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TECHNICAL MEMORANDUM

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SUBJECT: Joint Base Elmendorf-Richardson Conceptual Site Model
Anchorage, Alaska
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This technical memorandum presents the results of a Base-wide conceptual site model (CSM) for Joint Base Elmendorf-Richardson (JBER) prepared for the Air Force by AECOM on behalf of the Air Force Civil Engineer Center (AFCEC). The evaluation consisted of three principal tasks:

1. Reinterpretation of previously-acquired site-subsurface lithology data in the context of the depositional environments and sea-level history using Environmental Sequence Stratigraphy (ESS);
2. A synoptic groundwater level gauging event; and
3. Interpretation of groundwater elevation data in the context of the stratigraphy and other factors such as hydraulic boundary conditions.

CSM work products include:

1. Geologic cross sections showing ESS interpretation;
2. Potentiometric surface maps corresponding to different stratigraphic intervals; and
3. This Technical Memorandum.

The objective of the CSM was to assess potential contaminant migration pathways through interaction of site stratigraphy and groundwater occurrence and flow.

1 Regional Geology

Joint Base Elmendorf-Richardson (JBER) is located in Southcentral Alaska, as shown on **Figure 1,** and occupies approximately 84,000 acres adjacent to the Municipality of Anchorage. Elmendorf Air Force Base (Elmendorf AFB) and neighboring Fort Richardson were realigned to form JBER in 2010. Much of the Base is undeveloped, consisting primarily of forests, wetlands, lakes, streams and ponds. Developed portions support Base and airfield operations, personnel housing, and recreation facilities.

1.1 Geologic History

The regional Quaternary geology of Alaska may be divided into four main phases: pre-Wisconsin, Wisconsin, Pleistocene to Recent, and Recent, representing deposits of at least 3 of the 5 glaciers (Miller,

1922) that invaded the area, as well as lacustrine and alluvial deposits associated with the glacial advances and retreats (**Table 1**).

The oldest pre-Wisconsin deposits consist of till, outwash and silt deposited by the Eklutna glacier, and are exposed only in one area north of the Eagle River Flats along the bluff of Knik Arm. Sorted and unsorted drift of the youngest pre-Wisconsin glaciation, the Knik glaciation, form deposits of advance outwash, lateral moraine, ground moraine, pitted outwash, and glaciofluvial and ice-contact deposits.

An extensive blue-gray clay of glacio-estuarine origin, known as the Bootlegger Cove Formation (Bootlegger), was deposited following the Dishno Pond advance of the Knik glaciation. The Bootlegger is extensive along Knik Arm, where it separates Knik Arm from the overlying Naptowne glacial deposits. Alluvial deposits form the floor of abandoned melt-water channels in the ground moraine.

During the Wisconsin age, the Naptowne glaciation formed advance outwash, ground moraine, end moraine (e.g. the Elmendorf Moraine), and ice-contact deposits separated into sequences of kame fields and kame terraces, outwash, and pitted outwash. Alluvial deposits (e.g. The Mountain View alluvial fan) covered the floor of abandoned melt-water channels that cut into Wisconsin and into pre-Wisconsin deposits exposed south of the area covered by the Wisconsin deposits.

1.2 Main Depositional Features

A literature study (e.g., Updike 1986; Schmoll et al., 1999; Combellick et al., 2001) on the regional Quaternary geology of Alaska, shown on **Figure 2**, reveals eight major phases of stratigraphic development during pre-Wisconsin to Recent times. Lewis et al. (2000) summarized these distinctive changes and their main depositional features, as described below:

- Phase 1 corresponds to full glacial conditions reached prior to 20,000 years before present (BP). Glaciers flowed out of the Chugach and Talkeetna Mountains, where they coalesced and flowed into the Cook Inlet–Susitna Lowland, filled Knik Arm with ice, overtopping some of the ridges along the Chugach Mountains, and flowed into the isostatically depressed Cook Inlet. Lateral moraine deposits from this time correspond to the Rabbit Creek Moraines (**Figure 2**).
- Phase 2 is the retreat from full glacial conditions, probably beginning around 18,000 to 20,000 years BP. A marine transgression (sea inundation) accompanied retreat to an unknown position in Cook Inlet.
- Phase 3 is a still stand or minor re-advance of the glaciers, with multiple fluctuations in the ice margin that resulted in deposition of some of the Fort Richardson moraines. Marine conditions extended to Rabbit Creek and South Fork Campbell Creek about this time.
- Phase 4 is a retreat of unknown distance, which allowed a marine incursion that extended north to at least the North Fork Campbell Creek and Chester Creek areas. The lowermost sediments composing the Bootlegger were deposited during this incursion.
- Phase 5 is a re-advance that deposited the lateral moraines in the eastern low-land area. Marine conditions remained in the Campbell Creek and Chester Creek areas, with additional marine sediments deposited to form additional Bootlegger sediments.
- Phase 6 corresponds to the final retreat of the ice from the Dishno Pond moraines and progressive recession up-valley out of the lower Knik Arm. Ice-rafted debris in the base of the Bootlegger indicates tide-water conditions and glaciers breaking into icebergs into the sea (Schmidt 1963) around 14,900 ± 350 years BP (Schmoll et al., 1972; Reger et al., 1995).
- Phase 7 corresponds to a major re-advance, 13,500 to 14,000 years ago, into Knik Arm. It likely occurred behind the marine shoal that protected the glacier's terminus from tidewater. It deposited the uppermost units of the Bootlegger. These units contain sands, generally coarsening upwards. Termination of the advance constructed the Elmendorf Moraine. At the end of this advance, high sedimentation rates and isostatic rebound caused land emergence from the sea. Ice or moraine dams at the mouth of the Eagle River periodically broke, flooding the area

and causing local scour. Recurrence of these floods formed the Mountain View fan. The Eagle River reoccupied its channel and formed new channels and drainages as the ice retreated.

- Phase 8: rapid retreat. Marine submergence may have occurred, as possibly indicated by silt and clay found on the surface north of the Elmendorf Moraine. Small lakes formed in hummocky glacial deposits, and numerous stream channels formed.

2 Stratigraphy

Anchorage and adjacent areas are generally covered by deposits of glacial, glacio-estuarine and glacio-alluvial origin, with bedrock outcrops found on the south and east along the Chugach Mountains. Sedimentary successions under investigation at JBER primarily consist of Pre-Wisconsin (Dishno Pond moraine, Bootlegger and morainal shoals) to Wisconsin (Elmendorf Moraine, ground moraine and outwash) and Pleistocene to recent deposits (Mountain View alluvial fan and glacial drift), as highlighted in red text in **Table 1**.

2.1 Glacial Terms

Previous work in the region by various authors has resulted in a plethora of terms for describing glacial and related geomorphological features that are often overlapping or equivocal in concept. Therefore, it is necessary to revisit these glacial terms in order to develop a coherent stratigraphic framework. **Table 2** is a summary of glacial terms relevant for this report.

Figures 3 and **4** represent the depositional models for JBER on the basis of stratigraphic correlation using available borehole data. **Figure 3** shows the stratigraphic successions that are predominant in the Elmendorf area, and **Figure 4** shows the stratigraphic successions that are predominant in the Fort Richardson area.

The **Bootlegger Cove Formation** (Miller and Dobrovolny, 1959) shown at the base in **Figure 3** is a major Pre-Wisconsin stratigraphic unit (**Table 1**) in the region considered to be of glacio-estuarine origin. This formation accumulated in an ancestral Cook Inlet that was larger and deeper than at present, and that probably differed from the present-day inlet in configuration because of base level changes and the presence of glaciers. The upper limit of marine submergence during this time may have been as great as 183 to 213 meters (m) above modern levels (Yehle and Schmoll, 1987/1988).

Regionally, the Bootlegger (**Figure 2**) covers at least 100 square kilometers (km) in the Anchorage Lowland, where it is an important confining layer in the regional groundwater flow system (Cederstrom et al., 1964; Freethy, 1976). It is generally 30 to 45 m thick, although locally it may exceed 90 m (Cederstrom et al., 1964). The Bootlegger exists below Elmendorf AFB, and is exposed beneath the Elmendorf Moraine in the coastal bluffs of Knik Arm (Miller and Dobrovolny, 1959; Cederstrom et al., 1964). The Bootlegger pinches out to the east, and does not underlie the Fort Richardson area.

In the area of Elmendorf AFB (**Figure 1**), the Bootlegger extends as a continuous, clay-dominated unit beneath the Elmendorf Moraine, locally inter-fingering with ground moraines related to the Elmendorf Moraine towards the north. The Bootlegger deposits and the ground moraine form an irregular surface upon which younger glacioalluvial sediments were deposited.

Morainal shoals in **Figure 3** are related to tidewater glaciers that flow out into the sea. Subglacial deformation, stream (subglacial, supraglacial and ice-marginal) and other processes usually deliver sediment to the fronts of such glaciers more rapidly than it is removed by marine or lacustrine processes (Powell, 1984; Anderson and Molnia, 1989), forming deposits called moraine shoals. This protects the glacier from the actions of deep tidal water. Advance occurs behind the moraine shoal, which is eroded on the up-glacier side with deposition on the down-glacier side, causing shoal advance through "conveyor-belt" recycling (Post, 1975). Advance is possible because the moraine shoals reduce the water depth and restrict calving (breaking of ice). Once the glacier retreats to a stable position where the

ice is supported, or strong enough to hold itself together, the calving slows, and the glacier will advance again, gradually pushing a new moraine shoal in front of it. Thus, a series of morainal shoals are formed, as shown in the model.

Subaqueous outwash deposits (after Rust and Romanelli, 1975) in the area of Elmendorf AFB (**Figure 3**) are part of the glacio-marine depositional system along with the Bootlegger and the morainal shoals. Origin of this unit is attributed to subaqueous stream channels developed on the surface of the morainal shoals that fanned out basin-wide as an outwash plain. Unlike in fluvial channels, these subaqueous channels are infilled by gravity-driven processes of mass-flow, and this facies is composed of clast-supported pebbles and cobbles with a very low percentage of clayey materials.

The Elmendorf moraine is an end moraine that forms a major morphological feature (**Figure 3**) across Fort Richardson just north of the cantonment area (**Figure 1**). It continues along the north edge of Elmendorf AFB and in the Susitna Lowland across the Knik Arm as a low relief ridge, trending east to west (**Figure 4**). However, the record of this cycle is not complete below all of Fort Richardson because the Elmendorf advance stopped north of the main cantonment area and, thus, a basal diamicton was only deposited upglacier of the Elmendorf Moraine. The moraine indicates a major regional glacial advance between 14,000 years BP and 13,000 years BP during the Wisconsin Phase (Reger et al., 1995). The end of the advance led to the Elmendorf Moraine being deposited through combined glacial (thrusting, pushing, meltout, lodgment), fluvial (outwash streams), and gravitational (debris flow) processes.

Ground Moraines in the JBER area are spatially extensive and relatively level to gently rolling features associated with the Elmendorf end moraine, and are formed by the deposition of accumulated material left behind during the retreat of the Elmendorf Glacier during the Wisconsin Phase. These deposits are common towards the north of the Elmendorf Moraine. The stratigraphic models (**Figures 3 and 4**) do not depict the ground moraine deposits since they lie behind the Elmendorf Moraine.

The oldest strata encountered in boreholes in the Fort Richardson area consist of diamictons and claystones (**Figure 4)** that bear resemblance to the Bootlegger to the west (and may represent a similar mechanism of origin).

The **Dishno Pond** lateral moraine (Schmoll et al., 1999) is named after a pond (shown within the focus area on **Figure 2**) just north of Ship Creek (**Figure 1**). The Dishno Pond advance produced a broad diamicton (till) sheet that covers much of the Anchorage Lowland. It extends about 15 km southwest from the Eagle River valley to near the South Fork Chester Creek where it feathers out. It also extends into the Eagle River valley and northeast about as far as Peters Creek. Beyond there, distinction between the various lateral moraines becomes uncertain both because the moraines are not continuously preserved and because they converge in altitude northeastward. Dishno Pond deposits and similar lithologic units are localized only in the Fort Richardson area (**Figure 4**).

In the Fort Richardson area, **stratified drift deposits** related to the Elmendorf Advance typically blanket the topographic lows of the underlying Dishno Pond and associated sandy diamictons. An alternative interpretation is that the glacial drift deposits initially fanned out over the Dishno Pond as a homogenous stratified unit. But subsequently, the differential erosion at the base of the Mountain View alluvial fan leads these sediments to be recorded as discontinuous remnants. These glacial drifts may be genetically linked to the Elmendorf Moraine deposits to the north.

The **Mountain View Fan** is the uppermost stratigraphic unit below the Fort Richardson cantonment area. During Pleistocene to Recent time, ice or moraine dams at the mouth of the Eagle River Valley (**Figure 1**) periodically broke, causing rapid drainage of lakes impounded in the valley. Such catastrophic flooding would cause intense, local scour as water was deflected across the front of the Elmendorf Moraine. Recurrence of these events likely produced the Mountain View fan that originates through the Elmendorf Moraine and dips toward the south-southwest (**Figure 4**). As ice began to retreat from the Elmendorf Moraine, ancestral channels of the Eagle River were reoccupied as new channels became incised, providing lower elevation drainages and shorter routes to Knik Arm. The debris flow deposits at the origin of the alluvial fan shown in **Figure 4** are not encountered in any of the cross

sections drawn. As the alluvial fan continued to prograde down-dip, poorly developed, cut-and-fill fluvial channels locally incised the fan-surface.

2.2 Data and Methods

Borehole grain-size and textural data from 218 locations at JBER were utilized for this CSM study for the development of six geological cross sections. These cross section transects, the locations of which are shown on **Figure 5**, were drawn on the basis of optimum data coverage and data quality for capturing the subsurface stratigraphy of the area. The grain-size and textural information were processed by developing grain size log (GSLs) in order to reveal grain size trends and infer their depositional environments. In the absence of geophysical logs, the drilling blow counts at the well locations were converted into blow-count logs, which provided valuable information about the impedance of the underlying strata. Cross sections are illustrated on **Figures 6** through **15**.

2.3 Lithology and Stratigraphy in Cross Sections

Bootlegger Cove Formation. Western parts of section A-A' (**Figure 6**) and B-B' (**Figure 9**), as well as north-south sections C-C' (**Figure 12**), D-D' (**Figure 13**) and E-E' (**Figure 14**) in the Elmendorf area, represent the various inter-relations between the Bootlegger and the overlying strata. Thickness of this unit is generally greater than 30 feet (ft). The Bootlegger is absent in the Fort Richardson in sections A-A' and B-B' on the east side. However, the lowermost unit of section F-F' (**Figure 15**) reveals a clay-prone diamicton unit that may be the southward equivalent to the Bootlegger. Cross sections covering the area between Fort Richardson and Elmendorf (**Figures 8** and **11**) show the transitions between the Bootlegger in the west and the diamicton units in the east.

Lithologically, this formation is predominantly represented by dark, silt- to clay-size materials that are interpreted as glacio-estuarine deposits. The occasional presence of clayey gravel, silty sand, or silt with sand could be interpreted as a nearshore or ice marginal phase of the Bootlegger. The Bootlegger has a much lower hydraulic conductivity than the overlying gravel, and may confine groundwater into multiple aquifers.

Morainal Shoals and Elmendorf Subaqueous Outwash. **Figures 6, 12, 13** and **14** represent the various interrelationships of morainal shoals and their associated subaqueous outwash deposits with the other depositional elements. **Figure 9** shows only the presence of the outwash in the western part of section B-B'. Note that the morainal shoal is overlain either by outwash or by the Elmendorf Moraine and/or its ground moraine deposits. Laterally, it either intercalates with the subaqueous outwash or with the ground moraine. The morainal shoals in the JBER area are largely composed of diamicton with a large proportion of silt, clay and very fine sand, and a smaller proportion of sand and gravel (approximately 20 percent [%]).

The subaqueous outwash deposits related to the morainal shoals consist largely of matrix-poor, moderately sorted gravels. Any matrix material present is typically poorly sorted, muddy, coarse sand. Beds may be sheet-like and pinch out laterally over several thousands of feet. The sheet-like nature of the beds suggests that the parental flows were unconfined. The matrix-poor nature of the facies suggests that the gravels were hydraulically sorted prior to deposition.

Dishno Pond. The Dishno Pond lateral moraine and associated deposits are only encountered in the eastern parts of sections A-A' (**Figure 7**) and B-B' **(Figure 10)**, as well as in section F-F' (**Figure 15),** which cross-cuts A-A' and B-B'. This unit is overlain by the Mountain View alluvial fan (and locally by glacial drift deposits), and underlain by a muddy diamicton of an older moraine or a probable eastern equivalent of the Bootlegger. Cross sections covering the area between Fort Richardson and Elmendorf (**Figures 8** and **11**) show the pinching out of Dishno Pond diamicton towards the west.

The Dishno Pond deposits primarily consist of sandy diamictons with various proportions (5 to 20%) of clay matrix. The grain size of the sandy fraction ranges from very fine to coarse, interspersed by

granules, pebbles and cobbles. These deposits are a few to tens of feet thick in the study area. The poor sorting indicates a low transmissibility for these sediments.

Stratified Glacial Drift. The eastern portion of section A-A' (**Figure 7**) and section F-F' (**Figure 15**) show good examples of these erosional remnants overlain by the Mountain View fan and underlain by the Dishno Pond diamicton and its associated deposits. The contact between the glacial drift and the Dishno Pond (and associated diamictons) is generally non-erosive.

These deposits are sorted according to the size and weight of their fragments. As the glacial ice started to melt, sub-aerial channels started to develop, which transported sediments downhill, depositing well-sorted sand and pebbles saddled on the depressions of the underlying strata. As well-sorted sediments, the stratified drift deposits are inferred to show high transmissibility.

Elmendorf End Moraine. The Elmendorf end moraine is represented in all the stratigraphic sections in the Elmendorf area (**Figures 6, 8, 12** and **13**) as an east-west trending continuous ridge of diamicton deposits. As shown, locally the deposit intercalates with ground moraines and outwash deposits, and overlies morainal shoals.

The deposits of the Elmendorf end moraine largely consist of a poorly-sorted mixture of silt, sand and gravel (diamicton), along with coarse gravel, fine, well-sorted sand, and dense silt and clay, which is moderately to well compacted. They are genetically related to glacial and gravitational slope processes, producing a gently arching ridge complex at the ice margin. The transmissibility of these sediments is inferred to be generally poor.

Ground Moraine. This unit is always associated with the Elmendorf end moraine, and intercalates with it spatially (e.g., **Figures 12** and **13**). Eastward, the ground moraine also intercalates with the edge of the Mountain View alluvial fan, as shown in section D-D' (**Figure 13**). In the Elmendorf area, the ground moraine overlies the morainal shoal or their subaqueous outwash deposits (e.g., **Figure 13**). In the absence of the shoals, the unit is directly in contact with the Bootlegger (e.g., **Figure 12**).

The ground moraine deposits are composed of diamicton that may exhibit various degrees of sorting and stratification, and may contain thin, interbedded sand, silt and gravel horizons. The unit locally contains thin, interbedded sand and silt, and occasionally shows gravel horizons related to outwash.

Mountain View Alluvial Fan. The Mountain View fan facies is most prominently developed in the Fort Richardson area (e.g., **Figures 7, 10** and **15**). **Figures 6** and **9** show the lateral extent of this unit towards the Elmendorf AFB area. The trend of thickness and marker horizons indicates that the axis of the fan probably runs in a general north to south direction, dipping in the south to southwest direction (e.g., **Figures 11** and **4**). Note that although debris flow deposits are inferred at the initiation of the fan in the model (**Figure 4**), from a theoretical perspective such deposits were not encountered in any of the cross sections for the Mountain View alluvial fan.

Deposits of the Mountain View fan primarily consist of sand and gravel, with a high concentration (10 to 15%) of fines (silt and clay). Interbedded silty sand and gravel-containing lenses and layers of silt and clay are common. Silt and clay horizons may be rafted blocks transported during outburst floods, or deposits in small ephemeral ponds and backwater areas of abandoned channels.

3 JBER Hydrogeology

Groundwater flow patterns across JBER are complex, with varying gradients and flow directions in response to the hydraulic boundaries that surround the Base. Stratigraphy also impacts groundwater occurrence and movement.

Fieldwork for the CSM consisted of examining nearby outcrops of geologic units and performing a synoptic round of water levels. Water levels were collected from September 12 through September 16,

2016, and a total of 474 water levels were measured. **Table 3** presents the water-level data. These data were used to prepare the maps that follow.

Groundwater at JBER occurs under water-table conditions within relatively permeable sediments. In areas where low permeability material such as diamicton is present, the deeper water-bearing sediments may be confined. Perched water tables are also present.

Figure 16 shows the water-table surface over a shaded relief topographic map. The aquifer is bounded by the Chugach Mountains to the east, Knik Arm to the west, Ship Creek to the south, and several water bodies (including the Eagle River) to the north. These hydraulic boundaries control groundwater flow. The section numbers shown on the map were used to organize the water-level data collection effort, and were left in place to provide convenient geographical references for the following discussion.

Ship Creek is an interesting and complex hydraulic boundary in that it acts as both a discharge (losing stream) and a recharge (gaining stream) boundary. On the eastern portion of the map (east of the 170-foot groundwater contour; Map Section C-2), this creek is losing water to the aquifer. On the west side (west of the 170-foot groundwater contour), it gains as groundwater discharges to it. It is not clear whether the losing section of Ship Creek is directly connected to the aquifer along this entire reach, but water levels in monitoring wells (Map Section C2) indicate that it is; this may not be the case farther up into the mountains. The interpretation of the losing reach of Ship Creek shown on the map assumes that there is a direct connection to the groundwater along this reach. The tributary to Ship Creek, Gunnery Creek, which stretches along the eastern boundary of the map (Map Section B3), also appears to be losing water to the aquifer. Along their losing sections, these creeks are at a relatively high elevation (170 ft to as much as 400 ft). The alluvial fans developed along the Chugach Mountains provide a major source of water storage and recharge.

On the northern part of the map, the water bodies present are discharge areas for groundwater. These water bodies include the Eagle River and mud flats, and numerous lakes of varying sizes. The Eagle River mud flats (Map Section A2) occur at an elevation of approximately 22 ft, dropping to sea level downstream. The other nearby lakes, Upper Six Mile and Otter, are at a much higher elevation (approximately 100 ft). Because of its low elevation and large size, the Eagle River mud flats act as a significant discharge area for groundwater. In the same area, Fossil Creek (Map Sections A2 and A3) also acts as a discharge area.

To the west, Knik Arm does not seem to be a major discharge area for groundwater. Seepage along the banks at the edge of the Elmendorf Moraine occurs, but most discharge is to Ship Creek. As a result, Knik Arm does not exert much control over groundwater. Much of the sediment creating the Elmendorf Moraine is a mixture of fine and course-grained material that is of relatively low permeability. While groundwater within the Elmendorf Moraine drains to the north and south, the quantity of water moving is likely to be low. Therefore, the primary recharge to the shallow aquifer is from precipitation stored in the alluvial fans and from Ship Creek.

The occurrence and orientation of the Bootlegger, which acts hydrologically as a confining bed, also has a major influence on groundwater flow patterns. This geologic unit underlies Elmendorf AFB, but pinches out to the east so that it is not present underlying Fort Richardson (**Figure 6**). This pinch out allows the Eagle-River-mudflats discharge area to drain a portion of the overlying sediment within the moraine, possibly leaving small perched water tables where a perching layer is present. The Bootlegger underlying Elmendorf is an effective aquitard, and prevents discharge areas to the north (lakes and mudflats) from draining the moraine sediments in this area.

Groundwater flow across JBER would likely be from east to west, from the topographic highs in the Chugach Mountains to Knik Arm. However, the hydraulic boundaries mentioned above cause groundwater flow to turn to the north, northwest in the Fort Richardson cantonment area. The major influence is the Eagle River mud flats. The influence of this feature, combined with the lack of an underlying confining bed (Bootlegger), lowers the water table below the bottom of the end moraine in this area. However, there are very few monitoring wells that penetrate the moraine in the Fort Richardson area and, therefore, this interpretation cannot be directly verified.

As groundwater moves into the Fort Richardson cantonment area (Map Section B2), it flows over a low-permeability diamicton that pinches out and is therefore only present locally. The steep gradient shown in that area marks the diamicton pinch out, as shallow groundwater merges with deeper flow. Moving to the west, the groundwater gradient is relatively flat. As groundwater moves toward Elmendorf, at about the 170 ft contour (Map Section C2), Ship Creek transitions from a losing stream to a gaining stream. This transition coupled with groundwater draining from the Elmendorf Moraine creates unusual groundwater flow patterns. In the area where Map Sections B1, B2, C1 and C2 intersect, multiple components of groundwater flow are present, consisting of flow that is to the northwest, west, northeast and northwest, all occurring under a relatively flat gradient. Farther to the west, on Elmendorf AFB (Map Section C1), groundwater flows to the south and southwest, to discharge into Ship Creek.

Groundwater drains to the northwest and southeast off the Elmendorf Moraine. North of the moraine, groundwater flow is toward the major surface-water bodies present. Smaller lakes occur, some of which may be perched.

The Base-wide map was divided into east and west sections so the data upon which they were based could be shown. **Figure 17** shows the east side of the map, and **Figure 18** shows the west side. On the far eastern side of **Figure 17**, groundwater flows to the west from losing streams at relatively high elevations. Between the Chugach Mountains and the Eagle River mudflats there is nearly 380 ft of head loss. On the east side of the map there is a tributary to Ship Creek, Gunnery Creek, that is assumed to be losing, as is Ship Creek on this part of the map, and directly connected to the water table. These assumptions result in a steep gradient entering the Fort Richardson area. This gradient flattens somewhat as groundwater moves across the area, flowing over a low permeability confining bed (diamicton) present in the Cantonment area. The gradient steepens in the Cantonment area when this confining bed pinches out. The water-table aquifer and the underlying confined aquifer merge, and the gradient becomes very flat as it moves toward the remnants of the end moraine and the Eagle River mud flats. To the north (Map Sections A2 and A3) the interpretation of groundwater flow is based upon any monitoring wells present, topography, and the elevations of surface-water bodies that are likely connected to regional shallow aquifer.

On the west side of JBER where Elmendorf AFB is located (**Figure 18**), groundwater flow is primarily to the south and southwest, moving from high elevations on the Elmendorf Moraine to Ship Creek or seeps along Knik Arm. Note that the contour interval on this map varies, particularly on the Elmendorf Moraine (Map Section B1). There is 100 ft to as much as 250 ft of head loss moving across Elmendorf AFB. To the north, the groundwater contours are based on the available water-level data, topography, and connected water bodies.

Figure 19 shows the water levels at wells in the confined aquifer within the Fort Richardson cantonment area. There are few wells screened in this unit, resulting in subjective contours. However, the map provides a concept for how groundwater moves within this unit. The confined groundwater moves to the northwest in general, but turns to the north to merge with the unconfined groundwater and migrates to the Eagle River.

North of the Elmendorf Moraine (**Figure 18**, Map Section A1) is site DP98. The shallow groundwater in this area is mapped in more detail on **Figure 20**. This area is also shown on the extreme northern end of section C-C' (**Figure 12**). The site sits on a topographic high that slopes down to the north and west. A wetland is present at the base of the site's north slope, and groundwater in this area is encountered just above a mat of peat. Unconfined groundwater intersects topographic contours at the base of this slope north of well 41755WL-07. Over a large part of the site there is fill material, which overlies diamicton and interfingering morainal shoal and glacial outwash material. The diamicton, shoal and outwash material comprise the primary unconfined water-bearing zones, and are part of the regional water-table aquifer. The diamicton and the finer-grained material within the morainal shoal create localized semi-confined conditions; however, based on historical pump tests at the site, there is hydraulic connectivity between the all of these materials (URS, 2003).

The artificial fill material creates a localized perched-water zone. Wells 41755WL-10, 41755WL-11 and 41755WL-01 are screened in this zone, and the water levels were not used in contouring. During the synoptic water level measurements in September 2016, the total depth of well 41755WL-03 was observed to be at approximately seven feet below top of casing (TOC), whereas historical measurements indicate a total depth of approximately 30 feet below TOC. This indicates the well may be damaged; therefore, this water level was not used.

Groundwater flow within the water-table aquifer is to the north-northwest, which is the flow direction shown on the regional map, **Figure 18**. Underlying the water-table aquifer is a confined groundwater unit screened beneath the diamicton, but across interfingering outwash and shoal materials (**Figure 12**). These two zones do not indicate separate aquifers, but rather changing conditions deeper within the aquifer. There are three wells screened in this zone. The water levels and contours are shown on **Figure 21**. Groundwater flow is to the north, a slightly different flow direction than is indicated by data on the shallow water table.

4 CSM Observations

Based on the work performed, the following observations are presented:

- Groundwater generally occurs under water-table conditions. The shallow aquifer is bounded by the Chugach Mountains to the east, Knik Arm to the west, Ship Creek to the south, and several water bodies (including the Eagle River) to the north. These hydraulic boundaries control groundwater flow.
- Ship Creek is a complex hydraulic boundary in that it is both a losing stream and a gaining stream, depending upon location. In the area of Elmendorf AFB, the shallow aquifer discharges to Ship Creek, but in the Fort Richardson area the creek recharges the aquifer.
- To the north are other hydraulic boundaries that act as groundwater discharge areas, the most significant of which is the Eagle River and mud flats.
- To the west, Knik Arm does not seem to be a major discharge area for groundwater.
- The Bootlegger, which acts hydrologically as a confining bed, has a major influence on groundwater flow patterns. This unit underlies Elmendorf AFB, but pinches out to the east so that it is not present underlying Fort Richardson. This pinch out allows the Eagle River mudflats discharge area to drain a portion of the overlying sediment within the moraine, possibly leaving small perched water tables where a perching layer is present. The Bootlegger underlying Elmendorf AFB is an effective aquitard, and prevents discharge areas to the north (lakes and mudflats) from draining the moraine sediments in this area.
- Groundwater flows from the topographic highs in the Chugach Mountains to the west onto Fort Richardson. However, groundwater flow turns to the north, northwest toward Eagle River.
- As groundwater moves to Elmendorf AFB, at about the 170 ft contour (Map Section C2, **Figure 16**), Ship Creek transitions from a losing stream to a gaining stream. Groundwater flow at Elmendorf AFB is to the south, southwest toward Ship Creek. An area of complex flow patterns and relatively flat gradients with northerly and southerly components is present in the area where Ship Creek transitions from losing to gaining.
- Groundwater within the Elmendorf Moraine drains to the northwest and southeast from a groundwater flow divide.
- At Site DP98, the regional, shallow, water-table aquifer is present. A perched zone is present in the fill material at the ground surface, and a deeper confined zone is present. Groundwater flow within the water-table aquifer is to the northwest, and flow within the confined zone is to the north.

5 References

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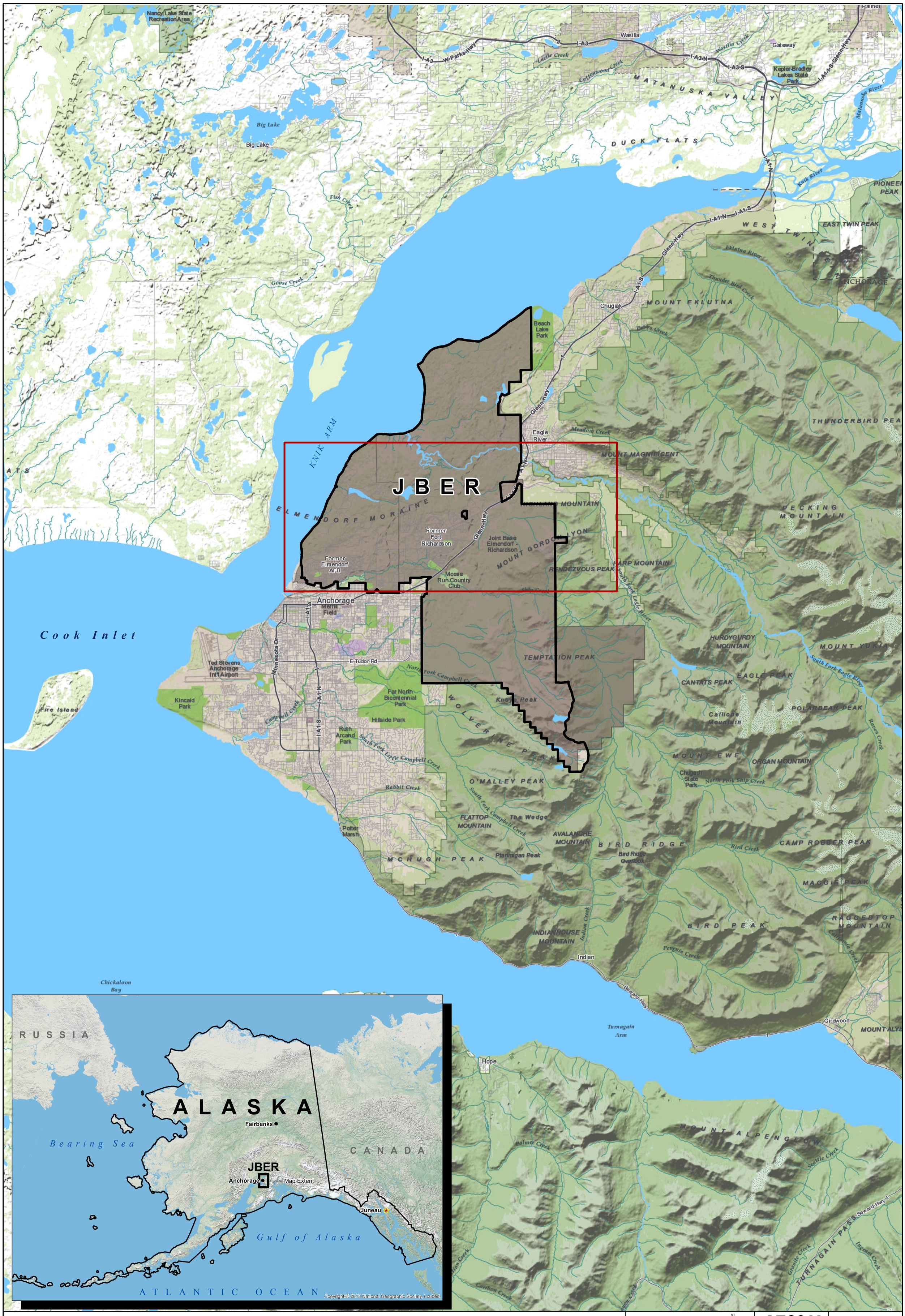
Figures



Legend

JBER CSM Study Area

Map Projection: Alaska Zone 4
NAD 83, Feet
Fips: 5004

Datum: North American 1983

N W E S

10,000 5,000 0 10,000 Feet

0 1 2 4 Miles

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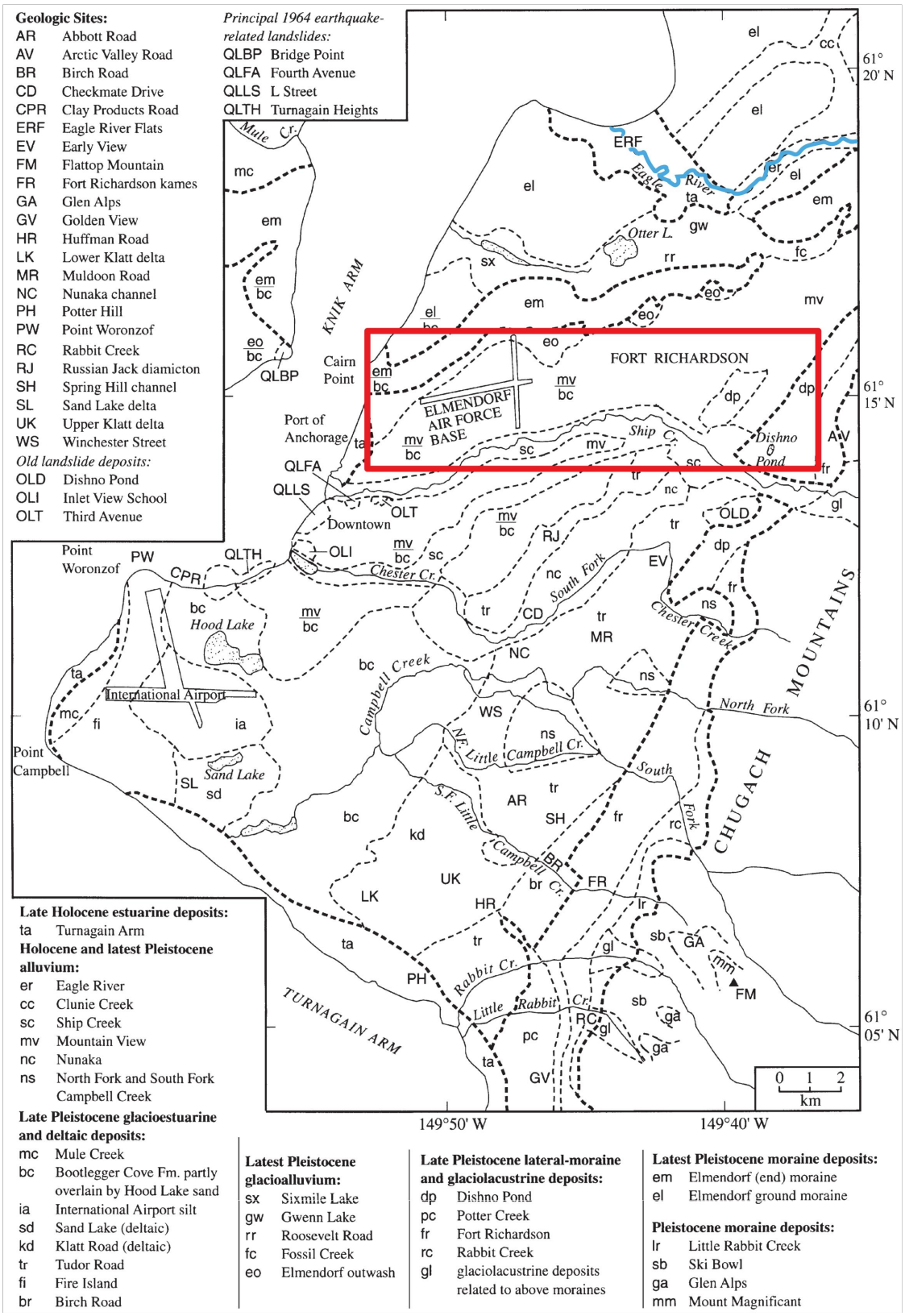
JBER CSM

Base Location Map

CONTRACT NO.	PREPARED BY:	DATE:	
60443333	RJS	8/29/2017	**Figure 1**

L:\Projects\60443333_AETC_CSMs\900-CADD_GIS\904_JBER\920-929-GIS-graphics\Maps\Regional Location Map 2234_Port_NAD83.mxd



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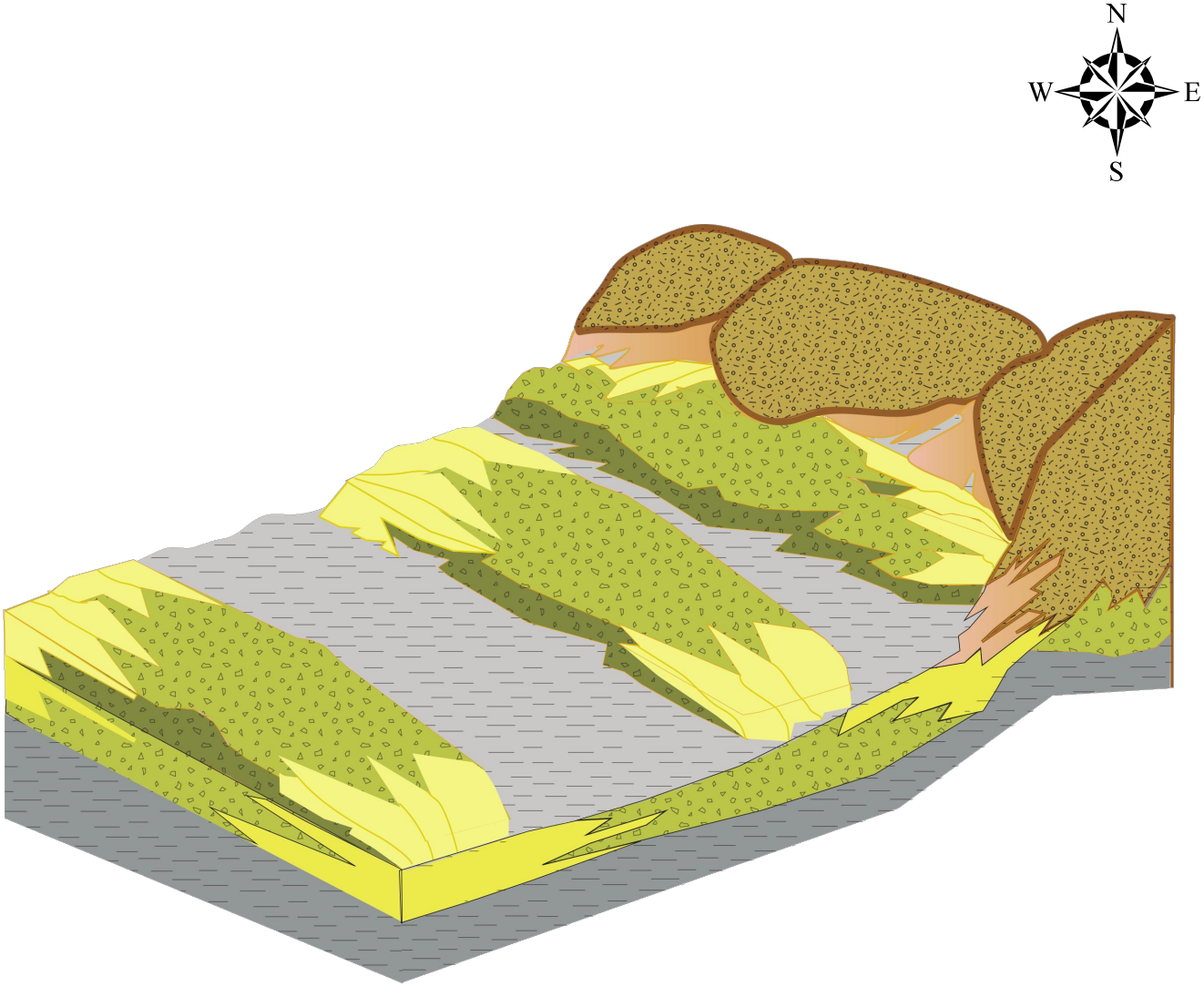
Regional Quarternary Geology of the Anchorage Lowland

PROJECT NO.	DRAWN BY:	DATE:	
60443333	RJS	08/28/2017	**Figure 2**

JBER STRATIGRAPHIC MODEL, ELMENDORF AREA



- Ground Moraine
- Elmendorf End Moraine
- Elmendorf Outwash (Subaqeuous)
- Morainal Shoal
- Boot Legger Formation (Estuarine)

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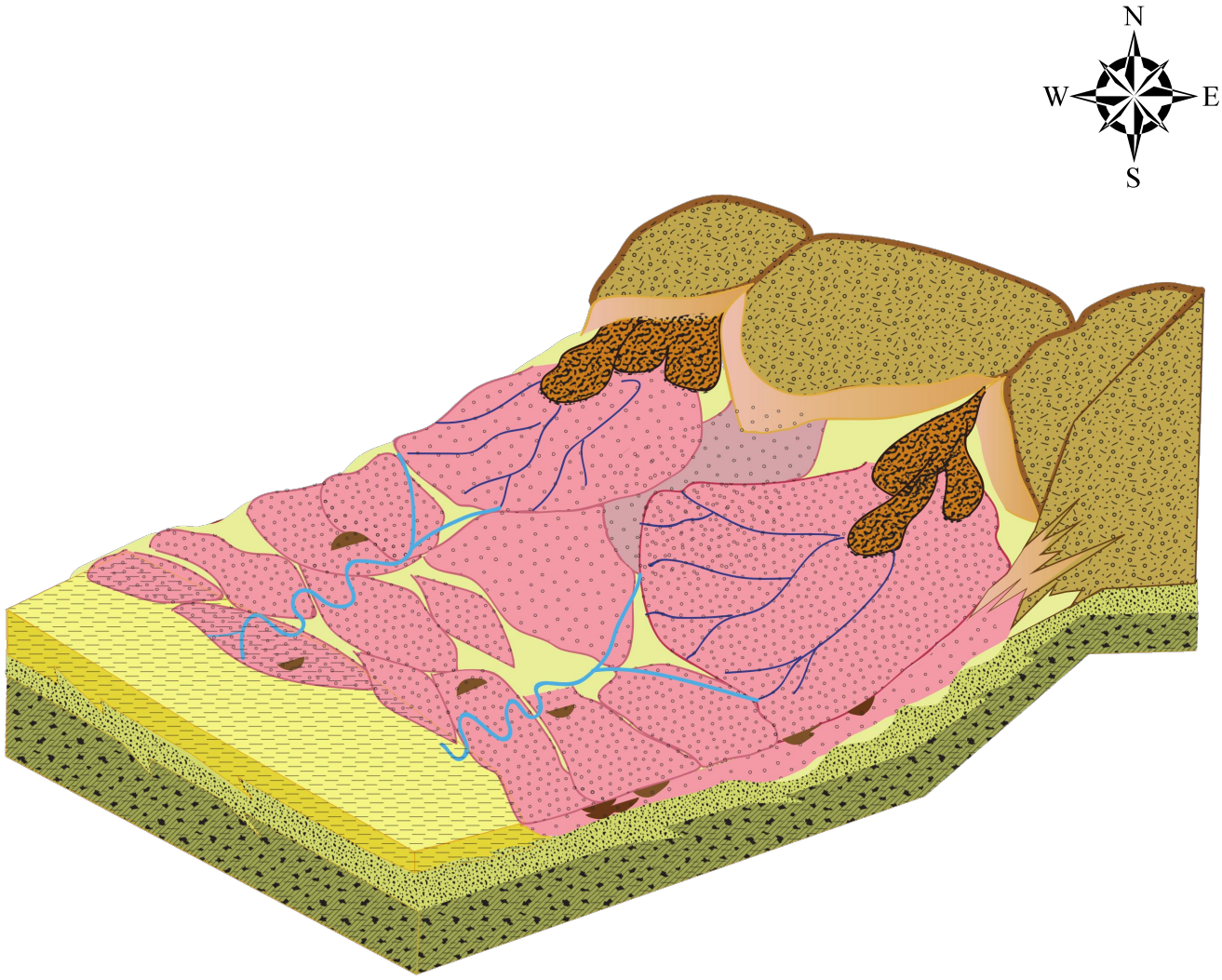
Summary Stratigraphic Model
for Elmendorf Area (West Side)

PROJECT NO.	DRAWN BY:	DATE:	
60443333	RJS	08/30/2017	**Figure 3**

JBER STRATIGRAPHIC MODEL, FORT RICHARDSON AREA



- Ground Moraine
- Elmendorf End Moraine
- Mountainview Alluvial Fan
- Stratified Drift
- Glacial Outwash
- Sand-dominated Diamicton (Dishno Pond Moraine)
- Clay-dominated Diamicton (Older Moraine)
- Debris Fow Deposits (Not encountered in cross-sections)
- Channel-fill deposits

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Summary Stratigraphic Model
for Fort Richardson Area (East Side)

PROJECT NO.	DRAWN BY:	DATE:	
60443333	RJS	08/30/2017	**Figure 4**

KNIK ARM

SIXMILE LAKE

Sixmile Creek

SPRING LAKE

GREEN LAKE

TUOMI LAKE

FISH LAKE

TRIANGLE LAKE

OTTER LAKE

Fossil Creek

North Fork Ship Creek

Ship Creek

SHIP CREEK

Former Elmendorf AFB

Former Ft. Richardson

A — A'

B — B'

C — C'

D — D'

E — E'

F — F'

DP98MW-06, DP98MW-05, DP98INJ-01, 41755-WL05, 41755-WL21, DP98MW-04, DP98MW-08, 41755-WL03, 41755-WL10, 41755-WL01, 41755-WL20

59WL21, 59WL13, 59WL12, 59WL33, 59WL28, T42202, 59WL05, 59WL03, 59BH80, 59WL08, 59WL-44, SP5-06, SP5-07, ST41-MW36, MW-78-OU6, MW-13-OU6, K303, MW-06-OU6, MW-05-OU6, 59WL20, W-4, 59WL16, T40503, 59WL36, 59WL-36R, 59WL04, 59BH13, 43WL07, 43WL02, 43TW09-13, 43TW09-08

TWNMW-79, W-12, W-13, MW-13-OU3, MW-06-OU3, 49WL01, 48WL01, 48WL03, 529MW-IN, MW-24-OU3, MW-15-OU3, MW-03-OU3, 5MW34, OU5MW-38, OU5MW-43, 5MW01, OU5MW-46, SP1-01, 5MW35, W-16, ST524MW-01, 516MW-02, NS3-06, NS3-02

SD025MW-02, 52WL02, 52WL04, OU4W-16, OU4W-17, W-15, FP51, FP53, GW-5A, 407MW-01, SB-039-OU4, W-19, SB-040-OU4, IS-3, OU4W-15, OU4W-14, OU4E-3, 509MW-IN, W-7, SP15-02, 64WL01, 64WL03, 64WL02, 60WL-06, ST20-MW08, ST20-MW09, ST20-MW07, ST20-MW06, ST20-MW11, W-17, ST20-MW12, 61WL05, 61WL04, 427MW-IN, SP14-01, 61WL01, 61WL02, GW-7A, 536WL-01, SP14-02, SP4-03, SP4-01, 5MW08, ST375MW-08, ST375MW-07, 5MW31

SB-22-OU6, SB-19-OU6, SB-79-OU6, MW-72-OU6, MW-70-OU6

SB-048-OU4, SB-043-OU4, IS-5, SB-050-OU4, OU4E-2, OU4E-1, SS22MW10, SS22MW06, SS22MW07, SS22MW01, SS22-MW18D, SS22MW02, GW-1A, LF05-ZBH07, LF05-ZBH12, LF05-ZMW08, LF05-MW17, W-1, D13-01, GW-1C, LF05-ZBH11, LF05-ZMW06, LF05-ZMW09, D3-04, D13-04, D13-03, LF05-ZBH13, LF05-ZMW14, LF05MW-16, GW-1B, LF05-ZBH14, GW-2C, LF59-BH10, LF59-BH09, MW-49-OU6, MW-48-OU6, GW-2A, LF05-ZMW01

RVLMW03, RVLMW02, RVLMW04, RVLB06A, RVLMW01

TU077-SB02, TU075-SB01, TU070-SB01, TU070-SB02, TU073-SB02, TU073-SB06, TU076-SB01, TU085-SB01, TU071-SB01, TU074-SB06, TEMFMW01, AP-3460, TEMFMW02, AP-3375, AP-5793, AP-5794, AP-5792, DHUST-MW02, DHUST-MW03, DHUST-MW01, AP-3657, AT029-SB02, TU110-E1-C, TU110-E1-B, AP-3696, AP-3533, AP-3513, AP-4536, AP-4537, AP-5038, AP-5004, AP-3532, TU037-MW01, AP-3871, AP-3774, AP-5002, AP-5000, TU111-E5-C, TU111-E5-B, TU111-E5-A, TU112-E7-B, TU112-E7-C, TU112-E7-A, FS4-1

Map Extents

JBER

Legend

- Borehole Location
- JBER Installation Boundary

Transect

- A-A
- B-B
- C-C
- D-D
- E-E
- F-F

Map Projection:
NAD 1983, State Plane Ohio South, FIPS 3402, Feet

Datum:
North American, 1983

1,000 500 0 1,000 Feet

1:16,000

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Transect Locations
for Stratigraphic Cross Sections

PROJECT NUMBER:	PREPARED BY:	DATE:	
60443333	RJS	8/30/2017	Figure 5

Cross-Section A-A'

Match Line

Former Elmendorf AFB | Former Ft. Richardson

Cross-Section A-A' - West Side
Former Elmendorf AFB

Cross-Section A-A' - East Side
Former Fort Richardson

A
West

A'
East

C - C'

D - D'

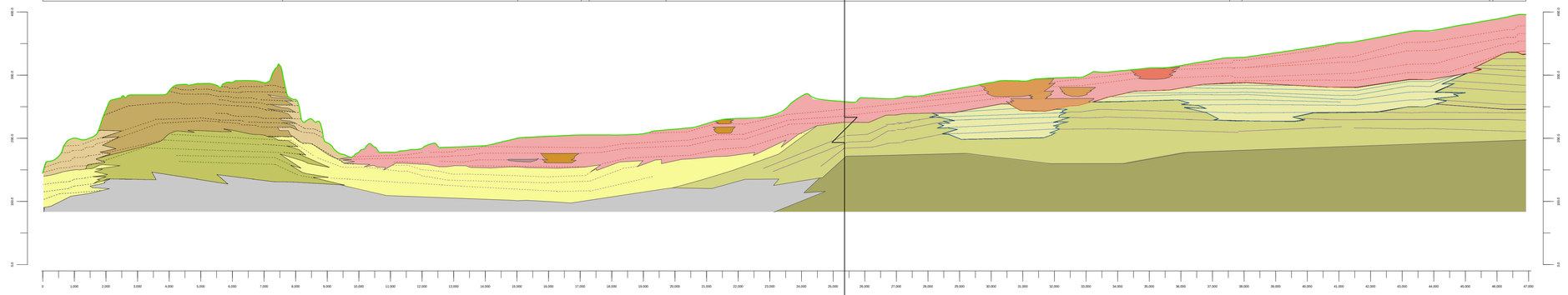
N - S Runway

E - E'

F - F'

F - F

E - W Runway



Match Line

Lithofacies

- Artificial Fill
- Mountain View Fan Alluvium (Gravel, Sand, and Silt)
- Mountain View Fan Alluvium (Silt)
- Pebbly channels
- Elmendorf Outwash 2
- Elmendorf Outwash 1 (Likely Deposited Subaqeuously)

Multiple Generations of Glacial Drift

- Stratified Drift (including some outwash) - free of silt and clay
- Diamicton (Sand, Gravel, and Silt)
- Diamicton, silt and clay dominated deposits
- Elmendorf End Moraine Till
- Elmendorf Ground Moraine Till
- Morainal Shoal (Heavily Deformed Glacio-Estuarine Clay, silt, and Sand, including Reworked Bootlegger Formation)
- Boot Legger Formation (Estuarine Clay)
- Boot Legger Formation (Estuarine Sands)

Units Identified using combination of topographic positioning, 1:25,000 Quaternery Geology Maps by Schmoll and Yehle, and boring descriptions

0 1000 2000 4000 6000

HORIZONTAL SCALE IN FEET

0 50 100 200 400

VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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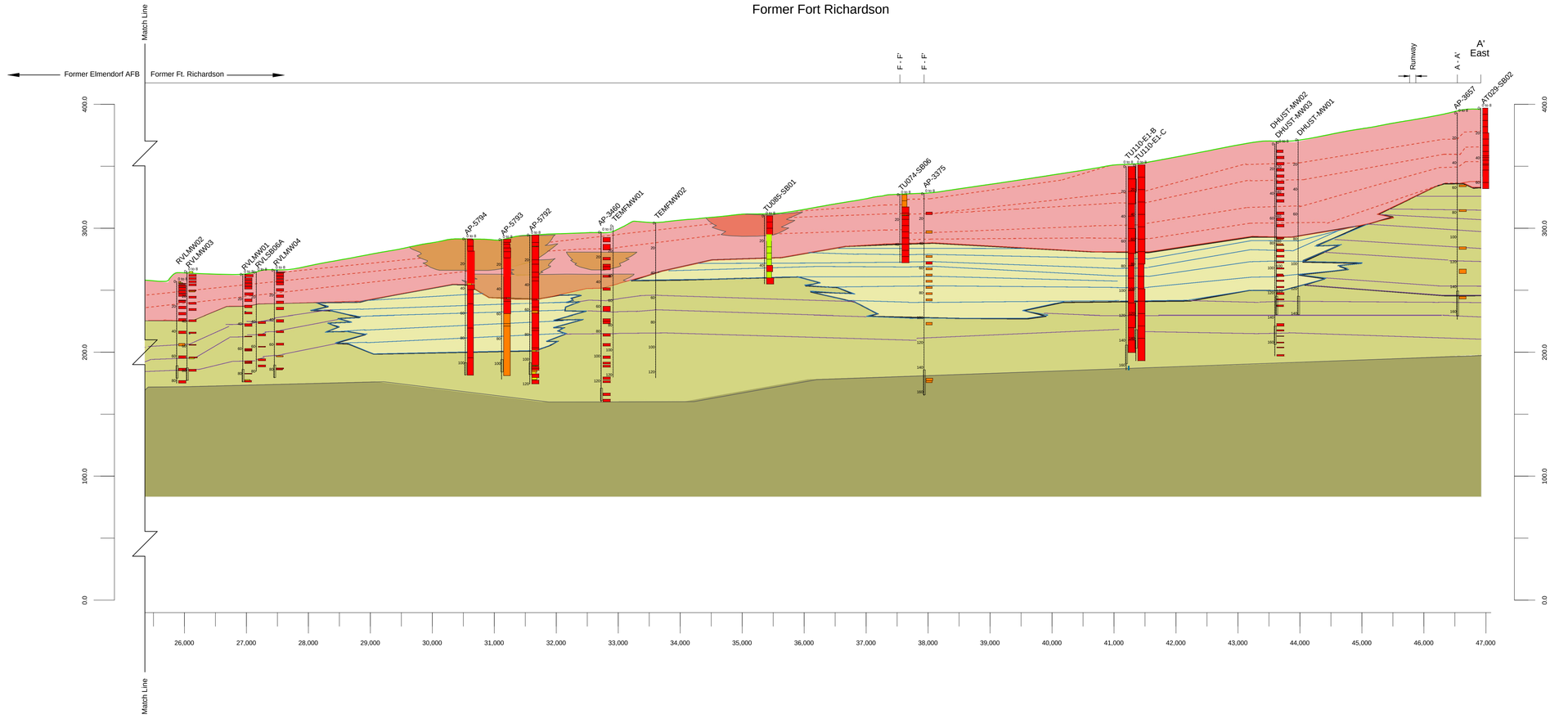
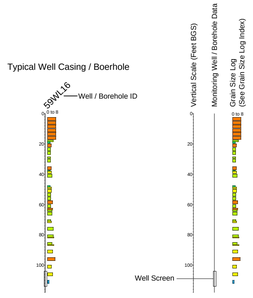
Complete Cross Section A-A'
Covering Both Fort Richardson and Elmendorf AFB

PROJECT NO:	DRAWN BY:	DATE:	
60443333	RJS	08/29/2017	**Figure 6**

Cross-Section A-A' - East Side
Former Fort Richardson



Down-hole Data Explanation



Lithofacies

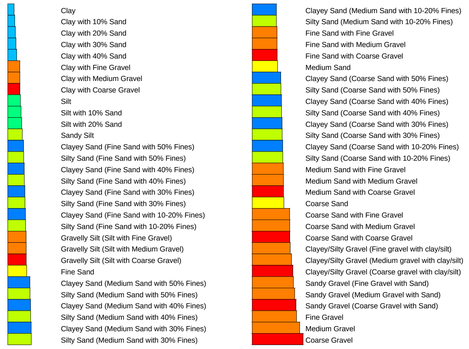
- Artificial Fill
- Mountain View Fan Alluvium (Gravel, Sand, and Silt)
- Mountain View Fan Alluvium (Silt)
- Pebbly channels
- Elmendorf Outwash 2
- Elmendorf Outwash 1 (Likely Deposited Subaqeuously)

Multiple Generations of Glacial Drift

- Stratified Drift (including some outwash) - free of silt and clay
- Diamicton (Sand, Gravel, and Silt)
- Diamicton, silt and clay dominated deposits
- Elmendorf End Moraine Till
- Elmendorf Ground Moraine Till
- Morainal Shoal (Heavily Deformed Glacio-Estuarine Clay, silt, and Sand, including Reworked Bootlegger Formation)
- Boot Legger Formation (Estuarine Clay) Boot Legger Formation (Estuarine Sands)

Units identified using combination of topographic positioning, 1:25,000 Quaternery Geology Maps by Schmoll and Yehle, and boring descriptions

Grain Size Log Index



0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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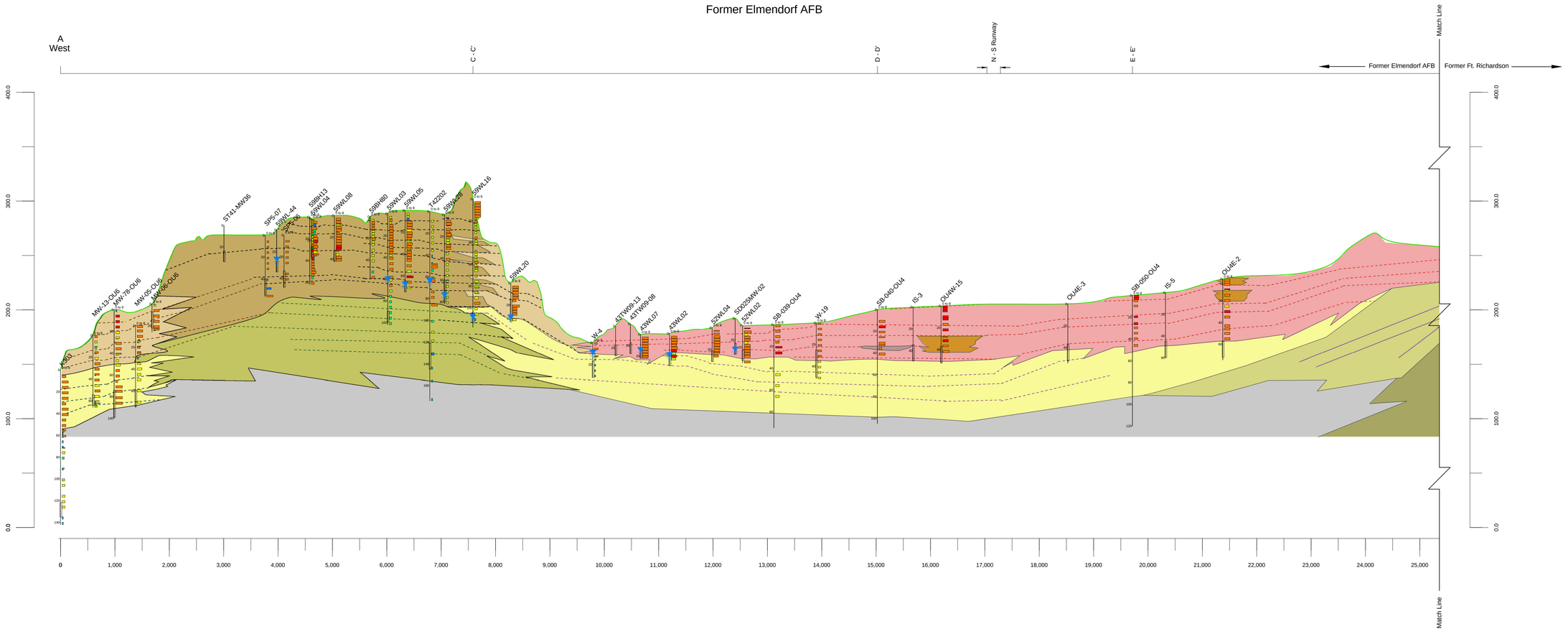
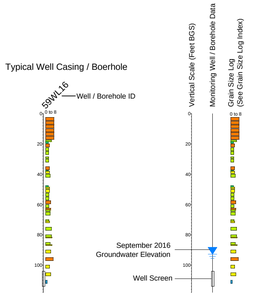
Cross-Section A A': East

PROJECT NO.	DRAWN BY:	DATE:	
60443333	RJS	08/30/2017	**Figure 7**

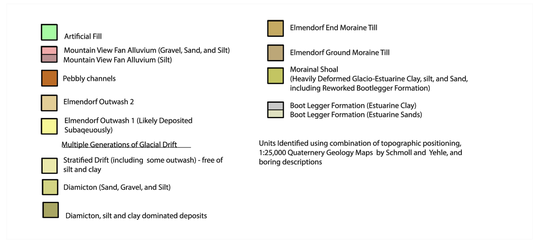
Cross-Section A-A' - West Side
Former Elmendorf AFB



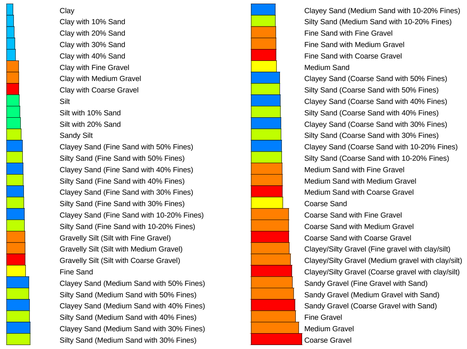
Down-hole Data Explanation



Lithofacies



Grain Size Log Index



0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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Cross Section A-A': West

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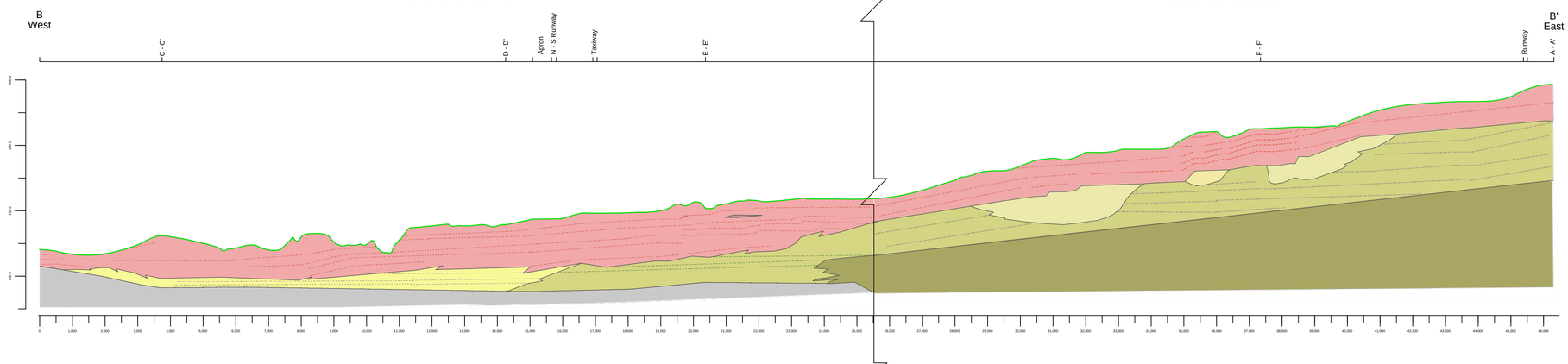
Cross-Section B-B'

Match Line

Former Elmendorf AFB | Former Ft. Richardson

Cross-Section B-B' - West Side
Former Elmendorf AFB

Cross-Section B-B' - East Side
Former Fort Richardson



Match Line

Lithofacies

- Artificial Fill
- Mountain View Fan Alluvium (Gravel, Sand, and Silt)
- Mountain View Fan Alluvium (Silt)
- Pebbly channels
- Elmendorf Outwash 2
- Elmendorf Outwash 1 (Likely Deposited Subaqeuously)

Multiple Generations of Glacial Drift

- Stratified Drift (including some outwash) - free of silt and clay
- Diamicton (Sand, Gravel, and Silt)
- Diamicton, silt and clay dominated deposits
- Elmendorf End Moraine Till
- Elmendorf Ground Moraine Till
- Morainal Shoal (Heavily Deformed Glacio-Estuarine Clay, silt, and Sand, including Reworked Bootlegger Formation)
- Boot Legger Formation (Estuarine Clay)
- Boot Legger Formation (Estuarine Sands)

Units Identified using combination of topographic positioning, 1:25,000 Quaternery Geology Maps by Schmoll and Yehle, and boring descriptions

0 1000 2000 4000 6000
HORIZONTAL SCALE IN FEET

0 50 100 200 300
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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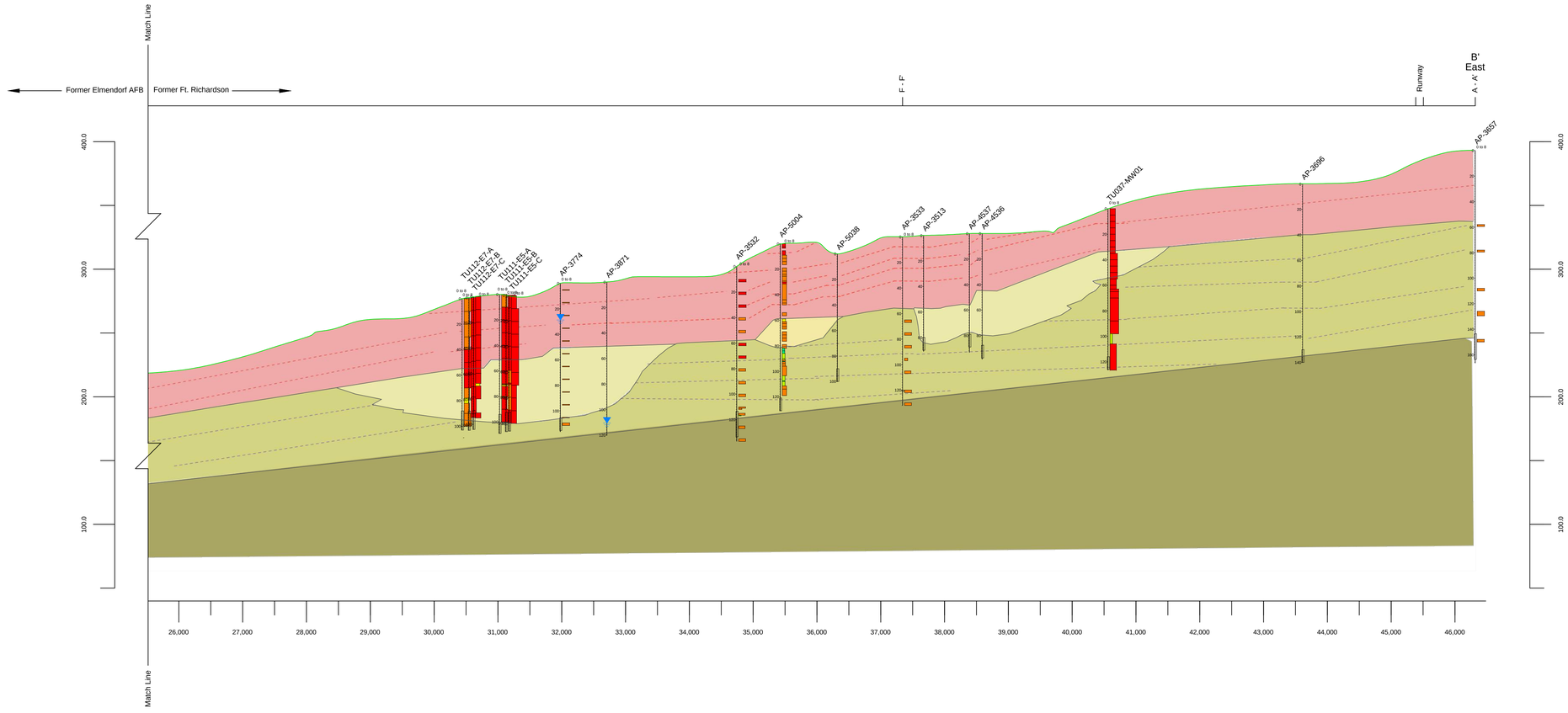
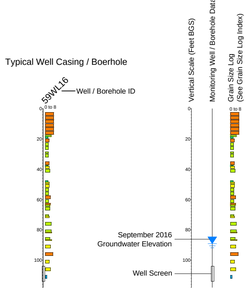
Complete Cross Section B-B'
Covering both Fort Richardson and Elmendorf AFB

PROJECT NO:	DRAWN BY:	DATE:	
60443333	RJS	08/30/2017	**Figure 9**

Cross-Section B-B' - East Side
Former Fort Richardson



Down-hole Data Explanation



Lithofacies

- Artificial Fill
- Mountain View Fan Alluvium (Gravel, Sand, and Silt)
- Mountain View Fan Alluvium (Silt)
- Pebbly channels
- Elmendorf Outwash 2
- Elmendorf Outwash 1 (Likely Deposited Subaqeuously)

Multiple Generations of Glacial Drift

- Stratified Drift (including some outwash) - free of silt and clay
- Diamicton (Sand, Gravel, and Silt)
- Diamicton, silt and clay dominated deposits
- Elmendorf End Moraine Till
- Elmendorf Ground Moraine Till
- Morainal Shoal (Heavily Deformed Glacio-Estuarine Clay, silt, and Sand, including Reworked Bootlegger Formation)
- Boot Legger Formation (Estuarine Clay)
- Boot Legger Formation (Estuarine Sands)

Units Identified using combination of topographic positioning, 1:25,000 Quaternery Geology Maps by Schmoll and Yehle, and boring descriptions

Grain Size Log Index

- Clay
- Clay with 10% Sand
- Clay with 20% Sand
- Clay with 30% Sand
- Clay with 40% Sand
- Clay with Fine Gravel
- Clay with Medium Gravel
- Clay with Coarse Gravel
- Silt
- Silt with 10% Sand
- Silt with 20% Sand
- Sandy Silt
- Clayey Sand (Fine Sand with 50% Fines)
- Silty Sand (Fine Sand with 50% Fines)
- Clayey Sand (Fine Sand with 40% Fines)
- Silty Sand (Fine Sand with 40% Fines)
- Clayey Sand (Fine Sand with 30% Fines)
- Silty Sand (Fine Sand with 30% Fines)
- Clayey Sand (Fine Sand with 10-20% Fines)
- Silty Sand (Fine Sand with 10-20% Fines)
- Gravelly Silt (Silt with Fine Gravel)
- Gravelly Silt (Silt with Medium Gravel)
- Gravelly Silt (Silt with Coarse Gravel)
- Fine Sand
- Clayey Sand (Medium Sand with 50% Fines)
- Silty Sand (Medium Sand with 50% Fines)
- Clayey Sand (Medium Sand with 40% Fines)
- Silty Sand (Medium Sand with 40% Fines)
- Clayey Sand (Medium Sand with 30% Fines)
- Silty Sand (Medium Sand with 30% Fines)
- Clayey Sand (Medium Sand with 10-20% Fines)
- Silty Sand (Medium Sand with 10-20% Fines)
- Fine Sand with Fine Gravel
- Fine Sand with Medium Gravel
- Fine Sand with Coarse Gravel
- Medium Sand
- Clayey Sand (Coarse Sand with 50% Fines)
- Silty Sand (Coarse Sand with 50% Fines)
- Clayey Sand (Coarse Sand with 40% Fines)
- Silty Sand (Coarse Sand with 40% Fines)
- Clayey Sand (Coarse Sand with 30% Fines)
- Silty Sand (Coarse Sand with 30% Fines)
- Clayey Sand (Coarse Sand with 10-20% Fines)
- Silty Sand (Coarse Sand with 10-20% Fines)
- Medium Sand with Fine Gravel
- Medium Sand with Medium Gravel
- Medium Sand with Coarse Gravel
- Coarse Sand
- Coarse Sand with Fine Gravel
- Coarse Sand with Medium Gravel
- Coarse Sand with Coarse Gravel
- Clayey/Silty Gravel (Fine gravel with clay/silt)
- Clayey/Silty Gravel (Medium gravel with clay/silt)
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- Sandy Gravel (Medium Gravel with Sand)
- Sandy Gravel (Coarse Gravel with Sand)
- Fine Gravel
- Medium Gravel
- Coarse Gravel

0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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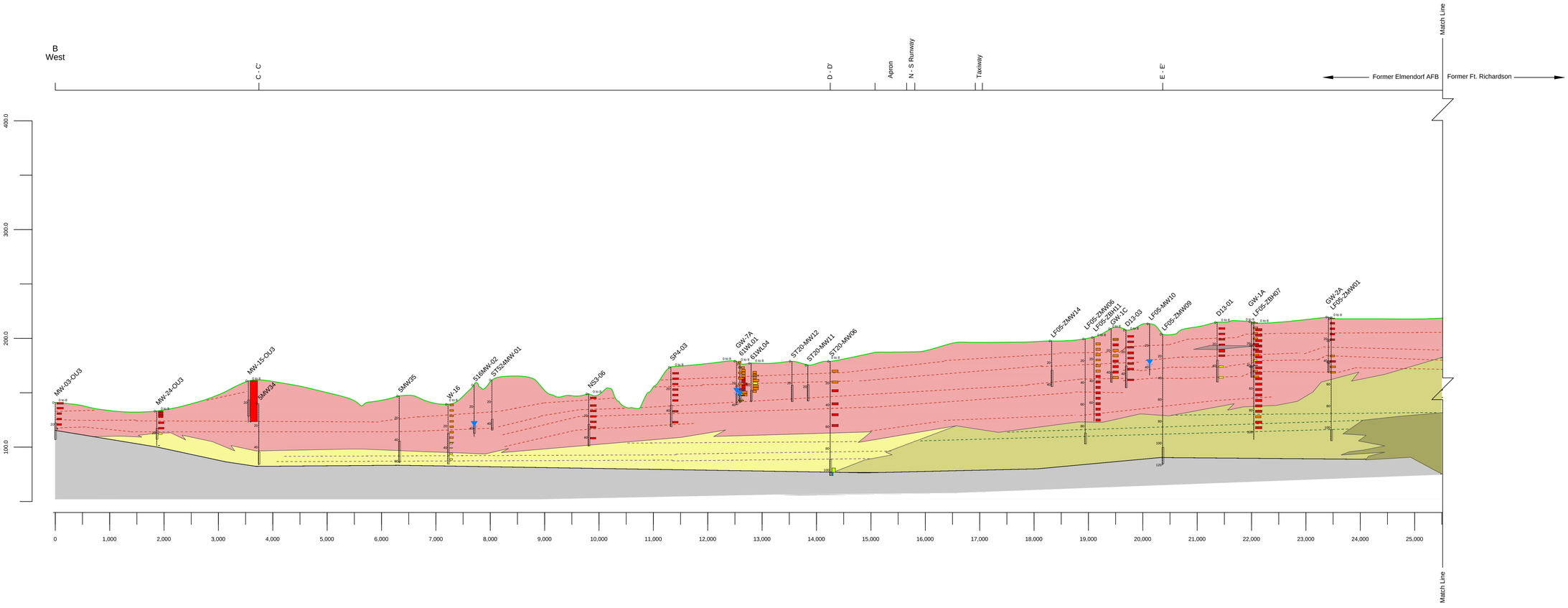
JBER CSM

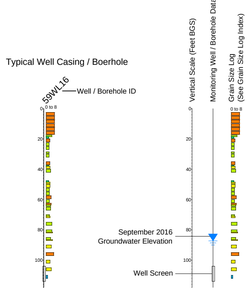
Cross Section B-B': East

PROJECT NO.	DRAWN BY:	DATE	
60443333	RJS	08/30/2017	**Figure 10**

Cross-Section B-B' - West Side
Former Elmendorf AFB



Down-hole Data Explanation



Lithofacies

- Artificial Fill
- Mountain View Fan Alluvium (Gravel, Sand, and Silt)
- Mountain View Fan Alluvium (Silt)
- Pebbly channels
- Elmendorf Outwash 2
- Elmendorf Outwash 1 (Likely Deposited Subaqeuously)

Multiple Generations of Glacial Drift

- Stratified Drift (including some outwash) - free of silt and clay
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- Diamicton, silt and clay dominated deposits
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- Elmendorf Ground Moraine Till
- Morainal Shoal (Heavily Deformed Glacio-Estuarine Clay, silt, and Sand, including Reworked Bootlegger Formation)
- Boot Legger Formation (Estuarine Clay)
- Boot Legger Formation (Estuarine Sands)

Units Identified using combination of topographic positioning, 1:25,000 Quaternery Geology Maps by Schmoll and Yehle, and boring descriptions

Grain Size Log Index

- Clay
- Clay with 10% Sand
- Clay with 20% Sand
- Clay with 30% Sand
- Clay with 40% Sand
- Clay with Fine Gravel
- Clay with Medium Gravel
- Clay with Coarse Gravel
- Silt
- Silt with 10% Sand
- Silt with 20% Sand
- Sandy Silt
- Clayey Sand (Fine Sand with 50% Fines)
- Silty Sand (Fine Sand with 50% Fines)
- Clayey Sand (Fine Sand with 40% Fines)
- Silty Sand (Fine Sand with 40% Fines)
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- Gravelly Silt (Silt with Coarse Gravel)
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- Sandy Gravel (Medium Gravel with Sand)
- Sandy Gravel (Coarse Gravel with Sand)
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- Medium Gravel
- Coarse Gravel

0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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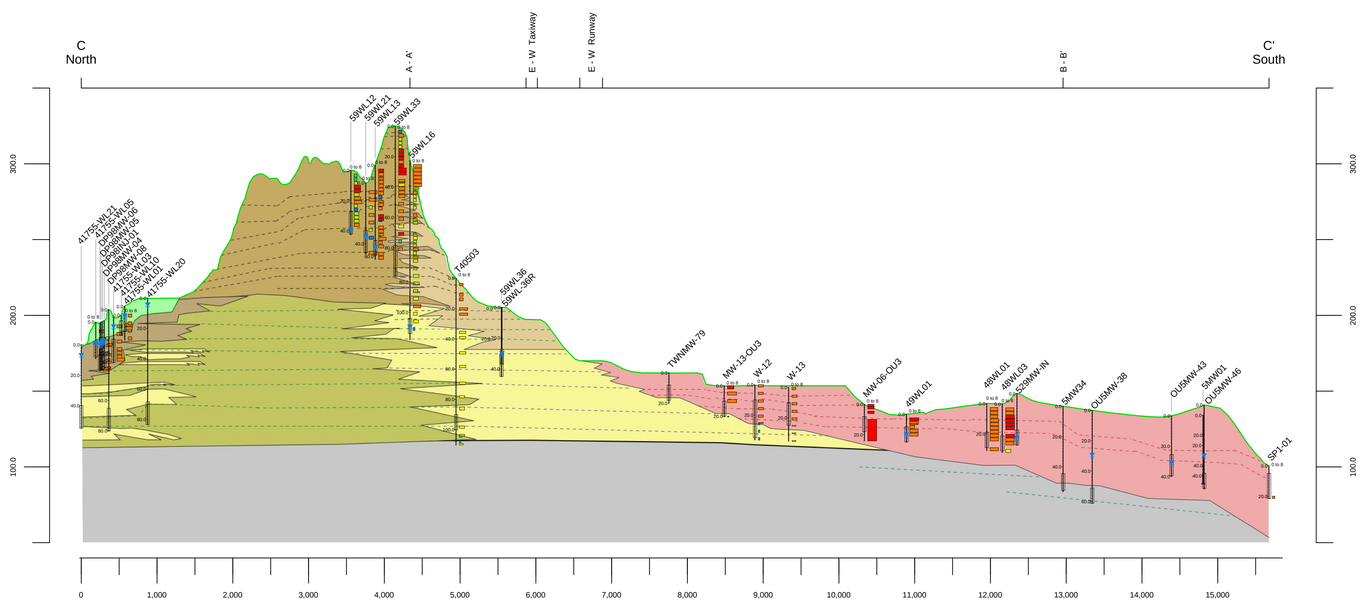
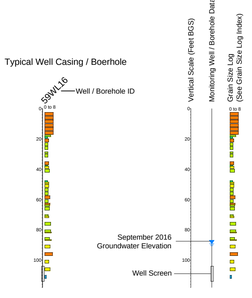
Cross Section B-B': West

PROJECT NO:	DRAWN BY:	DATE:	
60443333	RJS	08/30/2017	**Figure 11**

Cross-Section C-C'



Down-hole Data Explanation



Lithofacies

- Artificial Fill
- Mountain View Fan Alluvium (Gravel, Sand, and Silt)
- Mountain View Fan Alluvium (Silt)
- Pebbly channels
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- Elmendorf Outwash 1 (Likely Deposited Subaqeuously)

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  Boot Legger Formation (Estuarine Sands)

Units Identified using combination of topographic positioning, 1:25,000 Quaternery Geology Maps by Schmoll and Yehle, and boring descriptions

Grain Size Log Index

- Clay
- Clay with 10% Sand
- Clay with 20% Sand
- Clay with 30% Sand
- Clay with 40% Sand
- Clay with Fine Gravel
- Clay with Medium Gravel
- Clay with Coarse Gravel
- Silt
- Silt with 10% Sand
- Silt with 20% Sand
- Sandy Silt
- Clayey Sand (Fine Sand with 50% Fines)
- Silty Sand (Fine Sand with 50% Fines)
- Clayey Sand (Fine Sand with 40% Fines)
- Silty Sand (Fine Sand with 40% Fines)
- Clayey Sand (Fine Sand with 30% Fines)
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- Silty Sand (Fine Sand with 10-20% Fines)
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- Gravelly Silt (Silt with Coarse Gravel)
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- Clayey Sand (Medium Sand with 50% Fines)
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- Fine Sand with Medium Gravel
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- Medium Gravel
- Coarse Gravel

0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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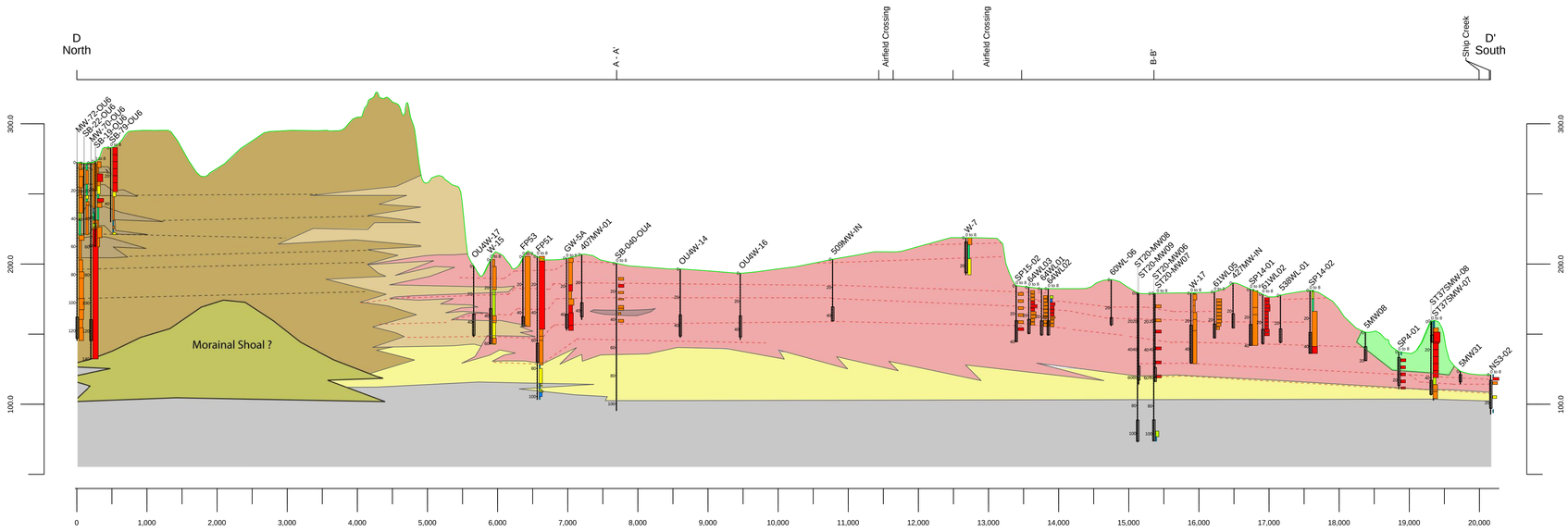
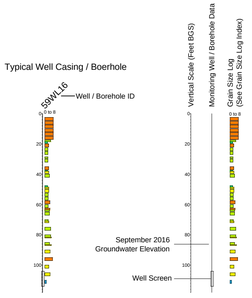
Cross Section C-C'

PROJECT NO:	DRAWN BY:	DATE:	
60443333	RJS	08/30/2017	**Figure 12**

Cross-Section D-D'



Down-hole Data Explanation



Lithofacies

- Artificial Fill
- Mountain View Fan Alluvium (Gravel, Sand, and Silt)
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Units Identified using combination of topographic positioning, 1:25,000 Quaternery Geology Maps by Schmoll and Yehle, and boring descriptions

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- Clay
- Clay with 10% Sand
- Clay with 20% Sand
- Clay with 30% Sand
- Clay with 40% Sand
- Clay with Fine Gravel
- Clay with Medium Gravel
- Clay with Coarse Gravel
- Silt
- Silt with 10% Sand
- Silt with 20% Sand
- Sandy Silt
- Clayey Sand (Fine Sand with 50% Fines)
- Silty Sand (Fine Sand with 50% Fines)
- Clayey Sand (Fine Sand with 40% Fines)
- Silty Sand (Fine Sand with 40% Fines)
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- Silty Sand (Fine Sand with 30% Fines)
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- Gravelly Silt (Silt with Coarse Gravel)
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- Clayey Sand (Medium Sand with 50% Fines)
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- Medium Gravel
- Coarse Gravel

0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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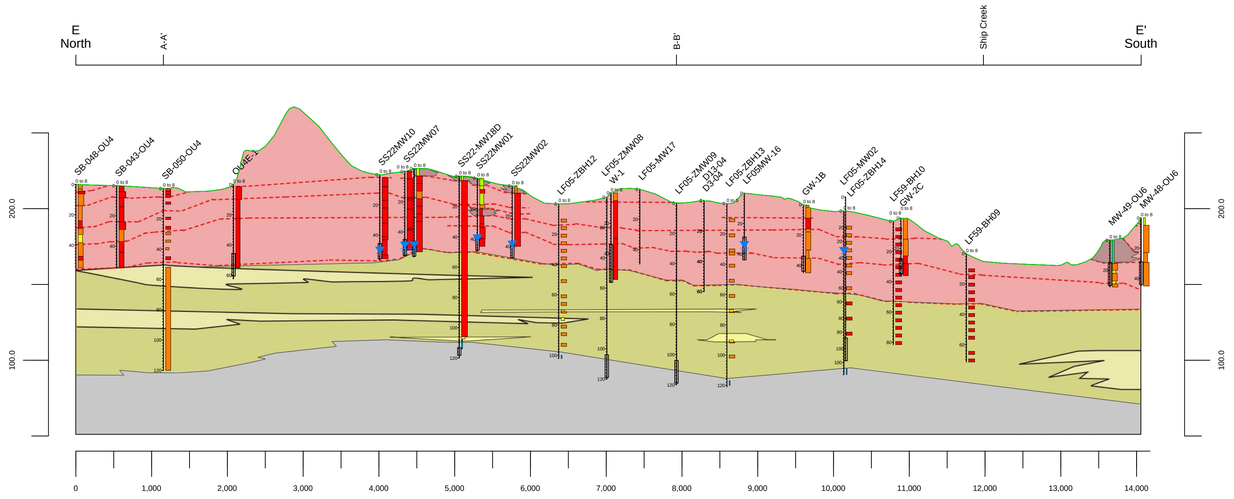
JBER CSM

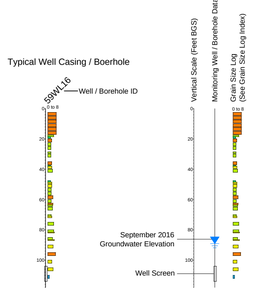
Cross Section D-D'

PROJECT NO:	DRAWN BY:	DATE:	
60443333	RJS	08/30/2017	**Figure 13**

Cross-Section E-E'



Down-hole Data Explanation



Lithofacies

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- Sandy Silt
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0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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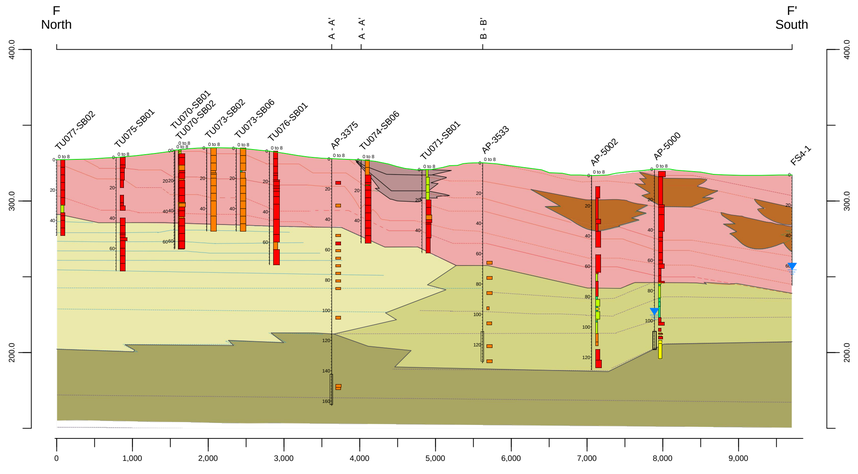
JBER CSM

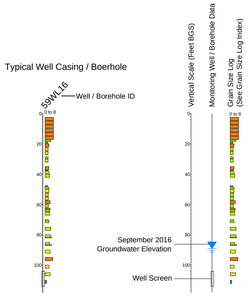
Cross Section E-E'

PROJECT NO.	DRAWN BY:	DATE:	
60443333	BJS	08/30/2017	Figure 14

Cross-Section F-F'



Down-hole Data Explanation



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0 500 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 25 50 100 150
VERTICAL SCALE IN FEET

Vertical Exaggeration = 20X

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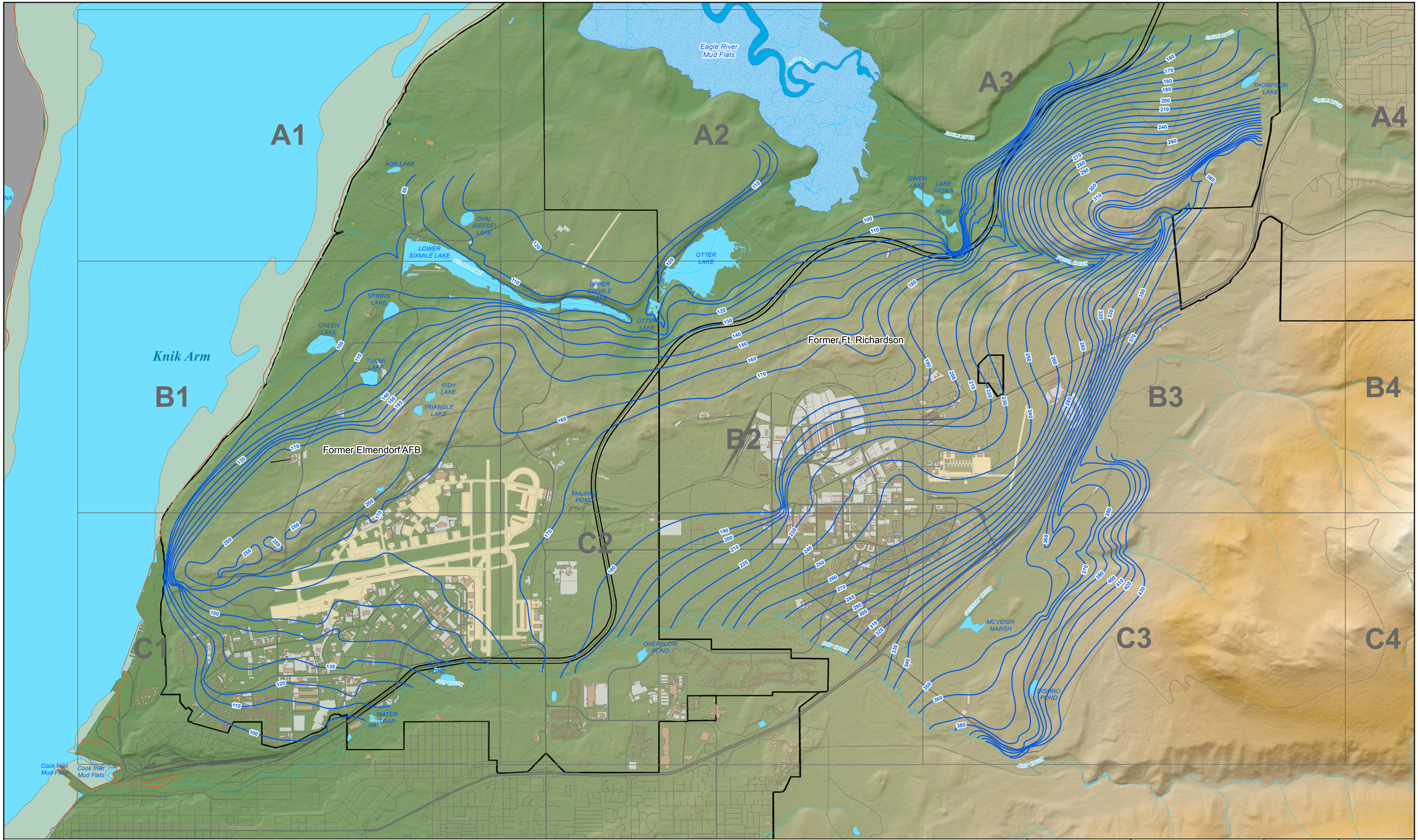
JBER CSM

Cross Section F-F'

PROJECT NO.	DRAWN BY	DATE	
60443333	BJS	08/30/2017	**Figure 15**



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JBER CSM

Base-Wide Water-Table Map

PROJECT NUMBER:	PREPARED BY:	DATE:	
30443333	RJS	8/30/2017	**Figure 16**

EAGLE RIVER MUD FLATS

EAGLE RIVER

EAGLE RIVER

EAGLE RIVER

EAGLE RIVER

THOMPSON LAKE

MEADOW CREEK

EAGLE RIVER

<20

GWEN LAKE

<20

<10 LAKE KIOWA

<60 POND

POND CREEK

<90 OTTER LAKE

OTTER LAKE

OTTER LAKE

100 OTTER LAKE

Former Ft. Richardson

GUNNERY CREEK

GUNNERY CREEK

GUNNERY CREEK

GUNNERY CREEK

GUNNERY CREEK

SHIP CREEK

SHIP CREEK

SHIP CREEK

SHIP CREEK

MCVEIGH MARSH

<340

DISHNO POND

<400

OVERFLOW POND

NA

NA

Match Line

Match Line

Match Line

Legend

- Monitoring Well Location
- Groundwater Contours (Ft. MSL)
- Ground Surface Elevation Contour (Ft.MSL)
- Building
- VehicleParking
- DrivewayArea
- AirfieldSurface
- Natural Waterbody
- Creek/Stream
- JBER Installation Boundary

Map Extents

JBER

Map Projection:
NAD 1983, State Plane Alaska Zone 4, FIPS 5004, Feet

Datum:
North American 1983

N W E S

1,000 500 0 1,000

Feet

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JBER CSM
Water-Table Map
East Side

PROJECT NUMBER	PREPARED BY:	DATE	
30443333	RJS	8/30/2017	**Figure 17**

Knik Arm

Former Elmendorf AFB

ANCHORAGE

Eagle River Mud Flats

Cook Inlet Mud Flats

Cook Inlet Mud Flats

ADR LAKE

OVAL (BEEBE) LAKE

SIXMILE LAKE

LOWER SIXMILE LAKE

UPPER SIXMILE LAKE

SPRING LAKE

GREEN LAKE

TUOMI LAKE

FISH LAKE

TRIANGLE LAKE

OTTER LAKE

OVERFLOW POND

COOLING POND

SHIP CREEK

Match Line

Match Line

Match Line

Match Line

Legend

- Monitoring Well Location
- Groundwater Elevation Contour (Ft. MSL)
- Ground Surface Elevation Contours (Ft. MSL)
- Building
- Vehicle Parking
- Driveway Area
- Airfield Surface
- Creek/Stream
- Natural Waterbody
- JBER Installation Boundary

Map Extents

JBER

Map Projection:
NAD 1983, State Plane Alaska Zone 4, FIPS 5004, Feet

Datum:
North American 1983

1,000 500 0 1,000

Feet

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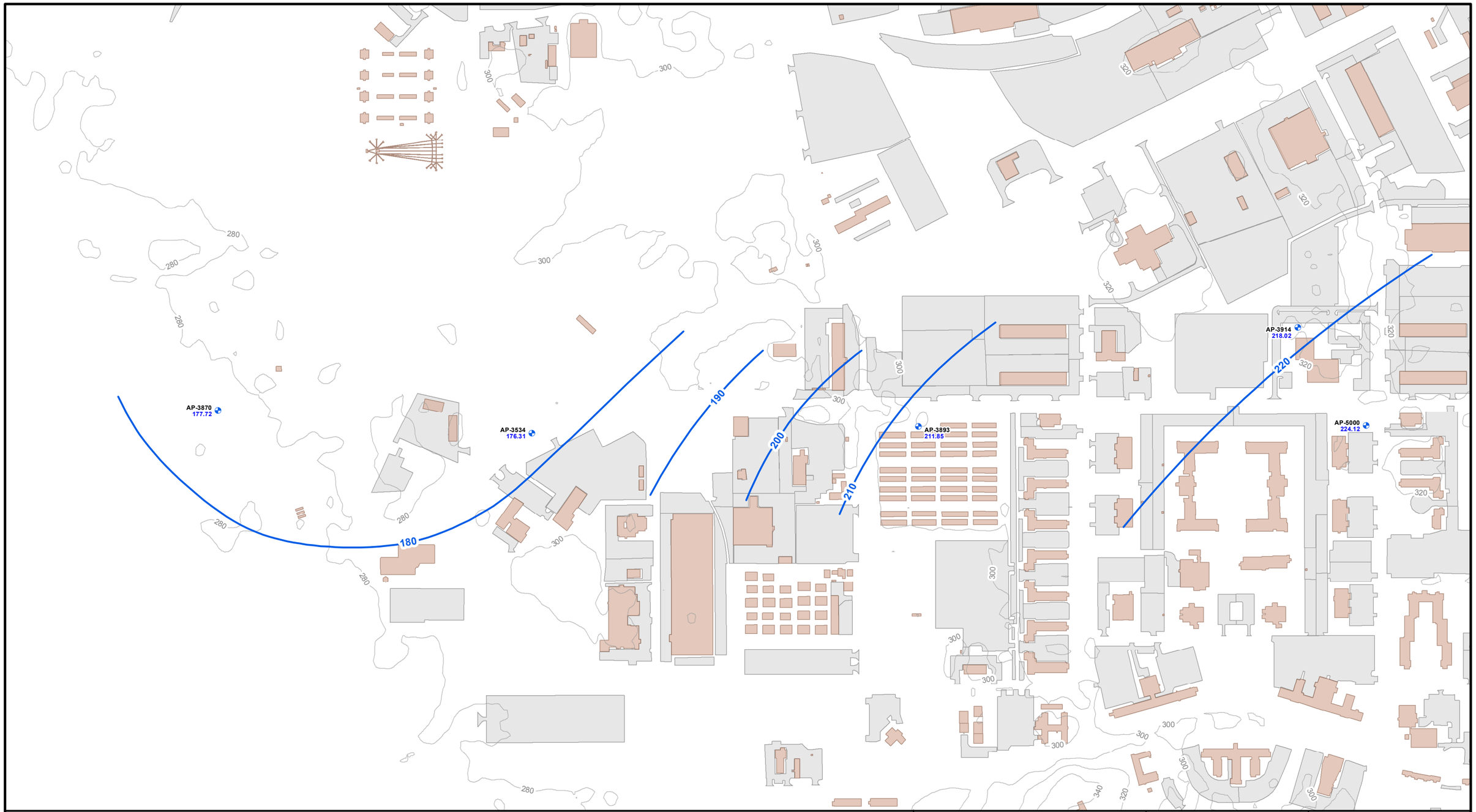
Water-Table Map:
West Side

PROJECT NUMBER:	PREPARED BY:	DATE:	
30443333	RJS	8/30/2017	**Figure 18**



Legend

- Monitoring Well Location
- Groundwater Surface Contour (Ft MSL)
- Ground Surface Elevation Contours (Ft. MSL)
- Building
- VehicleParking

Map Projection: Alaska Zone 4
NAD 83, Feet
Fips: 5004

Datum: North American 1983

N
W E
S

500 250 0 500
Feet

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JBER CSM

Confined Groundwater

PROJECT NO.	PREPARED BY:	DATE:	
60443333	RJS	8/29/2017	**Figure 19**

41755WL-12
167.71

41755WL-16
169.34

41755WL-15
169.60

41755WL-17
169.14

41755WL-09
166.68

41755WL-13
192.10

DP98MW-06
182.08

41755WL-07
172.05

DP98INJ-03
184.30

41755WL-04
187.95

DP98INJ-02
184.50

41755WL-05
188.86

DP98MW-05
183.42

DP98MW-04
185.14

DP98INJ-01
184.43

41755WL-06
179.08

41755WL-21
174.20

41755WL-19
181.92

Legend

- Monitoring Well Location
- Ground Surface Elevation Contours (Ft. MSL)
- Groundwater Surface Contour (Ft MSL)
- Wetland
- Building
- VehicleParking

Map Projection: Alaska Zone 4
NAD 83, Feet
Fips: 5004

Datum: North American 1983

N
W E
S

200 100 0 200
Feet

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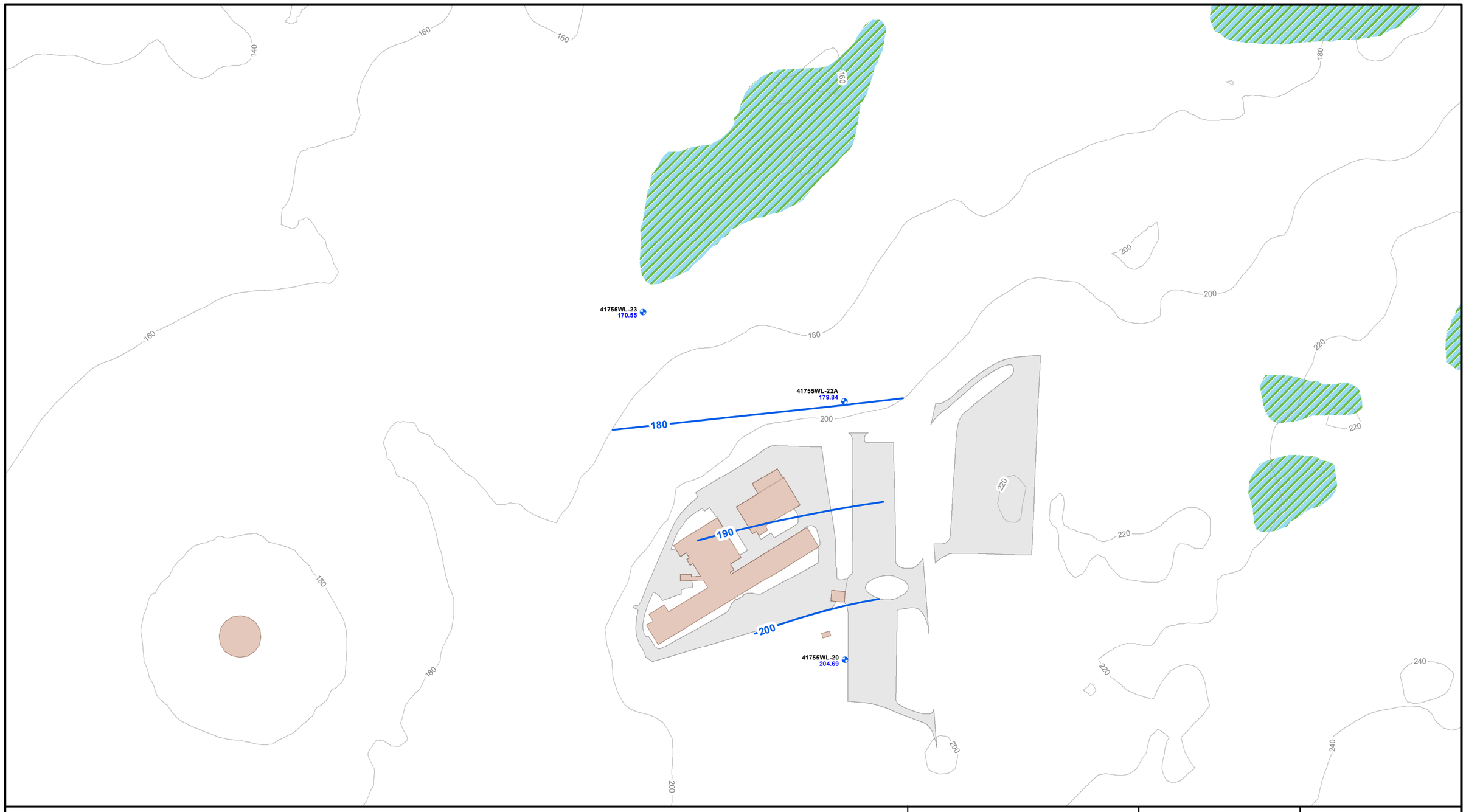
Shallow Groundwater Flow
at Site DP98

PROJECT NO.	PREPARED BY:	DATE:	
60443333	RJS	8/29/2017	**Figure 20**



Legend

- Monitoring Well Location
- Groundwater Surface Contour (Ft MSL)
- Ground Surface Elevation Contours (Ft. MSL)
- Wetland
- Building
- VehicleParking

Map Projection: Alaska Zone 4
NAD 83, Feet
Fips: 5004

Datum: North American 1983

N W E S

200 100 0 200 Feet

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Deep Groundwater Flow at Site DP98

PROJECT NO.	PREPARED BY:	DATE:	
60443333	RJS	8/29/2017	**Figure 21**

Tables

Table 1. JBER Quaternary Geology and Stratigraphy

Series	Stage	Glaciation	Geomorphological Feature
			Loess (not mapped)
			Alluvium
Recent			Estuarine silt
			Dune sand
			Swamp deposits
			Alluvial fans (Mountainview Fan)
Pleistocene-Recent			Glacial drift
			Morainal deposits, undifferentiated
			Silt
			Abandoned-channel deposits
			Outwash
			Pitted outwash
	Wisconsin	*Naptowne*	Kame field and kame terrace deposits
			Ground moraine
			End moraine (Elmendorf Moraine)
			Subaqueous outwash
			Abandoned-channel deposits
Pleistocene			Morainal shoals
			Glaciofluvial ice-contact deposits
			Dishno Pond Lateral Moraine
	Pre-Wisconsin	*Knik*	Prodelta deposits
			Delta deposits
			Ground moraine
			Bootlegger Cove clay
			Advance outwash
			Lateral moraine
			Advance outwash
	Illinoian	*Eklutna*	Till and outwash

Table 2. Essential Glacial Terms

Depositional Environment	Morphological Feature	Lithological Composition
Alluvial Fan	Radially spreading, steep near the apex, moderate to gently dipping distally	Poorly sorted pebbly/gravelly sandstones with various low proportions of silt and clay (5-15%), locally stratified, occasionally channelized
End Moraine	Large, ridge-like features recording the greatest extent of glacial advancement	Diamicton
Ground Moraine	**Tills**: Smooth to hummocky features recording glacial retreat	Diamicton + interbedded silt & sand/gravel + clayey lake deposits
Morainal Shoal	Submerged portion of moraine close to the surface	Diamicton
Glacio-estuarine	Smooth, nearly flat basin-fill	Mostly clay & silt, locally diamicton
Outwash	Smooth train of deposits accumulated in front of end-moraines	Well-sorted well-bedded sandstones and gravels
Glacial-drift	Same as above	Same as above

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
ELMENDORF WELLS													
100WL-01	6793445.076	349339.409	179.29	---	Monitor Well	19	29	9/14/2016	1310	22.94	156.35	28.45	Flushmount
11160WL-01	6793124.444	349824.0478	185.3	---	Monitor Well	---	---	9/14/2016	1305	NM	NA	NM	Abandoned
14MW-111	6793971.554	345801.2269	170.43	---	Monitor Well	---	---	9/15/2016	1205	22.41	148.02	26.61	Tubing in well
14MW-120	6794018.969	345904.0202	224.15	---	Monitor Well	---	---	9/15/2016	1352	24.88	199.27	31.07	Tubing in well; Firm Tag
14MW-121	6793949.255	345824.8527	196.27	---	Monitor Well	---	---	9/15/2016	1437	17.69	178.58	22.38	Tubing in well; Firm Tag
14MW-123	6794100.832	345882.5817	259.55	---	Monitor Well	---	---	9/15/2016	1410	41.81	217.74	47.93	Tubing in well; soft tag
14MW-138	6794008.713	345784.8429	---	---	Monitor Well	---	---	9/15/2016	1158	26.99	NA	31.55	Tubing in well
32-189PZ-01	6793480.665	348151.0776	168.47	---	Piezometer	---	---	9/13/2016	1535	NM	NA	NM	Abandoned
401PZ-01	6792116.058	348166.4785	152.21	---	Piezometer	---	---	9/12/2016	1145	DRY	NA	28.24	Well cap missing
401PZ-05	6792149.317	348170.9677	153.55	---	Piezometer	---	---	9/12/2016	1140	DRY	NA	28.48	Well cap missing
401WL-01	6792122.595	348179.0123	150.11	---	Monitor Well	20	29.6	9/12/2016	1127	32.17	117.94	32.79	Tubing in well; product observed
401WL-02	6792146.745	348184.6811	151.27	---	Monitor Well	20.5	30.5	9/12/2016	1135	32.37	118.90	34.29	Tubing present in well; total depth may not be accurate
401WL-03	6792004.466	348174.351	141.28	---	Monitor Well	26.5	41	9/12/2016	1445	33.94	107.34	43.80	Well pad is loose
401WL-04	6792039.643	348211.9605	141.28	---	Monitor Well	23.79	38.79	9/12/2016	1115	32.11	109.17	NM	Equipment in well, total depth not measured
402MW-DG	6793022.17	348061.5899	157.1	---	Monitor Well	---	---	9/14/2016	1423	15.44	141.66	24.95	Looks like a piezometer (0.75-inch casing)
402PZ-01	6793108.387	348063.4232	160.44	---	Piezometer	---	---	9/14/2016	1348	DRY	NA	15.37	Well appears damaged
402WL-01	6793118.152	348073.0078	160.5	---	Monitor Well	4	13.75	9/14/2016	1335	16.58	143.92	16.90	
402WL-02	6793128.261	348081.806	160.61	---	Monitor Well	8.5	18.5	9/14/2016	1331	16.50	144.11	21.85	
402WL-04	6793139.21	348057.79	158.65	---	Monitor Well	12	22	9/14/2016	1339	15.29	143.36	21.61	Flushmount
402WL-05	6793158.93	348095.02	160.59	---	Monitor Well	12	22	9/14/2016	1326	16.15	144.44	25.45	
403MW-IN	6792107.685	347942.3782	153.12	---	Monitor Well	34.6	43.9	9/12/2016	---	NM	NA	NM	Not found
403WL-01	6792056.657	347929.5577	150.53	---	Monitor Well	---	---	9/12/2016	953	39.94	110.59	46.20	Tubing in well
403WL-02	6792121.882	347921.6033	147.61	---	Monitor Well	---	---	9/12/2016	1052	NM	NA	NM	Not found
403WL-03	6792108.136	347943.353	147.51	---	Monitor Well	---	---	9/12/2016	1050	NM	NA	NM	Not found
403WL-04	6792115.492	347931.065	147.38	---	Monitor Well	---	---	9/12/2016	1054	NM	NA	NM	Not found
404PZ-01	6793286.924	350375.3203	188.29	---	Piezometer	---	---	9/14/2016	1325	NM	NA	NM	Abandoned
404WL-01	6793304.078	350389.9348	189.21	---	Monitor Well	---	---	9/14/2016	1325	NM	NA	NM	Abandoned
407MW-01	6795225.66	349584.28	206.73	---	Monitor Well	34.5	44.5	9/13/2016	1140	40.22	166.51	45.93	Well vault damaged
409WL-06	6791883.323	352279.0919	224.38	---	Monitor Well	---	---	9/12/2016	1005	NM	NA	NM	Not found
409WL-07	6791892.76	352281.2054	225.05	---	Monitor Well	---	---	9/12/2016	1005	NM	NA	NM	Abandoned
409WL-08	6791884.47	352271.2276	224.48	---	Monitor Well	---	---	9/12/2016	1005	NM	NA	NM	Not found
414WL-01	6792694.478	348536.9699	165.57	---	Monitor Well	---	---	9/13/2016	1622	NM	NA	NM	Abandoned
41-701PZ-01	6794271.733	347694.5702	208.5	---	Piezometer	---	---	---	---	NM	NA	NM	Abandoned
41-701PZ-02	6794283.415	347698.0927	208.62	---	Piezometer	---	---	---	---	NM	NA	NM	Abandoned
41-701PZ-03	6794269.308	347674.5817	208.58	---	Piezometer	---	---	9/16/2016	---	NM	NA	NM	Abandoned
41-701WL-01	6794291.165	347681.5121	210.7	---	Monitor Well	---	---	9/14/2016	1610	13.32	197.38	13.73	
41755PZ-01	6795617.654	347453.3158	203.65	---	Piezometer	---	---	9/15/2016	1048	NM	NA	NM	Abandoned
41755PZ-03	6795644.729	347443.0922	---	---	Piezometer	---	---	9/15/2016	1035	NM	NA	NM	Well damaged
41755WL-01	6795618.482	347459.5908	210.67	---	Monitor Well	6	16	9/15/2016	1052	7.07	203.60	16.01	Strong petroleum odor, well appears damaged
41755WL-02	6795655.075	347422.3582	---	---	Monitor Well	10	20	9/15/2016	1035	8.31	NA	19.49	Tubing in well; firm tag
41755WL-03	6795659.253	347444.4684	205.33	---	Monitor Well	15	30	9/15/2016	1105	7.10	198.23	NM	Bailer in well, total depth not measured; strong odor
41755WL-04	6795701.581	347432.1804	204.71	---	Monitor Well	22	32	9/12/2016	1025	16.76	187.95	NM	Tubing in well, total depth not measured; strong odor
41755WL-05	6795685.164	347394.5709	203.49	---	Monitor Well	---	---	9/12/2016	1113	14.63	188.86	26.30	Tubing in well; firm tag at total depth; odor
41755WL-06	6795668.035	347334.4908	186.83	---	Monitor Well	5	15	9/12/2016	1140	7.76	179.08	16.70	Water in pro-cover
41755WL-07	6795710.47	347334.3352	179.31	---	Monitor Well	5	15	9/12/2016	1150	7.26	172.05	17.50	
41755WL-08	6795764.777	347413.415	---	---	Monitor Well	5	10	9/12/2016	1500	4.19	NA	11.79	Well appears damaged
41755WL-09	6795735.498	347373.647	170.02	---	Monitor Well	---	---	9/12/2016	1200	3.34	166.68	16.62	
41755WL-11	6795620.459	347458.711	203.97	---	Monitor Well	6	16	9/15/2016	1100	6.90	197.07	NM	Bailer in well, total depth not measured
41755WL-12	6795807.766	347286.1744	171.40	---	Monitor Well	---	---	9/12/2016	1422	3.69	167.71	16.30	Procover damaged; soft tag at total depth

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
41755WL-13	6795730.515	347544.1978	205.41	---	Monitor Well	---	---	9/15/2016	1150	13.31	192.10	37.89	Firm tag at total depth
41755WL-14	6795780.331	347499.4941	---	---	Monitor Well	---	---	9/12/2016	1545	4.38	NA	18.89	Well appears damaged
41755WL-15	6795798.968	347441.7651	172.40	---	Monitor Well	---	---	9/12/2016	1530	2.80	169.60	22.78	Well appears damaged
41755WL-16	6795806.742	347390.7617	172.4	---	Monitor Well	---	---	9/12/2016	1515	3.06	169.34	27.17	Well appears damaged
41755WL-17	6795768.346	347347.3604	172.30	---	Monitor Well	---	---	9/12/2016	1435	3.15	169.14	24.14	Water in stand pipe same depth as DTW, soft tag
41755WL-19	6795613.779	347357.412	196.4	---	Monitor Well	---	---	9/12/2016	1123	14.48	181.92	21.81	Firm tag at total depth
41755WL-20	6795536.177	347511.9951	210.01	---	Monitor Well	68.5	83.5	9/15/2016	1125	5.32	204.69	83.02	Well appears damaged
41755WL-21	6795661.735	347343.2399	182.03	---	Monitor Well	40	55	9/12/2016	1136	7.83	174.20	56.50	
41755WL-22A	6795707.078	347519.5235	205.06	---	Monitor Well	60	75	9/12/2016	950	25.22	179.84	77.69	Well appears damaged
41755WL-23	6795772.155	347389.2052	172.24	---	Monitor Well	50	80	9/12/2016	1445	1.69	170.55	78.50	Tubing in well; well not labeled; soft tag at total depth
418PZ-01	6793949.116	351347.1864	221.95	---	Piezometer	---	---	9/13/2016	---	NM	NA	NM	Not found
418PZ-02	6793960.847	351340.0757	221.94	---	Piezometer	---	---	9/13/2016	---	NM	NA	NM	Not found
419WL-01	6794387.847	347617.9914	221.04	---	Monitor Well	---	---	9/12/2016	1627	18.84	202.20	19.83	Grout observed in well casing
420WL-01	6794764.04	350962.9652	220.53	---	Monitor Well	41.5	51.5	9/16/2016	---	NM	NA	NM	Not found
421MW-01	6794877.99	348878.998	189	---	Monitor Well	28	38	9/16/2016	1328	29.94	159.06	40.45	
422MW-IN	6794268.669	347674.9913	208.58	---	Monitor Well	13.5	23.5	9/16/2016	---	NM	NA	NM	Abandoned
422WL-01	6794257.56	347706.142	207.57	---	Monitor Well	---	---	9/13/2016	835	28.21	179.37	34.92	
422WL-02	6794289.568	347681.532	209.5	---	Monitor Well	10	25	9/13/2016	828	13.63	195.87	25.12	
422WL-03	6794312.055	347670.383	209.8	---	Monitor Well	10	25	9/13/2016	837	13.23	196.57	24.98	
42-425PZ-01	6794871.388	348878.5108	191.98	---	Piezometer	---	---	9/16/2016	---	NM	NA	NM	Not found
42-425WL-01	6794876.368	348878.0029	191.91	---	Monitor Well	---	---	9/16/2016	---	NM	NA	NM	Not found
424MW-IN	6793480.058	348163.0051	168.66	---	Monitor Well	11	21	9/13/2016	1535	NM	NA	NM	Abandoned
427MW-IN	6793105.422	349828.4223	186.11	---	Monitor Well	22	32	9/14/2016	1305	NM	NA	NM	Abandoned
43-1A	6794361.042	348340.2063	172.91	---	Monitor Well	---	---	9/13/2016	930	NM	NA	NM	Not found
43-1B	6794357.921	348333.3578	173.3	---	Monitor Well	---	---	9/13/2016	930	NM	NA	NM	Not found
43-1C	6794388.789	348342.1723	173.37	---	Monitor Well	---	---	9/13/2016	930	NM	NA	NM	Not found
43-3A	6794387.773	348371.385	173.3	---	Monitor Well	---	---	9/13/2016	930	NM	NA	NM	Abandoned
43-3B	6794391.492	348364.815	173	---	Monitor Well	---	---	9/13/2016	930	NM	NA	NM	Abandoned
43WL-02	6794563.368	348587.3835	183.92	---	Monitor Well	19.5	29.5	9/13/2016	1105	21.92	162.00	30.15	
43WL-06	6794486.634	348350.2579	147.05	---	Monitor Well	9.5	19.5	9/13/2016	935	14.38	132.67	18.11	Soft tag at total depth; tubing in well; well cover damaged
43WL-07	6794510.071	348433.7999	175.53	---	Monitor Well	12	22	9/13/2016	1015	16.45	159.08	NM	Equipment in well, total depth not measured
43WL-08	6794595.473	348486.3188	178.91	---	Monitor Well	14	24	9/13/2016	1004	17.34	161.57	23.77	Tubing in well; firm tag at total depth; well cover damaged
43WL-09	6794698.16	348454.5748	187.64	---	Monitor Well	12	22	9/13/2016	1039	18.28	169.36	NM	Equipment in well, total depth not measured
43WL-11	6794668.636	348484.6148	182.03	---	Monitor Well	11	21	9/13/2016	1026	15.97	166.06	20.89	Tubing in well; firm tag at total depth; strong odor
43WL-12	6794532	348214.05	181.49	---	Monitor Well	5	14	9/13/2016	955	5.40	176.09	13.44	No well vault lid
43WL-13	6794403.81	348284.82	179.54	---	Monitor Well	9	19	9/13/2016	945	13.00	166.54	18.13	Well vault damaged; petroleum odor
43WL-14	6794467.92	348479.0401	182.62	---	Monitor Well	15	25	9/13/2016	1010	19.18	163.44	NM	Petroleum odor, total depth not measured
44-785WL-01	6795420.252	352239.246	308.36	---	Monitor Well	7	12	9/13/2016	1048	7.47	300.89	14.91	
44-785WL-02	6795423.152	352237.7223	309.01	---	Monitor Well	---	---	9/13/2016	1053	8.97	300.04	19.52	
44-785WL-03	6795408.127	352221.2236	308.01	---	Monitor Well	---	---	9/13/2016	1101	17.86	290.15	25.17	Inner casing appears damaged
44-785WL-04	6795422.611	352240.3929	308.6	---	Monitor Well	---	---	9/13/2016	1043	11.60	297.00	24.16	
44-785WL-05	6795392.989	352186.7681	302.92	---	Monitor Well	---	---	9/13/2016	1114	NM	NA	NM	Well damaged
46WL-01	6793669.408	346287.3484	181.21	---	Monitor Well	2	12	9/15/2016	920	7.94	173.27	14.86	Well appears damaged
46WL-02	6793650.927	346277.944	176.09	---	Monitor Well	5	15	9/15/2016	934	7.05	169.04	12.37	Well not labeled; observe sediment in well
46WL-03	6793674.061	346311.4575	190.05	---	Monitor Well	---	---	9/15/2016	943	NM	NA	NM	Well damaged, could not unlock
46WL-04	6793660.233	346268.5887	179.7	---	Monitor Well	---	---	9/15/2016	926	NM	NA	NM	Well damaged, could not unlock
49WL-01	6792812.173	347344.6407	145.81	---	Monitor Well	8	18	9/14/2016	1512	14.38	131.43	25.01	
506WL-01	6792917.12	350827.748	206.63	---	Monitor Well	---	---	9/14/2016	1520	NM	NA	NM	Abandoned
507WL-01	6794689.361	348490.4394	188.31	---	Monitor Well	---	---	9/13/2016	1000	17.04	171.27	21.74	Well not labeled; tubing in well
50WL-01	6797593.884	348576.652	197.38	---	Monitor Well	20	35	9/14/2016	1031	27.49	169.89	33.78	Broken well cap; tubing in well

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
50WL-03	6797600.126	348589.0547	197.82	---	Monitor Well	20	40	9/14/2016	1036	DRY	NA	39.78	Well not labeled; no lock or screws on flushmount; dry
516MW-02	6792353.43	348367.813	157.2	---	Monitor Well	34.5	44.5	9/12/2016	1243	37.94	119.26	NM	Equipment in well, total depth not measured; well not labeled
516MW-IN	6792343.238	348359.4657	160.47	---	Monitor Well	32	42	9/12/2016	1250	NM	NA	NM	Not found
526MW-IN	6792688.891	349390.5436	177.6	---	Monitor Well	33.5	43.5	9/13/2016	1618	36.40	141.20	43.01	Loose plug
529MW-IN	6792429.205	347274.5991	151.66	---	Monitor Well	24	34	9/12/2016	1445	30.21	121.45	37.03	Well is deeper than historical reports
534MW-01	6792777.99	350501.22	196.5	---	Monitor Well	---	---	9/14/2016	1455	32.27	164.23	39.90	3/4-inch casing; soft tag at total depth
534MW-02	6792786	350501.26	197.64	---	Monitor Well	31	41	9/14/2016	1335	33.57	164.07	NM	Equipment in well, total depth not measured
538WL-01	6792926.721	349725.5308	184.06	---	Monitor Well	24	33.5	---	---	NM	NA	NM	Not found
538WL-02	6792934.815	349714.6027	186.97	---	Monitor Well	24	33.5	9/13/2016	1316	32.97	154.00	37.48	Slab slightly broken
538WL-04	6792962.504	349758.6756	185.7	---	Monitor Well	---	---	9/13/2016	1456	30.60	155.10	34.87	Inner casing appears damaged
538WL-05	6792990.357	349736.6555	185	---	Monitor Well	---	---	9/13/2016	1448	29.82	155.18	33.97	
539MW-01	6794332.93	348644.701	183.14	---	Monitor Well	---	---	9/13/2016	1108	22.26	160.88	26.91	Tubing in well
539MW-02	6794562.945	348333.21	179.9	---	Monitor Well	---	---	9/13/2016	945	5.74	174.16	13.16	Tubing in well
53WL-02	6791894.366	350801.1896	167.98	---	Monitor Well	2.8	12.8	9/12/2016	1036	3.99	163.99	15.17	Inner casing appears damaged; well not labeled; sludge at well bottom
53WL-05	6791906.76	350705.4333	166.41	---	Monitor Well	2	12	9/12/2016	1048	4.53	161.88	12.70	Slighly leaning outer casing, no markings on PVC
54WL-02	6792776.89	348109.8636	150.37	---	Monitor Well	14.5	19.5	9/13/2016	1635	18.73	131.64	23.79	Firm tag at total depth
56WL-01	6797615.953	348580.1827	196.84	---	Monitor Well	---	---	9/14/2016	1008	NM	NA	NM	Abandoned
56WL-02	6797595.203	348592.2168	197.37	---	Monitor Well	---	---	9/14/2016	1045	NM	NA	NM	Abandoned
56WL-03	6797618.96	348563.5202	195.09	---	Monitor Well	57.5	67.5	9/14/2016	1015	62.28	132.81	71.40	No lock or screws on flush mount; well plug loose
56WL-05	6797635.811	348585.7942	197.68	---	Monitor Well	63	73	9/14/2016	1001	68.43	129.25	73.92	Tubing in well; well plug loose
56WL-06	6797670.414	348577.0534	187.25	---	Monitor Well	---	---	9/14/2016	955	57.68	129.57	65.98	notch on PVC (not marked)
56WL-08	6797622.605	348536.3064	176.34	---	Monitor Well	40	54.9	9/14/2016	1023	46.81	129.53	57.14	Well appears damaged
56WL-09	6797655.349	348603.3988	187.06	---	Monitor Well	50	64.9	9/14/2016	958	57.67	129.39	68.11	
59WL-01R	6794203.13	347085.77	262.312	---	Monitor Well	49.5	59.5	9/12/2016	1001	51.31	211.00	58.87	
59WL-05	6794295.44	347244.3099	295.81	---	Monitor Well	65	75	9/12/2016	1037	70.03	225.78	77.91	Well cap missing
59WL-07	6794208.59	346618.05	289.18	---	Monitor Well	31	41	9/12/2016	1107	36.16	253.02	41.90	
59WL-08	6794212.022	346858.4865	170.03	---	Monitor Well	---	---	---	---	NM	NA	NM	Not found
59WL-09	6794326.13	346835.63	287.9	---	Monitor Well	32	42	9/12/2016	1103	31.65	256.25	45.94	
59WL-10	6794404.56	347206.28	264.03	---	Monitor Well	30	40	9/12/2016	1009	36.68	227.35	39.75	
59WL-11	6794188.32	346734.43	288.65	---	Monitor Well	21.5	31.5	9/12/2016	1127	24.37	264.28	34.55	
59WL-12	6794726.98	347549.25	305.3	---	Monitor Well	27	42	9/12/2016	1426	40.46	264.84	45.51	
59WL-13	6794643.01	347500.27	303.48	---	Monitor Well	49.5	59.5	9/12/2016	1549	54.89	248.59	62.88	
59WL-14	6794593.925	347657.2065	300.3	---	Monitor Well	35	45	9/12/2016	1600	35.50	264.80	47.95	
59WL-16	6794513.54	347534.38	305.52	---	Monitor Well	104	114	9/13/2016	1340	110.47	195.05	113.97	
59WL-18	6794203.63	347307.23	233.57	---	Monitor Well	23	33	9/12/2016	940	31.35	202.22	36.15	
59WL-20	6794460.58	347739.78	225.96	---	Monitor Well	15	35	9/12/2016	1610	33.38	192.58	37.00	
59WL-21	6794678.89	347514.2	291.64	---	Monitor Well	31	46	9/12/2016	1421	36.06	255.58	47.18	
59WL-22	6794558.27	347440.1	297.41	---	Monitor Well	15.5	30.5	9/12/2016	1535	20.90	276.51	33.41	
59WL-23	6794409.39	346992.82	288.26	---	Monitor Well	26.5	41.5	9/12/2016	1048	35.69	252.57	44.40	Well cap missing
59WL-24	6794395.17	346951.79	242.8	---	Monitor Well	5	15	9/12/2016	1058	7.49	235.31	17.60	
59WL-27	6794498.65	347386.52	291.31	---	Monitor Well	25	40	9/12/2016	1527	32.53	258.78	42.47	
59WL-28	6794393.43	347429.74	297.6	---	Monitor Well	60	80	9/12/2016	1453	76.04	221.56	82.71	
59WL-29	6794436.01	347664.26	---	---	Monitor Well	---	---	9/16/2016	1328	NM	NA	NM	Abandoned
59WL-30	6794296.23	347470.44	---	---	Monitor Well	25	35	9/12/2016	1555	32.05	NA	37.35	
59WL-31	6794050.45	347078.59	212.54	---	Monitor Well	20	30	9/12/2016	948	23.11	189.43	28.18	
59WL-35	6794263.664	347785.8618	199.32	---	Monitor Well	---	---	9/16/2016	1045	30.65	168.67	38.92	
59WL-36R	6794197.216	347636.869	205.2	---	Monitor Well	27.5	37.5	9/16/2016	1037	31.31	173.89	40.40	
59WL-38	6793950.14	347065.0559	---	---	Monitor Well	---	---	9/16/2016	1023	NM	NA	NM	Not found
59WL-38R	6793921.951	347075.7465	188.51	---	Monitor Well	12	22	9/16/2016	1015	NM	NA	NM	Not found
59WL-39	6794281.2	346606.4001	247.1	---	Monitor Well	---	---	9/12/2016	1300	3.28	243.82	36.82	Well appears damaged

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
59WL-40	6794319.21	346723.53	250.7	---	Monitor Well	---	---	9/12/2016	1400	3.57	247.13	40.03	Well appears damaged
59WL-41	6794468.79	346945.9	242.72	---	Monitor Well	---	---	9/12/2016	1414	3.57	239.15	57.05	Well appears damaged
59WL-42	6794359.01	347212.542	304.9	---	Monitor Well	48.5	58.5	9/12/2016	1200	49.61	255.29	61.40	
59WL-43	6794421.784	347104.801	276.4	---	Monitor Well	25	35	9/12/2016	1044	19.49	256.91	36.32	
59WL-44	6794137.967	346550.248	273.4	---	Monitor Well	28.6	38.6	9/14/2016	1025	29.22	244.18	40.47	Slightpetroleum odor
59WL-45	6794033.891	346688.568	234.8	---	Monitor Well	16	26	9/14/2016	1055	20.08	214.72	28.80	Monument lid labeled 59WL-46
59WL-46	6794155.044	347466.296	200.4	---	Monitor Well	21	31	9/16/2016	1034	26.44	173.96	33.66	
59WL-47	6794614.754	347474.139	300.29	---	Monitor Well	28	43	9/12/2016	1543	43.96	256.33	47.25	Strong odor
59WL-48	6794167.722	347139.02	229.23	---	Monitor Well	6	16	9/12/2016	953	11.90	217.33	19.80	
59WL-49	6794455.674	347711.888	231.83	---	Monitor Well	25	35	9/12/2016	1615	32.71	199.12	38.67	
59WL-50	6794442.022	347705.003	229.07	---	Monitor Well	23	33	9/12/2016	1622	30.26	198.81	36.64	
60WL-02	6793654.572	349888.0355	184.91	---	Monitor Well	---	---	---	---	NM	NA	NM	
60WL-03	6793702.848	349883.4234	---	---	Monitor Well	23	33	9/14/2016	1252	27.14	NA	32.25	Well appears damaged
60WL-04R	6793609.967	349808.4912	153.72	---	Monitor Well	21.5	31.5	9/13/2016	1615	26.07	127.65	32.60	Well found has 1-inch casing
60WL-05	6793636.296	349796.7029	190.5	---	Monitor Well	---	---	9/13/2016	1602	26.61	163.89	31.49	
60WL-06	6793553.36	349743.61	191.66	---	Monitor Well	27	32	9/13/2016	1531	29.33	162.33	34.54	
60WL-07	6793167.89	349401.07	178.57	---	Monitor Well	18	28	9/13/2016	1605	24.42	154.15	31.20	
61WL-01	6792984.377	349651.852	177.69	---	Monitor Well	25	35	9/13/2016	1408	29.23	148.46	34.75	Monument cap appears damaged
61WL-02	6792990.922	349770.0052	179.11	---	Monitor Well	---	---	9/14/2016	1250	26.86	152.25	31.72	
61WL-04	6793029.9	349695.2778	148.03	---	Monitor Well	25	35	9/13/2016	1515	28.32	119.71	33.86	Well appears damaged
61WL-07	6792918.431	349679.6065	177.96	---	Monitor Well	23	33	9/13/2016	1415	30.23	147.73	34.70	
62WL-02	6793725.179	349496.3432	188.5	---	Monitor Well	---	---	9/14/2016	---	NM	NA	NM	Not Found
62WL-02R	6793725.487	349493.077	190.72	---	Monitor Well	22	32	9/14/2016	1206	29.08	161.64	34.70	
62WL-03	6793731.889	349446.3802	151.43	---	Monitor Well	22	32	9/14/2016	1223	25.46	125.97	32.64	Flushmount
62WL-05	6793626.433	349361.8716	180.98	---	Monitor Well	---	---	9/14/2016	---	NM	NA	NM	Well found but could not be accessed
62WL-06	6793411.958	349147.9539	174.71	---	Monitor Well	---	---	9/13/2016	1620	24.74	149.97	34.38	Vault lid appears damaged
62WL-07	6793616.799	349281.2131	179.14	---	Monitor Well	---	---	9/14/2016	---	NM	NA	NM	Not found
64WL-01	6793780.959	349546.511	182.06	---	Monitor Well	23	33	9/14/2016	1230	26.30	155.76	32.81	Well bolts missing; soft tag at total depth
64WL-02	6793761.208	349568.1133	188.65	---	Monitor Well	23	33	9/14/2016	1235	26.04	162.61	32.63	No bolts on vault lid
65WL-04R	6791906.4	351109.2415	199.84	---	Monitor Well	---	---	9/12/2016	1015	NM	NA	NM	Abandoned
700PZ-02	6792032.794	348044.1883	153.45	---	Piezometer	---	---	9/12/2016	1042	NM	NA	NM	Well damaged
702WL-01	6798528.509	350081.85	120.15	---	Monitor Well	---	---	9/14/2016	1129	13.69	106.46	19.79	Tubing in well; no screws on flush mount; strong petroleum odor
702WL-02	6798510.979	350082.8167	116.91	---	Monitor Well	---	---	9/14/2016	1132	11.28	105.63	16.49	Tubing in well; no screws on flush mount
702WL-03	6798499.641	350072.462	111.8	---	Monitor Well	---	---	9/14/2016	1116	4.39	107.41	9.70	Tubing in well; no lock or screws on flush mount
702WL-04	6798495.037	350095.3505	114.17	---	Monitor Well	---	---	9/14/2016	1139	7.89	106.28	12.63	No screws on flush mount
702WL-05	6798487.828	350065.9576	114.27	---	Monitor Well	---	---	9/14/2016	1113	5.12	109.15	9.69	Well plug missing; tubing in well, no screws on flushmount
702WL-06	6798480.603	350078.5241	114.95	---	Monitor Well	---	---	9/14/2016	1110	3.78	111.17	8.60	Flushmount
702WL-07	6798500.951	350051.8182	119.44	---	Monitor Well	---	---	9/14/2016	1119	11.82	107.62	16.67	Tubing in well; strong petroleum odor
702WL-09	6798500.313	350102.7888	121.28	---	Monitor Well	---	---	9/14/2016	1137	9.03	112.25	14.38	Well not labeled; tubing in well
702WL-10	6798465.988	350063.2214	111.56	---	Monitor Well	---	---	9/14/2016	1104	12.55	99.01	16.96	
702WL-11	6798497.855	350019.2632	111.08	---	Monitor Well	---	---	9/14/2016	1153	12.13	98.95	25.00	Hole in top on well box, casing push up against side
702WL-12	6798474.442	350028.471	118.82	---	Monitor Well	---	---	9/14/2016	1149	15.80	103.02	16.52	Cracked concrete base; tubing in well
702WL-13	6798416.23	350024.588	109.41	---	Monitor Well	---	---	9/14/2016	1217	6.52	102.89	13.35	Inside of well box appears washed out
702WL-14	6798492.628	350109.5062	113.48	---	Monitor Well	---	---	9/14/2016	1142	8.09	105.39	14.16	Well not labeled clearly; tubing in well
702WL-15	6798486.288	350008.6463	114.71	---	Monitor Well	---	---	9/14/2016	1159	10.41	104.30	28.98	Flushmount; inside of well box appears washed out
702WL-16	6798410.659	350000.7165	108.31	---	Monitor Well	---	---	9/14/2016	1205	5.98	102.33	12.50	Tubing in well
702WL-17	6798432.794	350014.2005	112.31	---	Monitor Well	---	---	9/14/2016	1211	9.61	102.70	16.31	Well plug missing; lots of sediment on well bottom
702WL-18	6798394.57	350010.6943	106.39	---	Monitor Well	---	---	9/14/2016	1225	4.24	102.15	15.00	Well appears damaged
702WL-19	6798381.021	350030.9941	106.99	---	Monitor Well	3.07	17.02	9/14/2016	1230	4.16	102.83	18.53	Well appears damaged
702WL-20	6798513.76	350062.95	126.95	---	Monitor Well	---	---	9/14/2016	1124	17.23	109.72	24.16	Flushmount; strong petroleum odor

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Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
704WL-02	6794303.567	348152.4211	174.05	---	Monitor Well	---	---	9/16/2016	1111	NM	NA	NM	Abandoned
79WL-01	6794587.527	348833.0943	185.27	---	Monitor Well	---	---	9/13/2016	1400	26.19	159.08	34.83	Well appears damaged
805WL-01	6793147.971	348201.1143	157.1	---	Monitor Well	7.5	17.5	9/14/2016	1400	13.14	143.96	17.75	Well not labeled
807WL-01	6792897.279	350292.1551	198.85	---	Monitor Well	---	---	9/14/2016	1315	NM	NA	NM	Abandoned
BH-04	6794942.216	347801.9181	300.82	---	Monitor Well	8	18	9/12/2016	1432	NM	NA	NM	Not found
BH-05	6794681.448	347098.3892	249.2	---	Monitor Well	7	17	9/12/2016	1250	5.80	243.40	18.43	
BH-06	6793192.863	346595.3021	147.33	---	Monitor Well	5.1	10.1	9/14/2016	---	NM	NA	NM	Not found
CASTA-1	6793165.61	347376.24	155.56	---	Monitor Well	15	25	9/14/2016	1537	13.40	142.16	28.56	
CCH-1	6792695.17	347727.55	153.78	---	Monitor Well	33	43	9/14/2016	1441	21.77	132.01	46.08	
CFTA-1	6795018.49	351561.09	245.14	---	Monitor Well	70	80	9/15/2016	1440	72.90	172.24	80.60	
CFTA-2	6795114.35	351537.08	246.14	---	Monitor Well	71	81	9/15/2016	1450	74.46	171.68	85.72	
CFTA-3	6794908.21	351596.09	240.31	---	Monitor Well	69	79	9/15/2016	1435	67.39	172.92	77.92	
CHD-1	6793265.39	346432.91	146.77	---	Monitor Well	10	20	9/14/2016	1610	10.83	135.94	23.62	
CHD-2	6792927.99	346451.98	143.7	---	Monitor Well	10	20	9/14/2016	1615	11.54	132.16	23.22	
CHD-3	6792518.08	346047.33	133.53	---	Monitor Well	7	17	9/15/2016	923	8.86	124.67	20.35	
CHD-4	6792395.23	345487.57	34.41	---	Monitor Well	10	20	9/15/2016	944	2.25	32.16	30.20	
DP98INJ-01	6795683.772	347410.5208	198.54	195.9	Injection Well	21.5	31.5	9/12/2016	1101	14.11	184.43	32.69	
DP98INJ-02	6795685.623	347413.4371	199.03	---	Injection Well	21	31	9/12/2016	1055	14.53	184.50	31.96	Tubing in well
DP98INJ-03	6795687.098	347415.9439	199.02	---	Injection Well	20.5	30.5	9/12/2016	1047	14.72	184.30	31.38	
DP98MW-04	6795681.527	347423.1283	199.28	---	Monitor Well	20.5	30.5	9/12/2016	1107	14.14	185.14	32.67	
DP98MW-05	6795690.997	347417.9509	197.95	---	Monitor Well	21	31	9/12/2016	1040	14.53	183.42	33.36	
DP98MW-06	6795695.003	347415.7882	197.32	---	Monitor Well	21	31	9/12/2016	1030	15.24	182.08	33.44	
E3-1	6795651.11	351890.66	256.31	---	Monitor Well	82	92	9/15/2016	1415	85.72	170.59	96.93	
ESMW-3A	6794171.561	348762.5284	182.18	---	Monitor Well	---	---	9/13/2016	910	NM	NA	NM	Not found
ESMW-3B	6794170.218	348762.8725	182.2	---	Monitor Well	---	---	9/13/2016	910	NM	NA	NM	Not found
ESMW-4A	6794190.288	348880.8701	183.95	---	Monitor Well	---	---	9/13/2016	905	NM	NA	NM	Abandoned
ESMW-4B	6794188.863	348880.7226	183.95	---	Monitor Well	---	---	9/13/2016	905	NM	NA	NM	Abandoned
ESMW-5A	6794102.896	348833.4384	---	---	Monitor Well	---	---	9/13/2016	855	NM	NA	NM	Abandoned
ESMW-5B	6794102.962	348831.3412	---	---	Monitor Well	---	---	9/13/2016	855	NM	NA	NM	Abandoned
ESMW-7A	6794101.782	348742.9332	171.75	---	Monitor Well	---	---	9/13/2016	850	NM	NA	NM	Abandoned
ESMW-7B	6794100.357	348741.8191	171.67	---	Monitor Well	---	---	9/13/2016	850	NM	NA	NM	Abandoned
FASTA-1	6793252.84	347119.77	154.44	---	Monitor Well	24	34	9/14/2016	1547	12.03	142.41	37.72	
FP-52	6795426.166	349630.5773	204.7	---	Monitor Well	---	---	9/15/2016	1115	42.74	161.96	51.50	Flush mount
FP-56	6795414.19	349599.1201	207.9	---	Monitor Well	---	---	9/15/2016	1110	40.92	166.98	NM	Flush mount
FS1-1	6793775.91	348725.71	176.98	---	Monitor Well	24	34	9/14/2016	1220	20.66	156.32	33.95	Equipment down well, total depth may not be accurate
FS6-1	6794814.24	350886.87	218.19	---	Monitor Well	51.4	61.4	9/16/2016	1214	48.04	170.15	61.62	
FS7-1	6794462.95	348910.67	189.39	---	Monitor Well	30.6	40.6	9/13/2016	1400	27.00	162.39	40.52	
FSFS-1	6792460.34	347188.89	149.52	---	Monitor Well	30	40	9/12/2016	1451	27.03	122.49	43.25	Bladder pump and tubing in well; well apears damaged
GW-4A	6792526.19	349460.323	137.87	---	Monitor Well	1	11	9/12/2016	1412	5.58	132.29	12.28	No lock; tubing in well; well appears damaged
GW-5A	6795291.875	349601.9791	204.86	---	Monitor Well	40	50	9/13/2016	1135	43.60	161.26	NM	Equipment down well, total depth not measured
GW-7A	6792976.504	349639.3428	177.37	---	Monitor Well	30	40	9/13/2016	1401	29.10	148.27	36.49	
H10-1	6794672.2	349179.44	191.38	---	Monitor Well	30	40	9/13/2016	1215	27.34	164.04	40.50	Tubing in well; soft tag at total depth
H16-1	6794577.4	350451.81	208.88	---	Monitor Well	47	57	9/16/2016	1148	40.24	168.64	56.92	
H17-1	6794841.41	350632.53	213.99	---	Monitor Well	47	57	9/16/2016	1224	44.74	169.25	57.89	
H18-1	6795114.57	349190.51	198.07	---	Monitor Well	35	45	9/13/2016	1200	32.92	165.15	44.98	Tubing in well; soft tag at total depth
H5-1	6792748.09	348001.07	158.56	---	Monitor Well	27	37	9/14/2016	1432	23.56	135.00	40.31	combo lock 0911
H6-1	6793244.62	347928.99	157.5	---	Monitor Well	14	24	9/13/2016	1524	12.01	145.49	24.09	Tubing in well
H8-1	6794378.74	348699.27	183.67	---	Monitor Well	34.5	44.5	9/13/2016	1125	22.86	160.81	43.87	Tubing in well; soft tag at total depth
HS-01	6795865.339	346852.4817	120.97	---	Monitor Well	---	---	9/12/2016	---	NM	NA	NM	Abandoned
HS-02A	6795957.893	346844.5519	127.99	---	Monitor Well	---	---	9/12/2016	---	NM	NA	NM	Abandoned

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
HS-02B	6795961.513	346847.5665	122.77	---	Monitor Well	---	---	9/12/2016	---	NM	NA	NM	Abandoned
HS-03	6795955.877	346756.2093	---	---	Monitor Well	---	---	9/12/2016	---	NM	NA	NM	Abandoned
HS-04	6795996.657	346796.6287	128.78	---	Monitor Well	---	---	9/12/2016	---	NM	NA	NM	Abandoned
HS-05	6795986.778	346695.8835	108.57	---	Monitor Well	---	---	9/12/2016	---	NM	NA	NM	Abandoned
IS-2	6794966.185	348982.1887	192.98	---	Monitor Well	25	40	9/13/2016	1419	NM	NA	NM	Abandoned
IS6-01	6794880.776	350899.215	184.50	---	Monitor Well	50.2	60.2	9/16/2016	1206	49.81	134.68	59.92	Well appears damaged
LF02SP-01	6791924.389	350400.6172	---	---	Seep	---	---	9/12/2016	1109	NM	NA	NM	Not found
LF04SP-01	6793723.328	345542.6547	---	---	Seep	---	---	9/15/2016	1540	NM	NA	NM	Destoyed
LF04SP-02	6793761.724	345572.8094	---	---	Seep	---	---	9/15/2016	1533	NM	NA	NM	Not found
LF04SP-02DG	6793779.148	345528.8266	---	---	Seep	---	---	9/15/2016	1522	NM	NA	NM	Destoyed
LF04SP-03	6794006.771	345611.9917	---	---	Seep	---	---	9/15/2016	1138	2.34	NA	4.89	Well appears damaged
LF04SP-04	6794043.307	345642.1383	---	---	Seep	---	---	9/15/2016	1130	3.84	NA	5.20	Well appears damaged
LF04SP-05	6794420.123	345599.4989	---	---	Seep	---	---	9/15/2016	1100	NM	NA	NM	Not found
LF04SP-06	6794294.425	345569.9914	---	---	Seep	---	---	9/15/2016	1507	NM	NA	NM	Destoyed
LF04SP-07	6794604.836	345629.8995	---	---	Seep	---	---	9/15/2016	1432	3.90	NA	4.96	Well appears damaged
LF05GW-1A	6793558.39	351717.4156	222.44	---	Monitor Well	---	---	9/12/2016	1442	41.70	180.74	52.53	
LF05GW-2A	6793215.113	351976.4958	225.95	---	Monitor Well	---	---	9/12/2016	1456	41.60	184.35	52.37	Concrete pad appears to be damaged
LF05GW-2B	6792829.302	350953.8229	205.18	---	Monitor Well	---	---	9/12/2016	1143	33.21	171.97	44.13	
LF05MW-02	6792853.01	350940.5355	207.6	198.5	Monitor Well	93	108	9/12/2016	1137	37.48	170.12	NM	Concrete pad appears to be damaged
LF05MW-03	6792936.028	350937.4061	210.16	---	Monitor Well	---	---	9/15/2016	1535	37.97	172.19	50.75	
LF05MW-04	6792914.466	350818.1306	203.39	195.5	Monitor Well	28	43	9/14/2016	1500	31.91	171.48	NM	top of casing is broken, total depth not measured
LF05MW-07	6793531.717	350899.9851	210.88	201.7	Monitor Well	31	46	9/14/2016	1400	37.86	173.02	48.65	
LF05MW-10	6793283.745	351223.4052	213.48	206	Monitor Well	32	47	9/13/2016	814	37.38	176.10	48.96	
LF05MW-13	6792757.524	351400.5654	186.49	183.6	Monitor Well	75	90	9/12/2016	1100	13.26	173.23	92.02	Well appears damaged
LF05MW-14	6793055.86	350869.5928	207.51	---	Monitor Well	---	---	9/16/2016	1250	NM	NA	NM	Not found
LF05MW-15	6793013.639	351749.7576	219.68	---	Monitor Well	37.5	52.5	9/13/2016	---	NM	NA	NM	Not found
LF05MW-15R	6793017.012	351753.316	224.93	---	Monitor Well	36	51	9/12/2016	1153	41.24	183.69	53.79	
LF05MW-16	6793065.625	351239.1011	207.57	---	Monitor Well	29	44	9/12/2016	1625	36.20	171.37	47.62	Tubing in well
LF05MW-17	6793424.402	351249.3084	210.39	---	Monitor Well	29	49	9/12/2016	825	39.46	170.93	50.95	
LF05MW-18	6793051.994	351084.6492	201.79	---	Monitor Well	31.5	46.5	9/12/2016	1619	32.63	169.16	49.72	Tubing in well
LF05W-05	6792821.487	351370.9104	210.97	---	Monitor Well	---	---	9/12/2016	1041	32.39	178.58	56.33	Pump in well
LF05W-06	6792731.801	350971.9436	205.12	---	Monitor Well	---	---	9/12/2016	940	33.10	172.02	56.05	Well appears damaged
LF59MW-01	6792576.464	350786.1491	176.32	167.9	Monitor Well	4.5	14.87	9/12/2016	1136	7.79	168.53	17.75	Equipment in well
LF59MW-02	6792656.918	350330.4936	175.6	167.1	Monitor Well	7.29	24.62	9/12/2016	1319	16.50	159.10	27.25	Tubing in well
LF59MW-03	6792706.365	350417.6565	191.01	182.3	Monitor Well	22.08	37.45	9/12/2016	1245	29.34	161.67	39.65	Tubing in well
LF59-MW04	6792647.23	350674.94	179.93	171	Monitor Well	7.29	22.29	9/12/2016	1306	13.47	166.46	23.82	Well appears damaged
LF59-MW05	6792668.17	350635.4	174.53	165.7	Monitor Well	4.58	19.58	9/12/2016	1302	8.85	165.68	21.32	Well appears damaged
LF59MW-06R	6792588.703	350310.3249	168.81	---	Monitor Well	---	---	9/12/2016	1329	11.24	157.57	27.71	Lock damaged; thick sludge on well bottom
LF59-MW07	6792705.36	350604.01	178.18	---	Monitor Well	---	---	9/12/2016	1257	13.30	164.88	25.76	
LF59-MW08	6792724.9	350527.96	190.17	---	Monitor Well	---	---	9/12/2016	1253	26.14	164.03	37.67	
LF59-MW09	6792661	350419.76	191.32	---	Monitor Well	---	---	9/12/2016	1313	30.02	161.30	43.13	
LF59-PZ01	6792481.17	350782.17	175.05	164.9	Piezometer	3	13	9/12/2016	1125	7.05	168.00	15.57	
LF59-PZ02	6792568.91	350518.43	176.3	166.6	Piezometer	10	25	9/12/2016	1145	14.34	161.96	25.37	
MWSS80-01	6792988.268	347657.5014	119.51	---	Monitor Well	---	---	9/14/2016	---	NM	NA	NM	Abandoned
NS3-02	6792282.814	349083.4828	125	---	Monitor Well	4	24	9/12/2016	1523	4.82	120.18	26.03	Well appears damaged
OU1-LF19	6792806.152	350828.1412	196.72	---	Monitor Well	---	---	9/12/2016	1246	33.54	163.18	42.11	OU1MW-19R, Screen 27.2-42.2
OU1-LF19R	6792806.466	350427.7	---	---	Monitor Well	---	---	9/14/2016	1325	NM	NA	NM	Abandoned
OU1-LF20	6793191.479	351032.6955	211.68	---	Monitor Well	30.9	45.9	9/15/2016	1510	NM	NA	NM	Lock broken
OU1-LF21	6793171.105	350878.2353	205.78	---	Monitor Well	28.6	43.6	9/12/2016	1314	33.83	171.95	43.60	Flush mount; well not labeled
OU1-LF22	6792723.265	350264.8757	186.12	---	Monitor Well	---	---	9/12/2016	1456	27.64	158.48	38.95	Well not labeled

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
OU1-LF23	6793279.365	351135.072	208.54	---	Monitor Well	26.95	41.95	9/12/2016	1606	39.99	168.55	44.82	Well label says OU1MW-23
OU3MW-02	6792277.325	347632.1471	142.66	141.08	Monitor Well	23.7	38.7	9/12/2016	1338	27.74	114.92	39.22	Well label is missing.
OU3MW-05	6792854.738	347499.3958	113.82	142.92	Monitor Well	8.6	18.6	9/14/2016	1458	11.94	101.88	17.86	Well not labeled
OU3MW-06	6792892.307	347502.9511	145.94	142.27	Monitor Well	8.02	23.02	9/14/2016	1505	12.58	133.36	24.59	
OU3MW-11	6793138.296	347518.5651	118.76	---	Monitor Well	---	---	9/14/2016	---	NM	NA	NM	Not found
OU3MW-12	6793134.184	347518.4667	118.90	---	Monitor Well	---	---	9/14/2016	---	NM	NA	NM	Not found
OU3MW-25	6793180.911	348023.1185	154.93	153.34	Monitor Well	9	24	9/14/2016	1413	14.66	140.27	24.80	May have some surface water intrusion in well
OU4MW-04	6794366.359	348821.1012	---	---	Monitor Well	---	---	9/16/2016	1115	NM	NA	NM	No access
OU4MW-08R	6794916.042	348840.2951	191.93	---	Monitor Well	26	41	9/14/2016	930	32.07	159.86	43.20	Petroleum odor
OU4W-1	6794196.055	349018.7496	149.55	---	Monitor Well	18	33	9/16/2016	1126	NM	NA	NM	Not found
OU4W-11	6795347.154	349722.3032	208.27	204.00	Monitor Well	38.8	53.8	9/13/2016	1138	46.62	161.65	NM	Equipment in well
OU4W-6	6794970.732	349307.7142	188.58	---	Monitor Well	24.2	39.2	9/13/2016	1215	NM	NA	NM	Abandoned
OU5CP-01	6791471.439	347156.695	81.15	---	Seep	---	---	9/13/2016	1115	3.04	78.11	5.20	Well cap missing
OU5CP-02	6791471.29	347157.311	80.92	---	Seep	---	---	9/13/2016	---	NM	NA	NM	Not found
OU5KINJ-01	6792111.83	347943.1201	149.92	---	Injection Well	43	53	9/15/2016	1000	39.17	110.75	NM	Total depth not measured
OU5KINJ-02	6792059.6	347920.53	150.02	---	Injection Well	43	53	9/15/2016	925	39.23	110.79	NM	Total depth not measured
OU5KINJ-03	6792052.66	347937.01	146.04	---	Injection Well	43	53	9/12/2016	---	NM	NA	NM	Not found
OU5KINJ-04	6792047.96	347933.07	145.68	---	Injection Well	43	53	9/12/2016	---	NM	NA	NM	Not found
OU5KMW-01	6792082.528	347927.4278	146.69	---	Monitor Well	43	53	9/12/2016	---	NM	NA	NM	Not found
OU5KMW-02	6792021.202	347951.2173	150.53	---	Monitor Well	45	55	9/12/2016	1001	41.12	109.41	58.53	
OU5KMW-03	6792067.569	347931.9825	146.22	---	Monitor Well	40	55	9/12/2016	---	NM	NA	NM	Not found
OU5KMW-04	6792029.943	347928.3453	148.52	---	Monitor Well	43	53	9/12/2016	---	NM	NA	NM	Incorrect key or lock seized - cannot access
OU5KMW-05	6792006.735	347921.9555	145	---	Monitor Well	41	51	9/15/2016	950	35.80	109.20	54.24	
OU5MW-01	6791715.936	347076.0824	---	---	Monitor Well	30	45	9/12/2016	1557	NM	NA	NM	Not found
OU5MW-02	6792015.615	347544.6074	142.26	---	Monitor Well	25	40	9/12/2016	1352	33.79	108.47	46.57	
OU5MW-03	6792210.642	347911.5517	148.76	---	Monitor Well	25	40	9/12/2016	1320	33.59	115.17	46.80	Tubing in well
OU5MW-05	6792710.838	348790.4714	156.3	---	Monitor Well	18	33	9/13/2016	---	23.25	133.05	NM	Equipment in well, total depth not measured
OU5MW-06	6792755.959	349406.9439	173.3	---	Monitor Well	28	43	9/13/2016	1625	34.70	138.60	48.30	Tubing in well
OU5MW-07	6792808.478	349735.4513	178.48	---	Monitor Well	30	45	9/13/2016	1435	32.65	145.83	49.21	
OU5MW-08	6792601.679	349676.8949	155.81	---	Monitor Well	10	20	9/12/2016	1349	16.63	139.18	21.93	
OU5MW-09	6792264.39	348807.4779	116.41	---	Monitor Well	3	8	9/12/2016	1506	3.92	112.49	9.78	Equipment in well
OU5MW-10	6792091.883	348601.4082	110.1	---	Monitor Well	3	8	9/12/2016	1500	0.63	109.47	4.78	Equipment in well; well not labeled
OU5MW-11	6792236.586	348245.3593	123.93	---	Monitor Well	30	45	9/12/2016	1230	37.94	85.99	NM	Equipment in well, total depth not measured
OU5MW-12	6791830.017	348109.1181	97.38	---	Monitor Well	5	10	9/13/2016	1205	6.21	91.17	9.53	
OU5MW-13	6791780.825	347941.3542	98.1	---	Monitor Well	2.5	7.5	9/12/2016	1755	4.29	93.81	9.10	
OU5MW-14	6791640.561	347679.0054	86.49	---	Monitor Well	7	12	9/13/2016	903	10.05	76.44	13.49	
OU5MW-15	6791553.005	347396.7582	82.68	---	Monitor Well	7	12	9/13/2016	1058	11.02	71.66	14.41	
OU5MW-30	6792324.315	348972.94	85.22	---	Monitor Well	2.5	7.5	9/12/2016	1519	NM	NA	NM	Not found
OU5MW-31	6792411.862	349316.8401	136.98	---	Monitor Well	2.5	7.5	9/12/2016	1418	4.55	132.43	8.94	Equipment in well
OU5MW-33	6792585.467	350030.0848	156.76	---	Monitor Well	---	---	9/12/2016	1340	13.11	143.65	23.03	Equipment in well
OU5MW-34	6792264.382	347189.2385	141.34	---	Monitor Well	---	---	9/12/2016	1434	NM	NA	NM	Well appears damaged
OU5MW-36	6792046.106	348006.6035	150.56	---	Monitor Well	---	---	9/12/2016	1013	40.75	109.81	62.23	
OU5MW-37	6791917.795	347032.8859	135.44	---	Monitor Well	27.4	42.4	9/12/2016	1526	32.85	102.59	42.29	Needs new well plug and lock
OU5MW-38	6792167.184	347152.5547	138.36	---	Monitor Well	51.23	61.23	9/12/2016	1517	30.35	108.01	59.32	
OU5MW-39	6793351.518	347612.0112	169.76	---	Monitor Well	7.5	22.5	9/13/2016	1510	11.21	158.55	22.68	Tubing in well
OU5MW-40	6792079.931	347254.8891	139.83	---	Monitor Well	28	41	9/12/2016	1413	32.04	107.79	43.59	
OU5MW-43	6791856.314	347079.2691	134.19	134.2	Monitor Well	25.5	39.5	9/12/2016	1541	31.96	102.23	NM	Tubing in well, total depth not measured
OU5MW-44	6791972.214	347458.3047	138.23	138.2	Monitor Well	27	41	9/12/2016	1401	31.11	107.12	41.82	Tubing in well, total depth not measured
OU5MW-45	6791686.436	347367.226	135.08	135.1	Monitor Well	24.5	39.5	9/15/2016	1038	32.72	102.36	39.40	Equipment in well
OU5MW-46	6791713.109	347073.1332	140.9	---	Monitor Well	45	55	9/12/2016	1400	34.40	106.50	54.10	Flushmount; set transducer

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
OU5SP-01	6791505.409	347124.5217	83.08	---	Seep	---	---	9/13/2016	1120	4.25	78.83	7.12	
OU5SP-02	6791531.419	347162.082	90.56	---	Seep	---	---	9/13/2016	1126	2.25	88.31	4.83	
OU5SP-03	6791697.332	347643.8371	105.12	---	Seep	---	---	9/13/2016	1041	1.18	103.94	2.56	Well casing appears damaged
OU5SP-04	6792011.077	348217.2198	105.32	---	Seep	---	---	9/13/2016	933	2.72	102.60	4.28	
OU5SP-05	6792030.934	348233.6447	105.35	---	Seep	---	---	9/13/2016	938	2.85	102.50	4.89	
OU5SP-06	6791947.999	348128.2055	104.57	---	Seep	---	---	9/13/2016	923	2.42	102.15	5.02	
OU5SP-07	6791749.752	347731.2949	116.84	---	Seep	---	---	9/13/2016	1035	3.32	113.52	4.96	
OU5SP-08	6791679.588	347621.5221	88.13	---	Seep	---	---	9/13/2016	1045	2.78	85.35	4.20	
OU5SP-09	6791913.256	347976.3832	99.61	---	Seep	---	---	9/13/2016	1010	2.61	97.00	5.05	
OU5SP-10	6791913.002	347994.8397	100.89	---	Seep	---	---	9/13/2016	1008	1.79	99.10	4.78	
OU5SP-11	6791913.961	347999.7795	100.2	---	Seep	---	---	9/13/2016	1005	2.50	97.70	4.80	
OU5SP-12	6791916.976	348023.5609	101.06	---	Seep	---	---	9/13/2016	1003	3.35	97.71	5.10	
OU5SP-13	6791920.375	348037.5201	100.14	---	Seep	---	---	9/13/2016	958	3.02	97.12	4.86	
OU5SP-14	6791923.275	348058.4506	103.25	---	Seep	---	---	9/13/2016	953	1.75	101.50	3.87	
OU5SP-15	6791623.882	347468.1269	74.05	---	Seep	---	---	9/13/2016	1130	1.91	72.14	4.58	
OU5SP-17	6791866.734	347783.4452	99.48	---	Seep	---	---	9/13/2016	1030	2.98	96.50	4.86	
OU5SP-18	6791848.04	347781.0203	101.91	---	Seep	---	---	9/13/2016	1026	4.40	97.51	6.01	
OU6MW-05	6793931.495	345803.9385	195.74	---	Monitor Well	---	---	9/15/2016	1210	NM	NA	NM	Destoyed
OU6MW-06	6793963.198	345890.8065	215.37	---	Monitor Well	7.3	22.3	9/15/2016	1430	18.38	196.99	25.18	Tubing in well; firm tag at total depth
OU6MW-12	6793911.064	345768.2787	196.27	---	Monitor Well	9.6	24.6	9/15/2016	953	21.19	175.08	27.75	Well box heaved slightly; tubing in well; strong petroleum odor
OU6MW-13	6793870.342	345714.2525	181.11	---	Monitor Well	45.5	65.4	9/16/2016	1430	56.26	124.85	68.32	
OU6MW-17	6796530.907	351016.418	283	---	Monitor Well	42.8	52.8	9/14/2016	1257	45.81	237.19	52.07	Tubing in well
OU6MW-46	6793858.906	345905.5521	202.93	---	Monitor Well	15	40	9/15/2016	1002	8.34	194.60	41.77	Well appears damaged
OU6MW-49R	6791882.889	350825.3887	169.16	---	Monitor Well	---	---	9/12/2016	1041	4.39	164.77	18.93	
OU6MW-60	6793987.291	345920.994	216.3	---	Monitor Well	6	21	9/15/2016	1420	11.97	204.33	24.95	Firm tag at total depth
OU6MW-61	6793822.508	345670.0484	161.39	---	Monitor Well	20.3	35.3	9/15/2016	950	28.28	133.11	39.00	Tubing in well; firm tag at total depth
OU6MW-63	6793715.365	345617.8408	145.38	---	Monitor Well	33.5	48.5	9/12/2016	1050	44.69	100.69	51.72	Set Transducer
OU6MW-67	6794036.484	345686.3096	226.07	---	Monitor Well	74.1	84.1	9/12/2016	1145	66.97	159.10	87.10	Set Transducer
OU6MW-71A	6796617.447	351010.9539	274.51	---	Monitor Well	---	---	9/14/2016	1302	NM	NA	NM	Abandoned
OU6MW-75	6794050.156	345737.9683	233.21	---	Monitor Well	66.43	76.43	9/15/2016	1150	41.13	192.08	80.49	Tubing in well
OU6MW-77	6793967.892	345727.8758	196.04	---	Monitor Well	19.8	34.8	9/15/2016	1016	28.95	167.09	38.74	Well box heaved slightly; well plug missing; strong petroleum odor
OU6MW-78	6793987.848	345698.1798	209.76	---	Monitor Well	74	99	9/12/2016	1231	79.58	130.18	102.40	Set transducer
OU6MW-90	6796507.027	351033.7604	278.6	---	Monitor Well	---	---	9/14/2016	1252	39.63	238.97	51.86	
OU6MW-91	6793934.231	345725.7868	199.24	---	Monitor Well	---	---	9/15/2016	1000	25.24	174.00	32.75	Well label is very faint; very strong petroleum odor
OU6MW-92	6793966.999	345707.3466	204.55	---	Monitor Well	---	---	9/12/2016	1304	34.09	170.46	39.60	Well pad is loose; set transducer
OU6MW-92	6793966.999	345707.3466	204.55	---	Monitor Well	---	---	9/15/2016	1021	33.91	170.64	NM	Transducer and tubing in well, total depth not measured; well not labeled
OU6MW-93	6794012.833	345698.7041	216.72	---	Monitor Well	---	---	9/15/2016	1027	56.84	159.88	66.50	Tubing in well; well not labeled
OU6MW-94	6793930.004	345709.5994	192.02	---	Monitor Well	---	---	9/15/2016	1006	20.44	171.58	27.66	Tubing in well; well box appears heaved, well against side of well box
SAMW-01	6793859.037	348956.2201	179.7	---	Monitor Well	---	---	9/14/2016	1205	NM	NA	NM	Abandoned
SAMW-02	6793837.381	348968.472	180.17	---	Monitor Well	---	---	9/14/2016	1205	NM	NA	NM	Abandoned
SAMW-UK	6793837.377	348968.4753	180.17	---	Monitor Well	---	---	9/14/2016	1205	NM	NA	NM	Abandoned
SD025MW-01	6794921.89	348862.837	200.15	---	Monitor Well	26	36	9/16/2016	1300	35.72	164.43	39.57	
SD025MW-02	6794821.262	348842.495	194.78	---	Monitor Well	23	33	9/16/2016	1316	30.82	163.96	35.58	
SD025MW-03	6794853.719	348783.233	193.06	---	Monitor Well	23	33	9/16/2016	1322	28.76	164.30	NM	Diffusion bag in well, total depth not measured
SD025MW-04	6794949.245	348819.308	206.19	---	Monitor Well	33	43	9/14/2016	940	41.84	164.35	45.95	
SD28MW-01	6794764.436	350961.488	219.17	---	Monitor Well	59.32	69.32	9/16/2016	1217	52.51	166.66	68.89	
SP-01A	6791488.944	347228.9451	---	---	Seep	---	---	---	---	NM	NA	NM	Abandoned
SP-03A	6791704.975	347681.3319	---	---	Seep	---	---	---	---	NM	NA	NM	Abandoned
SP-04A	6791988.352	348204.8826	---	---	Seep	---	---	---	---	NM	NA	NM	Abandoned
SP1-02	6791646.148	347428.5104	136.75	---	Monitor Well	48	63	9/12/2016	1612	35.02	101.73	50.78	

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
SP2/6-04	6792076.523	348255.6075	147.33	---	Monitor Well	30	50	9/12/2016	1121	37.53	109.80	52.91	
SP2/6-05	6791959.074	348109.2001	140.84	---	Monitor Well	26	46	9/12/2016	1154	31.40	109.44	NM	Equipment deployed in well; therefore, no TD measured
SP4/11-03	6792616.941	349300.4807	169.33	---	Monitor Well	---	---	9/15/2016	1118	37.20	132.13	54.25	Equipment in well
SP7/10-01	6794117.281	348453.1494	173.35	---	Monitor Well	14	34	9/13/2016	840	13.81	159.54	34.77	
SP7/10-04	6794373.707	348363.234	174.12	---	Monitor Well	15	30	9/13/2016	935	17.80	156.32	NM	Petroleum odor; total depth not measured
SS-09	6794747.59	350953.954	---	---	Monitor Well	---	---	9/16/2016	---	NM	NA	NM	Not found
SS108-1	6795747.35	351881.65	245.82	---	Monitor Well	71	81	9/15/2016	1405	75.61	170.21	84.87	
SS22MW01	6793607.157	351459.4823	219.41	---	Monitor Well	37.5	47.5	9/14/2016	1053	41.76	177.65	47.30	Well open
SS22MW02	6793528.571	351343.5737	217.6	---	Monitor Well	37.6	47.6	9/14/2016	1029	40.90	176.70	50.80	Well open
SS22MW03	6793575.004	351333.3419	219.31	---	Monitor Well	36.5	46.5	9/14/2016	1024	42.78	176.53	49.90	Concrete slab slightly elevated; well open
SS22MW04	6793613.883	351333.6286	220.74	---	Monitor Well	37.5	47.5	9/14/2016	1011	44.25	176.49	50.48	Concrete slab slightly elevated; well open
SS22MW05	6793870.579	351552.8547	229.97	---	Monitor Well	46	56.5	9/14/2016	928	52.90	177.07	59.40	
SS22MW06	6793847.797	351414.3526	229.07	---	Monitor Well	48	58	9/14/2016	943	52.70	176.37	60.86	
SS22MW07	6793879.68	351434.1035	227.14	---	Monitor Well	45	55.5	9/14/2016	950	50.96	176.18	58.08	
SS22MW08	6793922.222	351334.2512	224.19	---	Monitor Well	42.8	54.5	9/14/2016	906	48.77	175.42	55.90	
SS22MW09	6793969.295	351272.2863	223.71	---	Monitor Well	43	53	9/12/2016	1354	48.98	174.73	56.58	
SS22MW10	6793963.942	351379.5038	227.71	---	Monitor Well	45.5	55.5	9/14/2016	917	52.07	175.64	58.85	
SS22MW11	6793895.163	351482.1341	229.05	---	Monitor Well	46	56	9/14/2016	933	52.32	176.73	59.18	
SS22MW12	6793799.662	351673.4594	229.04	---	Monitor Well	45	55	9/12/2016	1420	50.39	178.65	57.63	
SS22MW13	6793642.018	351653.9994	223.07	---	Monitor Well	38	48	9/12/2016	1431	43.86	179.21	50.82	Bollards knocked over
SS22MW14	6793704.656	351394.2472	224.92	---	Monitor Well	42	52	9/14/2016	1117	48.30	176.62	55.40	
SS22MW15	6794008.759	351218.169	225.12	---	Monitor Well	45.5	55.5	9/12/2016	1410	51.15	173.97	60.10	
SS22MW16	6793640.075	351347.1156	222.69	---	Monitor Well	39	49	9/14/2016	1016	46.10	176.59	52.40	
SS22MW17	6793630.781	351379.6902	223.59	---	Monitor Well	39	59	9/14/2016	1105	46.72	176.87	61.56	
SS37MW07	6792478.095	349420.4444	162.406	---	Monitor Well	---	---	9/12/2016	1407	6.21	156.19	17.61	Well appears damaged
SS37MW08	6792479.93	349423.287	162.01	---	Monitor Well	---	---	9/12/2016	1358	5.39	156.62	55.97	Sediment in well bottom
ST41-08	6794235.14	346396.0235	252.59	---	Monitor Well	---	---	9/14/2016	1040	16.76	235.83	27.85	Soft tag at total depth
ST41-10R	6794236.147	346361.1092	243.34	---	Monitor Well	---	---	9/14/2016	1025	7.32	236.02	16.18	Well appears damaged
ST41-15	6794005.764	346340.1868	259.18	---	Monitor Well	---	---	9/14/2016	1115	8.88	250.31	22.50	
ST41-16	6794007.214	346385.2019	257.75	---	Monitor Well	---	---	9/14/2016	1110	16.83	240.92	NM	Strong petroleum odor
ST41-20	6794240.923	346262.0106	223.25	---	Monitor Well	---	---	9/14/2016	1048	3.63	219.62	11.57	Frost Heave; firm tag at total depth
ST41-23	6793927.83	346659.6001	173.474	---	Monitor Well	---	---	9/14/2016	1630	9.10	164.38	17.89	Well appears damaged
ST41-24	6793928.65	346553.16	177.661	---	Monitor Well	---	---	9/14/2016	1610	0.42	177.24	13.51	Well appears damaged
ST41-25	6793941.989	346374.7407	224.72	---	Monitor Well	---	---	9/14/2016	1540	4.40	220.33	13.58	
ST41-28	6794200.53	346390.0001	249.19	---	Monitor Well	14.5	23.5	9/14/2016	1020	22.48	226.71	NM	
ST41-30	6794273.781	346350.6152	231.42	---	Monitor Well	5.5	15.5	9/14/2016	1620	4.68	226.74	18.91	Firm tag at total depth
ST41-33A	6794229.028	346153.3601	189.53	---	Monitor Well	---	---	9/15/2016	1150	4.27	185.26	22.25	
ST41-34	6794275.346	346199.9807	187.49	---	Monitor Well	5	25	9/15/2016	1205	5.84	181.65	24.65	Frost heave
ST41ES-02	6793958.045	346317.2984	222.02	---	Monitor Well	---	---	9/14/2016	1635	NM	NA	NM	Not found
ST41SP-01	6794242.316	346352.8025	233.08	---	Seep	---	---	9/14/2016	1030	3.89	229.19	4.73	
ST524MW-01	6792385.296	348462.0295	161.49	---	Monitor Well	36	46	9/12/2016	1310	NM	NA	NM	Not found
ST524MW-02	6792363.472	348475.6774	160.69	---	Monitor Well	35.7	45.7	9/12/2016	1310	NM	NA	NM	Not found
ST600MW-01	6793542.186	351008.1686	210.38	---	Monitor Well	35.5	45.5	---	---	NM	NA	NM	Abandoned
ST600MW-02	6793526.392	350978.4481	210.98	---	Monitor Well	35.63	45.63	---	---	NM	NA	NM	Abandoned
ST600MW-04	6793463.52	350774.25	204.65	---	Monitor Well	31.85	45.85	9/14/2016	1402	NM	NA	NM	Abandoned
T40001	6794026.334	346493.6394	247.8	---	Monitor Well	85.5	110.5	9/14/2016	1105	27.31	220.49	NM	Slight petroleum odor
T40304	6794189.977	347309.6772	229.3	---	Monitor Well	61	67	9/12/2016	938	35.71	193.59	68.50	Well not labeled
T40905	6794122.819	346594.958	292.1	---	Monitor Well	24	35	9/14/2016	1040	30.41	261.69	39.10	Slight petroleum odor
T41206	6794228.14	346837.1099	287.9	---	Monitor Well	19	29	9/12/2016	1155	18.10	269.80	30.20	Strong odor
T41709	6794418.206	347209.6529	281.9	---	Monitor Well	20	30	---	---	NM	NA	NM	Well appears damaged

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
T42202	6794393.581	347327.9454	287.81	---	Monitor Well	121	145	9/12/2016	1445	65.71	222.10	149.40	No lock
TU091MW-01	6793113.024	349760.435	185.01	---	Monitor Well	---	---	9/16/2016	1403	26.94	158.07	32.67	
TWNMW-11	6793638.475	347947.5555	164.38	---	Monitor Well	7	17	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-12	6793724.671	347970.9191	163.28	---	Monitor Well	---	---	9/13/2016	1445	10.15	153.13	NM	Petroleum odor
TWNMW-13	6793697.556	347875.7936	162.19	---	Monitor Well	---	---	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-16	6793729.423	347834.3257	165.46	---	Monitor Well	---	---	9/13/2016	1440	NM	NA	NM	Not found
TWNMW-18	6793671.636	347960.8266	164.08	---	Monitor Well	5	15	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-25	6793628.907	347935.3003	164.03	---	Monitor Well	5	15	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-26	6793623.779	347950.6521	164.3	---	Monitor Well	5	15	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-27	6793603.495	347928.632	164.33	---	Monitor Well	5	15	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-29	6793614.145	347939.3471	164.64	---	Monitor Well	5	15	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-42	6793592.272	347916.4259	163.99	---	Monitor Well	5	15	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-47	6793637.623	347962.2847	164.42	---	Monitor Well	---	---	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-48	6793577.74	347920.4236	164.09	---	Monitor Well	---	---	9/13/2016	1440	NM	NA	NM	Abandoned
TWNMW-82	6793555.785	347782.7161	161.02	---	Monitor Well	---	---	9/13/2016	1441	19.35	141.67	19.38	Tubing in well; soft tag at total depth
UC35A-1	6793995.47	349166.05	183.01	---	Monitor Well	30	40	9/14/2016	1225	22.17	160.84	39.80	
UK-01	6792926.574	349725.6455	184.16	---	Monitor Well	---	---	---	---	NM	NA	NM	Not found
W-3	6794405.771	348397.1898	175.6	---	Monitor Well	10	35	9/13/2016	920	19.84	155.76	34.87	Petroleum odor
W-4	6794186.815	348111.8379	172.63	---	Monitor Well	17	32	9/13/2016	1050	11.28	161.35	29.05	Good condition
FORT RICHARDSON WELLS													
AP-2982	6793359.472	353943.5892	262	---	Monitor Well	---	---	9/13/2016	1140	13.19	248.81	23.80	
AP-2983	6793357.53	353975.0839	263	---	Monitor Well	---	---	9/13/2016	1150	NM	NA	NM	Not found
AP-3010	6796854.962	355653.068	---	---	Monitor Well	---	---	9/13/2016	1305	230.23	NA	243.00	Soft tag at total depth
AP-3013	6796135.4	354477.5949	312	311.63	Monitor Well	135	150	9/13/2016	1318	136.72	175.28	151.65	
AP-3014	6796385.252	354114.0051	297	---	Monitor Well	---	---	9/13/2016	1557	NM	NA	NM	Abandoned
AP-3015	6796379.473	354106.3189	294	294.15	Monitor Well	111	126	9/13/2016	1600	121.22	172.78	129.40	
AP-3020	6795225.384	354256.6127	297	---	Monitor Well	---	---	9/14/2016	1258	NM	NA	NM	Abandoned
AP-3219	6796906.312	354697.2454	300	---	Monitor Well	---	---	9/13/2016	1437	NM	NA	NM	Abandoned
AP-3220	6796738.48	355152.9366	408	---	Monitor Well	---	---	9/12/2016	1445	235.41	172.59	248.85	Tried to set transducer- cable not longe enough.
AP-3221	6796210.61	355439.4516	333	---	Monitor Well	158.4	178.4	9/14/2016	919	156.42	176.58	179.80	
AP-3222	6796907.414	354697.2136	300	---	Monitor Well	---	---	9/13/2016	1438	130.28	169.72	142.40	
AP-3231	6793375.583	353968.5245	263	---	Monitor Well	---	---	9/13/2016	1058	15.92	247.08	23.52	Tubing in well
AP-3354	6794634.716	355436.5438	314	---	Monitor Well	---	---	---	---	NM	NA	NM	Well obstruction at 37.23 feet bgs
AP-3441	6794677.119	354057.0312	285	---	Monitor Well	---	---	9/14/2016	1615	106.92	178.08	113.68	
AP-3449	6794567.165	354090.999	226	---	Monitor Well	---	---	9/14/2016	1620	NM	NA	NM	Not found
AP-3460	6795472.865	354300.264	297	---	Monitor Well	126	136	9/14/2016	1125	NM	NA	NM	Equipment in well, water level and total depth not measured
AP-3463	6795763.495	354249.9073	297	---	Monitor Well	---	---	9/13/2016	855	123.24	173.76	139.25	Soft tag at total depth
AP-3468	6794601.562	354292.7607	287	---	Monitor Well	103.7	113.7	9/13/2016	948	109.78	177.22	115.10	Soft tag at total depth
AP-3469	6794370.309	354386.8507	287	---	Monitor Well	---	---	9/14/2016	1505	NM	NA	NM	Equipment in well
AP-3502	6793357.56	353929.2648	261	---	Monitor Well	---	---	9/13/2016	1130	NM	NA	NM	Not found
AP-3534	6794599.076	354286.3294	286	---	Monitor Well	127.8	137.8	9/13/2016	1006	109.69	176.31	139.70	Tubing in well
AP-3648	6795225.515	354264.5993	296	---	Monitor Well	110.42	120.42	9/14/2016	1257	NM	NA	NM	Abandoned
AP-3649	6795289.802	354257.7731	296	---	Monitor Well	188.39	208.39	9/14/2016	1250	117.53	178.47	130.81	
AP-3652	6795255.361	354198.7839	294	---	Monitor Well	---	---	9/14/2016	1301	115.68	178.32	130.72	No lock
AP-3690	6791021.315	357717.2494	481	---	Monitor Well	---	---	9/12/2016	1006	34.52	446.48	38.13	Flushmount
AP-3699	6795595.433	354127.8038	266	---	Monitor Well	112.5	132.5	9/13/2016	1603	NM	NA	NM	Equipment in well, water level and total depth not measured
AP-3744	6799391.889	360227.4282	290	---	Monitor Well	26.5	36.5	9/13/2016	1348	28.84	261.16	39.10	Well appears damaged
AP-3745	6799331.254	360198.0916	295	---	Monitor Well	18	28	9/13/2016	1318	22.43	272.57	29.85	Tubing in well; well plug loose
AP-3746	6799362.214	360135.2402	304	---	Monitor Well	---	---	9/13/2016	1423	21.91	282.09	22.34	Well appears damaged
AP-3747	6799455.715	360228.4107	295	---	Monitor Well	20	30	9/13/2016	1453	26.60	268.40	32.19	Tubing in well well plug missing

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
AP-3748	6799486.111	360291.4259	292	---	Monitor Well	164.9	169.9	9/15/2016	1014	134.79	157.21	171.18	Equipment in well; well plug missing
AP-3749	6799157.87	359891.1603	303	---	Monitor Well	---	---	9/13/2016	1541	21.92	281.08	24.67	Loose well plug
AP-3772	6794473.947	354054.7915	---	---	Monitor Well	---	---	9/14/2016	1345	102.39	NA	120.16	
AP-3774	6794641.063	353979.9067	289.46	---	Monitor Well	105.4	115.4	9/14/2016	1520	115.77	173.69	106.12	
AP-3776	6794590.905	353943.9417	---	---	Monitor Well	---	---	9/14/2016	1600	103.31	NA	111.02	
AP-3777	6794948.086	355700.668	---	---	Monitor Well	82	92	---	---	NM	NA	NM	Abandoned
AP-3778	6794882.815	355647.7084	323.61	---	Monitor Well	83	93	9/14/2016	1503	79.30	244.31	97.88	
AP-3789	6794498.107	354317.9862	---	---	Monitor Well	---	---	9/14/2016	1435	NM	NA	NM	Lock broken
AP-3794	6791050.948	357697.0133	478	---	Monitor Well	---	---	9/14/2016	956	49.89	428.11	52.35	
AP-3795	6791100.033	357502.4147	426	---	Monitor Well	---	---	9/13/2016	1425	44.76	381.24	47.73	
AP-3796	6791032.529	357704.1463	488	---	Monitor Well	40	50	9/14/2016	950	46.05	441.95	49.23	
AP-3870	6794659.089	353772.9531	277	---	Monitor Well	110	120	9/14/2016	1551	99.28	177.72	110.16	
AP-3871	6794764.086	354164.9091	289	---	Monitor Well	109.3	119.3	9/13/2016	1612	110.58	178.42	121.33	Tubing in well
AP-3875	6796843.379	359725.6711	470.86	---	Monitor Well	76	86	9/13/2016	859	68.31	402.55	90.53	Equipment in well
AP-3876	6791019.807	357664.3853	485	---	Monitor Well	---	---	9/14/2016	959	62.07	422.93	67.32	
AP-3877	6791044.11	357731.8959	447	---	Monitor Well	---	---	9/14/2016	942	32.91	414.09	39.98	
AP-3879	6791002.433	357603.7891	455	---	Monitor Well	---	---	9/14/2016	1012	33.43	421.57	42.76	
AP-3880	6791029.542	357622.8319	449	---	Monitor Well	41.2	51.2	9/13/2016	1536	40.62	408.38	51.63	
AP-3881	6791107.32	357627.1419	440	---	Monitor Well	44.4	54.4	9/13/2016	1556	48.16	391.84	55.00	
AP-3882	6791074.929	357659.6968	446	---	Monitor Well	---	---	9/13/2016	1551	52.81	393.19	56.82	
AP-3883	6791102.76	357665.7504	440	---	Monitor Well	46.2	56.2	9/13/2016	1600	46.62	393.38	56.98	
AP-3884	6791064.37	357624.9369	443	---	Monitor Well	47.8	57.8	9/13/2016	1540	52.49	390.51	58.52	
AP-3885	6791042.579	357713.4555	487	---	Monitor Well	44.4	54.4	9/14/2016	946	43.63	443.37	50.25	
AP-3886	6791046.935	357697.9949	480	---	Monitor Well	---	---	9/14/2016	953	45.40	434.60	54.75	Heaved slightly; monument lid is damaged
AP-3893	6794580.344	354921.4195	300	---	Monitor Well	113.2	123.2	9/14/2016	1315	88.15	211.85	123.68	
AP-3913	6796970.343	359845.0323	376	---	Monitor Well	---	---	9/13/2016	826	84.98	291.02	89.06	
AP-3914	6794714.618	355551.0717	317.34	314.8	Monitor Well	95	110	9/14/2016	1337	99.32	218.02	129.15	Well lock and cap are missing
AP-3914	6794714.618	355551.0717	317.34	314.8	Monitor Well	60	70	9/14/2016	1337	99.32	218.02	129.15	Well lock and cap are missing
AP-3914	6794714.618	355551.0717	317.34	314.8	Monitor Well	118	131	9/14/2016	1337	99.32	218.02	129.15	Well lock and cap are missing
AP-3915	6791068.144	357640.9916	372	---	Monitor Well	---	---	9/13/2016	1543	53.95	318.05	67.47	
AP-3916	6794627.729	354049.6707	---	---	Monitor Well	---	---	9/14/2016	1326	NM	NA	NM	Lock broken
AP-3981	6799314.546	360115.6488	296	---	Monitor Well	30.5	40.5	9/13/2016	1216	23.62	272.38	41.98	Equipment in well
AP-3982	6799391.214	360291.8611	299	---	Monitor Well	30.5	40.5	9/13/2016	1335	27.53	271.47	37.17	Tubing in well; well plug loose
AP-3983	6799362.055	360170.4442	299	---	Monitor Well	---	---	9/13/2016	1105	26.09	272.91	33.35	Labeled as IW01-3983
AP3983R	6799362.751	360168.23	304.2	---	Monitor Well	---	---	9/13/2016	1102	26.93	277.27	45.41	Tubing in well
AP-3984	6799348.697	360129.1252	304	---	Monitor Well	---	---	9/13/2016	1443	28.58	275.42	32.43	Well box bent; well plug loose, lock is broken
AP-3985	6799323.646	360123.7882	302	---	Monitor Well	---	---	9/13/2016	1212	25.80	276.20	33.29	Well lidand plug are broken
AP-3986	6799324.439	360131.9158	301	---	Monitor Well	---	---	9/13/2016	1210	25.51	275.49	36.51	No mark on casing
AP-3989	6799378.421	360192.6946	301	---	Monitor Well	24	34	9/13/2016	1241	29.14	271.86	36.62	Tubing in well
AP-4004	6796866.087	359730.4149	469	---	Monitor Well	65	75	9/13/2016	904	73.09	395.91	77.19	Tubing in well
AP-4005	6796865.625	359712.6623	469	---	Monitor Well	68.2	78.2	9/13/2016	909	75.15	393.85	80.36	Tubing in well
AP-4006	6791192.374	357609.3269	432	---	Monitor Well	48	58	9/13/2016	1441	46.87	385.13	57.00	Well cap missing
AP-4007	6790993.757	357792.0723	516	---	Monitor Well	61	71	9/13/2016	1415	67.07	448.93	71.45	
AP-4008	6791050.233	357559.4824	445	---	Monitor Well	---	---	9/13/2016	1512	62.04	382.96	66.75	
AP-4009	6791185.096	357770.5142	424	---	Monitor Well	---	---	9/13/2016	1502	33.10	390.90	41.73	
AP-4010	6791322.45	357502.5269	426	---	Monitor Well	---	---	9/13/2016	1437	NM	NA	NM	Well obstruction at 54.06 feet bgs
AP-4011	6799369.533	360245.9858	295	---	Monitor Well	---	---	9/13/2016	1408	NM	NA	NM	Not found
AP-4012	6799362.118	360252.1116	294	---	Monitor Well	---	---	9/13/2016	1359	21.42	272.58	37.98	Well plug missing
AP-4014	6799391.136	360182.0397	297	---	Monitor Well	---	---	9/13/2016	1240	NM	NA	NM	Abandoned
AP-4017	6799311.918	360151.4577	298	---	Monitor Well	---	---	9/13/2016	1206	NM	NA	NM	Abandoned

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
AP-4021	6799649.342	360066.7598	311	---	Monitor Well	---	---	9/13/2016	1527	NM	NA	NM	Not found
AP-4022	6799364.714	360136.8552	303	---	Monitor Well	---	---	9/13/2016	1419	30.12	272.88	37.02	Well plug missing
AP-4027	6791139.872	357663.259	434	---	Monitor Well	---	---	9/13/2016	1604	43.64	390.36	55.00	
AP-4028	6791119.157	357554.5407	438	---	Monitor Well	---	---	9/13/2016	1423	54.69	383.31	67.91	
AP-4341	6795049.43	354488.6298	291	291.133	Monitor Well	50	65	9/14/2016	1503	64.03	226.97	68.07	Not found
AP-4342	6794508.843	354293.8187	293	---	Monitor Well	90	100	9/14/2016	1430	97.09	195.91	101.10	Essentially dry
AP-4343	6795482.687	354236.2623	296	---	Monitor Well	---	---	9/14/2016	1130	NM	NA	NM	Not found
AP-4344	6799504.392	360118.7826	313.52	---	Monitor Well	152.1	162.1	9/15/2016	1015	151.05	162.47	163.45	Equipment in well
AP-4345	6799662.562	360291.3639	---	---	Monitor Well	---	---	9/15/2016	1004	159.11	NA	186.17	Well plug is loose
AP-4347	6799351.903	360331.9605	---	---	Monitor Well	---	---	9/13/2016	1341	37.94	NA	46.54	Tubing in well
AP-4348	6799348.233	360322.5161	---	---	Monitor Well	---	---	9/13/2016	1337	NM	NA	NM	Destroyed
AP-4349	6799256.853	360197.4869	---	---	Monitor Well	---	---	9/13/2016	1233	76.36	NA	85.15	Tubing in well
AP-4350	6799684.999	360041.3739	998	---	Monitor Well	998	999	9/13/2016	1521	NM	NA	>100'	Tubing in well; well cap missing
AP-4351	6799260.565	360196.1631	---	---	Monitor Well	---	---	9/13/2016	1230	29.50	NA	51.15	
AP-4352	6799505.79	360126.1811	---	---	Monitor Well	---	---	9/13/2016	1309	30.72	NA	33.38	Well plug is loose
AP-4353	6799301.565	360120.2688	305.27	---	Monitor Well	57	67	9/13/2016	1221	32.59	272.68	70.11	Tubing in well; well plug is broken
AP-4354	6799309.708	360109.7399	---	---	Monitor Well	---	---	9/13/2016	1218	11.48	NA	17.71	
AP-4355	6799279.142	359871.3538	---	---	Monitor Well	---	---	9/13/2016	1533	25.69	NA	89.16	Loose plug
AP-4372	6795590.538	354242.4542	301.15	---	Monitor Well	124.2	134.2	9/13/2016	1541	123.70	177.45	137.05	
AP-4411	6794492.011	354460.4765	292.82	---	Monitor Well	70.8	71.8	9/14/2016	1455	67.98	224.84	72.79	Flushmount
AP-4412	6794422.24	354342.9957	---	---	Monitor Well	---	---	9/14/2016	1358	107.09	NA	127.89	
AP-4413	6794420.791	354343.33	291.36	---	Monitor Well	64.4	74.4	9/14/2016	1354	71.95	219.41	75.34	
AP-4518	6799301.985	360191.6792	---	---	Monitor Well	---	---	9/13/2016	1226	26.04	NA	47.28	Water in well box
AP-4519	6799313.877	360144.723	---	---	Monitor Well	---	---	9/13/2016	1159	25.43	NA	47.46	
AP-4521	6799369.758	360133.2004	---	---	Monitor Well	---	---	9/13/2016	1427	23.16	NA	23.58	Well appears damaged
AP-4522	6799365.678	360133.2337	---	---	Monitor Well	---	---	9/13/2016	1429	19.96	NA	23.40	Well appears damaged
AP-4523	6799360.228	360131.8205	---	---	Monitor Well	---	---	9/13/2016	1434	DRY	NA	23.23	Well appears damaged
AP-4524	6799355.115	360131.6094	---	---	Monitor Well	---	---	9/13/2016	1440	20.67	NA	23.45	Well appears damaged
AP-4525	6799395.852	360188.7232	306	---	Monitor Well	113.8	123.8	9/13/2016	1058	NM	NA	>100	Well box lid is damaged
AP-4525	6799395.852	360188.7232	306	---	Monitor Well	113.8	123.8	9/15/2016	1010	NM	NA	122.72	Well monument is damaged
AP-4527	6796803.589	359779.3934	471	---	Monitor Well	59	69	9/13/2016	840	50.88	420.12	71.17	Tubing in well
AP-4529	6794769.841	355957.9356	252	---	Monitor Well	72.5	82.5	---	---	NM	NA	NM	Abandoned
AP-4530	6794900.958	355834.095	326	---	Monitor Well	---	---	---	---	NM	NA	NM	Abandoned
AP-4531	6794923.315	355877.0178	328	---	Monitor Well	---	---	9/14/2016	1434	NM	NA	NM	Well is labeled SS13MW01; lock broken
AP-4532	6794750.683	355969.6066	327	---	Monitor Well	---	---	---	---	NM	NA	NM	Abandoned
AP-4533	6794748.379	356000.6658	328	---	Monitor Well	---	---	---	---	NM	NA	NM	Abandoned
AP-4534	6794754.378	355927.0204	326	---	Monitor Well	---	---	---	---	NM	NA	NM	Abandoned
AP-4535	6794601.003	356022.7524	326	---	Monitor Well	70.6	80.6	9/14/2016	1400	71.87	254.13	74.28	Full of grout
AP-4536	6795007.086	355853.8648	328	---	Monitor Well	87.6	97.6	9/14/2016	1443	NM	NA	NM	Abandoned
AP-4537	6794963.059	355811.5533	328	---	Monitor Well	82	92	---	---	NM	NA	NM	Abandoned
AP-4550	6799341.006	360163.5337	307.03	---	Monitor Well	32	42	9/13/2016	1144	25.92	281.11	42.96	Tubing in well
AP-4551	6799341.779	360167.2187	306.6	---	Monitor Well	85.2	95.2	9/13/2016	1152	DRY	NA	96.36	Tubing in well
AP-5000	6794548.234	355655.9799	320.35	---	Monitor Well	108	118	9/14/2016	1233	96.23	224.12	118.58	Full of grout
AP-5001	6794818.105	355929.1453	251.5	---	Monitor Well	69	79	---	---	NM	NA	NM	Abandoned
AP-5002	6794660.931	355429.5674	316.6	---	Monitor Well	117.5	127.5	9/14/2016	1335	NM	NA	NM	Abandoned
AP-5004	6794859.416	354982.8705	319.63	---	Monitor Well	121	131	---	---	NM	NA	NM	Abandoned
AP-5007	6794807.48	355932.3838	251.5	---	Monitor Well	70	80	---	---	NM	NA	NM	Abandoned
AP-5008	6794820.553	355938.8734	251.5	---	Monitor Well	77.5	87.5	---	---	NM	NA	NM	Abandoned
AP-5011	6794809.249	355907.533	---	---	Monitor Well	---	---	---	---	NM	NA	NM	Abandoned
AP-5013	6796831.864	359734.9131	478.98	---	Monitor Well	62.6	72.6	9/13/2016	845	69.36	409.62	71.99	Equipment in well; strong petroleum odor

Table 3
Well Construction Details and Water Levels
Joint Base Elmendorf Richardson
Anchorage, Alaska

Well Location ID	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Well Type	Screened Interval Top (ft bgs)	Screened Interval Bottom (ft bgs)	Measurement Date	Measurement Time	Depth to Water (ft btoc)	Water Surface Elevation (ft amsl)	Total Depth of Well (ft btoc)	Comments
AP-5014	6796851.365	359709.0822	998	---	Monitor Well	70.3	80.3	9/13/2016	927	69.48	928.52	NM	Equipment in well, total depth not measured; strong petroleum odor
AP-5015	6796859.506	359698.3539	472.2	---	Monitor Well	76.4	86.4	9/13/2016	913	75.23	396.97	88.74	Tubing in well
AP-5038	6794961.17	355235.8698	311.6	---	Monitor Well	90	100	---	---	NM	NA	NM	Abandoned
AP-5246	6799602.419	360169.0067	313.65	---	Monitor Well	148	158	9/15/2016	1115	151.42	162.23	160.63	Equipment in well; well plug damaged
AP-5681	6795319.878	354358.32	299.29	---	Monitor Well	117	127	9/14/2016	1116	117.63	181.66	127.10	
AP-5682	6794641.689	355425.087	316.55	---	Monitor Well	81	91	9/14/2016	1328	70.20	246.34	89.33	
AP-5683	6799450.124	360229.026	303.10	---	Monitor Well	139	145	9/15/2016	1110	139.56	163.54	142.67	Tubing in well; total depth of 144.80 written on well
AP-5684	6796849.066	359647.012	470.91	---	Monitor Well	72	93	9/13/2016	917	84.76	386.15	96.79	Tubing in well; depth to water may be 157.06 - hard to read field sheet
AP-5685	6794873.687	355910.442	331.88	---	Monitor Well	87	97	9/14/2016	1430	80.20	251.68	99.57	Well labelled AP-5009R and 5685
AT029-1	6795707.26	358096.82	399.18	---	Monitor Well	150	160	9/14/2016	1532	153.22	245.96	163.10	
AT035-MW02	6791865.042	355563.926	323.2	---	Monitor Well	79	89	---	---	NM	NA	NM	Not found
AT052-1	6796479.07	355814.64	345.55	---	Monitor Well	189.5	199.5	9/13/2016	833	173.87	171.68	NM	Equipment in well
AT052-1	6796479.07	355814.64	345.55	---	Monitor Well	189.5	199.5	9/15/2016	1325	173.69	171.86	NM	
AT052-1	6796479.07	355814.64	345.55	---	Monitor Well	189.5	199.5	9/15/2016	1330	173.69	171.86	NM	
AT052-1	6796479.07	355814.64	345.55	---	Monitor Well	189.5	199.5	9/15/2016	1330	173.69	171.86	NM	
AT052-1	6796479.07	355814.64	345.55	---	Monitor Well	189.5	199.5	9/15/2016	1340	173.69	171.86	NM	
FR-1	6796222.75	354425.8588	---	---	Monitor Well	---	---	9/13/2016	1524	132.81	NA	150.35	Well labeled 5wr-131 and FR-1
FR-2	6796499.529	354414.9389	---	---	Monitor Well	---	---	9/14/2016	948	149.02	NA	163.25	
FR-3	6796579.35	356215.7607	---	---	Monitor Well	---	---	9/13/2016	1555	150.20	NA	162.30	Top of casing is loose
FS4-1	6794086.11	355963.14	319.81	---	Monitor Well	62	72	9/14/2016	1540	62.71	257.10	NM	Transducer in well, total depth not measured
FS5-1	6794990.41	357330.14	361.77	---	Monitor Well	122.75	132.75	9/15/2016	1346	122.34	239.43	135.70	Behind locked fence
IW-01-4413	6794413.365	354340.404	287.85	---	Injection Well	67	72	9/14/2016	1413	71.39	216.46	74.31	
IW-01-4550	6799339.522	360158.697	305.69	---	Injection Well	25	40	9/13/2016	1115	27.30	278.39	38.07	
IW-01-4551	6799338.593	360161.65	305.66	---	Injection Well	92	97	9/13/2016	1125	93.16	212.50	NM	Well appears damaged
IW-01-4551	6799338.593	360161.65	305.66	---	Injection Well	92	97	9/15/2016	1100	93.00	212.66	99.53	
IW-02-3983	6799360.168	360164.432	304.3	---	Injection Well	30	40	9/13/2016	1111	26.37	277.93	41.85	
IW-02-4413	6794415.993	354343.567	287.74	---	Injection Well	65	70	9/14/2016	1411	DRY	NA	70.80	
IW-02-4550	6799336.461	360161.918	305.44	---	Injection Well	25	40	9/13/2016	1133	27.11	278.33	42.92	Bridged at 38 feet; milky product on tape
IW-02-4551	6799336.022	360165.223	304.64	---	Injection Well	89	94	9/13/2016	1138	92.23	212.41	NM	Intermittent water level measurements throughout well depth
IW-02-4551	6799336.022	360165.223	304.64	---	Injection Well	89	94	9/15/2016	1105	92.31	212.33	95.72	
IW-03-4413	6794419.267	354347.219	288.5	---	Injection Well	65	70	9/14/2016	1405	72.47	216.03	72.66	Essentially dry
IW-04-4413	6794422.238	354350.462	288.96	---	Injection Well	65	70	9/14/2016	1401	DRY	NA	74.16	Soft tag at total depth
ROI-3983	6799359.141	360166.473	304.25	---	---	20	30	9/13/2016	1109	25.97	278.28	38.96	Well plug missing
ROI-4413	6794417.766	354345.509	291.09	---	---	65	70	9/14/2016	1409	72.52	218.57	73.30	Essentially dry
ROI-4551	6799338.047	360160.336	305.77	---	---	---	---	9/13/2016	1120	30.16	275.61	45.00	Labeled as ROI-4550; milky white product on tape
SB21-MW1	6795362.77	353967.28	297.67	---	Monitor Well	---	---	9/14/2016	1025	NM	NA	NM	Not found
SB28-MW2	6795385.88	353830.56	291.08	---	Monitor Well	---	---	9/14/2016	1030	NM	NA	NM	likely abandoned, looks like area has been regraded
SB29-MW3	6795416.55	353654.73	291.53	---	Monitor Well	---	---	9/14/2016	1010	NM	NA	NM	Abandoned
SS04-1	6793375.19	353922.71	265.12	---	Monitor Well	13	23	9/13/2016	1127	13.90	251.22	23.19	Flushmount; well lock missing
SS090-MW01	--	--	316.26	---	Monitor Well	70.75	85.75	---	---	NM	NA	NM	
SS090-MW02	--	--	316.81	---	Monitor Well	74.8	84.8	---	---	NM	NA	NM	
SS090-MW03	--	--	320.01	---	Monitor Well	73	83	---	---	NM	NA	NM	

Notes:
Water levels were measured from September 12 through 16, 2016
Locations without a top of casing elevation do not have a calculated water surface elevation

---	Data not available		
ft amsl	feet above mean sea level	ID	Identification
ft bgs	feet below ground surface	NA	not applicable
ft btoc	feet below top of casing	NM	not measured