APPENDIX F-I.4

Roach Dry Lake

Huffman-Broadway Group, Inc.
Environmental Consultants

Investigation of the Presence of Wetlands and Other Waters of the United States DesertXpress Project HUC 8 Ivanpah - Pahrump Valleys Watershed Draining to Roach Dry Lake Clark County, Nevada

July 2010

Prepared for

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1.0 INTRODUCTION

1.1 Project Purpose and Scope of Work

DesertXpress Enterprises, LLC (DXE) is proposing to construct and operate a dedicated two-tracked high speed passenger railway and associated operations and maintenance facilities between Victorville, California, and Las Vegas, Nevada (DesertXpress Project; Exhibit A, Figure 1). A Draft Environmental Impact Statement was issued for the project in March of 2009 and the Final EIS is nearing completion. A Supplemental Draft EIS has been prepared and will be issued shortly to address certain modifications to the proposed alignment and station locations made by the Applicant, DXE, in response to various comments made on the Draft. The U.S. Department of Transportation, Federal Railroad Administration (FRA) is the lead agency responsible for preparing the project Environmental Impact Statement (EIS).

In preparation for the permit phase of the project, DXE has retained Huffman-Broadway Group, Inc. (HBG) to investigate the presence of wetlands and other waters potentially subject to Corps and EPA regulation under Section 404 of the Clean Water Act (CWA) along the DesertXpress Project's preferred and alternative alignments and study areas for the stations and ancillary facilities.

For the purpose of the jurisdictional delineation study, the proposed DesertXpress Project has been divided into six areas using the USGS HUC 8 [1] level of watershed classification. The scope of this report is to evaluate the presence or absence of wetlands and waters potentially subject to Corps CWA jurisdiction within the proposed DesertXpress Project alignments and facilities located within the HUC 8 Ivanpah - Pahrump Valleys watershed draining to Roach Lake (Exhibit A, Figure 2 and Exhibit D). Roach Lake is an ephemeral dry lake with no outlet located within Clark County, Nevada.

This study was conducted in accordance with *Code of Federal Regulations* (CFR) definitions of jurisdictional waters, the Corps' 1987 *Wetlands Delineation Manual*, the Corps' 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0),* and supporting guidance documents. The remaining portions of Section 1.0 provide project contact information, describe the location of the Study Area and provide technical details regarding the general environmental conditions found within the Study Area, including relevant technical information from the Draft EIS regarding water resource data and biological and cultural resource information. Section 2.0 provides regulatory background information and details regarding the technical criteria and types of field indicators evaluated for during the study. Section 3.0 provides a detailed description of the methods used during this

[1] HUC = U.S. Geological Survey (USGS) Hydrologic Unit Code. The Hydrologic Unit system is a standardized watershed classification system developed by USGS in the mid 1970s. Hydrologic units are watershed boundaries organized in a nested hierarchy by size. They range in size from national regions, to the smaller cataloging units (HUCs), which are roughly equivalent to local watershed.

investigation. Section 4.0 provides a description of technical findings and Section 5.0 describes the types of areas found that potentially may be subject to Corps CWA jurisdiction. Section 6.0 is a Clean Water Act jurisdictional analysis using the Rapanos Guidance.

HBG is seeking, on behalf of DXE, a Verified Jurisdictional Determination pursuant to applicable Corps guidance documents.

1.2 Contact Information

Project Owner Contact	*Applicant's Agent & Wetland Regulatory Scientist*
DesertXpress Enterprises, LLC 6750 Via Austi Parkway Suite 250 Las Vegas, NV 89119 ***Contact***: Tom Stone (702) 491-8940 tstone@transmaxgroup.com	**Huffman-Broadway Group, Inc** 828 Mission Avenue San Rafael, California 94901 ***Contact***: Terry Huffman, Ph.D. (415) 925-2000 thuffman@h-bgroup.com

1.3 Study Area

The Study Area for this investigation is defined as the area where potential ground disturbing components of the proposed project would occur based on the alternatives identified and analyzed in conjunction with the EIS and Supplemental EIS prepared for the DesertXpress Project. The Study Area is that portion of the alignment that extends for approximately 12 miles north-northeast of Primm, Nevada, through the Ivanpah Valley (Exhibit A, Figure 3). .

1.4 Environmental Setting

The Study Area encompasses those portions of the proposed DesertXpress Project alignment and facilities that are located within the central portion of the Ivanpah-Pahrump Valleys watershed (HUC-8 watershed 16060015) and portions of the following HUC-12 watersheds:

HUC-12 Watershed	Total acreage	Linear distance of DesertXpress alignment alternative within watershed	Comments
Ivanpah Lake (north portion)	23,514 acres	--	Watershed is shaped like an hourglass with Roach (dry) Lake in the north half and Ivanpah Lake in the south half. All of alignment alternative within this watershed is in south half. Portion of Study Area in this watershed drains to Roach (dry) Lake.
Porter Wash-Frontal Ivanpah Lake	35,223 acres	5.7 miles	Watershed drains to Roach (dry) Lake.
Town of Jean-Frontal Ivanpah Lake	32,490 acres	5.66 miles	Watershed drains to Roach (dry) Lake.
Lookout Peak	9,556 acres	0.53 mile	Alignment alternative crosses only the southeastern finger of this watershed. Watershed drains to Roach (dry) Lake.
Town of Goodsprings	32,888 acres	0.27 mile	Alignment alternative crosses only the southeastern finger of this watershed. Watershed drains to Roach (dry) Lake.

Seasonal runoff from these watersheds flows to Roach Lake, a playa lake on the east side of I-15 north of Primm. The alignment alternative through this area (Exhibit A, Figure 2) passes along the east side of the I-15 freeway.

1.4.1 Topography

Segment 5 Alternative 3B extends from Primm, Nevada, northward through the Ivanpah Valley. The area is relatively flat, with elevations along the alignment alternative within this Study Area ranging from approximately 2,650 feet msl at Primm to approximately 3,060 feet msl at the north end of Ivanpah Valley, north of Jean, Nevada, at the divide between the HUC-12 watershed Town of Jean-Frontal Ivanpah Lake and HUC-12 watershed 160600151401-Frontal Jean Lake. The roughly 12-mile-long alignment alternative passes through alluvial fan materials in the Ivanpah Valley east of and below the Spring Mountains.

1.4.2 Land Use

The current land use for the alignment alternative is as I-15 right of way.

1.4.3 Geology and Soils

In the Ivanpah Valley between the Primm and the north end of this section near the Jean Hills, soils are underlain by younger alluvial deposits. These deposits include younger Holocene wash sediments, alluvial fan deposits (Qa, Qal, Qay, Qay_2, Qay_3) and older early-Holocene to late-Pleistocene alluvial fan deposits (Qay_1). Playa fringe deposits (Qpf) are along the west side of Roach Lake. Some areas of fill soil and other disturbed areas (Qx) are found here, primarily at highway onramp/off-ramp areas. An outcrop of Paleozoic-age dolomite (DЄg, MzPzs) is to the west of I-15 between Primm and Jean. These geologic units and associated soils are described in the table below:

Geologic Unit (Symbol[s])	Geologic Age	Description - Soils
Disturbed and modified areas (Qx)	Holocene	Areas of anthropogenic disturbance, artificial fill, commercial development areas, I-15 corridor.
Undivided young alluvial deposits (Qa, Qal, Qay)	Holocene	Undivided alluvial fan and wash deposits of gravel, sand, and minor silt.
Playa fringe deposits (Qpf)	Holocene	Deposits of silt, sand, and gravel along the perimeter of playa surfaces.
Youngest active alluvium (Qay_3)	Late-Holocene	Active wash and alluvial fan deposits of gravel, sand, and minor silt.
Young active alluvium (Qay_2)	Holocene	Alluvial fan and wash deposits of gravel, sand, and minor silt of intermittently active alluvial surfaces.
Oldest young alluvium (Qay_1)	Early-Holocene	Alluvial fan and wash deposits of gravel, sand, and minor silt of inactive alluvial surfaces.
Marine sedimentary and meta-sedimentary rocks (Dєg, Mzpzs)	Paleozoic – Cambrian and Devonian	Dolomite and limestone with interbedded shale, sandstone, and conglomerate; Goodsprings dolomite and carbonate rocks of Hewett, 1956.

Seismicity

This section crosses the concealed and potentially active Stateline fault, mapped in California parallel to the state line.

Faults in the Nevada portion of the alignment alternative are indicated as active or potentially active on some geologic maps, although activity on these faults is attributed to land subsidence, not tectonic activity. There is some controversy among Nevada geologists as to the origin of these faults, which are sometimes referred to as "compaction faults." Differing proposed origins for these faults include the following:

- Differential consolidation or compaction over time of the thick alluvial and lakebed sediments in the Las Vegas Valley.
- Tectonic factors associated with faults that may extend into the basement bedrock beneath the valley's sediment.
- A combination of differential consolidation and tectonic factors.

1.4.4 Biological Resources

In the Ivanpah Valley, the alignment alternative crosses creosote bush scrub habitat. In the Mojave, creosote bush (*Larrea tridentata*) is the dominant plant species on the desert floor and lower alluvial fans. Shrubs appear evenly spaced, with bare ground visible between them.

Land adjacent to the west side of I-15 between Primm and Jean is a Desert Tortoise Relocation Center where tortoises from the Desert Tortoise Conservation Center were released. In an environmental assessment for Nevada Power Company's Goodsprings Energy Recovery Station, BLM reported:

> In 1996, Clark County prepared an EA for the translocation and research of desert tortoise on BLM lands near Jean (RECON, 1996). The area included approximately 26,200 acres bordered on the east by I-15, the north by Highway 161, the west by the Spring Mountains, and the south by a proposed fence a few miles north of Nevada/California state line. The EA covered the translocation of up to 1,200 desert tortoise to the site along with research to evaluate the effectiveness of the translocation effort. A second EA was prepared in 2003 (Aztec Environmental Consulting, 2003) which allowed additional desert tortoise to be released in the LSTS over a 36-month period (March 2003 to March 2007). A presence/absence survey for tortoises was completed on May 11, 2009. . . . Multiple active and inactive burrows were found within the project area as well as scat, a carcass and three live tortoises during the survey. (BLM 2009)

1.4.5 Climate

The Mojave Desert has an arid to semi-arid climate; the area is in the rain shadow of 5,000 to 11,000-foot high mountains west of the area. About 2/3 of average annual precipitation occurs between November and March, when winter storms move east from the Pacific Ocean. Precipitation amounts are higher in the mountains, ranging from about 4 inches annually in lower areas, with precipitation over 12 inches annually in the highest elevations. In the higher mountains, winter precipitation may occur as snow. Precipitation in the summer comes as short, intense, and localized thunderstorms; much of this rain is lost to evapotranspiration, particularly if the storm is a small one. The farther east in the Mojave, summer storms are more frequent, as they arrive from Arizona to the south. (NPS 1999). Average annual precipitation ranges from about 4 to 10 inches.

1.4.6 Hydrology

Roach Lake collects seasonal runoff from the McCullough Range to the east and the Spring Mountains to the west. The HUC-12 watersheds listed above drain to Roach Lake. The lake is approximately 5 miles long (north-south) on the east side of I-15. Many small unnamed drainages in this section drain from the Spring Mountains to the west. The primary named drainage in the Study Area is Porter Wash.

The State of Nevada delineates groundwater basins but does not collect or publish detailed groundwater basin information. This section is in the northern Ivanpah Valley Groundwater Basin (Nevada Basin Number 164A). The Roach Dry Lake 100-year floodplain is located just north of Primm.

1.5 Disclaimer

Huffman-Broadway Group, Inc. have conducted a thorough historic review and site investigation and made a good-faith effort herein to thoroughly describe and document the presence of potential factors that the Corps may consider in determining jurisdiction under their CWA jurisdiction as part of the Corps jurisdictional verification / determination process, however, DXE reserves the right to challenge or seek revision to any areas over which the Corps may assert jurisdiction.

2.0 REGULATORY FRAMEWORK

2.1 Definition of Wetlands and Other Waters of the U.S.

Section 404 of the Federal Clean Water Act authorizes the Corps to regulate activities that discharge dredged or fill material to wetlands and other waters of the United States. As described by EPA's and the Corps' regulations (40 CFR § 230.3(s) and 33 CFR § 328.3(a), respectively), the term "waters of the United States" encompasses the following resources:

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

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purpose by industries in interstate commerce

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.

EPA and the Corps define wetlands as:

> …those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (EPA regulations at 40 CFR § 230.3(t); Corps regulations at 33 CFR § 328.3(b)).

2.2 Limits of Jurisdiction

The following provides the regulatory definitions and criteria followed in determining the geographic extent of potential EPA/Corps jurisdiction as applicable to inland waters.

The geographic limits of relevant federal jurisdiction for non-tidal waters of the U.S. are defined as follows at 33 CFR § 328.4(c):

> *Non-Tidal Waters of the United States*: The limits of jurisdiction in non-tidal waters:
>
> (1) In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark.
>
> (2) When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
>
> (3) When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

The terms "adjacent" and "ordinary high water mark," used in the above definition, are defined at 33 CFR § 328.3 as follows:

> The term *adjacent* means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands." (33 CFR § 328.3(c))
>
> The term *ordinary high water mark* means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. (33 CFR § 328.3(e))

A site must meet certain water, soil, and vegetation criteria to qualify as a jurisdictional wetland. The Corps' 1987 *Wetlands Delineation Manual* and various regional supplements describe these criteria and the methods used to determine whether they are met and the geographic extent of wetland areas identified in the field.

2.3 Identification of Ordinary High Water Marks (OHWM)

The Corps definition of Ordinary High Water Mark (OHWM) provides the criterion by which the OHWM line can be identified which consists of "*that line on the shore established by fluctuations of water and indirect physical characteristics*" (33 CFR § 328.3(e)). The Corps has developed a delineation manual for the identification of OHWMs within the Arid West Region, entitled *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual* (Lichvar and McColley 2008). Tables 1a and 1b, below provide a summarized listing from the manual of indicators associated with areas that become flood or ponded, but are not dominated by wetland vegetation and the duration of

flooding, ponding and/or near surface soil saturation (≤12 inches) is not sufficient to cause hydric soils to form or wetland hydrology conditions to occur.

Table 1a. Potential Geomorphic Indicators of Ordinary High Water Marks for the Arid West *

Potential Geomorphic OHWM Indicators		
(A) Below OHW	**(B) At OHW**	**(C) Above OHW**
1. In-stream dunes 2. Crested ripples 3. Flaser bedding 4. Harrow marks 5. Gravel sheets to rippled sands 6. Meander bars 7. Sand tongues 8. Muddy point bars 9. Long gravel bars 10. Cobble bars behind obstructions 11. Scour holes downstream of obstructions 12. Obstacle marks 13. Stepped-bed morphology in gravel 14. Narrow berms and levees 15. Streaming lineations 16. Dessication / mud cracks 17. Armored mud balls 18. Knick Points	1. Valley flat 2. Active floodplain 3. Benches: low, mid, most prominent 4. Highest surface of channel bars 5. Top of point bars 6. Break in bank slope 7. Upper limit of sand-sized particles 8. Change in particle size distribution 9. Staining of rocks 10. Exposed root hairs below intact soil layer 11. Silt deposits 12. Litter (organic debris, small twigs and leaves) 13. Drift (organic debris, larger than twigs)	1. Desert pavement 2. Rock varnish 3. Clast weathering 4. Salt splitting 5. Carbonate etching 6. Depositional topography 7. Caliche rubble 8. Soil development 9. Surface color/tone 10. Drainage development 11. Surface relief 12. Surface rounding

* Adapted from *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual* (Lichvar and McColley 2008).

Table 1b. Potential Vegetation Indicators of Ordinary High Water Marks for the Arid West *			
Potential Vegetation OHWM Indicators			
	(D) Below OHW	**(E) At OHW**	**(F) Above OHW**
Hydroriparian indicators	1. Herbaceous marsh species 2. Pioneer tree seedlings 3. Sparse, low vegetation 4. Annual herbs, hydromesic ruderals 5. Perennial herbs, hydromesic clonals	1. Annual herbs, hydromesic ruderals 2. Perennial herbs, hydromesic clonals 3. Pioneer tree seedlings 4. Pioneer tree saplings	1. Annual herbs, xeric ruderals 2. Perennial herbs, non-clonal 3. Perennial herbs, clonal and non-clonal co-dominant 4. Mature pioneer trees, no young trees 5. Mature pioneer trees w/upland species 6. Late-successional species
Mesoriparian indicators	6. Pioneer tree seedlings 7. Sparse, low vegetation 8. Pioneer tree saplings 9. Xeroriparian species	5. Sparse, low vegetation Annual herbs, hydromesic 6. ruderals 7. Perennial herbs, hydromesic clonals 8. Pioneer tree seedlings 9. Pioneer tree saplings 10. Xeroriparian species 11. Annual herbs, xeric ruderals	7. Xeroriparian species 8. Annual herbs, xeric ruderals 9. Perennial herbs, non-clonal 10. Perennial herbs, clonal and non-clonal codominent 11. Mature pioneer trees, no young trees 12. Mature pioneer trees, xeric understory 13. Mature pioneer trees w/upland species 14. Late-successional species 15. Upland species
Xeroriparian indicators	10. Sparse, low vegetation 11. Xeroriparian species 12. Annual herbs, xeric ruderals	12. Sparse, low vegetation 13. Xeroriparian species 14. Annual herbs, xeric ruderals	16. Annual herbs, xeric ruderals 17. Mature pioneer trees w/upland species 18. Upland species

* Adapted from *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual* (Lichvar and McColley 2008).

2.4 Wetlands Delineation Criteria

The Corps' 1987 *Wetlands Delineation Manual* identifies the key diagnostic criteria for determining the presence of wetlands. These include:

1. Wetland Hydrology: Inundation or saturation to the surface during the growing season.
2. Hydric Soils: Soils classified as hydric or that possess characteristics associated with reducing soil conditions.
3. Predominance of Wetland Vegetation: Vegetation classified as facultative, facultative wet, or obligate according to its tolerance of saturated (i.e., anaerobic) soil conditions.

Specific criteria used to determine the presence or absence of wetland hydrology, soil, and vegetation conditions are described in the sections below.

2.4.1 Wetland Hydrology

The 1987 Corps *Manual* states that wetland hydrology conditions occur when a "site is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation." Whether a site meets either of these criteria is determined by the presence of diagnostic indicators of wetland hydrology, which include those listed in Table 2.

Table 2. Wetland Hydrology Indicators
(Based on 1987 Corps Manual and Corps Guidance Documents)

Primary Indicators	Secondary Indicators
Watermarks	Oxidized Rhizospheres Associated with Living Roots
Drift Lines	Water-Stained Leaves
Water-Borne Sediment Deposits	FAC-Neutral Test
Drainage Patterns Within Wetlands	Local Soil Survey Data

A March 8, 1992 Corps memorandum entitled *Clarification and Interpretation of the 1987 Manual* provides further clarification:

> Areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days for more than 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas wet between 5 percent and 12.5 percent of the growing season in most years may or may not be wetlands. Sites saturated to the surface for less than 5 percent of the growing season are non-wetlands.

Wetland hydrology indicators have also been further defined and described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). These indicators are similar to the indicators listed above from the 1987 Corps *Manual* and are presented in Table 3.

Table 3. Wetland Hydrology Indicators for the Arid West (Based on Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0)		
	Primary Indicators (*any one indicator is sufficient to make a determination that wetland hydrology is present*)	**Secondary Indicators** (*two or more indicators are required to make a determination that wetland hydrology is present*)
Group A – Observation of Surface Water or Saturated Soils		
A1* – Surface Water	**X**	
A2 – High Water Table	**X**	
A3 – Saturation	**X**	
Group B – Evidence of Recent Inundation		
B1 – Water Marks	**X** (Nonriverine)	**X** (Riverine)
B2 – Sediment Deposits	**X** (Nonriverine)	**X** (Riverine)
B3 – Drift Deposits	**X** (Nonriverine)	**X** (Riverine)
B6 – Surface Soil Cracks	**X**	
B7 – Inundation Visible on Aerial Imagery	**X**	
B9 –Water-Stained Leaves	**X**	
B10 – Drainage		**X**
B11 – Salt Crust	**X**	
B12 – Biotic Crust	**X**	
B13 – Aquatic Invertebrates	**X**	
Group C – Evidence of Current or Recent Soil Saturation		
C1 – Hydrogen Sulfide Odor	**X**	
C2 – Dry-Season Water Table		**X**
C3 – Oxidized Rhizospheres along Living Roots	**X**	
C4 – Presence of Reduced Iron	**X**	
C6 – Recent Iron Reduction in Tilled Soils	**X**	
C7 – Thin Muck Surface	**X**	
C8 – Crayfish Burrows		**X**

Table 3. Wetland Hydrology Indicators for the Arid West (Based on Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0)		
	Primary Indicators (*any one indicator is sufficient to make a determination that wetland hydrology is present*)	**Secondary Indicators** (*two or more indicators are required to make a determination that wetland hydrology is present*)
C9 – Saturation Visible on Aerial Imagery		**X**
Group D – Evidence from Other Site Conditions or Data		
D3 – Shallow Aquitard		**X**
D5 – FAC-Neutral Test		**X**
***** Denotes number of wetland hydrology indicator described in detail in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).*		

2.4.2 Hydric Soils

The 1987 Corps *Manual* states that the diagnostic environmental characteristics indicative of wetland soil conditions are met when "soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions." According to the Manual, indicators of soils developed under reducing conditions may include:

1. Organic soils (Histosols);
2. Histic epipedons;
3. Sulfidic material;
4. Aquic or peraquic moisture regime;
5. Reducing soil conditions;
6. Soil colors (chroma of 2 or less);
7. Soil appearing on hydric soils list; and
8. Iron and manganese concretions.

A February 20, 1992, Corps memorandum entitled *Regional Interpretation of the 1987 Manual* states that the most recent version of National Technical Committee for Hydric Soils (NTCHS) hydric soil criteria will be used (to make hydric soil determinations). These soil criteria specify at least 15 consecutive days of saturation or 7 days of inundation (flooding or ponding) during the growing season in most years.

The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics. As indicated above, like the NRCS, the Corps has typically accepted guidance for the identification of hydric soils developed by the National Technical Committee for Hydric Soils (NTCHS). The

NTCHS, a working group organized by NRCS, has developed criteria for identifying and mapping hydric soils throughout the United States and defines a hydric soil as "a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part [of the soil profile]" (http://soils.usda.gov/use/hydric/intro.html). The most recent (2000) version of the NTCHS hydric soils criteria identifies those soils that are likely to meet this definition. These criteria, which are accepted by most state and federal agencies, are as follows (http://soils.usda.gov/use/hydric/criteria.html):

1. All Histels except Folistels and Histosols except Folists, or
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Andic, Vitrandic, and Pachic subgroups, or Cumulic subgroups that are:
    a. Somewhat poorly drained with a water table equal to 0.0 foot (ft) from the surface during the growing season, or
    b. poorly drained or very poorly drained and have either:
        (i.) water table equal to 0.0 ft during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches (in), or for other soils,
        (ii.) water table at less than or equal to 0.5 ft from the surface during the growing season if permeability is equal to or greater than 6.0 in/hour (h) in all layers within 20 in, or
        (iii.) water table at less than or equal to 1.0 ft from the surface during the growing season if permeability is less than 6.0 in/h in any layer within 20 in, or
3. Soils that are frequently ponded for a long duration or a very long duration (7 to 30 days) during the growing season, or
4. Soils that are frequently flooded for a long duration or a very long duration (7 to 30 days) during the growing season.

On the basis of computer database searches for soils meeting the second criterion, NRCS has developed hydric soils lists for many parts of the country. Although they are useful for determining whether a particular soil series *has the potential to support current hydric soil conditions*, caution should be used when using these lists for site-specific hydric soil determinations. Many soils on the lists have ranges in water table depths and other characteristics that allow them to be either hydric or nonhydric depending on landscape position and other site-specific factors (e.g., soil clay content, depth to bedrock). Accordingly, hydric soils lists are good ancillary tools to facilitate wetland determinations, but are not a substitute for onsite investigations.

Field indicators of hydric soils are morphological properties known to be associated with soils that meet the definition of a hydric soil. Presence of one or more field indicators suggests that processes associated with hydric soil formation have taken place on the site being observed. The field indicators are essential for hydric soil identification because

once formed, they persist in the soil during both wet and dry seasonal periods. However, few hydric soil indicators identify soils at a site as being currently hydric in accordance with the NTCHS hydric soils criteria described above. Field indicators of hydric soil conditions are listed in Table 4:

Table 4. Field Indicators of Hydric Soil Conditions
(Based on 1987 Corps Manual and Corps Guidance Documents)

1. Indicators of Historical Hydric Soil Conditions:	**2. Indicators of Current Hydric Soil Conditions:**
a. Histosols b. Histic epipedons; c. Soil colors (e.g., gleyed or low-chroma colors, soils with bright mottles (Redoximorphic features) and/or depleted soil matrix d. High organic content in surface of sandy soils e. Organic streaking in sandy soils f. Iron and manganese concretions g. Soil listed on county hydric soils list	a. Aquic or peraquic moisture regime (inundation and/or soil saturation for ≥7 continuous days) b. Reducing soil conditions (inundation and/or soil saturation for ≥ 7 continuous days) c. Sulfidic material (rotten egg smell)

The presence of one or more of the field indicators in "1 a, b, c, and/or d" above suggests that historical processes associated with hydric soil development have taken place at a given site. These indicators are useful in determining if soils at a site were historically formed under hydric soil conditions because the indicators persist in soils during both wet and dry periods and may remain for decades and even centuries after changes in site conditions occur that inhibit subsequent wetland development, such as the elimination of wetland hydrology (NRCS 1995). However, only the presence of field indicators "2 a, b, and/or c" confirms that hydric soils occur at a site during the period of observation.

Hydric soil indicators have also been further defined and described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). These indicators are similar to those listed above from the 1987 Corps *Manual* and are presented below in Table 5.

Table 5. Hydric Soil Indicators for the Arid West
(Based on *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0*)

Hydric Soil Indicators			Hydric Soil Indicators for Problem Soils**
All Soils	**Sandy Soils**	**Loamy & Clayey Soils**	
A1* – Histosol	S1 – Sandy Mucky Mineral	F1 – Loamy Mucky Mineral	A9 – 1 cm Muck
A2 – Histic Epipedon	S4 – Sandy Gleyed Matrix	F2 – Loamy Gleyed Matrix	A10 – 2 cm Muck
A3 – Black Histic	S5 – Sandy Redox	F3 – Depleted Matrix	F18 – Reduced Vertic
A4 – Hydrogen Sulfide	S6 – Stripped Matrix	F6 – Redox Dark Surface	TF2 – Red Parent Material
A5 – Stratified Layers	--	F7 – Depleted Dark Surface	Other (See Section 5 of the Regional Supplement, Version 2.0)--
A9 – 1 cm Muck	--	F8 – Redox Depressions	--
A11 – Depleted Below Dark Surface	--	F9 – Vernal Pools	--
A12 – Thick Dark Surface	--	--	--

***** Denotes number of hydric soil indicator described in detail in *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).*
****** Indicators of hydrophytic vegetation and wetland hydrology must be present.

It should also be noted for problematic areas that the 2008 Corps Regional Supplement specifies 14 days continuous ponding as an acceptable indicator of problematic hydric soils (USACE 2008, p. 101).

2.4.3 Prevalence of Wetland Vegetation

Species Classifications

Species classifications (e.g., tolerance of anaerobic soil conditions) are determined by consulting the *National List of Plant Species that Occur in Wetlands* (Reed 1988) and the relevant regional lists, which are published by FWS' National Wetlands Inventory (NWI). Regional Interagency Review Panels develop the lists by determining species' estimated probability of occurrence in wetlands vs. non-wetlands. Classifications are made by unanimous agreement of the Panel. If the Panel is unable to reach a unanimous decision on the status of a species, "no agreement" (NA) is recorded. If insufficient information exists to determine the status of a species, "no indicator" (NI) is recorded. Species that are not included in the NWI list are assigned a "not listed" (NL) designation in this report.

The resulting NWI lists include plants that grow in a range of soil conditions from permanently wet to dry. Species are divided into the following "indicator categories:"

1. **"Obligate wetland" (OBL)** species, which, under natural conditions, occur almost always in wetlands (estimated probability >99 percent);
2. **"Facultative wetland" (FACW)** species, which usually occur in wetlands (estimated probability 67 – 99 percent), but are occasionally found in non-wetlands;
3. **"Facultative" (FAC)** species, which are equally likely to occur in wetlands or non-wetlands (estimated probability 34 – 66 percent);
4. **"Facultative upland" (FACU)** species, which sometimes occur in wetlands (estimated probability 1 – 33 percent), but more often occur in non-wetlands; and
5. **"Obligate upland" (UPL)** species, which occur in wetlands in other regions, but, under natural conditions, occur almost always in non-wetlands in the region specified (estimated probability >99 percent).

Species that have an indicator status of OBL, FACW, and FAC are typically considered to be adapted for life in anaerobic soil conditions (Corps 1987) and are used as evidence of hydrophytic vegetation when they dominate plant community composition or cover. Despite widespread use of the lists for wetland delineations, it is important to note that wetland indicator species assignments are not based on the results of a statistical analysis of species occurrence. The indicator assignments are approximations of wetland affinity based on a synthesis of submitted review comments, published botanical literature, and the field experience of the members of the Interagency Review Panel. For this reason and because many plants have properties that enable them to occur in a range of microhabitats (i.e., wetlands and non-wetlands), the presence of wetland indicator species is not unequivocal evidence of the presence of wetland hydrology and hydric soils. A positive indicator or indicators of wetlands should be emphasized, such as an assemblage of plants that can only be considered "hydrophytes" when they are growing in water or partly drained hydric soils (not effectively drained hydric soils) (Corps 1987). From the FWS perspective, all species on the NWI plant lists are hydrophytes at one time or another and the wetland indicator status (OBL, FACW, FAC, or FACU) reflects the likelihood that a given individual of a species is a hydrophyte or a certain population of these plants is hydrophytic. While OBL and FACW species are the most reliable plant indicators of wetlands, FAC and FACU species also contain populations of hydrophytes (Tiner 2006).

For the reasons stated above, the 1987 Corps *Manual* does not solely rely on the presence of hydrophytic vegetation to make wetland determinations.

Hydrophytic Vegetation Definitions

The Corps' 1987 *Manual* states that the wetland vegetation conditions are met when the prevalent vegetation (i.e., more than 50 percent of vegetation cover or tree basal area) consists of macrophytes that are typically adapted to sites having wetland hydrologic and soil conditions (e.g., periodic or continuous inundation or soil saturation). Hydrophytic vegetation is defined as "plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (Cowardin *et al*.

1979). Hydrophytic vegetative species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Positive indicators of the presence of hydrophytic vegetation include:

1. More than 50 percent of the dominant species are rated as Obligate ("OBL"), Facultative Wet ("FACW"), or Facultative ("FAC") on lists of plant species that occur in wetlands (see Reed 1988 for California);
2. Visual observations of plant species growing in sites of prolonged inundation or soil saturation; and
3. Reports in the technical literature indicating the prevalent vegetation is commonly found in saturated soils.

Hydrophytic vegetation indicators have been further defined and described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). These indicators include:

1. Dominance Test. More than 50 percent of the dominant plant species across all strata are rated OBL, FACW, or FAC.
2. Prevalence Index. The prevalence index is 3.0 or less with indicators of hydric soils and wetland hydrology being present.
3. Morphological Adaptations. The plant community passes either the dominance test or the prevalence index after reconsideration of the indicator status of certain plant species that exhibit morphological adaptations for life in wetlands.

3.0 DELINEATION METHOD

This study was conducted in accordance with Code of Federal Regulations (CFR) definitions of jurisdictional waters, the Corps' 1987 *Wetlands Delineation Manual*, the Corps' 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual,* and supporting guidance documents. The following provides an overview of the objective of the delineation approach, how the Study Area is defined, and the methods used to identify and map (delineate) areas potentially subject to Corps jurisdiction under Section 404 of the CWA.

3.1 Objective and Establishment of Study Area Boundary

The objective of this investigation is to identify and map areas potentially meeting the Clean Water Act definition of wetlands and Other Waters of the United States within the potential impact footprint of the DesertXpress Project. This impact footprint, which is encompassed within the Study Area, includes the proposed alignment and any alternative alignment and support facilities such as passenger stations and operations and maintenance facilities (e.g., maintenance yard, power substations, and transmission lines). Temporary construction areas for equipment and materials laydown, new access roads, and borrow areas are also included within the Study Area. The boundary of the Study Area also represents a slightly larger area (increased alignment and facility ROW width by an average of 200 feet) to accommodate potential minor changes in the impact footprint.

3.2 Study Area Reconnaissance

Prior to initiating detailed field survey work, existing land forms within the Study Area that may potentially contain wetlands or other waters of the United States were identified by conducting vehicle and pedestrian on-site reconnaissance inspections during the month of April 2010 in conjunction with review of the following information:

- Aerial photography and satellite imagery of the area;
- USGS topographic mapping;
- NRCS soils mapping;
- Engineer scale topographic mapping of segment alternatives
- USGS National Hydrology Dataset; and
- Preliminary level vegetation mapping and wetland / OHWM data collection efforts conducted during February and March 2008 and September and October 2009 as part of an on-going Federal EIS process by the FRA's EIS contractor.

The above efforts led to the development, in coordination with Corps regulatory staff, and use of the project-specific methods described below.

3.3 Wetlands Identification and Delineation

Field surveys designed to identify the presence or absence of field indicators of wetland vegetation, soils and hydrology conditions were conducted within low-lying landscape features where wetlands could potentially occur. These field surveys were conducted during the months of April, May, and June 2010.

3.3.1 Dominance of Wetland Vegetation

Presence or absence of a dominance of wetland vegetation / hydrophytes within the Study Area was evaluated using the methodology described in Sections 2.2 and 2.4.3. Indicator status of plants was confirmed by referring to the *National List of Plant Species that Occur in Wetlands: 1988 National Summary* (Reed). Plant cover data were collected for individual species associated within and immediately adjacent to the landscape features identified during the site reconnaissance survey as having the potential to meet the Corps' technical criteria for wetlands. Plant cover was visually estimated within 3-foot diameter plots at each soil sample location described below and was recorded on a Corps Wetland Determination Data Form – Arid West Region. Copies of completed data forms are provided In Exhibit B2. Subsequently, field data were analyzed to assess whether 50 percent or greater of the dominant species within the area sampled are hydrophytes. Sites that are depressional landforms that do not have a dominance of wetland vegetation forming at least 5 percent cover were not considered to be dominated by hydrophytes and were classified as a potential "other water of the United States" following the methodology described in Section 3.4, below, except if conditions for problematic vegetation were met as described in the Corps' 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).*

3.3.2 Presence of Hydric Soil Indicators

The presence or absence of hydric soil field indicators was evaluated following the methodology described in Section 2.3.2 using the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Corps 2008). At each potential wetland sampling location within the Study Area, hand-dug soil pits were excavated to a minimum of 20 inches or until a limiting layer or standing water is reached. The presence or absence of hydric soil indicators found at each soil pit location was recorded on a Corps Wetland Determination Data Form – Arid West Region. Copies of completed data forms are provided in Exhibit B. For sampling locations where the possibility of problematic hydric soils is found, procedures for the identification of problematic hydric soils as defined by the above described publication were followed.

3.3.3 Presence of Wetland Hydrology Indicators

The presence or absence of wetland hydrology field indicators were assessed following the methodology described in Section 2.3.1 using the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). The presence or absence of wetland hydrology indicators at each soil pit location was recorded on a Corps Wetland Determination Data Form – Arid West Region. Copies of completed data forms are provided in Exhibit B. For sampling locations where the possibility of problematic hydrology indicators was found, procedures for the

identification of problematic hydrology indicators, as defined by the above-described publication, were followed.

3.4 Identification and Delineation of Other Waters

Field surveys designed to identify the presence or absence of field indicators of an ordinary high water mark (OHWM) were conducted within low-lying landscape features where other waters of the United States could potentially occur. These field surveys were conducted during the months of April, May, and June 2010 after the detailed methodology was reviewed and approved by Corps staff during May 2010.

HBG identified drainages within each watershed that potentially met the Corps technical criteria for Other Waters of the United States (presence of field indicators of active surface water flow and associated Ordinary High Water Mark [OHWM]) using the following approach based on *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual*.

Initial efforts involved identification of all drainages within the Study Area having the potential for active surface flow. This was accomplished through field reconnaissance and imagery interpretation. Detailed sampling was then conducted to identify and delineated active drainages with an OHWM. This was accomplished by randomly sampling the identified drainages in a stratified manner by geographically dividing the Study Area into HUC 12 watershed units.

Field sampling within each HUC 12 watershed consisted of gathering OHWM data, including the measured width of the OHWM, for 3 to 5 main drainages (> 3 feet), if present, selected at random; and 6 to 10 (depending on watershed size) random samples of minor drainages (≤ 3 feet), if present. Each of the HCC 12 watersheds located within the Study Area was divided into approximate thirds. Then a minimum of, one major drainage and two minor drainages, if present, were sampled within each third of a watershed. Where the length of the watershed along the alignment alternative was less than 5 miles, the watershed was divided into approximate halves, instead. If the minor drainages (≤ 3 feet) occurring within each one-third watershed varied in OHWM width by more than 33 percent, sampling was increased in that third of the watershed.

Drainage data for each of the watershed drainages sampled was collected on a standardized field data sheet (Exhibit B). Exhibit A, Figures 5-12 provide examples of the types of field indicators observed within various drainages located along the DesertXpress Project alternative alignments. Each field sampling point was memorialized using a handheld GPS unit with submeter accuracy. Where stormwater flows originated upslope of the side of I-15 opposite the alignment, those drainages were hydrologically cut off by the freeway during construction and channeled into detention basins and / or manmade drainages on that side of I-15. As a consequence, drainages on the proposed alignment side of I-15 were hydrologically cut off from their sources and no longer technically meet the Corps OHWM criterion. This condition was noted on the

field data sheets. Detailed OHWM indicator data for these historical drainage features was not collected.

All drainage data (field and photointerpreted drainage data) are summarized by HUC 12 watershed on the required LA District Excel JD Summary Data Sheet (see Exhibit B1). Widths for active drainages identified through photointerpretation are based on an average width calculated from field data. The length of each drainage is based on photointerpretation. Standardized field data sheets are provided in Exhibit B2. Representative photographs of various drainage features are presented in Exhibit A on Figures 13 – 42. The field data collected from each watershed were used to aid in the imagery interpretation process described in Section 3.5, below.

3.5 Mapping

Wetland indicator data sample locations and the locations of areas identified during field surveys that are potentially Other Waters of the United States due to the presence of an OHWM were mapped using a hand-held Trimble XT global positioning system (GPS) unit with sub-meter accuracy. This GPS data was incorporated into a Geographic Information System (GIS) and geo-referenced in overlay fashion onto digital orthorectified satellite imagery and/or high resolution aerial photograph depending on availability. Overlays were used to assist in analysis, identification, and digitization of the location and geographic extent of areas that could potentially qualify as waters of the United States. The imagery interpretation process involved the combined use of available imagery, field data, engineer level topographic mapping, field verification of mapped features and best professional judgment to map the geographic extent of areas potentially subject to Corps CWA jurisdiction. Exhibit C presents representative detailed mapping within the Study Area with field sampling points and delineated active linear drainage features with labeling indicating their average OHWM width overlaid onto orthorectified digital imagery. Based on guidance received from Corps staff, only representative ephemeral drainages were mapped within a watershed that drains to an isolated dry lake with no surface water drainage outlet. Resulting mapping depicts representative ephemeral drainages within the Study Area and the surface water flow path from the Study Area to the isolated dry lake.

4.0 TECHNICAL FINDINGS

The following sections describe the landscape features and field indicators found within the Study Area that provide a technical basis for (a) determining the presence or absence of a potential water of the United States; and (b) defining the geographic extent of any potential water of the United States identified. Two types of landscape features were found that potentially contain waters of the United States. These include:

1. Natural drainages
2. Manmade drainages

4.1 Field Indicators of Hydric Soils

Based on field observations within the Study Area soil indicators were not found that meet the hydric soils criteria defined by current Corps' regulatory guidance, including the *2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). Onsite observations of surface conditions, including road and channel bank cuts, and interpretation of aerial photography revealed two primary soil types, desert pavement and more active wash sediments. Onsite examination revealed that soils or substrates within both natural drainages and manmade drainages consist of alluvial materials primarily made up of sorted sands and gravel, and are well drained, ranging from moderately well drained to excessively well drained.

4.2 Field Indicators of Wetland Hydrology Conditions

Based on field observations within the Study Area, wetland hydrology indicators were not found that meet the wetland hydrology criteria defined by current Corps' regulatory guidance, including the *2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). Onsite observations revealed evidence of flooding within the low-lying natural and manmade drainages. These observations also showed that there was no evidence of ponding and soil saturation for long to very long periods of time. The lack of ponding and soil saturation conditions meeting the wetland hydrology criteria is a direct result of the moderately well drained to excessively well drained alluvial soils.

Although wetland hydrology conditions were not found within the Study Area, the field indicators of active surface water flow or flooding found within natural and manmade drainages were sufficient enough to form Ordinary High Water Marks (OHWM). As indicated in Section 2.0, an OHWM provides a technical basis for (a) determining the presence a potential water of the United States; and (b) defining the geographic extent of potential water of the United States.

The natural and manmade drainages within the Study Area found with an OHWM exhibited the following characteristics which are discussed in detail in the following subsections:

1. identifiable field indicators of surface flow
2. identifiable landscape features that supports surface flow
3. identifiable landscape features with a recognizable OHWM

Exhibit A, Figures 5-12 provides typical examples of field indicators of active surface water flow and OHWMs found within ephemeral drainages occurring within the DesertXpress Project Study Area. Exhibit A, Figures 13-42 provide photographs of various types of drainages observed within the HUC 8 Ivanpah - Pahrump Valleys watershed.

4.2.1 Field Indicators of Surface Flow

Review of topographic mapping (USGS and Engineer scale) and imagery of the Study Area provided visual indication of the presence of curvilinear depressional land surface features where focused surface water flow could potentially be directed. Linear drainage features associated with road drainage and flood control were also found. Field investigations confirmed the presence of surface flow within a number of these channels or drainages while others lacked evidence / field indicators of active ephemeral surface water flow. No drainages were found to contain evidence of perennial or intermittent surface water flow, and no evidence of subsurface flow was found in the form of spring discharges, artesian flows or or indicia of a high groundwater table. Observation of active natural and manmade ephemeral drainages revealed evidence of surface water / hydrologic connectivity with other active drainages within and outside the Study Area. These ephemeral drainages are locally referred to as "desert dry washes." The manmade drainages served to redirect surface flow from altered natural drainages. Indicators of drainages having active surface water flow paths included (1) water marks defined by linear deposits of fine grained sediment, minerals, and/or plant debris; (2) bank scour, erosion, and/or shelving; (3) deposits of sorted alluvial materials; and (4) flow-deposited woody and soft tissue plant debris (Exhibit B2).

Flow-deposited woody and soft tissue plant debris were typically absent in drainages that did not have active surface flow. If woody debris was present, the pieces observed were relatively thick (i.e., greater that ¼ inch) weathered limb or root material or milled posts or lumber. The wood pieces found were randomly placed and were not part of a collective flow line of deposited woody and/or soft tissue plant debris, which would be indicative of an active channel. The historical drainages were found to possess one or more of the same type of indicators found in active drainages, but the indicators found were considerably weathered. Surface flow indicators such as bank scour, erosion and shelving areas had rounded edges in contrast to those found in active drainages having angular edges. Water marks defined by linear deposits of fine grained sediment and minerals, and sorted alluvial materials such as gravels, cobbles and boulders were etched or varnished from weathering. The historical drainages were found to consist of the historical remains of channel drainages that were abandoned due to upslope changes in drainage due to either channel down-cutting or the channel becoming abandoned as the surface drainage became redirected or changed course due to deposition of alluvial material damming the channel flow path. The historical drainages were found to lack

indicators of active flow.

Surface water flow patterns were also found within various portions of the landscape that were relatively flat. These surface flow areas were defined by flow-deposited fine grained sediment or soft tissue plant debris. The visible surface flow pattern at these locations would continue for several feet then disappear either on a relatively flat soil surface or localized depression.

Based on the above technical findings and as documented in Exhibits B and C, drainages were found with indicators of active surface water flows within the Study Area.

4.2.2 Landscape Features that Support Surface Flow

Detailed field surveys identified land surface features that have the potential to convey surface flows. These features included a bed or channel and abutting banks. These physical features were found associated with both active flow areas and historical drainages. These drainage types can be summarized as follows:

1. Active drainage channel and abutting banks containing evidence of recent surface flows as indicated by the presence of unweathered sediment material (sand, gravel, cobbles, etc.) with unweathered surfaces, and the presence of flow deposited woody debris and/or soft tissue plant debris.
2. Active drainage channel and abutting banks containing evidence of historical surface flows as indicated by the presence of unweathered sediment material (sand, gravel, cobbles, etc.) with unweathered surfaces, but lacked the presence of flow deposited woody debris and/or soft tissue plant debris.
3. Historical drainage channels and abutting banks having no evidence of recent surface flow as indicated by weathered sedimentary gravel, cobbles, boulders, erosional or depositional deposits, and the lack of flow deposited woody debris and/ or soft tissue plant debris.

The frequency interval of flow events within drainages with observable plant debris (1 above) and unweathered sediment material is estimated to be within the 1 to 15 year range. Strojan, et al. (1987) found that surface litter decomposition rates for creosote bush and burro bush in the Mojave Desert were 42.5% and 58.4%, respectively over a 54-week period of study. Kemp, et al. (2003) reported a similar one year decomposition rate for creosote bush and a 74% loss within a 41 month period. This lends support to qualitative observations made by one of the preparers of this report, Dr. Terry Huffman, who has observed over 20 + years of delineating wetlands within arid environments that soft plant tissue (i.e., pieces of plant leaves and thin bark) will decompose in arid drainage environments within a 2 to 3 year period. In addition, field observations over these years indicated that small woody stems (<1/4 inch) decompose over many more years, perhaps 10 + years. For older drainages where the surfaces of the sediment material (e.g., sand, gravel, cobbles, etc.) is no longer smoothed by the interaction of surface water flow and transport, but weathered, and lacks flow deposited woody and thin tissue plant debris, the frequency interval likely ranges to well over a decade in shallower

channels to prehistoric times for deeply incised channels (i.e. > 6 feet in desert pavement areas).

The land surface of the Study Area is characterized by the presence of active and inactive alluvial fan systems. Ephemeral drainage channels are found on both types of these alluvial fan types. The majority of the ephemeral channels supporting active surface water flow were narrow, with an average width of less than 3 feet. Active alluvial fans were characterized by sandy soils, a uniform vegetation type, and evidence by surface flow patterns indicative of surface water sheetflow. Narrow channels within these areas were both weakly expressed and discontinuous. This discontinuity indicated that new channels could be formed with each major flood event resulting in the current channels being bypassed and blocked off. Channels >3 feet wide were also found. These channels were considerably deeper that the narrow channels found and were less common when considering the landscape as a whole in relationship to the Study Area. Evidence was found within both of these channel types where previously bypassed cutoff channels where becoming filled with sediment. The specific conditions varied within the Study Area.

Based on the above technical findings, drainages with active surface flow were found within the Study Area with physical features that allow for the conveyance of surface flows.

4.2.3 Landscape Features with a Recognizable OHWM

The desert dry washes with active flow were found to have identifiable features which represented the geographic reach of lateral surface water. These features included channels or beds with evidence of active flow and abutting banks which demarcated the lateral reach or extent of flow. Field indicators of the extent of active flow along the banks included water marks defined by linear deposits of fine grained sediment and/or minerals, bank scour, erosion, and/or shelving, and flow deposited woody and soft tissue plant debris (Exhibit B).

Based on the above technical findings, the active drainages, described in the above subsections, have recognizable landscape features from which the lateral extent of surface water flow can be geographically delineated. Field indicators of this surface water flow were used to identify the OHWM. Exhibit C shows representative active ephemeral drainages, as described in Section 3.5, Mapping.

4.3 Field Indicators of Wetland Vegetation

On the basis of field observations within the Study Area, a dominance of wetland plant species or hydrophytes was not found. Based on this result, the criteria defined by current Corps' regulatory guidance, including the *2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) for wetland vegetation were not met.

4.4. Presence of Wetland Vegetation within Natural and Manmade Drainages

On the basis of field observations within the Study Area, a dominance of wetland plant species or hydrophytes was not found within natural or manmade drainages within the Study Area where active ephemeral drainages were found.

5.0 AREAS POTENTIALLY SUBJECT TO JURISDICTION

This section presents the findings of this delineation with respect to the identification and geographic extent of areas found that could potentially be regulated by the Corps and the EPA as wetlands or other waters of the United States under Section 404 of the Clean Water Act.

5.1 Wetlands

No areas meeting the Corps technical criteria for wetlands were identified within the Study Area. These findings are based on the absence of hydric soil, wetland hydrology, and / or wetland vegetation indicators as required by the Corps' *1987 Manual, the Arid West Regional Supplement*, guidance documents, and regulations.

5.2 Other Waters of the U.S.

Ephemeral drainages or desert dry washes were found within the Study Area that meet the technical criteria to potentially be subject to CWA Section 404 jurisdiction as Other Waters of the United States (Exhibit C). This finding is based on the presence of an OHWM as required by Corps regulations. Length and width measurements of the ephemeral drainages found to contain an observable OHWM are provided by Exhibit B.

6.0 CWA JURISDICTIONAL ANALYSIS

This section analyzes the potential for waters identified within the Study Area to constitute waters of the United States subject to jurisdiction under the CWA. Section 6.1 provides an explanation of the jurisdictional determination process following EPA and Corps guidance. Section 6.2 defines the area to be analyzed (i.e., the Review Area). Section 6.3 analyzes the potential for waters of the United States to be present in the Review Area. Section 6.4 describes any jurisdictional and /or non-jurisdictional waters found. Section 6.5 summarizes the findings of this jurisdictional analysis. Section 6.6 is a disclaimer statement.

6.1 Regulatory Background

Beyond the Corps and EPA regulatory definitions of "waters of the United States" as described in Section 2.0, recent judicial decisions have further limited and refined the scope of CWA jurisdiction with regard to isolated waters and certain wetlands and non-navigable tributaries. Two of these decisions are relevant to this jurisdictional analysis.

First, in *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, No. 99-1178* (531 U. S. 159; [2001]) (*SWANCC*), both statutory and constitutional challenges were made to the assertion of CWA jurisdiction over isolated, non-navigable, intrastate waters solely on the basis that those waters were used as habitat by migratory birds. The U.S. Supreme Court in *SWANCC* rejected the "migratory bird rule," and held that CWA jurisdiction does not exist over "isolated, non-navigable, intrastate waters" where there is no nexus to interstate or foreign commerce.

Second, the U.S. Supreme Court's plurality opinion in *Rapanos v. United States,* 547 U.S. 715 (2006) (*Rapanos*), addressed jurisdiction over waters of the United States under Section 404 of the CWA. The concurring opinion by Justice Kennedy held in pertinent part that waters with a "significant nexus" to "navigable waters" are covered under the CWA. In response to *Rapanos*, on December 2, 2008, USEPA and the Corps issued guidance to EPA regions and Corps districts (the "Rapanos Guidance") to address the jurisdictional scope of the CWA over certain types of waters (i.e., traditional navigable waters, wetlands adjacent to traditional navigable waters, non-navigable tributaries that are relatively permanent, and wetlands that directly abut tributaries). The Rapanos Guidance identifies which waters the agencies will categorically assert jurisdiction over and which will be subject to a case-by-case analysis based on the reasoning of the *Rapanos* opinions to identify whether the water has a "significant nexus" to a "traditional navigable water" (TNW). The Rapanos Guidance focuses only on those definitions of "waters of the United States" in 33 C.F.R. § 328.3(a)(1), (a)(5) and (a)(7).[2] Neither the Supreme Court nor the Rapanos Guidance draws a bright line with regard to the

2 The Rapanos Guidance covers the following 33 C.F.R. § 328.3(a) definition of "waters of the United States":
(a)(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(a)(5) Tributaries of waters identified in paragraphs (a)(1)-(4) of this section;
(a)(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.

geographic reach of jurisdiction, particularly in drainages where flows are ephemeral and where wetlands are adjacent to, but not directly abutting relatively permanent waters. The Rapanos Guidance provides in pertinent part the following:

- The agencies will assert jurisdiction over non-navigable, not relatively permanent tributaries and their adjacent wetlands where such tributaries and wetlands have a ***significant nexus*** to a traditional navigable water.

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters.

- "Similarly situated" wetlands include all wetlands adjacent to the same tributary.

- Significant nexus includes consideration of hydrologic factors including the following: volume, duration, and frequency of flow, including consideration of certain physical characteristics of the tributary; proximity to the traditional navigable water; size of the watershed; average annual rainfall; average annual winter snow pack.

- Significant nexus also includes consideration of ecologic factors including the following : potential of tributaries to carry pollutants and flood waters to traditional navigable waters; provision of aquatic habitat that supports a traditional navigable water; potential of wetlands to trap and filter pollutants or store flood waters; maintenance of water quality in traditional navigable waters.

- The following geographic features generally are not jurisdictional waters: swales or ***erosional features*** (e.g. gullies, small washes characterized by low volume, infrequent, or short duration flow)…. [Rapanos Guidance, at p. 8 (emphasis added)]

According to the Rapanos Guidance, a significant nexus analysis ". . . will assess the flow characteristics and functions of the tributary itself, together with the functions performed by any wetlands adjacent to that tributary," to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters. (Rapanos Guidance, p. 8.) The analysis will consider both hydrologic and ecologic factors. Hydrologic factors include volume, duration, and frequency of flow, proximity to the TNW, size of the watershed, and average annual rainfall. Ecologic factors include the potential for tributaries to carry pollutants and flood waters to TNWs or to provide aquatic habitat to support a TNW, and the potential for wetlands to trap and filter pollutants or store flood waters. The Guidance states (on p.10), "[w]here it is determined

that a tributary and its adjacent wetlands collectively have a significant nexus with traditional navigable waters, the tributary and all of its adjacent wetlands are jurisdictional."

6.2 Review Area

For the purpose of this analysis, the Study Area used for the delineation process is also to be considered the Review Area. A Review Area as defined by the Rapanos Guidance is the area of interest for the verification of the location and extent of waters of the United States. Exhibit D presents a series of maps that show the Review Area relative to Roach Dry Lake. Exhibits D1 and D2 show USGS National Hydrography Dataset (NHD) flowlines and arrows that indicate the direction and route of surface water flow from the Review Area toward Roach Dry Lake; the NHD data are superposed respectively on an aerial photo and on a USGS topographic map. Exhibit D3 shows the extent of the Review Area (also referred to as the Study Area).

6.3 CWA Analysis

Section 5.0 of this report discusses a number of active ephemeral drainages (locally known as desert dry washes) identified and delineated within the Study Area / Review Area that meet the technical criteria of "other waters" *potentially* subject to CWA jurisdiction. Maps showing the geographic extent of these drainages within the Review Area are presented in Exhibit D (Exhibits D1 – D3).

The following discussion follows the Corps Approved Jurisdictional Determination Form developed following the *Rapanos* decision.

6.3.1 Are Jurisdictional Waters Present within the Study Area (Rapanos Guidance)?

Table 6 provides a summary of the Rapanos Guidance process for determining jurisdiction over waters of the United States under Section 404 of the CWA.

Table 6. Summary of Process for Determining Jurisdiction Over Waters of the U.S. Under Section 404 of the Clean Water Act Following EPA and Corps Rapanos Guidance*

"Approved JD Form" Categories of Potential Waters of the U.S.**	**Will Corps Categorically Assert Jurisdiction?**	**Corps Will Assert Jurisdiction Based on a Fact-Specific Analysis to Determine Whether Waters Identified Have a Significant Nexus With a TNW**	
		Analysis Based on Significant Nexus Testing	*Comments*
1. Traditional navigable waters (TNWs), including territorial seas, and adjacent wetlands	Yes	Not Applicable (NA)	NA
2. Wetlands adjacent to TNWs	Yes	NA	NA

Table 6. Summary of Process for Determining Jurisdiction Over Waters of the U.S. Under Section 404 of the Clean Water Act Following EPA and Corps Rapanos Guidance*			
"Approved JD Form" Categories of Potential Waters of the U.S.**	**Will Corps Categorically Assert Jurisdiction?**	**Corps Will Assert Jurisdiction Based on a Fact-Specific Analysis to Determine Whether Waters Identified Have a Significant Nexus With a TNW**	
		Analysis Based on Significant Nexus Testing	*Comments*
3. Relatively permanent waters (RPWs)[3] that flow directly or indirectly into TNWs	Yes	NA	NA
4. Non-RPWs that flow directly or indirectly into TNWs	No	Yes	Jurisdictional if the drainage flows directly or indirectly into a TNW and has a significant nexus with the TNW
5. Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	Yes	NA	NA
6. Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs	No	Yes	Jurisdictional when considered in combination with the tributary to which they are adjacent and, with similarly situated adjacent wetlands, have a significant nexus with a TNW
7. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs	No	Yes	Jurisdictional when considered in combination with the tributary to which they are adjacent and, with similarly situated adjacent wetlands, have a significant nexus with a TNW
8. Impoundments of jurisdictional waters	Generally, impoundment of a water of the U.S. does not affect its jurisdictional status.	NA	Yes, if: ▪ Impoundment created from WOUS ▪ Water meets one of the above waters categories ▪ Water is isolated with a significant nexus to interstate or foreign commerce (to be elevated to Corps Headquarters for review consistent with Rapanos Guidance)
9. Isolated (interstate or intrastate) waters including isolated wetlands the use, degradation or destruction of which could affect interstate commerce	No		To be elevated to Corps Headquarters for review consistent with Rapanos Guidance

* U.S. Army Corps of Engineers. 2007. *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook.* May 30.
** U.S. Army Corps of Engineers. 2007. Appendix B, Approved JD Form, Section II, in *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook.* May 30.

As described in the technical findings of this report (Section 4.0), the active ephemeral drainages identified in the Review Area are not permanent or even seasonal, but rather flow or flood for few hours during heavy precipitation events. The climate data in Section 1.0 indicates that the Review Area receives an annual average rainfall amount of 4 inches. Thus, these ephemeral drainages are non-Relatively Permanent Waters (non-

[3] Under the Corps / EPA Rapanos Guidance, a Relatively Permanent Water (RPW) is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

RPWs). (A Relatively Permanent Water is defined in the Rapanos Guidance as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months). Representative drainages that flow to Roach Dry Lake are shown on Exhibit D3. These drainages (non-RPWs) are also listed in the Exhibit B field data table. In addition, no areas were found within the Review Area that meet the Corps criteria for wetlands in the 1987 Corps of Engineers *Wetlands Delineation Manual* and/or the 2008 Arid West Supplement.

Using the Rapanos Guidance analysis as summarized in Table 6, the non-RPWs were determined to *not* fall within any of the categories of potential waters of the U.S., as shown below in Table 7.

Table 7. Summary of EPA and Corps Rapanos Analysis

"Approved JD Form" Categories of Potential Waters of the U.S.*	Wetlands Present? (acres)	Other Waters of the U.S Present? (acres)	Rationale For Determination if Waters in Review Area are Subject to Corps Jurisdiction under CWA Section 404
1. Traditional navigable waters (TNWs), including territorial seas	No	No	Criteria for type of water not met; waters are non-RPWs.
2. Wetlands adjacent to TNWs	No	No	Criteria for type of water not met; no wetlands present within Review Area.
3. Relatively permanent waters (RPWs) that flow directly or indirectly into TNWs	No	No	Criteria for type of water not met; waters are non-RPWs, but do not flow directly or indirectly into TNWs.
4. Non-RPWs that flow directly or indirectly into TNWs	No	No	Criteria for type of water not met; waters are non-RPWs that do not flow directly or indirectly into a TNW.
5. Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	No	No	Criteria for type of water not met; no wetlands present within Review Area.
6. Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs	No	No	Criteria for type of water not met; no wetlands present within Review Area.
7. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs	No	No	Criteria for type of water not met; no wetlands present within Review Area.
8. Impoundments of jurisdictional waters	No	No	Criteria for type of water not met; waters are non-RPWs.
9. Isolated (interstate or intrastate) waters including isolated wetlands the use, degradation or destruction of which could affect interstate commerce	No	No	Criteria for type of water not met. See Table 8 for interstate commerce analysis for the Review Area, the drainages connecting the Review Area to Roach Dry Lake, and Roach Dry Lake.

* U.S. *Army Corps of Engineers. 2007*. Appendix B, Approved JD Form, Section II, in *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook. May 30.*

6.3.2 Are There Isolated Waters within the Study Area?

When the non-RPWs identified within the Review Area flow, they flow toward the northern boundary of Roach Dry Lake, which is an ephemeral dry lake with no outlet (Exhibit D). No substantial nexus to interstate or foreign commerce was found associated with the non-RPWs within the Review Area. This finding is based on the following fact-

specific analysis provided by Table 8, below regarding whether the use, degradation, or destruction of the intrastate non-RPWs within the Review Area would affect interstate commerce. In addition, a fact specific analysis was conducted for Roach Dry Lake. On the basis of HBG's analysis, Roach Dry Lake was found to be: (1) a non-Traditional Navigable Water, (2) an intrastate water located entirely within the state of Nevada, (3) an isolated basin with no hydrologic surface water outlet, and (4) although the dry lake bed of this ephemeral water is known to be used for land sailing (aka: sand yachting or land yachting) and meteorite hunting, no surface water connection to interstate or foreign commerce was found (Table 8).

Table 8. Interstate/Foreign Commerce Analysis				
Factors Used to Determine Substantial Nexus to Interstate or Foreign Commerce	**Could the Use, Degradation or Destruction of the Intrastate non-RPWs within the Review Area, Drainages Connecting the Review Area to Roach Dry Lake, or Roach Dry Lake Affect Interstate or Foreign Commerce?**	**Fact-Specific Analysis**		
		Review Area	**Drainages Connecting the Review Area to Roach Dry Lake**	**Roach Dry Lake**
Waters which are or could be used by interstate or foreign travelers for recreational purposes.	No	Given the ephemeral as well as unpredictable nature of surface flows, no recreational use occurs that is surface water dependent. This was confirmed by site inspection, review of remote sensing imagery, and internet search.	Given the ephemeral as well as unpredictable nature of surface flows, no recreational use occurs that is surface water dependent. This was confirmed by site inspection, review of remote sensing imagery, and internet search.	Given the ephemeral as well as unpredictable nature of surface ponding, no recreational uses occur that are surface water dependent. This was confirmed by site inspection, review of remote sensing imagery, and internet search.
Waters from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.	No	Given the ephemeral as well as unpredictable nature of surface flows, no fish or shellfish habitat is associated with the ephemeral drainages. This was confirmed by site inspection, review of remote sensing imagery, and internet search.	Given the ephemeral as well as unpredictable nature of surface flows, no fish or shellfish habitat is associated with the ephemeral drainages. This was confirmed by site inspection, review of remote sensing imagery and internet search.	Given the ephemeral as well as unpredictable nature of surface ponding, no fish or shellfish habitat is associated with this playa lake. This was confirmed by site inspection, review of remote sensing imagery, and internet search.
Waters which are or could be used for industrial purposes by industries in interstate commerce.	No	Given the ephemeral as well as unpredictable nature of surface flows, the non-RPWs are not used and could not be used for surface-water-dependent industrial purposes, including, but not limited, to mineral extraction, power generation, and agricultural irrigation. This was confirmed by site inspection, review of remote sensing imagery, and internet search.	Given the ephemeral as well as unpredictable nature of surface flows, the non-RPWs are not used and could not be used for surface-water-dependent industrial purposes, including, but not limited, to mineral extraction, power generation, and agricultural irrigation. This was confirmed by site inspection, review of remote sensing imagery, and internet search.	Given the ephemeral as well as unpredictable nature of surface ponding, the waters are not used and could not be used for surface-water-dependent industrial purposes, including but not limited to mineral extraction, power generation, and agricultural irrigation. This was confirmed by site inspection, review of remote sensing imagery, and internet search.
Waters which are interstate isolated waters.	Not Applicable	Waters are intrastate non-RPWs found within the State of Nevada with no nexus to interstate or foreign commerce, as demonstrated by the above analysis.	Waters are intrastate non-RPWs found within the State of Nevada with no nexus to interstate or foreign commerce, as demonstrated by the above analysis.	Roach Dry Lake is an intrastate water found within the State of Nevada with no nexus to interstate or foreign commerce, as demonstrated by the above analysis. This isolated basin has no outlet (Exhibits D1 and D2).
Other factors	Not Applicable	No other factors known to occur.	No other factors known to occur.	No other factors known to occur.

6.4 Are Non-Jurisdictional Waters Present Within the Study Area?

On the basis of the above analysis and findings, no areas were found within the Review Area, drainages connecting the Review Area to Roach Dry Lake, or Roach Dry Lake that meet the Corps criteria for wetlands defined in the 1987 Corps of Engineers *Wetlands Delineation Manual* and/or the 2008 Arid West Supplement. The above analysis also found that the Review Area and drainages connecting the Review Area to Roach Dry Lake contain non-RPWs that are isolated, non-navigable, and wholly intrastate waters with no substantial nexus to interstate or foreign commence. Furthermore, Roach Dry Lake itself is an isolated, non-navigable and wholly intrastate water with no substantial nexus to interstate or foreign commence. As required, as part of the determination process under the Rapanos Guidance, it should be noted that:

1. Prior to the January 2001 Supreme Court decision in SWANCC, some portion of the non-RPWs in the Review Area would likely have been subject to CWA jurisdiction based on the then-existing Migratory Bird Rule (51 F.R. 41217), given the likely presence of migratory waterbirds during ephemeral ponding and the presence of a federal listed endangered species, the desert tortoise (*Gopherus agassizii*)[4], within the Review Area.
2. The waters are isolated with no significant nexus to interstate or foreign commerce and therefore no significant nexus standard analysis for connectivity to a TNW is required by the Rapanos Guidance as non-RPWs are not in a category of water requiring such analysis.

6.5 Jurisdictional Analysis Summary

On the basis of the above analysis and as seen in the maps in Exhibit D and summarized in Table 9, the active ephemeral drainages (non-RPWs or desert dry washes) found within the (1) Review Area, (2) drainages connecting the Review Area to to Roach Dry Lake, and (3) Roach Dry Lake would be considered non-jurisdictional under the CWA. The non-RPWs within the Review Area are *not* jurisdictional waters of the United States based on the fact that:

1. No wetlands were found with the Review Area as there were no areas that met the criteria in the 1987 Corps of Engineers *Wetlands Delineation Manual* and/or the 2008 Arid West Supplement.
2. The non-jurisdictional non-RPWs found are isolated waters with no substantial connection to interstate or foreign commerce.

[4] Under the Migratory Bird Rule (51 F.R. 41217) the presence of or the potential for use by migratory birds and/ or Federally-listed species satisfies the determination requirements.

Table 9. Jurisdictional Analysis Summary				
"Approved JD Form" Categories of Potential Waters of the U.S.*	**Was Category of Waters Identified in Study Area?**	**Nexus to Interstate or Foreign Commerce?**	**Jurisdictional Water Found?**	**Non-Jurisdictional Water Found?**
1. Traditional navigable water (TNW), including territorial seas	No	No	No	No
2. Wetlands adjacent to TNWs	No	No	No	No
3. Relatively permanent waters (RPWs) that flow directly or indirectly into TNWs	No	No	No	No
4. Non-RPWs that flow directly or indirectly into TNWs	No	No	No	No
5. Wetlands directly abutting RPWs that flow directly or indirectly into TNWs	No	No	No	No
6. Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs	No	No	No	No
7. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs	No	No	No	No
8. Impoundments of jurisdictional waters	No	No	No	No
9. Isolated (interstate or intrastate) waters including isolated wetlands the use, degradation or destruction of which could affect interstate commerce	No	No	No	No
Waters** that are **not** one of the above nine categories of potential Waters of the U.S.	**Yes**	No	No	**Yes** Review Area: ***Non-RPWs*** Drainages Connecting the Review Area to Roach Dry Lake: ***Non-RPWs*** Roach Dry Lake: ***Isolated Water***
* U.S. Army Corps of Engineers. 2007. Appendix B, Approved JD Form, Section II, in *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook.* May 30.				
** Areas that meet the technical criteria for wetlands (collective presence of hydric soil, wetland hydrology and wetland vegetation indicators) or have an Ordinary High Water Mark (OHWM) but have no significant nexus to a TNW or connection to interstate commerce. 33 CFR 328.3(a)(3) states: "All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters (i) which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce' or (iii) Which are used or could be used for industrial purpose by industries in interstate commerce"				

6.6 Disclaimer

HBG has made a good-faith effort herein to thoroughly describe and document the presence of potential factors that the Corps may consider. Nevertheless, DXE reserves the right to challenge or seek revision to any areas over which the Corps may assert such jurisdiction, as the implementation of the Corps / EPA Rapanos Guidance is further clarified or altered through formal guidance, assertions or disclaimers of jurisdiction over other properties, court decisions, or other relevant actions.

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Exhibit A

Figures

Figure 1	DesertXpress Project Alignment Alternatives
Figure 2	Location of Alignment Alternatives Within HUC-8 Watershed
Figure 3	Location of Study Area
Figure 4	Location of Study Area Within HUC-8 / HUC-12 Watersheds
Figures 5-12	Typical Examples of Field Indicators of Active Surface Water Flow and Ordinary High Water Marks Found Within Ephemeral Drainages Occurring Within the DesertXpress Project Study Area.
Figures 13-42	Examples of Drainages Found Within HUC-8 Watershed

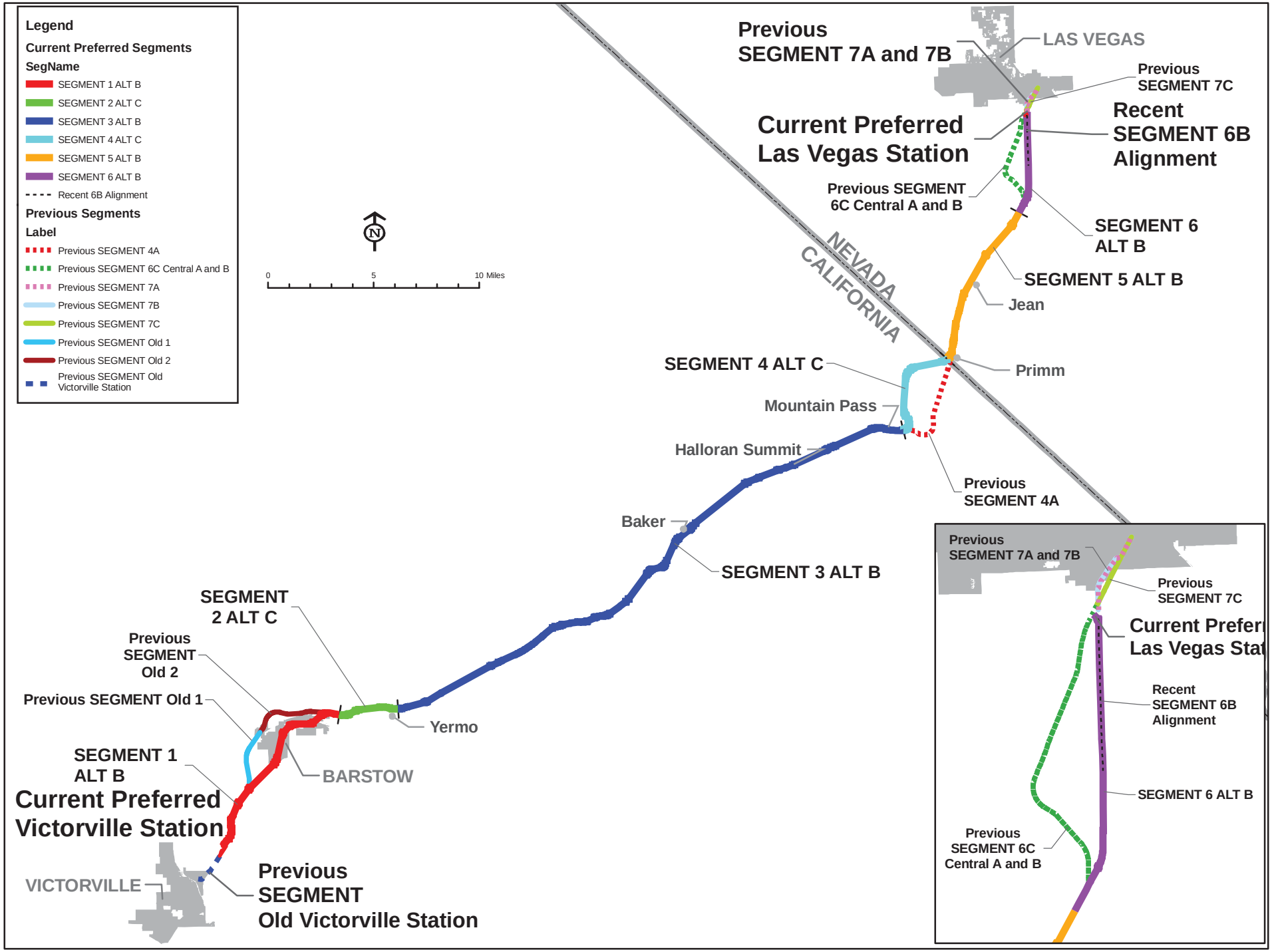

Figure 1. DesertXpress Project Alignment Alternatives F-I.4-45

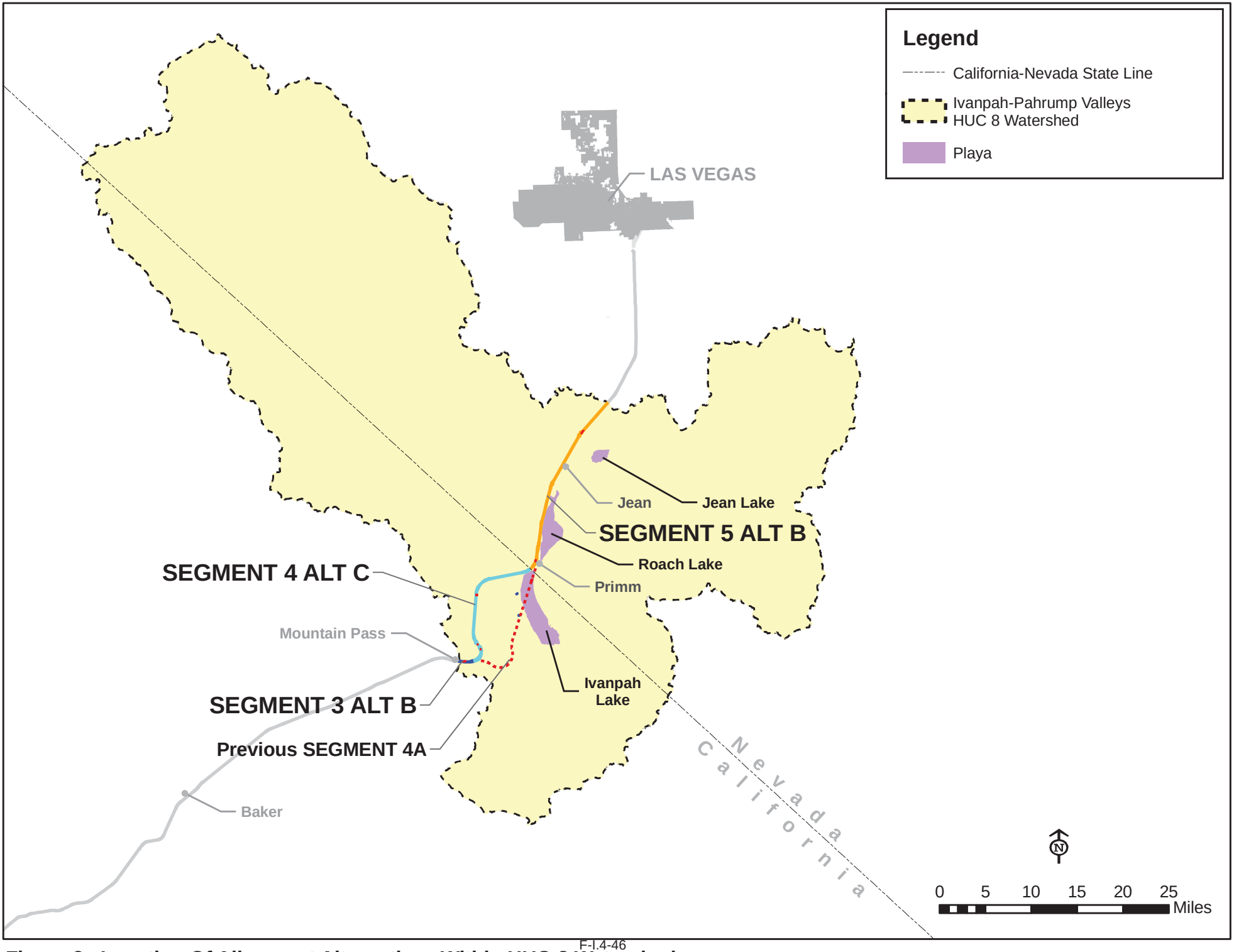

Figure 2. Location Of Alignment Alternatives Within HUC-8 Watershed

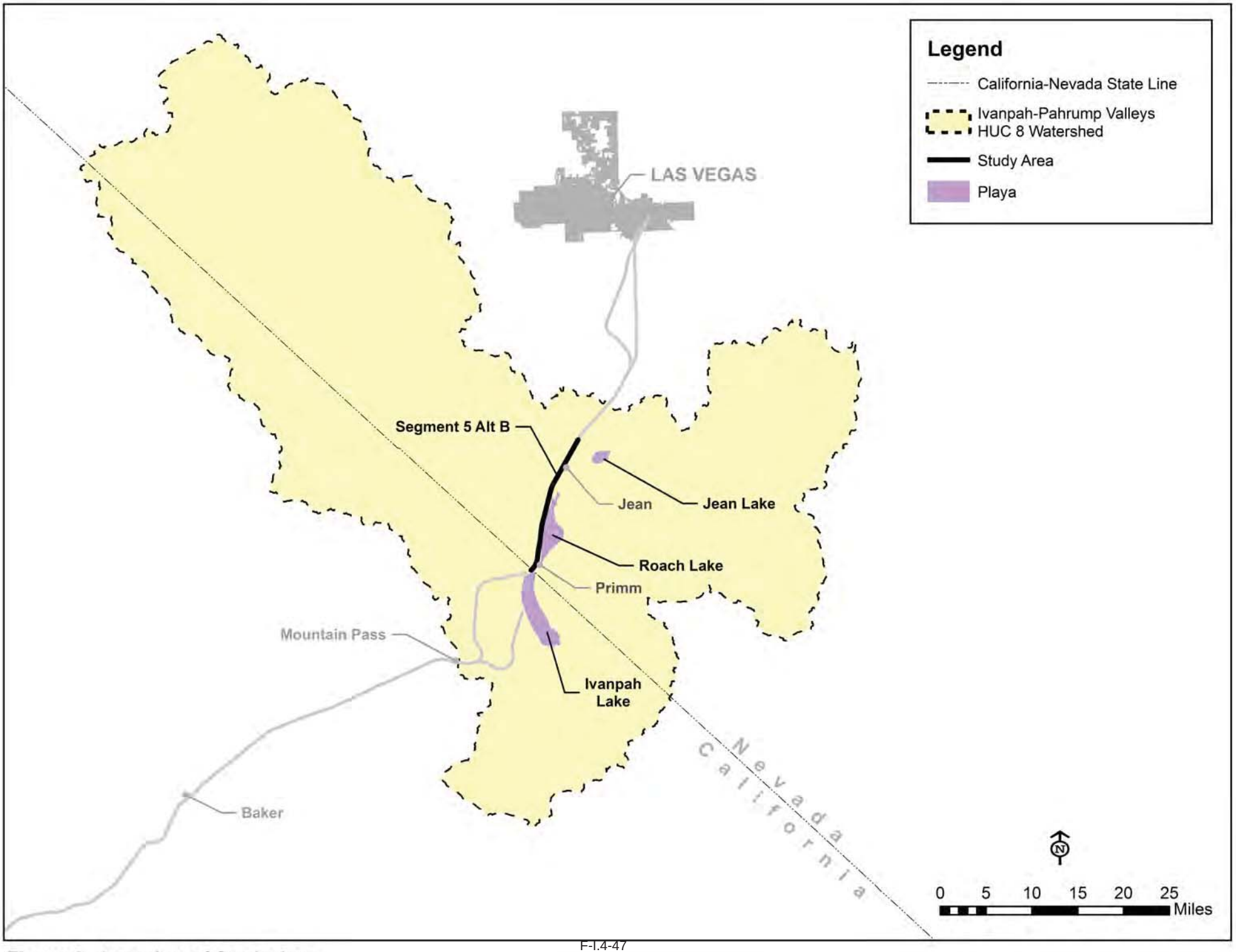

Figure 3. Location of Study Area

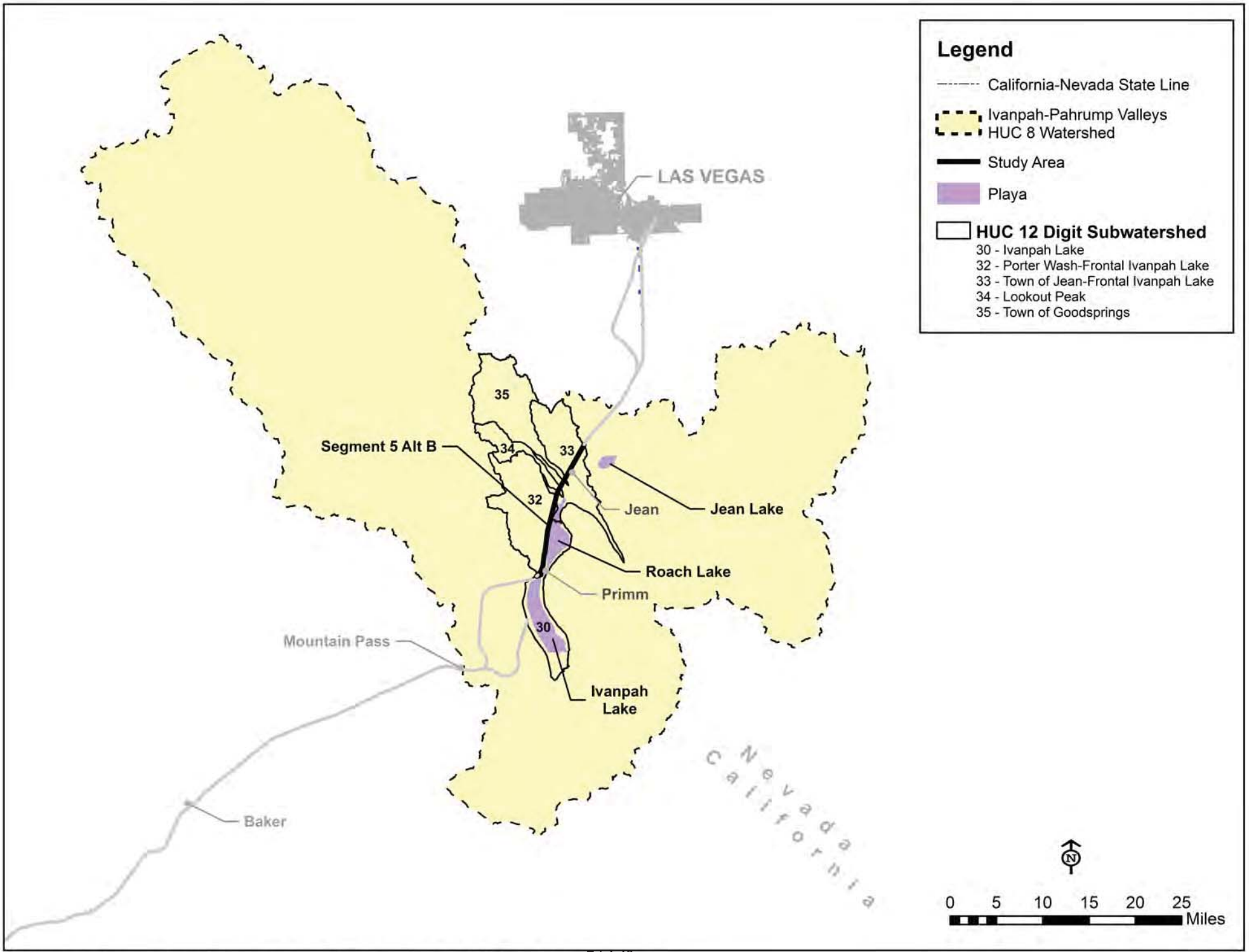

Figure 4. Location of Study Area Within HUC-8 / HUC-12 Watersheds

Exhibit A. Figure 5. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

Exhibit A. Figure 6. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

Exhibit A. Figure 7. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

Exhibit A. Figure 8. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

Exhibit A. Figure 9. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

Exhibit A. Figure 10. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

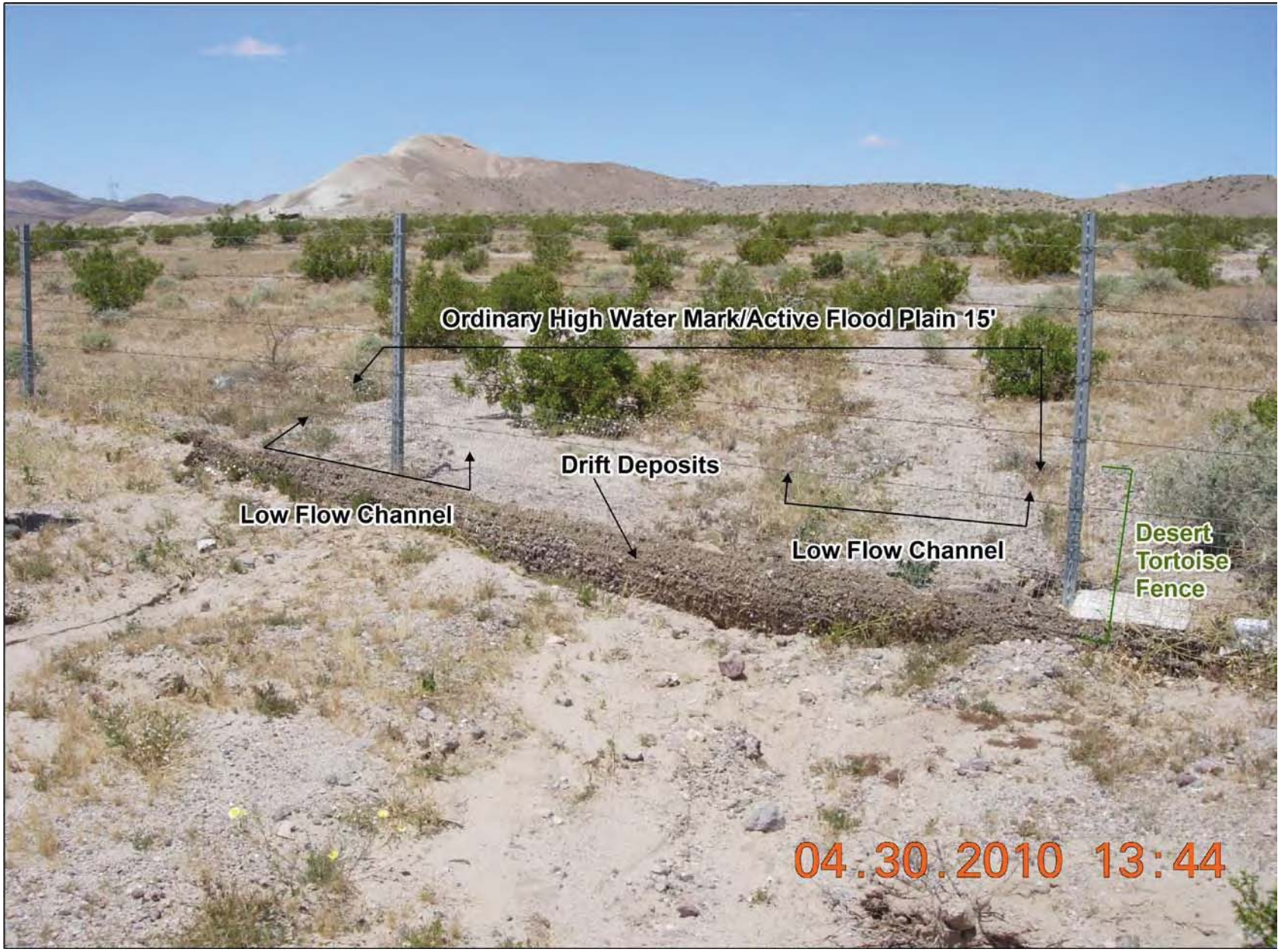

Exhibit A. Figure 11. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

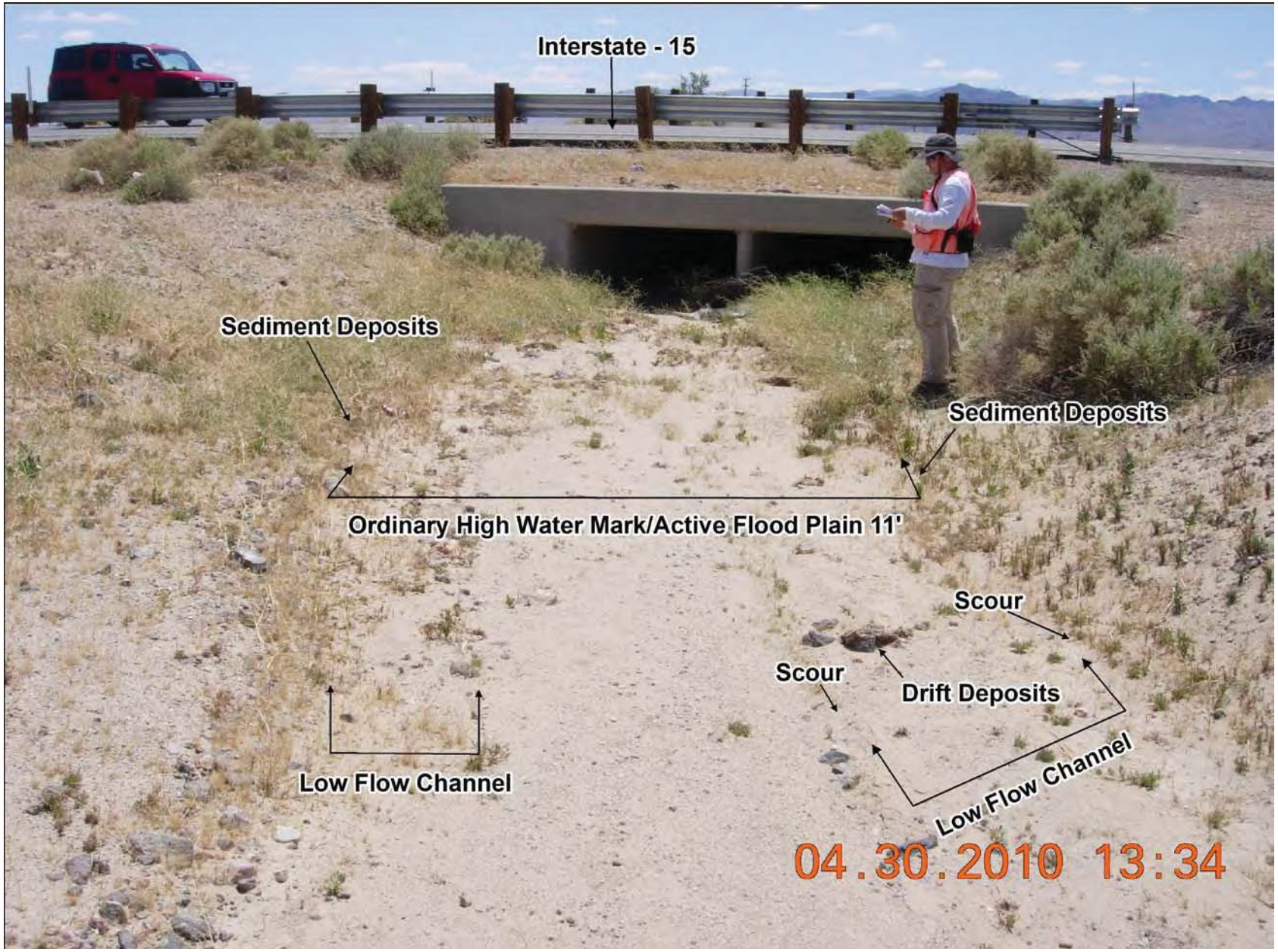

Exhibit A. Figure 12. Typical examples of field indicators of active surface water flow and Ordinary High Water Marks found within ephemerals drainages occurring within the DesertXpress Project Study Area.

Exhibit A. Figure 13. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Ivanpah Subwatershed

Exhibit A. Figure 14. Ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Ivanpah Subwatershed

Exhibit A. Figure 15. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Ivanpah Subwatershed

Exhibit A. Figure 16. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Ivanpah Subwatershed

Exhibit A. Figure 17. Manmade drainage connecting to ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 18. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash-Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 19. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 20. Ephemeral drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 21. Ephemeral drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 22. Manmade drainage connecting to ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 23. Ephemeral drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 24. Manmade drainage connecting to ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 25. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Porter Wash -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 26. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean-Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 27. Ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 28. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 29. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 30. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 31. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 32. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 33. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 34. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 35. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys Watersheds / HUC 12 Town of Jean -Frontal Ivanpah Lake Subwatershed

Exhibit A. Figure 36. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys / HUC 12 Town of Goodsprings Subwatershed

Exhibit A. Figure 37. Ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys / HUC 12 Town of Goodsprings Subwatershed

Exhibit A. Figure 38. Manmade drainage connecting to ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys / HUC 12 160600151401-Frontal Jean Lake Subwatershed

Exhibit A. Figure 39. Manmade drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys / HUC 12 160600151401-Frontal Jean Lake Subwatershed

Exhibit A. Figure 40. Manmade drainage connecting to ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys / HUC 12 160600151401-Frontal Jean Lake Subwatershed

Exhibit A. Figure 41. Ephemeral drainage connecting to road culvert within HUC 8 Ivanpah-Pahrump Valleys / HUC 12 160600151401-Frontal Jean Lake Subwatershed

Exhibit A. Figure 42. Ephemeral drainage within HUC 8 Ivanpah-Pahrump Valleys / HUC 12 160600151401-Frontal Jean Lake Subwatershed

Exhibit B

Field Data

Exhibit B1 Required Corps Waters Data Summary Table

Exhibit B2 Field Data*

(Exhibit B2 provided on attached CD in PDF format.)

Exhibit B1

Required Corps Waters Data Summary Table

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-28-3	R6	RIVERINE	0.479982	2090.8	NRPW	35.469048	-115.534003	Wheaton Wash-Frontal Ivanpah Lake	10.00	28M9
D-28-4	R6	RIVERINE	0.165381	720.4	NRPW	35.469455	-115.536374	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-5	R6	RIVERINE	0.023531	102.5	NRPW	35.469441	-115.533154	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-6	R6	RIVERINE	0.054477	237.3	NRPW	35.469094	-115.532528	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-7	R6	RIVERINE	0.092218	401.7	NRPW	35.469207	-115.531216	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-8	R6	RIVERINE	0.003227	156.2	NRPW	35.469032	-115.530491	Wheaton Wash-Frontal Ivanpah Lake	0.90	28D8
D-28-9	R6	RIVERINE	0.083907	365.5	NRPW	35.468580	-115.529527	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-10	R6	RIVERINE	0.020707	90.2	NRPW	35.468358	-115.527264	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-11	R6	RIVERINE	0.087167	379.7	NRPW	35.468411	-115.527911	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-12	R6	RIVERINE	0.038797	169.0	NRPW	35.468744	-115.526708	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-13	R6	RIVERINE	0.045340	197.5	NRPW	35.468865	-115.526990	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-17	R6	RIVERINE	0.491667	1427.8	NRPW	35.468832	-115.519500	Wheaton Wash-Frontal Ivanpah Lake	15.00	
D-28-19	R6	RIVERINE	0.009921	254.2	NRPW	35.469061	-115.517205	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-21	R6	RIVERINE	0.017631	76.8	NRPW	35.469028	-115.518910	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-23	R6	RIVERINE	0.053558	233.3	NRPW	35.468784	-115.520569	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-24	R6	RIVERINE	0.046419	202.2	NRPW	35.468501	-115.520566	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-25	R6	RIVERINE	0.316736	1379.7	NRPW	35.468358	-115.522927	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-26	R6	RIVERINE	0.079293	345.4	NRPW	35.468733	-115.521001	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-27	R6	RIVERINE	0.008996	230.5	NRPW	35.469333	-115.515778	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-34	R6	RIVERINE	0.010475	268.4	NRPW	35.470799	-115.509843	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-35	R6	RIVERINE	0.064909	336.6	NRPW	35.471108	-115.508754	Wheaton Wash-Frontal Ivanpah Lake	8.40	
D-28-36	R6	RIVERINE	0.014190	363.6	NRPW	35.471102	-115.508222	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-37	R6	RIVERINE	0.010806	276.9	NRPW	35.471372	-115.508060	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-38	R6	RIVERINE	0.011056	283.3	NRPW	35.471405	-115.507707	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-42	R6	RIVERINE	0.017074	437.5	NRPW	35.472289	-115.505506	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-43	R6	RIVERINE	0.023880	611.9	NRPW	35.472688	-115.504683	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-44	R6	RIVERINE	0.009238	236.7	NRPW	35.473531	-115.502909	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-46	R6	RIVERINE	0.060758	441.1	NRPW	35.475113	-115.501640	Wheaton Wash-Frontal Ivanpah Lake	6.00	
D-28-47	R6	RIVERINE	0.004792	122.8	NRPW	35.475409	-115.501940	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-48	R6	RIVERINE	0.038696	421.4	NRPW	35.476426	-115.500529	Wheaton Wash-Frontal Ivanpah Lake	4.00	
D-28-49	R6	RIVERINE	0.150344	436.6	NRPW	35.477910	-115.499513	Wheaton Wash-Frontal Ivanpah Lake	15.00	
D-28-50	R6	RIVERINE	0.165124	599.4	NRPW	35.478675	-115.499082	Wheaton Wash-Frontal Ivanpah Lake	12.00	
D-28-56	R6	RIVERINE	0.104155	453.7	NRPW	35.488143	-115.498944	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-57	R6	RIVERINE	0.015989	409.7	NRPW	35.490764	-115.500428	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-58	R6	RIVERINE	0.269284	469.2	NRPW	35.495665	-115.504539	Wheaton Wash-Frontal Ivanpah Lake	25.00	
D-28-59	R6	RIVERINE	0.128145	558.2	NRPW	35.497116	-115.505768	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-60	R6	RIVERINE	0.019466	498.8	NRPW	35.499385	-115.507358	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-61	R6	RIVERINE	0.028691	416.6	NRPW	35.500118	-115.507955	Wheaton Wash-Frontal Ivanpah Lake	3.00	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-28-62	R6	RIVERINE	0.117080	425.0	NRPW	35.501005	-115.508488	Wheaton Wash-Frontal Ivanpah Lake	12.00	
D-28-63	R6	RIVERINE	0.186731	406.7	NRPW	35.503023	-115.509763	Wheaton Wash-Frontal Ivanpah Lake	20.00	
D-28-64	R6	RIVERINE	0.116281	422.1	NRPW	35.507981	-115.511667	Wheaton Wash-Frontal Ivanpah Lake	12.00	
D-28-65	R6	RIVERINE	0.006912	177.1	NRPW	35.507631	-115.511988	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-66	R6	RIVERINE	0.044821	162.7	NRPW	35.507913	-115.512044	Wheaton Wash-Frontal Ivanpah Lake	12.00	
D-28-67	R6	RIVERINE	0.016321	418.2	NRPW	35.508723	-115.511778	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-68	R6	RIVERINE	0.343884	416.1	NRPW	35.515278	-115.512043	Wheaton Wash-Frontal Ivanpah Lake	36.00	
D-28-69	R6	RIVERINE	0.017991	461.0	NRPW	35.518491	-115.511790	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-70	R6	RIVERINE	0.091906	476.6	NRPW	35.520075	-115.511519	Wheaton Wash-Frontal Ivanpah Lake	8.40	
D-28-71	R6	RIVERINE	0.104017	453.1	NRPW	35.520460	-115.511505	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-72	R6	RIVERINE	0.134745	451.5	NRPW	35.521917	-115.511185	Wheaton Wash-Frontal Ivanpah Lake	13.00	
D-28-73	R6	RIVERINE	0.016009	410.2	NRPW	35.522257	-115.511276	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-74	R6	RIVERINE	0.090083	436.0	NRPW	35.524776	-115.510940	Wheaton Wash-Frontal Ivanpah Lake	9.00	
D-28-75	R6	RIVERINE	0.017222	441.3	NRPW	35.525654	-115.510812	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-76	R6	RIVERINE	0.056350	409.1	NRPW	35.526089	-115.510815	Wheaton Wash-Frontal Ivanpah Lake	6.00	
D-28-77	R6	RIVERINE	0.015837	405.8	NRPW	35.526680	-115.510754	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-78	R6	RIVERINE	0.412810	399.6	NRPW	35.526971	-115.510722	Wheaton Wash-Frontal Ivanpah Lake	45.00	
D-28-79	R6	RIVERINE	0.017078	437.6	NRPW	35.538605	-115.509432	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-81	R6	RIVERINE	0.025598	655.9	NRPW	35.540087	-115.509151	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-83	R6	RIVERINE	0.015583	399.3	NRPW	35.542145	-115.508943	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-86	R6	RIVERINE	0.024353	408.0	NRPW	35.543519	-115.508788	Wheaton Wash-Frontal Ivanpah Lake	2.60	28D4
D-28-87	R6	RIVERINE	0.016062	437.3	NRPW	35.543836	-115.508756	Wheaton Wash-Frontal Ivanpah Lake	1.60	
D-28-88	R6	RIVERINE	0.004815	419.5	NRPW	35.544431	-115.508677	Wheaton Wash-Frontal Ivanpah Lake	0.50	28D1
D-28-89	R6	RIVERINE	0.004660	406.0	NRPW	35.544369	-115.508682	Wheaton Wash-Frontal Ivanpah Lake	0.50	28D2
D-28-91	R6	RIVERINE	0.015243	415.0	NRPW	35.543991	-115.508720	Wheaton Wash-Frontal Ivanpah Lake	1.60	28D3
D-28-92	R6	RIVERINE	0.013512	218.0	NRPW	35.469309	-115.530978	Wheaton Wash-Frontal Ivanpah Lake	2.70	28D10
D-28-93	R6	RIVERINE	0.113774	590.0	NRPW	35.471345	-115.506578	Wheaton Wash-Frontal Ivanpah Lake	8.40	
D-28-94	R6	RIVERINE	0.072835	377.7	NRPW	35.471692	-115.506678	Wheaton Wash-Frontal Ivanpah Lake	8.40	
D-28-95	R6	RIVERINE	0.017359	444.8	NRPW	35.493119	-115.502305	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-96	R6	RIVERINE	0.013019	333.6	NRPW	35.492693	-115.502241	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-97	R6	RIVERINE	0.023256	595.9	NRPW	35.492360	-115.501673	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-98	R6	RIVERINE	0.017195	440.6	NRPW	35.493485	-115.502583	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-99	R6	RIVERINE	0.017929	459.4	NRPW	35.493644	-115.502806	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-100	R6	RIVERINE	0.058581	425.3	NRPW	35.506126	-115.511082	Wheaton Wash-Frontal Ivanpah Lake	6.00	
D-28-101	R6	RIVERINE	0.032004	464.7	NRPW	35.510315	-115.512083	Wheaton Wash-Frontal Ivanpah Lake	3.00	
D-28-102	R6	RIVERINE	0.031591	458.7	NRPW	35.511740	-115.512190	Wheaton Wash-Frontal Ivanpah Lake	3.00	
D-28-103	R6	RIVERINE	0.104568	455.5	NRPW	35.513287	-115.512230	Wheaton Wash-Frontal Ivanpah Lake	10.00	
D-28-104	R6	RIVERINE	0.014190	363.6	NRPW	35.514999	-115.512452	Wheaton Wash-Frontal Ivanpah Lake	1.70	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-28-105	R6	RIVERINE	0.034137	874.7	NRPW	35.516725	-115.511594	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-106	R6	RIVERINE	0.023221	595.0	NRPW	35.517483	-115.511863	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-107	R6	RIVERINE	0.019939	510.9	NRPW	35.521033	-115.511421	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-108	R6	RIVERINE	0.029208	424.1	NRPW	35.523906	-115.511081	Wheaton Wash-Frontal Ivanpah Lake	3.00	
D-28-109	R6	RIVERINE	0.003953	101.3	NRPW	35.529022	-115.510987	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-110	R6	RIVERINE	0.195826	473.9	NRPW	35.529141	-115.510545	Wheaton Wash-Frontal Ivanpah Lake	18.00	
D-28-111	R6	RIVERINE	0.040340	439.3	NRPW	35.530316	-115.510305	Wheaton Wash-Frontal Ivanpah Lake	4.00	
D-28-112	R6	RIVERINE	0.605234	439.4	NRPW	35.532597	-115.510070	Wheaton Wash-Frontal Ivanpah Lake	60.00	
D-28-113	R6	RIVERINE	0.247314	513.0	NRPW	35.533143	-115.510005	Wheaton Wash-Frontal Ivanpah Lake	21.00	
D-28-114	R6	RIVERINE	0.082167	447.4	NRPW	35.539250	-115.509245	Wheaton Wash-Frontal Ivanpah Lake	8.00	
D-28-115	R6	RIVERINE	0.080355	416.7	NRPW	35.541504	-115.509039	Wheaton Wash-Frontal Ivanpah Lake	8.40	
D-28-116	R6	RIVERINE	0.004067	104.2	NRPW	35.491939	-115.500696	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-117	R6	RIVERINE	0.002283	58.5	NRPW	35.495604	-115.504395	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-118	R6	RIVERINE	0.008441	216.3	NRPW	35.496839	-115.505612	Wheaton Wash-Frontal Ivanpah Lake	1.70	
D-28-119	R6	RIVERINE	0.045510	236.0	NRPW	35.520138	-115.511803	Wheaton Wash-Frontal Ivanpah Lake	8.40	
D-28-120	R6	RIVERINE	0.008926	216.0	NRPW	35.521918	-115.510941	Wheaton Wash-Frontal Ivanpah Lake	1.80	
D-28-121	R6	RIVERINE	0.042103	366.8	NRPW	35.532286	-115.510263	Wheaton Wash-Frontal Ivanpah Lake	5.00	
D-28-122	R6	RIVERINE	0.036639	532.0	NRPW	35.537581	-115.509573	Wheaton Wash-Frontal Ivanpah Lake	3.00	
D-28-123	R6	RIVERINE	0.056501	410.2	NRPW	35.535875	-115.509681	Wheaton Wash-Frontal Ivanpah Lake	6.00	
D-28-124	R6	RIVERINE	0.038338	417.5	NRPW	35.530861	-115.510258	Wheaton Wash-Frontal Ivanpah Lake	4.00	
D-28-125	R6	RIVERINE	0.014982	652.6	NRPW	35.506978	-115.511202	Wheaton Wash-Frontal Ivanpah Lake	1.00	
D-28-126	R6	RIVERINE	0.019527	425.3	NRPW	35.502119	-115.509231	Wheaton Wash-Frontal Ivanpah Lake	2.00	
D-28-127	R6	RIVERINE	0.020588	448.4	NRPW	35.479417	-115.498833	Wheaton Wash-Frontal Ivanpah Lake	2.00	
D-28-135	R6	RIVERINE	0.001407	122.6	NRPW	35.544387	-115.508689	Wheaton Wash-Frontal Ivanpah Lake	0.50	28D17
D-30-1	R6	RIVERINE	0.000904	24.6	NRPW	35.607640	-115.411184	Ivanpah Lake	1.60	
D-30-2	R6	RIVERINE	0.002373	64.6	NRPW	35.607789	-115.410750	Ivanpah Lake	1.60	
D-30-3	R6	RIVERINE	0.001146	31.2	NRPW	35.607686	-115.411016	Ivanpah Lake	1.60	
D-30-4	R6	RIVERINE	0.003016	82.1	NRPW	35.607958	-115.410083	Ivanpah Lake	1.60	
D-30-5	R6	RIVERINE	0.002872	78.2	NRPW	35.607933	-115.410162	Ivanpah Lake	1.60	
D-30-6	R6	RIVERINE	0.010105	275.1	NRPW	35.608688	-115.408099	Ivanpah Lake	1.60	
D-30-7	R6	RIVERINE	0.016283	443.3	NRPW	35.610083	-115.404767	Ivanpah Lake	1.60	
D-30-8	R6	RIVERINE	0.015809	430.4	NRPW	35.610265	-115.404431	Ivanpah Lake	1.60	
D-30-9	R6	RIVERINE	0.015449	420.6	NRPW	35.610719	-115.403087	Ivanpah Lake	1.60	
D-30-10	R6	RIVERINE	0.012275	334.2	NRPW	35.610912	-115.402919	Ivanpah Lake	1.60	
D-30-11	R6	RIVERINE	0.008268	225.1	NRPW	35.610469	-115.404391	Ivanpah Lake	1.60	
D-30-12	R6	RIVERINE	0.007963	216.8	NRPW	35.608529	-115.408540	Ivanpah Lake	1.60	
D-30-13	R6	RIVERINE	0.006461	175.9	NRPW	35.608401	-115.408720	Ivanpah Lake	1.60	
D-30-14	R6	RIVERINE	0.004437	120.8	NRPW	35.608445	-115.408950	Ivanpah Lake	1.60	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-30-15	R6	RIVERINE	0.014296	389.2	NRPW	35.609500	-115.406218	Ivanpah Lake	1.60	
D-30-16	R6	RIVERINE	0.016353	445.2	NRPW	35.609789	-115.405404	Ivanpah Lake	1.60	
D-30-17	R6	RIVERINE	0.009565	260.4	NRPW	35.609599	-115.405390	Ivanpah Lake	1.60	
D-30-18	R6	RIVERINE	0.015438	420.3	NRPW	35.610601	-115.403412	Ivanpah Lake	1.60	
D-30-19	R6	RIVERINE	0.014938	406.7	NRPW	35.612581	-115.399536	Ivanpah Lake	1.60	30D10
D-30-20	R6	RIVERINE	0.023330	406.5	NRPW	35.611858	-115.400794	Ivanpah Lake	2.50	30D14
D-30-45	R6	RIVERINE	0.001343	41.8	NRPW	35.613790	-115.398330	Ivanpah Lake	1.40	
D-30-46	R6	RIVERINE	0.007371	321.1	NRPW	35.700998	-115.369204	Ivanpah Lake	1.00	
D-30-47	R6	RIVERINE	0.007082	308.5	NRPW	35.695799	-115.371062	Ivanpah Lake	1.00	32M5E
D-30-48	R6	RIVERINE	0.007532	328.1	NRPW	35.693588	-115.371838	Ivanpah Lake	1.00	
D-30-49	R6	RIVERINE	0.007303	318.1	NRPW	35.691722	-115.372500	Ivanpah Lake	1.00	
D-30-50	R6	RIVERINE	0.007332	319.4	NRPW	35.688318	-115.373675	Ivanpah Lake	1.00	
D-30-51	R6	RIVERINE	0.023781	345.3	NRPW	35.684672	-115.374908	Ivanpah Lake	3.00	
D-30-52	R6	RIVERINE	0.020551	298.4	NRPW	35.681496	-115.375767	Ivanpah Lake	3.00	
D-30-53	R6	RIVERINE	0.020537	298.2	NRPW	35.673669	-115.377030	Ivanpah Lake	3.00	
D-30-54	R6	RIVERINE	0.022927	332.9	NRPW	35.664251	-115.378689	Ivanpah Lake	3.00	
D-30-55	R6	RIVERINE	0.020654	299.9	NRPW	35.670311	-115.377622	Ivanpah Lake	3.00	30BD17E
D-30-56	R6	RIVERINE	0.014105	307.2	NRPW	35.666434	-115.378319	Ivanpah Lake	2.00	
D-30-57	R6	RIVERINE	0.041377	300.4	NRPW	35.657919	-115.379722	Ivanpah Lake	6.00	
D-31-1	R6	RIVERINE	0.014635	425.0	NRPW	35.545231	-115.508559	Whisky Spring-Frontal Ivanpah Lake	1.50	31MD2
D-31-2	R6	RIVERINE	0.021490	407.0	NRPW	35.545855	-115.508513	Whisky Spring-Frontal Ivanpah Lake	2.30	31D3
D-31-3	R6	RIVERINE	0.014975	407.7	NRPW	35.556278	-115.507281	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-4	R6	RIVERINE	0.016129	439.1	NRPW	35.556489	-115.507225	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-7	R6	RIVERINE	0.014916	406.1	NRPW	35.557901	-115.507091	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-8	R6	RIVERINE	0.014803	403.0	NRPW	35.558257	-115.507046	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-9	R6	RIVERINE	0.094904	413.4	NRPW	35.558775	-115.506979	Whisky Spring-Frontal Ivanpah Lake	10.00	
D-31-10	R6	RIVERINE	0.004371	119.0	NRPW	35.558981	-115.507465	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-11	R6	RIVERINE	0.031515	457.6	NRPW	35.559806	-115.506890	Whisky Spring-Frontal Ivanpah Lake	3.00	
D-31-12	R6	RIVERINE	0.014773	402.2	NRPW	35.560221	-115.506855	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-13	R6	RIVERINE	0.015085	410.7	NRPW	35.561484	-115.506671	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-14	R6	RIVERINE	0.077479	337.5	NRPW	35.561120	-115.506969	Whisky Spring-Frontal Ivanpah Lake	10.00	
D-31-18	R6	RIVERINE	0.046143	502.5	NRPW	35.563733	-115.506422	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-19	R6	RIVERINE	0.020950	456.3	NRPW	35.563468	-115.506438	Whisky Spring-Frontal Ivanpah Lake	2.00	
D-31-20	R6	RIVERINE	0.038678	421.2	NRPW	35.564319	-115.506341	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-21	R6	RIVERINE	0.113609	412.4	NRPW	35.564924	-115.506283	Whisky Spring-Frontal Ivanpah Lake	12.00	
D-31-22	R6	RIVERINE	0.004500	122.5	NRPW	35.564979	-115.506739	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-23	R6	RIVERINE	0.013157	358.2	NRPW	35.564785	-115.506390	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-24	R6	RIVERINE	0.142149	412.8	NRPW	35.565339	-115.506222	Whisky Spring-Frontal Ivanpah Lake	15.00	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-31-25	R6	RIVERINE	0.513453	422.0	NRPW	35.567355	-115.505968	Whisky Spring-Frontal Ivanpah Lake	53.00	
D-31-26	R6	RIVERINE	0.056322	408.9	NRPW	35.567979	-115.505917	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-28	R6	RIVERINE	0.114463	415.5	NRPW	35.568431	-115.505851	Whisky Spring-Frontal Ivanpah Lake	12.00	
D-31-29	R6	RIVERINE	0.015140	412.2	NRPW	35.568497	-115.505864	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-30	R6	RIVERINE	0.156612	454.8	NRPW	35.569032	-115.505776	Whisky Spring-Frontal Ivanpah Lake	15.00	
D-31-35	R6	RIVERINE	0.015313	416.9	NRPW	35.570569	-115.505623	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-37	R6	RIVERINE	0.015526	422.7	NRPW	35.570205	-115.505649	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-38	R6	RIVERINE	0.009991	272.0	NRPW	35.570289	-115.505869	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-39	R6	RIVERINE	0.220937	401.0	NRPW	35.570843	-115.505577	Whisky Spring-Frontal Ivanpah Lake	24.00	
D-31-42	R6	RIVERINE	0.042103	458.5	NRPW	35.572002	-115.505528	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-43	R6	RIVERINE	0.036529	994.5	NRPW	35.573102	-115.504485	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-44	R6	RIVERINE	0.036973	1006.6	NRPW	35.573292	-115.504498	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-45	R6	RIVERINE	0.005028	136.9	NRPW	35.572751	-115.505815	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-48	R6	RIVERINE	0.472548	980.2	NRPW	35.573950	-115.504338	Whisky Spring-Frontal Ivanpah Lake	21.00	
D-31-49	R6	RIVERINE	0.027949	760.9	NRPW	35.574604	-115.504541	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-50	R6	RIVERINE	0.254878	444.1	NRPW	35.575856	-115.504857	Whisky Spring-Frontal Ivanpah Lake	25.00	
D-31-60	R6	RIVERINE	0.164959	449.1	NRPW	35.577004	-115.504651	Whisky Spring-Frontal Ivanpah Lake	16.00	
D-31-63	R6	RIVERINE	0.051090	445.1	NRPW	35.577677	-115.504538	Whisky Spring-Frontal Ivanpah Lake	5.00	
D-31-64	R6	RIVERINE	0.059284	430.4	NRPW	35.578841	-115.504182	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-65	R6	RIVERINE	0.016062	437.3	NRPW	35.578415	-115.504349	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-75	R6	RIVERINE	0.070627	439.5	NRPW	35.580030	-115.503817	Whisky Spring-Frontal Ivanpah Lake	7.00	
D-31-86	R6	RIVERINE	0.079210	431.3	NRPW	35.581538	-115.503163	Whisky Spring-Frontal Ivanpah Lake	8.00	
D-31-94	R6	RIVERINE	0.049415	430.5	NRPW	35.582906	-115.502503	Whisky Spring-Frontal Ivanpah Lake	5.00	
D-31-99	R6	RIVERINE	0.057874	504.2	NRPW	35.584403	-115.501613	Whisky Spring-Frontal Ivanpah Lake	5.00	
D-31-100	R6	RIVERINE	0.035611	387.8	NRPW	35.584860	-115.501391	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-108	R6	RIVERINE	0.112741	491.1	NRPW	35.586560	-115.500176	Whisky Spring-Frontal Ivanpah Lake	10.00	
D-31-117	R6	RIVERINE	0.021235	462.5	NRPW	35.587028	-115.499876	Whisky Spring-Frontal Ivanpah Lake	2.00	
D-31-119	R6	RIVERINE	0.016320	444.3	NRPW	35.588046	-115.498931	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-121	R6	RIVERINE	0.015967	434.7	NRPW	35.587897	-115.499004	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-122	R6	RIVERINE	0.761226	473.7	NRPW	35.588212	-115.498662	Whisky Spring-Frontal Ivanpah Lake	70.00	
D-31-124	R6	RIVERINE	0.016298	443.7	NRPW	35.588859	-115.498140	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-125	R6	RIVERINE	0.935331	452.7	NRPW	35.589091	-115.497919	Whisky Spring-Frontal Ivanpah Lake	90.00	
D-31-126	R6	RIVERINE	0.016716	455.1	NRPW	35.588979	-115.498021	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-127	R6	RIVERINE	0.015383	418.8	NRPW	35.589898	-115.497192	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-128	R6	RIVERINE	0.021895	596.1	NRPW	35.590859	-115.496233	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-129	R6	RIVERINE	0.995443	667.1	NRPW	35.590534	-115.496476	Whisky Spring-Frontal Ivanpah Lake	65.00	
D-31-131	R6	RIVERINE	0.021763	592.5	NRPW	35.590887	-115.496012	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-132	R6	RIVERINE	0.002424	66.0	NRPW	35.590959	-115.496786	Whisky Spring-Frontal Ivanpah Lake	1.60	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-31-133	R6	RIVERINE	0.021712	591.1	NRPW	35.591072	-115.495777	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-134	R6	RIVERINE	0.041357	600.5	NRPW	35.591296	-115.495554	Whisky Spring-Frontal Ivanpah Lake	3.00	
D-31-135	R6	RIVERINE	0.009341	254.3	NRPW	35.591151	-115.496324	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-138	R6	RIVERINE	0.015416	419.7	NRPW	35.591916	-115.494816	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-140	R6	RIVERINE	0.074564	406.0	NRPW	35.591736	-115.495290	Whisky Spring-Frontal Ivanpah Lake	8.00	
D-31-141	R6	RIVERINE	0.011607	316.0	NRPW	35.591597	-115.495688	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-142	R6	RIVERINE	0.023592	642.3	NRPW	35.591562	-115.495389	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-143	R6	RIVERINE	0.009366	255.0	NRPW	35.591538	-115.494802	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-144	R6	RIVERINE	0.034587	502.2	NRPW	35.592483	-115.494118	Whisky Spring-Frontal Ivanpah Lake	3.00	
D-31-148	R6	RIVERINE	1.634986	712.2	NRPW	35.594067	-115.491587	Whisky Spring-Frontal Ivanpah Lake	100.00	
D-31-150	R6	RIVERINE	0.022949	624.8	NRPW	35.593739	-115.491833	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-152	R6	RIVERINE	0.032500	471.9	NRPW	35.593336	-115.492778	Whisky Spring-Frontal Ivanpah Lake	3.00	
D-31-153	R6	RIVERINE	0.017421	474.3	NRPW	35.593594	-115.492400	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-154	R6	RIVERINE	0.007611	207.2	NRPW	35.593720	-115.492224	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-155	R6	RIVERINE	0.014744	401.4	NRPW	35.593938	-115.492197	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-156	R6	RIVERINE	0.013095	356.5	NRPW	35.594062	-115.491334	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-157	R6	RIVERINE	0.212718	926.6	NRPW	35.595005	-115.490306	Whisky Spring-Frontal Ivanpah Lake	10.00	
D-31-171	R6	RIVERINE	0.075815	660.5	NRPW	35.596458	-115.486967	Whisky Spring-Frontal Ivanpah Lake	5.00	
D-31-178	R6	RIVERINE	0.227961	827.5	NRPW	35.597033	-115.485531	Whisky Spring-Frontal Ivanpah Lake	12.00	
D-31-186	R6	RIVERINE	0.117810	855.3	NRPW	35.598129	-115.482118	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-191	R6	RIVERINE	0.015728	428.2	NRPW	35.572448	-115.505344	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-193	R6	RIVERINE	0.016485	448.8	NRPW	35.590268	-115.496924	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-196	R6	RIVERINE	0.024217	659.3	NRPW	35.599228	-115.476617	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-200	R6	RIVERINE	0.027071	737.0	NRPW	35.599434	-115.475526	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-201	R6	RIVERINE	0.024287	661.2	NRPW	35.599310	-115.475938	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-202	R6	RIVERINE	0.023052	627.6	NRPW	35.599287	-115.476370	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-206	R6	RIVERINE	0.173416	1259.0	NRPW	35.599677	-115.471960	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-214	R6	RIVERINE	0.089706	976.9	NRPW	35.599908	-115.468676	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-217	R6	RIVERINE	0.332433	1810.1	NRPW	35.600410	-115.466294	Whisky Spring-Frontal Ivanpah Lake	8.00	
D-31-219	R6	RIVERINE	0.622360	2711.0	NRPW	35.600710	-115.463904	Whisky Spring-Frontal Ivanpah Lake	10.00	
D-31-232	R6	RIVERINE	0.235234	853.9	NRPW	35.602076	-115.455944	Whisky Spring-Frontal Ivanpah Lake	12.00	
D-31-241	R6	RIVERINE	0.283099	2055.3	NRPW	35.602671	-115.452788	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-244	R6	RIVERINE	0.172975	627.9	NRPW	35.602152	-115.455511	Whisky Spring-Frontal Ivanpah Lake	12.00	
D-31-250	R6	RIVERINE	0.500964	1091.1	NRPW	35.602155	-115.453218	Whisky Spring-Frontal Ivanpah Lake	20.00	
D-31-312	R6	RIVERINE	0.132287	960.4	NRPW	35.603114	-115.447914	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-313	R6	RIVERINE	0.027265	742.3	NRPW	35.603238	-115.447093	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-314	R6	RIVERINE	0.326033	946.8	NRPW	35.603110	-115.447582	Whisky Spring-Frontal Ivanpah Lake	15.00	
D-31-315	R6	RIVERINE	0.522727	227.7	NRPW	35.603580	-115.448128	Whisky Spring-Frontal Ivanpah Lake	100.00	

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D-31-321	R6	RIVERINE	0.145289	1054.8	NRPW	35.603327	-115.445137	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-325	R6	RIVERINE	0.030294	329.9	NRPW	35.603239	-115.445991	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-333	R6	RIVERINE	0.071930	1958.3	NRPW	35.603973	-115.443007	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-347	R6	RIVERINE	0.028331	771.3	NRPW	35.604189	-115.440895	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-350	R6	RIVERINE	5.089509	943.4	NRPW	35.604280	-115.439148	Whisky Spring-Frontal Ivanpah Lake	235.00	
D-31-359	R6	RIVERINE	2.347303	435.1	NRPW	35.604662	-115.438035	Whisky Spring-Frontal Ivanpah Lake	235.00	
D-31-363	R6	RIVERINE	3.072397	1394.1	NRPW	35.605382	-115.434362	Whisky Spring-Frontal Ivanpah Lake	96.00	
D-31-365	R6	RIVERINE	0.687603	312.0	NRPW	35.605138	-115.434855	Whisky Spring-Frontal Ivanpah Lake	96.00	
D-31-369	R6	RIVERINE	1.300000	629.2	NRPW	35.605266	-115.430291	Whisky Spring-Frontal Ivanpah Lake	90.00	
D-31-370	R6	RIVERINE	0.017792	484.4	NRPW	35.605553	-115.430023	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-371	R6	RIVERINE	0.040900	445.4	NRPW	35.605608	-115.429268	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-373	R6	RIVERINE	0.028599	778.6	NRPW	35.605559	-115.431512	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-375	R6	RIVERINE	0.004852	132.1	NRPW	35.605699	-115.431751	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-376	R6	RIVERINE	1.056818	511.5	NRPW	35.605465	-115.431043	Whisky Spring-Frontal Ivanpah Lake	90.00	
D-31-378	R6	RIVERINE	0.015331	417.4	NRPW	35.605832	-115.427947	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-379	R6	RIVERINE	0.014913	406.0	NRPW	35.605808	-115.428008	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-380	R6	RIVERINE	0.015783	429.7	NRPW	35.606016	-115.426744	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-381	R6	RIVERINE	0.015196	413.7	NRPW	35.605987	-115.426640	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-382	R6	RIVERINE	0.015089	410.8	NRPW	35.606140	-115.425565	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-383	R6	RIVERINE	0.017142	466.7	NRPW	35.606183	-115.425186	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-384	R6	RIVERINE	0.017543	477.6	NRPW	35.606307	-115.424275	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-385	R6	RIVERINE	0.004158	113.2	NRPW	35.606689	-115.424443	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-386	R6	RIVERINE	0.016073	437.6	NRPW	35.606447	-115.423057	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-387	R6	RIVERINE	0.013039	355.0	NRPW	35.606571	-115.422808	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-388	R6	RIVERINE	0.015074	410.4	NRPW	35.606604	-115.422097	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-389	R6	RIVERINE	0.010938	297.8	NRPW	35.606740	-115.422208	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-390	R6	RIVERINE	0.014659	399.1	NRPW	35.606648	-115.421558	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-391	R6	RIVERINE	0.016338	444.8	NRPW	35.606739	-115.421112	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-392	R6	RIVERINE	0.080220	436.8	NRPW	35.606896	-115.420000	Whisky Spring-Frontal Ivanpah Lake	8.00	
D-31-393	R6	RIVERINE	0.015519	422.5	NRPW	35.607062	-115.418676	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-394	R6	RIVERINE	0.014461	393.7	NRPW	35.607100	-115.418232	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-395	R6	RIVERINE	0.009054	246.5	NRPW	35.606859	-115.418380	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-396	R6	RIVERINE	0.086465	470.8	NRPW	35.607088	-115.417852	Whisky Spring-Frontal Ivanpah Lake	8.00	
D-31-399	R6	RIVERINE	0.017469	475.6	NRPW	35.607561	-115.415678	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-400	R6	RIVERINE	0.009087	247.4	NRPW	35.607720	-115.415467	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-401	R6	RIVERINE	0.009517	259.1	NRPW	35.607763	-115.415664	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-402	R6	RIVERINE	0.015133	412.0	NRPW	35.607674	-115.414203	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-403	R6	RIVERINE	0.015456	420.8	NRPW	35.607672	-115.414069	Whisky Spring-Frontal Ivanpah Lake	1.60	

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D-31-404	R6	RIVERINE	0.016040	436.7	NRPW	35.607725	-115.413884	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-405	R6	RIVERINE	0.004926	134.1	NRPW	35.608051	-115.414285	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-406	R6	RIVERINE	0.015578	424.1	NRPW	35.607877	-115.412810	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-407	R6	RIVERINE	0.016312	444.1	NRPW	35.608144	-115.411586	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-408	R6	RIVERINE	0.014200	386.6	NRPW	35.608276	-115.411208	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-409	R6	RIVERINE	0.006307	171.7	NRPW	35.607959	-115.411093	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-410	R6	RIVERINE	0.014094	383.7	NRPW	35.608370	-115.410676	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-411	R6	RIVERINE	0.000353	9.6	NRPW	35.608053	-115.410181	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-412	R6	RIVERINE	0.004242	115.5	NRPW	35.608540	-115.411365	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-413	R6	RIVERINE	0.006417	174.7	NRPW	35.609059	-115.408638	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-414	R6	RIVERINE	0.004580	399.0	NRPW	35.545059	-115.508601	Whisky Spring-Frontal Ivanpah Lake	0.50	31D1
D-31-415	R6	RIVERINE	0.502562	405.4	NRPW	35.546159	-115.508477	Whisky Spring-Frontal Ivanpah Lake	54.00	
D-31-416	R6	RIVERINE	0.031990	464.5	NRPW	35.550995	-115.507915	Whisky Spring-Frontal Ivanpah Lake	3.00	
D-31-417	R6	RIVERINE	0.813017	393.5	NRPW	35.553765	-115.507585	Whisky Spring-Frontal Ivanpah Lake	90.00	
D-31-419	R6	RIVERINE	0.040088	406.1	NRPW	35.555100	-115.507427	Whisky Spring-Frontal Ivanpah Lake	4.30	
D-31-421	R6	RIVERINE	0.868182	420.2	NRPW	35.565872	-115.506205	Whisky Spring-Frontal Ivanpah Lake	90.00	
D-31-422	R6	RIVERINE	0.040779	413.1	NRPW	35.575737	-115.504940	Whisky Spring-Frontal Ivanpah Lake	4.30	
D-31-424	R6	RIVERINE	0.038400	389.0	NRPW	35.580656	-115.503545	Whisky Spring-Frontal Ivanpah Lake	4.30	
D-31-426	R6	RIVERINE	0.117883	513.5	NRPW	35.586520	-115.500302	Whisky Spring-Frontal Ivanpah Lake	10.00	
D-31-427	R6	RIVERINE	0.014733	401.1	NRPW	35.582552	-115.502743	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-428	R6	RIVERINE	0.020327	553.4	NRPW	35.584442	-115.501721	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-429	R6	RIVERINE	0.279339	405.6	NRPW	35.585242	-115.501116	Whisky Spring-Frontal Ivanpah Lake	30.00	
D-31-430	R6	RIVERINE	0.031864	867.5	NRPW	35.599666	-115.474430	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-431	R6	RIVERINE	0.024937	678.9	NRPW	35.601916	-115.456721	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-433	R6	RIVERINE	0.023857	649.5	NRPW	35.602921	-115.449267	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-434	R6	RIVERINE	0.137549	1393.4	NRPW	35.604552	-115.437755	Whisky Spring-Frontal Ivanpah Lake	4.30	
D-31-435	R6	RIVERINE	0.157484	857.5	NRPW	35.602042	-115.452457	Whisky Spring-Frontal Ivanpah Lake	8.00	
D-31-436	R6	RIVERINE	0.821304	1788.8	NRPW	35.602758	-115.452720	Whisky Spring-Frontal Ivanpah Lake	20.00	
D-31-437	R6	RIVERINE	0.017866	486.4	NRPW	35.551751	-115.507883	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-438	R6	RIVERINE	0.314738	457.0	NRPW	35.550706	-115.507922	Whisky Spring-Frontal Ivanpah Lake	30.00	
D-31-439	R6	RIVERINE	0.007129	194.1	NRPW	35.609016	-115.408864	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-440	R6	RIVERINE	0.008720	237.4	NRPW	35.608917	-115.409003	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-441	R6	RIVERINE	0.009818	267.3	NRPW	35.608761	-115.409461	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-442	R6	RIVERINE	0.001139	31.0	NRPW	35.609891	-115.406728	Whisky Spring-Frontal Ivanpah Lake	1.60	
D-31-443	R6	RIVERINE	0.126777	920.4	NRPW	35.601616	-115.459635	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-444	R6	RIVERINE	0.039995	871.1	NRPW	35.598223	-115.481221	Whisky Spring-Frontal Ivanpah Lake	2.00	
D-31-445	R6	RIVERINE	0.065767	716.2	NRPW	35.598765	-115.479320	Whisky Spring-Frontal Ivanpah Lake	4.00	
D-31-446	R6	RIVERINE	0.023434	510.4	NRPW	35.589442	-115.497511	Whisky Spring-Frontal Ivanpah Lake	2.00	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-31-447	R6	RIVERINE	0.018884	411.3	NRPW	35.583072	-115.502514	Whisky Spring-Frontal Ivanpah Lake	2.00	
D-31-448	R6	RIVERINE	0.020372	443.7	NRPW	35.549828	-115.508052	Whisky Spring-Frontal Ivanpah Lake	2.00	
D-31-449	R6	RIVERINE	0.059270	430.3	NRPW	35.549129	-115.508109	Whisky Spring-Frontal Ivanpah Lake	6.00	
D-31-450	R6	RIVERINE	0.019151	417.1	NRPW	35.547691	-115.508322	Whisky Spring-Frontal Ivanpah Lake	2.00	
D-31-451	R6	RIVERINE	0.080129	436.3	NRPW	35.546664	-115.508445	Whisky Spring-Frontal Ivanpah Lake	8.00	
D-31-452	R6	RIVERINE	0.005072	157.8	NRPW	35.613675	-115.397904	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-453	R6	RIVERINE	0.011146	346.8	NRPW	35.613572	-115.397759	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-454	R6	RIVERINE	0.013508	420.3	NRPW	35.613774	-115.397454	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-455	R6	RIVERINE	0.006299	196.0	NRPW	35.614049	-115.398075	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-456	R6	RIVERINE	0.002594	80.7	NRPW	35.614390	-115.397679	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-457	R6	RIVERINE	0.006058	188.5	NRPW	35.614284	-115.397666	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-458	R6	RIVERINE	0.006936	215.8	NRPW	35.614170	-115.397634	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-459	R6	RIVERINE	0.002854	88.8	NRPW	35.613851	-115.397892	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-460	R6	RIVERINE	0.002722	84.7	NRPW	35.613785	-115.397904	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-461	R6	RIVERINE	0.003098	96.4	NRPW	35.614109	-115.397858	Whisky Spring-Frontal Ivanpah Lake	1.40	
D-31-462	R6	RIVERINE	0.004792	417.5	NRPW	35.544638	-115.508626	Whisky Spring-Frontal Ivanpah Lake	0.50	31D5
D-32-1	R6	RIVERINE	0.016336	355.8	NRPW	35.615488	-115.394535	Porter Wash-Frontal Ivanpah Lake	2.00	
D-32-2	R6	RIVERINE	0.001883	58.6	NRPW	35.616129	-115.393801	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-5	R6	RIVERINE	0.005483	170.6	NRPW	35.618379	-115.391743	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-6	R6	RIVERINE	0.009841	306.2	NRPW	35.618542	-115.391457	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-7	R6	RIVERINE	0.012296	82.4	NRPW	35.619980	-115.391589	Porter Wash-Frontal Ivanpah Lake	6.50	
D-32-8	R6	RIVERINE	0.043169	289.3	NRPW	35.620134	-115.391296	Porter Wash-Frontal Ivanpah Lake	6.50	
D-32-11	R6	RIVERINE	0.014813	460.9	NRPW	35.621909	-115.389492	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-13	R6	RIVERINE	0.010477	380.3	NRPW	35.625101	-115.387671	Porter Wash-Frontal Ivanpah Lake	1.20	32D18W
D-32-14	R6	RIVERINE	0.004013	218.5	NRPW	35.625054	-115.387339	Porter Wash-Frontal Ivanpah Lake	0.80	
D-32-15	R6	RIVERINE	0.003295	179.4	NRPW	35.625044	-115.387850	Porter Wash-Frontal Ivanpah Lake	0.80	
D-32-16	R6	RIVERINE	0.002937	159.9	NRPW	35.625009	-115.387935	Porter Wash-Frontal Ivanpah Lake	0.80	
D-32-17	R6	RIVERINE	0.006500	353.9	NRPW	35.624950	-115.387683	Porter Wash-Frontal Ivanpah Lake	0.80	32D17W
D-32-18	R6	RIVERINE	0.007742	240.9	NRPW	35.624838	-115.387610	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-19	R6	RIVERINE	0.011271	350.7	NRPW	35.626189	-115.387494	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-20	R6	RIVERINE	0.011943	371.6	NRPW	35.626005	-115.387591	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-22	R6	RIVERINE	0.013855	431.1	NRPW	35.626802	-115.387060	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-23	R6	RIVERINE	0.009729	302.7	NRPW	35.626701	-115.387285	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-25	R6	RIVERINE	0.011831	368.1	NRPW	35.629197	-115.386397	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-26	R6	RIVERINE	0.010304	320.6	NRPW	35.629326	-115.386445	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-27	R6	RIVERINE	0.011230	349.4	NRPW	35.629476	-115.386330	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-28	R6	RIVERINE	0.007852	244.3	NRPW	35.629690	-115.386590	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-29	R6	RIVERINE	0.008842	275.1	NRPW	35.630529	-115.386269	Porter Wash-Frontal Ivanpah Lake	1.40	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-32-30	R6	RIVERINE	0.001980	61.6	NRPW	35.630543	-115.386581	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-31	R6	RIVERINE	0.003085	96.0	NRPW	35.630377	-115.386557	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-32	R6	RIVERINE	0.002227	69.3	NRPW	35.630334	-115.386665	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-33	R6	RIVERINE	0.009533	296.6	NRPW	35.631936	-115.386000	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-34	R6	RIVERINE	0.007125	221.7	NRPW	35.632100	-115.385782	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-35	R6	RIVERINE	0.006698	208.4	NRPW	35.632000	-115.386120	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-36	R6	RIVERINE	0.008729	271.6	NRPW	35.632402	-115.385909	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-37	R6	RIVERINE	0.005187	161.4	NRPW	35.632505	-115.386054	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-38	R6	RIVERINE	0.002848	88.6	NRPW	35.632474	-115.386195	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-39	R6	RIVERINE	0.010429	324.5	NRPW	35.632821	-115.385733	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-40	R6	RIVERINE	0.004480	139.4	NRPW	35.632917	-115.386018	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-41	R6	RIVERINE	0.008315	258.7	NRPW	35.633013	-115.385808	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-42	R6	RIVERINE	0.007235	225.1	NRPW	35.634312	-115.385744	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-44	R6	RIVERINE	0.008687	270.3	NRPW	35.634897	-115.385475	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-45	R6	RIVERINE	0.009684	301.3	NRPW	35.635163	-115.385392	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-46	R6	RIVERINE	0.008128	252.9	NRPW	35.635234	-115.385471	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-47	R6	RIVERINE	0.007848	244.2	NRPW	35.635665	-115.385400	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-48	R6	RIVERINE	0.008996	279.9	NRPW	35.635586	-115.385467	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-49	R6	RIVERINE	0.007264	226.0	NRPW	35.636435	-115.385277	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-50	R6	RIVERINE	0.007511	233.7	NRPW	35.636725	-115.385232	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-51	R6	RIVERINE	0.005557	172.9	NRPW	35.636669	-115.385349	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-53	R6	RIVERINE	0.005438	169.2	NRPW	35.637159	-115.385237	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-54	R6	RIVERINE	0.004223	131.4	NRPW	35.637071	-115.385325	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-55	R6	RIVERINE	0.003021	94.0	NRPW	35.637128	-115.385384	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-56	R6	RIVERINE	0.007755	241.3	NRPW	35.637778	-115.385032	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-57	R6	RIVERINE	0.006560	204.1	NRPW	35.637856	-115.385144	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-58	R6	RIVERINE	0.007758	241.4	NRPW	35.638089	-115.384984	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-60	R6	RIVERINE	0.007421	230.9	NRPW	35.638159	-115.384977	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-61	R6	RIVERINE	0.001668	51.9	NRPW	35.638242	-115.385275	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-65	R6	RIVERINE	0.009096	283.0	NRPW	35.638758	-115.384823	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-66	R6	RIVERINE	0.007797	242.6	NRPW	35.638840	-115.384856	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-67	R6	RIVERINE	0.001610	50.1	NRPW	35.638821	-115.385171	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-68	R6	RIVERINE	0.004541	141.3	NRPW	35.638756	-115.385027	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-69	R6	RIVERINE	0.007820	243.3	NRPW	35.638525	-115.384850	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-70	R6	RIVERINE	0.002446	76.1	NRPW	35.638577	-115.385174	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-72	R6	RIVERINE	0.008376	260.6	NRPW	35.639215	-115.384756	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-73	R6	RIVERINE	0.005573	173.4	NRPW	35.639050	-115.384957	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-74	R6	RIVERINE	0.007418	230.8	NRPW	35.639871	-115.384718	Porter Wash-Frontal Ivanpah Lake	1.40	

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Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-32-75	R6	RIVERINE	0.009295	289.2	NRPW	35.639986	-115.384615	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-76	R6	RIVERINE	0.004348	135.3	NRPW	35.640068	-115.384827	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-77	R6	RIVERINE	0.005837	181.6	NRPW	35.640252	-115.384719	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-78	R6	RIVERINE	0.008941	278.2	NRPW	35.640088	-115.384599	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-79	R6	RIVERINE	0.008874	276.1	NRPW	35.640541	-115.384520	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-80	R6	RIVERINE	0.008408	261.6	NRPW	35.641222	-115.384413	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-82	R6	RIVERINE	0.004895	152.3	NRPW	35.641235	-115.384592	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-84	R6	RIVERINE	0.011815	367.6	NRPW	35.641824	-115.384188	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-85	R6	RIVERINE	0.008739	271.9	NRPW	35.642081	-115.384252	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-86	R6	RIVERINE	0.002928	91.1	NRPW	35.641895	-115.384585	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-87	R6	RIVERINE	0.008530	265.4	NRPW	35.642666	-115.384185	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-88	R6	RIVERINE	0.005056	157.3	NRPW	35.642541	-115.384259	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-89	R6	RIVERINE	0.008449	262.9	NRPW	35.642771	-115.384142	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-91	R6	RIVERINE	0.014821	339.8	NRPW	35.643672	-115.383889	Porter Wash-Frontal Ivanpah Lake	1.90	32M16W
D-32-92	R6	RIVERINE	0.004384	136.4	NRPW	35.643771	-115.384181	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-93	R6	RIVERINE	0.002504	77.9	NRPW	35.643689	-115.384282	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-94	R6	RIVERINE	0.002263	70.4	NRPW	35.643661	-115.384299	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-95	R6	RIVERINE	0.008466	263.4	NRPW	35.644139	-115.383876	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-96	R6	RIVERINE	0.003127	97.3	NRPW	35.644258	-115.384147	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-97	R6	RIVERINE	0.007241	225.3	NRPW	35.644513	-115.383876	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-98	R6	RIVERINE	0.007074	220.1	NRPW	35.644906	-115.383789	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-99	R6	RIVERINE	0.006582	204.8	NRPW	35.646192	-115.383496	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-100	R6	RIVERINE	0.006457	200.9	NRPW	35.646930	-115.383323	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-101	R6	RIVERINE	0.005901	183.6	NRPW	35.647146	-115.383258	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-102	R6	RIVERINE	0.005399	168.0	NRPW	35.647395	-115.383210	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-116	R6	RIVERINE	0.012946	402.8	NRPW	35.626604	-115.387130	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-120	R6	RIVERINE	0.001578	49.1	NRPW	35.640635	-115.384858	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-121	R6	RIVERINE	0.004281	133.2	NRPW	35.640664	-115.384742	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-123	R6	RIVERINE	0.006669	207.5	NRPW	35.641940	-115.384290	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-125	R6	RIVERINE	0.011281	351.0	NRPW	35.645789	-115.383424	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-136	R6	RIVERINE	0.003465	107.8	NRPW	35.716083	-115.363776	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-137	R6	RIVERINE	0.003680	114.5	NRPW	35.716275	-115.364187	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-139	R6	RIVERINE	0.006471	104.4	NRPW	35.719925	-115.362388	Porter Wash-Frontal Ivanpah Lake	2.70	
D-32-140	R6	RIVERINE	0.016184	261.1	NRPW	35.720396	-115.362778	Porter Wash-Frontal Ivanpah Lake	2.70	32D9E
D-32-142	R6	RIVERINE	0.031799	213.1	NRPW	35.725743	-115.360838	Porter Wash-Frontal Ivanpah Lake	6.50	32M11E
D-32-143	R6	RIVERINE	0.020518	137.5	NRPW	35.725292	-115.360457	Porter Wash-Frontal Ivanpah Lake	6.50	
D-32-146	R6	RIVERINE	0.012325	447.4	NRPW	35.734768	-115.357531	Porter Wash-Frontal Ivanpah Lake	1.20	32D12E
D-32-147	R6	RIVERINE	0.013573	422.3	NRPW	35.621887	-115.389555	Porter Wash-Frontal Ivanpah Lake	1.40	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-32-148	R6	RIVERINE	0.044573	647.2	NRPW	35.621454	-115.390122	Porter Wash-Frontal Ivanpah Lake	3.00	
D-32-149	R6	RIVERINE	0.003709	115.4	NRPW	35.630251	-115.386546	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-152	R6	RIVERINE	0.004426	137.7	NRPW	35.638468	-115.385087	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-153	R6	RIVERINE	0.010551	328.3	NRPW	35.637469	-115.384933	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-154	R6	RIVERINE	0.009661	300.6	NRPW	35.637425	-115.384976	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-155	R6	RIVERINE	0.002086	64.9	NRPW	35.637043	-115.385445	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-156	R6	RIVERINE	0.007591	236.2	NRPW	35.636584	-115.385238	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-157	R6	RIVERINE	0.011027	343.1	NRPW	35.634541	-115.385435	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-158	R6	RIVERINE	0.003629	112.9	NRPW	35.632077	-115.386204	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-159	R6	RIVERINE	0.009182	285.7	NRPW	35.631707	-115.386055	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-160	R6	RIVERINE	0.002764	86.0	NRPW	35.629396	-115.386749	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-161	R6	RIVERINE	0.011567	359.9	NRPW	35.621594	-115.389889	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-162	R6	RIVERINE	0.010551	328.3	NRPW	35.618004	-115.392448	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-163	R6	RIVERINE	0.008263	257.1	NRPW	35.617670	-115.392448	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-164	R6	RIVERINE	0.003574	111.2	NRPW	35.617979	-115.392020	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-165	R6	RIVERINE	0.002134	66.4	NRPW	35.618023	-115.391921	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-166	R6	RIVERINE	0.005512	171.5	NRPW	35.616455	-115.393715	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-167	R6	RIVERINE	0.003124	97.2	NRPW	35.617178	-115.392791	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-168	R6	RIVERINE	0.006447	200.6	NRPW	35.616966	-115.392924	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-169	R6	RIVERINE	0.007029	218.7	NRPW	35.615884	-115.394643	Porter Wash-Frontal Ivanpah Lake	1.40	
D-32-172	R6	RIVERINE	0.007764	338.2	NRPW	35.730491	-115.358870	Porter Wash-Frontal Ivanpah Lake	1.00	
D-32-173	R6	RIVERINE	0.006442	280.6	NRPW	35.728915	-115.359469	Porter Wash-Frontal Ivanpah Lake	1.00	
D-32-174	R6	RIVERINE	0.003910	170.3	NRPW	35.725535	-115.360866	Porter Wash-Frontal Ivanpah Lake	1.00	
D-32-175	R6	RIVERINE	0.009798	426.8	NRPW	35.723520	-115.361623	Porter Wash-Frontal Ivanpah Lake	1.00	
D-32-176	R6	RIVERINE	0.008955	390.1	NRPW	35.721630	-115.362081	Porter Wash-Frontal Ivanpah Lake	1.00	32M10E
D-32-177	R6	RIVERINE	0.008705	379.2	NRPW	35.718163	-115.363517	Porter Wash-Frontal Ivanpah Lake	1.00	32BD8E
D-32-178	R6	RIVERINE	0.006573	286.3	NRPW	35.711433	-115.365592	Porter Wash-Frontal Ivanpah Lake	1.00	
D-32-179	R6	RIVERINE	0.047397	344.1	NRPW	35.708881	-115.366448	Porter Wash-Frontal Ivanpah Lake	6.00	
D-32-180	R6	RIVERINE	0.015601	339.8	NRPW	35.706422	-115.367264	Porter Wash-Frontal Ivanpah Lake	2.00	
D-32-181	R6	RIVERINE	0.007427	323.5	NRPW	35.704457	-115.367998	Porter Wash-Frontal Ivanpah Lake	1.00	32M7E
D-32-182	R6	RIVERINE	0.003375	24.5	NRPW	35.652897	-115.381832	Porter Wash-Frontal Ivanpah Lake	6.00	
D-32-183	R6	RIVERINE	0.002169	31.5	NRPW	35.651369	-115.382319	Porter Wash-Frontal Ivanpah Lake	3.00	
D-32-184	R6	RIVERINE	0.002355	34.2	NRPW	35.651695	-115.382241	Porter Wash-Frontal Ivanpah Lake	3.00	
D-32-185	R6	RIVERINE	0.006701	97.3	NRPW	35.650932	-115.382330	Porter Wash-Frontal Ivanpah Lake	3.00	
D-32-186	R6	RIVERINE	0.018802	273.0	NRPW	35.648948	-115.382915	Porter Wash-Frontal Ivanpah Lake	3.00	
D-32-187	R6	RIVERINE	0.015709	228.1	NRPW	35.647750	-115.383213	Porter Wash-Frontal Ivanpah Lake	3.00	
D-32-188	R6	RIVERINE	0.004197	182.8	NRPW	35.648079	-115.383098	Porter Wash-Frontal Ivanpah Lake	1.00	
D-33-1	R6	RIVERINE	0.108259	280.7	NRPW	35.770669	-115.334695	Town of Jean-Frontal Ivanpah Lake	16.80	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-33-2	R6	RIVERINE	0.044930	301.1	NRPW	35.783761	-115.325119	Town of Jean-Frontal Ivanpah Lake	6.50	33MD5E
D-33-13	R6	RIVERINE	0.019728	452.3	NRPW	35.804225	-115.309979	Town of Jean-Frontal Ivanpah Lake	1.90	33D10E
D-33-14	R6	RIVERINE	0.020937	570.0	NRPW	35.805612	-115.309261	Town of Jean-Frontal Ivanpah Lake	1.60	
D-33-15	R6	RIVERINE	0.012533	341.2	NRPW	35.805433	-115.308924	Town of Jean-Frontal Ivanpah Lake	1.60	
D-33-32	R6	RIVERINE	0.010182	369.6	NRPW	35.735733	-115.356830	Town of Jean-Frontal Ivanpah Lake	1.20	
D-33-33	R6	RIVERINE	0.038394	257.3	NRPW	35.741257	-115.355130	Town of Jean-Frontal Ivanpah Lake	6.50	33M12E
D-33-38	R6	RIVERINE	0.046362	310.7	NRPW	35.755954	-115.345495	Town of Jean-Frontal Ivanpah Lake	6.50	
D-33-41	R6	RIVERINE	0.046646	312.6	NRPW	35.757616	-115.344299	Town of Jean-Frontal Ivanpah Lake	6.50	33M2E
D-33-54	R6	RIVERINE	0.025784	320.9	NRPW	35.765231	-115.338710	Town of Jean-Frontal Ivanpah Lake	3.50	
D-33-63	R6	RIVERINE	0.012598	457.3	NRPW	35.792512	-115.318676	Town of Jean-Frontal Ivanpah Lake	1.20	33D8E
D-33-64	R6	RIVERINE	0.015614	425.1	NRPW	35.794382	-115.317251	Town of Jean-Frontal Ivanpah Lake	1.60	
D-33-69	R6	RIVERINE	1.456612	2115.0	NRPW	35.773429	-115.332523	Town of Jean-Frontal Ivanpah Lake	30.00	
D-33-70	R6	RIVERINE	0.016166	352.1	NRPW	35.797049	-115.315382	Town of Jean-Frontal Ivanpah Lake	2.00	
D-33-150	R6	RIVERINE	0.009031	393.4	NRPW	35.753634	-115.347256	Town of Jean-Frontal Ivanpah Lake	1.00	33M1E
D-33-153	R6	RIVERINE	0.010220	445.2	NRPW	35.742259	-115.354495	Town of Jean-Frontal Ivanpah Lake	1.00	33M13E
D-33-168	R6	RIVERINE	0.026198	190.2	NRPW	35.773388	-115.332915	Town of Jean-Frontal Ivanpah Lake	6.00	
D-33-169	R6	RIVERINE	0.021529	312.6	NRPW	35.785445	-115.323891	Town of Jean-Frontal Ivanpah Lake	3.00	33M6E
D-33-170	R6	RIVERINE	0.025324	367.7	NRPW	35.787890	-115.321925	Town of Jean-Frontal Ivanpah Lake	3.00	
D-33-171	R6	RIVERINE	0.024056	349.3	NRPW	35.789974	-115.320513	Town of Jean-Frontal Ivanpah Lake	3.00	
D-33-173	R6	RIVERINE	0.017916	390.2	NRPW	35.798951	-115.313924	Town of Jean-Frontal Ivanpah Lake	2.00	
D-33-174	R6	RIVERINE	0.018338	399.4	NRPW	35.801904	-115.311845	Town of Jean-Frontal Ivanpah Lake	2.00	33M9E
D-33-175	R6	RIVERINE	0.015510	337.8	NRPW	35.808062	-115.307250	Town of Jean-Frontal Ivanpah Lake	2.00	33M11E
D-33-176	R6	RIVERINE	0.006423	139.9	NRPW	35.810885	-115.305453	Town of Jean-Frontal Ivanpah Lake	2.00	
D-33-177	R6	RIVERINE	0.027392	596.6	NRPW	35.809623	-115.306172	Town of Jean-Frontal Ivanpah Lake	2.00	
D-33-178	R6	RIVERINE	0.018292	398.4	NRPW	35.809135	-115.306448	Town of Jean-Frontal Ivanpah Lake	2.00	
D-33-179	R6	RIVERINE	0.007879	171.6	NRPW	35.812532	-115.304270	Town of Jean-Frontal Ivanpah Lake	2.00	
D-34-3	R6	RIVERINE	0.171967	346.8	NRPW	35.745822	-115.352857	Lookout Peak	21.60	34MD1E
D-34-4	R6	RIVERINE	0.005475	238.5	NRPW	35.746993	-115.352289	Lookout Peak	1.00	
D-34-5	R6	RIVERINE	0.025393	368.7	NRPW	35.746233	-115.352643	Lookout Peak	3.00	
D-34-6	R6	RIVERINE	0.007307	318.3	NRPW	35.747499	-115.351701	Lookout Peak	1.00	34BD2E
D-34-7	R6	RIVERINE	0.006899	300.5	NRPW	35.749153	-115.350539	Lookout Peak	1.00	34BD3E
D-34-8	R6	RIVERINE	0.006123	266.7	NRPW	35.748883	-115.350575	Lookout Peak	1.00	
D-34-9	R6	RIVERINE	0.008907	388.0	NRPW	35.749804	-115.350115	Lookout Peak	1.00	34BD4E
D-34-10	R6	RIVERINE	0.007156	311.7	NRPW	35.750311	-115.349647	Lookout Peak	1.00	
D-34-11	R6	RIVERINE	0.004658	202.9	NRPW	35.750558	-115.349651	Lookout Peak	1.00	
D-34-12	R6	RIVERINE	0.008338	363.2	NRPW	35.744803	-115.353429	Lookout Peak	1.00	
D-34-13	R6	RIVERINE	0.007867	342.7	NRPW	35.745111	-115.353341	Lookout Peak	1.00	
D-34-14	R6	RIVERINE	0.006031	262.7	NRPW	35.750388	-115.351637	Lookout Peak	1.00	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-34-15	R6	RIVERINE	0.010110	293.6	NRPW	35.752096	-115.350510	Lookout Peak	1.50	34D6
D-35-1	R6	RIVERINE	0.044900	300.9	NRPW	35.764636	-115.339150	Town of Goodsprings	6.50	35M3E
D-35-2	R6	RIVERINE	0.051242	343.4	NRPW	35.762201	-115.340943	Town of Goodsprings	6.50	35M1E
D-36-2	R6	RIVERINE	0.042417	302.9	NRPW	35.838167	-115.279372	160600151401-Frontal Jean Lake	6.10	
D-36-19	R6	RIVERINE	0.022031	369.1	NRPW	35.844314	-115.272385	160600151401-Frontal Jean Lake	2.60	
D-36-25	R6	RIVERINE	0.017727	297.0	NRPW	35.850130	-115.265552	160600151401-Frontal Jean Lake	2.60	
D-36-27	R6	RIVERINE	0.020049	335.9	NRPW	35.858925	-115.255466	160600151401-Frontal Jean Lake	2.60	
D-36-29	R6	RIVERINE	0.044070	314.7	NRPW	35.821040	-115.297775	160600151401-Frontal Jean Lake	6.10	
D-36-31	R6	RIVERINE	0.024747	414.6	NRPW	35.824426	-115.294968	160600151401-Frontal Jean Lake	2.60	
D-36-34	R6	RIVERINE	0.018490	298.3	NRPW	35.830376	-115.288272	160600151401-Frontal Jean Lake	2.70	36D1
D-36-35	R6	RIVERINE	0.014101	245.7	NRPW	35.830310	-115.288393	160600151401-Frontal Jean Lake	2.50	36D2
D-36-38	R6	RIVERINE	0.049669	360.6	NRPW	35.835818	-115.282002	160600151401-Frontal Jean Lake	6.00	36MD3
D-36-39	R6	RIVERINE	0.043481	310.5	NRPW	35.839586	-115.277726	160600151401-Frontal Jean Lake	6.10	
D-36-41	R6	RIVERINE	0.016742	280.5	NRPW	35.840721	-115.276429	160600151401-Frontal Jean Lake	2.60	
D-36-42	R6	RIVERINE	0.071993	514.1	NRPW	35.842447	-115.274381	160600151401-Frontal Jean Lake	6.10	
D-36-46	R6	RIVERINE	0.117529	538.9	NRPW	35.852267	-115.263175	160600151401-Frontal Jean Lake	9.50	36MD6
D-36-47	R6	RIVERINE	0.009037	151.4	NRPW	35.852231	-115.263440	160600151401-Frontal Jean Lake	2.60	
D-36-49	R6	RIVERINE	0.036427	610.3	NRPW	35.853593	-115.261582	160600151401-Frontal Jean Lake	2.60	
D-36-52	R6	RIVERINE	0.016838	282.1	NRPW	35.856602	-115.258209	160600151401-Frontal Jean Lake	2.60	
D-36-53	R6	RIVERINE	0.020819	348.8	NRPW	35.856869	-115.257735	160600151401-Frontal Jean Lake	2.60	
D-36-54	R6	RIVERINE	0.017220	288.5	NRPW	35.857923	-115.256700	160600151401-Frontal Jean Lake	2.60	
D-36-59	R6	RIVERINE	0.016939	283.8	NRPW	35.861154	-115.252961	160600151401-Frontal Jean Lake	2.60	
D-36-61	R6	RIVERINE	0.016862	282.5	NRPW	35.863305	-115.250510	160600151401-Frontal Jean Lake	2.60	
D-36-63	R6	RIVERINE	0.019172	321.2	NRPW	35.867434	-115.245838	160600151401-Frontal Jean Lake	2.60	
D-36-67	R6	RIVERINE	0.021995	368.5	NRPW	35.841563	-115.275457	160600151401-Frontal Jean Lake	2.60	
D-36-68	R6	RIVERINE	0.041437	295.9	NRPW	35.839749	-115.277449	160600151401-Frontal Jean Lake	6.10	
D-36-71	R6	RIVERINE	0.018067	302.7	NRPW	35.844743	-115.271818	160600151401-Frontal Jean Lake	2.60	
D-36-74	R6	RIVERINE	0.017071	286.0	NRPW	35.854948	-115.260075	160600151401-Frontal Jean Lake	2.60	
D-36-78	R6	RIVERINE	0.045680	326.2	NRPW	35.831369	-115.287231	160600151401-Frontal Jean Lake	6.10	
D-36-79	R6	RIVERINE	0.017751	309.3	NRPW	35.836172	-115.281654	160600151401-Frontal Jean Lake	2.50	36D4
D-36-82	R6	RIVERINE	0.021255	356.1	NRPW	35.850836	-115.264571	160600151401-Frontal Jean Lake	2.60	
D-36-87	R6	RIVERINE	0.017980	391.6	NRPW	35.822747	-115.296472	160600151401-Frontal Jean Lake	2.00	
D-36-88	R6	RIVERINE	0.014757	321.4	NRPW	35.834627	-115.283461	160600151401-Frontal Jean Lake	2.00	
D-36-89	R6	RIVERINE	0.017571	382.7	NRPW	35.835047	-115.282947	160600151401-Frontal Jean Lake	2.00	
D-36-90	R6	RIVERINE	0.013058	284.4	NRPW	35.835298	-115.282590	160600151401-Frontal Jean Lake	2.00	
D-36-92	R6	RIVERINE	0.013012	283.4	NRPW	35.838803	-115.278550	160600151401-Frontal Jean Lake	2.00	
D-36-93	R6	RIVERINE	0.014633	318.7	NRPW	35.837107	-115.280550	160600151401-Frontal Jean Lake	2.00	
D-36-94	R6	RIVERINE	0.014894	324.4	NRPW	35.836422	-115.281363	160600151401-Frontal Jean Lake	2.00	

Exhibit B1. Study Area Field Data for Areas Potentially Subject to Corps Jurisdiction, HUC-8 Ivanpah-Pahrump Valleys, Preferred Route Drainages, DesertXpress Project

Waters_ Name	Cowardin_ Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude (dd nad83)	Longitude (dd nad83)	Local_Waterway	width (OHWM)	HBG Data Field Point
D-36-95	R6	RIVERINE	0.044848	325.6	NRPW	35.843082	-115.273772	160600151401-Frontal Jean Lake	6.00	
D-36-96	R6	RIVERINE	0.016157	351.9	NRPW	35.848158	-115.267685	160600151401-Frontal Jean Lake	2.00	
D-36-97	R6	RIVERINE	0.013719	298.8	NRPW	35.847650	-115.268386	160600151401-Frontal Jean Lake	2.00	
D-36-98	R6	RIVERINE	0.015790	343.9	NRPW	35.863035	-115.250722	160600151401-Frontal Jean Lake	2.00	
		Totals:	**44.172045**	**207367.4**						

Exhibit B2

Field Data

(See attached CD in PDF format.)

LIST OF PLANT SPECIES ENCOUNTERED ALONG DRAINAGES WITHIN THE DESERT XPRESS PROJECT STUDY AREA

SCIENTIFIC NAME (AS LISTED IN JSA DATA SHEETS)	SCIENTIFIC NAME IF AVAILABLE IN NWI	SYNONYMY (SOURCE: CALFLORA 2010)	COMMON NAME	REGION 0 (NWI) CA	REGION 8 (NWI) NV	STRATUM (H, S, T)
Abronia villosa	NL	=*A. v.* var. *aurita* =*A. v.* var. *villosa* =*Bastardiopsis eggersii*	DESERT SAND VERBENA	NL	NL	Herb
Acacia gregii	*Acacia gregii*	NA	CATCLAW ACACIA	FACU	FACU	Shrub
Achnatherum speciosum	NL	=*Stipa speciosa*	DESERT STIPA	NL	NL	Shrub
Adenophyllum porophylloides	NL	= *Dyssodia porophylloides*	SAN FELIPE DOGWEED	NL	NL	Shrub
Allenrolfea occidentalis	*Allenrolfea occidentalis*	NA	IODINE BUSH	FACW+	FACW	Shrub
Ambrosia dumosa	NL	= *Fransera dumosa*	BURROWEED	NL	NL	Shrub
Ambrosia eriocentra	NL	= *Fransera eriosentra*	RAGWEED	NL	NL	Shrub
Amsinckia tesselata	NL	= *A. conica* = *A. cuneata* = *A. mojavenensis* = *A. purpusii* = *A. rostellata* = *A. setosissima*	FIDDLE-NECK	NL	NL	Herb

LIST OF PLANT SPECIES ENCOUNTERED ALONG DRAINAGES WITHIN THE DESERT XPRESS PROJECT STUDY AREA

SCIENTIFIC NAME (AS LISTED IN JSA DATA SHEETS)	SCIENTIFIC NAME IF AVAILABLE IN NWI	SYNONYMY (SOURCE: CALFLORA 2010)	COMMON NAME	REGION 0 (NWI) CA	REGION 8 (NWI) NV	STRATUM (H, S, T)
Amsinskia intermedeon	NL	NA	FIDDLE-NECK	NL	NL	Herb
Aristida purpurea	NL	=*A. p.* var. *fendleriana* =*A. p.* var. *longiseta* =*A. p.* var. *neallegi* =*A. p.* var. *parishii* =*A. p.* var. *purpurea* =*A. p.* var. *wrightii*	PURPLE THREE AWN	NL	NL	Herb
Asclepias californica	NL	=*A. c.* ssp. *greenei* =*A. c.* ssp. *californica*	CALIFORNIA MILKWEED	NL	NL	Herb
Asclepias curassavica	*Asclepias curassavica*	NA	SCARLET MILKWEED	FAC	NL	Herb
Atriplex canescens	*Atriplex canescens*	NA	FOUR-WINGED SALTBUSH	FACU	UPL	Shrub
Atriplex hymenelytra	NL	NA	MANY-FRUITED SALTBUSH	NL	NL	Shrub
Atriplex polycarpa	*Atriplex*	NA	MANY-FRUIT SALTBUSH	FACU	FACU	Shrub

LIST OF PLANT SPECIES ENCOUNTERED ALONG DRAINAGES WITHIN THE DESERT XPRESS PROJECT STUDY AREA

SCIENTIFIC NAME (AS LISTED IN JSA DATA SHEETS)	SCIENTIFIC NAME IF AVAILABLE IN NWI	SYNONYMY (SOURCE: CALFLORA 2010)	COMMON NAME	REGION 0 (NWI) CA	REGION 8 (NWI) NV	STRATUM (H, S, T)
	polycarpa					
Avena barbata	NL	*=A. hirsuta*	SLENDER WILD OAT	NL	NL	Herb
Baccharis brachyphylla	NL	NA	SHORT LEAVED BACCHARIS	NL	NL	Shrub
Baccharis salicifolia	*Baccharis glutinosa*	*=B. glutinosa* *=B. viminea* *=Molina salicifolia*	MULE FAT	FACW-	FACW	Shrub
Baccharis sarothroides	*Baccharis sarothroides*	NA	DESERT FALSE-WILLOW	FAC	NI	Shrub
Baileya spp.	NL	NA	DESERT MARIGOLD	NL	NL	Herb
Bouteloua barbata	NL	*=B. arenosa* *=Chrondrosum barbata* *=C. exile* *=C. microstachyum* *=C. polystachyum* *=C. subscorpiodes*	SIX WEEKS GRAMA	NL	NL	Herb
Brassica tournefortii	NL	NA	ASIAN MUSTARD	NL	NL	Herb

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Bromus madritensis	NL	*=Anisantha madritensis =A. matritensis =Bromus maritensis*	FOXTAIL CHESS	NL	NL	Herb
Bromus rubens	NL		RIPGUT BROME	NI	NI	Herb
Bromus tectorum	NL	*=Anisantha tectorum*	CHEAT GRASS	NL	NL	Herb
Camissonia boothii	NL	*=Oenothera decorticans*	BOOTH'S EVENING PRIMROSE	NL	NL	Herb
Camissonia brevipes	NL	*=Oenothera brevipes*	YELLOW CUPS	NL	NL	Herb
Cercidium floridum	NL	NA	BLUE PALO VERDE	NL	NL	Shrub
Cercidium microphyllum	NL	NA	FOOTHILLS PALO VERDE	NL	NL	Tree
Chaenactis fremontii	NL	NA	FREMONT PINCUSHION	NL	NL	Herb
Chamaesyce albomarginata	NL	*=Euphorbia albomarginata*	RATTLESNAKE WEED	NL	NL	Herb
Chaenactis	NL	*=C c.* var.	PEBBLE PINCUSHION	NL	NL	Herb

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carphoclinia		*carphoclinia* =*C. c.* var. *peirsonii*				
Chenopodium album	*Chenopodium album*	NA	WHITE GOOSEFOOT	FAC	FACU	Herb
Chilopsis linearis	*Chilopsis linearis*	NA	DESERT WILLOW	FACW*	FAC	Tree
Chorizanthe brevicorny	NL	=*C. b.* var. *brevicorny* =*C. b.* var. *spathulata*	BRITTLE SPINEFLOWER	NL	NL	Herb
Chorizanthe rigida	NL	=*Acanthogonum rigidum*	SPINEY-HERB	NL	NL	Herb
Chrysothamnus paniculatus	NL	=*Ericameria paniculatus*	MOJAVE RABBITBRUSH	NL	NL	Shrub
Coleogyne ramosisssima	NL	NA	BLACKBUSH	NL	NL	Shrub
Cryptantha pterocarya	NL	=*C. p.* var. *purposii* =*C. p.* var *cyclopetera* =*C. p.* var. *pterocarya*	WINGED NUT FORGET ME NOT	NL	NL	Herb
Cylindropuntia	NL	=*Opuntia acanthocarpa*	BUCKHORN CHOLLA	NL	NL	Shrub

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acanthocarpa						
*Cylindroopuntia arbuscula***	NL	*Unknown*	No info. available on this species. *C. arbuscula* may = typo	NL	NL	Shrub?
Cynodon dactylon	*Cynodon dactylon*	*=Capriola dactylon =C. aristiglumis =Panicum dactylon*	BERMUDA GRASS	FAC	FAC	Herb
Descurainia sophia	NL	*=Sisymbrium Sophia*	HERB SOPHIA	NL	NL	Herb
Encelia actoni	NL	*=E. virginensis ssp. actoni*	ACTON ENCELIA	NL	NL	Shrub
Encelia farinosa	NL	NA	BRITTLE BUSH	NL	NL	Shrub
Encelia frutescens	NL	*=Simsia frustescens*	BUTTON BRITTLE BUSH	NL	NL	Shrub
Encelia virginensis	NL	*= Frutescens* var. *virginensis*	NO COMMON NAME	NL	NL	Shrub
Ephedra nevadensis	NL	NA	NEVADA EPHEDRA	NL	NL	Shrub
Ephedra viridis	NL	NA	MORMON TEA	NL	NL	Shrub
Eriastrum densifolium	NL	NA	SHRUBBY ERIASTRUM	NL	NL	Shrub

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Ericameria cooperi	NL	=*Haplopappus cooperi*	COOPER'S GOLDENBUSH	NL	NL	Shrub
Ericameria laricifolia	NL	=*Haplopappus lacrifolia*	TURPENTINE BUSH	NL	NL	Shrub
Ericameria nauseosa	NL	=*E. n.* ssp. *consimilis* =*E. n.* var. *bernardina* =*E. n.* var. *ceruminosa* =*E. n.* var. *hololeuca* =*E. n.* var. *leiosperma* =*E. n.* var. *oreophila* =*E. n.* var. *speciosa* =*E. n.* var. *washoensis* =*Chrysothamnus nauseosus*	RUBBER RABBITBRUSH	NL	NL	Shrub
Ericameria paniculata	NL	=*Chrysothamnus paniculatus*	MOJAVE RABBITBRUSH	NL	NL	Shrub

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Ericameria pinifolia	NL	=*E. ericoides* ssp. *pinifolia* =*Haplopappus pinifolius*	PINE BUSH	NL	NL	Shrub
Eriogonum deflexum	NL	NA	FLAT TOPPED BUCKWHEAT	NL	NL	Herb
Eriogonum fasciculatum	NL	=*E. d.* var. *baratum* =*E. d.* var. *deflexum* =*E. d.* var. *nevadense* =*E. d.* var. *rectum*	CALIFORNIA BUCKWHEAT	NL	NL	Shrub
Eriogonum inflatum	NL	=*E. glaucum* =*E. inflatum* var. *inflatum*	DESERT TRUMPET	NL	NL	Shrub
Erioneuron pulchellum	NL	=*Triodia pulchella* =*Dasyochloa pulchella*	FLUFF GRASS	NL	NL	Herb

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Eriophyllum ambiguum/E. wallacei [sic]	NL	=*E. ambiguum* var. *ambiguum* =*E. ambigium* var. *paleaceum* =*Antherapeas wallaceei* =*Eriophyllum wallacei* var. *rubellum* =*E. w.* var. *wallacei* =*E. w.* var. *calvescens* =*Eriophyllum aureum*	ANNUAL WOOLLY SUNFLOWER/WALLACE'S WOOLLY DAISY	NL	NL	Herb
Erodium cicutarium	NL	=*Erodium cicutarium* ssp. *cicutarium* =*E. cicutarium* ssp. *jacquinianum*	COASTAL HERON'S BILL	NL	NL	Herb
Eschscholzia minutiflora	NL	=*E. coville* =*E. minutiflora* ssp. *twisselmanii* =*E. minutiflora* var. *darwinensis*	PYGMY POPPY	NL	NL	Herb

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		=*E. minuscula*				
Gilia latifolia	NL	NA	BROADLEAF GILLIA	NL	NL	Herb
Gutierrezia sarothrae	NL	NA	MATCHWEED	NL	NL	Shrub
Hordeum moines	NL	NA	BARLEY	NL	NL	Herb
Hordeum murinum	*Hordeum leporinum*	=*H. m.* ssp. *glaucum* =*H. m.* ssp. *leporinum* =*H. m.* ssp. *murinum*	MOUSE BARLEY	NI	NI	Herb
Hymenoclea salsola	NL	=*H. m.* var. *patula* =*H. m.* var. *pentalepsis* =*H. m.* var. *salsola*	CHEESE BUSH	NL	NL	Shrub
Krameria parviflora	NL	NA	RHATANY	NL	NL	Shrub
Larrea tridentata	NL	=*L. divaricata* ssp. *tridentate* =*L. divaricata* =*L. tridentata* var. *arenaria* =*L. tridentate* var.	CREOSOTE BUSH	NL	NL	Shrub

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		tridentata				
Lepidium fremontii	NL	=*L. fremontii* var. *fremontii* =*L. f.* var. *stipitatum*	DESERT ALYSSUM	NL	NL	Herb
Lepidium latifolium	*Lepidium latifolium*	NA	BROAD LEAFED PEPPER-GRASS	FACW	FAC	Herb
Lepidium spp.	*Lepidium* spp.	NA	PEPPER-GRASS	FAC	NO to FACW+ depending on species	Shrub
Lepidium virginicum	*Lepidium virginicum*	NA	POOR-MAN'S PEPPER-GRASS	FACU	FACU	Herb
Lepidospartum squamatum	Possibly *Baccharis sarothroides*	=*Lepidospartum squamatum* var. *palmeri* =*Lepidospartum squamatum* var. *squamatum* =*Baccharis*	SCALE BROOM	NL Or FAC	NL	Shrub

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		sarathroides var. *pluricephala* =*Lepidospartim squamatum* var. *obtectum*				
Leptochloa uninervia	*Leptochloa uninervia*	NA	MEXICAN SPRANGLETOP	FACW	FACW	Herb
Leymus triticoides	*Elymus triticoides*	=*Elymus triticoides* =*E. condensatus* var. *triticoides* =*E. orcuttianus* =*E. triticoides* var. *pubescens*	VALLEY WILD RYE	FAC+	FAC+	Herb
Lupinus concinnus	NL	=*L. c.* var. *pallidus* =*L. c.* var. *orcutti* =*L. c.* var *optatus* =*L. c.* var. *concinnus* =*L. c.* var. *agardhianus* =*L. c.* ssp. *orcuttii* =*L. c.* ssp. *optatus* =*L. pallidus* =*L. agardhianus*	ELEGANT LUPINE	NL	NL	Herb

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Lycium andersonii	NL	=*L. a.* var. *andersonii* =*L. a.* var. *deserticola*	ANDERSON THORNBUSH	NL	NL	Shrub
Lycium cooperi	NL	NA	PEACH THORN	NL	NL	Shrub
Lycium parishii	NL	NONE	PARISH'S DESERT THORN	NL	NL	Shrub
Malacothrix coulteri	NL	= *Zollikoferia eluiensis* = *M.* var. *cognate*	SNAKE'S HEAD	NL	NL	Herb
Malacothrix glabrata	NL	= *M. californica* var. *glabrata*	DESERT DANDELION	NL	NL	Herb
Malva neglecta	NL	NA	COMMON MALLOW	NL	NL	Herb
Mentzelia spp.	NL	NA	STICK LEAF	NL	NL	Herb
Mimulus flemingii		=*M. parviflorus*	FLEMING MONKEYFLOWER	FACU-	NL	Herb
Mimulus fremontii	*Mimulus glabratus*	=*M. subsecundus eunanus fremontii* =*Mimulus glabratus* ssp. *fremontii*	FREMONT'S MONKEYFLOWER	OBL	OBL	Herb

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Oenethera deltoides	NL	=*O. d.* ssp. *cognate* =*O. d.* ssp. *deltoides* =*O. d.* ssp. *howellii* =*O. d.* ssp. *piperi* =*O. d.* var. *cineracea*	BIRDCAGE EVENING PRIMROSE	NL	NL	Herb
Olea europea	NL	NA	OLIVE TREE	NL	NL	Tree
Opuntia basilaris	NL	NA	BEAVERTAIL CACTUS	NL	NL	Shrub
Parkinsonia aculeata	*Parkinsonia aculeata*	NA	JERUSALEM –THORN OR PALO VERDE	FACW*	NI	Tree
Pectocarya heterophylla [sic] * =*P. heterocarpa*	NL	=*P. penicillata* var. *heterocarpa*	CHUCKWALLA COMBSEED	NL	NL	Herb
Pectocarya platycarpa	NL	=*P. gracilis* =*P. linearis*	NUTTED BROAD COMB	NL	NL	Herb
Phacelia distans	NL	= *P. cinera* = *P. scabrella* = *P. distans* var.	COMMON PHACELIA	NL	NL	Herb

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		austalis				
Phacelia fremontii	NL	*=P. hullii*	FREMONT'S PHACELIA	NL	NL	Herb
Plantago ovata	NL	NA	DESERT INDIAN WHEAT	NL	NL	Herb
Pluchea sericea	*Pluchea sericea*	NA	ARROW WEED	FACW	FACW	Shrub
Polypogon monspeliensis	*Polypogon monspeliensis*	NA	ANNUAL RABBIT-FOOT GRASS	FACW+	FACW+	Herb
Populus fremontii	*Populus fremontii*	---	FREMONT'S COTTONWOOD	FACW	FACW*	Tree
Prosopis glandulosa	*Prosopis juliflora*	*=P. glandulosa* var. *torreyana* *=P. juliflora* var. *torreyana* *= P. ordorata*	HONEY MESQUITE	FACU	NI	Shrub
Pucinella lemonni	*Pucinella lemonni*	NA	LEMON'S ALKALI GRASS	FAC	FACW*	Herb
Rafinesquia neomexicana	NL	NA	CALIFORNIA CHICORY	NL	NL	Herb
Rumexhymenose palus	NL	NA	WILD RUBARB	NL	NL	Herb
Salazaria	NL	NA	BLADDERSAGE	NL	NL	Shrub

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mexicana						
Salix exigua	*Salix exigua*	NL	SANDBAR WILLOW	OBL	OBL	Shrub
Salix gooddingii	*Salix gooddingii*	---	GOODDING WILLOW	OBL	FACW	Tree
Salsola pestifer	*Salsola pestifer*	NA	RUSSIAN THISTLE	FACU	FACU	Herb
*Salsola tragus***	*Salsola kali/ Salsola pestifer*	=*S. australis* =*S. iberica* =*S. kali* var. *tenuifoli* =*S. pestifer* =*S. kali* var. *tenuifolia* =*S. kali* var. *tragus* =*S. ruthenica*	RUSSIAN THISTLE	FACU*/ FACU	FACU/ FACU	Herb
Salvia columbariae	NL	= *S. c.* var. *columbariae* =*S. c.* var. *ziegleri*	CHIA	NL	NL	Herb
Salvia dorrii	NL	=*S. d.* var. *dorrii* =*S. d.* var. *incana* =*S. d.* var. *pilosa*	DESERT SAGE	NL	NL	Shrub
Schismus arabicus	NL	NA	MEDITERRANEAN GRASS	NL	NL	Herb
Schismus barbatus	NL	= *Festuca barbata* = *S. calycinus*	MEDITERRANEAN GRASS	NL	NL	Herb

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Senna armata	NL	= *Cassia armata*	DESERT SENNA, SPINY SENNA	NL	NL	Shrub
Sisymbrium altissimum	*Sisymbrium altissimum*	NA	TALL TUMBLE MUSTARD	FACU	FACU-	Herb
Spharalcea ambigua	NL	= *S. parvifolia*	APRICOT MALLOW	NL	NL	Shrub
Stanleya pinnata	NL	NA	DESERT PRINCE'S PLUME	NL	NL	Herb
Stephanomeria exigua	NL	NA	SMALL WIRELETTUCE	NL	NL	Herb
Stephanomeria pauciflora	NL	=*S. p.* var. *parishii* =*S. p.* var. *pauciflora* =*S. runcinata* var. *parishii* =*S. cinerea* =*S. lygoclesmoides* =*S. neomexicana* =*Lygodesmia pauciflora* =*Ptiloria pauciflora*	DESERT STRAW	NL	NL	Herb

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Stephanomeria virgata	NL	NA	NL	NL	NL	Herb
Tamarix aphylla	*Tamarix aphylla*	NA	ATHEL TAMARISK	FACW-	FACW	Tree
Tamarix ramosissima	*Tamarix ramosissima*	NA	SALTCEDAR	FAC	FACW	Shrub
Thamnosma montana	NL	NA	TURPENTINE BROOM	NL	NL	Shrub
Triticum aestivum	NL	= *T. hybernum* = *T. macha* = *T. sativum* = *T. sphaerococcum* = *T. vulgare*	COMMON WHEAT	NL	NL	Herb
Typha angustifolia	*Typha angustifolia*	NA	NARROW LEAF CATTAIL	OBL	OBL	Herb
Ulmus pumila	NL	NONE	SIBERIAN ELM	NL	NL	Tree
Washingtonia filifera	*Washingtonia filifera*	NA	CALIFORNIA FAN PALM	FACW	NO	Tree
Yucca brevifolia	NL	=*Y. jaegeriana*	JOSHUA TREE	NL	NL	Tree
Yucca schidigera	NL	=*Y. californica*	MOJAVE YUCCA	NL	NL	Shrub

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		=*Y. macrocarpa* =*Y. mohavensis*				

* = J.S.A. probably made a typographical error for this species.

**Using JSA taxonomy (*S. tragus)* we determined that in 1988, when the wetland manual was produced, this species could have been either *S. kali* (FACU*) or *S. pestifer* (FACU) (Region O), or FACU for both in Region 8.

NI = Not Indicated.

NL = Not Listed in NWI 1988.

Sources:

Calflora Database. 2010. Calflora Database was developed by the United States Forest Service working in collaboration with U.C. Berkeley. Available at: http://www.calflora.org/

National Wetlands Inventory and US Fish And Wildlife Service. 1988. National List of Plant Species that Occur in Wetlands. Compiled by Porter B. Reed, Jr., National Ecology Research Center, US Fish and Wildlife Service, St. Petersburg, Florida. In cooperation with US Army Corps of Engineers, US Environmental Protection Agency, and US Soil Conservation Service.

Exhibit B2

DesertXpress Field Data
For
Roach Lake Area
Ivanpah-Pahrump Valleys Watershed
(HUC 16060015)

HBG Watershed Number	HUC 12 Watershed Name	HBG Field Data	ICF Jones & Stokes Field Data	Comments
32	Porter Wash-Frontal Ivanpah Lake	Yes	Yes	Watershed drains to Roach (dry) Lake.
33	Town of Jean-Frontal Ivanpah Lake	Yes	No	Watershed drains to Roach (dry) Lake.
34	Lookout Peak	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.
35	Town of Goodsprings	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.

Huffman-Broadway Group

Field Data Forms

For DesertXpress
Roach Lake Area

HUC 12 Watershed
Porter Wash-Frontal Ivanpah Lake

HBG Watershed ID # 32

Within Ivanpah-Pahrump Valleys Watershed (HUC 16060015)

DesertXpress

Field Notebook

HBG Watershed ID # 32

Watershed Name: Porter Wash - Frontal Ivanpah Lake

If found, please return to:

George Ball
Huffman-Broadway Group, Inc.
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415.925.2000
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Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) Ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West) — Porter Wash - Prentall/Trampah Lake

HGB Team # B 60/125 | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 32 | HUC 12 # 160600151001

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
5-15-10	0304	1	32MD8	C215	3.5	A	U	N	A: 5 D: 10	B: 6, 11, 13 E:	C: F: 18	Flows to det. basin and on to road under freeway. NOT ON ROUTE
5-15-10	0318	1	32M9	C215		I	U	Yes	A: D:	B: E:	C: F:	This is a man-made feature similar to others near culverts, see comment #2
5-16-10	0742	1	32M1E	C169		I	D	NO	A: D:	B: E:	C: F:	Comment #1E
5-16-10	0730	1	32M2E	C224		I	D	Yes	A: D:	B: E:	C: F:	Comment #1E
5-16-10	0817	1	32BD4E	C223		I	D	NO	A: D:	B: E:	C: F:	Comment #2E
5-16-10	0829	1	32M5E	C223	1.0'	A	D	NO	A: D:	B: E:	C: F:	~~Comment #1E~~ PATH CHECKED
5-16-10	0845	1	32M7E	C224	1.0'	A	D	NO	A: D:	B: E:	C: F:	~~Comment #1E~~ PATH CHECKED

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

HBG OHWM Field Data Sheet (Arid West) — Porter wash - Frontal/Ivanpah Lake

HGB Team # BODIES | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 32 | HUC 12 # 160600151001

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
5-16-10	0904	1	32BD9E	C221	1.0	A	D	ND	A: D:	B: E:	C: F:	comment #3E PHT VERIFIED
5-16-10	0909	1	32D9E	C221	2.7	A	D	Yes	A: 5, 16 D:	B: 6, 11, 12, 13 E:	C: F: 18	Comment #5E
5-16-10	0918	1	32M10E	C221	1.0	A	D	ND	A: D:	B: E:	C: F:	comment #6E PHT VERIFIED
5-16-10	0924	1	32M11E	C220	6.5	A	D	ND	A: 5, 16 D:	B: 6, 11, 12, 13 E:	C: F: 18	comment #7E
5-16-10	0935	1	32D12E	C220	1.2	A	D	ND	A: 16 D:	B: 11, 12 E:	C: F:	flow from east
5-16-10	1241	1	32M14W	C169		I	U	ND	A: D:	B: E:	C: F:	Detention basin
5-16-10	1242	1	32M13W	C169		I	U	ND	A: D:	B: E:	C: F:	Man-made ditch

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

HBG OHWM Field Data Sheet (Arid West) — Porter wash - Frontal/Ivanpah lake

HGB Team # B 6D/ES | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 32 | HUC 12 # 160600151001

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
5-16-10	1243	1	32M16W	C169	1.9	A	U	NO	A: 13,15 D: 10	B: 6, 11, 12, 13 E:	C: F: 18	natural drainage
5-16-10	0105	1	32D17W	C172	0.8	A	U	NO	A: 5 D: 10	B: 6, 11, 12 E:	C: F: 18	staging area NOT ON ROUTE
5-16-10	0106	1	32D18W	C170	1.2	A	U	NO	A: 5 D: 10	B: 6, 11, 12 E:	C: F: 18	staging area
5-16-10	0110	1	32D19W	C170	0.8	A	U	NO	A: 5 D: 10	B: 6, 11, 12 E:	C: F: 18	staging area No OHWM upstream
									A: D:	B: E:	C: F:	→ NOT ON ROUTE
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Comment Number	Comment
#1E	This man-made feature is an overflow for the detention basin on the west side of the highway. When the detention basin is filled with water, some backs up under the freeway, evidenced by cracked soils. There is no active drainage beyond the graded apron.
#2E	This feature is like #1E but has a natural drainage continuing beyond the fence. This natural drainage has been blocked by material deposited by construction of the detention basin, and lack of features indicating an OHWM illustrates this.
#3E	This is an old drainage that was blocked by construction of the freeway. No evidence of recent water flow.
#5E	There are culverts under the freeway and culverts under the road east of the fenceline. This is an active drainage with an OHWM.
#6E	man-made overflow from detention basin showing evidence of water flow. Ends at the road by the fence
#7E	Similar to #6E but the flow continues under the road along the fenceline, in culverts.

ICF Jones & Stokes

Wetland Determination Data Forms – Arid West Region

For DesertXpress
Roach Lake Area

HUC 12 Watershed
Porter Wash-Frontal Ivanpah Lake

HBG Watershed ID # 32

Within Ivanpah-Pahrump Valleys Watershed (HUC 16060015)

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Desert Xpress City/County: Primm/Clark Sampling Date: 9/29/2009
Applicant/Owner: J. Holson / J. Hickman State: NV Sampling Point: P-S-1
Investigator(s): Circle Point Section, Township, Range:
Landform (hillslope, terrace, etc.): terrace - Bajada Local relief (concave, convex, none): flat Slope (%): 0
Subregion (LRR): D ~~lat~~: N -115.39.6570 ~~long~~: N 35.62.115 7 Datum: NAD 83 2006 11
Soil Map Unit Name: N/A NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (if no, explain in Remarks.)
Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation NO, Soil NO, or Hydrology NO 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: OHWM: 3' TOB: 5' - Braided stream
Ind.: Wrackline, Bed + Bank, Sed. dep/sorting
Photo #: ~~00854~~ 00855 - ~~SE~~ - SW
00856 - ~~SE~~ - NE

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	Ø		
Sapling/Shrub Stratum			
1. Ambrosia dumosa	2	Y	NL ~~UPL~~
2.			
3.			
4.			
5.			
Total Cover:	2		
Herb Stratum			
1. Schismus arabicus	1	Y	NL ~~UPL~~
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	1		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust Ø

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (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 = ~~5.0~~

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence index is ≤3.0[1]
___ 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.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sampling Point: 9-S-1

SOIL

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
0-3	10YR 4/3	100						Sandy gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, 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 C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 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)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: Rock
Depth (inches): 3"

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine) minor
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

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): ___

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks: Blue line on topo. Trib to Roach Dry Lake.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Desert Xpress City/County: Pinm / Clark Sampling Date: 9/29/2009
Applicant/Owner: Circle Point State: NV Sampling Point: 9-S-2
Investigator(s): S. Halsor / J. Hickman Section, Township, Range:
Landform (hillslope, terrace, etc.): bottomland / bajada Local relief (concave, convex, none): flat Slope (%): 2
Subregion (LRR): D Lat: N -115.391516 Long: N 35.619754 Datum: NAD 83 ZONE 11
Soil Map Unit Name: N/A NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation NO, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation NO, 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
Hydric Soil Present?	Yes ____	No ✓	within a Wetland? Yes ____ No ✓
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: OHWM: 1.5 To B: 8 Photo 0857 - N
Ind: Bed + Bank, sed dep., sed. sorting

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum			
1. Lycium sp.	2	Y	NL upl
2.			
3.			
4.			
5.			
Total Cover:	2		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (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 2	x 5 =	10
Column Totals: 2	(A)	10 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ 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.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sampling Point: 9-S-2

SOIL

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
0-6	10YR 4/3	100					sandy gravel	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, 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 C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 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)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: Rock
Depth (inches): 6

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

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): ___

Wetland Hydrology Present? Yes ___ No ✓

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

Remarks: Blue line on Topo. Trib to Roach Day Lake

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Desert Xpress City/County: Primm / Clark Sampling Date: 9/29/2009
Applicant/Owner: Circle Point State: NV Sampling Point: 9-S-3
Investigator(s): S Haksol / J. Hickman Section, Township, Range:
Landform (hillslope, terrace, etc.): Bajada Hillslope Local relief (concave, convex, none): sloped Slope (%): 5
Subregion (LRR): D Lat: W -115.394325 Long: N 35.615807 Datum: NAD 83 ZONE 11
Soil Map Unit Name: N/A NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation No, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation No, 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	
Hydric Soil Present?	Yes ____ No ✓	within a Wetland?	Yes ____ No ✓
Wetland Hydrology Present?	Yes ✓ No ____		

Remarks: OHWM: 2' TOB: 6' Photos: 838-NE 839-SW
Fn: WRack, Sed. dep., bed + Bank

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: 0			
Sapling/Shrub Stratum			
1. Ambrosia dumosa	3	Y	NL UPL
2. E. platyphylla (E. Ericameria)	2	Y	NL UPL
3. Hymenoclea salsola	1	N	NL UPL
4.			
5.			
Total Cover: 6			
Herb Stratum			
1. Stephanomeria virgata	1	Y	NL UPL
2. Aristida purpurea	1	Y	NL UPL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover: 2			
Woody Vine Stratum			
1.			
2.			
Total Cover: 0			

% Bare Ground in Herb Stratum 98 % Cover of Biotic Crust Ø

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (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 7	x 5 = 35	
Column Totals: 7 (A)	35 (B)	

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ 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.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sampling Point: 9-S-3

SOIL

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
0-3	10 YR 4/3	100					gravel	cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, 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 C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 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)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: 3"

Depth (inches): Rock

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine) minor
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

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): ____

Wetland Hydrology Present? Yes ✓ No ____

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

Remarks: Blue line on Topo. Trib to Ramada Dry Lake.

Exhibit B2

DesertXpress Field Data
For
Roach Lake Area
Ivanpah-Pahrump Valleys Watershed
(HUC 16060015)

HBG Watershed Number	HUC 12 Watershed Name	HBG Field Data	ICF Jones & Stokes Field Data	Comments
32	Porter Wash-Frontal Ivanpah Lake	Yes	Yes	Watershed drains to Roach (dry) Lake.
33	Town of Jean-Frontal Ivanpah Lake	Yes	No	Watershed drains to Roach (dry) Lake.
34	Lookout Peak	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.
35	Town of Goodsprings	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.

Huffman-Broadway Group

Field Data Forms

For DesertXpress
Roach Lake Area

HUC 12 Watershed
Town of Jean-Frontal Ivanpah Lake

HBG Watershed ID # 33

Within Ivanpah-Pahrump Valleys Watershed
(HUC 16060015)

DesertXpress

Field Notebook

HBG Watershed ID # 33

Watershed Name: Town of Jean-Frontal/Ivanpah Lake

If found, please return to:

George Ball
Huffman-Broadway Group, Inc.
828 Mission Avenue
San Rafael, California 94901
415.925.2000
gball@h-bgroup.com

Return Postage Guaranteed

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) Ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

Town of Jean - Frontal Stumpah Lake

HGB Team # B 6D/ES | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 33 | HUC 12 # 160600150903

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
5-16-10	1015	1	33M1E	C219	1.0	A	D	ND	A: / D:	B: / E:	C: / F:	comment #1E RTH USGS FIELD CHECKED
5-16-10	1025	1	33M2E	C218	6.5	A	D	ND	A: 5, 16 / D: 10	B: 6, 11, 12, 13 / E:	C: / F: 18	comment #2E
5-16-10	1043	1	33M3E	C218		I	D	ND	A: / D:	B: / E:	C: / F:	comment #1E
5-16-10	1046	1	33BD4E	C217		I	D	ND	A: / D:	B: / E:	C: / F:	comment #3E
5-16-10	1120	1	33MD5E	C217	6.5	A	D	ND	A: / D: 10	B: 6, 11, 12, 13 / E:	C: / F: 18	man-made cut to fence, major drainage beyond.
5-16-10	1127	1	33M6E	C216	3.0	A	D	No	A: / D:	B: / E:	C: / F:	~~comment #1E~~ RTH Checked
5-16-10	1133	1	33BD7E	C216		I	D	ND	A: / D:	B: / E:	C: / F:	comment #3E

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

HBG OHWM Field Data Sheet (Arid West) — Town of Jean - Frontal Evangah Lake

HGB Team # B 60 IES | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 33 | HUC 12 # 160600150903

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
5-16-10	1135	1	33D8E	C216	1.2	A	D	NO	A: 16,5 D:	B: 6, 11, 12, 13 E:	C: F: 18	
5-16-10	1145	1	33M9E	C215	2.0'	A	D	NO	A: 16,5 D:	B: 6, 11, 12, 13 E:	C: F: 18	~~Comment #11~~ RTH Checked
5-16-10	1148	1	33D10E	C215	1.9	A	D	NO	A: 5 D: 10	B: 6, 11, 12, 13 E:	C: F: 18	sampled beyond graded area
5-16-10	1153	1	33M11E	C215	2.0'	A	D	NO	A: 5 D:	B: 6, 11, 12, 13 E:	C: F: 18	RTH – Rechecked GPS Data
5-16-10	0941	1	33M12E	C220	6.5	A	D	NO	A: 16,5 D: 10	B: 11, 12, 13 E:	C: F: 18	Man-made drainage to fence, beyond is 18" mile
5-16-10	0950	1	33M13E	C219	1.0	A	D	NO	A: D:	B: E:	C: F:	RTH – Rechecked GPS Data
5-16-10	0950	1	33M10	C219	3.0'	A	D	NO	A: 10, 5 D: 10	B: 11, 12, 13 E:	C: F:	RTH – Rechecked GPS Data NOT ON ROUTE

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Comment Number	Comment
#1E	overflow for detention basin on the west side of the freeway. Some backs up under the freeway here at times as evidenced by cracked soils. No drainage continues past the graded area. No OHWM
#2E	overflow from detention basin on the other side of the freeway, but continues past the fence as a natural drainage. Shows evidence of recent water flow
#3E	former drainage blocked by freeway construction. No evidence of recent water flow.

Exhibit B2

DesertXpress Field Data
For
Roach Lake Area
Ivanpah-Pahrump Valleys Watershed
(HUC 16060015)

HBG Watershed Number	HUC 12 Watershed Name	HBG Field Data	ICF Jones & Stokes Field Data	Comments
32	Porter Wash-Frontal Ivanpah Lake	Yes	Yes	Watershed drains to Roach (dry) Lake.
33	Town of Jean-Frontal Ivanpah Lake	Yes	No	Watershed drains to Roach (dry) Lake.
34	Lookout Peak	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.
35	Town of Goodsprings	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.

Huffman-Broadway Group

Field Data Forms

For DesertXpress
Roach Lake Area

HUC 12 Watershed *Lookout Peak*

HBG Watershed ID # 34

Within Ivanpah-Pahrump Valleys Watershed (HUC 16060015)

DesertXpress

Field Notebook

HBG Watershed ID # 34

Watershed Name: Lookout Peak

If found, please return to:

George Ball
Huffman-Broadway Group, Inc.
828 Mission Avenue
San Rafael, California 94901
415.925.2000
gball@h-bgroup.com

Return Postage Guaranteed

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) Ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West) — Lookout Peak

HGB Team # B BDIES | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 34 | HUC 12 # 160600150902

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
5-16-10	0957	1	34MD1E	C219	21.6	A	D	ND	A: 5 D: 10	B: 3,6,10,11,12,13 E:	C: F: 18	
5-16-10	1002	1	34BD2E	C219	1.0	A	D	ND	A: D:	B: E:	C: F:	Comment #1E RTH RECHECKED
5-16-10	1008	1	34BD3E	C219	1.0	A/I	D	ND	A: D:	B: E:	C: F:	Comment #1E RTH RECHECKED
5-16-10	1012	1	34BD4E	C219	1.0	A/I	D	ND	A: D:	B: E:	C: F:	Comment #2E RTH RECHECKED
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

HBG OHWM Field Data Sheet (Arid West)

LOOKOUT PEAK

HGB Team # B 6M/125 | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 34 | HUC 12 # 160600150902

Drainage Data												Comments
Date M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
8-16-10	1012	1	34BD4E ~~34D4E~~	C219	-	I	D	N	A: D:	B: E:	C: F:	comment #2E
9.1.10	—	5	34DS		1.0	A	D	Y	A: 5 D: 10	B: 3,6,10,11,12,13 E:	C: F: 18	NOT ON PREFERRED ROUTE
9.1.10	—	5	34D6		1.5	A	D	Y	A: 5 D: 10	B: 3,6,10,11,12,13 E:	C: F: 18	
9.1.10	—	5	34D7		1.5	A	D	Y	A: 5 D: 10	B: 3.6,10,11,12,13 E:	C: F: 18	
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Comment Number	Comment
#1E	man-made overflow from detention basin on the other side of the freeway. Evidence of water flow but drainage blocked from continuing off-site by excavated material piled at fence line.
#2E	old drainage blocked by construction of freeway. No evidence of recent water flows.

Exhibit B2

DesertXpress Field Data
For
Roach Lake Area
Ivanpah-Pahrump Valleys Watershed
(HUC 16060015)

HBG Watershed Number	HUC 12 Watershed Name	HBG Field Data	ICF Jones & Stokes Field Data	Comments
32	Porter Wash-Frontal Ivanpah Lake	Yes	Yes	Watershed drains to Roach (dry) Lake.
33	Town of Jean-Frontal Ivanpah Lake	Yes	No	Watershed drains to Roach (dry) Lake.
34	Lookout Peak	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.
35	Town of Goodsprings	Yes	No	Watershed drains to Roach (dry) Lake. Route crosses only the southeastern finger of this watershed.

Huffman-Broadway Group

Field Data Forms

For DesertXpress
Roach Lake Area

HUC 12 Watershed *Town of Goodsprings*

HBG Watershed ID # 35

Within Ivanpah-Pahrump Valleys Watershed (HUC 16060015)

DesertXpress

Field Notebook

HBG Watershed ID # 35

Watershed Name: Town of Goodsprings

If found, please return to:

George Ball
Huffman-Broadway Group, Inc.
828 Mission Avenue
San Rafael, California 94901
415.925.2000
gball@h-bgroup.com

Return Postage Guaranteed

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) Ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

Town of Goodsprings

HGB Team # B BOIES | Project Name: DesertXpress | HBG Sub-Basin # (1 – 41) 35 | HUC 12 # 160600150901

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
5-16-10	1030	1	35M1E	C21B	6.5	A	D	NO	A: 16 D:	B: 11, 12, 13 E:	C: F: 18	comment #3E
5-16-10	1035	1	35B2E	C21B		I	D	NO	A: D:	B: E:	C: F:	comment #2E
5-16-10	1039	1	35M3E	C21B	6.5	A	D	NO	A: 16 D:	B: 11, 12, 13 E:	C: F: 18	comment #3E
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	
									A: D:	B: E:	C: F:	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Comment Number	Comment
#2E	This is an old drainage blocked by construction of the freeway. No evidence of recent water flow.
#3E	water from the detention basin on the other side of the freeway passes through here and continues in a natural drainage past the fence.

Exhibit C

Representative Areas Potentially Excluded from Corps Jurisdiction Based on Corps-EPA *Rapanos Guidance*, DesertXpress Project, HUC 8 Ivanpah – Pahrump Valleys Watershed Draining to Roach Dry Lake

Exhibit C. Map Showing Representative Areas Potentially Subject to Corps Jurisdiction Under Section 404 of the Clean Water Act, DesertXpress Project, HUC 8 Ivanpah - Pahrump Valleys Watershed Draining to Roach Dry Lake, Clark County, Nevada.

Exhibit D

Hydrology Maps for CWA Jurisdictional Analysis

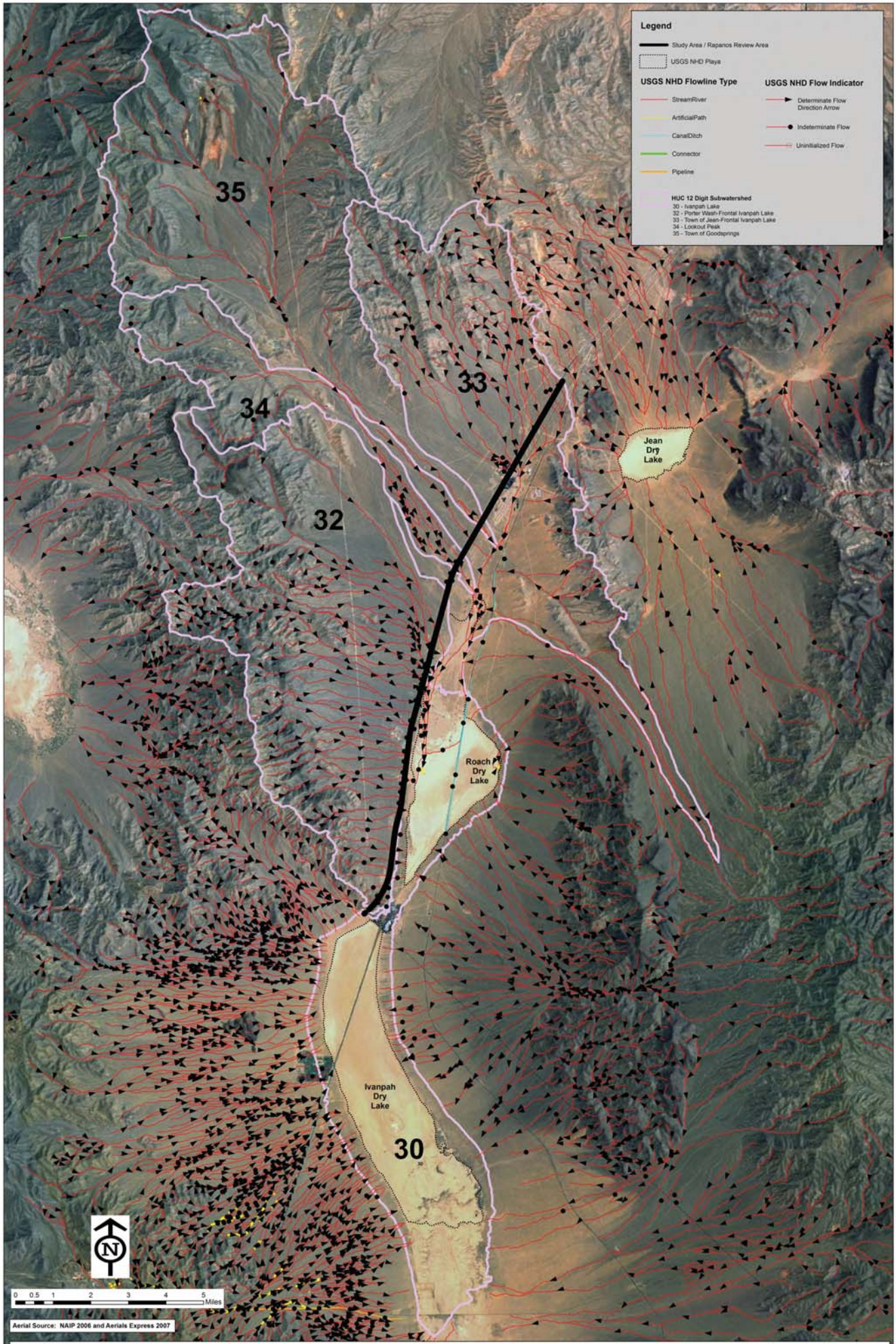

Exhibit D1. Satellite Imagery With USGS NHD Flowlines and Arrows Showing Direction and Route of Surface Water Flow From Review Area toward Isolated Roach Dry Lake

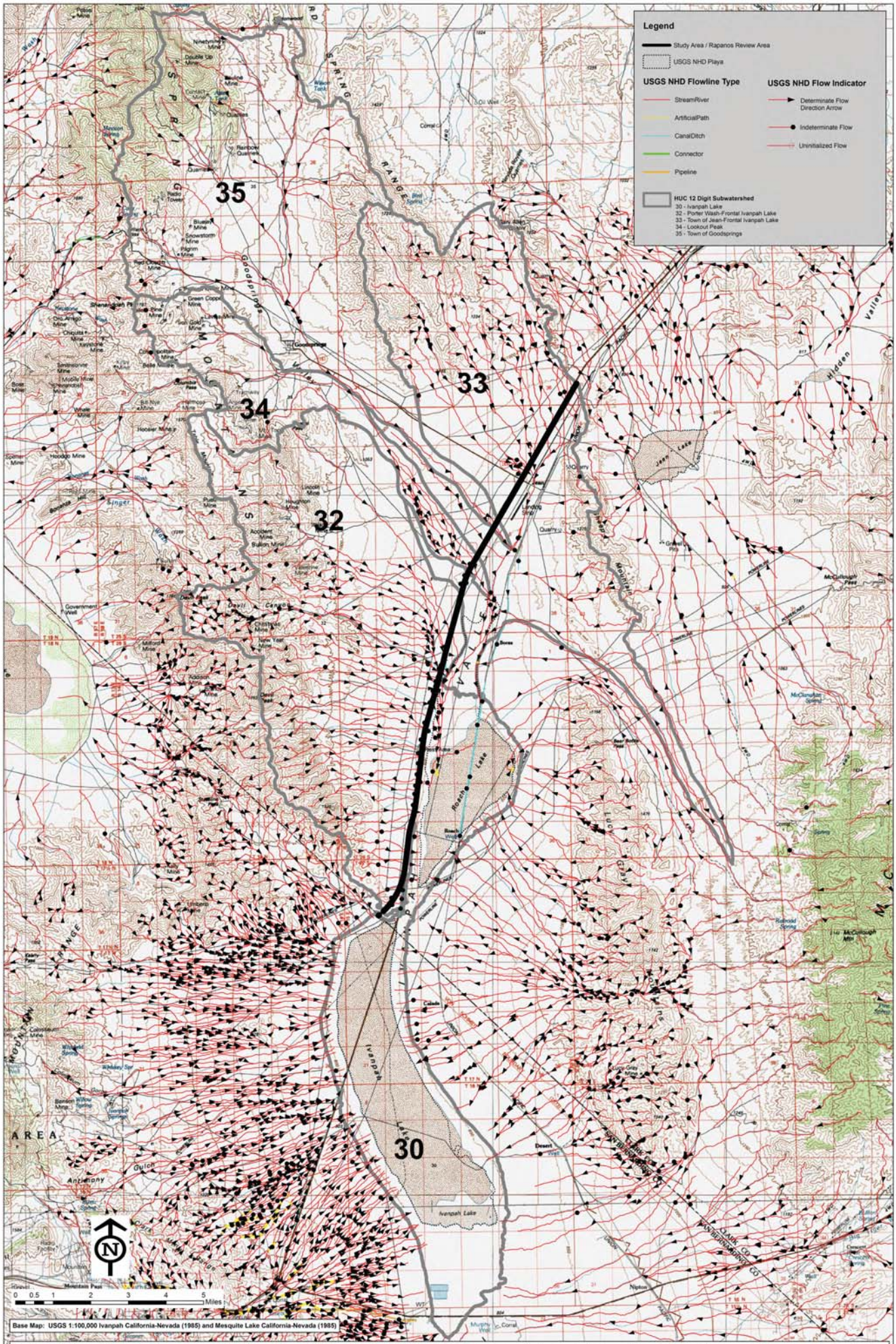

Exhibit D2. USGS Topographic Mapping With USGS NHD Flowlines and Arrows Showing Direction and Route of Surface Water Flow From Review Area toward Isolated Roach Dry Lake

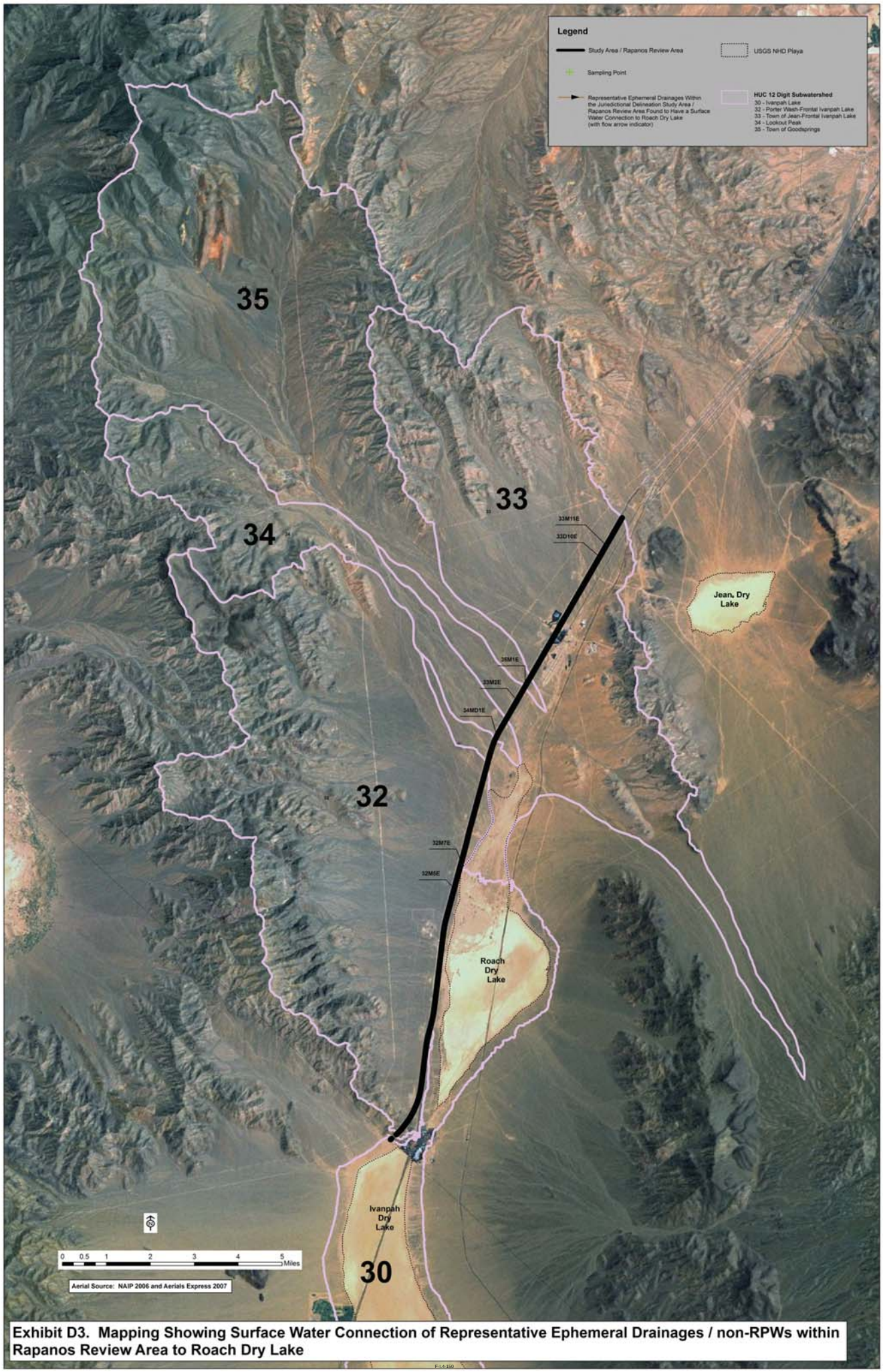

Exhibit D3. Mapping Showing Surface Water Connection of Representative Ephemeral Drainages / non-RPWs within Rapanos Review Area to Roach Dry Lake