TWINWOOD WETLAND MITIGATION BANK PROSPECTUS

TWINWOOD WETLAND MITIGATION BANK
321.47 ACRES
FORT BEND COUNTY, TEXAS

PREPARED FOR
TWINWOOD (U.S.) INC.
FORT BEND COUNTY, TEXAS

BERG ◆ OLIVER ASSOCIATES, INC.
ENVIRONMENTAL SCIENCE & LAND USE CONSULTANTS
HOUSTON, TEXAS
BOA PROJECT NO. 10374N-PROP
JUNE 2017

TWINWOOD WETLAND MITIGATION BANK PROSPECTUS

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H. Conceptual Development Plan

I. INTRODUCTION

The information provided herein is submitted by Berg ♦ Oliver Associates, Inc. (BOA), as authorized by Mr. James Ross from LJA Engineering, on behalf of Twinwood (U.S.), Inc. (Sponsor).

The Sponsor is requesting that the Interagency Review Team (IRT) approve the establishment of the Twinwood Wetland Mitigation Bank (TWMB). The property to be included in TWMB is located east of the Brazos River and west of Pony Lane in Fort Bend County, Texas.

The proposed TWMB would be created as a large-scale wetland complex available for regional wetland compensation that would be managed and maintained in perpetuity. The objective of the TWMB is to provide replacement of the various functions and values of wetlands lost due to permitted impacts to jurisdictional areas within the proposed Primary and Secondary Service Areas (***Appendix A***).

The consolidation of multiple small mitigation projects by creating TWMB would allow for better economic planning, implementation, and maintenance. Additionally, TWMB would produce wetlands of greater function and value due to their location, size, high level of commitment to assure wetland functions, and the long-term management of the ecosystem. In addition to the creation of wetlands, TWMB will preserve high quality riparian corridor along the Brazos River. Further, TWMB likely would reduce administrative costs and delays in issuing permits by the U.S. Army Corps of Engineers, Galveston District, for proposed activities that would qualify for use of TWMB. The expected benefits of TWMB include water quality management, fish and wildlife habitat restoration and creation, flood control, conservation of biological diversity, education, recreation, and aesthetics.

The proposed TWMB would be created on a 321.47 acre tract located east of the Brazos River and west of Pony Lane in Fort Bend County, Texas. More specifically, the site is located on the United States Geological Service (USGS) Wallis topographic quadrangle, coordinates 29.69362ºN and -96.00767ºW (***Appendix D***). Based on a wetland assessment determination and delineation study of the site, it is estimated that approximately 36.22 acres of potential wetlands, 1,432 linear feet (1.38 acres) of non-vegetated Waters of the U.S. (the Brazos River), and 8,318 linear feet (1.32 acres) of man-made upland ditches currently exist on the tract (***Appendix G***).

It appears that there is an opportunity to restore approximately 78 acres of forested wetlands within the TWMB property, based on position in the landscape, proximity to hydrologic sources, soil type, and an available seed source. There is also the potential to establish approximately 43 acres of herbaceous wetlands on the TWMB property within existing, previously disturbed upland agricultural fields. Of the 36.22 acres of existing wetlands on the TWMB property, the Sponsor is proposing to enhance 9.27 acres by planting desirable native wetland tree species, and to preserve the remaining 26.95 acres in perpetuity by the placement of a conservation easement held by a qualified third party land trust (***Appendix H***).

There is tremendous need for a wetland mitigation bank in Fort Bend County and surrounding counties. The expansion of development within the surrounding areas and the ever expanding and sprawling population of the greater Houston area has created a significant demand for wetland mitigation credits associated with permitted impacts for development.

The proposed TWMB property was chosen due to close proximity to the Brazos River and enhancement/restoration/establishment potential. Recognizing the need and social and economic benefits of wetland banking and the desire to protect certain portions of the property by conservation easement, Twinwood (U.S), Inc. decided to pursue wetland banking opportunities.

The proposed TWMB would be available for compensation for approved wetland Department of the Army (DA) permits for impacts to any jurisdictional non-tidal wetlands located within the primary and secondary service area (***Appendix A***). The service area proposed was evaluated based on the 8-digit Hydrologic Unit Code (HUC) in which the tract resides, relation to the EPA Level III eco-region, and all watersheds that contribute and flow into the Brazos River. The proposed primary service area includes the Lower Brazos HUC (12070104) and the proposed secondary service areas are the Austin-Oyster HUC (12040205) and the San Bernard HUC (12090401) (***Appendix A***). The proposed service areas would require approval by the IRT during the mitigation banking review process. However, the IRT has approved service areas based on this approach for recent mitigation banks that BOA has assisted with.

II. ESTABLISHMENT OF THE TWMB

A. BACKGROUND INFORMATION

The Sponsor has evaluated the current site conditions. The proposed TWMB property has the potential for enhancement, restoration, and establishment of aquatic resources.

The 321.47 acre proposed TWMB property lies entirely within the 100-year floodplain of the Brazos River as published by the Federal Emergency Management Agency (FEMA) (***Appendix C***). The project area is dominated by open pasture areas, with a few pockets of remnant forested areas. The majority of this site is currently undeveloped land utilized for agricultural livestock production and is improved grazing pasture for the livestock. The tract has historically been used for agricultural activities such as livestock production.

Wetlands generally occur as historical features on the landscape and usually maintain their basic configurations and appearances over a long period of time. However, vegetation communities naturally progress through several stages of succession as wetlands age and become mature. Additionally, topographical and hydrological characteristics may be changed by natural processes or by man-induced alterations in or near wetland and stream areas. While field verification remains essential to wetland and stream identification, historical aerial photography, and topographic maps played a vital role in the evaluation of wetland and stream features and variations over extended periods of time.

Aerial photography was used extensively in the evaluations made on the site. These photographs were studied extensively for the presence of wetland indicators that recur over time. Black & white photographs contain features which may outline the subtle changes in shading and contrast where wetland vegetation or soils may occur. Anaerobic soils are often of a different hue, due to hydrous conditions and vegetation patterns associated with such soils. Due to the hydroperiod and vegetation variation, these areas can be distinguished from surrounding uplands. Black & white photography becomes a primary method for interpretive delineation since wetland areas may often be very distinctive. Infrared photographs provide views of the site as a complete unit where areas and systems of high water content become more easily defined. Such areas are slightly cooler than the surrounding areas and will appear on the false color imagery as variations in shading. Areas which consistently appeared as possible wetlands were marked for field confirmation. The same process also identified areas that appeared as marginal or upland. From these photographic interpretations, a preliminary "rough" delineation pattern was established and incorporated into planned site reconnaissance.

BOA conducted a wetland delineation on the TWMB property in March 2017 to verify the findings from the aerial photograph investigation. The attached wetland delineation map depicts the findings of

the wetland delineation and provides exact locations of existing aquatic resources on the property (***Appendix G***). Based on this wetland assessment determination and delineation study, it is estimated that approximately 36.22 acres of potential wetlands, 1,432 linear feet (1.38 acres) of non-vegetated Waters of the U.S. (the Brazos River), and 8,318 linear feet (1.32 acres) of man-made upland ditches currently exist on the TWMB property.

B. CONCEPTUAL DEVELOPMENT PLAN

In order to develop a conceptual development plan for the TWMB, the following resources were reviewed: 1) Natural Resource Conservation Service (NRCS) county soil survey maps; 2) FEMA flood plain maps; 3) USGS topographic maps; 4) Current and historical aerial photographs; and 5) site reconnaissance.

The NRCS Web Soil Survey of Fort Bend County, Texas was reviewed to determine the types of soils that would most likely be present on the TWMB property. The dominant soils on the tract are Brazoria clay (Ma), Clemville silty clay loam (Md), Brazoria-Sumpf clay (Me), and Sandy alluvial land (Sa) (***Appendix B***). Brazoria clay (Ma) and Clemville silty clay loam (Md) are listed as "not hydric" according the NRCS Web Soil Survey of Fort Bend County, Texas. However, this does not mean that wetlands do not exist on the tract or that the tract is not conducive for wetland establishment and development. In fact, these soils are considered to have a slow infiltration rate that would allow water to pond on the surface rather than infiltrate and percolate quickly out of the root zone. Additionally, Brazoria-Sumpf clay (Me), which makes up a large portion of the soils on the subject property, has both non-hydric (Brazoria) and hydric (Sumpf) components to it. Especially when the hydrology of the area is manipulated to increase frequency of flooding, wetland establishment and development is easily achievable on these types of soils.

1. Preservation

Of the 36.22 acres of wetlands identified on the TWMB property, the Sponsor is proposing to preserve 26.95 acres. As these wetlands are not in specific need of protection from non-regulated imminent threats, the Sponsor is not currently seeking to generate preservation credits from this action.

The Sponsor is proposing preservation of high quality aquatic resources in perpetuity by the placement of a conservation easement held by a qualified third party land trust over the entire 321.47 acres once the final Mitigation Banking Instrument (fMBI) is approved and signed. The placement of the conservation easement will protect the existing aquatic resource functions.

2. Enhancement and Restoration

There is the potential to enhance 9.27 acres of existing wetlands by planting desirable native wetland tree species within the existing wetlands. There is also potential to restore 78 acres of forested wetlands on-site by removing approximately six (6) to twelve (12) inches of earth to mimic the contours of existing wetlands on-site. Excavated material could be used to develop maintenance roads on-site for enhanced access across the site, and to modify the landscape to maintain proper water levels within the restored wetlands. Hydrology would be maintained by natural rainfall on-site and slight modification to the landscape elevations. The proposed restored forested wetlands would be planted using desirable native wetland tree species. Target FCIs for

forested wetland enhancement and restoration will be approximately 0.742 Physical, 0.850 Biological, and 0.863 Chemical.

The exact enhancement and restoration activity will be fully defined in the draft MBI.

3. Establishment

There is potential to establish approximately 43 acres of herbaceous wetlands on-site. Herbaceous wetlands would be established to mimic existing herbaceous wetlands on the northern portion of the tract by removing approximately six (6) to twelve (12) inches of earth and diverting a drainage ditch that is currently carrying waters from the residential area along the east of the site directly into the existing oxbow wetland along the northern property boundary. The Sponsor is proposing to divert this drainage away from the oxbow wetland in the eastern portion of the property, into proposed grassland swales constructed within the middle portion of the subject property, which will flow through created wetlands, tie into existing ditches, and eventually outfall into the existing oxbow wetland at the current outfall location. Herbaceous wetlands would be planted with desirable herbaceous wetland species. Excavated material could be used to develop maintenance roads on-site for enhanced access across the site. Target FCIs for herbaceous wetland establishment will be 0.758 Physical, 0.833 Biological, and 0.720 Chemical.

III. OPERATION OF THE TWMB

A. WETLAND ASSESSMENT METHODOLOGY

BOA conducted a wetland delineation in March 2017 on the entire 321.47 acre tract of land according to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (v.2) in order to determine the exact acreage and location of aquatic resources on the tract. Based on the wetland assessment determination and delineation study of the site, it is estimated that 36.22 acres of wetlands, 1,423 linear feet (1.38 acres) of non-vegetated Waters of the U.S, and 8,318 linear feet (1.32 acres) of man-made upland ditches currently exist on the tract (***Appendix G***).

The existing wetlands were assessed for suitability for preservation and enhancement and restoration credit. A Hydrogeomorphic Model (HGM) Assessment was performed to determine the number of wetland credits to be released based on the removal of a non-regulated imminent threat for the preserved wetland areas, and the improvements of enhanced and restored wetlands. **Table 1** outlines Functional Capacity Units (FCUs) for all existing wetlands within the subject property.

Table 1: Functional Capacity Units (FCUs) for Existing Wetlands

Wet ID	Type	Credit	Acreage	Physical FCU	Biological FCU	Chemical FCU
Wet 1	Forested	Preserve	20.97	9.95	8.39	13.35
Wet 2	Herbaceous	Preserve	0.11	0.06	0.07	0.07
Wet 3	Herbaceous	Preserve	0.02	0.01	0.01	0.01
Wet 4	Herbaceous	Preserve	0.07	0.04	0.04	0.04
Wet 5	Herbaceous	Preserve	0.17	0.10	0.12	0.10
Wet 6	Herbaceous	Preserve	0.27	0.15	0.19	0.16
Wet 7	Forested	Preserve	0.72	0.34	0.38	0.49
Wet 8	Forested	Preserve	0.10	0.05	0.05	0.07
Wet 9	Forested	Preserve	0.31	0.22	0.20	0.23
Wet 10	Forested	Preserve	2.74	1.56	1.55	1.82
Wet 11	Forested	Enhance	0.03	0.01	0.01	0.02
Wet 12	Forested	Enhance	0.08	0.04	0.03	0.05
Wet 13	Forested	Enhance	0.79	0.25	0.20	0.45
Wet 14	Forested	Enhance	0.34	0.11	0.09	0.19
Wet 15	Forested	Enhance	0.12	0.04	0.03	0.07
Wet 16	Herbaceous	Preserve	0.70	0.48	0.49	0.43
Wet 17	Forested	Preserve	0.77	0.37	0.56	0.61
Wet 18	Forested	Enhance	1.03	0.33	0.26	0.58
Wet 19	Forested	Enhance	0.05	0.02	0.01	0.03
Wet 20	Forested	Enhance	0.07	0.02	0.02	0.04
Wet 21	Forested	Enhance	0.28	0.09	0.07	0.16
Wet 22	Forested	Enhance	0.11	0.03	0.03	0.06
Wet 23	Forested	Enhance	0.03	0.01	0.01	0.02
Wet 24	Forested	Enhance	0.13	0.08	0.05	0.08
Wet 25	Forested	Enhance	0.04	0.02	0.01	0.02
Wet 26	Forested	Enhance	4.24	2.12	1.06	2.47
Wet 27	Forested	Enhance	1.75	0.88	0.44	1.02
Wet 28	Forested	Enhance	0.16	0.05	0.04	0.09
TOTAL	**Herbaceous**	**Preserve**	**1.34**	**0.85**	**0.92**	**0.81**
		Enhance	**0.00**	**0.00**	**0.00**	**0.00**
		Total	**1.34**	**0.85**	**0.92**	**0.81**
	Forested	**Preserve**	**25.61**	**12.49**	**11.13**	**16.56**
		Enhance	**9.25**	**4.09**	**2.34**	**5.35**
		Total	**34.86**	**16.58**	**13.47**	**21.91**

B. CREDITING AND DEBITING PROCEDURES

As stated above, the Sponsor is not seeking preservation credits of existing wetlands.

Future wetland enhancement, restoration, and establishment credits would be released and available for purchase upon approval of the HGM assessments. Credits will be issued using a 1:1 ratio for mitigation compensation within the primary service area and 1.5:1 for mitigation compensation within the secondary service area. The Sponsor is not proposing to allow the release of advanced credits for purchase.

The amount of credits sold from the TWMB would be based on the HGM findings and best professional judgment of the Corps of Engineers Project Manager as to the quality of those waters. Once individual credits are sold, a credit ledger would be maintained by the Sponsor and forwarded to the Corps of Engineers, Galveston District on an annual basis with all pertinent information. This information would include the permit identification number, permittee name, amount of wetlands/streams approved for impact at the project site, number of credits purchased as compensation, date of purchase, and number of credits remaining available at TWMB.

C. MONITORING REQUIREMENTS

The enhanced, restored, and established wetland areas will be monitored in perpetuity to ensure the success of the areas and to determine when the appropriate functional assessment model needs to be run to produce a credit release. The exact monitoring parameters and performance standards will be included in the draft Mitigation Banking Instrument (dMBI).

D. LONG-TERM MAINENANCE/MANAGEMENT

A qualified third party land trust will be contacted to be the conservation easement holder. The entity and a draft conservation easement document will be provided to the IRT along with the dMBI.

E. PROTECTIVE REAL ESTATE MECHANISM

The TWMB would be maintained under a conservation easement held by a qualified third party land trust.

F. LAND USE PROVISIONS

The property may be used for educational and recreational purposes that do not impede the functional capacity of the wetlands within the TWMB property. The current use of this property is agricultural (livestock grazing). Livestock grazing will no longer be permitted on the TWMB property when the mitigation bank is constructed, due to potential degradation of the wetlands from grazing.

G. WATER RIGHTS

The Sponsor is not proposing to impede water rights of any surrounding property owners or public waterways. The hydrology of all wetlands on the TWMB property will be supported by natural rainfall and diversion of an existing ditch on the subject property. The ditch currently drains water from residential development along the eastern boundary of the property into an oxbow wetland along the northern boundary of the TWMB property. The proposed plans will not change the total outflow of water from the residential area or the total inflow of water into the oxbow wetland.

IV. CONCLUSION

It is the opinion of the Sponsor that the 321.47-acre TWMB property is a suitable tract for the development of a successful wetland mitigation bank. The TWMB property is located in an area that has a current and future market for mitigation credits. The TWMB property contains suitable habitat for wetland enhancement, restoration, and establishment. Based on the factors listed above, the Sponsor is respectfully submitting this prospectus to the IRT for review and comment with the intention of moving forward with the development of the TWMB.

V. LITERATURE CITED

Checklist of the Vascular Plants of Texas. Stephen L. Hatch, K.N. Gandhi, and Larry E. Brown, July 1990, Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas.

Grasses of Texas, The. Frank W. Gould, 1975. Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas.

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Web Soil Survey of Wharton County, Texas. http://websoilsurvey.nrcs.usda.gov/app/.

Trees, Shrubs, and Woody Vines of the Southwest. Robert A. Vines, 1960, The University of Texas Press, University of Texas, Austin, Texas.

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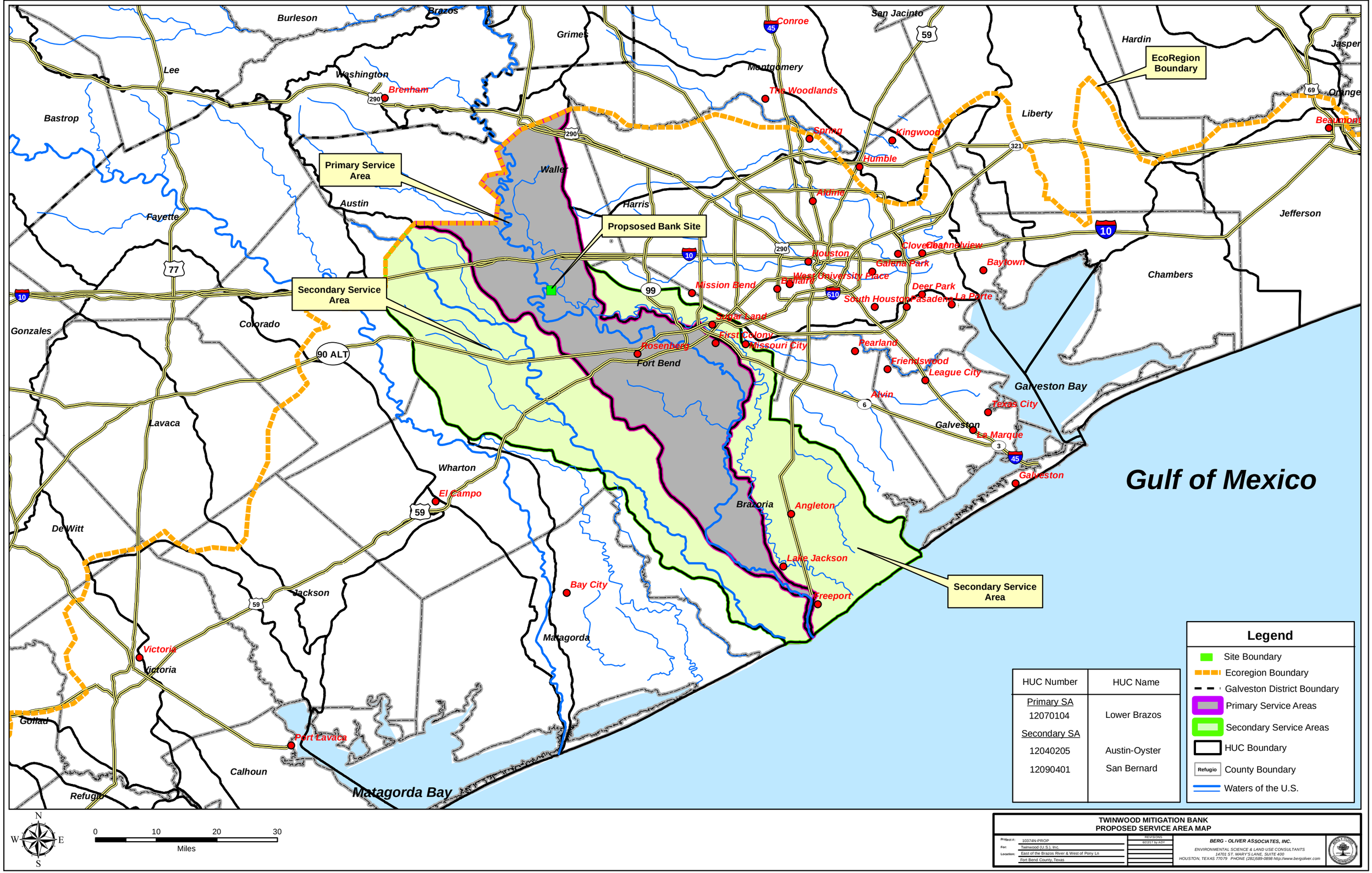
APPENDIX A

PROPOSED SERVICE AREA



HUC Number	HUC Name
Primary SA	
12070104	Lower Brazos
Secondary SA	
12040205	Austin-Oyster
12090401	San Bernard

Legend

- Site Boundary
- Ecoregion Boundary
- Galveston District Boundary
- Primary Service Areas
- Secondary Service Areas
- HUC Boundary
- Refugio — County Boundary
- Waters of the U.S.

TWINWOOD MITIGATION BANK
PROPOSED SERVICE AREA MAP

Project #: 10374N-PROP
For: Twinwood (U.S.), Inc.
Location: East of the Brazos River & West of Pony Ln
Fort Bend County, Texas

REVISIONS
6/23/17 by ADY

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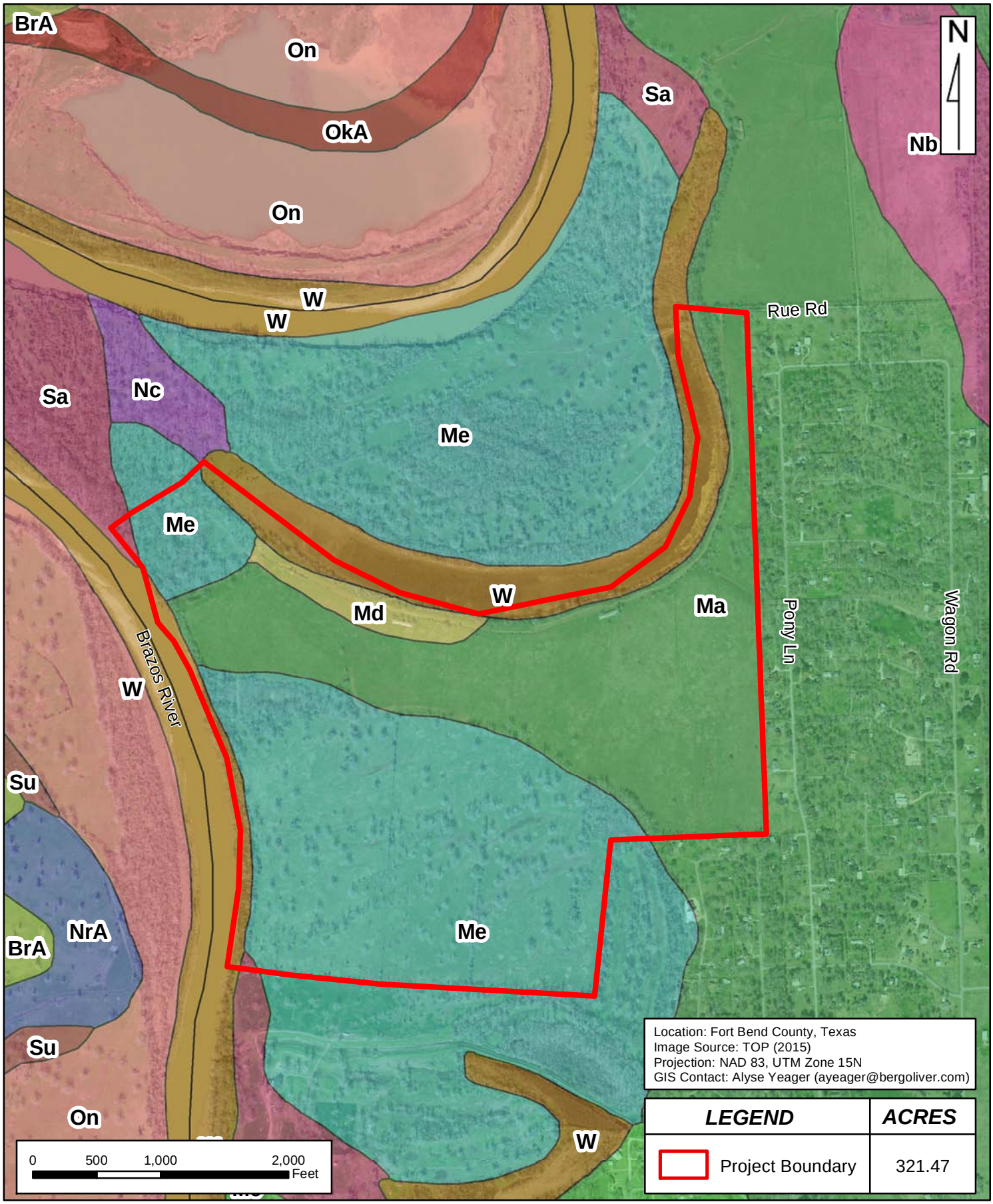
APPENDIX B

FORT BEND COUNTY SOIL SURVEY MAP



NRCS COUNTY SOILS ON 2015 TOP AERIAL

Project #: 10374N-WD
For: Twinwood (U.S.), Inc.
Location: Tract 1, west of Pony Ln & east of the Brazos River
Fort Bend County, Texas

REVISIONS
3/20/17 by ADY

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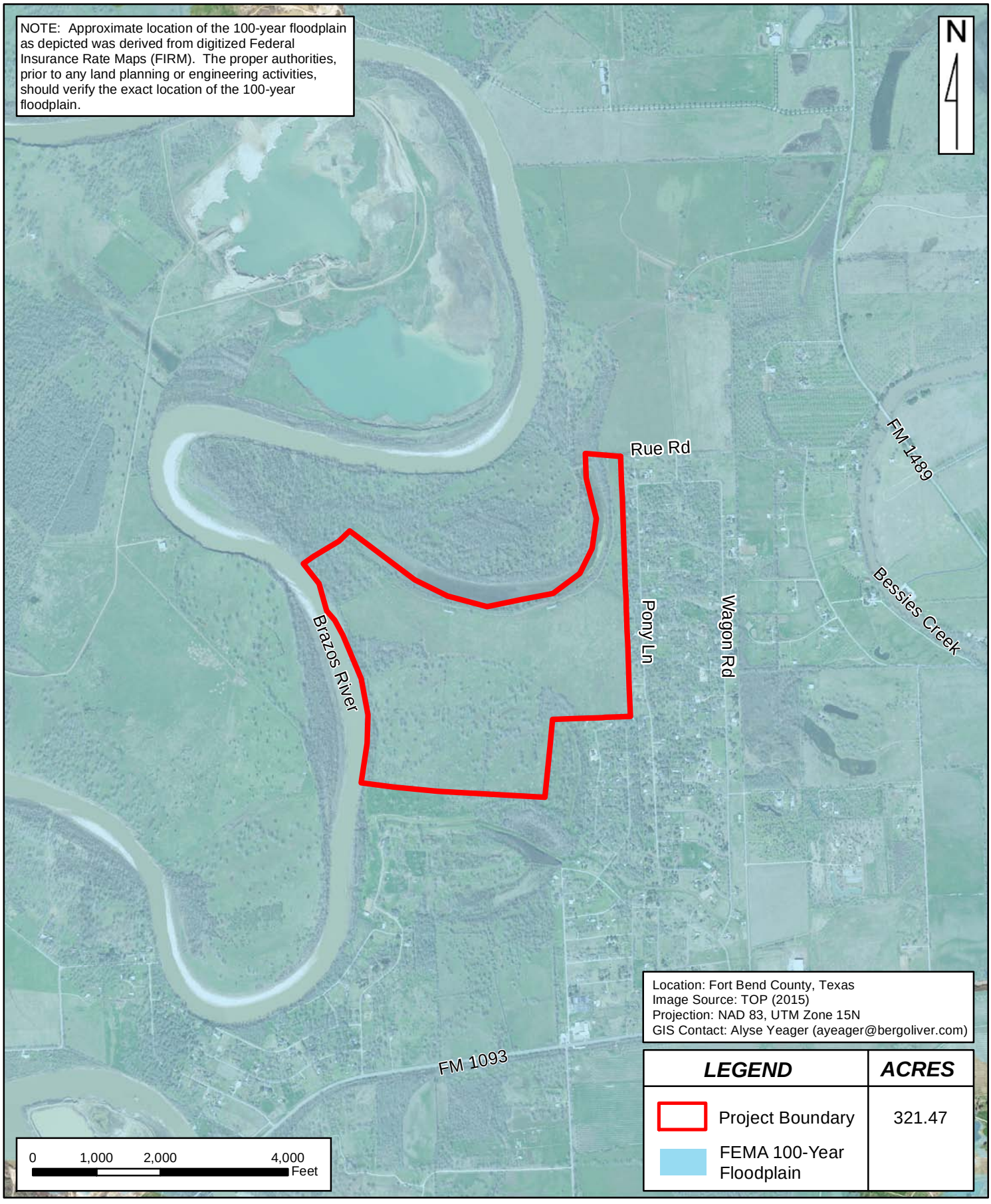
APPENDIX C

FEMA 100-YEAR FLOODPLAIN MAP



FEMA 100-YEAR FLOODPLAIN ON 2015 TOP AERIAL

Project #: 10374N-WD
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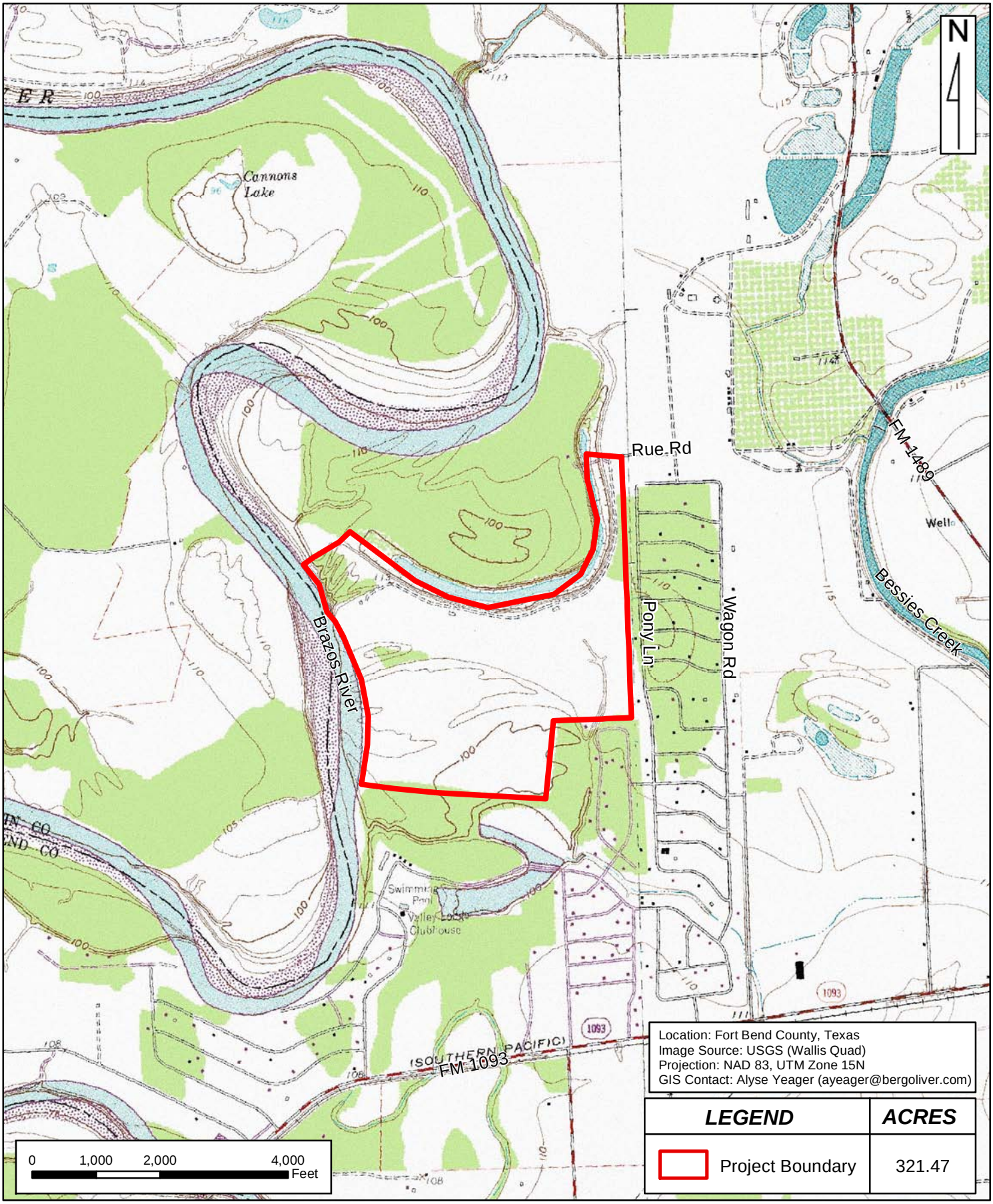
APPENDIX D

UNITED STATES GEOLOGIC SURVEY TOPOGRAPHIC MAP



USGS TOPOGRAPHIC MAP- Wallis Quad

Project #: 10374N-WD
For: Twinwood (U.S.), Inc.
Location: Tract 1, west of Pony Ln & east of the Brazos River
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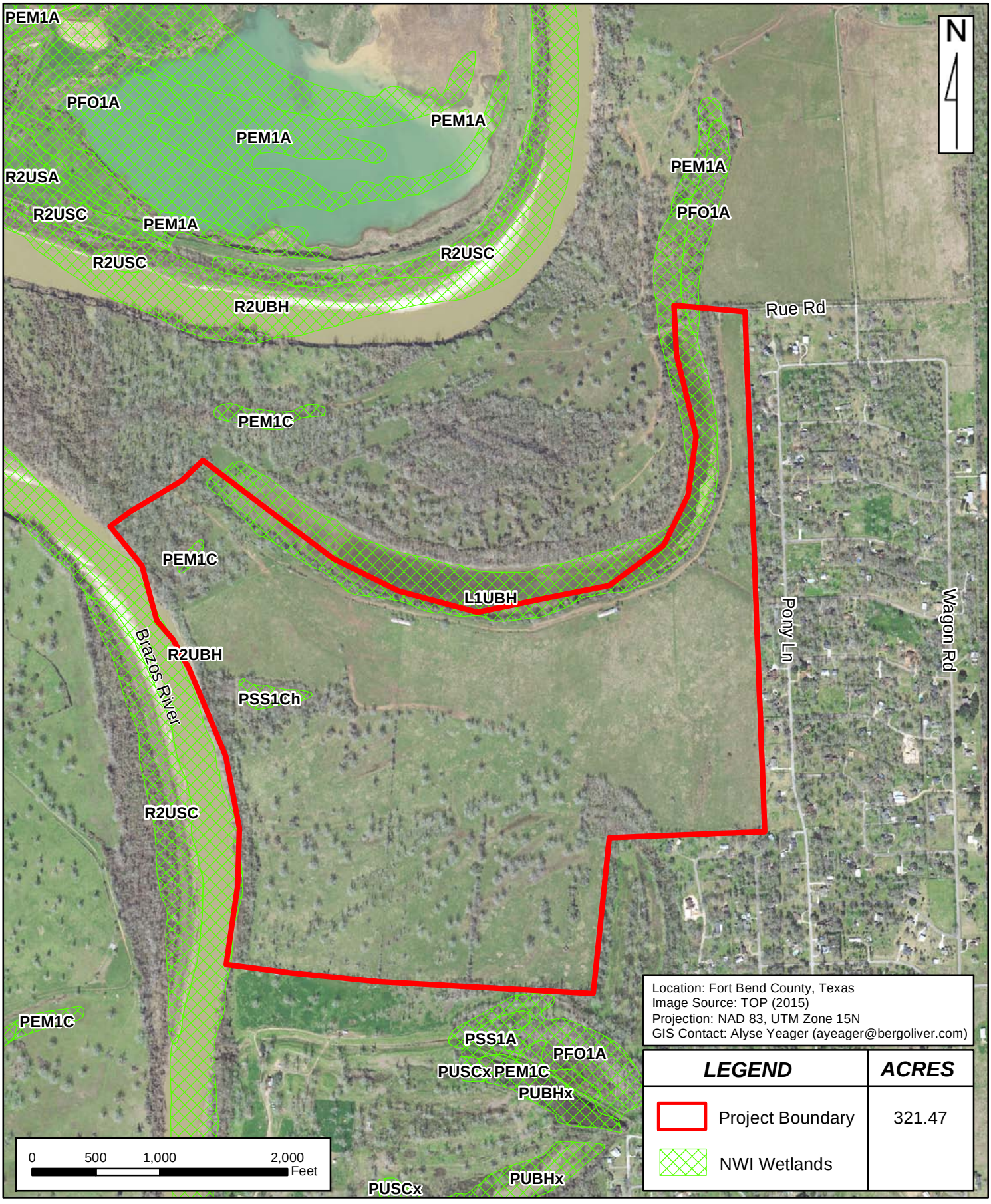
APPENDIX E

NATIONAL WETLAND INVENTORY MAP



NATIONAL WETLAND INVENTORY (NWI) WETLANDS ON 2015 TOP AERIAL

Project #: 10374N-WD
For: Twinwood (U.S.), Inc.
Location: Tract 1, west of Pony Ln & east of the Brazos River
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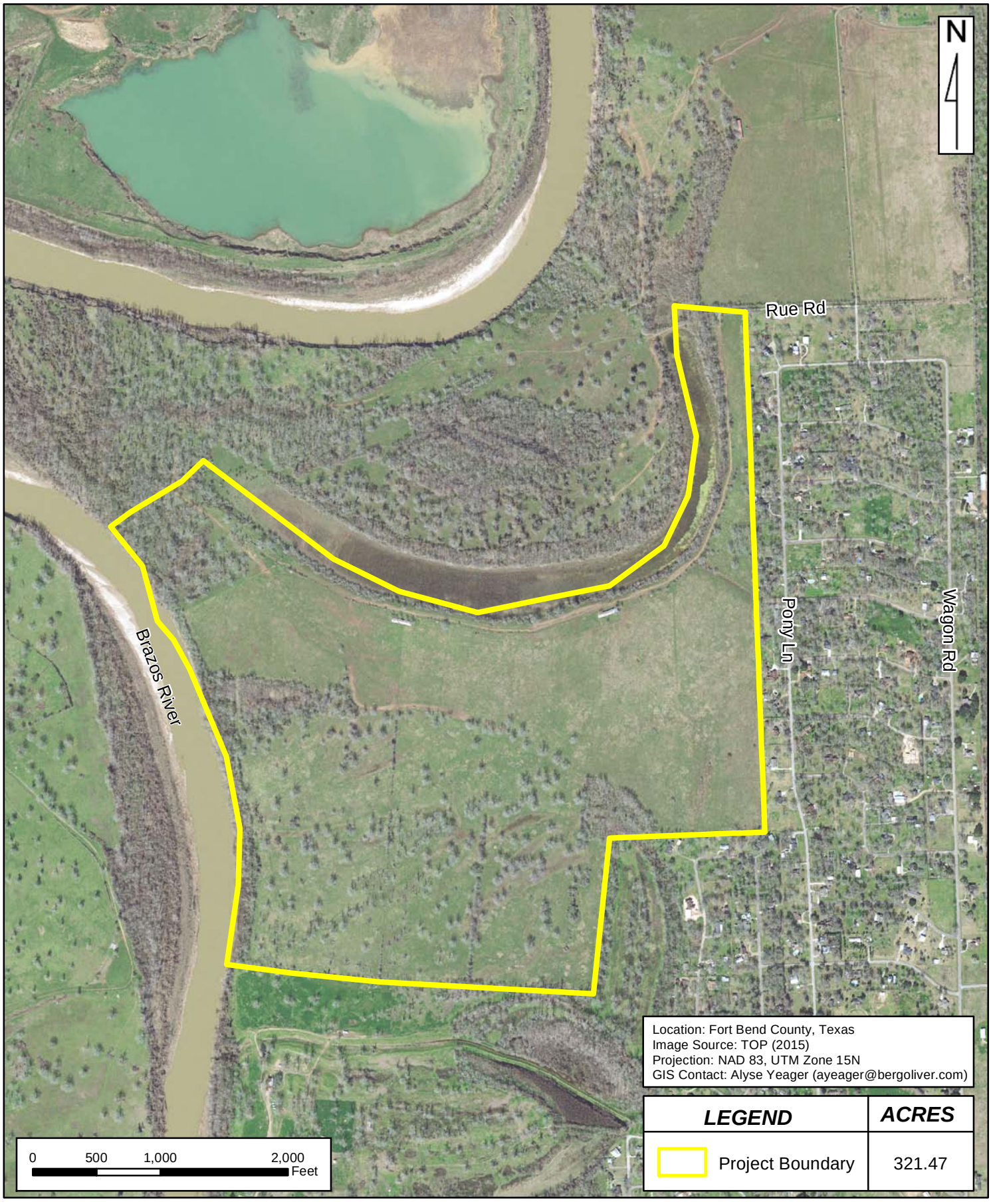
APPENDIX F

AERIAL PHOTOGRAPHY



Location: Fort Bend County, Texas
Image Source: TOP (2015)
Projection: NAD 83, UTM Zone 15N
GIS Contact: Alyse Yeager (ayeager@bergoliver.com)

LEGEND	ACRES
Project Boundary	321.47

2015 TOP AERIAL

Project #: 10374N-WD
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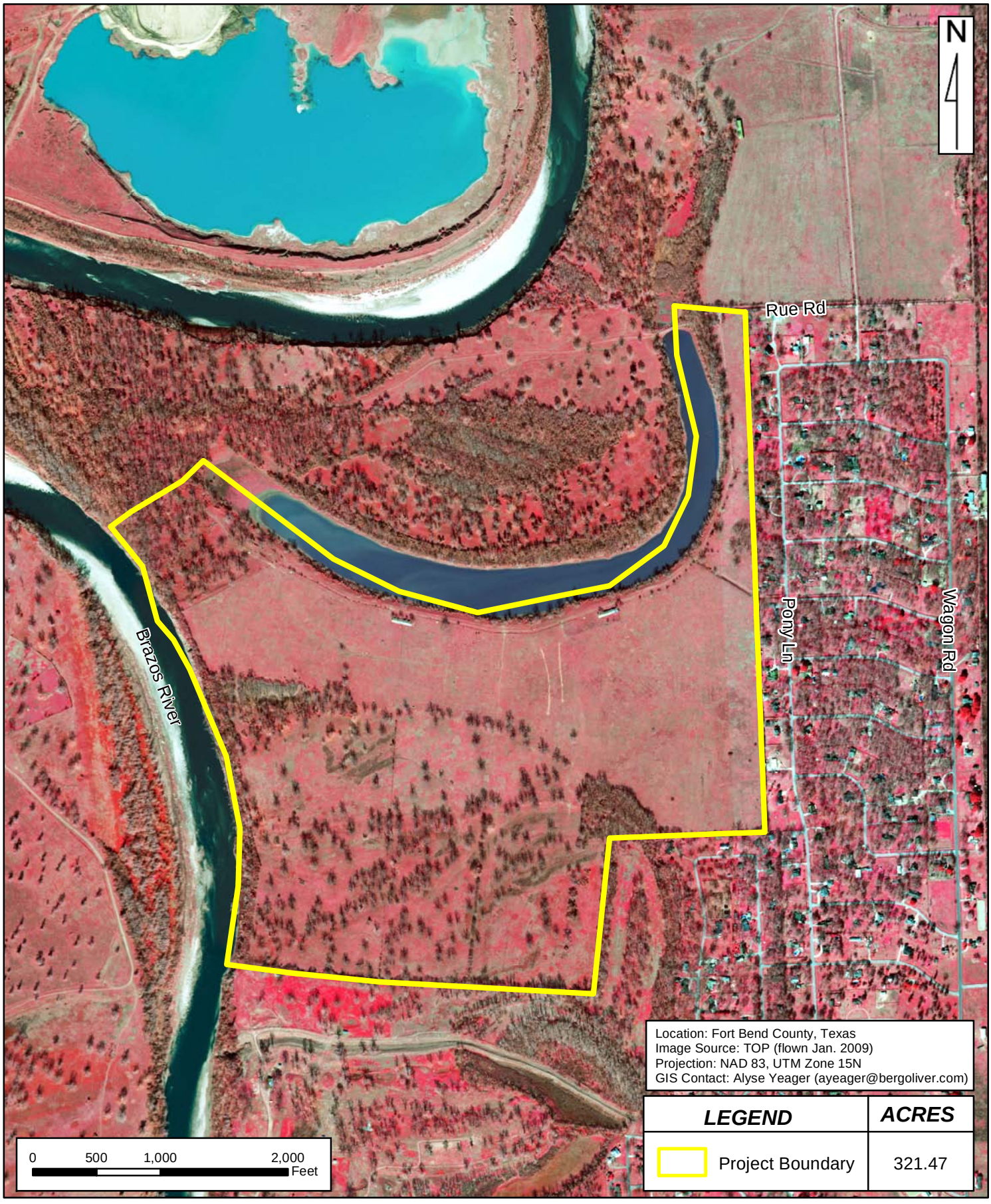

2009 TOP INFRARED AERIAL

Project #: 10374N-WD
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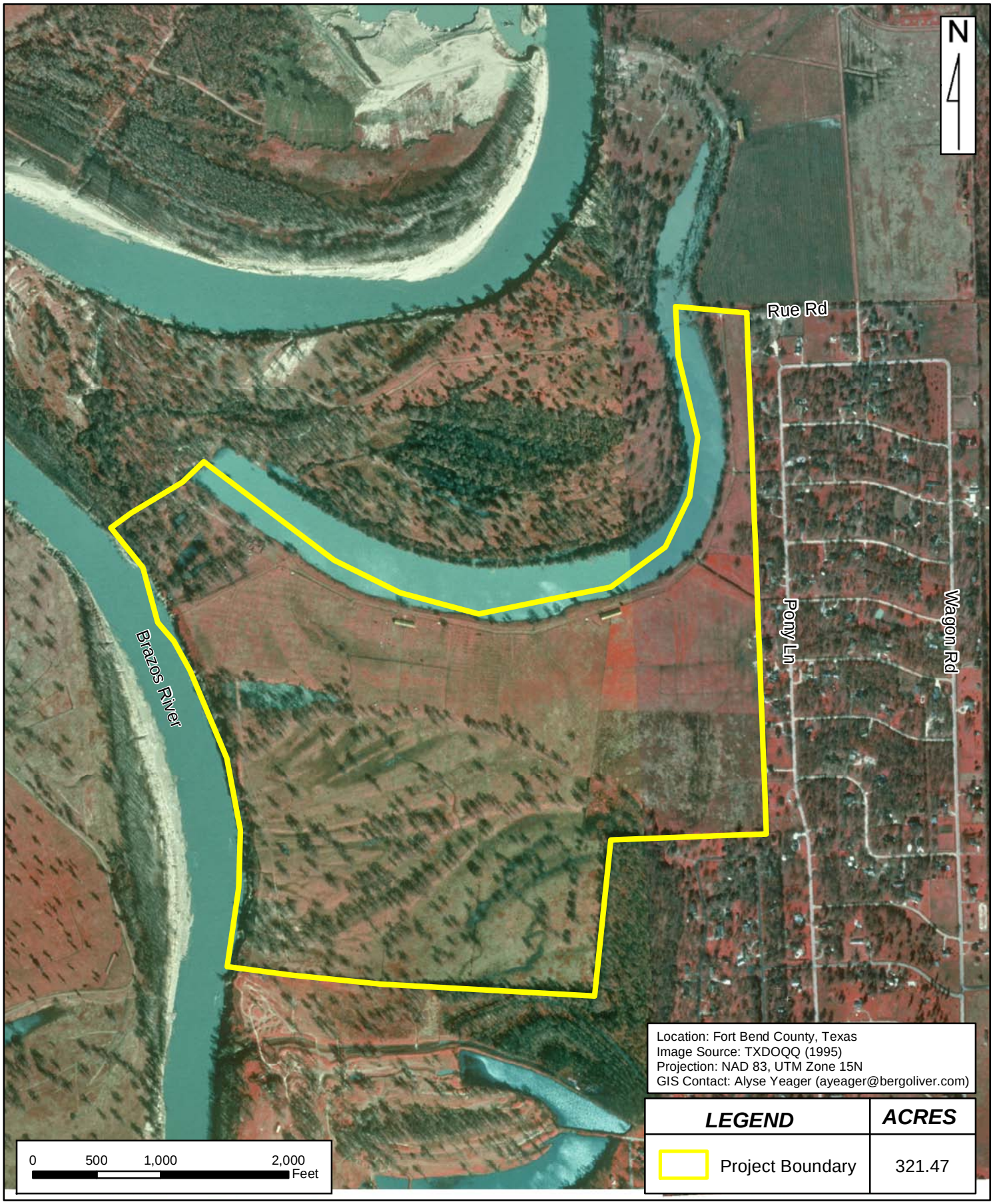

1995 TXDOQQ INFRARED AERIAL

Project #: 10374N-WD
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APPENDIX G

WETLAND DELINEATION SURVEY

NOTE: Potential wetland and jurisdictional water areas depicted have been classified as "isolated" or "adjacent" based upon Berg-Oliver Associates, Inc.'s assessment of the jurisdictional designation of these potential wetland and water areas. The actual designations should be verified by the Corps of Engineers - the final authority on jurisdictional status.

Wet ID	AC	Latitude	Longitude
Wet 1	20.97	29.69826	-96.00550
Wet 2	0.11	29.69557	-96.00058
Wet 3	0.02	29.69489	-96.00057
Wet 4	0.07	29.69529	-96.01069
Wet 5	0.17	29.69659	-96.01445
Wet 6	0.27	29.69701	-96.01436
Wet 7	0.72	29.69738	-96.01447
Wet 8	0.10	29.69811	-96.01468
Wet 9	0.31	29.69439	-96.01356
Wet 10	2.74	29.69429	-96.01231
Wet 11	0.03	29.69331	-96.01209
Wet 12	0.08	29.69331	-96.01166
Wet 13	0.79	29.69309	-96.01069
Wet 14	0.34	29.69272	-96.00990
Wet 15	0.12	29.69223	-96.00478
Wet 16	0.70	29.69223	-96.00185
Wet 17	0.77	29.69132	-96.00425
Wet 18	1.03	29.69123	-96.00677
Wet 19	0.05	29.69117	-96.00792
Wet 20	0.07	29.69097	-96.00819
Wet 21	0.28	29.69107	-96.01021
Wet 22	0.11	29.69103	-96.01166
Wet 23	0.03	29.69131	-96.01224
Wet 24	0.13	29.69104	-96.01233
Wet 25	0.04	29.68939	-96.01155
Wet 26	4.24	29.69013	-96.00655
Wet 27	1.75	29.68844	-96.00680
Wet 28	0.16	29.68862	-96.00545

0 300 600 1,200 Feet

Rue Rd

Pony Ln

Wagon Rd

Brazos River

Location: Fort Bend County, Texas
Image Source: TOP (2015)
Projection: NAD 83, UTM Zone 15N
GIS Contact: Alyse Yeager (ayeager@bergoliver.com)

Legend	Acres
Adjacent Wetlands (Jurisdictional)	36.22
Waters of the U.S. (Jurisdictional)	1.38 (~1,423 LF)
Man-Made Ditches (Potentially Non-Jurisdictional)	1.32 (~8,318 LF)
Sample Points	
Transects	
Project Boundary	321.47

WETLAND DETERMINATION AND CLASSIFICATION
SITE LOCATION MAP

BERG•OLIVER ASSOCIATES, INC.
ENVIRONMENTAL SCIENCE & LAND USE CONSULTANTS
14701 ST. MARY'S LANE, SUITE 400
HOUSTON, TEXAS 77079 PHONE (281)589-0898 http://www.bergoliver.com

REVISIONS
4/6/17 by ADY

Project #: 10374N-WD
For: Twinwood (U.S.), Inc.
Location: Tract 1, west of Pony Ln & east of the Brazos River
Fort Bend County, Texas

APPENDIX H

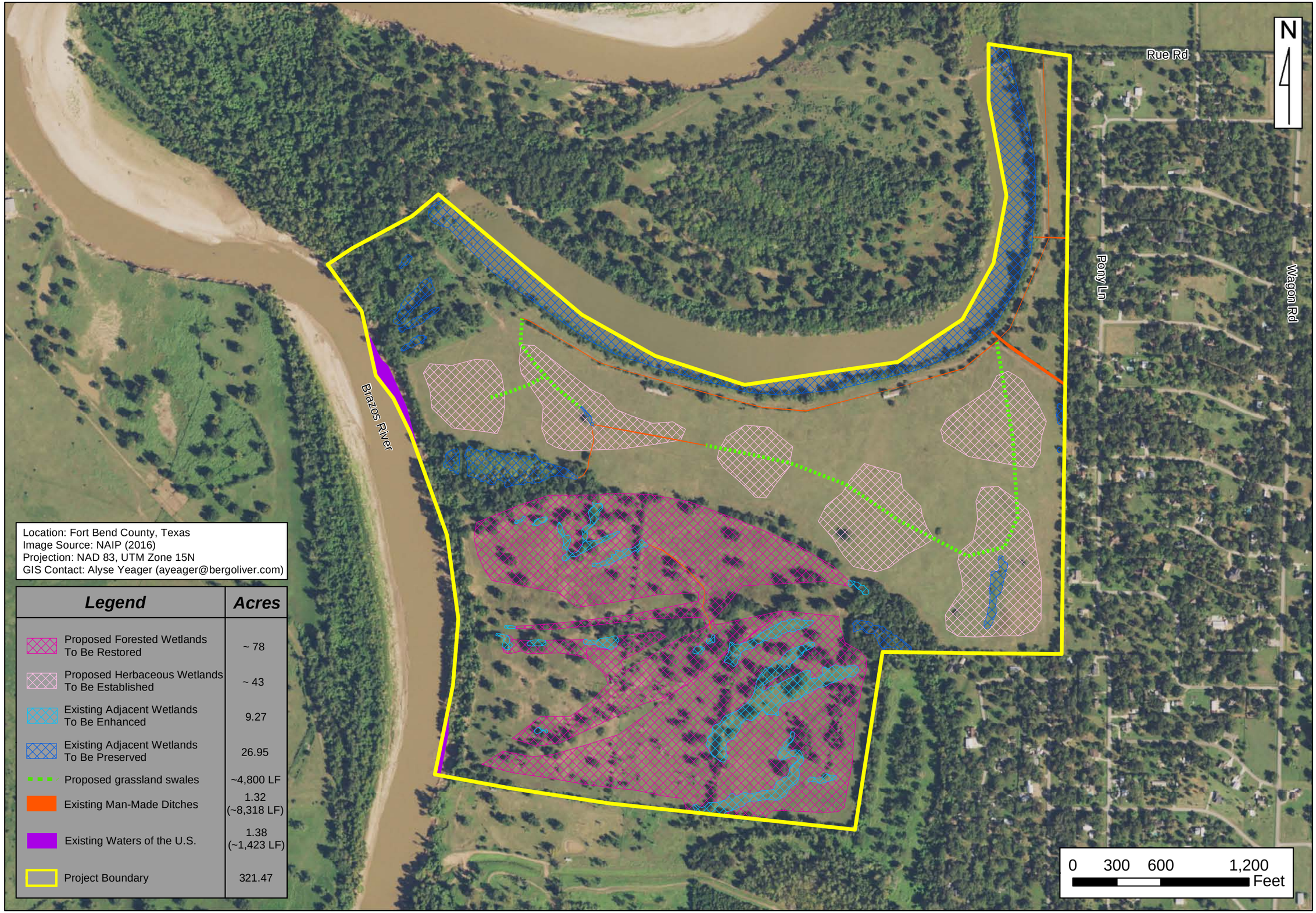
CONCEPTUAL DEVELOPMENT PLAN

CONCEPTUAL WETLAND MITIGATION BANK PLAN
SITE LOCATION MAP

BERG•OLIVER ASSOCIATES, INC.
ENVIRONMENTAL SCIENCE & LAND USE CONSULTANTS
14701 ST. MARY'S LANE, SUITE 400
HOUSTON, TEXAS 77079 PHONE (281)589-0898 http://www.bergoliver.com

REVISIONS
6/15/17 by ADY

Project #: 10374N-PROP
For: Twinwood (U.S.), Inc.
Location: Tract 1, west of Pony Ln & east of the Brazos River
Fort Bend County, Texas



Location: Fort Bend County, Texas
Image Source: NAIP (2016)
Projection: NAD 83, UTM Zone 15N
GIS Contact: Alyse Yeager (ayeager@bergoliver.com)

Legend	Acres
Proposed Forested Wetlands To Be Restored	~ 78
Proposed Herbaceous Wetlands To Be Established	~ 43
Existing Adjacent Wetlands To Be Enhanced	9.27
Existing Adjacent Wetlands To Be Preserved	26.95
Proposed grassland swales	~4,800 LF
Existing Man-Made Ditches	1.32 (~8,318 LF)
Existing Waters of the U.S.	1.38 (~1,423 LF)
Project Boundary	321.47