOCATIONS (FB-1 TO FB-6) FROM DAMES & MOORE, "BORROW MATERIAL INVESTIGATION AND EMBANKMENT DESIGN STUDIES, PAWNEE GENERATING STATION FOR PUBLIC SERVICE COMPANY OF COLORADO." TEST BORING LOGS DATED JANUARY 20, 1976. LOCATIONS ARE APPROXIMATE.
2. FIELD BORING LOCATIONS (DH-1 TO DH-42) FROM LINCOLN DEVORE SUBSURFACE INVESTIGATION, 1978.
3. TEST HOLE (TH-1 TO TH-8) AND TEST PIT (TP1 TO TP4) LOCATIONS FROM URS "PAWNEE LANDFILL EVALUATION," JULY 2009. LOCATIONS ARE APPROXIMATE.
4. MONITORING WELL LOCATIONS (PNMW-1 TO PNMW-11) AND SOIL BORINGS (SB-1 TO SB-10) FROM ELECTRICAL POWER RESEARCH INSTITUTE, 2006, "FIELD EVALUATION OF THE COMANAGEMENT OF UTILITY LOW-VOLUME WASTES WITH HIGH-VOLUME COAL COMBUSTION BYPRODUCTS: PA SITE, JULY 2006." TEST BORING LOGS DATED JULY 1996. LOCATIONS ARE APPROXIMATE.
5. MONITORING WELL LOCATIONS (PNMW-1B TO 9B) AND (PNMW-12 TO 14) FROM MONITORING WELL INSTALLATION REPORT, HDR ENGINEERING, FEBRUARY 2016. LOCATIONS FIELD SURVEYED BY EDWARDS-JAMES SURVEYING, INC.
6. TEST BORINGS TB-1 TO TB-9 AND MONITORING WELLS PNMW-15 TO PNMW-22 AND P-19 INSTALLED BY SITE SERVICES DRILLING LLC FOR HDR ENGINEERING, INC. JANUARY 2017. LOCATIONS FIELD SURVEYED BY EDWARD-JAMES SURVEYING, INC. FEBRUARY 2017.
7. MONITORING WELLS PNMW-24, 25 & 26 TO BE INSTALLED DURING CONSTRUCTION OF CELL 2.

North Landfill

East Landfill

SITE PLAN

SCALE: AS NOTED

NO	REVISION	ZONE	DATE	BY	CHK	ENG

NO	REVISION	ZONE	DATE	BY	CHK	ENG

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION

Xcel Energy®
PUBLIC SERVICE COMPANY OF COLORADO

DWN: TP		
ENG: TP		HDR PROJ. NO: 10025968
PM: DD-HDR	DATE: 04/03/17	PROJ. NO: 7816331
APVD: MR-HDR	DATE:	SCALE: 1"=200'

PAWNEE SEGS-UNIT 2
EAST CCR LANDFILL EDOP
EAST CCR LANDFILL SITE AREA

HDR ENGINEERING

DWG NO
L-22666
SHEET NO
Y2-24B
REV 0