14.F – Waters of the United States Delineation

18 September 2015

Ms. Kristine Lloyd
Dallas/Fort Worth International Airport
Environmental Affairs Department
3003 South Service Road, Annex Building A
DFW Airport, Texas 75261-9428

Re: Waters of the United States Delineation
Property Inventory Project – Tranche 2
Dallas/Fort Worth (DFW) International Airport, Dallas and Tarrant Counties, Texas

Dear Ms. Lloyd,

Integrated Environmental Solutions, LLC (IES) performed a delineation of waters of the United States on approximately 609.2 acres, associated with 11 tracts of land, collectively known as Tranche 2 for the Property Inventory Project (PIP) within the DFW International Airport, in Dallas and Tarrant Counties, Texas (**Attachment A, Figure 1**). The PIP will facilitate the leasing of DFW property for commercial development. The leasing of these tracts has been prioritized by the DFW Commercial Development Department and subsequently organized into four separate tranches (Tranche 1, 2, 3, and 4). This report will ultimately assess the anticipated impacts to potentially jurisdictional waters to ensure compliance with Sections 404 and 401 of the Clean Water Act (CWA) for Tranche 2.

INTRODUCTION

Agencies that regulate impacts to the nation's water resources within Texas include the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), the U.S. Fish and Wildlife Service (USFWS), and the Texas Commission on Environmental Quality (TCEQ). Jurisdictional waters of the United States are protected under guidelines outlined in Sections 401 and 404 of the CWA, in Executive Order 11990 (Protection of Wetlands), and by the review process of the TCEQ. The USACE has the primary regulatory authority for enforcing Section 404 requirements for waters of the United States, including wetlands.

The definition of waters of the United States, in 33 Code of Federal Regulations (CFR) 328 as published June 29, 2015 includes

(a) ''waters of the United States'' means:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise identified as waters of the United States under this section;

(5) All tributaries of waters identified in paragraphs (a) (1) through (3) of this section;

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The terms tributary and tributaries each mean a water that contributes flow, either directly or through another water (including an impoundment identified in paragraph (a)(4) of this section), to a water identified in paragraphs (a)(1) through (3) of this section that is characterized by the presence of the physical indicators of a bed and banks and an OHWM. These physical indicators demonstrate there is volume, frequency, and duration of flow sufficient to create a bed and banks and an OHWM, and thus to qualify as a tributary. A tributary can be a natural, man-altered, or man-made water and includes waters such as rivers, streams, canals, and some ditches. A water that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if, for any length, there are one or more constructed breaks (such as bridges, culverts, pipes, or dams), or one or more natural breaks (such as wetlands along the run of a stream, debris piles, boulder fields, or a stream that flows underground) so long as a bed and banks and an OHWM can be identified upstream of the break. A water that otherwise qualifies as a tributary under this definition does not lose its status as a tributary if it contributes flow through a water of the United States that does not meet the definition of tributary or through a non-jurisdictional water to a water identified in paragraphs (a)(1) through (3) of this section.

(6) All waters adjacent to a water identified in paragraphs (a) (1) through (5) of this section, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters;

The term adjacent means bordering, contiguous, or neighboring a water identified in paragraphs (a)(1) through (5) of this section, including waters separated by constructed dikes or barriers, natural river berms, beach dunes, and the like. For purposes of adjacency, an open water such as a pond or lake includes any wetlands within or abutting its OWHM. Adjacency is not limited to waters located laterally to a water identified in paragraphs (a)(1) through (5) of this section. Adjacent waters also include all waters that connect segments of a water identified in paragraphs (a)(1) through (5) or are located at the head of a water identified in paragraphs (a)(1) through (5) of this section and are bordering, contiguous, or neighboring such water. Waters being used for established normal farming, ranching, and silviculture activities (33 US Code [USC] 1344(f)) are not adjacent.

The term neighboring means:

(a) All waters located within 100 feet of the OHWM of a water identified in paragraphs (a)(1) through (5) of this section. The entire water is neighboring if a portion is located within 100 feet of the OHWM;

(b) All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1) through (5) of this section and not more than 1,500 feet from the OHWM of such water. The entire water is neighboring if a portion is located within 1,500 feet of the OHWM and within the 100-year floodplain;

(c) All waters located within 1,500 feet of the high tide line of a water identified in paragraphs (a)(1) or (a)(3) of this section, and all waters within 1,500 feet of the OHWM of the Great Lakes. The entire water is neighboring if a portion is located within 1,500 feet of the high tide line or within 1,500 feet of the OHWM of the Great Lakes.

The term wetlands means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(7) All waters in paragraphs (a)(7)(i) through (v) of this section where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. The waters identified in each of paragraphs (a)(7)(i) through (v) of this section are similarly situated and shall be combined, for purposes of a significant nexus analysis, in the watershed that drains to the nearest water identified in paragraphs (a)(1) through (3) of this section. Waters identified in this paragraph shall not be combined with waters identified in paragraph (a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

(i) Prairie potholes.

(ii) Carolina bays and Delmarva bays.

(iii) Pocosins.

(iv) Western vernal pools.

(v) Texas coastal prairie wetlands.

(8) All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1) through (3) of this section and all waters located within 4,000 feet of the high tide line or ordinary high water mark (OHWM) of a water identified in paragraphs (a)(1) through (5) of this section where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. For waters determined to have a significant nexus, the entire water is a water of the United States if a portion is located within the 100-year floodplain of a water identified in paragraphs (a)(1) through (3) of this section or within 4,000 feet of the high tide line or OHWM. Waters identified in this paragraph shall not be combined with waters identified in paragraph (a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

Under the new Clean Water Rule, certain geographic features, generally, are not jurisdictional:

- Swales, erosional features (e.g., gullies) and small washes characterized by low volume, infrequent, and short duration flow;
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water; and
- Uplands transporting overland flow generated from precipitation (i.e., rain events and snowmelt).

However, certain geographic features (e.g., swales, ditches, pipes) may contribute to a surface hydrological connection and be considered jurisdictional where the features;

(A) Replace and relocate a water of the United States, or
(B) Connect a water of the United States to another water of the United States, or
(C) Provide a relatively permanent flow to water of the United States.

METHODOLOGY

Prior to conducting fieldwork, the U.S. Geological Survey (USGS) topographic map (**Attachment A, Figures 2, 2-A** and **2-B**), the *Soil Survey of Dallas County, Texas,* the *Soil Survey of Tarrant County, Texas,* and the Natural Resources Conservation Service (NRCS) digital soil database for Dallas and Tarrant Counties (**Attachment A, Figures 3, 3-A,** and **3-B**), the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (**Attachment A, Figure 4**), and recent aerial photographs of Tranche 2 were studied to identify possible waters of the United States and areas prone to wetland development. Tranche 2 consists of approximately 609.2 acres, which is broken up into two areas, Corporate Aviation (Area A) and East Aviation/East Air Cargo (Area B), and 11 tracts of land (see **Table 1**). Mr. Kamren Metzger and Mr. Shae Kipp of IES delineated all potential waters of the United States in the field in accordance with the USACE procedures from 18 August 2015 to 04 September 2015.

Table 1. Overview of PIP Areas and Tracts

County	Area	Tract	Acreage
Tarrant	Corporate Aviation (A)	2A1	15.3
		2A2	15.4
Dallas	East Aviation/East Air Cargo (B)	2B1	21.0
		2B2	53.1
		2B3	77.9
		2B4	68.8
		2B5	75.0
		2B6	17.7
		2B7	51.0
		2B8	117.7
		2B9	96.3
		Total	**609.2**

Wetland determinations were performed on location using the methodology outlined in the 1987 C*orps of Engineers Wetland Delineation Manual* and the *Regional Supplement to the Corps of Engineer Wetland Delineation Manual: Great Plains Region (Version 2.0, March 2010*). The presence of a wetland is determined and delineated by the positive indication of three criteria (i.e., hydrophytic vegetation, hydrology, and hydric soils). Potential jurisdictional boundaries for other water resources (i.e., non-wetland) were delineated in the field at the ordinary high water mark (OHWM). The 33 CFR 328.3(e) defines OHWM as the line on the shore/bank established by flowing and/or standing water, marked by characteristics such as a clear, natural line impressed on the bank, erosion shelving, changes in the character of soil, destruction of terrestrial vegetation, presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

The boundaries of all water features were recorded in the field utilizing a Global Positioning System (GPS) unit capable of sub-meter accuracy. Photographs were taken at representative points within the project site (**Attachment B**). Routine Wetland Determination Data Forms were recorded in areas where there was one or more wetland indicator (**Attachment C**).

RESULTS

Literature Review

The USGS topographic maps (Euless 7.5' Quadrangle 1982, Grapevine 7.5' Quadrangle 1982) illustrates the topography of Tranche 2 as sloping to four main drainage networks, Bear Creek, Grapevine Creek, Cottonwood Branch, and Hackberry Creek. These four drainage networks all reach the Trinity River, a traditionally navigable water (TNW), downstream. Five blue-line features, three linear drainage ditches, and one pond were illustrated within various tracts of Tranche 2. A summary of each tracts topography in Tranche 2 is detailed below in **Table 2**.

Table 2. Summary of Tranche 2 Topography

Area	Tract	Topographic Setting	Water Features Illustrated
Corporate Aviation (A)	2A1	Gently rolling dissected uplands near the headwaters to Grapevine Creek	None - "V" shaped contours present
	2A2	Western margins of upland ridge adjacent to Big Bear Creek valley floor and dissected by an unnamed tributary.	Linear drainage ditch
East Aviation/ East Cargo (B)	2B1	Sloping hillside with Hackberry Creek paralleling southern boundary	None - boundary parallels Hackberry Creek
	2B2	Eastern margins of upland ridge near the headwaters of Hackberry Creek	None
	2B3		Blue-line feature (tributary to Hackberry Creek)
	2B4		Linear drainage ditch; blue-line feature (tributary to Hackberry Creek)
	2B5		Blue-line feature (tributary to Hackberry Creek)
	2B6		Linear drainage ditch
	2B7		None - "U" shaped contours present
	2B8	Eastern margins of upland ridge near the headwaters of Estelle Creek	Blue-line feature (headwaters of Estelle Creek)
	2B9	Sloping hills dissected by Cottonwood Branch and unnamed tributary to South Fork Hackberry Creek	2 blue-line features(tributary to South Fork Hackberry Creek and the headwaters of Cottonwood Branch); and a pond

The *Soil Survey of Dallas County, Texas* and the *Soil Survey of Tarrant County, Texas* illustrated several unnamed tributaries to Hackberry Creek within Tracts 2B2, 2B3, 2B4, and 2B5 as well as an unnamed tributary to Cottonwood Branch within Tract 2B9. None of the soil map units present in Tranche 2 are listed as hydric soils according to the National Hydric Soils List prepared by the National Technical Committee for Hydric Soils (revision March 2014). The soil map units located within Tranche 2 are generally characterized as being clayey residuum weathered from calcareous mudstone and/or shale located on interfluve ridges and summits or clayey alluvium weathered from mixed sources located on stream terraces. These soil map units are well drained to moderately well drained and usually contain a root restrictive layer beyond 40 inches. Each tract and its associated soil map units are summarized in **Table 3**.

Table 3. Soil Map Units within Tranche 2

Area	Tract	Soil Map Units
Corporate Aviation (A)	2A1	Houston Black clay, 1 to 3 percent slopes; Heiden clay, 1 to 3 percent slopes; and Navo clay loam, 1 to 3 percent slopes
	2A2	Houston Black-Urban land complex, 1 to 4 percent slopes; and Urban land
East Aviation/ East Cargo (B)	2B1	Ferris-Heiden complex, 5 to 12 percent slopes; Heiden clay, 2 to 5 percent slopes; Houston Black clay, 0 to 1 percent slopes; and Houston Black clay, 1 to 3 percent slopes
	2B2	Ferris-Heiden complex, 5 to 12 percent slopes; Heiden clay, 1 to 3 percent slopes; and Heiden clay, 2 to 5 percent slopes
	2B3	Ferris-Heiden complex, 5 to 12 percent slopes; Houston Black-Urban land complex, 0 to 4 percent slopes; and Heiden clay, 2 to 5 percent slopes
	2B4	Ferris-Heiden complex, 5 to 12 percent slopes; Heiden clay, 1 to 3 percent slopes; Heiden clay, 2 to 5 percent slopes; and Ovan clay, frequently flooded
	2B5	Ferris-Heiden complex, 5 to 12 percent slopes; Heiden clay, 1 to 3 percent slopes; and Heiden clay, 2 to 5 percent slopes
	2B6	Heiden clay, 1 to 3 percent slopes; and Heiden clay, 2 to 5 percent slopes
	2B7	Burleson clay, 1 to 3 percent slopes; Heiden clay, 1 to 3 percent slopes; and Heiden clay, 2 to 5 percent slopes
	2B8	Burleson clay, 0 to 1 percent slopes; Burleson clay, 1 to 3 percent slopes; Heiden clay, 1 to 3 percent slopes; Heiden clay, 2 to 5 percent slopes; and Normangee clay loam, 1 to 3 percent slopes
	2B9	Ferris-Heiden complex, 5 to 12 percent slopes; Heiden clay, 2 to 5 percent slopes; and Normangee clay loam, 1 to 3 percent slopes

The FEMA FIRM (Map Panels 48113C0135K, 48113C0145K, 48113C0285K, Effective 07 July 2014 and Map Panel 48439C0115K, Effective 25 September 2009) did not illustrate any water features within tracts 2A1, 2A2, 2B2, 2B3, 2B4, 2B5, 2B6, or 2B7 (**Attachment A, Figure 4**). Each of these tracts were illustrated as being entirely within Zone X (Areas determined to be outside the 0.2 percent annual chance floodplain). Tract 2B1 was illustrated as being primarily within Zone X, with shaded Zone X (Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood) surrounding Hackberry Creek, which skirts the southern boundary of the tract. Tract 2B8 is depicted containing the headwaters of Estelle Creek beginning within the center of the tract and extending through the project site to the south. Shaded Zone X is present surrounding Estelle Creek, while Zone X comprises the remainder of the tract. Tract 2B9, the furthest east tract in Tranche 2, is illustrated entirely within Zone X. Two tributaries, South Fork of Hackberry Creek Tributary 6 and Cottonwood Branch, are depicted within Tract 2B9.

Field Investigation

Tranche 2 was primarily comprised of both a **maintained grassland** community and a **non-maintained grassland** vegetation community. Although less dominant, a **shrub-land** vegetation community, **forested upland** vegetation community, and a **forested riparian corridor** community were also present within Tranche 2. **Table 4** provides a summary of vegetation communities by tract.

Table 4. Summary of Vegetation Communities by Tract

Area	Tract	Vegetation Community
Corporate Aviation (A)	2A1	Maintained Grassland
	2A2	Maintained Grassland; Shrub-land (along drainage)
East Aviation/East Cargo (B)	2B1	Forested Upland; Non-maintained Grassland; Forested Riparian Corridor
	2B2	Maintained Grassland
	2B3	
	2B4	
	2B5	
	2B6	
	2B7	
	2B8	Non-Maintained Grassland; Shrub-land
	2B9	Non-Maintained Grassland; Shrub-land; Forested Upland

The **maintained grasslands** vegetation community was characterized by the presence of short turf grasses and sporadic forbs frequently maintained by mowing. These tracts appeared to be high-traffic areas that are presumably maintained for airport operations. The dominant vegetation type in these areas was Bermudagrass (*Cynodon dactylon*) with various other grasses and forbs, including heath aster (*Symphyotrichum ericoides*), dallisgrass (*Paspalum dilatatum*), prairie threeawn (*Aristida oligantha*), meadow dropseed (*Sporobolus asper*), and Japanese brome (*Bromus japonicus*). These areas are often bisected or bordered by paved or gravel roads and often contain shallow or excavated drainage swales and ditches. The vegetation within the swales and ditches was usually dominated by vegetation such as southern cattails (*Typha domingensis*), shrub black willow (*Salix nigra*), and sumpweed (*Iva annua*).

The **non-maintained grassland** areas were usually observed in undeveloped portions of the tranche that experienced low traffic with restricted access. These areas were observed portions in transition between strictly grasslands to savannah or shrub-land habitat types. The maintenance regimes for these tracts were either limited or apparently infrequent beyond utility line right-of-ways that were observed crossing some tracts. Though species dominance did often fluctuate, the species composition was relatively consistent. The species observed within the non-maintained grassland vegetation cummunity included Johnsongrass (*Sorghum halepens*), Bermudagrass, common sunflower (*Helianthus annuus*), giant ragweed (*Ambrosia trifida*), Queen Anne's lace (*Daucus carota*), saw-leaf daisy (*Prionopsis ciliata*), spreading hedge-parsley (*Torilis arvensis*), common broomweed (*Amphiachyris dracunculoides*), snow-on-the-prairie (*Euphorbia bicolor*), downy milkpea (*Galactia volubilis*), Japanese brome, ironweed (*Vernonia gigantea*), Canadian goldenrod (*Solidago canadensis*), sumpweed, and Texas croton (*Croton texanensis*). The lack of a maintenance regime frequently allows thickets of shrub species to inhabit the grassland habitats. The shrub species observed often included willow baccharis (*Baccharis salicina*), honey mesquite (*Prosopis glandulosa*), sugarberry (*Celtis laevigata*), and honeylocust (*Gleditsia triacanthos*). Trees of the same species were also observed in clusters and along the established forested areas, frequently creating a transitional area between grassland and forest lands consisting of sporadic trees and shrubs in a savannah-like habitat.

The **shrub-land** vegetation community was generally composed of honey mesquite, sugarberry (*Celtis laevigata*), and honeylocust. These shrub-land areas were generally observed along ridgelines and hillsides where the trees were not yet mature and the density is too low to allow for a closed canopy. The understory in these shrub-dominated areas was composed of spreading hedge parsley, Johnsongrass, and Bermudagrass. Other areas were observed as being dominated by willow baccharis, often with a high density and limited to no understory cover. The shrub-land vegetation community was often sporadic within the maintained and non-maintained grassland community and along upland drainages and tributaries.

The **forested upland** vegetation community was comprise of closed canopy deciduous hardwood trees often with an understory and mid-story composed of evergreen shrubs and/or woody vines. The species observed within the forested upland areas included honey mesquite, honeylocust, sugarberry, cedar elm (*Ulmus crassifolia*), Shumard's oak (*Quercus shumardii*), Osage-orange (*Maclura pomifera*), common persimmon (*Diospyros virginiana*), and green ash (*Fraxinus pennsylvanica*). The understory was frequently dominated by Chinese ligustrum (*Ligustrum sinense*), an evergreen shrub, and several woody vine species, including mustang grape (*Vitis mustangensis*), common greenbrier (*Smilax bona-nox*), and poison-ivy (*Toxicodendron radicans*). Some forested uplands have more of an open canopy with smaller, less mature trees. Ground cover in these areas is relatively limited, but consisted of spreading hedge parsley, Johnsongrass, and Bermudagrass with woody vines and shrubs interspersed, often creating hedgerows of vegetation between dominant trees. The upland forested vegetation community was observed in areas between open fields, along fence lines, old property boundaries, along upland drainages, and along first tier tributaries.

The **forested riparian corridor** vegetation community was predominantly observed along intermittent tributaries. These areas were dominated by mature trees with a closed canopy, often with shrubs and woody vines, similar to the composition forested upland vegetation community. However, the dominant species within the forested riparian corridor was black willow with other species such as cottonwood, sugarberry, honeylocust, willow baccharis, green ash, cedar elm, and American elm (*Ulmus americana*). Woody vines and shrubs observed included mustang grape, common greenbrier, and poison-ivy.

Fourteen water features were identified and delineated within Tranche 2 including nine jurisdictional features and five non-jurisdictional features. Of the nine jurisdictional features identified, there were 3 concrete channels, 1 pond, 2 tributaries, 2 wetlands, and 1 drainage swale. All water features are summarized in Table 5 and detailed below (**Attachment A, Figure 5**). The water features identified were delineated according to the presence of a bed and bank and an OHWM. The concrete channels were delineated based on the toe-of-slope within the channel and the presence of sediment deposits when available. The surface flows and run-off, which enter the water features identified in Tranche 2, contribute to four main drainage networks, Bear Creek, Grapevine Creek, Cottonwood Branch and Hackberry Creek. Each of these four drainage networks contributes hydrology to the Trinity River, a TNW.

Table 5. Water Features Delineated within the Project Site

Area	Tract	Water ID	Water of the United States	33 CFR 328 Definition/ Exclusions	Hydrologic [1] Characteristics	OHWM [2] Characteristics	Veg. [3] Comm.	Avg. OHWM Width	Length (Linear Feet)	Area (Acre)	TX RAM Score
Corporate Aviation	2A1	Drainage Ditch 1	No	---	Ephemeral	1, 2	1	8	917	0.15	---
	2A2	Drainage Ditch 2	No	---	Intermittent	1, 2, 3, 4	3	3	583	0.08	---
East Aviation/ East Cargo	2B1	None	---	---	---	---	1	---	---	---	---
	2B2	None	---	---	---	---	1	---	---	---	---
	2B3	Drainage Ditch 3	No	---	Ephemeral	1, 2, 3	1	15	880	0.35	---
	2B4	Concrete Channel 1	Yes	5, A	Ephemeral	7	1	8	3,158	0.76	---
		Drainage Ditch 4	No	---	Ephemeral	1, 4, 7	1	12	690	0.15	---
	2B5	Concrete Channel 2	Yes	5, A	Ephemeral	7	1	8	1,863	0.61	---
	2B6	Drainage Ditch 5	No	---	Ephemeral	3, 7	1	25	374	0.27	---
		Wetland 1	Yes	5, A	Seasonally Inundated	3, 7	1	---	1,430	0.86	---
		Drainage Swale 1	Yes	5, A	Ephemeral	7	1	3	152	0.09	---
		Concrete Channel 3	Yes	5, A	Ephemeral	7	1	4	150	0.07	---
	2B7	Tributary 1	Yes	5	Ephemeral	1, 3, 4, 7	1, 4	2	1,703	0.16	40
	2B8	None	---	---	---	---	2	---	---	---	---
	2B9	Tributary 2	Yes	5	Ephemeral	1, 3, 4, 7	2, 3	2	560	0.03	25.3
		Pond 1	Yes	4	Seasonally Inundated	3, 4, 5	2, 3	---	---	0.03	---
		Wetland 2	Yes	6	Seasonally Saturated	1, 3	2, 3	---	---	0.32	---

[1]
1. Ephemeral - An ephemeral stream has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.
2. Intermittent - An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.
3. Perennial - A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.
4. Seasonally Saturated – Areas that experience soil saturation during seasonal rain and water flow events. These areas may remain dry on the surface and in the soil column through part or most of the year outside rain events.
5. Seasonally Inundated – Areas that experience surface pooling and soil inundation due to ponding on the surface from rain events. These areas may remain dry on the surface and in the soil column through part or most of the year.

[2] *All delineated tributaries were observed with a defined bed and bank and some of the following OHWM characteristics:
1. Clear, natural line impressed on the bank
2. Presence of litter and debris
3. Changes in character of the soil
4. Destruction of terrestrial vegetation
5. Shelving
6. Sediment deposits
7. Other

[3]
1. Maintained Grassland
2. Non-Maintained Grassland
3. Shrub-land
4. Forested Upland
5. Forested Riparian Corridor

CONCLUSIONS

To summarize the delineation, nine jurisdictional water features were identified and delineated within Tranche 2. A summary of these features' characteristics are presented in Table 5. By definition, 3 concrete channels, 1 pond, 2 tributaries, 2 wetlands, and 1 drainage swale would be considered waters of the United States. As waters of the United States, discharges into these features would be regulated under Section 404 of the CWA.

This delineation is based on professional experience in the approved methodology and from experience with the USACE Fort Worth District regulatory biologists; however, this delineation does not constitute a jurisdictional determination of waters of the United States. Only the USACE can make the final jurisdictional determination, which can be based on the professional opinions presented in this report.

IES appreciates the opportunity to work with you and DFW International Airport on this project, and hope we may be of assistance to you in the future. If you have any comments, questions, or concerns, please do not hesitate to contact Shae Kipp, Kamren Metzger, or me at 972/562-7672 (skipp@intenvsol.com, kmetzger@intenvsol.com, or rreinecke@intenvsol.com).

Sincerely,

Integrated Environmental Solutions, LLC.

Mr. Rudi Reinecke
Vice President

Attachments

File ref: 03.006.032

ATTACHMENT A

Figures

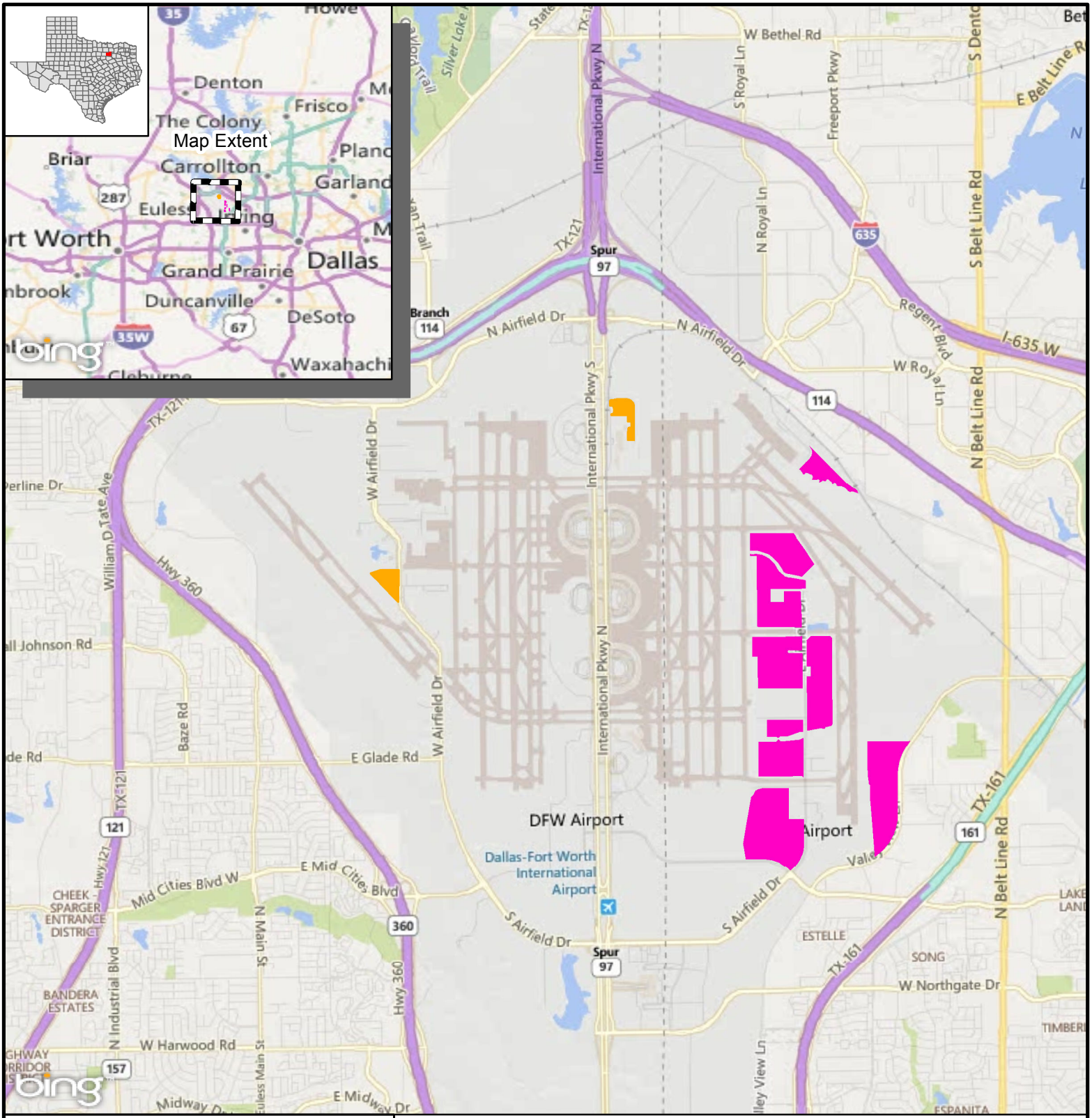


Figure 1
General Location Map

Tranche 2

- Corporate Aviation (A)
- East Aviation/East Air Cargo (B)

N
W E
S

County: Tarrant/Dallas
State: Texas
Date map created: 07/23/2015
Source: (c) 2010 Microsoft Corporation and its data suppliers

1 inch = 5,000 feet

0 5,000 10,000 15,000 Feet

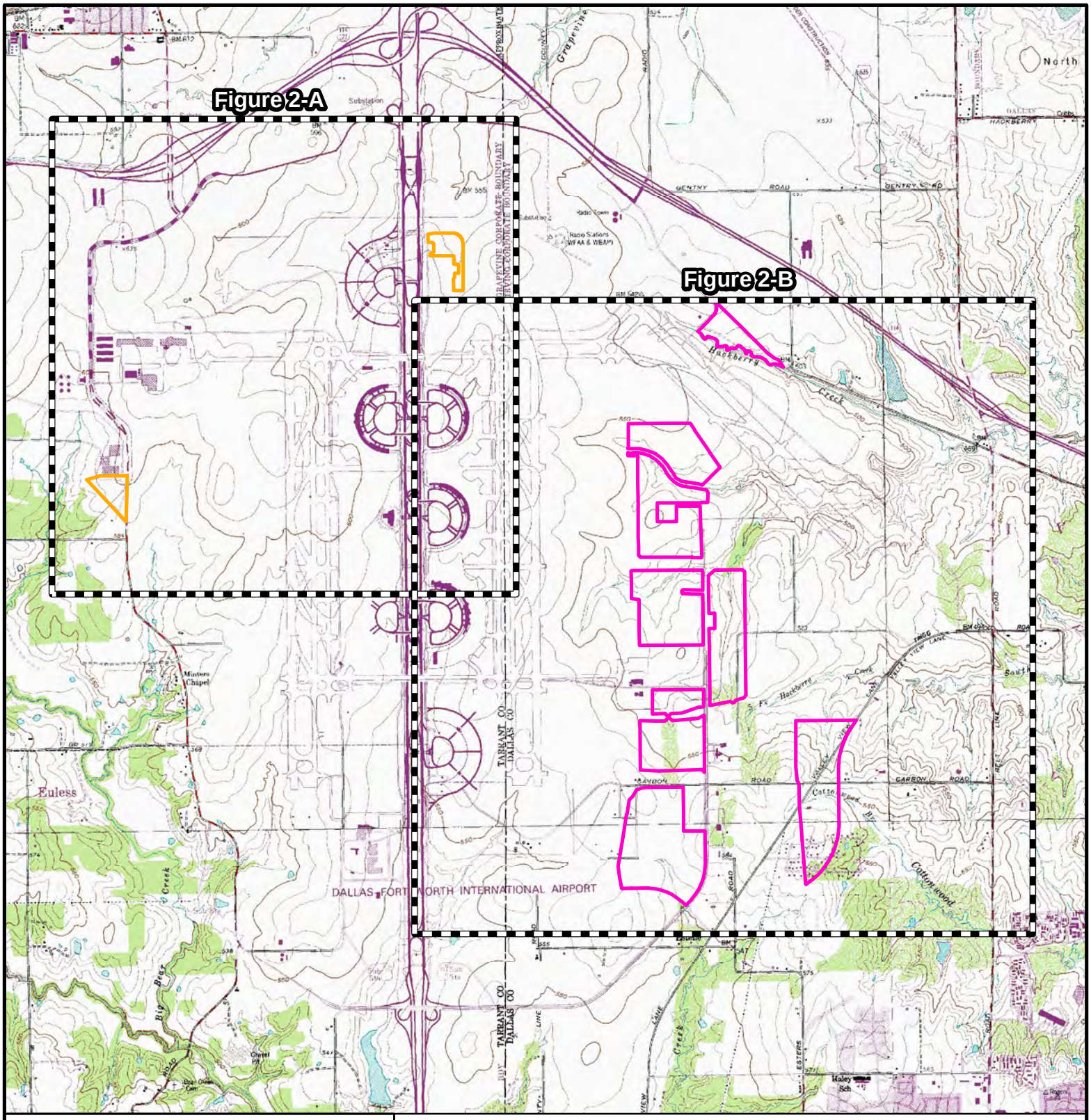


Figure 2
U.S. Geological Survey
Topographic Map

County: Tarrant/Dallas
State: Texas
Date map created: 07/23/2015
Source: USGS Topographic Map
Grapevine 7.5' Quadrangle, 1982
Euless 7.5' Quadrangle, 1982

Tranche 2

- Corporate Aviation (A)
- East Aviation/East Air Cargo (B)

N
W E
S

1 inch = 3,500 feet

0 3,500 7,000 14,000 Feet

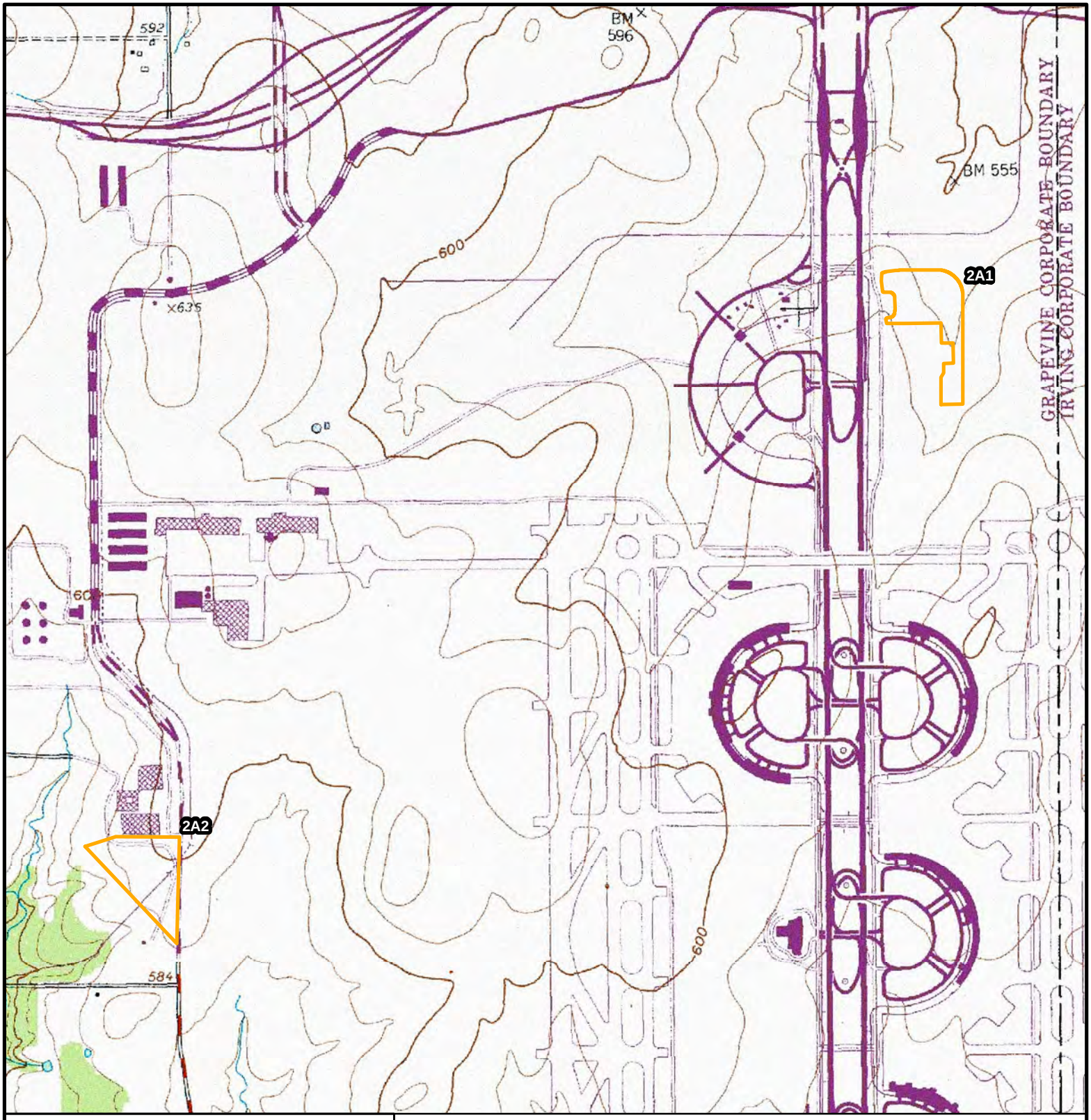


Figure 2-A
U.S. Geological Survey
Topographic Map

County: Tarrant/Dallas
State: Texas
Date map created: 07/23/2015
Source: USGS Topographic Map
Grapevine 7.5' Quadrangle, 1982
Euless 7.5' Quadrangle, 1982

Tranche 2

Corporate Aviation (A)

N
W E
S

1 inch = 1,500 feet

0 1,500 3,000 6,000 Feet

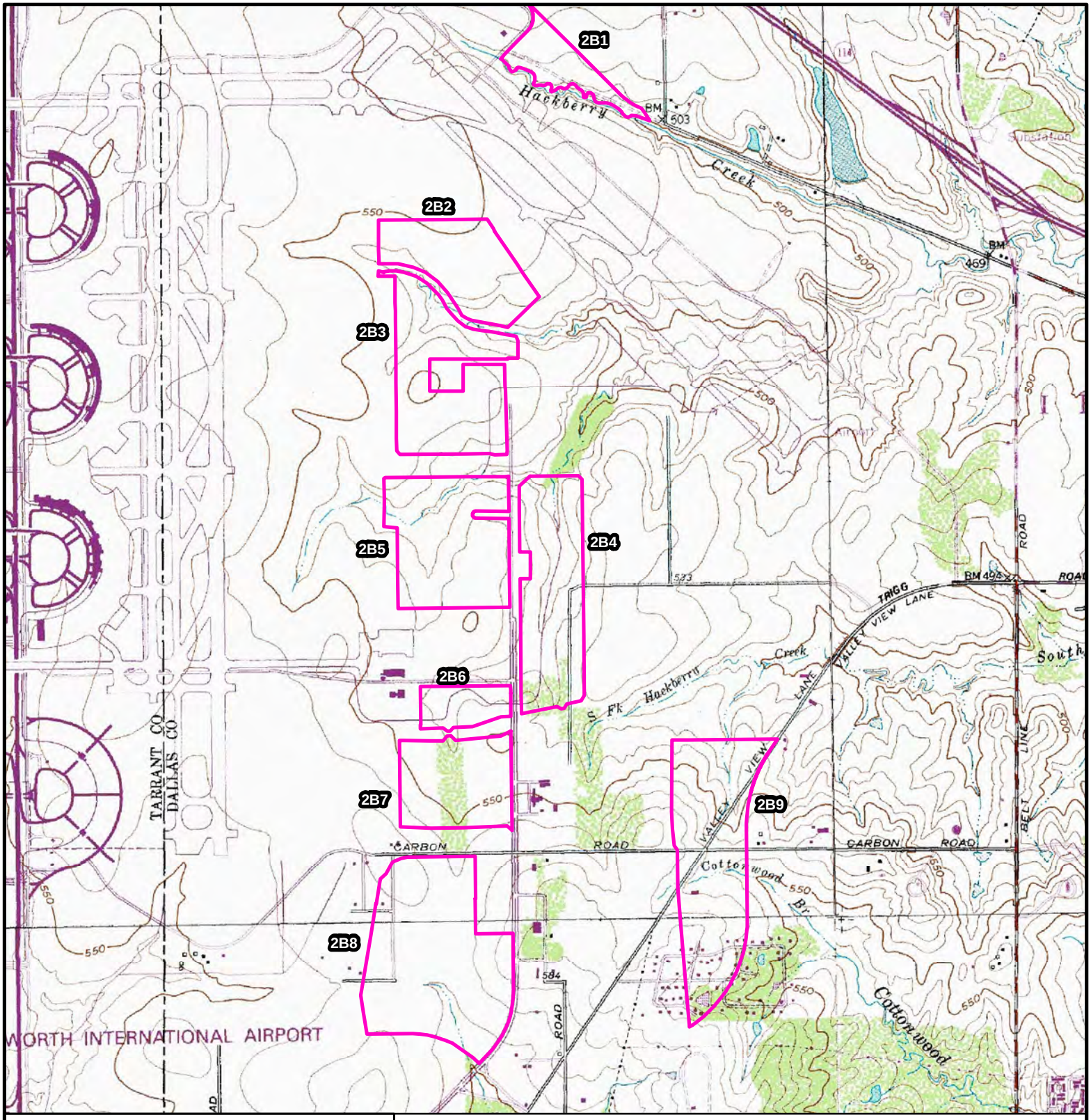


Figure 2-B
U.S. Geological Survey
Topographic Map

Tranche 2

East Aviation/East Air Cargo (B)

N
W E
S

County: Dallas
State: Texas
Date map created: 07/23/2015
Source: USGS Topographic Map
Grapevine 7.5' Quadrangle, 1982
Euless 7.5' Quadrangle, 1982

1 inch = 2,000 feet

0 2,000 4,000 8,000 Feet

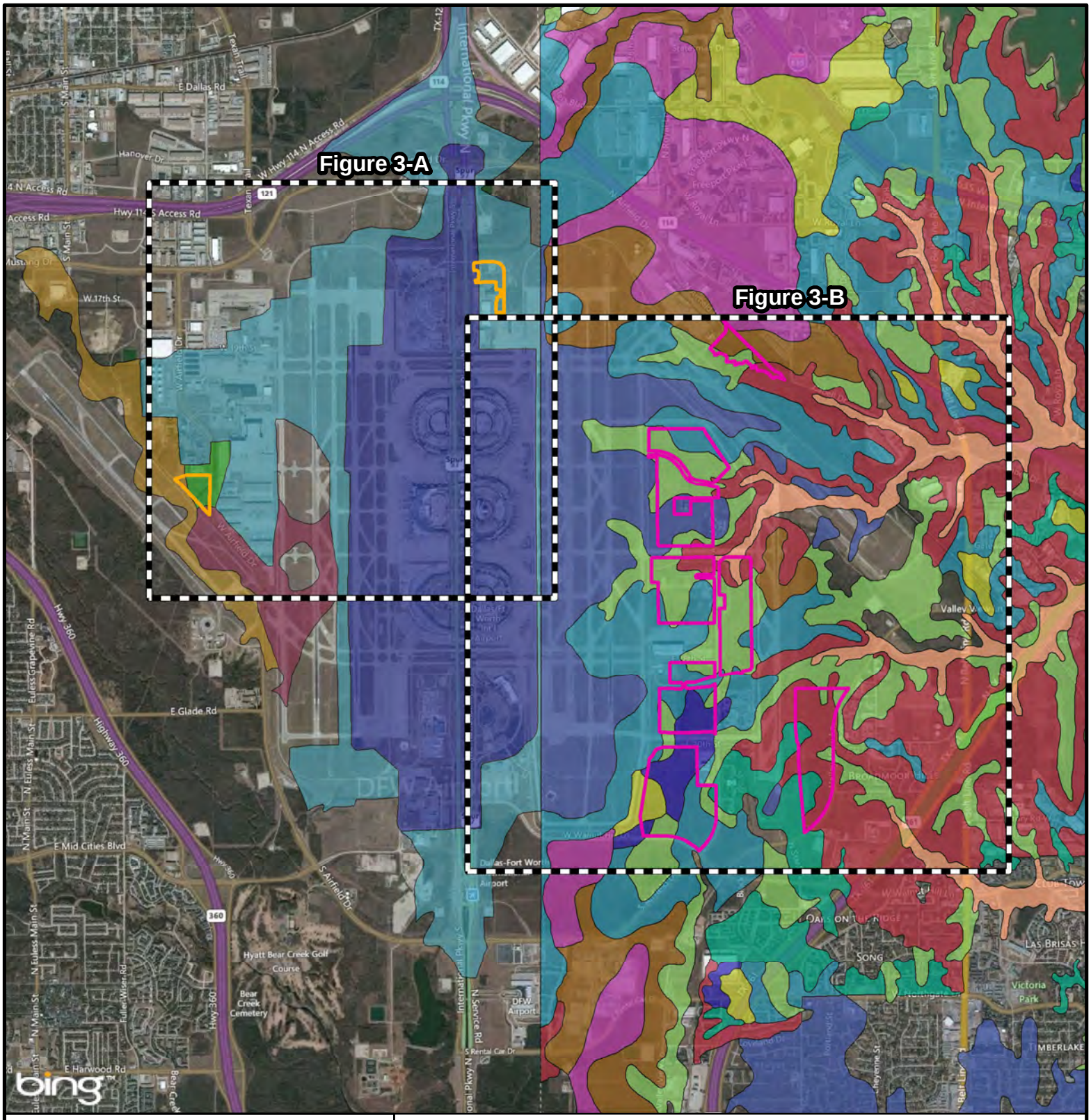


Figure 3
Soil Map

Tranche 2

- Corporate Aviation (A)
- East Aviation/East Air Cargo (B)

N
W E
S

County: Dallas/Tarrant
State: Texas
Date map created: 08/13/2015
Source: 2007 USDA
NRCS Digital Soils Database
Aerial photography: (c) 2010 Microsoft Corporation and its data suppliers

1 inch = 4,000 feet

0 4,000 8,000 16,000 Feet

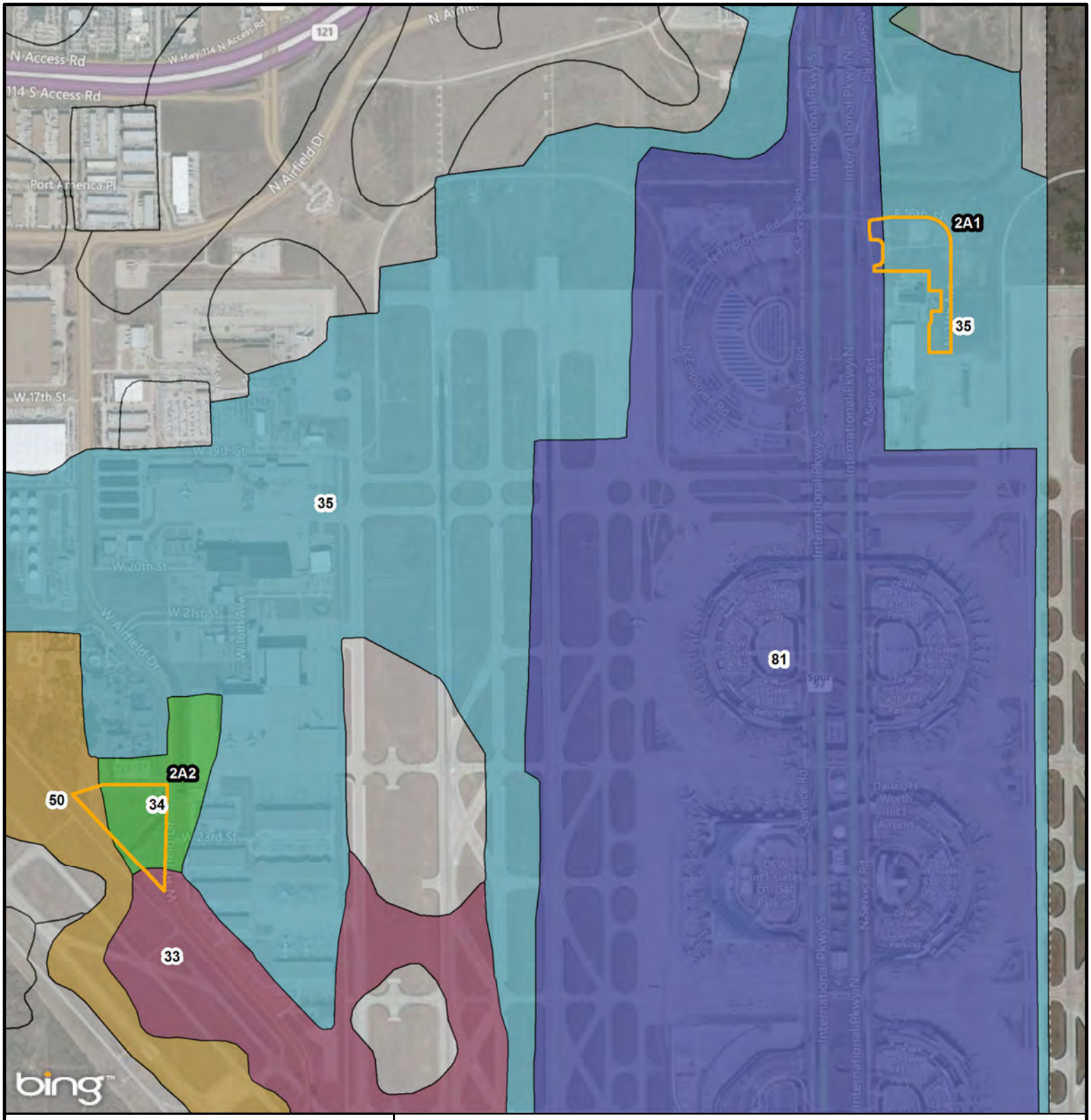


Figure 3-A
Soil Map

County: Tarrant
State:Texas
Date map created: 08/12/2015
Source: 2007 USDA
NRCS Digital Soils Database
Aerial photography: (c) 2010 Microsoft Corporation and its data suppliers

Tranche 2

Corporate Aviation (A)

Tarrant County Soil Map Units

- 33 - Heiden clay, 1 to 3 percent slopes
- 34 - Houston Black clay, 1 to 3 percent slopes
- 35 - Houston Black-Urban land complex, 1 to 4 percent slopes
- 50 - Navo clay loam, 1 to 3 percent slopes
- 81 - Urban land
- Soil Map Units outside of Tranche 2

N
W E
S

1 inch = 1,500 feet

0 1,500 3,000 6,000 Feet

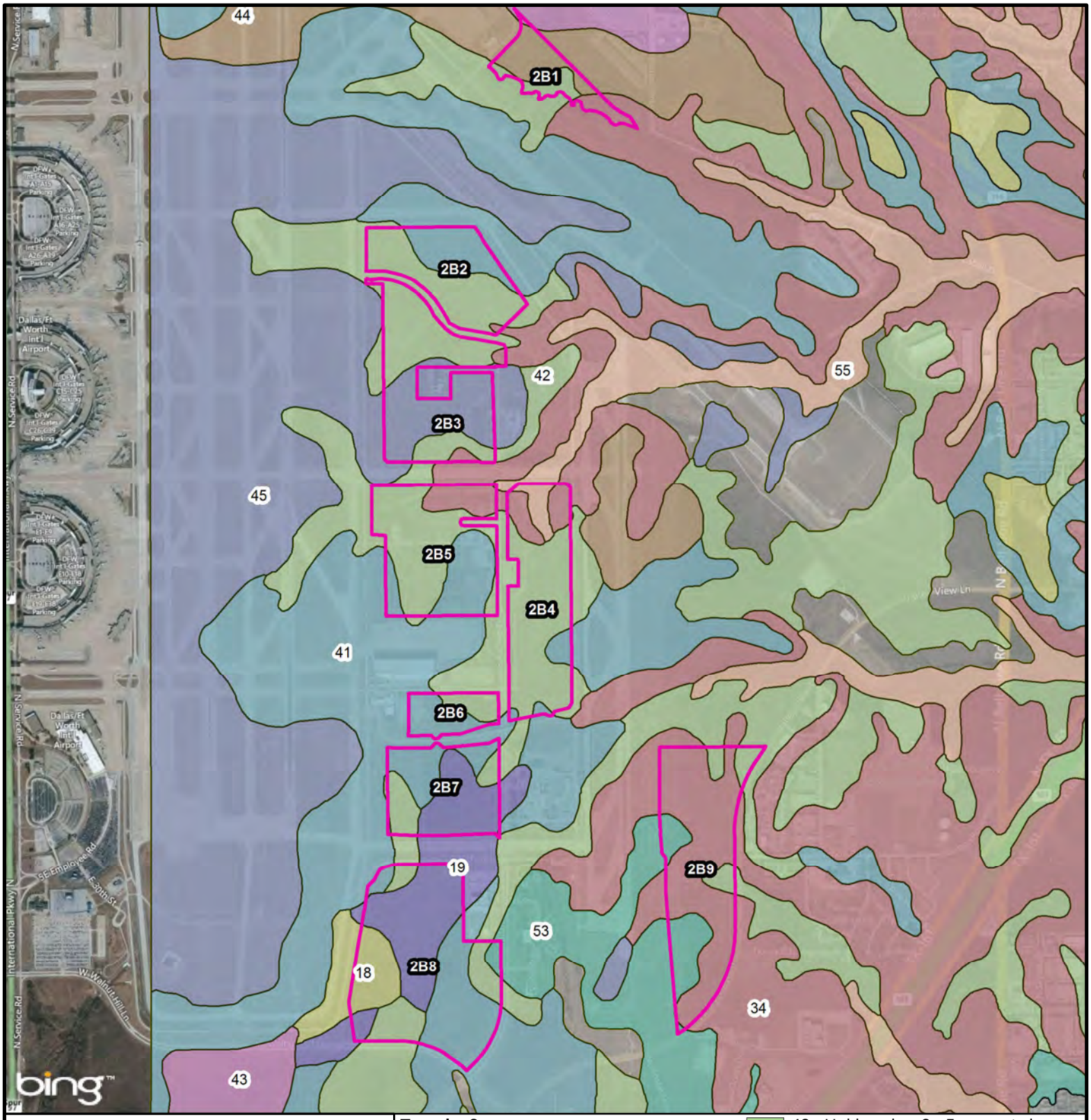


Figure 3-B
Soil Map

County: Dallas
State:Texas
Date map created: 08/12/2015
Source: 2007 USDA
NRCS Digital Soils Database
Aerial photography: (c) 2010 Microsoft Corporation and its data suppliers

Tranche 2

East Aviation/East Air Cargo

Dallas County Soil Map Units

- 18 - Burleson clay, 0 to 1 percent slopes
- 19 - Burleson clay, 1 to 3 percent slopes
- 34 - Ferris-Heiden complex, 5 to 12 percent slopes
- 41 - Heiden clay, 1 to 3 percent slopes
- 42 - Heiden clay, 2 - 5 percent slopes
- 43 - Houston Black clay, 0 to 1 percent slopes
- 44 - Houston Black clay, 0 to 1 percent slopes
- 45 - Houston Black-Urban land complex, 0 to 4 percent slopes
- 53 - Normangee clay loam, 1 to 3 percent slopes
- 55 - Ovan clay, frequently flooded

N
W E
S

1 inch = 2,000 feet

0 2,000 4,000 8,000 Feet

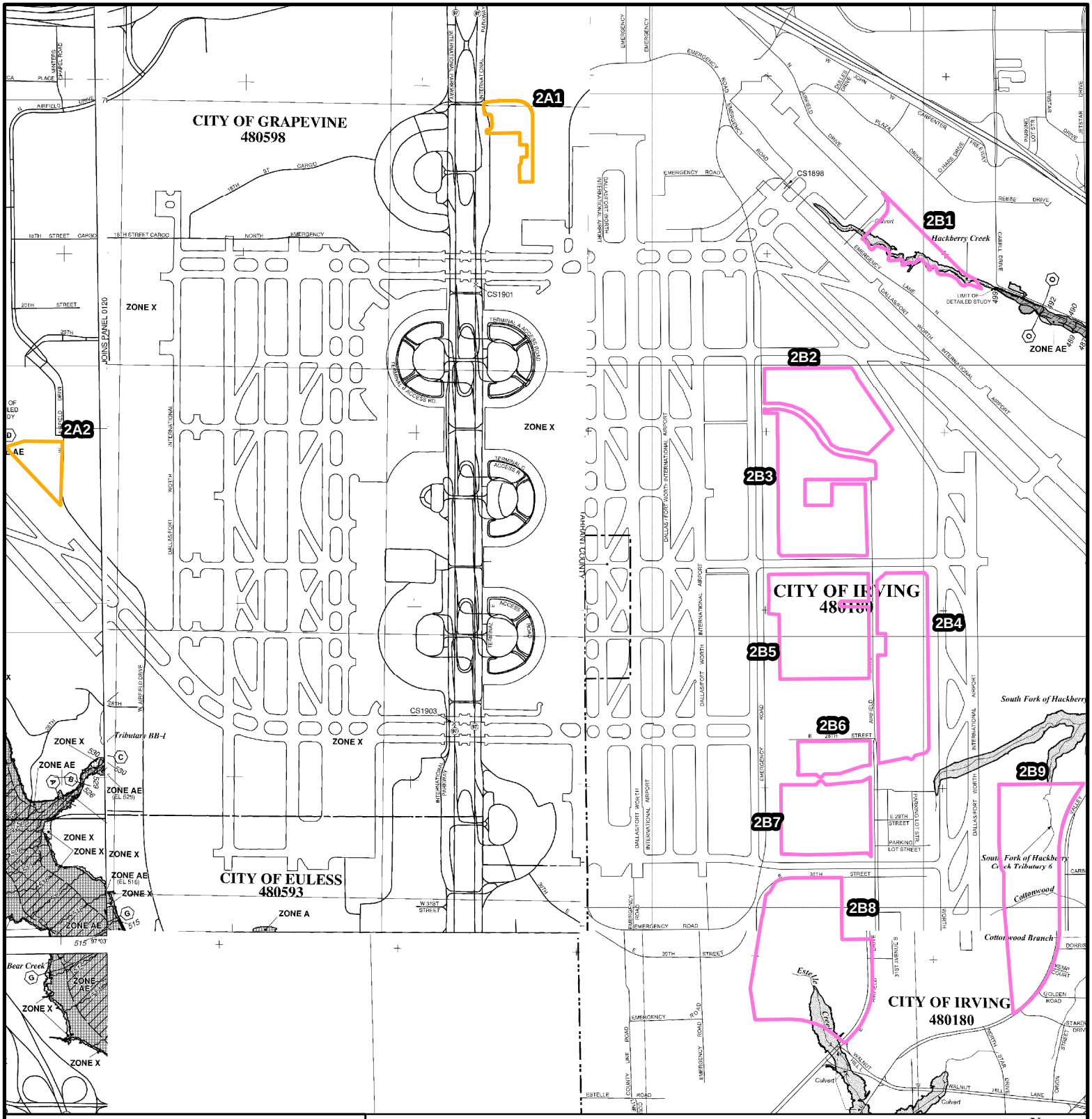


Figure 4
Federal Emergency Management Agency
Flood Insurance Rate Map

County: Tarrant/Dallas
State: Texas
Date map created: 08/24/2015
Source: FEMA FIRM Map Panels
48113C0135K; Effective: 07/07/14
48113C0145K; Effective: 07/07/14
48113C0285K; Effective: 07/07/14
48439C0115K; Effective: 09/25/09

Corporate Aviation (A)
East Aviation/East Air Cargo (B)

FEMA FIRM Zone Descriptions

Zone X - Areas determined to be outside the 0.2% annual chance floodplain

Zone X - Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood

Zone A - Special Flood Hazard Areas subject to inundation by the 1% annual chance flood; No base flood elevations determined

Zone AE - Special Flood Hazard Areas subject to inundation by the 1% annual chance flood; Base flood elevations determined

Zone AE - Floodway areas in Zone AE

N
W E
S

1 inch = 2,500 feet

0 2,500 5,000 10,000 Feet

Figure 5
Water Features identified within the Tranche 2

County: Dallas/Tarrant
State: Texas
Date map created: 09/10/2015
Source: (c) 2010 Microsoft Corporation and its data suppliers

Tranche 2

- Corporate Aviation (A)
- East Aviation/East Air Cargo (B)

N
W E
S

1 inch = 4,000 feet

0 4,000 8,000 16,000 Feet

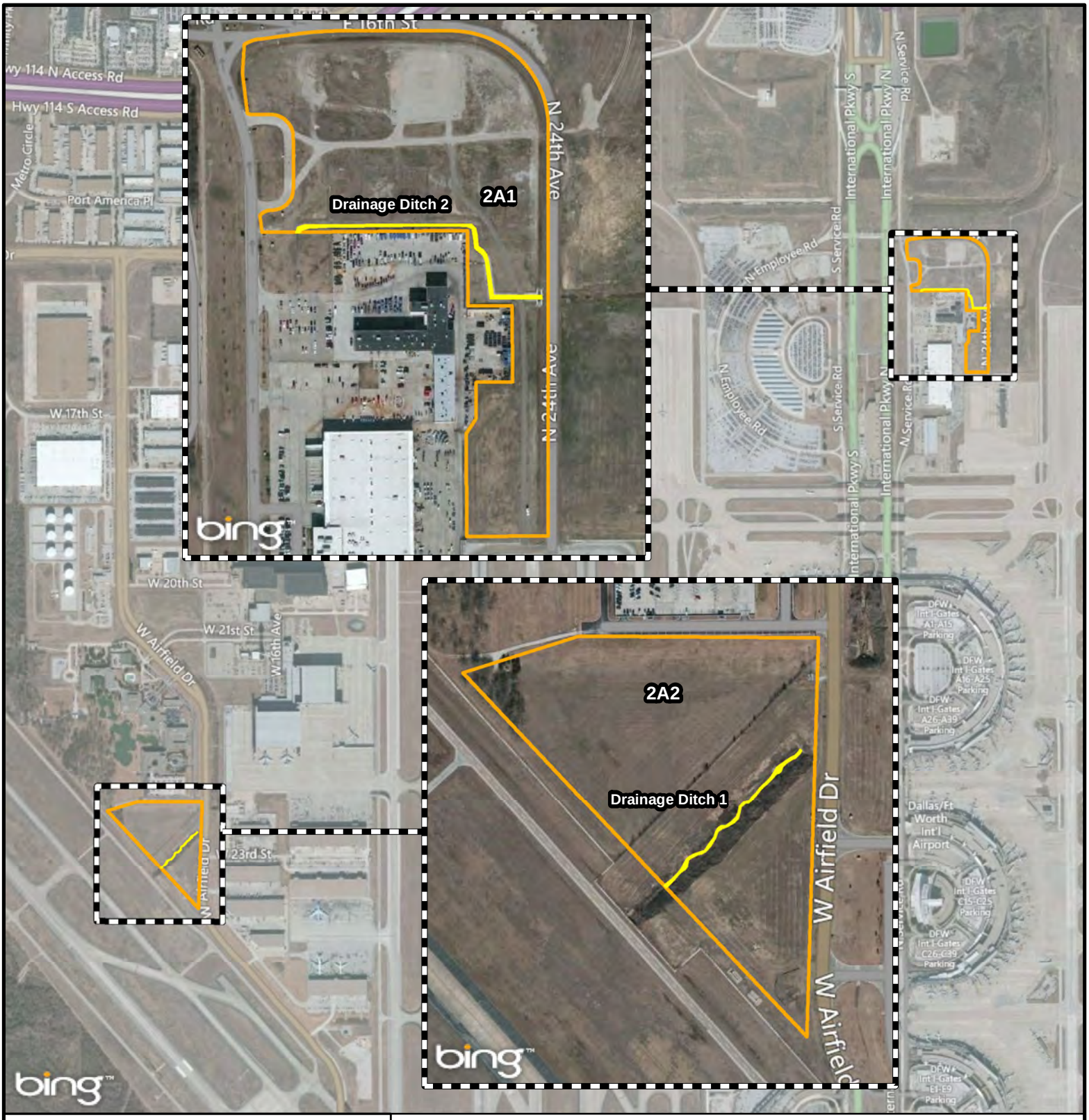


Figure 5-A
Water Features identified within the Tranche 2

County: Tarrant/Dallas
State: Texas
Date map created: 09/09/2015
Source: (c) 2010 Microsoft Corporation and its data suppliers

Tranche 2

Corporate Aviation (A)

Features that do not meet a definition of a waters of the United States

Drainage Ditch

N
W E
S

Inset Scale:

1 inch = 400 feet

0 400 800 1,200 Feet

1 inch = 1,500 feet

0 1,500 3,000 6,000 Feet

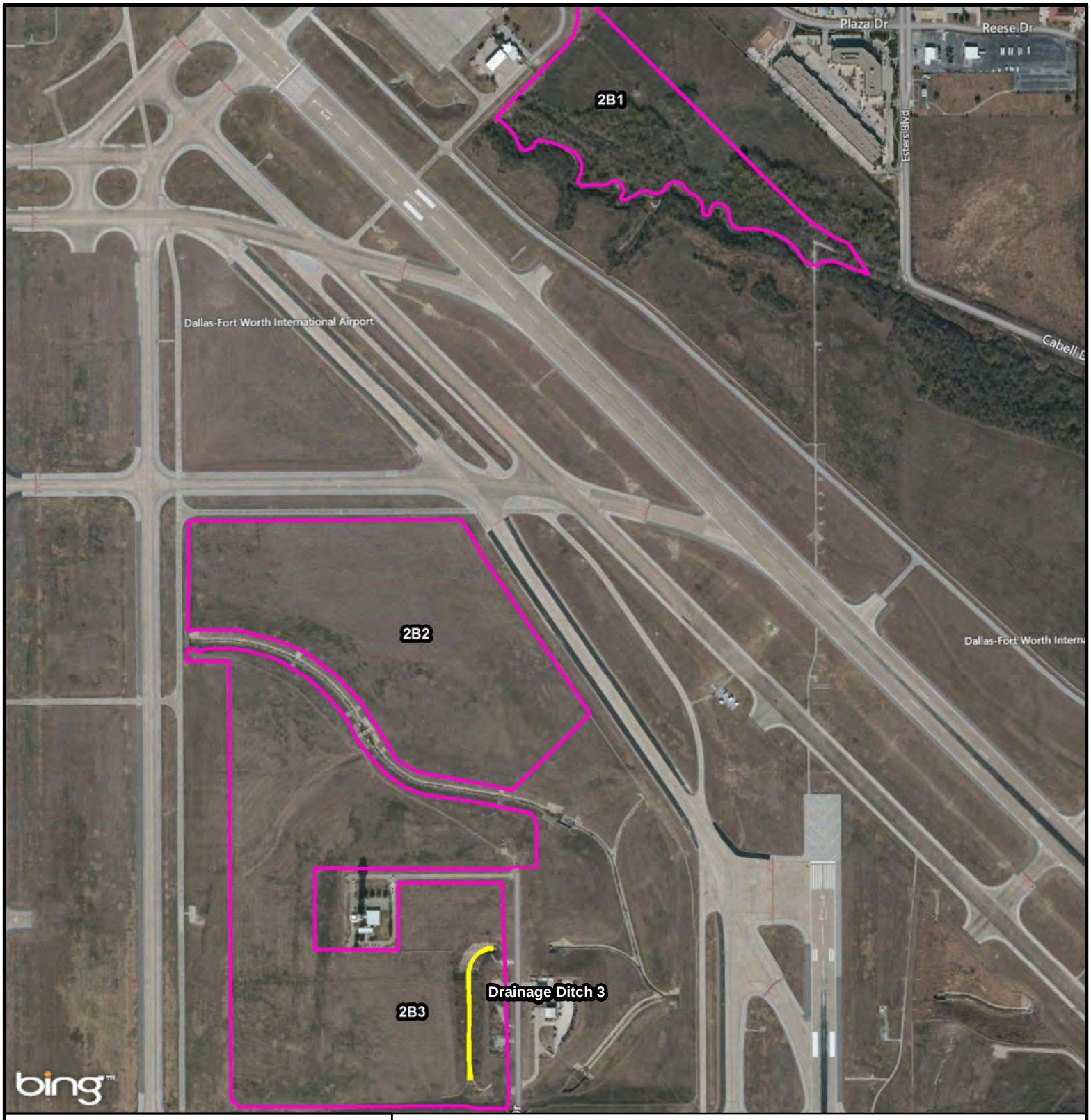


Figure 5-B
Water Features identified
within the Tranche 2

County:
State: Texas
Date map created:
Source: (c) 2010 Microsoft Corporation
and its data suppliers

Tranche 2

East Aviation/East Air Cargo (B)

Features that do not meet a definition of a waters of the United States

Drainage Ditch

N
W E
S

1 inch = 800 feet

0 800 1,600 3,200
Feet

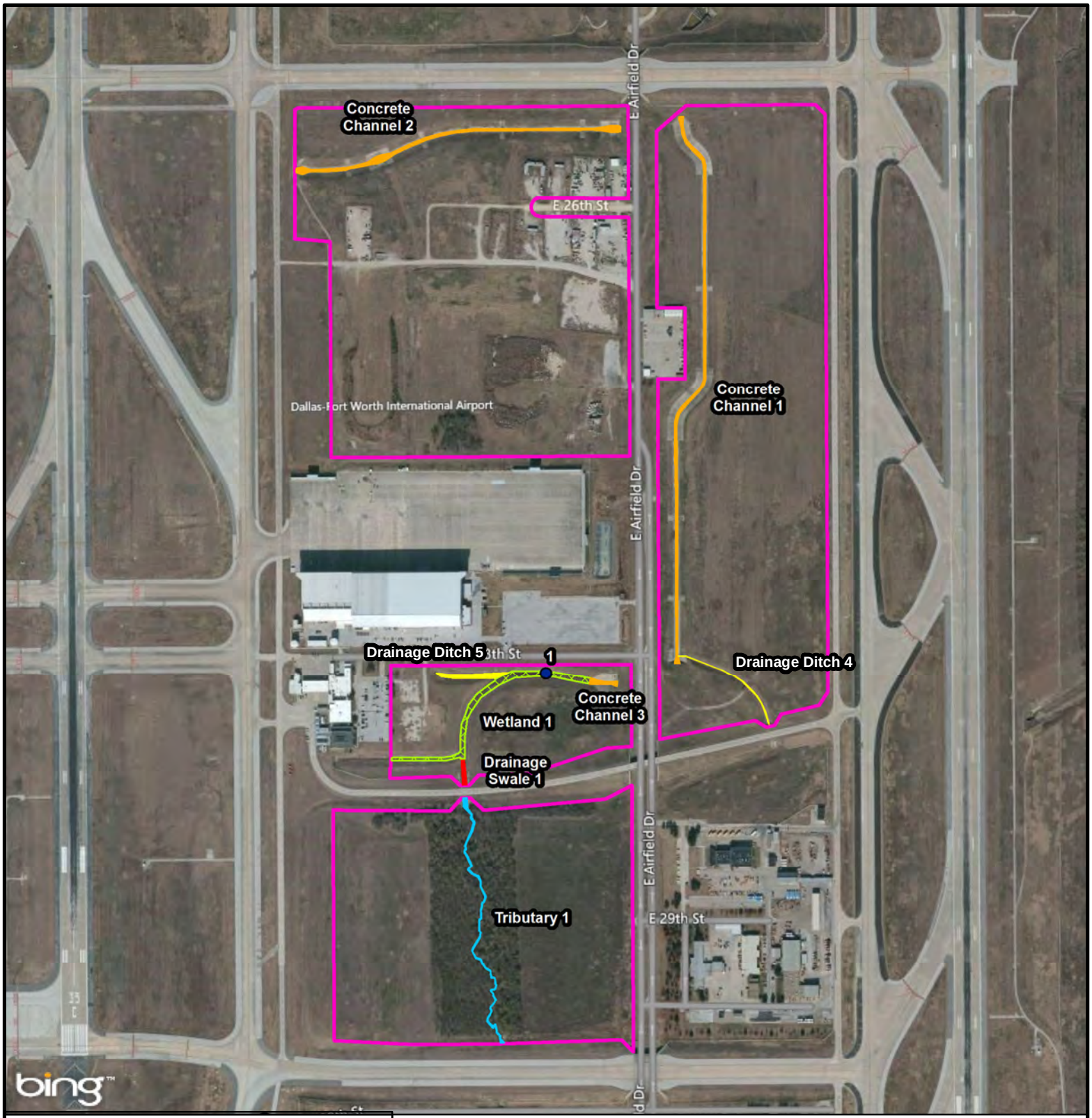


Figure 5-C
Water Features identified within the Tranche 2

County: Dallas
State: Texas
Date map created: 09/09/2015
Source: (c) 2010 Microsoft Corporation and its data suppliers

Tranche 2

East Aviation/East Air Cargo (B)

Features that meet a definition of a waters of the United States

- Concrete Channel
- Drainage Swale
- Tributary
- Wetland

Features that do not meet a definition of a waters of the United States

- Drainage Ditch

N
W E
S

1 inch = 750 feet

0 750 1,500 3,000 Feet

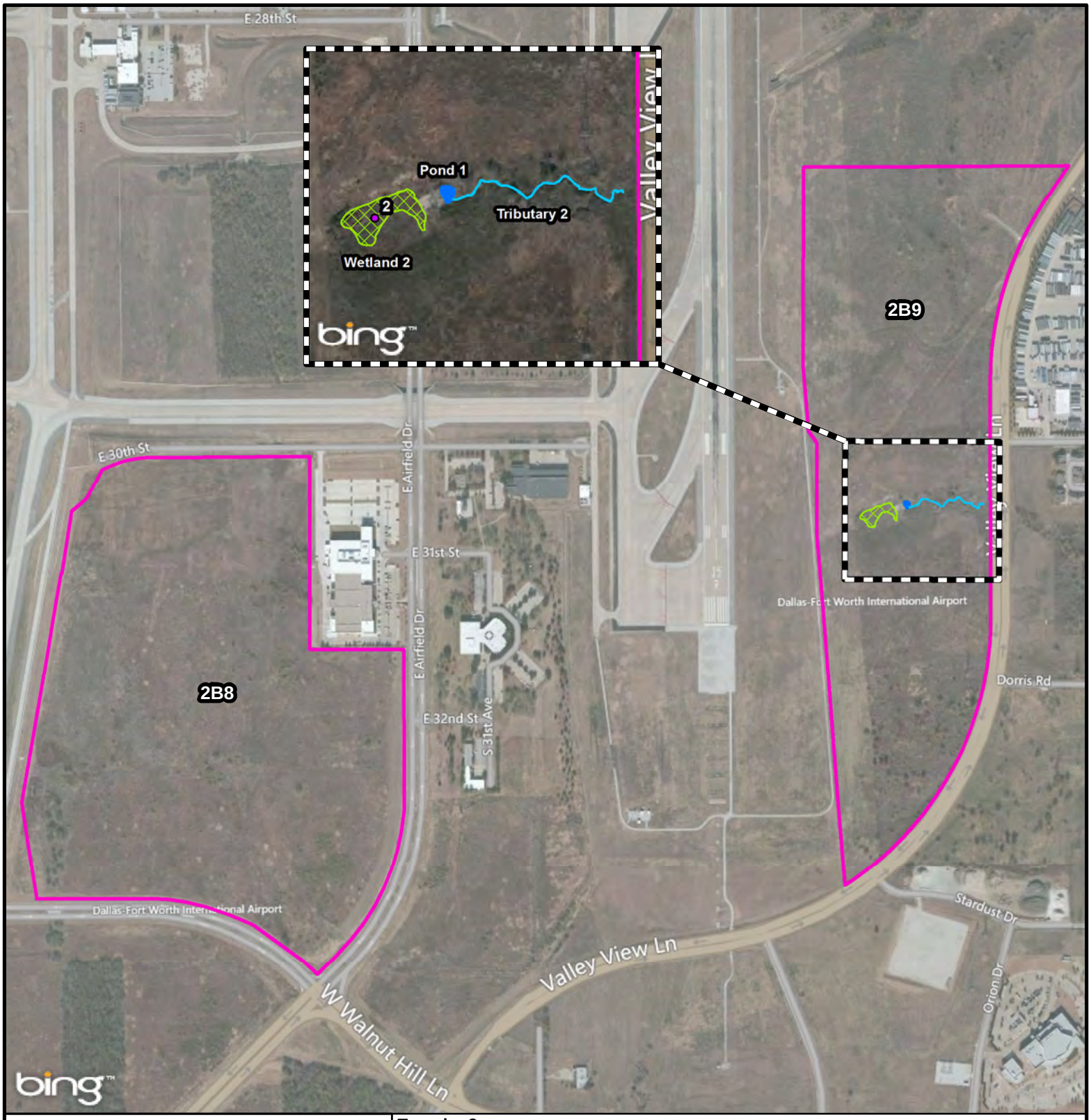


Figure 5-D
Water Features identified within Tranche 2

County: Dallas
State: Texas
Date map created: 09/09/2015
Source: (c) 2010 Microsoft Corporation and its data suppliers

Tranche 2

East Aviation/East Air Cargo (B)

Wetland Dataform Locations

Features that meet a definition of a waters of the United States

Pond

Tributary

Wetland

N
W E
S

Inset Scale: 1 inch = 350 feet
0 350 700 1,050 Feet

1 inch = 800 feet
0 800 1,600 3,200 Feet

ATTACHMENT B

Site Photographs

Photograph Location Map

Tranche 2

Photograph Locations

N

W E

S

County: Tarrant
State: Texas
Date map created: 09/09/2015
Source: (c) 2009 Microsoft Corporation and its data suppliers

1 inch = 250 feet

0 250 500 1,000 Feet

Tract 2A1

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

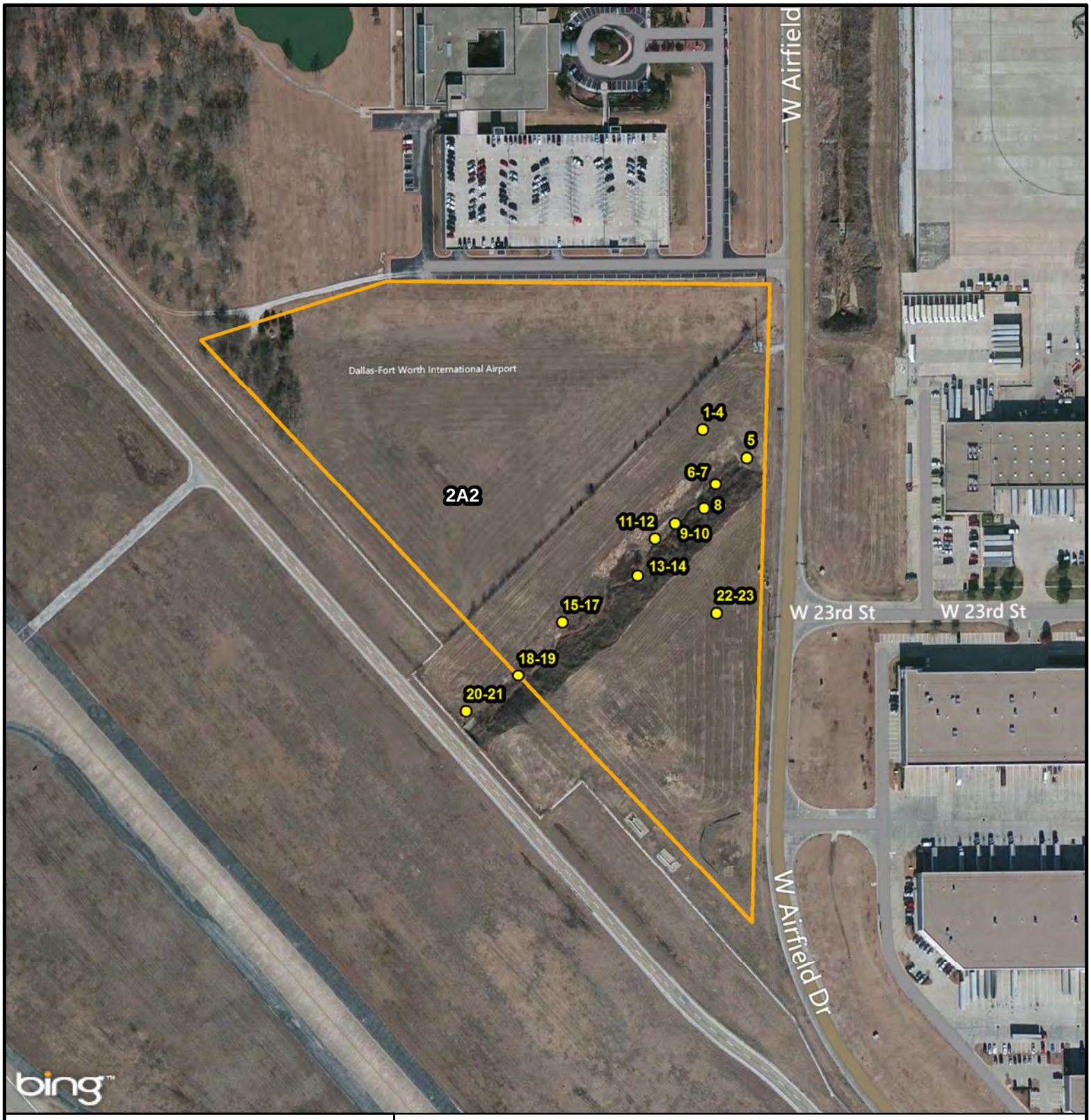
Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11



Photograph Location Map

Tranche 2

Photograph Locations

N
W E
S

County: Tarrant
State: Texas
Date map created: 09/09/2015
Source: (c) 2009 Microsoft Corporation and its data suppliers

1 inch = 250 feet

0 250 500 1,000 Feet

Tract 2A2

Photograph 1 – West

Photograph 2 - North

Photograph 3 – East

Photograph 4 - South

Photograph 5 – Southwest

Photograph 6 – Northeast

Photograph 7 – Southwest

Photograph 8 – North

Photograph 9 – Northeast

Photograph 10 - Southwest

Photograph 11 – Northeast

Photograph 12 - Southwest

Photograph 13 – Northeast

Photograph 14 - Southwest

Photograph 15 – Southeast

Photograph 16 - Northeast

Photograph 17 - Southwest

Photograph 18 - Northeast

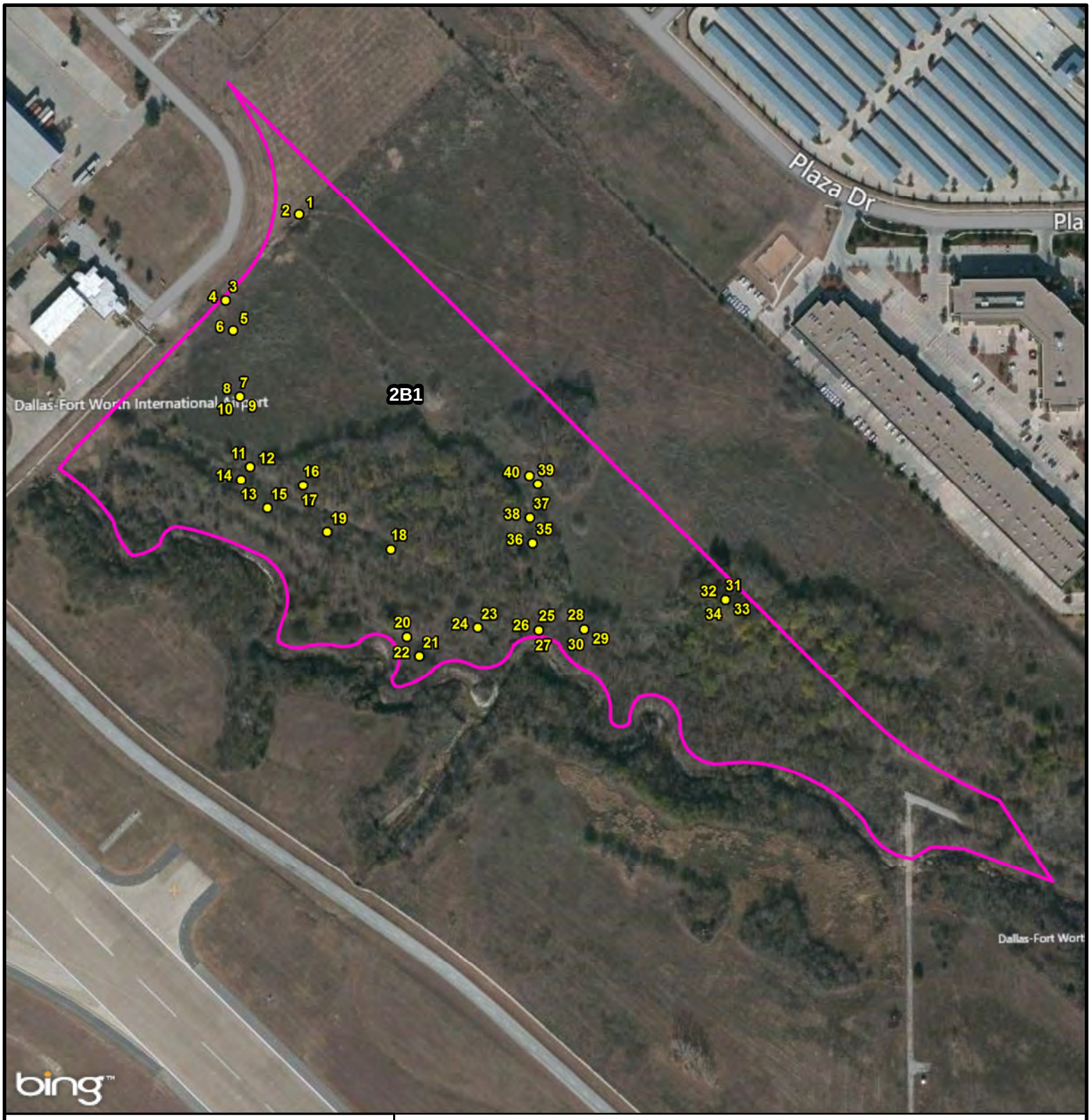
Photograph 19 - Southwest

Photograph 20 - Southwest

Photograph 21 - Northeast

Photograph 22 – South

Photograph 23 - West



Photograph Location Map

Tranche 2

Photograph Locations

N
W E
S

County: Dallas
State: Texas
Date map created: 09/09/2015
Source: (c) 2009 Microsoft Corporation and its data suppliers

1 inch = 300 feet

0 300 600 1,200 Feet

Tract 2B1

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

Photograph 13

Photograph 14

Photograph 15

Photograph 16

Photograph 17

Photograph 18

Photograph 19

Photograph 20

Photograph 21

Photograph 22

Photograph 23

Photograph 24

Photograph 25

Photograph 26

Photograph 27

Photograph 28

Photograph 29

Photograph 30

Photograph 31

Photograph 32

Photograph 33

Photograph 34

Photograph 35

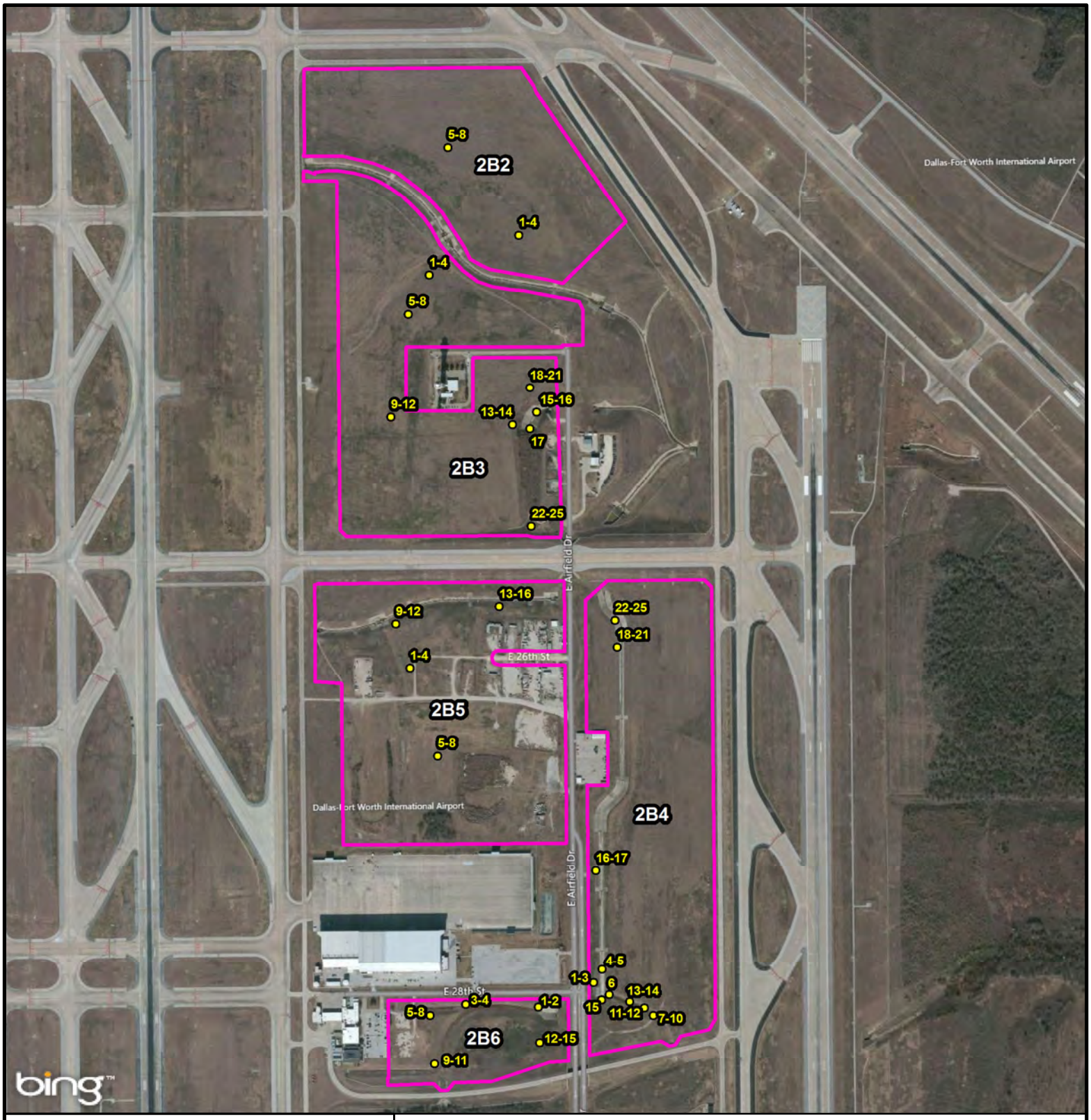
Photograph 36

Photograph 37

Photograph 38

Photograph 39

Photograph 40



Photograph Location Map

Tranche 2

Photograph Locations

County: Dallas
State: Texas
Date map created: 09/08/2015
Source: (c) 2009 Microsoft Corporation and its data suppliers

N
W E
S

1 inch = 1,000 feet

0 1,000 2,000 4,000 Feet

Tract 2B2

Photograph 1 – West

Photograph 2 – North

Photograph 3 – East

Photograph 4 - South

Photograph 5 – West

Photograph 6 – North

Photograph 7 – East

Photograph 8 - South

Tract 2B3

Photograph 1 – West

Photograph 2 - North

Photograph 3 – East

Photograph 4 - South

Photograph 5 – West

Photograph 6 - North

Photograph 7 - East

Photograph 8 - South

Photograph 9 – North

Photograph 10 - East

Photograph 11 – South

Photograph 12 - West

Photograph 13 - East

Photograph 14 - Southeast

Photograph 15 - East

Photograph 16 - South

Photograph 17 - South

Photograph 18 - North

Photograph 19 - East

Photograph 20 - South

Photograph 21 - West

Photograph 22 - West

Photograph 23 – North

Photograph 24 – East

Photograph 25 - South

Tract 2B4

Photograph 1 – North

Photograph 2 -East

Photograph 3 – Southeast

Photograph 4 - South

Photograph 5 – North

Photograph 6 - East

Photograph 7 - Southeast

Photograph 8 – Northeast

Photograph 9 – West

Photograph 10 - Northwest

Photograph 11 - East

Photograph 12 - West

Photograph 13 - East

Photograph 14 - West

Photograph 15 – North

Photograph 16 - South

Photograph 17 – North

Photograph 18 - North

Photograph 19 – East

Photograph 20 - West

Photograph 21 – North

Photograph 22 - South

Photograph 23 – West

Photograph 24 – East

Tract 2B5

Photograph 1 – North

Photograph 2 - West

Photograph 3 – East

Photograph 4 - South

Photograph 5 – North

Photograph 6 – East

Photograph 7 - South

Photograph 8 – West

Photograph 9 - North

Photograph 10 - West

Photograph 11 – East

Photograph 12 –South

Photograph 13 - North

Photograph 14 - East

Photograph 15 – South

Photograph 16 - West

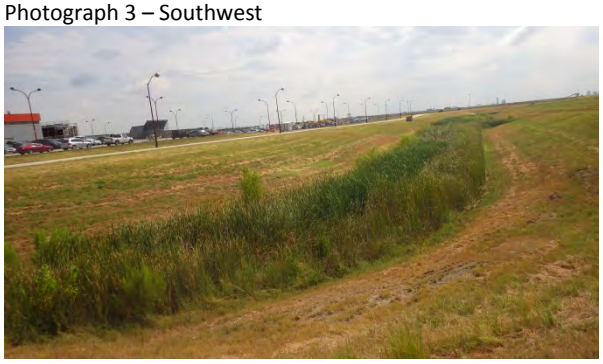
Tract 2B6

Photograph 1 - West

Photograph 2 - East

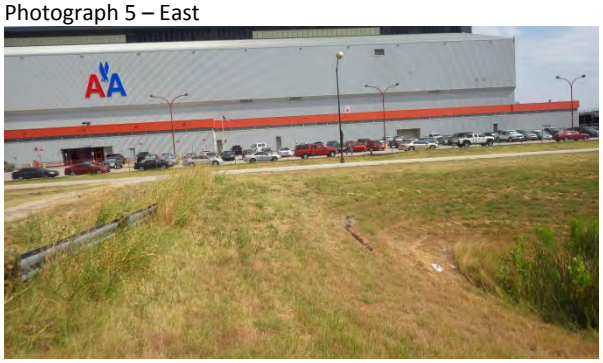
Photograph 3 – Southwest

Photograph 4 - East



Photograph 5 – East

Photograph 6 - West



Photograph 7 – North

Photograph 8 - South

Photograph 9 – Northeast

Photograph 10 - South

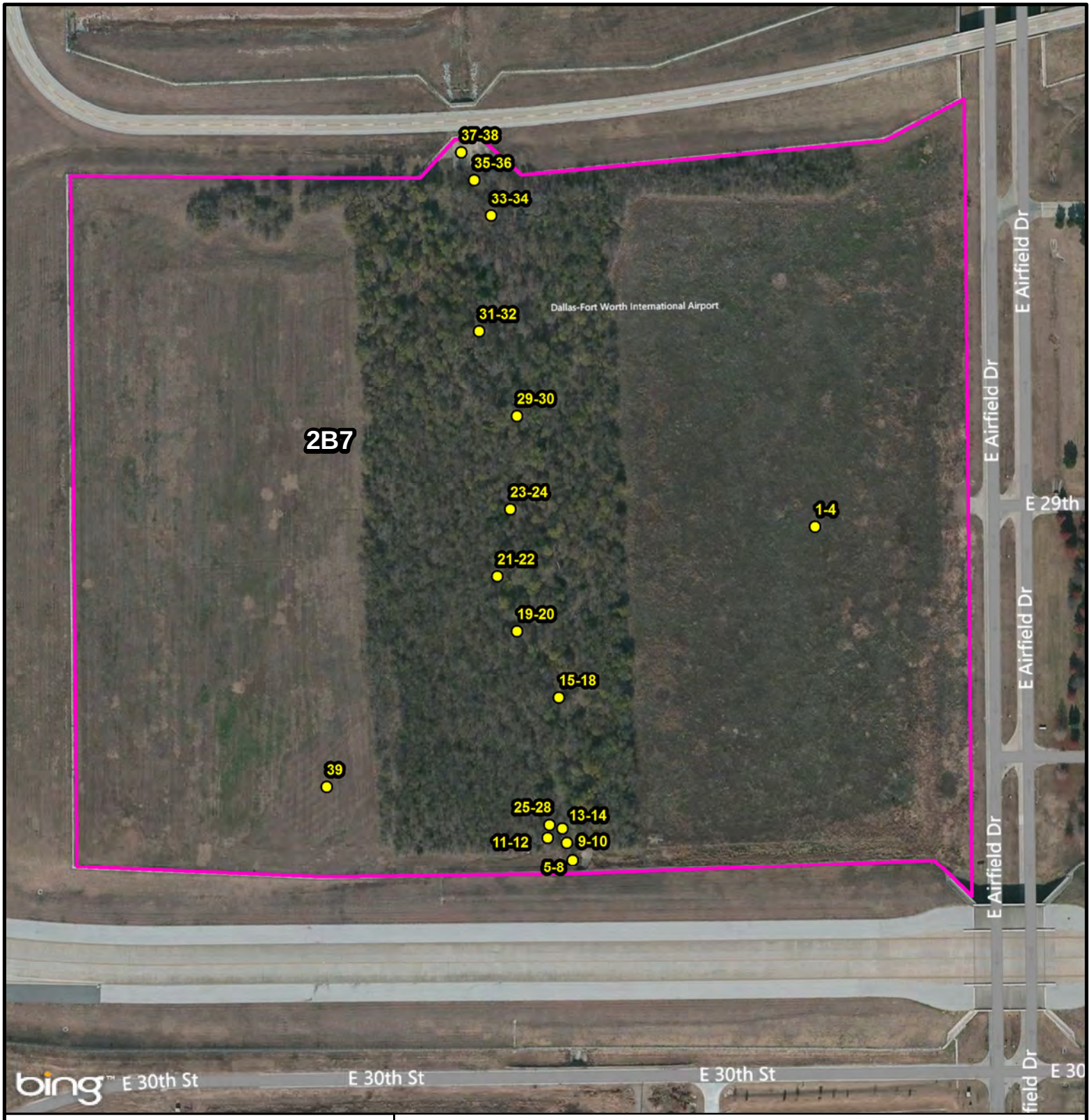
Photograph 11 – West

Photograph 12 - West

Photograph 13 – North

Photograph 14 – East

Photograph 15 – South



Photograph Location Map

Tranche 2

Photograph Locations

County:
State:
Date map created:
Source: (c) 2009 Microsoft Corporation and its data suppliers

N
W E
S

1 inch = 250 feet

0 250 500 1,000 Feet

Tract 2B7

Photograph 1 – South

Photograph 2 – East

Photograph 3 – North

Photograph 4 - West

Photograph 5 – South

Photograph 6 – West

Photograph 7 – East

Photograph 8 - North

Photograph 9 – South

Photograph 10 - North

Photograph 11 – North

Photograph 12 – South

Photograph 13 – North

Photograph 14 - South

Photograph 15 - North

Photograph 16 – South

Photograph 17 – East

Photograph 18 – West

Photograph 19 – North

Photograph 20 - South

Photograph 21 – North

Photograph 22 - South

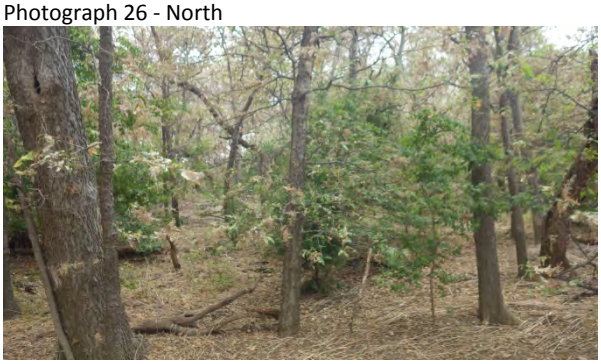
Photograph 23 - North

Photograph 24 - South

Photograph 25 - South

Photograph 26 - North

Photograph 27 – West



Photograph 28 - East

Photograph 29 – North

Photograph 30 - Southwest

Photograph 31 – North

Photograph 32 - South

Photograph 33 – North

Photograph 34 - South

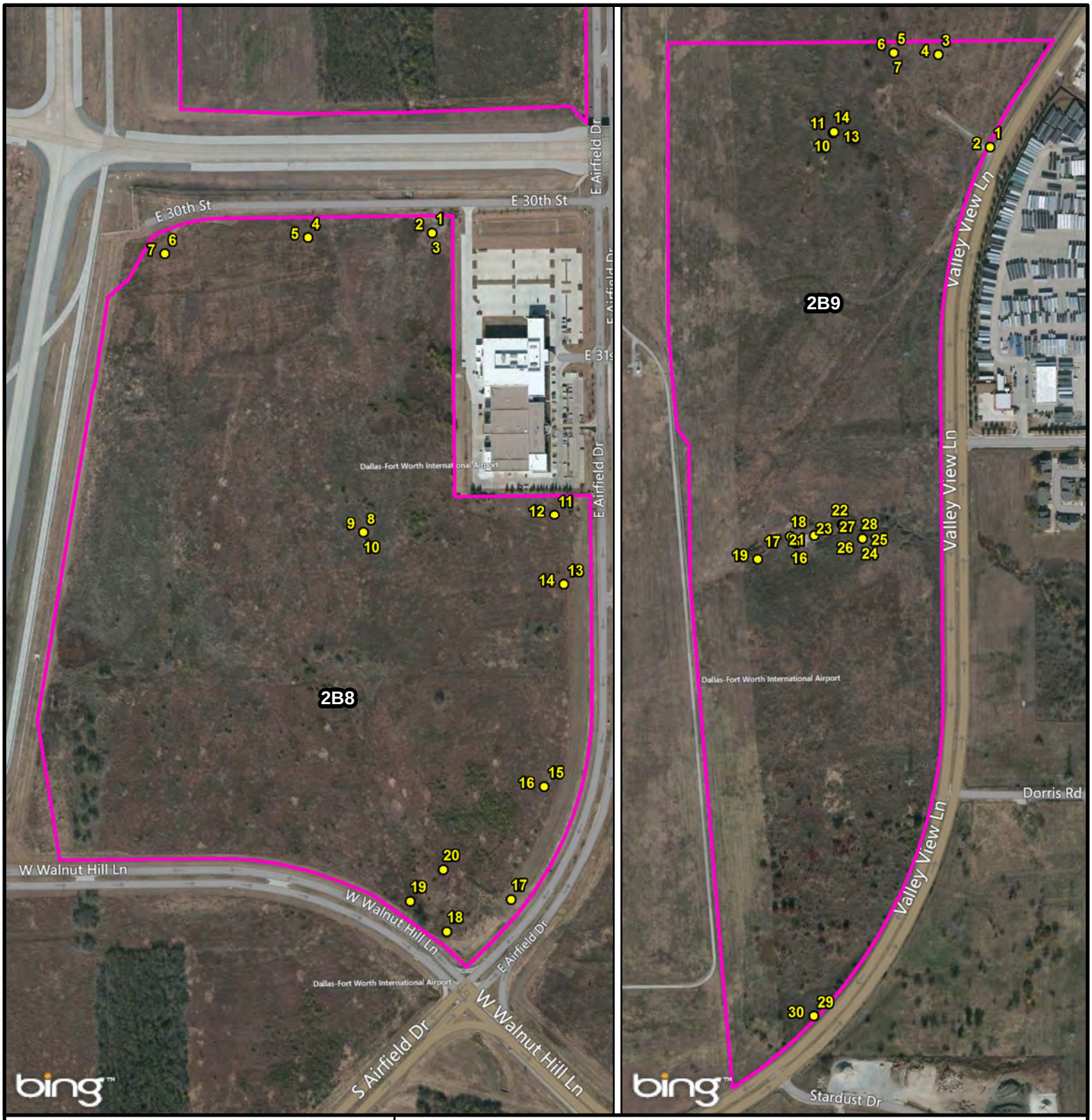
Photograph 35 – North

Photograph 36 - South

Photograph 37 - North

Photograph 38 - South

Photograph 39 - West



Photograph Location Map

Tranche 2

Photograph Locations

N
W E
S

County: Tarrant/Dallas
State: Texas
Date map created: 09/09/2015
Source: (c) 2009 Microsoft Corporation and its data suppliers

1 inch = 550 feet

0 550 1,100 2,200 Feet

Tract 2B8

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

Photograph 13

Photograph 14

Photograph 15

Photograph 16

Photograph 17

Photograph 18

Photograph 19

Photograph 20

Tract 2B9

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

Photograph 13

Photograph 14

Photograph 15

Photograph 16

Photograph 17

Photograph 18

Photograph 19

Photograph 20

Photograph 21

Photograph 22

Photograph 23

Photograph 24

Photograph 25

Photograph 26

Photograph 27

Photograph 28

Photograph 29

Photograph 30

ATTACHMENT C

Wetland Dataforms

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: DFW Airport Tramche 2, Tract 2B6 City/County: Dallas County Sampling Date: 08/19/2015

Applicant/Owner: DFW Airport State: Texas Sampling Point: 1

Investigator(s): Kamren Metzger Section, Township, Range:

Landform (hillslope, terrace, etc.): Upland Ridge Local relief (concave, convex, none): Concave Slope %: 0-3%

Subregion (LRR): Southwestern Praires Lat: 32.884687 N Long: -97.017581 W Datum: NAD 1983

Soil Map Unit Name: Heiden clay, 2 - 5 percent slopes NWI Classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	**Yes** ☒ **No** ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30' Radius)	Absolute % Coverage	Dominant Species?	Indicator Status
1. *N/A*			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot Size: 15' Radius)			
1. *N/A*			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot Size: 5' Radius)			
1. *Typha domingensis*	90	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		

Woody Vine Stratum (Plot Size: 30' Radius)			
1. *N/A*			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- YES 2 - Dominance Test is > 50%
- 3 - Prevalence Index is ≤ 3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: Located in a man-made drainage ditch. Cattails are dominant throughout the entire length of the ditch.

SOILS

Sampling Point: #1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-16	10YR 3/2	90	7.5YR 4/6	10	C	M/PL	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☒ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☒ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☒ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☐ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☐ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☒ No? ☐ Depth (inches): 1"

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: DFW Airport Tramche 2, Tract 2B9 City/County: Dallas County Sampling Date: 09/04/2015

Applicant/Owner: DFW Airport State: Texas Sampling Point: 2

Investigator(s): Shae Kipp Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Stormwater Basin Local relief (concave, convex, none): Concave Slope %: 0-3%

Subregion (LRR): Southwestern Praires Lat: 32.876759 N Long: -97.006642 W Datum: NAD 1983

Soil Map Unit Name: Ferris-Heiden complex, 5 to 12 percent slopes NWI Classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☒	No	☐	Is the Sampled Area within a wetland? **Yes** ☒ **No** ☐
Hydric Soil Present?	Yes	☒	No	☐	
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: Wetland area was located in stormwater basin; slope had been graded for temporary water storage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30' Radius)	Absolute % Coverage	Dominant Species?	Indicator Status
1. *N/A*			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot Size: 15' Radius)			
1. *N/A*			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot Size: 5' Radius)			
1. *Eleocharis palustris*	90	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		

Woody Vine Stratum (Plot Size: 30' Radius)			
1. *N/A*			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- YES 2 - Dominance Test is > 50%
- 3 - Prevalence Index is ≤ 3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOILS

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-16	10YR 3/2	95	7.5YR 5/8	5	C	M/PL	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☒ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes? ☐	No? ☒	Depth (inches):
Water Table Present?	Yes? ☐	No? ☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes? ☒	No? ☐	Depth (inches): 1"

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ATTACHMENT D

TxRAM Scoring Sheets

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Tranche 2 - 2B7 Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: Tributary 1 SAR No.: 1 Size (LF): 1703 Date: 09/09/2015 Evaluator(s): Metzger

Stream Type: Ephemeral Ecoregion: Southwestern Prairies Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 12030106 Watershed Condition (developed, pasture, etc.): Developed/Rangeland Watershed Size: _____

Aerial Photo Date and Source: Google Earth, 03/28/2015 Site Photos: Included Representative: ☒ Yes ☐ No

Stressor(s): _____ Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

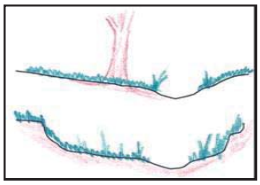
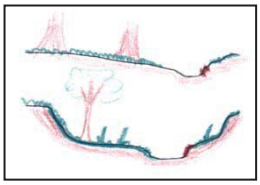
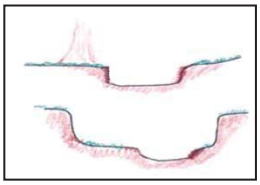
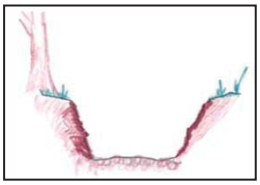
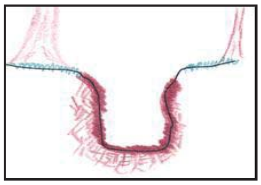
Stream Characteristics

Stream Width (Feet)		*Stream Height/Depth (Feet)*	
Avg. Bank to Bank:	3	Avg. Banks:	1-2
Avg. Waters Edge:	0	Avg. Water:	0
Avg. OHWM:	2	Avg. OHWM:	0.5

Notes: Tributary was dry at the time of the evaluation.

CHANNEL CONDITION

Floodplain Connectivity

				
Very little incision and access to the original floodplain or fully developed wide bankfull benches.	Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach.	Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas.	Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches.	Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut.
5	4	3	2	1

Score: 1

Bank Condition

Left Bank Active Erosion: 30 % Right Bank Active Erosion: 30 % Average: 30

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 2

Sediment Deposition

☐ Less than 20% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 20–40% of the bottom covered by excessive sediment deposition; some established bars with indicators of recently deposited sediments (4)

☒ 40–60% of the bottom covered by excessive sediment deposition; moderate deposition on old bars and creating new bars; moderate sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☐ 60–80% of the bottom covered by excessive sediment deposition; newly created bars prevalent; heavy sediment deposits at in-stream structures (2)

☐ Greater than 80% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 3

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 22 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score according to canopy cover, vegetation community, and land use (see section 3.3.2.1.3).

Left Bank Buffer Distance: 26

Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Woodland	70	Native	Low	5	100	5
2.						
3.						
4.						
5.						

Score: 5

Right Bank

Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Woodland	70	Native	Low	5	100	5
2.						
3.						
4.						
5.						

Score: 5

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder: 0	Gravel: 10	Fines (silt, clay, muck): 90	Artificial: 0
Cobble: 0	Sand: 0	Bedrock: 0	Other: 0

Score: 2

In-stream Habitat (check all habitat types that are present)

Habitat Type	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation													
Rootmats													
Rootwads													
Woody/Leafy Debris													
Boulders/Cobbles													
Aquatic Macrophytes													
Riffle/Pool Sequence													
Artificial Habitat Enhancement													
Other													
Total No. Present													

Average: _____ **Score:** 0

HYDROLOGIC CONDITION

Flow Regime

- ☐ Noticeable surface flow present (4)
- ☐ Continual pool of water but lacking noticeable flow (3)
- ☐ Isolated pools and interstitial (subsurface) flow (2)
- ☐ Isolated pools and no evidence of surface or interstitial flow (1)
- ☒ Dry channel and no observable pools or interstitial flow (0)

Score: 0

Channel Flow Status

- ☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
- ☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
- ☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
- ☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
- ☒ No water present in the channel; 100% of channel substrate exposed (0)

Score: 0

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Tranche 2 - 2B7 Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: Tributary 1 SAR No.: 1 Size (LF): 1703 Date: 09/09/2015 Evaluator(s): Metzger

Stream Type: Ephemeral Ecoregion: Southwestern Prairies Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): Developed/Rangeland Watershed Size: _____

Aerial Photo Date and Source: Google Earth, 03/28/2015 Site Photos: Representative Representative: ☒ Yes ☐ No

Stressor(s): _____ Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Notes: Tributary was dry at the time of the evaluation.

Stream Characteristics

Stream Width (Feet)		*Stream Height/Depth (Feet)*	
Avg. Bank to Bank:	3	Avg. Banks:	1-2
Avg. Waters Edge:	0	Avg. Water:	0
Avg. OHWM:	2	Avg. OHWM:	0.5

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	1	Sum of metric scores / 15 x 25	10
	Bank condition	2		
	Sediment deposition	3		
Riparian buffer condition	Riparian buffer (left bank)	5	Sum of bank scores / 10 x 25	25
	Riparian buffer (right bank)	5		
In-stream condition	Substrate composition	2	Sum of metric scores / 10 x 25	5
	In-stream habitat	0		
Hydrologic condition	Flow regime	0	Sum of metric scores / 8 x 25	0
	Channel flow status	0		
			Sum of core element scores = overall TXRAM stream score	40
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				0
			Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**	40

Representative Site Photograph:

[Insert Photograph]	

TXRAM STREAM DATA SHEET

Project/Site Name/No.: Tranche 2 - 2B9 Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: Tributary 2 SAR No.: 1 Size (LF): 560 Date: 09/09/2015 Evaluator(s): Kipp

Stream Type: Ephemeral Ecoregion: Southwestern Prairies Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 12030106 Watershed Condition (developed, pasture, etc.): Developed/Rangeland Watershed Size: _____

Aerial Photo Date and Source: Google Earth, 03/28/2015 Site Photos: Included Representative: ☒ Yes ☐ No

Stressor(s): Drought conditions Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

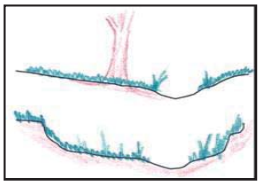
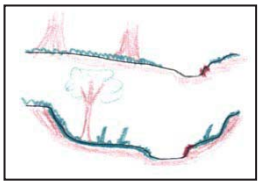
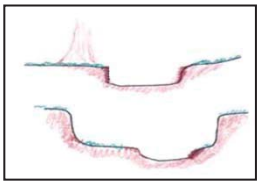
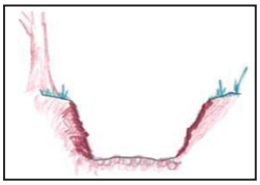
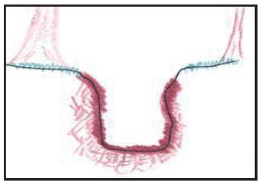
Stream Characteristics

Stream Width (Feet)		*Stream Height/Depth (Feet)*	
Avg. Bank to Bank:	5	Avg. Banks:	1-3
Avg. Waters Edge:	0	Avg. Water:	0
Avg. OHWM:	2	Avg. OHWM:	0.5

Notes: Tributary was dry at the time of the evaluation. Several areas within the tributary were vegetation between the toe-of-slope, within the bed and bank.

CHANNEL CONDITION

Floodplain Connectivity

				
Very little incision and access to the original floodplain or fully developed wide bankfull benches.	Slight incision and likely having regular (i.e., at least once a year) access to bankfull benches or newly developed floodplains along majority of the reach.	Moderate incision and presence of near vertical/ undercut banks; irregular (i.e., greater than 2 year return interval) access to floodplain or possible access to floodplain or bankfull benches at isolated areas.	Overwidened or incised channel and likely to widen further; majority of both banks near vertical/undercut; unlikely/rarely having access to floodplain or bankfull benches.	Deeply incised channel or channelized flow; severe incision with flow contained within the banks; majority of banks vertical/undercut.
5	4	3	2	1

Score: 1

Bank Condition

Left Bank Active Erosion: 30 % Right Bank Active Erosion: 30 % Average: 30

Bank Protection/Stabilization: ☒ Natural ☐ Artificial: _____

Score: 2

Sediment Deposition

☐ Less than 20% of the bottom covered by excessive sediment deposition; bars with established vegetation (5)

☐ 20–40% of the bottom covered by excessive sediment deposition; some established bars with indicators of recently deposited sediments (4)

☐ 40–60% of the bottom covered by excessive sediment deposition; moderate deposition on old bars and creating new bars; moderate sediment deposits at in-stream structures; OR obstructed view of the channel bottom and a lack of other depositional features (3)

☒ 60–80% of the bottom covered by excessive sediment deposition; newly created bars prevalent; heavy sediment deposits at in-stream structures (2)

☐ Greater than 80% of the bottom covered by excessive sediment deposition resulting in aggrading channel (1)

Score: 2

RIPARIAN BUFFER CONDITION

Riparian Buffer - See Table 22 to determine appropriate buffer distance. Confirm in office review.

Identify each buffer type and score according to canopy cover, vegetation community, and land use (see section 3.3.2.1.3).

Left Bank — Buffer Distance: 26

Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Shrub-land	40	Mix	Moderate	2	60	1.2
2. Grassland	0	Native	Low	3	40	1.2
3.						
4.						
5.						

Score: 2.4

Right Bank

Buffer Type	*Canopy Cover*	*Vegetation Community*	*Land Use*	*Score*	*Percentage of Area*	*Subtotal*
1. Shrub-land	40	Mix	Moderate	2	60	1.2
2. Grassland	0	Native	Low	2	40	1.2
3.						
4.						
5.						

Score: 2.4

IN-STREAM CONDITION

Substrate Composition (estimate percentages)

Boulder: 0	Gravel: 10	Fines (silt, clay, muck): 90	Artificial: 0
Cobble: 0	Sand: 0	Bedrock: 0	Other: 0

Score: 2

In-stream Habitat (check all habitat types that are present)

Habitat Type	*T1*	*T2*	*T3*	*T4*	*T5*	*T6*	*T7*	*T8*	*T9*	*T10*	*T11*	*T12*	*T13*
Undercut Banks													
Overhanging Vegetation													
Rootmats													
Rootwads													
Woody/Leafy Debris													
Boulders/Cobbles													
Aquatic Macrophytes													
Riffle/Pool Sequence													
Artificial Habitat Enhancement													
Other													
Total No. Present	0	0	0	0	0								

Average: 0 **Score:** 0

HYDROLOGIC CONDITION

Flow Regime

- ☐ Noticeable surface flow present (4)
- ☐ Continual pool of water but lacking noticeable flow (3)
- ☐ Isolated pools and interstitial (subsurface) flow (2)
- ☐ Isolated pools and no evidence of surface or interstitial flow (1)
- ☒ Dry channel and no observable pools or interstitial flow (0)

Score: 0

Channel Flow Status

- ☐ Water covering greater than 75% of the channel bottom width; less than 25% of channel substrate is exposed (4)
- ☐ Water covering 50–75% of the channel bottom width; 25–50% of channel substrate is exposed (3)
- ☐ Water covering 25–50% of the channel bottom width; 50–75% of channel substrate is exposed (2)
- ☐ Water present but covering less than 25% of the channel bottom width; greater than 75% of channel substrate is exposed (1)
- ☒ No water present in the channel; 100% of channel substrate exposed (0)

Score: 0

TXRAM STREAM FINAL SCORING SHEET

Project/Site Name/No.: Tranche 2 - 2B9 Project Type: ☐ Fill/Impact (☐ Linear ☐ Non-linear) ☐ Mitigation/Conservation

Stream ID/Name: Tributary 2 SAR No.: 1 Size (LF): 560 Date: 09/09/2015 Evaluator(s): Kipp

Stream Type: Ephemeral Ecoregion: Southwestern Prairies Delineation Performed: ☒ Previously ☐ Currently

8-Digit HUC: 12030103 Watershed Condition (developed, pasture, etc.): Developed/Rangeland Watershed Size: _____

Aerial Photo Date and Source: Google Earth, 03/28/2015 Site Photos: Representative Representative: ☒ Yes ☐ No

Stressor(s): Drought conditions Are normal climatic/hydrologic conditions present? ☒ Yes ☐ No (If no, explain in Notes)

Notes: Tributary was dry at the time of the evaluation. Several areas within the tributary were vegetation between the toe-of-slope, within the bed and bank.

Stream Characteristics

Stream Width (Feet)		*Stream Height/Depth (Feet)*	
Avg. Bank to Bank:	5	Avg. Banks:	1-3
Avg. Waters Edge:	0	Avg. Water:	0
Avg. OHWM:	2	Avg. OHWM:	0.5

Scoring Table

Core Element	***Metric***	***Metric Score***	***Core Element Score Calculation***	***Core Element Score***
Channel condition	Floodplain connectivity	1	Sum of metric scores / 15 x 25	8.3
	Bank condition	2		
	Sediment deposition	2		
Riparian buffer condition	Riparian buffer (left bank)	2.4	Sum of bank scores / 10 x 25	12
	Riparian buffer (right bank)	2.4		
In-stream condition	Substrate composition	2	Sum of metric scores / 10 x 25	5
	In-stream habitat	0		
Hydrologic condition	Flow regime	0	Sum of metric scores / 8 x 25	0
	Channel flow status	0		
			Sum of core element scores = overall TXRAM stream score	25.3
Additional points for limited habitats = overall TXRAM stream score x 0.025 for each bank (right/left) if: L R ☐ ☐ Dominated by native trees greater than 24-inch diameter at breast height ☐ ☐ Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree strata				0
			Sum of overall TXRAM stream score and additional points = **total overall TXRAM stream score**	25.3

Representative Site Photograph:

[Insert Photograph]	