ENVIRONMENTAL STUDY

Project Name: **I-215; 4700 South to SR-201** PIN: **9419**

Project No.: **F-I215(175)16** Job/Proj: **71798**

Prepared By: **Craig Bown**

For guidance in preparing this environmental study, refer to Chapter 4 of the UDOT Environmental Process Manual of Instruction:

http://www.udot.utah.gov/go/environmental

REQUIRED SIGNATURES

I have reviewed the information presented in this Environmental Study and I hereby attest that the document is complete and the details of the document are correct.

Reviewer's (Signature): Liz Robinson Digitally signed by Liz Robinson DN: cn=Liz Robinson, o, ou=UDOT Cultural Resources Program Manager, email=lizrobinson@utah.gov, c=US Date: 2015.09.15 13:37:43 -06'00' **Date:** September 15, 2015

Reviewer (Printed): Liz Robinson

Firm/UDOT Region: UDOT Central Environmental

FEDERAL AID PROJECTS

Based upon the information provided in this document and the analysis contained herein, the State has determined that, pursuant to the provisions of 23 CFR 771.117(a), this project has no significant impacts on the environment and that there are no unusual circumstances as described in 23 CFR 771.117(b). As such, the State has determined that the project is categorically excluded from the requirements to prepare an environmental assessment or environmental impact statement under the National Environmental Policy Act per 23 CFR 771.117 c(26). The State has been assigned, and hereby certifies that it has carried out, the responsibility to make this determination pursuant to Chapter 3 of title 23, United States Code, Section 326 and a Memorandum of Understanding dated June 30, 2014 executed between the FHWA and the State.

Digitally signed by Craig Bown
Date: 2015.09.15 14:19:23
-06'00'

Approved: _____ **Date:** _____

UDOT Region Environmental Manager

1. Purpose and Need for Action

The section of roadway along I-215 from approximate milepost (MP) 15 to 20 in Salt Lake County was built in the mid-1970s and is at the end of its expected service life. This condition leads to increased safety concerns related to poor pavement surfaces and the need for reoccurring maintenance efforts. This segment of I-215 also experiences congestion related to short weaving distances. The purpose of the project is to address roadway deficiencies, improve roadway safety related to pavement surfaces and to increase traffic flow.

2. Description

UDOT is proposing to reconstruct the section of roadway, and associated ramps, along I-215 from approximate milepost (MP) 15 to 20 in Salt Lake County (see exhibit in Appendix). The approximate project length is 5 miles. The proposed project will include: removal and replacement of the existing pavement surfaces with suitable pavement materials; minor widening for installation of auxiliary lanes; pavement soft spot repair; barrier upgrades; and bridge deck replacement with necessary repairs to the associated bridge and ramp structures. The project also includes: installation of ramp metering signals, traffic detection, Advanced Traffic Management System (ATMS) cameras and associated components; re-grading of shoulders; storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary; and installation of roadway signage, delineators, and pavement markings. It is anticipated that minor Right-of-Way acquisition and Temporary Construction Easements (TCEs) will be required for this project.

3. Public Hearing/Opportunity for Public Hearing

NO This project could result in public controversy or substantial impacts to adjacent properties, or substantially changes roadway geometry.

NO There are significant social, economic, environmental or other effects. If YES, a Categorical Exclusion is not applicable. Consult with UDOT Central Environmental Services.

NO UDOT/FHWA has determined that a public hearing is in the public interest.

If the answer to ANY of the above questions is YES, a public hearing or opportunity for a public hearing is required (attach documentation identifying date and location of hearing, summary of comments, and responses to substantial comments, or include certification of opportunity for hearing.)

The following types of public involvement have been provided:

NO Public Hearing in accordance with state and federal procedures

NO Opportunity for Public Hearing

NO Open House

NO Other:

NO Documentation is attached identifying the date and location of hearing, summary of comments, and responses to substantial comments; or the Certification of Opportunity for a Hearing is attached.

4. Right-of-Way

YES Acquisition of Right-of-Way is required.

NO The right-of-way required is significant because of its size, location, use, or relationship to remaining property and abutting properties. (If the right-of-way required is significant, the project does not qualify as a Categorical Exclusion.)

Comments: Property for utility easements was acquired from 3 parcels, totaling approximately 0.03 acres.

5. Cultural

According to the UDOT Region NHPA/NEPA Specialist and/or the Architectural Historian, the Finding of Effect for the project is one of the following:

NO No historic properties affected

YES No adverse effect

NO Adverse effect

Project documentation for determination of eligibility and finding of effect consists of one of the following and is attached:

NO Memo from UDOT Region NEPA/NHPA Specialist and/or Architectural Historian stating a finding of No Historic Properties Affected.

YES SHPO concurrence with the Determinations of Eligibility and Finding of Effect AND memo from UDOT Region NEPA/NHPA Specialist and/or Architectural Historian stating a finding of No Adverse Effect or Adverse Effect.

YES Have letters for Native American Consultation been sent? Attach letters.

NO Have letters for federal and state agencies, CLGs, historical societies, etc. been sent? If so attach letters.

NO Do the Impacts to historic properties require mitigation?

If YES, a signed Memorandum of Agreement (MOA) is attached.

Comments: See Appendix for Determination of Eligibility and Finding of No Adverse Effect (DOEFOE) and Native American Consultation Letters.

6. Paleontological

YES This project is one of the 16 types of projects listed in Stipulation III of the Memorandum of Understanding (MOU) with the Utah Geological Survey (UGS) that has no effect on paleontological resources and does not require notification to the UGS. If YES, a memo from the UDOT Region NEPA/NHPA Specialist is attached (can be included in cultural memo).

For all other projects, the UGS has been notified and has responded with the following (attach UGS letter and memo from the UDOT Region NEPA/NHPA Specialist):

N/A There are no known paleontological localities in the area of potential effects and the formations in the project area have a low potential for containing fossil remains (Class 1 or 2).

N/A Fossil-bearing formations (Class 3-5) and/or known paleontological localities are present in the area of potential effects, but the UDOT Region NEPA/NHPA Specialist (or paleontologist) has determined that they will not be affected by the project.

N/A Fossil-bearing formations (Class 3-5) and/or know paleontological localities are present in the area of potential effects and may be affected by construction activities. A survey and/or monitoring by a qualified paleontologist is required.

Comments: See Appendix for Paleontological clearance.

7. Federally Threatened, Endangered, or Candidate Species

For Federally Funded Projects:

YES Project will have **"no effect"** to T&E species, or their critical habitats, protected under the Endangered Species Act. If YES, attach **"no effect"** memo or review/comments (in the case of local government projects) from UDOT's Wildlife Biologist.

NO Project **"may affect, but is not likely to adversely affect"** T&E species, or their critical habitats, protected under the Endangered Species Act. If YES, attach BA and "concurrence" from the U.S. Fish and Wildlife Services (USFWS). List all mitigation/conservation measures.

NO Project **"may affect, and is likely to adversely affect"** threatened and endangered species, or their critical habitats, protected under the Endangered Species Act. If YES, attach BA and USFWS BO. List all mitigation/conservation measures.

NO The USFWS has issued a **"jeopardy"** opinion regarding this project. If YES, attach BA and BO as above. This project cannot go forward without being reconsidered.

Comments: See Appendix for memo from UDOT Wildlife Biologist.

8. Wildlife

NO Project has the potential to affect state-sensitive species, important wildlife habitat, big game migration routes, habitat connectivity, migratory birds, and fish spawning habitat or fish passage.

Memo from UDOT Wildlife Biologist is attached.

Comments: See Appendix for memo from UDOT Wildlife Biologist.

9. Invasive Species

If the project involves earthwork, grading or landscaping, there is potential to introduce or spread invasive weed species.

YES Based upon location, this project has the potential to introduce or spread invasive species included on the noxious weed list of the State of Utah and the county noxious weed lists.

10. Noise

Projects that may affect noise levels to adjacent receptors include changes in roadway alignment, roadway widening and the addition of traffic lanes.

YES This project has the potential to increase noise to adjacent receptors.

YES A noise study is attached.

Comments: This project has potential to increase noise to adjacent receptors and is considered a Type I Project. Accordingly, an evaluation of noise impacts and abatement measures was completed following the most current UDOT Noise Abetment Policy. Results indicated that noise abatement measures (i.e. noise walls) must be considered along the project corridor as predicted noise levels will exceed the allowable volume. However, for noise walls to be implemented, they must be determined both feasible and reasonable. None of the considered noise walls meet both of these requirements. Therefore, new noise walls will not be required for this project. Project impacts to existing noise walls will be replaced in-kind. See Appendix for Noise Report.

11. Wetlands, Water Resources, Storm Water, and Floodplains

Wetlands and Water Resources

NO The project is a type that does not have the potential to affect or cross a Waters of the United States. If YES, no concurrence letter is needed.

YES Project affects waters of the United States (e.g. wetlands, mudflats, lakes, or perennial or ephemeral streams). If NO, have a UDOT Landscape Architect provide a concurrence letter stating they agree with the determination. In order to indicate "NO" on this question, answers to the follwing statements must also be "NO".

- **NO** Project impacts perennial, intermittent, or ephemeral streams that have a riparian vegetation component. If YES, a Programmatic General Permit 40 (PGP40), also known as a Stream Alteration Permit, from the Utah Division of Water Rights will be required.
- **NO** Project exceeds the impact limitations for streams or washes indentified in the PGP40. If YES, both a PGP40 and a separate Department of the Army permit will be required.
- **NO** Project impacts an ephemeral wash not captured under PGP40 that has an ordinary high water mark (OHWM) with a connected flow to a downstream Traditional Navigable Water and the impact below the OHWM exceeds 1/10 of an acre per crossing. If YES, a Department of the Army permit will be required.
- **NO** Project impacts a perennial or intermittent stream below the OHWM less than 1/10 of an acre per crossing. If YES, notification to the U.S. Army Corps of Engineers will be required.
- **NO** Project impacts navigable waters of the United States (Lake Powell, Flaming Gorge Reservoir, Bear Lake, Green River - mouth to 20 miles above Green River Station, Colorado River - mouth of Castle Creek to Cataract Canyon - 4.5 miles below mouth of Green River) below the OHWN. If YES, a Section 10 Department of the Army permit will be required.
- **NO** Project impacts jurisdictional wetlands. If YES, a Department of Army Nationwide Permit (NWP) will be required for wetland impacts under the 1/2 acre threshold; a Letter of Permission (LOP) will be required for wetland impacts between 1/2 and 1 acre; an Individual Permit (IP) will be required for impacts greater than 1 acre.
- **YES** Project impacts non-jurisdictional wetlands. If YES, wetland mitigation may still be required under the federal policy of "no net loss." Consult UDOT Environmental Section.

Storm Water Runoff

YES Project disturbs 1 acre or more of ground surface.

If YES, a UPDES Storm Water Discharge Permit for Construction Activities is required from the Utah Division of Water Quality.

Floodplains

NO This project requires new construction or alteration of existing structures within the FEMA designated 100-year flood plain.

If YES, a "development permit" is required from the local permit official.

Comments: Impacts to potentially jurisdictional wetlands and others Waters of the U.S. identified within the project boundaries will be avoided. See Appendix for Wetland and Water Resource Clearance with wetland and Waters of the U.S. Delineation.

12. Hazardous Waste

NO Has a visual inspection of the project area found substances that may be hazardous to human health and/or the environment?

YES This project involves excavation beyond or below the existing roadway footprint.

If YES to either question 1 or 2, then site investigations and coordination with DEQ may be necessary.

Comments: Past UDOT highway as-built plans indicate the use of mine tailings for earthwork along I-215. Coordination with DEQ was initiated and field samples were tested for the mostly likely areas to be impacted by the proposed project. Test results did not indicate characteristics of hazardous waste. See Appendix for Hazardous Waste coordination.

13. Prime, Unique, Statewide, or Locally Important Farmland

Projects in areas whose land use maps indicate no current or future farming activities would not usually affect farmlands.

NO This project MAY affect Prime, Unique, Statewide, or Locally Important Farmlands.

N/A The Natural Resource Conservation Service letter and Form AD1006 are attached.

14. Air Quality

YES This project has the potential to increase particulate matter due to construction activities.

NO This project adds or alters roadway capacity or will result in increased traffic volumes at signalized intersections.

If YES, the Air Quality Supplement is attached.

15. Relocations

NO There may be relocations of residences or businesses as a result of this project.

16. Land Use/Urban Policy

NO This project may affect land use or urban policy.

17. Section 4(f) Properties

NO Section 4(f) properties are impacted.

N/A An Individual Section 4(f) Evaluation AND written concurrence from UDOT Environmental Services on the Individual Section 4(f) determination is attached.

N/A A Programmatic Section 4(f) Evaluation AND written concurrence from UDOT Environmental Services on the Programmatic Section 4(f) determination is attached.

N/A The 4(f) property(s) is an historic property and the impact is considered **de minimis**.

- **N/A** SHPO has concurred in writing on UDOT's **"no adverse effect"** determination to historic properties and has been notified of the intent to make a **de minimis** finding. Attach letter to SHPO and **de minimis** agreement letter.

N/A The 4(f) property(s) is a park, recreational area, wildlife or waterfowl refuge and the impact is considered **de minimis**.

- **N/A** The official(s) with jurisdiction have concurred, in writing, that the project will **"not adversely affect"** the activities, features, and attributes that qualify the resource for protection under Section 4(f) and have been notified of the intent to make the **de minimis** impact finding. Letters are attached.
- **N/A** The project sponsor has provided public notice and opportunity for public review and comment. Describe public involvement efforts in the comments below.

N/A Written concurrence from UDOT Environmental Services is attached.

18. Other Environmental Factors Considered

This Project, except as noted and explained in attachments, will have no disproportionate, serious or lasting effect on the following:

NO Visual

NO Social/Economic

NO Title VI and/or Environmental Justice

NO Natural Resources

NO Construction

NO Energy

NO Geology/Soils

NO Wild/Scenic Rivers

NO Ecology

19. Conclusion

NO This project may have substantial controversy or significant impacts.

MITIGATION COMMITMENTS

CONSTRUCTION		Responsible
Air Quality	Requirements outlined in Standard Specification 01572 titled "Dust Control and Watering" will be followed.	Contractor
Cultural	UDOT Standard Spec 01355, Parts 3.7 and 3.8	Contractor
Hazardous Waste	UDOT Standard Spec 01355, Part 3.1	Contractor
Invasive Species	Supplemental Specification 02924S titled "Invasive Weed Control" will be included in the contract documents and outlines BMPs that will be incorporated.	Contractor
PRELIMINARY ENGINEERING		**Responsible**
Water Quality	The project will disturb 1 acre or more of ground surface. Therefore, a storm water pollution prevention plan (SWPPP) must be included in the plans.	Udot Region Environmental
Water Quality 2	UPDES Permit from the Division of Water Quality must be obtained prior to construction.	Contractor

Environmental Commitments Signature Page

Project Name: I-215; 4700 South to SR-201
Project Number: F-I215(175)16
PIN: 9419

The purpose of this form is to ensure the environmental commitments that are made while following the environmental process are reasonable and feasible to those divisions they will affect. Frequently (as in maintenance preservation projects), UDOT Standard Specifications will provide the mitigation necessary for potential environmental impacts. Therefore, the Environmental Manager will decide whether or not special commitments exist and need to be reviewed. This sheet is required to be included on all UDOT environmental documents regardless of type.

The environmental commitments in the document can be mitigated by following current UDOT specifications.

Digitally signed by Craig Bown
Date: 2015.09.15 14:18:34
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_____

Craig Bown
UDOT Region 2 Environmental Coordinator

I have read the commitments outlined in the environmental document and believe they are designable, financially feasible, constructible, and maintainable.

_____

Design Engineer

_____

District Engineer
UDOT Region 2 District Engineer

Appendices

Project Name: I-215; 4700 South to SR-201
Project Number: F-I215(175)16
PIN: 9419

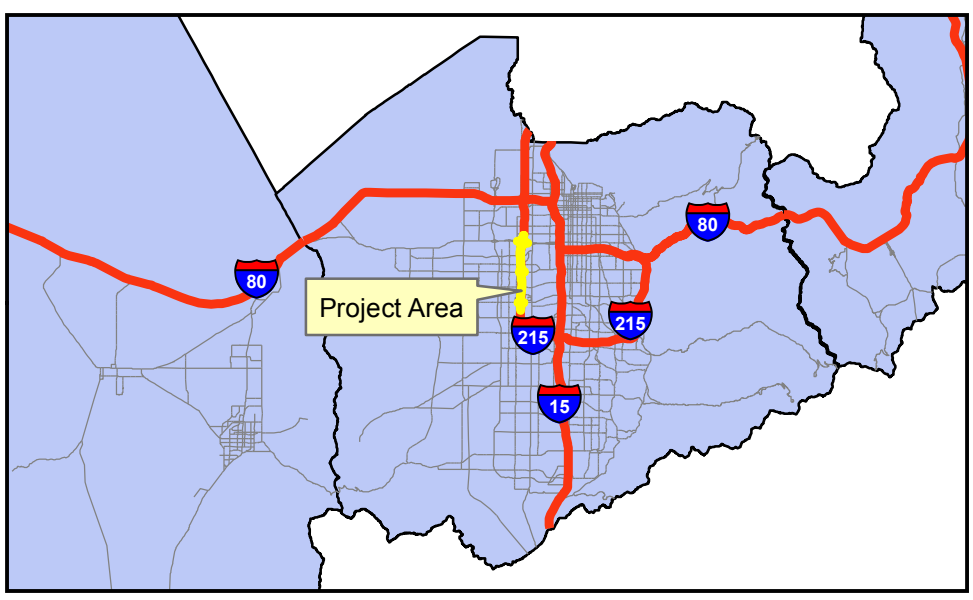
- Project Map
- Determination of Eligibility and Finding of Effect (DOEFOE)
  with Native American Consultation Letters
- Paleontological Clearance
- Wildlife Biologist Clearance
- Noise Report
- Wetland and Water Resource Clearance
  with Wetland and Waters of the U.S. Delineation
- Hazardous Waste Coordination

- Project Map

MP 20
MP 19
MP 18
MP 17
MP 16
MP 15
201
68
154
215
2700 South
Parkway Blvd
Decker Lake Dr
3100 South
171
3500 South
Bangerter Hwy
3200 West
2700 West
2200 West
Redwood Road
4100 South
266
4700 South
N
Miles
0 0.25 0.5 1 1.5 2

Project Name: I-215; 4700 South to SR-201
Project No: F-I215(175)16
PIN: 9419

9419_Project Area



- Determination of Eligibility and Finding of Effect (DOEFOE) with Native American Consultation Letters

15-0557

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

April 29, 2015

Ms. Lori Hunsaker
Deputy State Historic Preservation Officer
Utah Division of State History
300 Rio Grande
Salt Lake City, UT 84101-1182

RE: UDOT Project No. F-I215(175)16; I-215; 4700 South to SR-201, Salt Lake County, Utah (PIN 9419).
Determination of Eligibility and Finding of No Adverse Effect.

Dear Ms. Hunsaker:

The Utah Department of Transportation (UDOT) is preparing to undertake the subject federal-aid project. In accordance with Stipulation II, Part A and Appendix B of the *Memorandum of Understanding, State Assumption of Responsibility for Categorical Exclusions (23 USC §326)* (executed June 30, 2014), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. In accordance with the S*econd Amended Programmatic Agreement among the FHWA, the Utah State Historic Preservation Officer, the Advisory Council on Historic Preservation, the USACE Sacramento District, and the UDOT Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah* (executed June 3, 2013), Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 300101 et seq.), and U.C.A.9-8-404, the UDOT has taken into account the effects of this undertaking on historic properties, and is affording the Advisory Council on Historic Preservation (ACHP) and the Utah State Historic Preservation Officer (SHPO) an opportunity to comment on the undertaking. Additionally, this submission is in compliance with Section 4(f) of the Department of Transportation Act of 1966, 23 U.S.C. § 138 (as amended) and 49 U.S.C. § 303 (as amended).

PROJECT DESCRIPTION

UDOT is proposing to reconstruct I-215 from approximate Mile Post (M.P.) 15.1 to 20 in Salt Lake County. The approximate project length is 4.9 miles. The proposed project will include: removal and replacement of the existing pavement surfaces with suitable pavement materials; minor widening for auxiliary lanes; pavement soft spot repair; barrier upgrades; bridge deck replacement; and necessary repairs to the associated bridge and ramp structures. The project also includes: re-grading of shoulders, storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary; and installation of roadway signage, delineators, and pavement markings. All work will be limited to the existing UDOT ROW.

The area of potential affects (APE) has been defined as the UDOT ROW along I-215 from approximate milepost M.P. 15.1 to 20 in Salt Lake County. The APE is the width of the UDOT ROW, which varies, but is an average of 250 feet.

Environmental Division • Telephone (801) 965-4173 • Facsimile (801) 965-4403 • www.udot.utah.gov
Calvin Rampton Complex • 4501 South 2700 West • Mailing Address P.O. Box 148450 • Salt Lake City, Utah 84114-8450

Received
APR 29 2015
USHPO

The APE has been surveyed for archaeological resources by the Utah Department of Transportation, under State Antiquities Project Number U-15-UT-208s. Due to the extensive disturbance from construction of I-215 within the ROW, a reconnaissance level survey was conducted to determine if any undisturbed lands exist within the APE and to document any linear archaeological site that crosses the APE. No undisturbed lands are present in the APE and therefore no additional survey was conducted but known archaeological sites that cross the APE were documented. A survey was not conducted for architectural properties as none are present in the APE and all bridge structures are modern in age.

The survey has resulted in the identification of 2 archaeological sites within the APE, both of which are eligible to the National Register of Historic Places (NRHP). No known traditional cultural properties or paleontological resources are located in the APE. The Determinations of Eligibility and Findings of Effects (for both Section 106 and Section 4(f)) are provided in Table 1.

ARCHAEOLOGICAL RESOURCES

Table 1. Determinations of Eligibility and Findings of Effect for Archaeological Resources.

Site	Name or Description	NRHP Eligibility	Finding of Effect	Warrants preservation in place	Section 4(f) Use
42SL303	Brighton Canal	Eligible (Criterion A)	No Adverse Effect	No	No
42SL342	North Jordan Canal	Eligible (Criterion A)	No Adverse Effect	No	No

Description of Effects: The proposed project will modify or replace the modern culverts that carry the canal sites under I-215. No historic features or elements are present within the APE and the culvert channelizes the historic alignment. The project will affect a relatively small portion of the site and will not substantially impact or alter any contributing elements of the site or any of the character-defining features for which it was determined eligible for the NRHP. Thus, the proposed project will result in a finding of No Adverse Effect and no Section 4(f) use for each property.

CONSULTATION EFFORTS

Native American consultation was initiated through letters sent to the Eastern Shoshone Tribe of the Wind River Reservation, Shoshone-Bannock Tribes, Paiute Indian Tribe of Utah, Northwestern Band of Shoshone Nation, Uintah and Ouray Ute Tribes, and the Skull Valley Band of Goshute Indians (sent March 30, 2015). In addition, notification was also sent to those tribes with whom UDOT has Section 106 Programmatic Agreements: Cedar Band of Paiutes, Shivwits Band of Paiute Indian Tribe, and the Confederated Tribes of the Goshute Reservation (sent March 30, 2015). To date, The Paiute Indian Tribe of Utah has been the only tribe to respond to this notification. They have no objections to the project or area and are not aware of any sites, practices, or location of importance within the APE.

SUMMARY

To summarize, the project will result in a finding of **No Adverse Effect** for 2 archaeological sites and no Section 4(f) use. Therefore, the Finding of Effect for the proposed UDOT Project No. F-I215(175)16, I-215; 4700 South to SR-201, Salt Lake County, Utah, is **No Adverse Effect.**

Please review this document and, providing you agree with the findings contained herein, sign and date the signature line at the end of this letter. Should you have any questions or need additional information, please feel free to contact Liz Robinson at 801-910-2035 or via email at lizrobinson@utah.gov.

Sincerely,

Liz Robinson, M.A., RPA
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Oanh Le-Spradlin, Project Manager
Mason Palmer, Environmental Manager

Regarding UDOT Project No. F-I215(175)16, I-215; 4700 South to SR-201, Salt Lake County, Utah, I concur with the Determination of Eligibility and Finding of Effect, submitted to the Utah State Historic Preservation Office in accordance with the *Second Amended Programmatic Agreement,* Section 106 of the NHPA, and U.C.A. 9-8-404, which states that the UDOT has determined that the finding is **No Adverse Effect.**

For Lori Hunsaker
Deputy State Historic Preservation Specialist

Date 4/30/15

UDOT Project Initial Tribal Notification Form
Section 106 Consultation

Date: March 30, 2015
UDOT Project: UDOT Project Number: F-I215(175)16; I-215; 4700 South to SR-201, Salt Lake County, Utah (PIN 9419)
Contact Name: Liz Robinson
Address: 2010 South 2760 West, Salt Lake City UT 84120
Telephone: 801-887-3409
Email: lizrobinson@utah.gov

Project Description

The Utah Department of Transportation (UDOT), in cooperation with the Federal Highway Administration (FHWA) proposes to improve I-215 from 4700 South to SR-201 (see the enclosed Project Location Map). Proposed improvements include replacement of 14 inches of pavement, minor widening for an auxiliary lane, and deck replacement and minor repairs to the associated bridge and ramp structures. The project also includes: storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary and replacement/update of roadway signage, reflectors, and pavement markings. All work will be limited to the existing UDOT ROW.

Archaeological Potential (Prehistoric or Historic Sites)

- ☐ Known prehistoric sites in the project area
- ☒ Known historic sites in the project area
- ☐ Likely to find prehistoric sites in the project area
- ☐ Likely to find historic sites in the project area
- ☒ Unlikely to find prehistoric sites in the project area
- ☒ Unlikely to find historic sites in the project area
- ☐ No expected ground disturbance
- ☐ Other:

Additional Information/Comments

The area of potential effects (APE) for the Project is best illustrated in the enclosed Project APE Map. The APE extends approximately 4.7 miles along I-215 and is the width of the UDOT ROW. The area was surveyed on a reconnaissance level in 2001 and identified two historic archaeological sites that cross the APE. Both of these sites are eligible for the NRHP.

Tribal Information

Tribe: Shivwits Band of Paiute Indian Tribe of Utah
Name of tribal contact/representative: Georgetta Wood
Address: 26 South 400 West
City, State, Zip: Ivins, UT 84738
Telephone:
Email: jwood@utahpaiutes.org
Copies to: Shanan Anderson

Comments

1. Do you wish to be a Section106 consulting party on this project?	☐ Yes	☐ No	☐ Not Sure
2. If you do not wish to be a Section 106 consulting party, do you wish to continue to be involved in the development of this project?	☐ Yes	☐ No	☐ Not Sure
Note: If your answer is "Not Sure," UDOT will continue to provide information.			
3. Are you aware of any traditional religious or culturally important places in or near the project area?	☐ Yes	☐ No	☐ Not Sure
4. If yes, can you share details about the place (e.g., location and other characteristics) and any concerns you may have?	☐ Yes	☐ No	
5. Is this information sensitive?	☐ Yes	☐ No	

Additional Comments

Name of person completing this form, if different from above:
Signature: Date:

Mason Palmer

UDOT Project Initial Tribal Notification Form
Section 106 Consultation

Date: March 30, 2015
UDOT Project: UDOT Project Number: F-I215(175)16; I-215; 4700 South to SR-201, Salt Lake County, Utah (PIN 9419)
Contact Name: Liz Robinson
Address: 2010 South 2760 West, Salt Lake City UT 84120
Telephone: 801-887-3409
Email: lizrobinson@utah.gov

Project Description

The Utah Department of Transportation (UDOT), in cooperation with the Federal Highway Administration (FHWA) proposes to improve I-215 from 4700 South to SR-201 (see the enclosed Project Location Map). Proposed improvements include replacement of 14 inches of pavement, minor widening for an auxiliary lane, and deck replacement and minor repairs to the associated bridge and ramp structures. The project also includes: storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary and replacement/update of roadway signage, reflectors, and pavement markings. All work will be limited to the existing UDOT ROW.

Archaeological Potential (Prehistoric or Historic Sites)

- ☐ Known prehistoric sites in the project area
- ☒ Known historic sites in the project area
- ☐ Likely to find prehistoric sites in the project area
- ☐ Likely to find historic sites in the project area
- ☒ Unlikely to find prehistoric sites in the project area
- ☒ Unlikely to find historic sites in the project area
- ☐ No expected ground disturbance
- ☐ Other:

Additional Information/Comments

The area of potential effects (APE) for the Project is best illustrated in the enclosed Project APE Map. The APE extends approximately 4.7 miles along I-215 and is the width of the UDOT ROW. The area was surveyed on a reconnaissance level in 2001 and identified two historic archaeological sites that cross the APE. Both of these sites are eligible for the NRHP.

Tribal Information

Tribe: Cedar Band of Paiutes
Name of tribal contact/representative: Lora Tom
Address: 4655 North Utah Trail
City, State, Zip: Enoch, UT 84720
Telephone: (435) 327-0495
Email: cbcletom@q.com
Copies to: Vala Parashonts

Comments

1. Do you wish to be a Section106 consulting party on this project?	☐ Yes	☐ No	☑ Not Sure
2. If you do not wish to be a Section 106 consulting party, do you wish to continue to be involved in the development of this project?	☐ Yes	☐ No	☑ Not Sure
Note: If your answer is "Not Sure," UDOT will continue to provide information.			
3. Are you aware of any traditional religious or culturally important places in or near the project area?	☐ Yes	☐ No	☑ Not Sure
4. If yes, can you share details about the place (e.g., location and other characteristics) and any concerns you may have?	☐ Yes	☐ No	
5. Is this information sensitive?	☐ Yes	☐ No	

Additional Comments

Name of person completing this form, if different from above:
Signature: Date:

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, Suite 9-A
Salt Lake City, UT 84118-1847
801-955-3500
801-955-3539
http://www.fhwa.dot.gov/utdiv/utah.htm

March 30, 2015

In Reply Refer To:
HDA-UT

Mr. Darwin St. Clair, Jr.
Eastern Shoshone Tribe of the Wind River Reservation
P.O. Box 538/15 North Fork Rd
Fort Washakie, WY 82514

Subject: UDOT Project Number: F-I215(175)16; I-215; 4700 South to SR-201, Salt Lake County, Utah (PIN 9419)
Notification of Project and Invitation to be a Section 106 Consulting Party

Dear Mr. St. Clair, Jr. ,

The Utah Department of Transportation (UDOT), in cooperation with the Federal Highway Administration (FHWA) proposes to improve I-215 from 4700 South to SR-201 (see the enclosed Project Location Map). Proposed improvements include replacement of 14 inches of pavement, minor widening for an auxiliary lane, and deck replacement and minor repairs to the associated bridge and ramp structures. The project also includes: storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary and replacement/update of roadway signage, reflectors, and pavement markings. All work will be limited to the existing UDOT ROW. Some of the proposed construction work would include work below the existing imported roadbase materials in original (or native) ground.

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and the *Second Amended Programmatic Agreement among the Federal Highway Administration, the Utah Department of Transportation, the Utah State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah* (Section 106 PA) (signed into effect June 3, 2013), the FHWA will be responsible for consultation with Native American tribes/bands on this project. In accordance with Stipulation II, Part A and Appendix B of the *Memorandum of Understanding, State Assumption of Responsibility for Categorical Exclusions (23 USC §326)* (signed into effect July 1, 2008), the UDOT assumes responsibility, assigned by the FHWA, for ensuring compliance with Section 106 of the NHPA, except for Native American consultation.

In compliance with the 106 PA, the FHWA requests that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 304 of the NHPA, the FHWA and the UDOT will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural places that may be affected by this proposed undertaking.

The area of potential effects (APE) for the Project is best illustrated in the enclosed Project APE Map. The APE extends approximately 4.7 miles along I-215 and is the width of the UDOT ROW. The area was surveyed on a reconnaissance level in 2001 and identified two historic archaeological sites that cross the APE. Both of these sites are eligible for the NRHP. The UDOT Region Two NEPA/NHPA Specialist (Archaeologist) and is currently working with the design team on determining how the sites would be affected and will consult with the Utah State Historic Preservation Officer regarding those effects once they are determined. No other cultural resources or historic properties, previously-recorded or otherwise, were identified within the project APE. A copy of the cultural resources inventory results report will be kept on file at the UDOT Region Two Headquarters in Salt Lake City, Utah and will be available for your review upon request.

At your request, the FHWA and the UDOT staff will be available to meet with you to discuss any concerns you might have about the project. Should you have any questions or concerns about this project and/or wish to be a consulting party, feel free to contact me at 801-955-3517 or at Bryan.Dillon@dot.gov, or Liz Robinson at 801-887-3409 or at lizrobinson@utah.gov. We would also appreciate any suggestions you might have about other groups or individuals that we should contact regarding this project or ways that we may more effectively consult with your Tribe/Band.

To facilitate our consultation with you regarding this project, we would greatly appreciate a response to this letter within 30 days of receipt.

Thank you for your attention to this project notification and any comments you may have.

Sincerely yours,

for Bryan Dillon
Region 2 Area Engineer

Enclosure(s):
- Project Maps

cc:
- Ms. Glenda Trosper, Director, Cultural Center
- Mr. Wilfred Ferris, THPO
- Ms. Liz Robinson, NEPA/NHPA Specialist, UDOT Region Two

LIST OF OTHER TRIBES/BANDS NOTIFIED OF THE PROJECT:

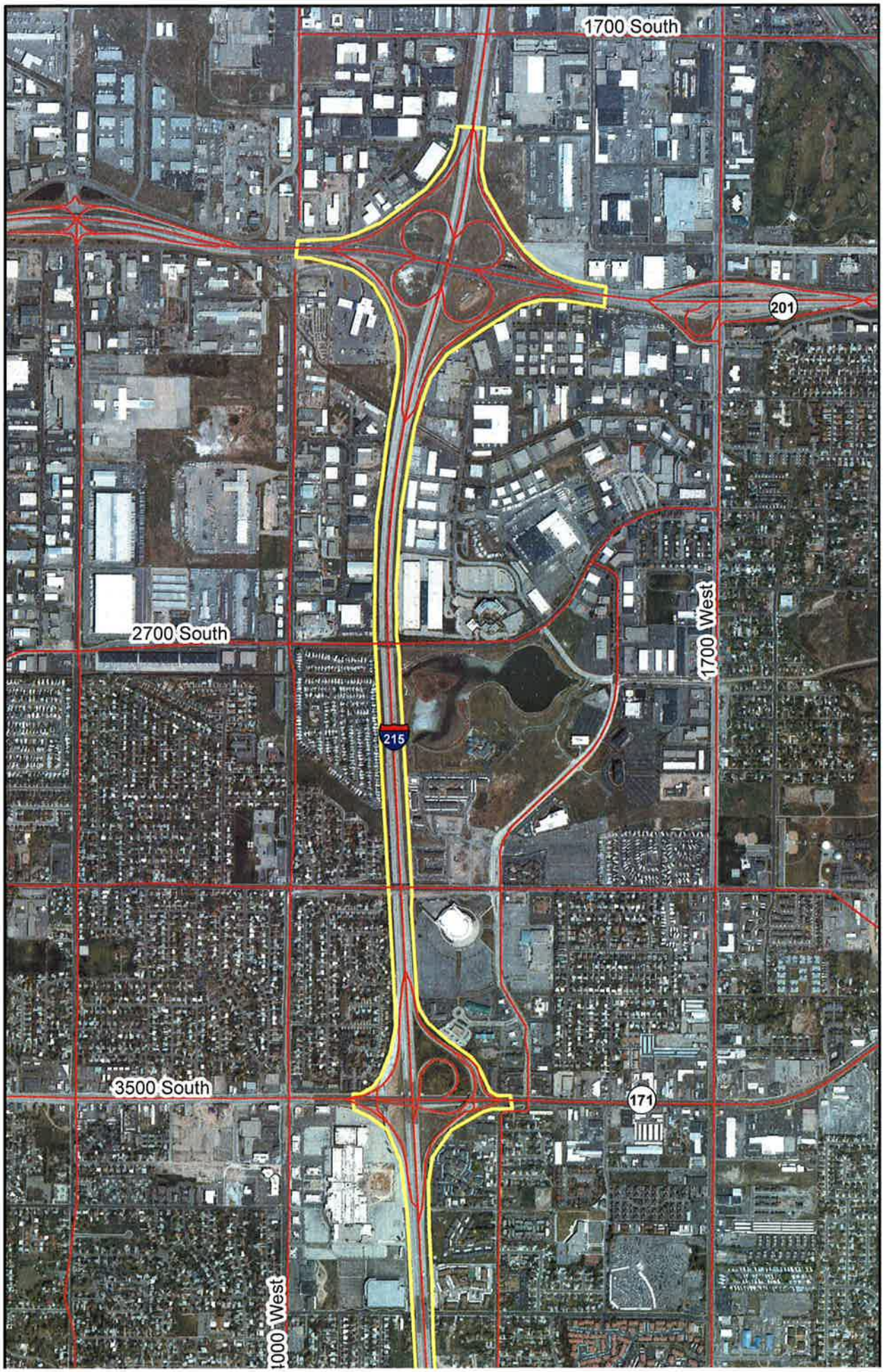
Tribal Contact List For: I-I215(175)16; I-215; 4700 South to SR-201, Salt Lake County, Utah (PIN 9419)

IDENTICAL COPIES OF THIS LETTER SENT TO THE FOLLOWING:

Original to:	CC to:
Mr. Darwin St. Clair, Jr., Chairman Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514	Ms. Glenda Trosper, Director, Cultural Center Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514
	Mr. Wilfred Ferris, THPO Eastern Shoshone Tribe of the Wind River Reservation P.O. Box 538/15 North Fork Rd Fort Washakie, WY 82514
Mr. Nathan Small, Chair Shoshone-Bannock Tribes of Fort Hall P.O. Box 306 Pima Drive Fort Hall, ID 83203	Ms. Carolyn Smith, Cultural Resource Director Shoshone-Bannock Tribes of Fort Hall P.O. Box 306 Pima Drive Fort Hall, ID 83203
Ms. Gari Lafferty, Tribal Chairperson Paiute Indian Tribe of Utah 440 North Paiute Drive Cedar City, UT 84720	Ms. Dorena Martineau, Cultural Resources Manager Paiute Indian Tribe of Utah 440 North Paiute Drive Cedar City, UT 84720
Mr. Jason Walker, Chairman Northwestern Band of Shoshone Nation 707 North Main Street Brigham City, UT 84302	Ms. Patty Timbimboo-Madsen, Cultural Specialist Northwestern Band of Shoshone Nation 707 North Main Street Brigham City, UT 84302
Mr. Gordon Howell, Chairperson Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026	Ms. Betsy Chapoose, Director, Cultural Rights and Protection Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026
Ms. Lori Bear Skiby, Chairperson Skull Valley Band of Goshute Indians P.O. Box 448 Grantsville, UT 84029	None

PROJECT INITIAL TRIBAL NOTIFICATION FORM WITH PROJECT INFORMATION SENT TO THE FOLLOWING (IN ACCORDANCE WITH TRIBAL SECTION 106 PAs; SENT BY THE UDOT REGION ARCHAEOLOGIST):

Mail Original to:	Mail CC to:	Email to:
Ms. Madeline Greymountain, Chairperson Confederated Tribes of the Goshute Reservation P.O. BOX 6104 195 Tribal Center Rd. Ibapah, UT 84034	Ms. Mary Pete-Freeman, Cultural Resources Coordinator Confederated Tribes of the Goshute Reservation P.O. BOX 6104 195 Tribal Center Rd. Ibapah, UT 84034	mgreymountain@goshutetribe.com marypete@goshutetribe.com
	Mr. Ed Naranjo, Administrator Confederated Tribes of the Goshute Reservation P.O. BOX 6104 195 Tribal Center Rd. Ibapah, UT 84034	ednaranjo@goshutetribe.com
Ms. Lora Tom, Band Chairwoman Cedar Band of Paiutes 4655 North Utah Trail Enoch, UT 84720	Ms. Vala Parashonts Cultural Resource Representative 533 South 640 West Cedar City, UT 84721	lora.tom@ihs.gov
Ms. Georgetta Wood, Band Chairwoman Shivwits Band of Paiute Indian Tribe of Utah 26 South 400 West Ivins, UT 84738	Ms. Shanan Anderson, Cultural Resource Director Shivwits Band of Paiute Indian Tribe of Utah 6060 West 3650 North Ivins, UT 84738	jetta@shivwits.org shayjaym@hotmail.com



UDOT Proj
I-215; 4700

PIN 9491

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UDOT Project No.: F-I215(175)16
I-215; 4700 South to SR-201

PIN 9491

UDOT is proposing to reconstruct I-215 from approximate Mile Post (M.P.) 15.20 to 19.90 in Salt Lake County (see exhibit in appendix). The approximate project length is 4.70 miles. The proposed project will include: concrete grinding to a depth of 14 inches of the existing pavement and replacement with 3 inches of asphalt and 10 inches of concrete, minor widening for an auxiliary lane, and deck replacement and minor repairs to the associated bridge and ramp structures. The project also includes: storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary and replacement/update of roadway signage, reflectors, and pavement markings. All work will be limited to the existing UDOT ROW.

Craig Bown <cbown@utah.gov>

Clearance Update for I-215; 4700 South to SR-201 - PIN 9419

Liz Robinson <lizrobinson@utah.gov> Mon, Aug 3, 2015 at 10:04 AM
To: Craig Bown <cbown@utah.gov>

Craig,

I have reviewed the modified project description and study limits. These additional areas have been previously surveyed and are on disturbed lands with no cultural resources present. The finding of effect for this project will remain No Adverse Effect and all mitigation commitments detailed in the original clearance for this project remain in force. Please keep me informed if there are further modifications to this project.

Liz Robinson
UDOT Cultural Resources Program Manager

On Tue, Jul 21, 2015 at 1:20 PM, Craig Bown <cbown@utah.gov> wrote:

> Paul and Liz,
>
> The project extents and description for I-215; 4700 South to SR-201 - PIN 9419 have been modified.Please review the attached and provide me with updated clearances at your earliest convenience.
>
> Thanks,
>
> **Craig Bown**
> UDOT Region 2 Environmental
> Office: 801-887-3689
> Mobile: 435-225-2559

–
Liz Robinson

UDOT Cultural Resources Program Manager
4501 South 2700 West
PO Box 148450
Salt Lake City, Utah 84114
801-910-2035

- Paleontological Clearance

Memorandum

Central Environmental

DATE: September 14, 2015

TO: Craig Bown
UDOT Environmental Coordinator

FROM: Liz Robinson
UDOT Cultural Resources Program Manager

SUBJECT: ***PALEONTOLOGICAL CLEARANCE***
PIN 9419—F-I215(175)16;I-215; 4700 South to SR-201, Salt Lake County, Utah.

This memorandum is to advise you that the subject federal –aid project is granted paleontological clearance. Pursuant to the *Memorandum of Understanding between the UDOT and the Utah Geological Survey Concerning Agency Responsibilities Pursuant to U.C.A. 79-3-508,* signed into effect March 25, 2010, the UDOT has taken into account the effects of this undertaking on paleontological resources.

UDOT is proposing to reconstruct the section of roadway, and associated ramps, along I-215 from approximate milepost (MP) 15 to 20 in Salt Lake County (see exhibit in appendix). The approximate project length is 5 miles. The proposed project will include: removal and replacement of the existing pavement surfaces with suitable pavement materials; minor widening for installation of auxiliary lanes; pavement soft spot repair; barrier upgrades; and bridge deck replacement with necessary repairs to the associated bridge and ramp structures.

This project is an exempted project under the above-mentioned agreement since all activities will be within previous disturbance and mostly on roadway fill. Therefore, the UDOT's responsibilities for consideration of potential impacts to paleontological resources have been met for this project. Please ensure that this clearance memo is included in the environmental document.

Please note that paleontological clearance for the subject project is contingent upon the contractor adhering to the proposed scope of work and remaining within cleared areas only. Any changes require consultation with region environmental staff which may result in an amendment to this clearance. According to the *UDOT Standard Specification Section 01355 Part 3.7, Environmental Clearances by the Contractor*, the contractor will be responsible for clearances for material sites, staging area, office sites, water lines, holding ponds, etc. not provided for in the contract.

In the case of an inadvertent discovery during construction, please adhere to *UDOT Standard Specification Section 01355 Part 3.8, Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites or Human Remains*. This specification stipulates procedures to be followed should any buried historic, archaeological, or paleontological resources be uncovered during construction of the project. Please notify me immediately if any such discoveries are made.

I appreciate your assistance in ensuring compliance for this project. Should you need any additional information or assistance, please contact me at 801-910-2035 or via email at lizrobinson@utah.gov.

- Wildlife Biologist Clearance

Memorandum

To: Craig Bown, Environmental Coordinator
UDOT, Region 2

From: Paul W. West, Wildlife/Wetlands Biologist
UDOT, Environmental Services

P.W.W.

Date: July 22, 2015

Re: F-I215(175)16 – I-215, 4700 South to SR-201, Salt Lake County (PIN 9419)

CC: Brandon Weston – UDOT, Environmental Services
Ashley Green – UDWR, Headquarters
Mark Farmer – UDWR, Central Region
Matt Howard – UDWR, Central Region
Lynn Bernhard – UDOT, Maintenance

Encls:

I understand that the Utah Department of Transportation (UDOT) is proposing to reconstruct the section of roadway, and associated ramps, along I-215 from approximate milepost (M.P.) 15 to 20 in Salt Lake County (see exhibit in appendix). The project length is approximately 5 miles. The proposed project would include:

- removal and replacement of the existing pavement surfaces with suitable pavement materials;
- minor widening for installation of auxiliary lanes;
- pavement soft spot repair;
- barrier upgrades; and
- bridge deck replacement with necessary repairs to the associated bridge and ramp structures.

The project also includes:

- installation of ramp metering signals;
- traffic detection, Advanced Traffic Management System (ATMS) cameras; and associated components;
- re-grading of shoulders;
- storm drain modifications;
- relocation or replacement of existing noise walls;
- utility relocations as necessary; and
- installation of roadway signage, delineators, and pavement markings.

It is anticipated that minor Right-of-Way acquisition and Temporary Construction Easements (TCEs) will be required for this project.

A review of the Utah Division of Wildlife Resources, Utah Natural Heritage Program (UDWR/UNHP) 2015 database indicates that no federally listed, threatened, endangered or candidate species, or any critical habitat would be affected by this project.

In accordance with the U.S. Fish and Wildlife Service memo dated January 27, 2006, they do not issue concurrence letters for "no-effect" determinations. Therefore, this memo is being issued in-lieu of their concurrence for your environmental documentation.

In addition, I have evaluated the above-referenced project with regard to wildlife issues as required in the UDOT Environmental Study Form.

Based on the UDWR/UNHP 2015 database, UDOT's 2015 Utah Wildlife-Vehicle Collision Reporter data, and UDOT's 2007 Wildlife Connectivity database, it is my opinion that this project would not negatively affect state-sensitive species, important wildlife habitat, big game migration routes, habitat connectivity, migratory birds, fish spawning habitat, or fish passage.

If you have any questions, please call me at (801) 633-8747, or email me at paulwest@utah.gov.

- Noise Report

Noise Study Report

I-215; 4700 South to SR-201
Region 2, County of Salt Lake
I-215; Mile-Post 15 to 20

Project No. F-I215(175)16
PIN 9419

August 2015

Keeping Utah Moving

Summary

The purpose of this Noise Study Report (NSR) is to evaluate noise impacts and abatement under the requirements of the Utah Department of Transportation (UDOT) Noise Abatement Policy UDOT 08A2-01 (Noise Abatement Policy). The Noise Abatement Policy provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to the Noise Abatement Policy, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

UDOT is proposing to reconstruct the section of roadway, and associated ramps, along Interstate 215 (I-215) from approximate milepost (MP) 15 to 20 in Salt Lake County. The approximate project length is 5 miles. The proposed project will include: removal and replacement of the existing pavement surfaces with suitable pavement materials; minor widening for installation of auxiliary lanes; pavement soft spot repair; barrier upgrades; and bridge deck replacement with necessary repairs to the associated bridge and ramp structures. The project also includes: installation of ramp metering signals, traffic detection, Advanced Traffic Management System (ATMS) cameras and associated components; re-grading of shoulders; storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary; and installation of roadway signage, delineators, and pavement markings. It is anticipated that minor Right-of-Way acquisition and Temporary Construction Easements (TCEs) will be required for this project.

The proposed project is considered a Type I project according to 23 CFR 772 because it would add auxiliary travel lanes to I-215. A noise analysis is required for all Type I projects. A Type I project is defined in 23 CFR 772 as:

- The construction of a highway on a new location; or
- The physical alteration of an existing highway where there is either:
    - Substantial Horizontal Alteration. A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
    - Substantial Vertical Alteration. A project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by

altering the topography between the highway traffic noise source and the receptor; or

- The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lane; or
- The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or
- Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or
- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

If a project is determined to be a Type I project under this definition then the entire project area as defined in the environmental document is a Type I project.

Terrain in the project area is generally flat with localized terrain features. Existing land uses in the project area include residential, recreational, commercial, industrial, and vacant land. However, the land uses affected by the proposed project include residential (single- and multi-family), commercial, recreational, and light manufacturing. The primary source of noise in the project area is traffic from I-215. Traffic noise level predictions were made with the Federal Highway Administration (FHWA) Traffic Noise Model (TNM®) Version 2.5 (FHWA, 2004). Using traffic volumes, speeds, roadway alignments, and cross-sections for the project, the predicted future plus project noise levels were compared to existing ambient noise levels and to applicable noise abatement criteria (NAC) to assess the project's potential noise impacts. This noise analysis evaluates noise exposure in terms of the hourly equivalent sound level (L_{eq}) during noisiest traffic hour and compares predicted traffic noise levels to federal and state NAC and to existing noise levels to assess impacts. The peak-traffic-noise-hour L_{eq} describes the noise level that is equivalent to the energy average noise levels that would be measured continuously during the hour producing the highest traffic noise during a typical 24-hour period.

12 noise level measurements were conducted at representative locations to document the existing ambient noise environment; short-term measurements were used to calibrate the

noise prediction model with concurrent traffic counts and measured vehicle speeds. Noise measurements were taken in areas representative of sensitive land uses closest to the freeway. The existing noise levels measured were between 53.5 and 74.8 A-weighted decibels (dBA) in the project area. A total of 178 receivers that represent residential, commercial, recreational, and light manufacturing land uses along the project corridor were modeled and evaluated for potential noise impacts resulting from traffic noise.

Existing, Future No Build, and Future Plus Project noise levels were computed for the 178 receivers. The predicted project Build noise levels were compared to existing noise levels and to NAC to assess potential project-related noise impacts.

Noise abatement in the form of noise barriers is considered and evaluated for residential uses along the eastern and western sides of I-215 where Future Plus Project noise levels are predicted to approach or exceed the NAC or increase substantially above existing noise levels. A total of nine noise barriers were evaluated for feasibility, reasonableness, and cost effectiveness in accordance with the requirements of the Noise Abatement Policy dated February 13, 2014. Of the nine noise barriers that were evaluated, none of the barriers satisfied all three criteria for feasibility, reasonableness, and cost effectiveness. Therefore, no noise barriers are required to be implemented for the proposed project.

During construction of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with federal regulation 23 CFR 772, and the Cities of West Valley City and Salt Lake City standard specifications.

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List of Abbreviated Terms

CAD	Computer Aided Design
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
dB	Decibels
dBA	A-weighted decibels
I-215	Interstate 215
FHWA	Federal Highway Administration
ft	Feet
Hz	Hertz
kHz	Kilohertz
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
$L_{eq(h)}$	Equivalent Sound Level over one hour
L_{max}	Maximum Sound Level
LOS	Level of Service
L_{xx}	Percentile-Exceeded Sound Level
MP	milepost
mPa	micro-Pascals
mph	miles per hour
NAC	noise abatement criteria
NEPA	National Environmental Policy Act
NSR	noise study reports
SPL	sound pressure level
ROW	right-of-way
TNM 2.5	FHWA Traffic Noise Model Version 2.5
UDOT	Utah Department of Transportation

Chapter 1. Introduction

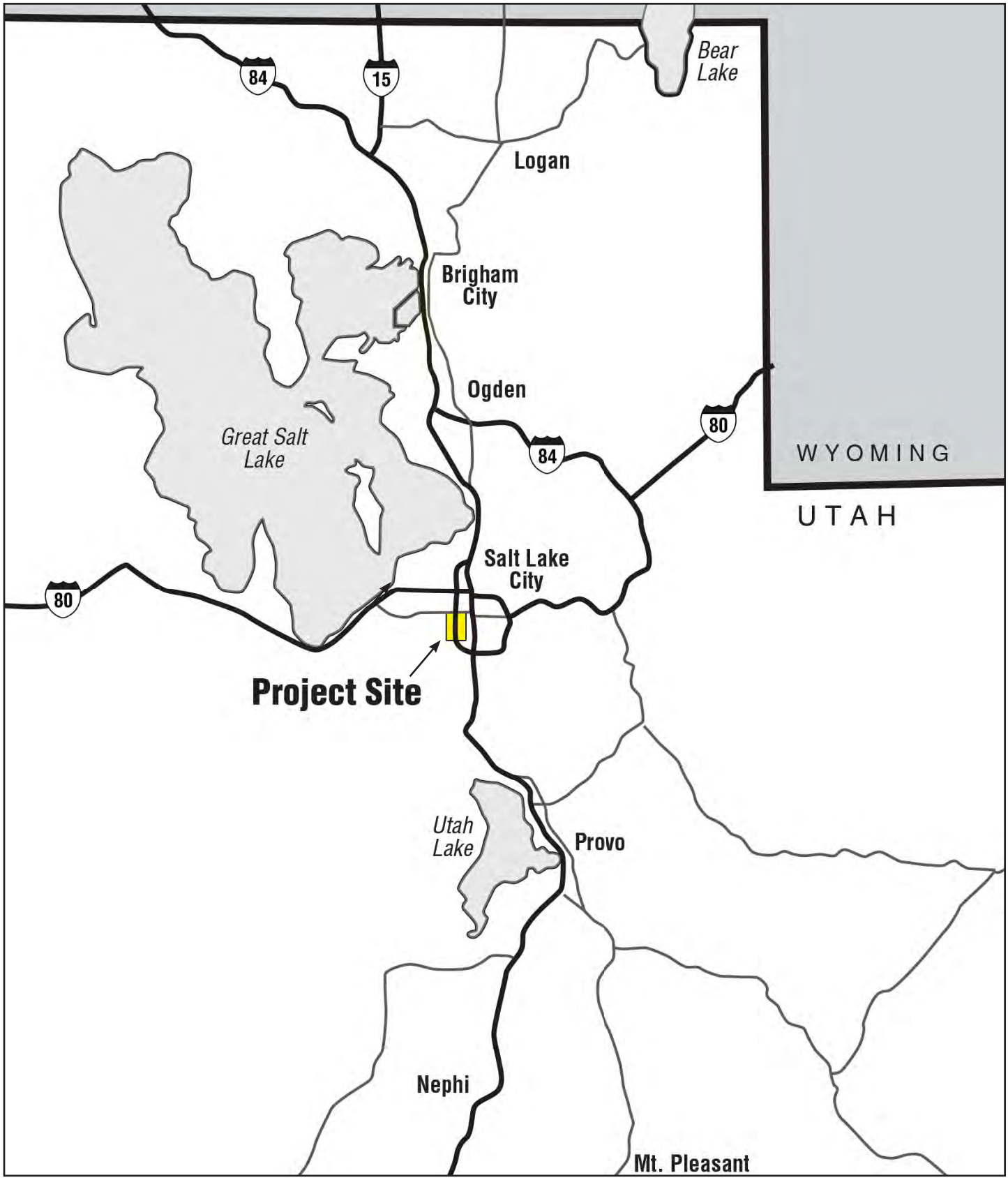
1.1. Purpose of the Noise Study Report

The purpose of this Noise Study Report (NSR) is to evaluate noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772) "Procedures for Abatement of Highway Traffic Noise". 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

The Utah Department of Transportation (UDOT) Noise Abatement Policy dated February 13, 2014, provides UDOT policy for implementing 23 CFR 772 in Utah. The Noise Abatement Policy outlines the requirements for preparing noise study reports.

Chapter 2. Project Description

UDOT is proposing to reconstruct the section of roadway, and associated ramps, along Interstate 215 (I-215) from approximate milepost (MP) 15 to 20 in Salt Lake County. The approximate project length is 5 miles. The proposed project will include: removal and replacement of the existing pavement surfaces with suitable pavement materials; minor widening for installation of auxiliary lanes; pavement soft spot repair; barrier upgrades; and bridge deck replacement with necessary repairs to the associated bridge and ramp structures. The project also includes: installation of ramp metering signals, traffic detection, Advanced Traffic Management System (ATMS) cameras and associated components; re-grading of shoulders; storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary; and installation of roadway signage, delineators, and pavement markings. It is anticipated that minor Right-of-Way (ROW) acquisition and Temporary Construction Easements (TCEs) will be required for this project.



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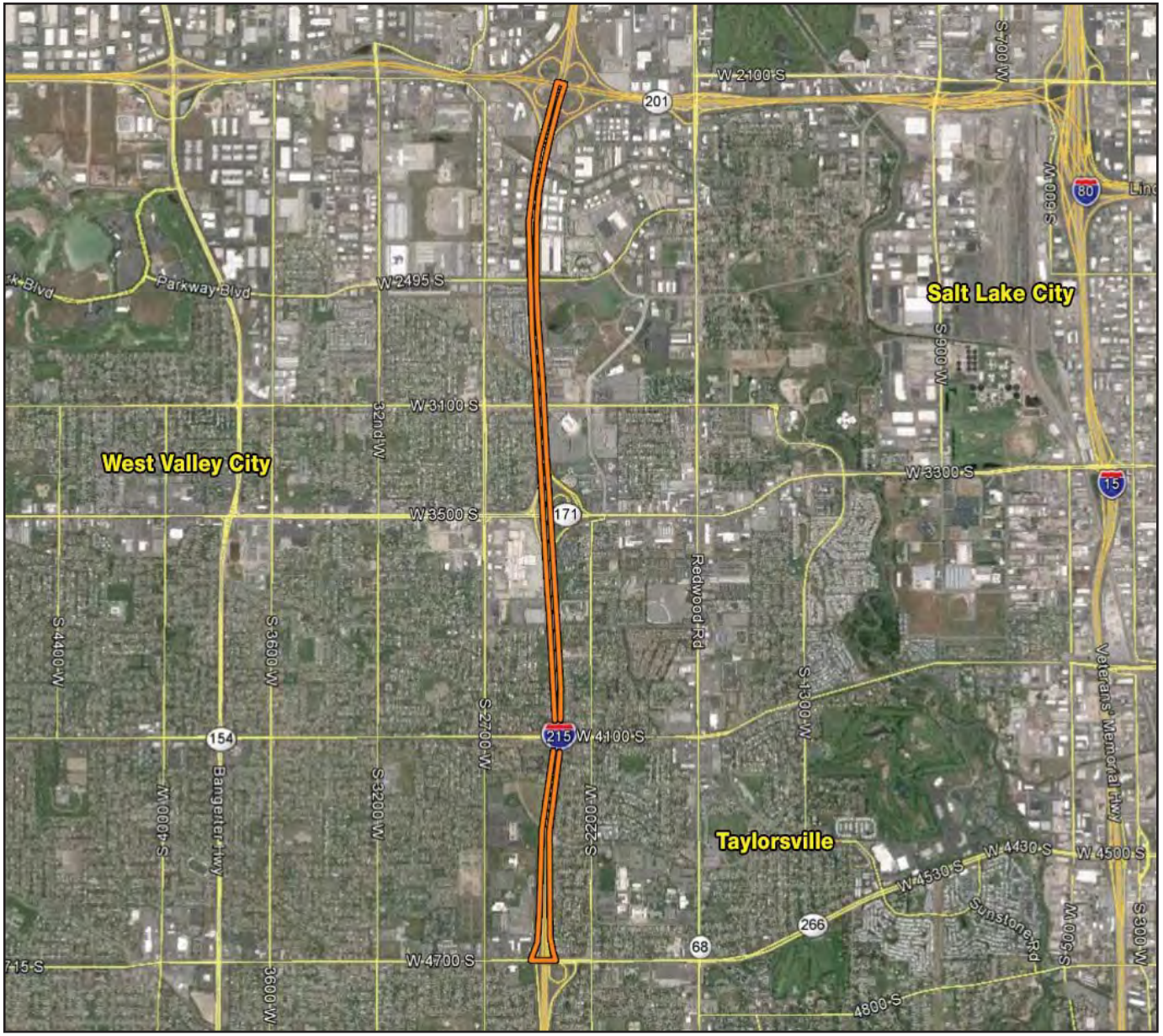
09/15 • JN 145455

I-215; 4700 SOUTH TO SR-201

Regional Vicinity

Exhibit 1



Source: Google Earth, 2015.
- Project Boundary

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09/15 • JN 145455

I-215; 4700 SOUTH TO SR-201

Site Vicinity

Exhibit 2

Chapter 3. Fundamentals of Traffic Noise

The following is a brief discussion of fundamental traffic noise concepts. For a detailed discussion, please refer to UDOT's Noise Abatement Policy, which is available on UDOT's Web site (https://www.udot.utah.gov/public/ucon/uconowner.gf?n=10496602977480171).

3.1. Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

3.2. Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

3.3. Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

3.4. Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

3.5. A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an “A-weighted” sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA. Table 3-1, Typical A-Weighted Noise Levels, describes typical A-weighted noise levels for various noise sources.

Table 3-1. Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

3.6. Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound, would generally be perceived as barely detectable.

3.7. Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random.

Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

- **Equivalent Sound Level (L_{eq}):** L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a one-hour period, and is the basis for noise abatement criteria (NAC) used by UDOT and FHWA.

- **Percentile-Exceeded Sound Level (L_{xx}):** L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10% of the time, and L_{90} is the sound level exceeded 90 percent of the time).

- **Maximum Sound Level (L_{max}):** L_{max} is the highest instantaneous sound level measured during a specified period.

- **Day-Night Level (L_{dn}):** L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

- **Community Noise Equivalent Level (CNEL):** Similar to L_{dn}, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m., and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

3.8. Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

3.8.1. Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a

cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 decibels for each doubling of distance from a line source.

3.8.2. Ground Absorption

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 decibels per doubling of distance.

3.8.3. Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

3.8.4. Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.

Chapter 4. Federal Regulations and State Policies

This report focuses on the requirements of 23 CFR 772, as discussed below.

4.1. Federal Regulations

4.1.1. 23 CFR 772

23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772, projects are categorized as Type I, Type II or Type III projects. A Type I project is defined in 23 CFR 772 as:

- The construction of a highway on a new location; or
- The physical alteration of an existing highway where there is either:
    - Substantial Horizontal Alteration. A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
    - Substantial Vertical Alteration. A project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor; or
- The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lane; or
- The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or
- Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or

- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

If a project is determined to be a Type I project under this definition then the entire project area as defined in the environmental document is a Type I project. A Type II project is defined as a Federal or Federal-aid highway project for noise abatement on an existing highway. For a Type II project to be eligible for Federal-aid funding, the highway agency must develop and implement a Type II program in accordance with section 772.7(e). It should be noted that UDOT does not provide a Type II program. A Type III project is a Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

Type I projects include those that create a completely new noise source, as well as those that increase the volume or speed of traffic or move the traffic closer to a receiver. Type I projects include the addition of an interchange, ramp, auxiliary lane, or truck-climbing lane to an existing highway, or the widening an existing ramp by a full lane width for its entire length. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type I projects.

Under 23 CFR 772, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project, and of noise impacts for which no apparent solution is available.

Traffic noise impacts, as defined in the Noise Abatement Policy, occur when the predicted noise level in the design year approaches or exceeds the NAC specified in 23 CFR 772, or a predicted noise level substantially exceeds the existing noise level (a “substantial” noise increase). 23 CFR 772 does not specifically define the terms “substantial increase” or “approach;” these criteria are defined in the Noise Abatement Policy, as described below.

Table 4-1, Activity Categories and Noise Abatement Criteria, summarizes the federal and UDOT NAC for corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area.

In identifying noise impacts, primary consideration is given to exterior areas of frequent human use. In situations where there are no exterior activities, or where the exterior activities are far from the roadway or physically shielded in a manner that prevents an

impact on exterior activities, the interior criterion (Activity Category D) is used as the basis for determining a noise impact.

Table 4-1. Activity Categories and Noise Abatement Criteria

Activity Category	FHWA NAC, Hourly A-Weighted Noise Level (dBA-L_{eq}[h])	UDOT NAC, Hourly A-Weighted Noise Level (dBA-L_{eq}[h])[1]	Description of Activities
A	57 Exterior	56 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	66 Exterior	Residential.
C	67 Exterior	66 Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52 Interior	51 Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 Exterior	71 Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	-	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	-	-	Undeveloped lands that are not permitted.

1. Hourly A-weighted sound level in decibels reflecting a 1 dBA "approach" value below 23CFR 772 values.

4.2. State Regulations and Policies

4.2.1. Utah Department of Transportation Noise Abatement Policy

The Noise Abatement Policy specifies the policies, procedures, and practices to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects. The Noise Abatement Policy defines a noise increase as substantial when the predicted noise levels with project implementation are equal to or greater than the UDOT NAC in Table 4-1 above for each corresponding land use category, or when the future worst case noise level is greater than or equal to an increase of 10 dBA over the existing noise level. The Noise Abatement Policy also states that a sound level is considered to

approach a NAC level when the sound level is within 1 dB of the NAC identified in 23 CFR 772 (e.g., 66 dBA is considered to approach the NAC of 67 dBA, but 65 dBA is not).

The Noise Abatement Policy provides detailed technical guidance for the evaluation of highway traffic noise. This includes field measurement methods, noise modeling methods, and report preparation guidance.

Chapter 5. Study Methods and Procedures

5.1. Methods for Identifying Land Uses and Selecting Noise Measurement and Modeling Receiver Locations

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Land uses in the project area were categorized by land use type, Activity Category as defined in Table 4-1, and the extent of frequent human use. Although all developed land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at multi-family residences.

12 short-term noise measurement locations were selected to represent noise sensitive areas in close proximity to I-215, and also serve as noise modeling locations. Noise measurement locations represent land uses in the vicinity of the proposed project area including residential (single- and multi-family) and recreational land uses. It is noted that all 12 noise measurement locations are considered areas of "frequent human use" and are representative of the ambient noise levels at the sensitive areas closest to I-215. In general, an area of "frequent human use" is an area where people are exposed to traffic noise for an extended period of time on a regular basis. In addition to short-term noise measurement locations, several other non-measurement locations were selected as modeling locations.

5.2. Field Measurement Procedures

A field noise study was conducted to determine the existing noise environment in the project vicinity. The following is a summary of the procedures used to collect short-term and long term sound level data.

5.2.1. Short-Term Measurements

Short-term monitoring was conducted at 12 locations from Tuesday, June 9, 2015 to Thursday, June 11, 2015 using a Larson Davis Model 831 Hand-held Analyzer. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. Measurements were taken over a 15-minute period at each site. 11 short-term measurements were conducted at residential land uses (Activity Category B), and one short-term measurement was conducted at a recreational land use (Activity Category C). Noise levels measured during the short-term measurements ranged between 53.5 and 74.8 dBA L_{eq}. The short-term

measurement locations are identified in Exhibit 3A through 3I, Noise Monitoring and Modeling Locations.

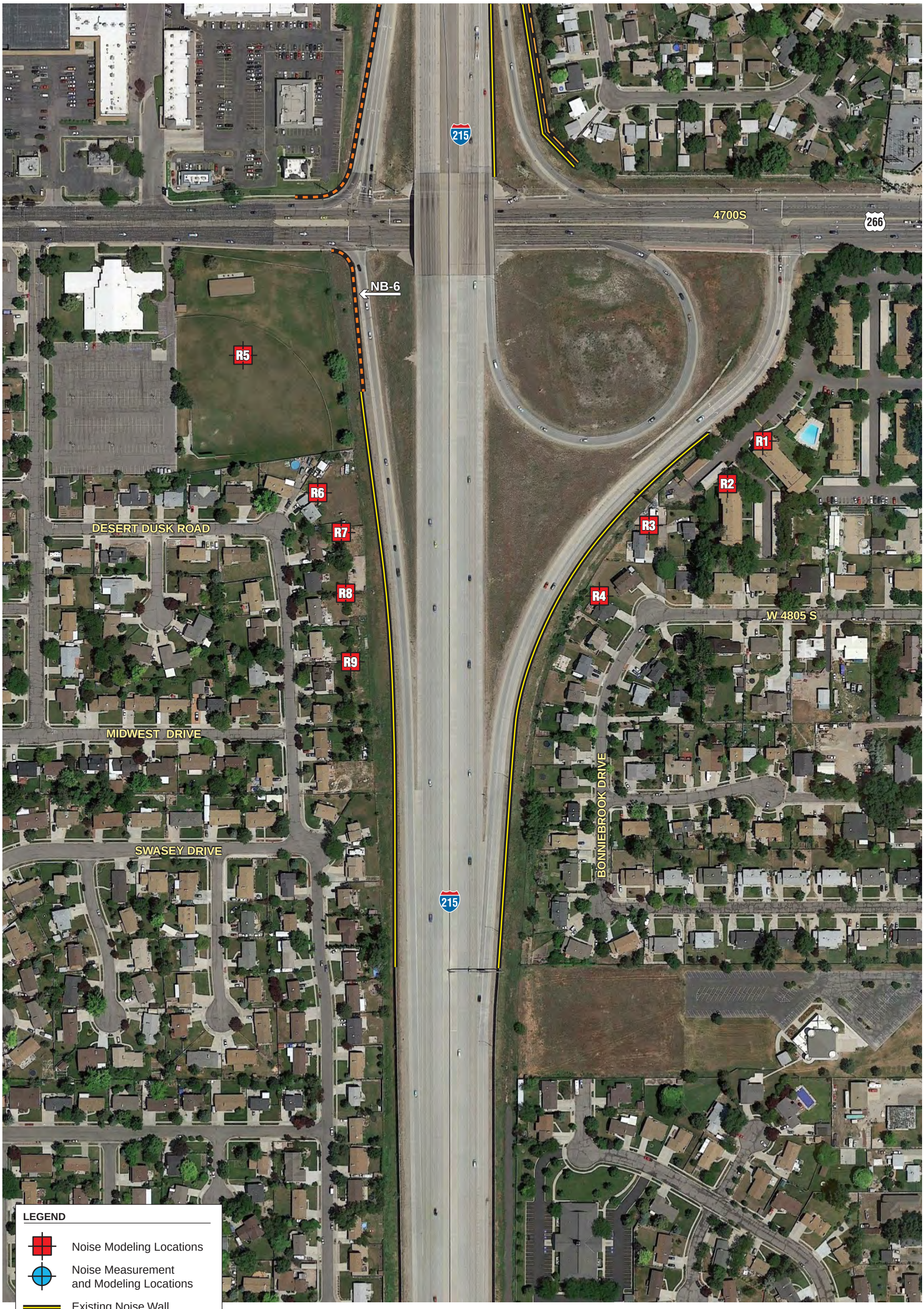
During the short-term measurements, field staff attended each meter. L_{eq} values collected during the measurement period (typically 15 minutes in duration) were logged, and dominant noise sources observed were also identified and logged. Using this approach, times when traffic noise was observed to be a dominant contributor to noise levels could be distinguished from non-traffic noise sources (such as aircraft and lawn equipment) that may have contributed significantly to existing noise levels.

Temperature, wind speed, and humidity were recorded manually during the short-term monitoring session. During the short-term measurements, wind speeds typically ranged from 3 to 13 miles per hour (mph), and temperatures ranged from 67-91°F. Traffic on I-215 was classified and counted during the short-term noise measurement for the Calibration location (refer to Table 6-1, Summary of Short-Term Measurements). Vehicles were classified as automobiles, medium-duty trucks, or heavy-duty trucks. An automobile was defined as a vehicle with two axles and four tires that are designed primarily to carry passengers. Small vans and light trucks were included in this category. Medium-duty trucks included all cargo vehicles with two axles and six tires. Heavy-duty trucks included all vehicles with three or more axles. The posted speed on I-215 was 70 mph.

5.3. Traffic Noise Levels Prediction Methods

Traffic noise levels were predicted using the FHWA Traffic Noise Model Version 2.5 (TNM 2.5). TNM 2.5 is a computer model based on two FHWA reports: FHWA-PD-96-009 and FHWA-PD-96-010 (FHWA 1998a, 1998b). Key inputs to the traffic noise model were the locations of roadways, shielding features (e.g., topography and buildings), noise barriers, ground type, and receivers. Three-dimensional representations of these inputs were developed using CAD drawings, aerials, and topographic contours provided. Traffic noise was evaluated under existing conditions, design year no-project conditions, and design year conditions with the project alternative. Traffic volumes based on a Level of Service (LOS) C vehicle capacity of 1,625 vehicles/lane/hour for I-215, LOS C vehicle capacity of 760 vehicles/lane/hour for the I-215 northbound on-ramp at 4700 South, LOS C vehicle capacity of 660 vehicles/lane/hour for the I-215 southbound on-ramp at 4700 South, vehicle classification percentages, and traffic speeds under existing and future year plus project conditions were input into the traffic noise model.[1,2]

[1] Email communication: Ivan Hooper, Avenue Consultants, May 6, 2015.
[2] Email communication: Ivan Hooper, Avenue Consultants, July 29, 2015.



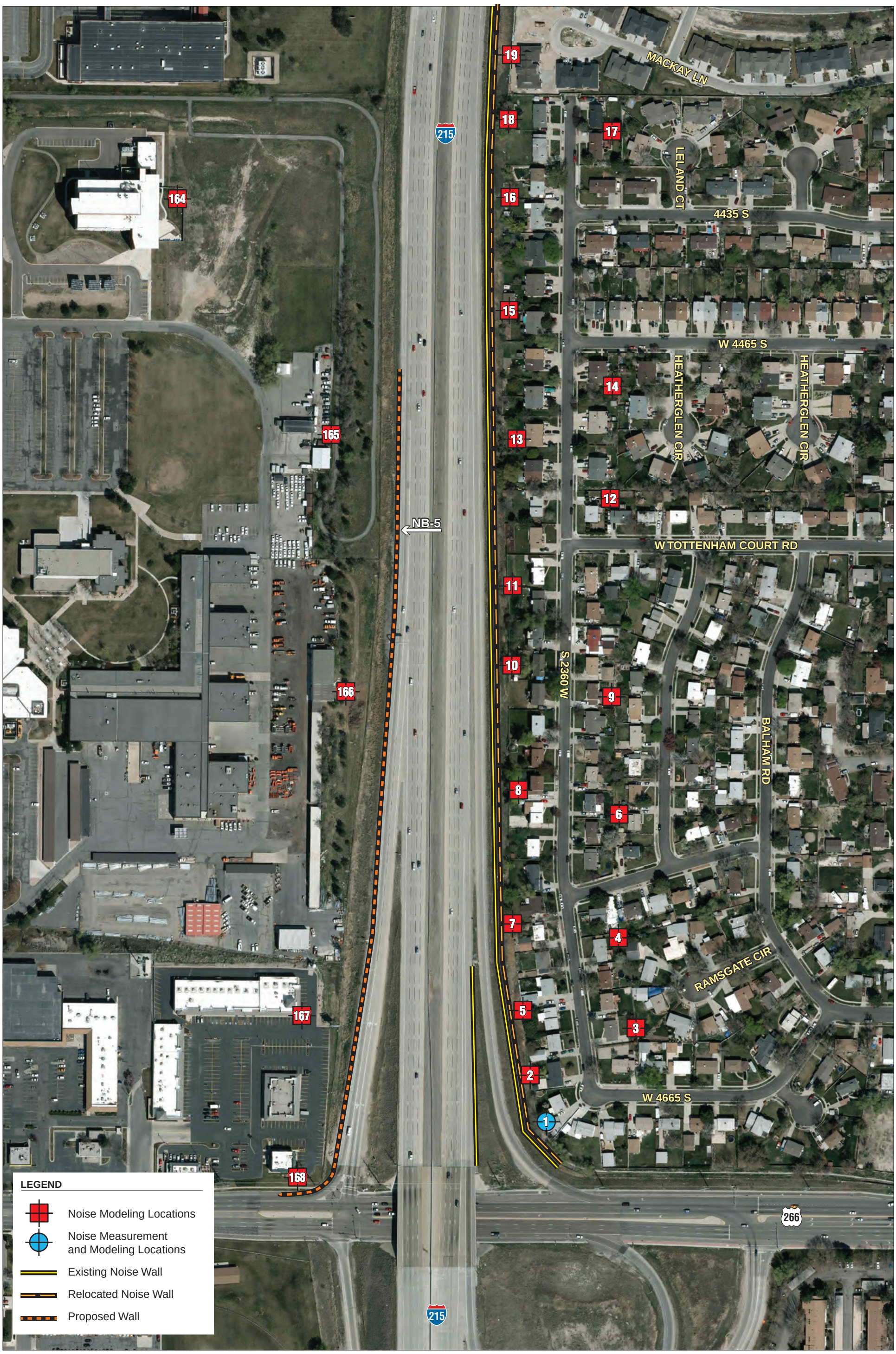
not to scale

I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

08/13/15 JN 145455-21020 MAS

Exhibit 3A



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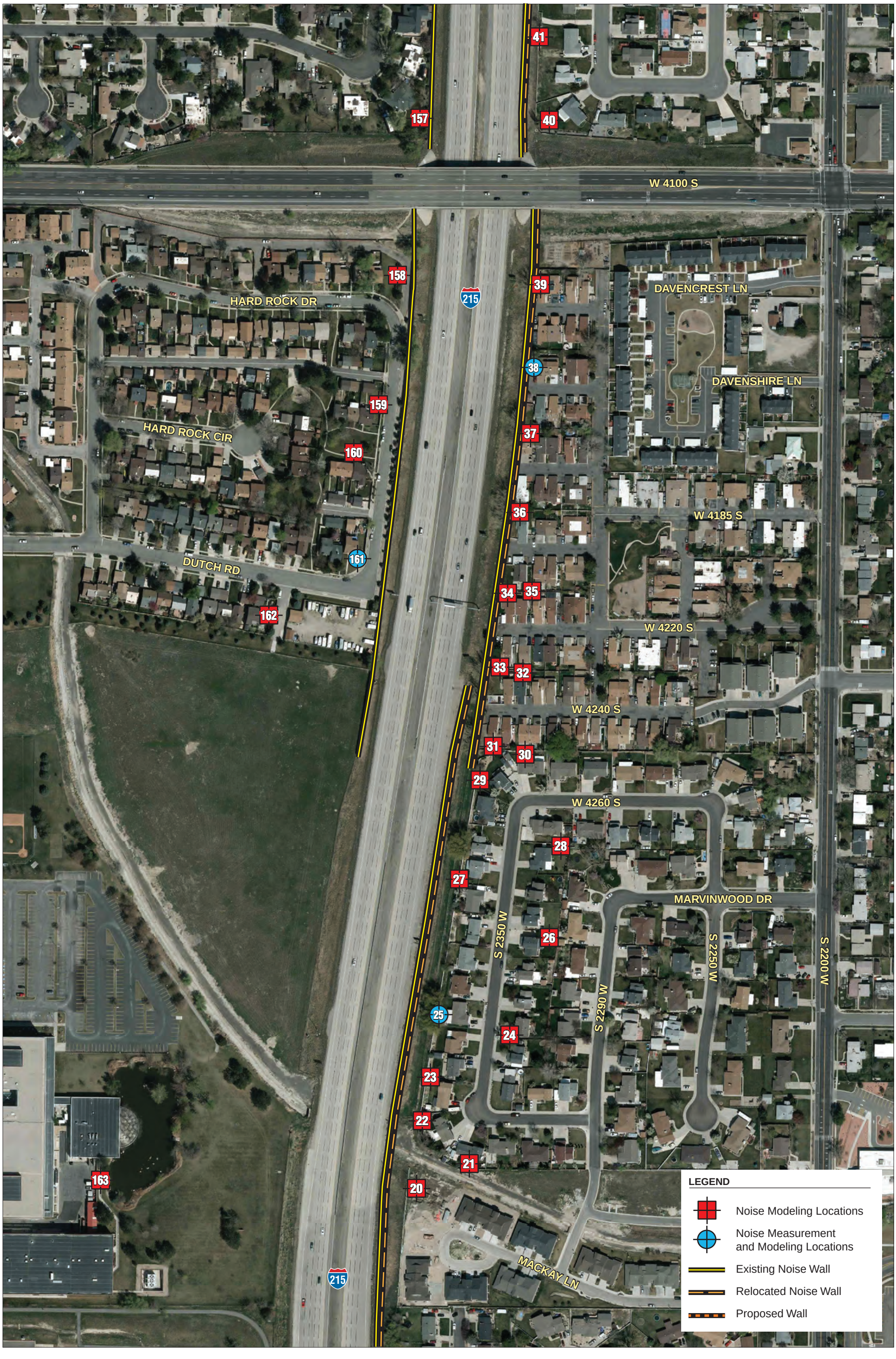
07/09/15 JN 145455-21020 MAS

I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

Exhibit 3B



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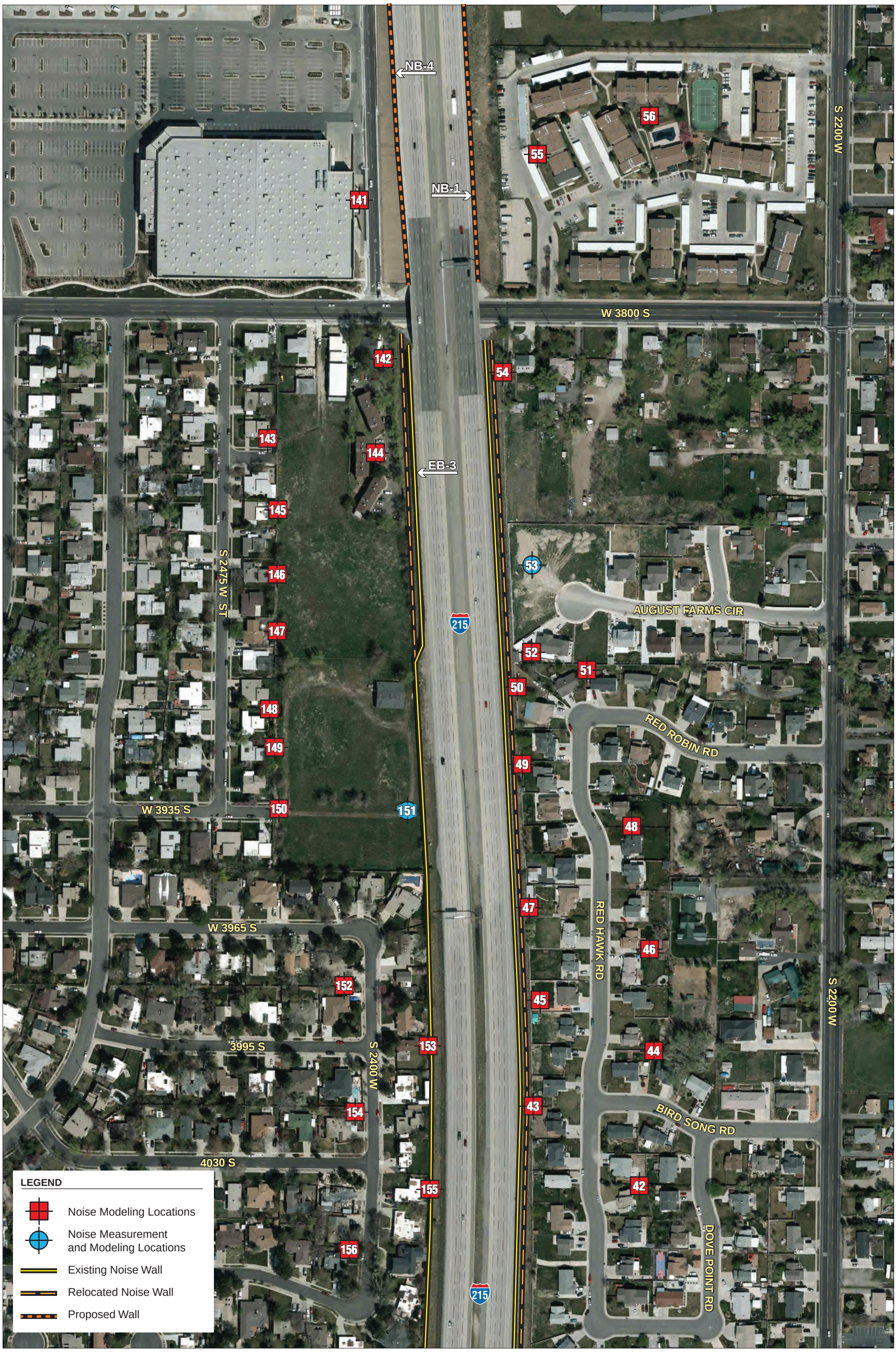
I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

07/09/15 JN 145455-21020 MAS

Exhibit 3C



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I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

07/09/15 JN 145455-21020 MAS

Exhibit 3D

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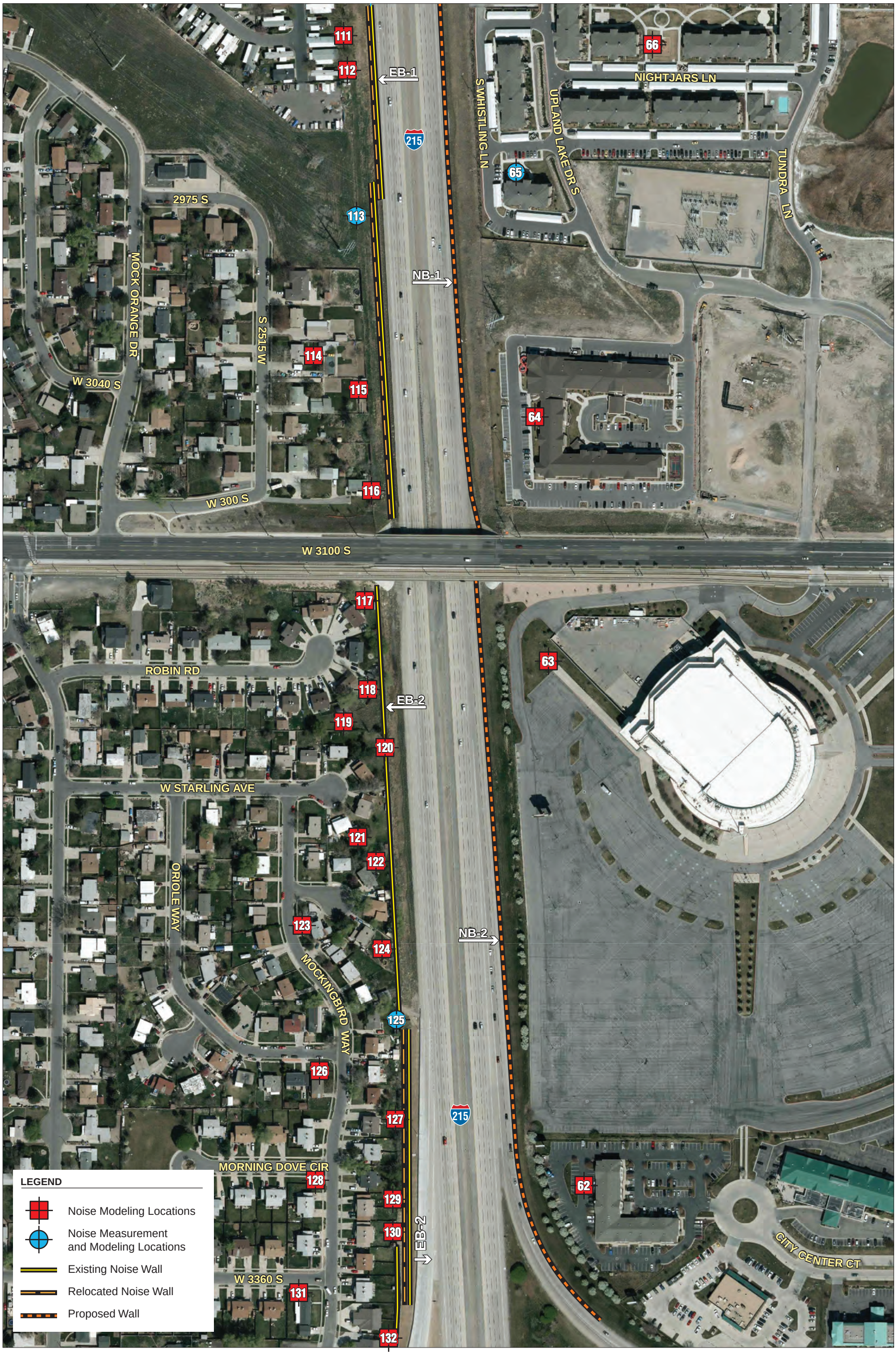
07/09/15 JN 145455-21020 MAS

I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

Exhibit 3E



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I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

07/09/15 JN 145455-21020 MAS

Exhibit 3F

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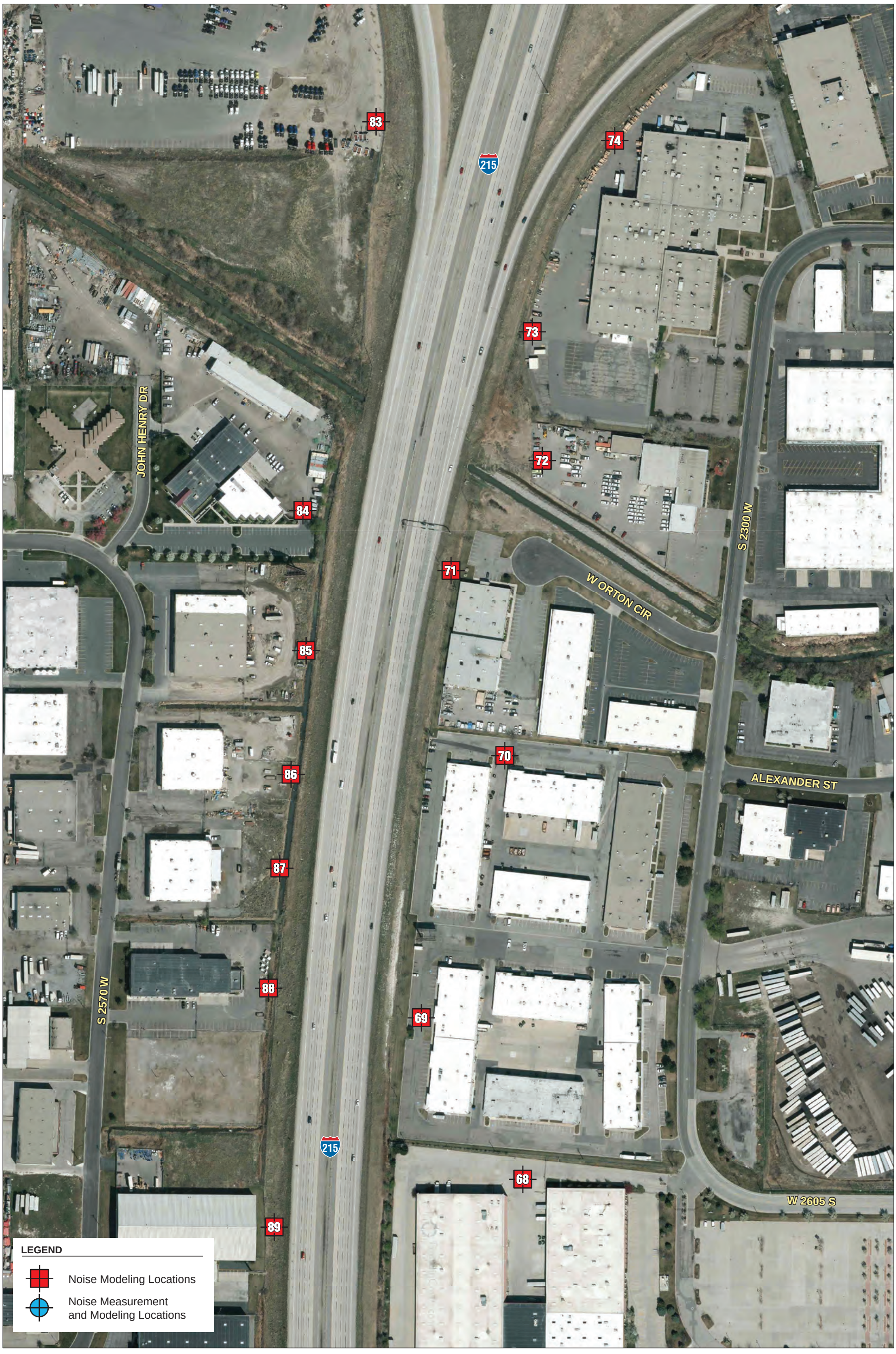
I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

07/09/15 JN 145455-21020 MAS

Exhibit 3G



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I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

07/09/15 JN 145455-21020 MAS

Exhibit 3H

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I-215; 4700 SOUTH TO SR-201

Noise Monitoring and Modeling Locations

07/09/15 JN 145455-21020 MAS

Exhibit 3I

Tables A-1 through A-3 in Appendix A summarize the traffic volumes and assumptions used for modeling existing and design-year conditions with and without the Build Alternatives.

To validate the accuracy of the model, TNM 2.5 was used to compare the measured traffic noise levels to modeled noise levels at the Calibration field measurement location (refer to Table 6-1 and Table 6-2) and were normalized to 1-hour volumes. These normalized volumes were assigned to the corresponding project area roadways to simulate the traffic noise during the actual measurement period. Modeled and measured sound levels were then compared to determine the accuracy of the model and if additional calibration of the model was necessary.

5.4. Methods for Identifying Traffic Noise Impacts and Consideration of Abatement

Traffic noise impacts are considered to occur at receiver locations where predicted design year noise levels approach or exceed the NAC for the applicable activity category, or where predicted design-year noise levels are at least 10 dBA greater than existing noise levels. Where traffic noise impacts are identified, noise abatement must be considered for reasonableness and feasibility as required by the Noise Abatement Policy.

According to the Noise Abatement Policy, abatement measures are considered acoustically feasible if predicted noise levels are reduced by at least 5 dBA at a minimum of 75 percent of front-row receptors with implementation of the abatement measures. Other factors that affect feasibility include topography, access requirements for driveways and ramps, presence of local cross streets, utility conflicts, other noise sources in the area, and safety considerations. The overall reasonableness of noise abatement is determined by considering factors such as cost; absolute predicted noise levels; predicted future increase in noise levels; expected noise abatement benefits; build date of surrounding residential development along the highway; environmental impacts of abatement construction; opinions of affected residents; input from the public and local agencies; and social, legal, and technological factors.

The Noise Abatement Policy defines the procedure for assessing reasonableness of noise barriers from a cost perspective. A cost-per-residence allowance is calculated for each benefited residence (i.e., residences that receive at least 5 dB of noise reduction from a noise barrier). The 2014 base allowance for a benefitted receiver in Activity Category B is $30,000 per benefitted receiver. The 2014 base determination for cost effectiveness of constructing a noise barrier is $20.00 per square foot for Activity Category B and $360.00

per linear foot for Activity Categories A, C, D, and E. There is no base allowance for a benefited receiver in Activity Category F. If the cost of the noise barrier exceeds the total allowance for benefitted receivers, then the noise barrier is deemed not cost effective. In addition, a noise barrier is determined to be reasonable if noise levels are reduced by at least 8 dBA at a minimum of 75 percent of front-row receptors. Lastly, the viewpoints of property owners and residents must be solicited to determine if noise abatement is desired.

Chapter 6. Existing Noise Environment

6.1. Existing Land Uses

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Single- and multi-family residences (Activity Category B), Decker Lake Trail (Activity Category C), a sports arena (Activity Category C), two hotels (Activity Category E), and light manufacturing (Activity Category F) were the identified land uses in the project area.

As required by the Noise Abatement Policy, although all developed land uses are evaluated in this analysis, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards, parks, and common use areas.

6.2. Noise Measurement Results

The existing noise environment in the project area is characterized below based on short-noise monitoring that was conducted.

6.2.1. Short-Term Monitoring

The existing noise environment in the project area is described below based on short-term noise monitoring that was conducted at 12 representative noise-sensitive receptor locations. The primary source of noise in the project area is traffic along I-215. Table 6-1 summarizes the results of the short-term noise monitoring conducted in the project area. The noise measurement locations are also depicted in Exhibit 3A through 3I.

TNM 2.5 was used to compare measured traffic noise levels to modeled noise levels at the field measurement locations for “Calibration”. Table 6-2, Comparison of Measured to Predicted Sound Levels in the TNM Model, compares measured and modeled noise levels at the field measurement locations (see Exhibit 3A through 3I). The predicted sound levels are within 3 dB of the measured sound levels and are, therefore, considered to be in reasonable agreement with the measured sound level. Therefore, no calibration of the model was made.

Table 6-1. Summary of Short-Term Measurements

Measurement Location	Land Uses	Date	Start Time	Duration (minutes)	Measured dBA L_{eq}	Autos[1]		Medium Trucks[1]		Heavy Trucks[1]		Observed Speed (mph)
						NB	SB	NB	SB	NB	SB	
1	Residential	6/10/15	6:00 a.m.	15	53.5	705	359	0	2	0	1	70
25	Residential	6/10/15	7:02 a.m.	15	63.5	1,337	711	24	13	16	9	70
38	Residential	6/10/15	7:26 a.m.	15	54.5	1,312	609	4	5	8	4	70
53	Residential	6/10/15	7:58 a.m.	15	61.3	1,541	781	21	8	31	16	70
58	Residential	6/10/15	8:20 a.m.	15	64.0	1,260	797	12	8	40	20	70
65	Residential	6/11/15	7:34 a.m.	15	73.0	1,820	874	7	3	16	8	70
Decker Laker Trail	Recreational	6/11/15	7:59 a.m.	15	74.8	1,292	747	20	12	32	19	70
99	Residential	6/9/15	3:14 p.m.	15	56.9	561	900	12	20	24	29	70
113	Residential	6/9/15	3:35 p.m.	15	59.4	724	1,224	8	14	12	16	70
125	Residential	6/9/15	4:12 p.m.	15	58.7	836	1,644	11	22	9	18	70
151	Residential	6/9/15	5:00 p.m.	15	57.4	712	1,372	5	9	4	7	70
161	Residential	6/9/15	5:25 p.m.	15	60.1	723	1,207	4	7	8	9	70

L_{eq} = equivalent continuous sound level measured in A-weighted decibels; mph = miles per hour; N/A = Not Applicable; NB = northbound; SB = southbound

Notes:
1 – Traffic counts were taken during each short-term 15 minute noise measurement.

Table 6-2. Comparison of Measured to Predicted Sound Levels in the TNM Model

Measurement Position	Measured Sound Level (dBA)	Predicted Sound Level (dBA)	Measured minus Predicted (dB)
1	53.5	52.6	0.9
25	63.5	61.2	2.3
38	54.5	57.3	-2.8
53	61.3	61.0	0.3
58	64.0	66.8	-2.8
65	73.0	74.2	-1.2
Decker Laker Trail	74.8	76.2	-1.4
99	56.9	59.8	-2.9
113	59.4	62.1	-2.7
125	58.7	61.0	-2.3
151	57.4	60.2	-2.8
161	60.1	62.8	-2.7

6.3. Existing Noise Levels

The worst-case traffic volumes and posted vehicle speeds were coded into TNM 2.5 with existing roadway conditions. The results of the existing traffic noise modeling are shown in Table 6-3, Existing Traffic Noise Levels. Currently, of the 178 modeled receptor locations, 23 approach or exceed the applicable NAC. Exhibit 3A through 3I depicts the locations of the modeled receptor locations. The model input and output data for the existing conditions are included in Appendix B.

Table 6-3. Existing Traffic Noise Levels

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3]
1	Residential	B	67	59
2	Residential	B	67	59
3	Residential	B	67	58
4	Residential	B	67	57
5	Residential	B	67	60
6	Residential	B	67	58
7	Residential	B	67	60
8	Residential	B	67	62
9	Residential	B	67	58
10	Residential	B	67	63
11	Residential	B	67	63
12	Residential	B	67	57
13	Residential	B	67	62
14	Residential	B	67	57
15	Residential	B	67	61
16	Residential	B	67	63
17	Residential	B	67	58
18	Residential	B	67	63
19	Residential	B	67	62
20	Residential	B	67	64
21	Residential	B	67	62
22	Residential	B	67	64
23	Residential	B	67	64
24	Residential	B	67	56
25	Residential	B	67	63
26	Residential	B	67	57
27	Residential	B	67	63
28	Residential	B	67	57
29	Residential	B	67	64
30	Residential	B	67	60
31	Residential	B	67	63
32	Residential	B	67	59
33	Residential	B	67	62
34	Residential	B	67	63
35	Residential	B	67	59
36	Residential	B	67	63
37	Residential	B	67	64
38	Residential	B	67	63
39	Residential	B	67	64
40	Residential	B	67	60
41	Residential	B	67	63
42	Residential	B	67	58
43	Residential	B	67	64
44	Residential	B	67	59
45	Residential	B	67	64
46	Residential	B	67	59
47	Residential	B	67	63
48	Residential	B	67	60
49	Residential	B	67	64

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3]
50	Residential	B	67	63
51	Residential	B	67	61
52	Residential	B	67	64
53	Residential	B	67	64
54	Residential	B	67	63
55	Residential	B	67	**71**
56	Residential	B	67	**67**
57	Residential	B	67	**67**
58	Residential	B	67	**70**
59	Residential	B	67	**70**
60	Residential	B	67	**74**
61	Residential	B	67	**68**
62	Hotel	E	72	**72**
63	Sports Arena	C	67	**76**
64	Hotel	E	72	**76**
65	Residential	B	67	**76**
66	Residential	B	67	**67**
Decker Lake Trail	Recreational	C	67	**79**
67	Light Manufacturing	F	N/A	80
68	Light Manufacturing	F	N/A	68
69	Light Manufacturing	F	N/A	79
70	Light Manufacturing	F	N/A	69
71	Light Manufacturing	F	N/A	76
72	Light Manufacturing	F	N/A	72
73	Light Manufacturing	F	N/A	73
74	Light Manufacturing	F	N/A	69
75	Light Manufacturing	F	N/A	63
76	Light Manufacturing	F	N/A	59
77	Light Manufacturing	F	N/A	59
78	Light Manufacturing	F	N/A	54
79	Light Manufacturing	F	N/A	56
80	Light Manufacturing	F	N/A	57
81	Light Manufacturing	F	N/A	60
82	Light Manufacturing	F	N/A	66
83	Light Manufacturing	F	N/A	71
84	Light Manufacturing	F	N/A	74
85	Light Manufacturing	F	N/A	75
86	Light Manufacturing	F	N/A	76
87	Light Manufacturing	F	N/A	75
88	Light Manufacturing	F	N/A	75
89	Light Manufacturing	F	N/A	81
90	Light Manufacturing	F	N/A	80
91	Light Manufacturing	F	N/A	78
92	Residential	B	67	**70**
93	Residential	B	67	64
94	Residential	B	67	62
95	Residential	B	67	63
96	Residential	B	67	61
97	Residential	B	67	64
98	Residential	B	67	59
99	Residential	B	67	64

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3]
100	Residential	B	67	59
101	Residential	B	67	64
102	Residential	B	67	59
103	Residential	B	67	64
104	Residential	B	67	59
105	Residential	B	67	64
106	Residential	B	67	58
107	Residential	B	67	64
108	Residential	B	67	58
109	Residential	B	67	64
110	Residential	B	67	58
111	Residential	B	67	64
112	Residential	B	67	64
113	Residential	B	67	63
114	Residential	B	67	63
115	Residential	B	67	63
116	Residential	B	67	63
117	Residential	B	67	**69**
118	Residential	B	67	63
119	Residential	B	67	59
120	Residential	B	67	63
121	Residential	B	67	60
122	Residential	B	67	64
123	Residential	B	67	60
124	Residential	B	67	64
125	Residential	B	67	65
126	Residential	B	67	60
127	Residential	B	67	63
128	Residential	B	67	60
129	Residential	B	67	64
130	Residential	B	67	63
131	Residential	B	67	58
132	Residential	B	67	60
133	Residential	B	67	59
134	Residential	B	67	56
135	Residential	B	67	57
136	Residential	B	67	56
137	Commercial	E	72	66
138	Commercial	E	72	**71**
139	Commercial	E	72	66
140	Commercial	E	72	**74**
141	Commercial	E	72	**71**
142	Residential	B	67	**67**
143	Residential	B	67	62
144	Residential	B	67	64
145	Residential	B	67	62
146	Residential	B	67	63
147	Residential	B	67	61
148	Residential	B	67	64
149	Residential	B	67	63
150	Residential	B	67	61

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3]
151	Residential	B	67	63
152	Residential	B	67	63
153	Residential	B	67	64
154	Residential	B	67	62
155	Residential	B	67	64
156	Residential	B	67	60
157	Residential	B	67	64
158	Residential	B	67	65
159	Residential	B	67	63
160	Residential	B	67	64
161	Residential	B	67	62
162	Residential	B	67	64
163	Commercial	E	72	66
164	Commercial	E	72	65
165	Commercial	E	72	**75**
166	Commercial	E	72	**74**
167	Commercial	E	72	**72**
168	Commercial	E	72	70
R1	Residential	B	67	64
R2	Residential	B	67	61
R3	Residential	B	67	63
R4	Residential	B	67	64
R5	Residential	B	67	**70**
R6	Residential	B	67	64
R7	Residential	B	67	64
R8	Residential	B	67	64
R9	Residential	B	67	64

Notes:
1. Values in **BOLD RED** indicate noise levels in exceedance of the applicable NAC.
2. Activity Category F does not have an established NAC.
3. Modeling results are rounded to the nearest decibel.

Chapter 7. Future Noise Environment, Impacts, and Considered Abatement

7.1. Future Noise Environment and Impacts

Table 7-1, Predicted Traffic Noise Levels, summarizes the traffic noise modeling results for design-year conditions with and without the project. Predicted design-year traffic noise levels with the project are compared to existing conditions and to design-year no-project conditions. The comparison to existing conditions is included in the analysis to identify traffic noise impacts under the Noise Abatement Policy. The comparison to no-project conditions indicates the direct effect of the project.

Table 7-1. Predicted Traffic Noise Levels

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
1	Residential	B	67	59	59	60
2	Residential	B	67	59	59	60
3	Residential	B	67	58	58	59
4	Residential	B	67	57	57	58
5	Residential	B	67	60	60	61
6	Residential	B	67	58	58	59
7	Residential	B	67	60	60	61
8	Residential	B	67	62	62	63
9	Residential	B	67	58	58	59
10	Residential	B	67	63	63	64
11	Residential	B	67	63	63	64
12	Residential	B	67	57	57	58
13	Residential	B	67	62	62	63
14	Residential	B	67	57	57	58
15	Residential	B	67	61	61	62
16	Residential	B	67	63	63	64
17	Residential	B	67	58	58	59
18	Residential	B	67	63	63	64
19	Residential	B	67	62	62	63
20	Residential	B	67	64	64	65
21	Residential	B	67	62	62	63
22	Residential	B	67	64	64	65
23	Residential	B	67	64	64	65
24	Residential	B	67	56	56	57
25	Residential	B	67	63	63	64
26	Residential	B	67	57	57	58
27	Residential	B	67	63	63	64
28	Residential	B	67	57	57	58
29	Residential	B	67	64	64	65

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
30	Residential	B	67	60	60	61
31	Residential	B	67	63	63	64
32	Residential	B	67	59	59	60
33	Residential	B	67	62	62	63
34	Residential	B	67	63	63	64
35	Residential	B	67	59	59	60
36	Residential	B	67	63	63	64
37	Residential	B	67	64	64	65
38	Residential	B	67	63	63	64
39	Residential	B	67	64	64	65
40	Residential	B	67	60	60	61
41	Residential	B	67	63	63	64
42	Residential	B	67	58	58	59
43	Residential	B	67	64	64	65
44	Residential	B	67	59	59	60
45	Residential	B	67	64	64	65
46	Residential	B	67	59	59	60
47	Residential	B	67	63	63	64
48	Residential	B	67	60	60	61
49	Residential	B	67	64	64	65
50	Residential	B	67	63	63	64
51	Residential	B	67	61	61	62
52	Residential	B	67	64	64	65
53	Residential	B	67	64	64	65
54	Residential	B	67	63	63	64
55	Residential	B	67	**71**	**71**	**72**
56	Residential	B	67	**67**	**67**	**68**
57	Residential	B	67	**67**	**67**	**68**
58	Residential	B	67	**70**	**70**	**71**
59	Residential	B	67	**70**	**70**	**71**
60	Residential	B	67	**74**	**74**	**75**
61	Residential	B	67	**68**	**68**	**69**
62	Hotel	E	72	**72**	**72**	**73**
63	Sports Arena	C	67	**76**	**76**	**77**
64	Hotel	E	72	**76**	**76**	**77**
65	Residential	B	67	**76**	**76**	**77**
66	Residential	B	67	**67**	**67**	**68**
Decker Lake Trail	Recreational	C	67	**79**	**79**	**80**
67	Light Manufacturing	F	N/A	80	80	81
68	Light Manufacturing	F	N/A	68	68	69
69	Light Manufacturing	F	N/A	79	79	80
70	Light Manufacturing	F	N/A	69	69	70
71	Light Manufacturing	F	N/A	76	76	77
72	Light Manufacturing	F	N/A	72	72	73
73	Light Manufacturing	F	N/A	73	73	74
74	Light Manufacturing	F	N/A	69	69	70
75	Light Manufacturing	F	N/A	63	63	64
76	Light Manufacturing	F	N/A	59	59	60
77	Light Manufacturing	F	N/A	59	59	60
78	Light Manufacturing	F	N/A	54	54	55

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
79	Light Manufacturing	F	N/A	56	56	57
80	Light Manufacturing	F	N/A	57	57	58
81	Light Manufacturing	F	N/A	60	60	61
82	Light Manufacturing	F	N/A	66	66	67
83	Light Manufacturing	F	N/A	71	71	72
84	Light Manufacturing	F	N/A	74	74	75
85	Light Manufacturing	F	N/A	75	75	76
86	Light Manufacturing	F	N/A	76	76	77
87	Light Manufacturing	F	N/A	75	75	76
88	Light Manufacturing	F	N/A	75	75	76
89	Light Manufacturing	F	N/A	81	81	82
90	Light Manufacturing	F	N/A	80	80	81
91	Light Manufacturing	F	N/A	78	78	79
92	Residential	B	67	**70**	**70**	**71**
93	Residential	B	67	64	64	65
94	Residential	B	67	62	62	63
95	Residential	B	67	63	63	64
96	Residential	B	67	61	61	62
97	Residential	B	67	64	64	65
98	Residential	B	67	59	59	60
99	Residential	B	67	64	64	65
100	Residential	B	67	59	59	60
101	Residential	B	67	64	64	65
102	Residential	B	67	59	59	60
103	Residential	B	67	64	64	65
104	Residential	B	67	59	59	59
105	Residential	B	67	64	64	65
106	Residential	B	67	58	58	59
107	Residential	B	67	64	64	65
108	Residential	B	67	58	58	59
109	Residential	B	67	64	64	65
110	Residential	B	67	58	58	59
111	Residential	B	67	64	64	65
112	Residential	B	67	64	64	65
113	Residential	B	67	63	63	64
114	Residential	B	67	63	63	64
115	Residential	B	67	63	63	64
116	Residential	B	67	63	63	64
117	Residential	B	67	**69**	**69**	**70**
118	Residential	B	67	63	63	64
119	Residential	B	67	59	59	60
120	Residential	B	67	63	63	64
121	Residential	B	67	60	60	61
122	Residential	B	67	64	64	65
123	Residential	B	67	60	60	61
124	Residential	B	67	64	64	65
125	Residential	B	67	65	65	64
126	Residential	B	67	60	60	61
127	Residential	B	67	63	63	65
128	Residential	B	67	60	60	61

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
129	Residential	B	67	64	64	65
130	Residential	B	67	63	63	64
131	Residential	B	67	58	58	59
132	Residential	B	67	60	60	61
133	Residential	B	67	59	59	60
134	Residential	B	67	56	56	57
135	Residential	B	67	57	57	58
136	Residential	B	67	56	56	57
137	Commercial	E	72	66	66	67
138	Commercial	E	72	**71**	**71**	**72**
139	Commercial	E	72	66	66	67
140	Commercial	E	72	**74**	**74**	**75**
141	Commercial	E	72	**71**	**71**	**72**
142	Residential	B	67	**67**	**67**	**68**
143	Residential	B	67	62	62	63
144	Residential	B	67	64	64	65
145	Residential	B	67	62	62	62
146	Residential	B	67	63	63	64
147	Residential	B	67	61	61	62
148	Residential	B	67	64	64	65
149	Residential	B	67	63	63	64
150	Residential	B	67	61	61	62
151	Residential	B	67	63	63	64
152	Residential	B	67	63	63	64
153	Residential	B	67	64	64	65
154	Residential	B	67	62	62	63
155	Residential	B	67	64	64	65
156	Residential	B	67	60	60	61
157	Residential	B	67	64	64	65
158	Residential	B	67	65	65	65
159	Residential	B	67	63	63	64
160	Residential	B	67	64	64	65
161	Residential	B	67	62	62	63
162	Residential	B	67	64	64	65
163	Commercial	E	72	66	66	67
164	Commercial	E	72	65	65	66
165	Commercial	E	72	**75**	**75**	**76**
166	Commercial	E	72	**74**	**74**	**75**
167	Commercial	E	72	**72**	**72**	**73**
168	Commercial	E	72	70	70	**71**
R1	Residential	B	67	64	64	65
R2	Residential	B	67	61	61	62
R3	Residential	B	67	63	63	64
R4	Residential	B	67	64	64	65
R5	Residential	B	67	**70**	**70**	**71**
R6	Residential	B	67	64	64	64
R7	Residential	B	67	64	64	65
R8	Residential	B	67	64	64	64
R9	Residential	B	67	64	64	65
Notes:						

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]

1. Values in **BOLD RED** indicate an NAC impact, a substantial increase impact, or both. Please note that Existing and No-Build values are not necessarily project "impacts", but are highlighted for informational purposes.
2. Activity Category F does not have an established NAC.
3. Modeling results are rounded to the nearest decibel.
4. Future No Build traffic noise volumes are equal to existing volumes, assuming 1,625 vehicles/lane/hour for I-215; 760 vehicles/lane/hour for northbound I-215 on-ramp at 4700 South; and 960 vehicles/lane/hour for southbound I-215 on-ramp 4700 South (i.e., under Future No Build conditions, the I-215 alignment/capacity would remain unchanged compared to existing conditions, thus, resulting in the same traffic volumes and noise levels).

Modeling results in Table 7-1 indicate that predicted traffic noise levels for the design-year with-project conditions approach or exceed the NAC of 67 dBA L_{eq}(h) for Activity Category B (residential) and Activity Category C (sports arena and recreational) land uses at receptor locations 55-61, 63, 65, 66, 92, 117, 142, R5, and Decker Lake Trail. The results also indicate that predicted traffic noise levels for the design-year with-project conditions approach or exceed the NAC of 72 dBA L_{eq}(h) for Activity Category E (hotel and commercial) land uses at receptor locations 62, 64, 138, 140, 141, and 165-168. It should be noted that there is no NAC established for Activity Category F (light manufacturing) in UDOT's Noise Abatement Policy.

Therefore, traffic noise impacts are predicted to occur at Activity Category B, Activity Category C, and Activity Category E land uses within the project area, and noise abatement must be considered.

7.2. Preliminary Noise Abatement Analysis

In accordance with the Noise Abatement Policy, noise abatement is considered where noise impacts are predicted in areas of frequent human use that would benefit from a lowered noise level. Potential noise abatement measures identified in the Noise Abatement Policy include the following:

- Traffic Management Measures such as truck restrictions or reducing speed limits.
- Noise barriers.
- Noise insulation of Activity Category D land use facilities will be considered as a noise abatement measure when determined reasonable and feasible according to 23 CFR 772.13(d).

All of these abatement options have been considered. However, because of the configuration and location of the project, abatement in the form of noise barriers is the only abatement that is considered to be potentially feasible.

Each noise barrier evaluated has been evaluated for feasibility based on achievable noise reduction. For each noise barrier found to be acoustically feasible, reasonable cost allowances were calculated. Tables 7-2 through 7-10 below summarize the results at receiver locations for the noise barriers (Barriers NB-1 through NB-6 and EB-1 through EB-3), that have been evaluated in detail for this project.

7.2.1 Reasonableness

7.2.1.1 Noise Barrier NB-1 (Residences: Receptors 55 through 61)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the residences represented by receptors 55 through 61, and are predicted to be between 68 and 75 dBA L_{eq}(h), and the increase in noise relative to existing conditions would be up to 1.0 dBA in the design year. Because the predicted noise levels in the design year exceed UDOT's 67 dBA L_{eq}(h) NAC, traffic noise impacts are predicted at these residences, and noise abatement must be considered for these locations. Detailed modeling analysis was conducted for a noise barrier located along the I-215 right-of-way, west of the residences located at receptor locations 55 through 61. The barrier evaluated is identified as Barrier NB-1 in Table 7-2, Summary of Reasonableness Determination Data – Barrier NB-1, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 2,100 feet.

As required by the Noise Abatement Policy, a 5 dBA noise reduction for at least 75 percent of front-row receptors is required to qualify as acoustically feasible, and an 8 dBA noise reduction for at least 75 percent of front-row receptors is required to qualify as acoustically reasonable. Additionally, UDOT requires an allowable cost of $30,000 per benefitted residence (dwelling unit) to be considered cost-effective. As summarized in Table 7-2, none of the noise barrier designs for Barrier NB-1 analyzed would satisfy all three criteria. While an eight foot noise barrier would satisfy all three criteria for receptor 60, the barrier would not be reasonable for at least 75 percent of front-row receptors the would benefit from NB-1. As such, Barrier NB-1 has been dropped from consideration.

Table 7-2. Summary of Reasonableness Determination Data—Barrier NB-1

Barrier I.D.: NB-1, Length: 2,100 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 67
Critical Design Receiver: 55 – 61 Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
55	65	6	12	$30,000	$360,000	$336,000	Yes	No	Yes
56	64	3	12	$30,000	$360,000	$336,000	No	No	Yes
57	63	4	12	$30,000	$360,000	$336,000	No	No	Yes
58	65	6	12	$30,000	$360,000	$336,000	Yes	No	Yes
59	63	6	12	$30,000	$360,000	$336,000	Yes	No	Yes
60	62	12	12	$30,000	$360,000	$336,000	Yes	Yes	Yes
61	63	6	12	$30,000	$360,000	$336,000	Yes	No	Yes
10-Foot Barrier									
55	65	6	12	$30,000	$360,000	$420,000	Yes	No	No
56	63	4	12	$30,000	$360,000	$420,000	No	No	No
57	62	5	12	$30,000	$360,000	$420,000	No	No	No
58	64	7	12	$30,000	$360,000	$420,000	Yes	No	No
59	63	7	12	$30,000	$360,000	$420,000	Yes	No	No
60	62	12	12	$30,000	$360,000	$420,000	Yes	Yes	No
61	62	6	12	$30,000	$360,000	$420,000	Yes	No	No
12-Foot Barrier									
55	64	7	12	$30,000	$360,000	$504,000	Yes	No	No
56	62	5	12	$30,000	$360,000	$504,000	No	No	No
57	61	5	12	$30,000	$360,000	$504,000	Yes	No	No
58	63	7	12	$30,000	$360,000	$504,000	Yes	No	No
59	62	7	12	$30,000	$360,000	$504,000	Yes	No	No
60	61	13	12	$30,000	$360,000	$504,000	Yes	Yes	No
61	62	6	12	$30,000	$360,000	$504,000	Yes	No	No
14-Foot Barrier									
55	64	7	12	$30,000	$360,000	$588,000	Yes	No	No
56	62	5	12	$30,000	$360,000	$588,000	Yes	No	No
57	61	6	12	$30,000	$360,000	$588,000	Yes	No	No
58	63	8	12	$30,000	$360,000	$588,000	Yes	No	No
59	62	8	12	$30,000	$360,000	$588,000	Yes	No	No
60	61	13	12	$30,000	$360,000	$588,000	Yes	Yes	No
61	62	7	12	$30,000	$360,000	$588,000	Yes	No	No
16-Foot Barrier									
55	63	8	12	$30,000	$360,000	$672,000	Yes	No	No
56	61	6	12	$30,000	$360,000	$672,000	Yes	No	No
57	60	6	12	$30,000	$360,000	$672,000	Yes	No	No
58	62	8	12	$30,000	$360,000	$672,000	Yes	Yes	No
59	61	8	12	$30,000	$360,000	$672,000	Yes	Yes	No
60	60	14	12	$30,000	$360,000	$672,000	Yes	Yes	No
61	61	7	12	$30,000	$360,000	$672,000	Yes	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 7 modeled receivers represent 12 benefitted units.
3. Based on the Noise Abatement Policy's fixed unit cost of $20.00 per square foot, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.2 Noise Barrier NB-2 (Hotel: Receptor 62, Sports Arena: Receptor 63)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the residences represented by receptors 62 and 63, and are predicted to be 73 dBA and 77 dBA L_{eq}(h), and the increase in noise relative to existing conditions would be up to 1.0 dBA in the design year. Because the predicted noise levels in the design year exceed UDOT's 67 dBA and 72 dBA L_{eq}(h) NAC, traffic noise impacts are predicted at these receptors, and noise abatement must be considered for these locations. Detailed modeling analysis was conducted for a noise barrier located along the I-215 right-of-way, west of the hotel and sports arena located at receptor locations 62 and 63. The barrier evaluated is identified as Barrier NB-2 in Table 7-3, Summary of Reasonableness Determination Data – Barrier NB-2, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 1,800 feet. As summarized in Table 7-3, none of the noise barrier designs for Barrier NB-2 analyzed would satisfy all three criteria. As such, Barrier NB-2 has been dropped from consideration.

Table 7-3. Summary of Reasonableness Determination Data—Barrier NB-2

Barrier I.D.: NB-2, Length: 1,800 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 67 and 72
Critical Design Receiver: 62 and 63 Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
62	67	5	6	$30,000	$180,000	$648,000	No	No	No
63	70	6	6	$30,000	$180,000	$648,000	Yes	No	No
10-Foot Barrier									
62	66	6	6	$30,000	$180,000	$648,000	Yes	No	No
63	70	6	6	$30,000	$180,000	$648,000	Yes	No	No
12-Foot Barrier									
62	65	7	6	$30,000	$180,000	$648,000	Yes	No	No
63	69	6	6	$30,000	$180,000	$648,000	Yes	No	No
14-Foot Barrier									
62	64	8	6	$30,000	$180,000	$648,000	Yes	No	No
63	69	7	6	$30,000	$180,000	$648,000	Yes	No	No
16-Foot Barrier									
62	63	8	6	$30,000	$180,000	$648,000	Yes	Yes	No
63	69	7	6	$30,000	$180,000	$648,000	Yes	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 2 modeled receivers represent 6 benefitted units.
3. Based on the Noise Abatement Policy's fixed unit cost of $360.00 per linear foot, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.3 Noise Barrier NB-3 (Hotel: Receptor 64, Residences: Receptors 65 and 66, Recreational: Decker Lake Trail)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the hotel, residences, and recreational land use represented by receptors 64 through 66 and Decker Laker Trail, are predicted to be 77 dBA, 77 dBA, 68 dBA and 80 dBA L_{eq}(h), and the increase in noise relative to existing conditions would be up to 1.0 dBA in the design year. Because the predicted noise levels in the design year exceed UDOT's 67 dBA and 72 dBA L_{eq}(h) NAC, traffic noise impacts are predicted at these receptors, and noise abatement must be considered for these locations. Detailed modeling analysis was conducted for a noise barrier located along the I-215 right-of-way, west of the hotel, residences, and recreational land use located at receptor locations 64 through 66 and Decker Lake Trail. The barrier evaluated is identified as Barrier NB-3 in Table 7-4, Summary of Reasonableness Determination Data – Barrier NB-3, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments. Due to the different land uses analyzed for NB-3 (hotel, residences, Decker Lake Trail), three different noise barrier lengths for NB-3 were evaluated for each land use in order to calculate the different costs for each land use pursuant to UDOT's Noise Abatement Policy. Noise barrier lengths of 750 feet, 2,900 feet, and 1,500 feet were analyzed for feasibility, reasonableness, and cost effectiveness. As summarized in Table 7-4, none of the noise barrier designs for Barrier NB-3 analyzed would satisfy all three criteria. While an eight foot noise barrier would satisfy all three criteria for receptor 65, the barrier would not be reasonable for at least 75 percent of front-row receptors the would benefit from NB-3. As such, Barrier NB-3 has been dropped from consideration.

Table 7-4. Summary of Reasonableness Determination Data—Barrier NB-3

Barrier I.D.: NB-3, Length: 750 feet, 2,900 feet, 1,500 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 67 and 72
Critical Design Receiver: 64 – 65, Decker Lake Trail Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
64	69	7	3	$30,000	$90,000	$270,000	Yes	No	No
65	66	11	18	$30,000	$540,000	$464,000	Yes	Yes	Yes
66	61	6	18	$30,000	$540,000	$464,000	Yes	No	Yes
Decker Lake Trail	69	10	1	$30,000	$30,000	$540,000	Yes	Yes	No
10-Foot Barrier									
64	69	7	3	$30,000	$90,000	$270,000	Yes	No	No
65	65	11	18	$30,000	$540,000	$580,000	Yes	Yes	No
66	61	6	18	$30,000	$540,000	$580,000	Yes	No	No
Decker Lake Trail	68	11	1	$30,000	$30,000	$540,000	Yes	Yes	No
12-Foot Barrier									
64	69	7	3	$30,000	$90,000	$270,000	Yes	No	No
65	64	12	18	$30,000	$540,000	$696,000	Yes	Yes	No
66	61	7	18	$30,000	$540,000	$696,000	Yes	No	No
Decker Lake Trail	67	12	1	$30,000	$30,000	$540,000	Yes	Yes	No
14-Foot Barrier									
64	68	7	3	$30,000	$90,000	$270,000	Yes	No	No
65	64	13	18	$30,000	$540,000	$812,000	Yes	Yes	No
66	60	7	18	$30,000	$540,000	$812,000	Yes	No	No
Decker Lake Trail	66	13	1	$30,000	$30,000	$540,000	Yes	Yes	No
16-Foot Barrier									
64	68	7	3	$30,000	$90,000	$270,000	Yes	No	No
65	63	13	18	$30,000	$540,000	$464,000	Yes	Yes	No
66	60	7	18	$30,000	$540,000	$464,000	Yes	No	No
Decker Lake Trail	65	14	1	$30,000	$30,000	$540,000	Yes	Yes	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 1 modeled receiver represents 3 benefitted units for Receiver 64; 2 modeled receivers represent 18 benefitted units for Receivers 65 and 66; 1 modeled receiver represents 1 benefitted receiver for Decker Lake Trail.
3. Based on the Noise Abatement Policy's fixed unit cost of $360.00 per linear foot for hotel and recreational uses, and $20.00 per square foot for residences, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.4 Noise Barrier NB-4 (Commercial: Receptors 138, 140, 141)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the commercial land uses represented by receptors 138, 140, and 141 are predicted to be 72 dBA, 75 dBA, and 72 dBA L_{eq}(h), and the increase in noise relative to existing conditions will be up to 1.0 dBA in the design year. Because the predicted noise level in the design year exceeds UDOT's 72 dBA L_{eq}(h) NAC for commercial land uses, traffic noise impacts are predicted at these receptors, and noise abatement must be considered for these locations. Detailed modeling analysis was conducted for a noise barrier located along the I-215 right-of-way, east of the commercial land uses at receptor locations 138, 140, and 141. The barrier evaluated is identified as Barrier NB-4 in Table 7-5, Summary of Reasonableness Determination Data – Barrier NB-4, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 1,800 feet. As summarized in Table 7-5, none of the noise barrier designs for Barrier NB-4 analyzed would satisfy all three criteria. As such, Barrier NB-4 has been dropped from consideration.

Table 7-5. Summary of Reasonableness Determination Data—Barrier NB-4

Barrier I.D.: NB-4, Length: 1,800 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 72
Critical Design Receiver: 138, 140, 141 Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
138	66	5	5	$30,000	$150,000	$648,000	No	No	No
140	66	8	5	$30,000	$150,000	$648,000	Yes	No	No
141	66	6	5	$30,000	$150,000	$648,000	Yes	No	No
10-Foot Barrier									
138	66	5	5	$30,000	$150,000	$648,000	Yes	No	No
140	65	9	5	$30,000	$150,000	$648,000	Yes	Yes	No
141	66	6	5	$30,000	$150,000	$648,000	Yes	No	No
12-Foot Barrier									
138	66	5	5	$30,000	$150,000	$648,000	Yes	No	No
140	65	9	5	$30,000	$150,000	$648,000	Yes	Yes	No
141	65	6	5	$30,000	$150,000	$648,000	Yes	No	No
14-Foot Barrier									
138	66	6	5	$30,000	$150,000	$648,000	Yes	No	No
140	64	10	5	$30,000	$150,000	$648,000	Yes	Yes	No
141	64	7	5	$30,000	$150,000	$648,000	Yes	No	No
16-Foot Barrier									
138	65	6	5	$30,000	$150,000	$648,000	Yes	No	No
140	64	10	5	$30,000	$150,000	$648,000	Yes	Yes	No
141	64	8	5	$30,000	$150,000	$648,000	Yes	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 3 modeled receivers represent 5 benefitted units.
3. Based on the Noise Abatement Policy's fixed unit cost of $360.00 per linear foot for hotel and recreational uses, and $20.00 per square foot for residences, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.5 Noise Barrier NB-5 (Commercial: Receptors 165 through 168)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the commercial land uses represented by receptors 165 through 168 are predicted to be 76 dBA, 75 dBA, 73 dBA, and 71 dBA L_{eq}(h), and the increase in noise relative to existing conditions will be up to 1.0 dBA in the design year. Because the predicted noise level in the design year exceeds UDOT's 72 dBA L_{eq}(h) NAC for commercial land uses, traffic noise impacts are predicted at these receptors, and noise abatement must be considered for these locations. Detailed modeling analysis was conducted for a noise barrier located along the I-215 right-of-way, east of the commercial land uses at receptor locations 165 – 168. The barrier evaluated is identified as Barrier NB-5 in Table 7-6, Summary of Reasonableness Determination Data – Barrier NB-5, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 2,000 feet. As summarized in Table 7-6, none of the noise barrier designs for Barrier NB-5 analyzed would satisfy all three criteria. As such, Barrier NB-5 has been dropped from consideration.

Table 7-6. Summary of Reasonableness Determination Data—Barrier NB-5

Barrier I.D.: NB-5, Length: 2,000 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 72
Critical Design Receiver: 165 - 168 Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
165	71	4	5	$30,000	$150,000	$720,000	No	No	No
166	72	2	5	$30,000	$150,000	$720,000	No	No	No
167	74	0	5	$30,000	$150,000	$720,000	No	No	No
168	72	0	5	$30,000	$150,000	$720,000	No	No	No
10-Foot Barrier									
165	71	4	5	$30,000	$150,000	$720,000	No	No	No
166	71	3	5	$30,000	$150,000	$720,000	No	No	No
167	74	0	5	$30,000	$150,000	$720,000	No	No	No
168	72	0	5	$30,000	$150,000	$720,000	No	No	No
12-Foot Barrier									
165	70	5	5	$30,000	$150,000	$720,000	Yes	No	No
166	69	5	5	$30,000	$150,000	$720,000	Yes	No	No
167	74	0	5	$30,000	$150,000	$720,000	No	No	No
168	72	0	5	$30,000	$150,000	$720,000	No	No	No
14-Foot Barrier									
165	69	6	5	$30,000	$150,000	$720,000	Yes	No	No
166	68	7	5	$30,000	$150,000	$720,000	Yes	No	No
167	74	0	5	$30,000	$150,000	$720,000	No	No	No
168	72	0	5	$30,000	$150,000	$720,000	No	No	No
16-Foot Barrier									
165	69	6	5	$30,000	$150,000	$720,000	Yes	No	No
166	67	8	5	$30,000	$150,000	$720,000	Yes	No	No
167	74	0	5	$30,000	$150,000	$720,000	No	No	No
168	72	0	5	$30,000	$150,000	$720,000	No	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 4 modeled receivers represent 5 benefitted units.
3. Based on the Noise Abatement Policy's fixed unit cost of $360.00 per linear foot, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.6 Noise Barrier NB-6 (Recreational: Receptor R5)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the residential land use represented by receptor R5 is predicted to be 70 dBA L_{eq}(h), and the increase in noise relative to existing conditions will be up to 0.4 dBA in the design year. Because the predicted noise level in the design year exceeds UDOT's 67 dBA L_{eq}(h) NAC for residential land uses, traffic noise impacts are predicted at this receptor, and noise abatement must be considered for this location. Detailed modeling analysis was conducted for a noise barrier located along the I-215 southbound on-ramp at 4700 South, east of the recreational land use at receptor location R5. The barrier evaluated is identified as Barrier NB-6 in Table 7-7, Summary of Reasonableness Determination Data – Barrier NB-6, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 300 feet. As summarized in Table 7-7, none of the noise barrier designs for Barrier NB-6 analyzed would satisfy all three criteria. As such, Barrier NB-6 has been dropped from consideration.

Table 7-7. Summary of Reasonableness Determination Data—Barrier NB-6

Barrier I.D.: NB-6, Length: 300 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 67
Critical Design Receiver: R5 Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
R5	68	2	1	$30,000	$30,000	$108,000	No	No	No
10-Foot Barrier									
R5	68	2	1	$30,000	$30,000	$108,000	No	No	No
12-Foot Barrier									
R5	67	3	1	$30,000	$30,000	$108,000	No	No	No
14-Foot Barrier									
R5	67	3	1	$30,000	$30,000	$108,000	No	No	No
16-Foot Barrier									
R5	67	3	1	$30,000	$30,000	$108,000	No	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 1 modeled receiver represents 1 benefitted recreational land use.
3. Based on the Noise Abatement Policy's fixed unit cost of $360.00 per linear foot, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.7 Existing Noise Barrier EB-1 (Residence: Receptor 92)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the residence represented by receptor 92 is predicted to be 71 dBA L_{eq}(h), and the increase in noise relative to existing conditions would be 1.0 dBA in the design year. Because the predicted noise levels in the design year exceed UDOT's 67 dBA L_{eq}(h) NAC, a traffic noise impact is predicted at this receptor, and noise abatement must be considered for this location. An existing noise barrier with a height of 14 feet and length of approximately 2,100 feet currently exists along the I-215 right-of-way, east of receptor 92. However, the noise barrier does not completely block the line of sight between receptor 92 and the I-215, creating an impact at receptor 92. Therefore, a detailed modeling analysis was conducted for the existing noise barrier. The barrier evaluated is identified as Barrier EB-1 in Table 7-8, Summary of Reasonableness Determination Data – Barrier EB-1, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 2,100 feet. As summarized in Table 7-8, none of the noise barrier designs for Barrier EB-1 analyzed would satisfy all three criteria. As such, Barrier EB-1 has been dropped from consideration.

Table 7-8. Summary of Reasonableness Determination Data—Barrier EB-1

Barrier I.D.: EB-1, Length: 2,100 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 67
Critical Design Receiver: 92 Design Year Noise Level Minus Existing Noise Level: 0.9

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
92	71	0	1	$30,000	$30,000	$336,000	No	No	No
10-Foot Barrier									
92	71	0	1	$30,000	$30,000	$420,000	No	No	No
12-Foot Barrier									
92	71	0	1	$30,000	$30,000	$504,000	No	No	No
14-Foot Barrier									
92	71	0	1	$30,000	$30,000	$588,000	No	No	No
16-Foot Barrier									
92	71	0	1	$30,000	$30,000	$672,000	No	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 1 modeled receiver represents 1 benefitted unit.
3. Based on the Noise Abatement Policy's fixed unit cost of $20.00 per square foot, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.8 Existing Noise Barrier EB-2 (Residence: Receptor 117)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the residence represented by receptor 117 is predicted to be 70 dBA L_{eq}(h), and the increase in noise relative to existing conditions would be 1.0 dBA in the design year. Because the predicted noise levels in the design year exceed UDOT's 67 dBA L_{eq}(h) NAC, a traffic noise impact is predicted at this receptor, and noise abatement must be considered for this location. An existing noise barrier with a height of 14 feet and length of approximately 1,060 feet currently exists along the I-215 right-of-way, east of receptor 117. However, the noise barrier does not completely block the line of sight between receptor 117 and the I-215, creating an impact at receptor 117. Therefore, a detailed modeling analysis was conducted for the existing noise barrier. The barrier evaluated is identified as Barrier EB-2 in Table 7-9, Summary of Reasonableness Determination Data – Barrier EB-2, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 1,060 feet. As summarized in Table 7-9, none of the noise barrier designs for Barrier EB-2 analyzed would satisfy all three criteria. As such, Barrier EB-2 has been dropped from consideration.

Table 7-9. Summary of Reasonableness Determination Data—Barrier EB-2

Barrier I.D.: EB-2, Length: 1,060 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 67
Critical Design Receiver: 117 Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
117	71	0	1	$30,000	$30,000	$169,600	No	No	No
10-Foot Barrier									
117	70	0	1	$30,000	$30,000	$212,000	No	No	No
12-Foot Barrier									
117	70	0	1	$30,000	$30,000	$254,400	No	No	No
14-Foot Barrier									
117	70	0	1	$30,000	$30,000	$296,800	No	No	No
16-Foot Barrier									
117	69	0	1	$30,000	$30,000	$339,200	No	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 1 modeled receiver represents 1 benefitted unit.
3. Based on the Noise Abatement Policy's fixed unit cost of $20.00 per square foot, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

7.2.1.9 Existing Noise Barrier EB-3 (Residence: Receptor 142)

The traffic noise modeling results in Table 7-1 indicate that traffic noise levels at the residence represented by receptor 142 is predicted to be 68 dBA L_{eq}(h), and the increase in noise relative to existing conditions would be 1.0 dBA in the design year. Because the predicted noise levels in the design year exceed UDOT's 67 dBA L_{eq}(h) NAC, a traffic noise impact is predicted at this receptor, and noise abatement must be considered for this location. An existing noise barrier with a height of 14 feet and length of approximately 2,500 feet currently exists along the I-215 right-of-way, east of receptor 142. However, the noise barrier does not completely block the line of sight between receptor 142 and the I-215, creating an impact at receptor 142. Therefore, a detailed modeling analysis was conducted for the existing noise barrier. The barrier evaluated is identified as Barrier EB-3 in Table 7-10, Summary of Reasonableness Determination Data – Barrier EB-3, below. Noise barrier heights in the range of 8 to 16 feet were evaluated in 2-foot increments with a length of 2,500 feet. As summarized in Table 7-10, none of the noise barrier designs for Barrier EB-3 analyzed would satisfy all three criteria. As such, Barrier EB-3 has been dropped from consideration.

Table 7-10. Summary of Reasonableness Determination Data—Barrier EB-3

Barrier I.D.: EB-3, Length: 2,500 feet
Predicted Sound Level without Barrier Design Year Noise Level, dBA Leq(h): 67
Critical Design Receiver: 142 Design Year Noise Level Minus Existing Noise Level: 1

Receiver No.	dBA With Noise Barrier[1]	Barrier Noise Reduction (dBA)[1]	Number of Benefited Receivers[2]	Reasonable Allowance Per Benefitted Receiver	Total Reasonable Allowance	Barrier Cost Estimate[3]	Feasible?	Reasonable?	Cost Effective?
8-Foot Barrier									
142	67	0	1	$30,000	$30,000	$400,000	No	No	No
10-Foot Barrier									
142	67	0	1	$30,000	$30,000	$500,000	No	No	No
12-Foot Barrier									
142	67	0	1	$30,000	$30,000	$600,000	No	No	No
14-Foot Barrier									
142	67	0	1	$30,000	$30,000	$700,000	No	No	No
16-Foot Barrier									
142	66	1	1	$30,000	$30,000	$800,000	No	No	No

Notes:
1. Modeling results are rounded to the nearest decibel.
2. 1 modeled receiver represents 1 benefitted units.
3. Based on the Noise Abatement Policy's fixed unit cost of $20.00 per square foot, *Noise Abatement UDOT 08A2-01*, revised February 13, 2014.

Based on the noise reduction performance and Noise Abatement Policy, reasonable cost allowance data, and the engineer's cost estimates summarized in Tables 7-2 through 7-10 for the noise barriers NB-1 through NB-6 and EB-1 through EB-3, preliminary reasonableness determinations for noise barriers were made. Based on the preliminary noise abatement analysis, none of the noise barrier designs would satisfy all three criteria for feasibility, reasonableness, or cost effectiveness. Thus, the preliminary noise abatement analysis determined that none of the noise barriers analyzed would meet UDOT's criteria contained in their Noise Abatement Policy, and are therefore not recommended for inclusion in the proposed project.

Chapter 8. Construction Noise

During construction of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Construction noise is regulated by federal regulation 23 CFR 772 - Procedures for Abatement of Highway Traffic Noise and Construction Noise. Table 8-1, Construction Equipment Noise, summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels up to 95 dB at a distance of 25 feet, 89 dB at 50 feet, 85 dB at 75 feet, and 83 at 100 feet. Noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 8-1. Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 25 feet)	Maximum Noise Level (dBA at 50 feet)	Maximum Noise Level (dBA at 75 feet)	Maximum Noise Level (dBA at 100 feet)
Scrapers	95	89	85	83
Bulldozers	91	85	81	79
Heavy Trucks	94	88	84	82
Backhoe	86	80	76	74
Pneumatic Tools	91	85	81	79
Concrete Pump	88	82	78	76
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, 2006.				

The closest sensitive receptors are located approximately 75 feet from the nearest project construction areas. Therefore, these receptor locations would be subject to short-term noise between approximately 76 and 85 dBA L_{max} generated by construction activities along the project alignment. No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with federal regulation 23 CFR 772 and applicable local noise standards. Construction noise would be short-term, intermittent, and overshadowed by local and freeway traffic noise. Further, implementing the following measures would minimize the temporary noise impacts from construction:

- All equipment will have sound-control devices that are no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust.

Chapter 9. References

Email communication: Ivan Hooper, Avenue Consultants, July 29, 2015.

Email communication: Ivan Hooper, Avenue Consultants, May 6, 2015.

Federal Highway Administration. 2004. *Traffic Noise Model Version 2.5*. April. FHWA-PD-96-009. Washington D.C.

Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment.* (FTA-VA-90-1003-06.) Office of Planning and Environment, Washington, DC. Prepared by Harris Miller Miller & Hanson, Inc. Burlington, MA.

Utah Department of Transportation. 2014. *Noise Abatement UDOT 08A2-01*. February 13, 2014.

Appendix A Traffic Data

Table A-1. Traffic Data for Existing Conditions

Roadway	Direction	Number of Lanes	Level of Service C Volumes	Vehicle Distribution			Modeled Traffic Volumes			Speed (mph)
				Auto	Medium Trucks	Heavy Trucks	Auto	Medium Trucks	Heavy Trucks	
				%	%	%	Volume	Volume	Volume	
I-215	Northbound	4	6,500[1]	93.0%	3.0%	4.0%	6,045	195	260	70
	Southbound	4	6,500[1]	93.0%	3.0%	4.0%	6,045	195	260	70
4700 South On-Ramp	Northbound	1	760[2]	93.0%	3.0%	4.0%	707	23	30	35
	Southbound	1	960[3]	93.0%	3.0%	4.0%	893	29	38	40

Note:
1. Based on Level of Service C volumes (1,625 vehicles per lane, per hour).
2. Based on Level of Service C volumes (760 vehicles per lane, per hour).
3. Based on Level of Service C volumes (960 vehicles per lane, per hour).

Source: [1] Email communication: Ivan Hooper, Avenue Consultants, May 6, 2015.
[2] Email communication: Ivan Hooper, Avenue Consultants, July 29, 2015.

Table A-2. Traffic Data for Future No Build Conditions

Roadway	Direction	Number of Lanes	Level of Service C Volumes	Vehicle Distribution			Modeled Traffic Volumes			Speed (mph)
				Auto	Medium Trucks	Heavy Trucks	Auto	Medium Trucks	Heavy Trucks	
				%	%	%	Volume	Volume	Volume	
I-215	Northbound	4	6,500[1]	93.0%	3.0%	4.0%	6,045	195	260	70
	Southbound	4	6,500[1]	93.0%	3.0%	4.0%	6,045	195	260	70
4700 South On-Ramp	Northbound	1	760[2]	93.0%	3.0%	4.0%	707	23	30	35
	Southbound	1	960[3]	93.0%	3.0%	4.0%	893	29	38	40

Note:
1. Based on Level of Service C volumes (1,625 vehicles per lane, per hour).
2. Based on Level of Service C volumes (760 vehicles per lane, per hour).
3. Based on Level of Service C volumes (960 vehicles per lane, per hour).

Source: [1] Email communication: Ivan Hooper, Avenue Consultants, May 6, 2015.
[2] Email communication: Ivan Hooper, Avenue Consultants, July 29, 2015.

Table A-3. Traffic Data for Future Plus Project Conditions

Roadway	Direction	Number of Lanes	Level of Service C Volumes	Vehicle Distribution			Modeled Traffic Volumes			Speed (mph)
				Auto	Medium Trucks	Heavy Trucks	Auto	Medium Trucks	Heavy Trucks	
				%	%	%	Volume	Volume	Volume	
I-215	Northbound	5	8,125[1]	93.0%	3.0%	4.0%	7,556	244	325	70
	Southbound	5	8,125[1]	93.0%	3.0%	4.0%	7,556	244	325	70
4700 South On-Ramp	Northbound	2	1,520[2]	93.0%	3.0%	4.0%	1,414	45	61	35
	Southbound	2	1,920[3]	93.0%	3.0%	4.0%	1,785	58	77	40

Note:
1. Based on Level of Service C volumes (1,625 vehicles per lane, per hour).
2. Based on Level of Service C volumes (760 vehicles per lane, per hour).
3. Based on Level of Service C volumes (960 vehicles per lane, per hour).

Source: [1] Email communication: Ivan Hooper, Avenue Consultants, May 6, 2015.
[2] Email communication: Ivan Hooper, Avenue Consultants, July 29, 2015.

Appendix B Predicted Future Noise Levels

This appendix contains tables that summarize the traffic noise modeling results for Existing, Future No Build, and Future Plus Project conditions. This table also includes noise model input and output data for calibration.

Table B-1. Predicted Traffic Noise Levels

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
1	Residential	B	67	59	59	60
2	Residential	B	67	59	59	60
3	Residential	B	67	58	58	59
4	Residential	B	67	57	57	58
5	Residential	B	67	60	60	61
6	Residential	B	67	58	58	59
7	Residential	B	67	60	60	61
8	Residential	B	67	62	62	63
9	Residential	B	67	58	58	59
10	Residential	B	67	63	63	64
11	Residential	B	67	63	63	64
12	Residential	B	67	57	57	58
13	Residential	B	67	62	62	63
14	Residential	B	67	57	57	58
15	Residential	B	67	61	61	62
16	Residential	B	67	63	63	64
17	Residential	B	67	58	58	59
18	Residential	B	67	63	63	64
19	Residential	B	67	62	62	63
20	Residential	B	67	64	64	65
21	Residential	B	67	62	62	63
22	Residential	B	67	64	64	65
23	Residential	B	67	64	64	65
24	Residential	B	67	56	56	57
25	Residential	B	67	63	63	64
26	Residential	B	67	57	57	58
27	Residential	B	67	63	63	64
28	Residential	B	67	57	57	58
29	Residential	B	67	64	64	65
30	Residential	B	67	60	60	61

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
31	Residential	B	67	63	63	64
32	Residential	B	67	59	59	60
33	Residential	B	67	62	62	63
34	Residential	B	67	63	63	64
35	Residential	B	67	59	59	60
36	Residential	B	67	63	63	64
37	Residential	B	67	64	64	65
38	Residential	B	67	63	63	64
39	Residential	B	67	64	64	65
40	Residential	B	67	60	60	61
41	Residential	B	67	63	63	64
42	Residential	B	67	58	58	59
43	Residential	B	67	64	64	65
44	Residential	B	67	59	59	60
45	Residential	B	67	64	64	65
46	Residential	B	67	59	59	60
47	Residential	B	67	63	63	64
48	Residential	B	67	60	60	61
49	Residential	B	67	64	64	65
50	Residential	B	67	63	63	64
51	Residential	B	67	61	61	62
52	Residential	B	67	64	64	65
53	Residential	B	67	64	64	65
54	Residential	B	67	63	63	64
55	Residential	B	67	**71**	**71**	**72**
56	Residential	B	67	**67**	**67**	**68**
57	Residential	B	67	**67**	**67**	**68**
58	Residential	B	67	**70**	**70**	**71**
59	Residential	B	67	**70**	**70**	**71**
60	Residential	B	67	**74**	**74**	**75**
61	Residential	B	67	**68**	**68**	**69**
62	Hotel	E	72	**72**	**72**	**73**

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
63	Sports Arena	C	67	**76**	**76**	**77**
64	Hotel	E	72	**76**	**76**	**77**
65	Residential	B	67	**76**	**76**	**77**
66	Residential	B	67	**67**	**67**	**68**
Decker Lake Trail	Recreational	C	67	**79**	**79**	**80**
67	Light Manufacturing	F	N/A	80	80	81
68	Light Manufacturing	F	N/A	68	68	69
69	Light Manufacturing	F	N/A	79	79	80
70	Light Manufacturing	F	N/A	69	69	70
71	Light Manufacturing	F	N/A	76	76	77
72	Light Manufacturing	F	N/A	72	72	73
73	Light Manufacturing	F	N/A	73	73	74
74	Light Manufacturing	F	N/A	69	69	70
75	Light Manufacturing	F	N/A	63	63	64
76	Light Manufacturing	F	N/A	59	59	60
77	Light Manufacturing	F	N/A	59	59	60
78	Light Manufacturing	F	N/A	54	54	55
79	Light Manufacturing	F	N/A	56	56	57
80	Light Manufacturing	F	N/A	57	57	58
81	Light Manufacturing	F	N/A	60	60	61
82	Light Manufacturing	F	N/A	66	66	67
83	Light Manufacturing	F	N/A	71	71	72
84	Light Manufacturing	F	N/A	74	74	75
85	Light Manufacturing	F	N/A	75	75	76
86	Light Manufacturing	F	N/A	76	76	77
87	Light Manufacturing	F	N/A	75	75	76
88	Light Manufacturing	F	N/A	75	75	76
89	Light Manufacturing	F	N/A	81	81	82
90	Light Manufacturing	F	N/A	80	80	81
91	Light Manufacturing	F	N/A	78	78	79
92	Residential	B	67	**70**	**70**	**71**
93	Residential	B	67	64	64	65

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
94	Residential	B	67	62	62	63
95	Residential	B	67	63	63	64
96	Residential	B	67	61	61	62
97	Residential	B	67	64	64	65
98	Residential	B	67	59	59	60
99	Residential	B	67	64	64	65
100	Residential	B	67	59	59	60
101	Residential	B	67	64	64	65
102	Residential	B	67	59	59	60
103	Residential	B	67	64	64	65
104	Residential	B	67	59	59	59
105	Residential	B	67	64	64	65
106	Residential	B	67	58	58	59
107	Residential	B	67	64	64	65
108	Residential	B	67	58	58	59
109	Residential	B	67	64	64	65
110	Residential	B	67	58	58	59
111	Residential	B	67	64	64	65
112	Residential	B	67	64	64	65
113	Residential	B	67	63	63	64
114	Residential	B	67	63	63	64
115	Residential	B	67	63	63	64
116	Residential	B	67	63	63	64
117	Residential	B	67	**69**	**69**	**70**
118	Residential	B	67	63	63	64
119	Residential	B	67	59	59	60
120	Residential	B	67	63	63	64
121	Residential	B	67	60	60	61
122	Residential	B	67	64	64	65
123	Residential	B	67	60	60	61
124	Residential	B	67	64	64	65
125	Residential	B	67	65	65	64

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
126	Residential	B	67	60	60	61
127	Residential	B	67	63	63	65
128	Residential	B	67	60	60	61
129	Residential	B	67	64	64	65
130	Residential	B	67	63	63	64
131	Residential	B	67	58	58	59
132	Residential	B	67	60	60	61
133	Residential	B	67	59	59	60
134	Residential	B	67	56	56	57
135	Residential	B	67	57	57	58
136	Residential	B	67	56	56	57
137	Commercial	E	72	66	66	67
138	Commercial	E	72	**71**	**71**	**72**
139	Commercial	E	72	66	66	67
140	Commercial	E	72	**74**	**74**	**75**
141	Commercial	E	72	**71**	**71**	**72**
142	Residential	B	67	**67**	**67**	**68**
143	Residential	B	67	62	62	63
144	Residential	B	67	64	64	65
145	Residential	B	67	62	62	62
146	Residential	B	67	63	63	64
147	Residential	B	67	61	61	62
148	Residential	B	67	64	64	65
149	Residential	B	67	63	63	64
150	Residential	B	67	61	61	62
151	Residential	B	67	63	63	64
152	Residential	B	67	63	63	64
153	Residential	B	67	64	64	65
154	Residential	B	67	62	62	63
155	Residential	B	67	64	64	65
156	Residential	B	67	60	60	61
157	Residential	B	67	64	64	65

Receptor No.	Land Use	Noise Abatement Category	Impact Criteria[2]	Modeled Existing Noise Level[3,4]	Future No Build[3,4]	Future Plus Project[3,4]
158	Residential	B	67	65	65	65
159	Residential	B	67	63	63	64
160	Residential	B	67	64	64	65
161	Residential	B	67	62	62	63
162	Residential	B	67	64	64	65
163	Commercial	E	72	66	66	67
164	Commercial	E	72	65	65	66
165	Commercial	E	72	**75**	**75**	**76**
166	Commercial	E	72	**74**	**74**	**75**
167	Commercial	E	72	**72**	**72**	**73**
168	Commercial	E	72	70	70	**71**
R1	Residential	B	67	64	64	65
R2	Residential	B	67	61	61	62
R3	Residential	B	67	63	63	64
R4	Residential	B	67	64	64	65
R5	Residential	B	67	**70**	**70**	**71**
R6	Residential	B	67	64	64	64
R7	Residential	B	67	64	64	65
R8	Residential	B	67	64	64	64
R9	Residential	B	67	64	64	65

Notes:

1. Values in **BOLD RED** indicate an NAC impact, a substantial increase impact, or both. Please note that Existing and No-Build values are not "impacts", but are highlighted for informational purposes.
2. Activity Category F does not have an established NAC.
3. Modeling results are rounded to the nearest decibel.
4. Future No Build traffic noise volumes are equal to existing volumes, assuming 1,625 vehicles/lane/hour for I-215; 760 vehicles/lane/hour for northbound I-215 on-ramp at 4700 South; and 960 vehicles/lane/hour for southbound I-215 on-ramp 4700 South (i.e., under Future No Build conditions, the I-215 alignment/capacity would remain unchanged compared to existing conditions, thus, resulting in the same traffic volumes and noise levels).

Table B-2. Calibrated Traffic Noise Levels

Receiver	Noise Measurements			Traffic Adjusted for 1 Hour[1]					Modeled Level	Difference
	Date	Time	L_{eq} (dB)	Direction	Autos	Medium Trucks	Heavy Trucks	Total	L_{eq} (dB)	L_{eq} (dB)
1	6/10/15	6:00 a.m.	53.5	Northbound	705	0	0	705	52.6	0.9
				Southbound	359	2	1	362		
				Total	1064	2	1	1067		
25	6/10/15	7:02 a.m.	63.5	Northbound	1337	24	16	1377	61.2	2.3
				Southbound	711	13	9	733		
				Total	2048	37	25	2110		
38	6/10/15	7:26 a.m.	54.5	Northbound	1312	4	8	1324	57.3	-2.8
				Southbound	609	5	4	618		
				Total	1921	9	12	1942		
53	6/10/15	7:58 a.m.	61.3	Northbound	1541	21	31	1593	61.0	0.3
				Southbound	781	8	16	805		
				Total	2322	29	47	2398		
58	6/10/15	8:20 a.m.	64.0	Northbound	1260	12	40	1312	66.8	-2.8
				Southbound	797	8	20	825		
				Total	2057	20	60	2137		
65	6/11/15	7:34 a.m.	73.0	Northbound	1820	7	16	1843	74.2	-1.2
				Southbound	874	3	8	885		
				Total	2694	10	24	2728		
Decker Lake Trail	6/11/15	7:59 a.m.	74.8	Northbound	1292	20	32	1344	76.2	-1.4
				Southbound	747	12	19	778		
				Total	2039	32	51	2122		
99	6/9/15	3:14 p.m.	56.9	Northbound	561	12	24	597	59.8	-2.9
				Southbound	900	20	29	949		
				Total	1461	32	53	1546		

Receiver	Noise Measurements			Traffic Adjusted for 1 Hour[1]					Modeled Level	Difference
	Date	Time	L_{eq} (dB)	Direction	Autos	Medium Trucks	Heavy Trucks	Total	L_{eq} (dB)	L_{eq} (dB)
113	6/9/15	3:35 p.m.	59.4	Northbound	724	8	12	744	62.1	-2.7
				Southbound	1224	14	16	1254		
				Total	1948	22	28	1998		
125	6/9/15	4:12 p.m.	58.7	Northbound	836	11	9	856	61.0	-2.3
				Southbound	1644	22	18	1684		
				Total	2480	33	27	2540		
151	6/9/15	5:00 p.m.	57.4	Northbound	712	5	4	721	60.2	-2.8
				Southbound	1372	9	7	1388		
				Total	2084	14	11	2109		
161	6/9/15	5:25 p.m.	60.1	Northbound	723	4	8	735	62.8	-2.7
				Southbound	1207	7	9	1223		
				Total	1930	11	17	1958		

Notes:
1. Traffic counts were conducted over 15-minute intervals and then multiplied by four to get the adjusted 1 hour traffic counts.

Appendix C Supplemental Data

This appendix includes noise measurement data collected in the field.

Summary				
Filename	9419_Dat.007			
Serial Number	3142			
Model	Model 831			
Firmware Version	2.301			
User				
Location				
Job Description				
Note				
Measurement Description				
Start	2015/06/10 6:00:19			
Stop	2015/06/10 6:15:19			
Duration	0:15:00.0			
Run Time	0:15:00.0			
Pause	0:00:00.0			
Pre Calibration	2015/06/05 14:39:24			
Post Calibration	None			
Calibration Deviation	---			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRM831			
Microphone Correction	Off			
Integration Method	Linear			
Gain	0.0	dB		
Overload	144.7	dB		
	A		**C**	**Z**
Under Range Peak	77.2		74.2	**79.2**
Under Range Limit	**26.5**		26.8	32.6
Noise Floor	17.3		17.7	23.1
Results				
LAeq	53.5	dB		
LAE	83.1	dB		
EA	22.547	µPa²h		
EA8	721.509	µPa²h		
EA40	3.608	mPa²h		
LZpeak (max)	2015/06/10 6:00:27		82.2	dB
LASmax	2015/06/10 6:07:16		61.0	dB
LASmin	2015/06/10 6:03:43		48.8	dB
SEA	-99.9	dB		

Summary			
Filename	9419_Dat.001		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/09 15:14:04		
Stop	2015/06/09 15:29:04		
Duration	0:15:00.0		
Run Time	0:00:00.8		
Pause	0:14:59.2		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	56.9 dB		
LAE	55.9 dB		
EA	0.044 µPa²h		
EA8	1.570 mPa²h		
EA40	7.849 mPa²h		
LZpeak (max)	2015/06/09 15:14:04	-99.9 dB	
LASmax	2015/06/09 15:14:04	61.0 dB	
LASmin	2015/06/09 15:14:04	59.2 dB	
SEA	-99.9 dB		

Summary			
Filename	9419_Dat.009		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/10 7:02:08		
Stop	2015/06/10 7:17:08		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	63.5 dB		
LAE	93.0 dB		
EA	221.784 µPa²h		
EA8	7.097 mPa²h		
EA40	35.485 mPa²h		
LZpeak (max)	2015/06/10 7:02:09	88.4 dB	
LASmax	2015/06/10 7:02:16	67.8 dB	
LASmin	2015/06/10 7:15:19	43.2 dB	
SEA	-99.9 dB		

Summary			
Filename	9419_Dat.010		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/10 7:26:36		
Stop	2015/06/10 7:41:36		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	54.5 dB		
LAE	84.0 dB		
EA	27.999 µPa²h		
EA8	895.957 µPa²h		
EA40	4.480 mPa²h		
LZpeak (max)	2015/06/10 7:26:37	89.7 dB	
LASmax	2015/06/10 7:39:29	63.5 dB	
LASmin	2015/06/10 7:26:47	44.4 dB	
SEA	-99.9 dB		

Summary	
Filename	9419_Dat.012
Serial Number	3142
Model	Model 831
Firmware Version	2.301
User	
Location	
Job Description	
Note	
Measurement Description	
Start	2015/06/10 7:58:07
Stop	2015/06/10 8:13:07
Duration	0:15:00.0
Run Time	0:15:00.0
Pause	0:00:00.0
Pre Calibration	2015/06/05 14:39:24
Post Calibration	None
Calibration Deviation	---
Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRM831
Microphone Correction	Off
Integration Method	Linear
Gain	0.0 dB
Overload	144.7 dB

	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1

Results		
LAeq	61.3 dB	
LAE	90.9 dB	
EA	135.197 µPa²h	
EA8	4.326 mPa²h	
EA40	21.632 mPa²h	
LZpeak (max)	2015/06/10 8:06:22	86.2 dB
LASmax	2015/06/10 8:09:05	65.9 dB
LASmin	2015/06/10 8:08:28	43.7 dB
SEA	-99.9 dB	

Summary			
Filename	9419_Dat.013		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/10 8:20:37		
Stop	2015/06/10 8:35:37		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	64.0 dB		
LAE	93.5 dB		
EA	248.909 µPa²h		
EA8	7.965 mPa²h		
EA40	39.825 mPa²h		
LZpeak (max)	2015/06/10 8:20:37	95.7 dB	
LASmax	2015/06/10 8:33:28	69.4 dB	
LASmin	2015/06/10 8:23:29	44.8 dB	
SEA	-99.9 dB		

Summary				
Filename	9419_Dat.015			
Serial Number	3142			
Model	Model 831			
Firmware Version	2.301			
User				
Location				
Job Description				
Note				
Measurement Description				
Start	2015/06/10 21:36:02			
Stop	2015/06/10 21:57:28			
Duration	0:15:04.5			
Run Time	0:15:02.5			
Pause	0:00:02.0			
Pre Calibration	2015/06/05 14:39:24			
Post Calibration	None			
Calibration Deviation	---			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRM831			
Microphone Correction	Off			
Integration Method	Linear			
Gain	0.0	dB		
Overload	144.7	dB		
	A		**C**	**Z**
Under Range Peak	77.2		74.2	**79.2**
Under Range Limit	**26.5**		26.8	32.6
Noise Floor	17.3		17.7	23.1
Results				
LAeq	73.0	dB		
LAE	102.6	dB		
EA	2.005	mPa²h		
EA8	63.967	mPa²h		
EA40	319.835	mPa²h		
LZpeak (max)	2015/06/10 21:36:02		119.4	dB
LASmax	2015/06/10 21:57:26		86.6	dB
LASmin	2015/06/10 21:46:26		72.6	dB
SEA	-99.9	dB		

Summary			
Filename	9419_Dat.002		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/09 15:35:56		
Stop	2015/06/09 15:50:56		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	59.4 dB		
LAE	88.9 dB		
EA	87.228 µPa²h		
EA8	2.791 mPa²h		
EA40	13.957 mPa²h		
LZpeak (max)	2015/06/09 15:39:36	83.7 dB	
LASmax	2015/06/09 15:35:56	63.7 dB	
LASmin	2015/06/09 15:43:42	56.3 dB	
SEA	-99.9 dB		

Summary			
Filename	9419_Dat.003		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/09 16:12:09		
Stop	2015/06/09 16:27:09		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	58.7 dB		
LAE	88.2 dB		
EA	73.756 µPa²h		
EA8	2.360 mPa²h		
EA40	11.801 mPa²h		
LZpeak (max)	2015/06/09 16:15:21	83.5 dB	
LASmax	2015/06/09 16:12:34	65.4 dB	
LASmin	2015/06/09 16:22:12	54.1 dB	
SEA	-99.9 dB		

Summary			
Filename	9419_Dat.005		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/09 16:59:52		
Stop	2015/06/09 17:14:52		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	57.4 dB		
LAE	86.9 dB		
EA	54.578 µPa²h		
EA8	1.747 mPa²h		
EA40	8.733 mPa²h		
LZpeak (max)	2015/06/09 17:09:34	83.8 dB	
LASmax	2015/06/09 17:09:35	64.1 dB	
LASmin	2015/06/09 17:03:35	52.9 dB	
SEA	-99.9 dB		

Summary			
Filename	9419_Dat.006		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/09 17:25:27		
Stop	2015/06/09 17:40:27		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	60.1 dB		
LAE	89.7 dB		
EA	102.852 µPa²h		
EA8	3.291 mPa²h		
EA40	16.456 mPa²h		
LZpeak (max)	2015/06/09 17:25:27	95.6 dB	
LASmax	2015/06/09 17:39:24	63.3 dB	
LASmin	2015/06/09 17:36:29	56.2 dB	
SEA	-99.9 dB		

Summary			
Filename	9419_Dat.016		
Serial Number	3142		
Model	Model 831		
Firmware Version	2.301		
User			
Location			
Job Description			
Note			
Measurement Description			
Start	2015/06/10 22:01:09		
Stop	2015/06/10 22:16:09		
Duration	0:15:00.0		
Run Time	0:15:00.0		
Pause	0:00:00.0		
Pre Calibration	2015/06/05 14:39:24		
Post Calibration	None		
Calibration Deviation	---		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	144.7 dB		
	A	**C**	**Z**
Under Range Peak	77.2	74.2	**79.2**
Under Range Limit	**26.5**	26.8	32.6
Noise Floor	17.3	17.7	23.1
Results			
LAeq	74.8 dB		
LAE	104.4 dB		
EA	3.026 mPa²h		
EA8	96.825 mPa²h		
EA40	484.125 mPa²h		
LZpeak (max)	2015/06/10 22:01:11	110.5 dB	
LASmax	2015/06/10 22:01:09	82.4 dB	
LASmin	2015/06/10 22:14:06	73.0 dB	
SEA	-99.9 dB		

- Wetland and Water Resource Clearance
  with Wetland and Waters of the U.S. Delineation

Memorandum

Region 2 Environmental

Date: September 10, 2015

To: Project File

From: Craig Bown – Region 2 Environmental Coordinator

Re: Environmental Review for Invasive Species, Wetland and Water Resources
Project Name: I-215; 4700 South to SR-201
Project No: F-I215(175)16 PIN: 9419

Project Scope of Work

UDOT is proposing to reconstruct the section of roadway, and associated ramps, along I-215 from approximate milepost (MP) 15 to 20 in Salt Lake County (see exhibit in appendix). The approximate project length is 5 miles. The proposed project will include: removal and replacement of the existing pavement surfaces with suitable pavement materials; minor widening for installation of auxiliary lanes; pavement soft spot repair; barrier upgrades; and bridge deck replacement with necessary repairs to the associated bridge and ramp structures. The project also includes: installation of ramp metering signals, traffic detection, Advanced Traffic Management System (ATMS) cameras and associated components; re-grading of shoulders; storm drain modifications; relocation or replacement of existing noise walls; utility relocations as necessary; and installation of roadway signage, delineators, and pavement markings. It is anticipated that minor Right-of-Way acquisition and Temporary Construction Easements (TCEs) will be required for this project.

The above referenced project has been reviewed, within the existing State Right-of-Way and proposed project APE, for the following categories of resources identified in the UDOT Categorical Exclusion Environmental Study. A summary of findings and recommendations follow:

Invasive Species – ePM Categorical Exclusion, Environmental Study (Section 9)

The proposed project involves earthwork and grading activities that increase the potential to introduce or spread invasive weed species identified on the noxious weed list for the State of Utah and/or county list. Therefore, UDOT Special Provision Section 02924S INVASIVE WEED CONTROL is to be included in the bid set for this project. Best Management Practices (BMPs) to minimize the potential spread of invasive weed species are to be implemented.

<u>ePM Categorical Exclusion Environmental Study (Section 9) – Invasive Species Question:</u>

☐ NO ☒ YES 1. Based upon location, this project has the potential to introduce or spread invasive species included on the noxious weed list of the State of Utah and the county noxious weed lists.

Mitigation Commitments:

1. **UDOT Special Provision Section 02924S INVASIVE WEED CONTROL will be included in the contract documents and outline BMPs that will be incorporated during the project (Contractor Responsible).**

Wetland and Water Resources – ePM Categorical Exclusion, Environmental Study (Section 11)

The project has been evaluated for wetlands and Waters of the US (WoUS) regulated by US Army Corps of Engineers (USACE) and the State of Utah. To determine the presence of wetlands and WoUS, a delineation was completed by Wetland Resources in July 2015 (see attached). Results of the delineation identified 2.07 acres of that wetlands, 0.839 acres of WoUS, two canals (North Jordan Canal and Brighton Canal Extension) and multiple unnamed drainage ditches.

Through coordination with the design engineer, the project cannot avoid impacts to wetland W10 and ditch D-6 as identified within the delineation. However, as confirmed with additional field investigations, hydrology to W10 is supplied by stormwater runoff, it is not close to other wetlands or WoUS, and has no connection to a WoUS. As such, wetland W10 is considered isolated and would not be regulated by the USACE. Additionally, further field investigations of ditch D-6 also indicate that any relatively permanent water is supplied by stormwater runoff and there is no direct connection to a WoUS. Therefore, ditch D-6 would not be regulated by the USACE. Any project impacts to W10 and D-6 would not require a permit for the USACE. All other identified wetlands and waters will be avoided by the project.

ePM Categorical Exclusion Environmental Study (Section 11) – Wetland and Water Resources Questions:

☒ NO ☐ YES 1. The project is a type that does not have the potential to affect or cross a waters of the United States.

☒ NO ☐ YES 2. Project affects waters of the United States (e.g. wetlands, mudflats, lakes, or perennial or ephemeral streams).

- ☒ NO ☐ YES a. Project impacts perennial, intermittent, or ephemeral streams that have a riparian vegetation component.
- ☒ NO ☐ YES b. Project exceeds the impact limitations for streams or washes identified in the PGP40.
- ☒ NO ☐ YES c. Project impacts an ephemeral wash not captured under PGP40 that has an ordinary high water mark (OHWM) with a connected flow to a downstream Traditional Navigable Water and the impact below the OHWM exceeds 1/10 of an acre per crossing.
- ☒ NO ☐ YES d. Project impacts a perennial or intermittent stream below the OHWM less than 1/10 of an acre per crossing.
- ☒ NO ☐ YES e. Project impacts navigable water of the United States (Lake Powell, Flaming Gorge Reservoir, Bear Lake, Green River – mouth to 20 miles above Green

River Station, Colorado River – mouth of Castle Creek to Cataract Canyon – 4.5 miles below mouth of Green River) below the OHWM.

☒ NO ☐ YES f. Project impacts jurisdictional wetlands.

☒ NO ☐ YES g. Project impacts non-jurisdictional wetlands.

ePM Categorical Exclusion Environmental Study (Section 11b) – Stormwater Runoff Question:

☐ NO ☒ YES 1. Project will disturb 1 acre or more of ground surface

ePM Categorical Exclusion Environmental Study (Section 11c) – Floodplain Question:

☒ NO ☐ YES 1. This project requires new construction or alteration of existing structures within the FEMA designated 100-year flood plain.

Mitigation Commitments:

1. **A Storm Water Pollution Prevention Plan (SWPPP) template will be started and provided to the contractor at the Preconstruction meeting. The Contractor must complete the remaining portions of the SWPPP and obtain the Resident Engineer's signature prior to submitting a Notice of Intent to the Division of Water Quality for the UPDES Permit (Contractor Responsible)**
2. **UPDES Permit from the Division of Water Quality must be obtained prior to construction (Contractor Responsible)**

Wetland and Waters of the U.S. Delineation

Interstate 215

SR-201 to 4700 South
Salt Lake County, Utah

July 2015

Wetland Resources

Wetland and Waters of the U.S. Delineation

Interstate 215

State Route 201 to 4700 South

Prepared for:

UDOT Region 2
2010 South 2760 West
Salt Lake City, Utah 84104
801.975.4907

Prepared by:

Wetland Resources
182 East 300 North
Logan, Utah 84321
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July 2015

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Appendix A: Maps

Appendix B: Photos

Appendix C: Wetland Data Sheets

Appendix D: Soil Information

Appendix E: Canal/Ditch Cross-Sections

A. INTRODUCTION

A Wetland and Waters of the U.S. delineation was conducted in April 2015 along approximately 4.8 miles of Interstate 215 (I-215) in West Valley City, Utah (Appendix A: Map 1). The delineation was prepared for Avenue Consultants who is providing environmental and engineering services for the Utah Department of Transportation on the project. The project corridor is located in a commercial and residential area and stretches from State Route 201 to 4700 South.

B. METHODOLOGY

Wetland Resources surveyed the project area for wetlands, ephemeral and perennial channels, and ditches on April 21 and June 29, 2015.

Wetlands

The wetland delineation was completed in accordance with the U.S. Army Corps of Engineers' 1987 Wetland Delineation Manual (USACOE 1987) and the Arid West Supplement (USACOE 2008). All potential wetland areas were checked for wetland indicators. The following procedure was implemented at each sample point:

1. The plant species within a six foot radius of the sample point were recorded. The percent of relative cover for each species was determined by estimating areal cover. The indicator status of each species was determined by using the National Wetland Plant List: Arid West (Lichvar 2009). If a plant species comprised at least 20 percent of the total relative cover in its stratum, it was considered to be a dominant plant species. If more than 50 percent of the dominant plant species had an indicator status of obligate (OBL), facultative wetland (FACW), or facultative (FAC), the sample point met the wetland vegetation parameter.

2. A 20 inch-deep soil pit was dug at each sample point to assess soil characteristics. Soil color, texture, and moisture at different depths within the soil profile were recorded. Color was determined by comparing a moistened soil sample with the Munsell Soil Color Charts. If the soil characteristics met the hydric soil criteria provided in the Arid West Supplement and the Field Indicators of Hydric Soils (NRCS 2006) manuals, the sample point met the wetland soils parameter.

3. Each soil pit was examined to determine correlation with the wetland hydrology criteria. Field indicators of periodic saturation and/or inundation include redox features, drainage patterns in the wetland, sulfur odor, gleyed soils, soils with low chroma, sediment deposits, salt crust, surface soil cracks, or water stained leaves. If at least one primary indicator or two secondary indicators were present, the sample point met the wetland hydrology parameter.

If a sample point met all three parameters, it was classified as occurring in a wetland. Wetland and Waters of the U.S. boundaries were surveyed by Wetland Resources using a sub-meter accuracy GPS unit.

Waters of the U.S.
The Waters of the U.S. survey was conducted in accordance with the Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Lichvar and McColley 2008), and the Updated Datasheet for the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States (Curtis and Lichvar 2010). The Waters of the U.S. were surveyed using a sub-meter GPS unit.

Irrigation Ditches and Canals
Irrigation ditches and canals were surveyed using a sub-meter GPS unit. Recent EPA and Corps guidance (EPA 2008) states that non-tidal ditches (including roadside and agricultural ditches) are not Waters of the U.S. unless they have a bed, bank, and ordinary high water mark; connect directly or through other tributaries to a traditional navigable or interstate water; and have at least one of the following four characteristics:

- natural streams that have been altered (e.g., channelized, straightened or relocated);
- ditches that have been excavated in waters of the U.S., including wetlands;
- ditches that have relatively permanent flowing or standing water; or
- ditches that connect two or more jurisdictional waters of the U.S.

C. Results and Discussion

Wetlands
The 299-acre project area contains a total of 2.07 acres of wetland. All of the wetlands within the project area are Palustrine Emergent wetlands. Table 1 provides the wetland acreages, and Table 2 lists all of the wetland plant species identified within the project corridor. Maps showing the project area and the surveyed wetland and Waters of the U.S. boundaries are provided in Appendix A. Photos of the project area are provided in Appendix B, and data sheets supporting the wetland boundaries are provided in Appendix C. Soil descriptions for all soils in the project area are provided in Appendix D. A description of each of the 10 wetland areas follows:

W1 - This Palustrine Emergent wetland occurs around the periphery of a man-made basin in a gore area and is dominated by common reed and saltgrass. The middle of the basin is deeper open water that does not support any emergent vegetation, and therefore does not meet the wetland criteria but still qualifies as a Waters of the U.S. The boundary of the open water area was surveyed and not included in the wetland acreage. The soils are a Lasil silt loam and had a chroma of 2 with extensive redox features, meeting the criteria for depleted matrix. The wetland soils were saturated in the upper profile and the hydrology appears to be provided by stormwater runoff from the adjacent highway interchange, and potentially a high water table. The basin has a culvert outlet that drains to an unknown final location, so these wetlands are likely jurisdictional. Map 4; Sample points 1 and 2; Photo 1; 0.477 acre.

W2 - This Palustrine Emergent wetland occurs in a low depression in a gore area and is dominated by western seepweed and saltgrass. The soils are a Lasil silt loam and had a chroma of 2 with redox features, meeting the criteria for depleted matrix. The wetland soils were saturated in the upper profile and the hydrology appears to be provided by stormwater runoff from the adjacent highway interchange ponding in the depression. The wetland has a culvert outlet that drains to an unknown final location, so these wetlands are likely jurisdictional. Map 4; Sample points 4 and 5; Photo 2; 0.144 acre.

W3 - This Palustrine Emergent wetland occurs within a man-made basin in a gore area and is dominated by common reed and cattails. The soils are a Lasil silt loam and had a chroma of 2 with extensive redox features, meeting the criteria for depleted matrix. The wetland soils were saturated in the upper profile and the hydrology appears to be provided by stormwater runoff from the adjacent highway interchange, and potentially a high water table. The basin has a culvert outlet that drains to an unknown final location, so these wetlands are likely jurisdictional. Map 4; Sample points 5 and 6; Photo 3; 0.508 acres.

W4 - This Palustrine Emergent wetland occurs in a depression dominated by saltgrass, with some western seepweed and five-hook bassia. There are areas within the wetland that support less than 5% cover of vegetation and therefore do not meet the wetland vegetation criteria. The boundaries of these unvegetated areas were surveyed and not included in the wetland acreage. The soils are identified as Loamy Borrow Pits and had a chroma of 2 with extensive redox features, meeting the criteria for depleted matrix. The wetland soils were saturated in the upper profile at the time of the delineation indicating wetland hydrology. Hydrology appears to be provided by stormwater runoff ponding in the depression, and possibly a high water table. The depression has a culvert outlet that drains to an unknown final location, so these wetlands are likely jurisdictional. Map 4; Sample points 7 and 8; Photo 4; 0.188 acres.

W5 - This Palustrine Emergent wetland occurs in a depression dominated by saltgrass. There are areas within the wetland that support less than 5% cover of vegetation and therefore do not meet the wetland vegetation criteria. The boundaries of these unvegetated areas were surveyed and not included in the wetland acreage. The soils are identified as Loamy Borrow Pits and had a matrix color of 10YR6/2, meeting the criteria for depleted matrix. The wetland soils were only moist at the time of the delineation, but the wetland exhibits a brittle salt crust, indicating wetland hydrology. Hydrology appears to be provided by stormwater runoff ponding in the depression, and possibly a high water table. The depression has a culvert outlet that drains to an unknown final location, so these wetlands are likely jurisdictional. Map 4; Sample points 9 and 10; Photo 5; 0.364 acres.

W6 - This Palustrine Emergent wetland occurs in a depression dominated by saltgrass. There are areas within the wetland that support less than 5% cover of vegetation and therefore do not meet the wetland vegetation criteria. The boundaries of these unvegetated areas were surveyed and not included in the wetland acreage. The soils are a Lewiston loam and had a chroma of 2 with redox features, meeting the criteria for depleted matrix. The wetland soils were saturated in the upper profile at the time of the delineation indicating wetland hydrology. Hydrology appears to be provided by stormwater runoff from the highway and adjacent development. The depression has a culvert outlet that drains to an unknown final location, so these wetlands are likely jurisdictional. Map 4; Sample points 11 and 12; Photo 6; 0.274 acre.

W7 - This Palustrine Emergent wetland occurs in a depression dominated exclusively by common reed. The soils are a Deckerman fine sandy loam and had a chroma of 2 with extensive redox features, meeting the criteria for depleted matrix. The soils also emitted a hydrogen sulfide odor when excavating, indicating hydric soils and wetland hydrology. Hydrology appears to be provided by stormwater runoff from the highway and adjacent development. The wetland soils were saturated at the surface at the time of the delineation. The wetland occurs in the vicinity of a canal, but there is no surface connection between the wetland and the canal or any other Waters

of the U.S., therefore this wetland could potentially be isolated and non-jurisdictional. Map 5; Sample points 21 and 22; Photo 7; 0.066 acre.

W8 - This Palustrine Emergent wetland occurs in a depression dominated by common reed, Baltic rush, whitetop, and Canada thistle. The soils are a Bramwell silty clay loam and had a chroma of 2 with redox features, meeting the criteria for depleted matrix. The wetland soils were saturated in the upper profile at the time of the delineation and exhibited oxidized rhizospheres, indicating wetland hydrology. Hydrology appears to be provided by stormwater runoff from the highway and adjacent development. The wetland occurs in the vicinity of a canal, but there is no surface connection between the wetland and the canal or any other Waters of the U.S., therefore this wetland could potentially be isolated and non-jurisdictional. Map 5; Sample points 19 and 20; Photo 8; 0.018 acre.

W9 - This Palustrine Emergent wetland occurs in a depression dominated by cattails and three-square bulrush. The soils are a Saltair silty clay loam and had a chroma of 2 with extensive redox features, meeting the criteria for depleted matrix. The wetland soils were saturated in the upper profile at the time of the delineation, indicating wetland hydrology. Hydrology appears to be provided by stormwater runoff from the highway and adjacent development. There are no other wetlands or any other Waters of the U.S. in the vicinity and no culvert draining this closed depression, therefore this wetland is likely isolated and non-jurisdictional. Map 7; Sample points 16 and 17; Photo 9; 0.015 acre.

W10 - This Palustrine Emergent wetland occurs in a depression dominated by cattails, spikerush, foxtail barley, Nuttall alkaligrass, and common reed. The soils are a Deckerman fine sandy loam and had a chroma of 2 with redox features, meeting the criteria for depleted matrix. The wetland soils were inundated 2 inches at the time of the delineation, indicating wetland hydrology. Hydrology appears to be provided by stormwater runoff from the highway and adjacent development. There are no other wetlands or any other Waters of the U.S. in the vicinity and no culvert draining this closed depression, therefore this wetland is likely isolated and non-jurisdictional. Map 7; Sample points 14 and 15; Photo 10; 0.020 acre.

The uplands in the project area are dominated by cheatgrass, smooth brome, tall wheatgrass, alkali sacaton, bulbous bluegrass, crested wheatgrass, clasping pepperweed, rubber rabbitbrush, and greasewood. There were also a couple of small patches of common reed that were sampled but did not meet the hydric soil or wetland hydrology criteria (Sample points 13 and 18). The soils in the upland areas were dry and did not exhibit any indicators of hydric soil. A complete list of upland species identified in the project area can be found in Table 3.

Table 1. Wetland Acreages

Wetland Number	Palustrine Emergent Wetland (acres)
W-1	0.477
W-2	0.144
W-3	0.508
W-4	0.188
W-5	0.364
W-6	0.274
W-7	0.066
W-8	0.018
W-9	0.015
W-10	0.020
Total	**2.074**

Table 2. Wetland plant species identified in the project area.

Botanical Name	Common Name	Indicator Status
Acer negundo	Box Elder	FACW
Allenrolfea occidentalis	iodine bush	FACW
Asclepias speciosa	showy milkweed	FACW
Bassia hyssopifolia	fivehook bassia	FACW
Dipsacus sylvestris	Teasel	FAC
Distichlis spicata	saltgrass	FAC
Elaeagnus angustifolia	Russian olive	FAC
Eleocharis palustris	spikerush	OBL
Hordeum jubatum	foxtail barley	FAC
Hordeum murinum	seaside barley	FAC
Iva axillaris	povertyweed	FACW
Juncus balticus	Baltic rush	FACW
Phalaris arundinacea	reed canary grass	OBL
Phragmites australis	common reed	FACW
Plantago major	common plantain	FAC

Puccinellia nuttalliana	Nuttall alkaligrass	OBL
Sporobolus airoides	alkali sacaton	FAC
Suaeda occidentalis	western seepweed	FACW
Triglochin maritima	shore arrowgrass	OBL
Typha latifolia	common cattail	OBL

Table 3. Upland plant species identified in the project area.

Botanical Name	Common Name	Indicator Status
Agropyron cristatum	crested wheatgrass	UPL
Agropyron dasystachyum	slender wheatgrass	UPL
Agropyron elongatum	tall wheatgrass	UPL
Bromus inermis	smooth brome	UPL
Bromus japonicus	Japanese brome	UPL
Bromus tectorum	Cheatgrass	UPL
Cardaria draba	Whitetop	UPL
Chrysothamnus nauseosus	rubber rabbitbrush	UPL
Cirsium arvense	Canada thistle	FACU
Convolvulus arvensis	field bindweed	UPL
Dactylis glomerata	orchard grass	FACU
Descurainia sophia	flixweed tansy mustard	UPL
Festuca pratensis	meadow fescue	FACU
Grindelia squarrosa	curly cup gumweed	FACU
Lactuca serriola	prickly lettuce	FACU
Lepidium perfoliatum	clasping pepperweed	FACU
Malva neglecta	roundleaf mallow	UPL
Poa bulbosa	bulbous bluegrass	UPL
Poa pratensis	Kentucky bluegrass	FAC
Sarcobatus vermiculatus	greasewood	FAC
Taraxacum officinale	Dandelion	FACU

Waters of the U.S.
The project area contains several unvegetated areas within wetlands. These areas support less than 5% vegetative cover and, therefore, do not meet the wetland vegetation criteria. In all cases within the project area, these unvegetated areas occur in the lower areas of the wetland and are surrounded by at least a fringe of wetland. For this reason it is assumed that these unvegetated areas are Waters of the U.S. where they occur within wetlands that are determined to be jurisdictional. In addition to the unvegetated areas, there is a large area of open water associated with wetland W1. This unvegetated open water area also does not meet the wetland vegetation criteria, but is still considered a Waters of the U.S. Table 4 provides the acreages of the unvegetated Waters of the U.S.

Table 4. Water of the U.S. Acreages.

Wetland Number	Unvegetated Area (acres)
W-1a	0.414
W-4a	0.089
W-5a	0.295
W-5b	0.024
W-6a	0.017
Total	**0.839**

Irrigation Ditches and Canals
The project area contains seven irrigation/drainage ditches. Table 5 provides the dimensions of the ditches/canals within the project area, and cross-section drawings of each ditch/canal are provided in Appendix E. A description of each ditch/canal follows:

D-1 – Unnamed drainage ditch. This 15 foot wide unlined drainage ditch flows north into a culvert under State Road 201. The ditch supports reed canary grass along both banks. It has been piped at both ends within the project area. Map 4; Photo 11.

D-2 – Unnamed drainage ditch. This 15 foot wide unlined drainage ditch flows north into a culvert under State Road 201. The ditch supports reed canary grass along both banks. It has been piped at both ends within the project area. Map 4; Photo 12.

D-3 – Unnamed drainage ditch. This 15 foot wide unlined drainage ditch flows west under I-215. The ditch supports reed canary grass and Russian olive along both banks. Map 5; Photo 13.

D-4 – Brighton Canal Extension. This 20 foot wide irrigation canal flows west under I-215. The canal supports reed canary grass and common reed along its edge. Map 5; Photo 14.

D-5 – Unnamed drainage ditch. This 10 foot wide unlined drainage ditch flows west under I-215. The ditch supports reed canary grass and Russian olive along both banks. Map 5; Photo 15.

D-6 - Unnamed drainage ditch. This 8 foot wide drainage ditch runs parallel to I-215 on the east side. The ditch supports common reed along its length. Map 6; Photo 16.

D-7 – North Jordan Canal. This 23 foot wide irrigation canal flows west under I-215. The ditch supports reed canary grass along both banks. Map 8; Photo 17.

Based on the Corps of Engineers criteria for determining jurisdiction on ditches (see Methodology section), it would appear that all of the ditches within the project area are potentially jurisdictional because they support wetland vegetation, which can be an indicator of relatively permanent water.

Table 5. Dimensions of Ditches in the Project Area.

Ditch/Canal Label	Width (ft)	Length (l.f.)	Area (acres)
D-1	15	59	0.020
D-2	15	60	0.051
D-3	15	102	0.037
D-4	20	302	0.138
D-5	10	173	0.042
D-6	8	1306	0.240
D-7	23	108	0.057
Total		**2,110**	**0.585**

REFERENCES

Cowardin, Lewis M., Carter, Virginia, Golet, Francis C., and LaRoe, Edward T. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service, Washington, D.C.

Curtis, Katherine E., and Lichvar, Robert W. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TN-10-1. U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

Environmental Protection Agency. 2008. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States and Carabell v. United States. Memo issued December 2, 2008.

Lichvar, Robert W., and McColley, Shawn M. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TR-08-12. U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

Lichvar, Robert W., and Kartesz, John T. 2009. North American Digital Flora: National Wetland Plant List, Version 2.4.0 (https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC.

Munsell Color Services. 2000. Munsell Soil Color Charts. Gretag Macbeth, New York.

National Agriculture Imagery Program (NAIP). 2011. Farm Service Agency, United States Department of Agriculture.

Natural Resources Conservation Service (NRCS). 2006. Field Indicators of Hydric Soils in the United States. Version 6.0.

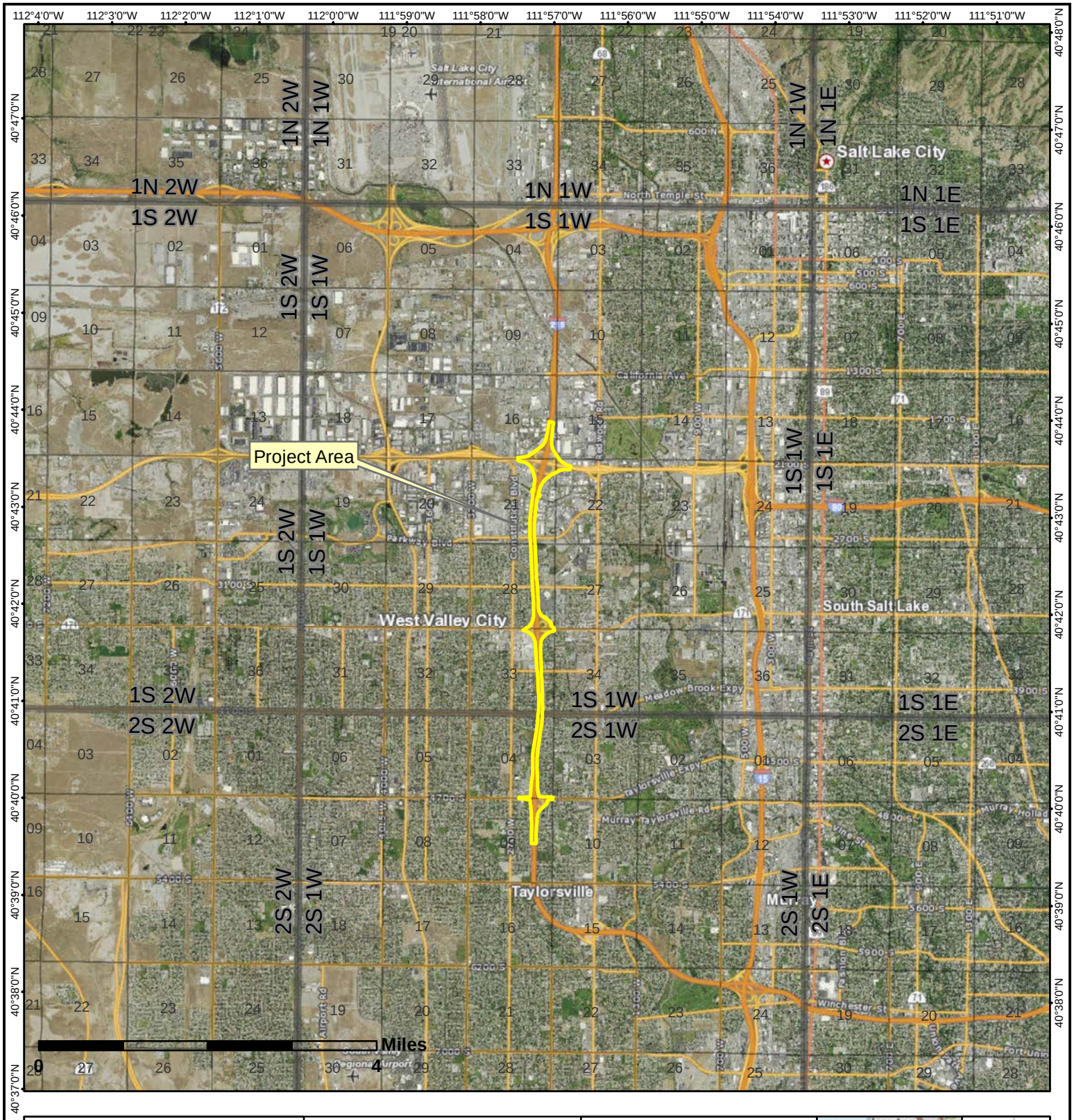
Natural Resources Conservation Service (NRCS). 2007. Web Soil Survey. Website: http://websoilsurvey.nrcs.usda.gov/app/ No data is available for this area.

U.S. Army Corps of Engineers - Engineering Laboratory (USAOE). 1987. Corps of Engineers Wetlands Delineation Manual (Online Edition). Technical Report Y-87-1. U.S. Army Engineers Waterways Experiment Station. Vicksburg, Mississippi.

U.S. Army Corps of Engineers – Environmental Laboratory (USAOE). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Version 2.0. Report ERDC/EL TR-08-28. Vicksburg, Mississippi.

Natural Resources Conservation Service (USDA). 2008. The PLANTS Database, National Plant Data Center, Baton Rouge, LA 70874-4490 USA PLANTS. http://plants.usda.gov/wetland.htm

APPENDIX A: MAPS



Project Location

I-215
SR-201 to 4700 South

Sections 15, 16, 21, 22, 27, 28, 33, 34 in T1S, R1W
Sections 3, 4 in T2S, R1W

Legend

Project Area

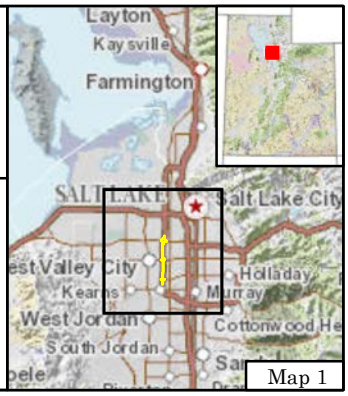
Projection:
NAD 83 UTM Zone 12N

Source:
Utah AGRC Hybrid-Basemap

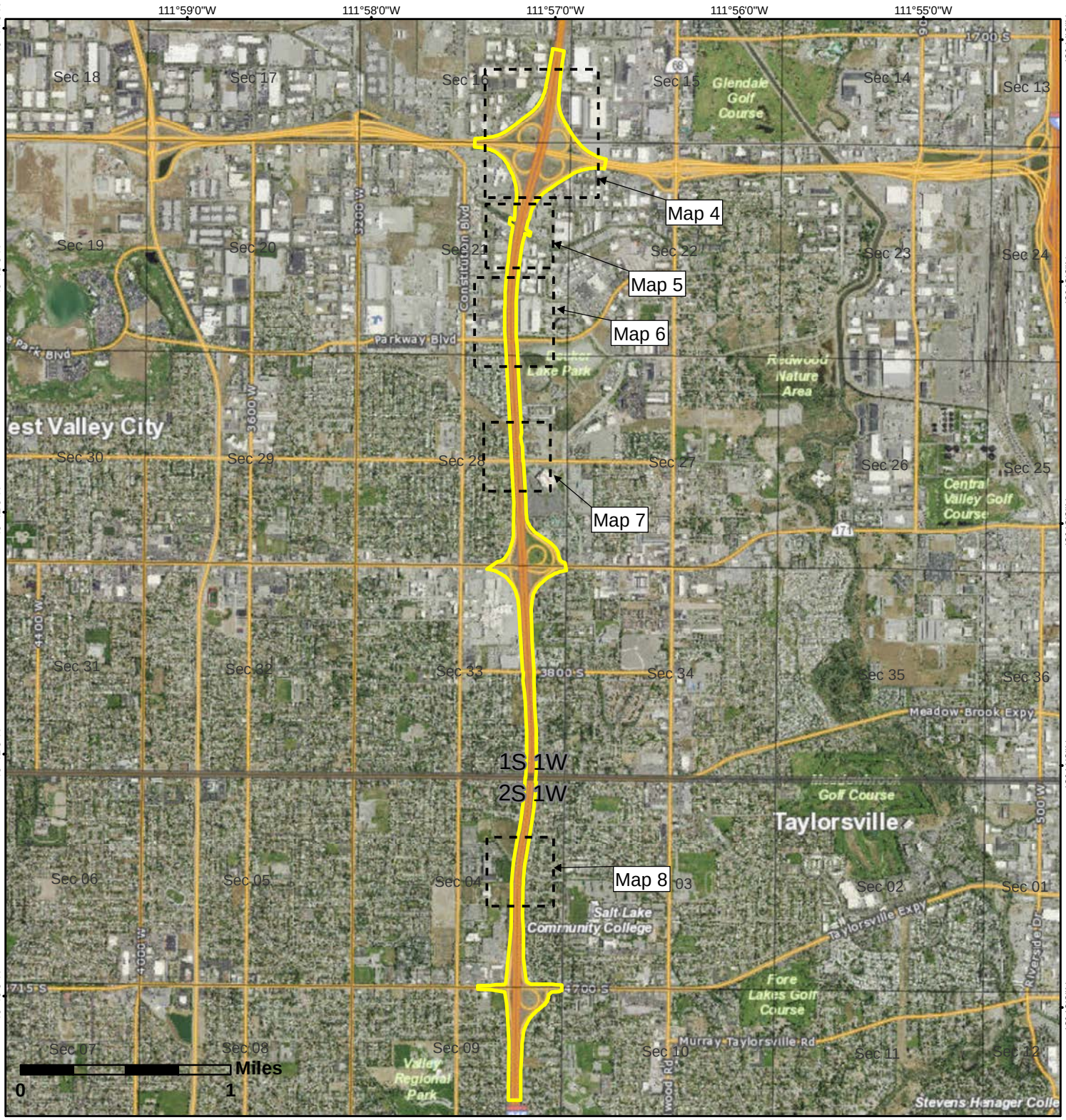
Survey Performed by
Todd Sherman

Wetland Resources, Inc.

Created: 7/2/2015
Author: Cody Mittanck



Map 1



Aerial Overview

I-215
SR-201 to 4700 South

Sections 15, 16, 21, 22, 27, 28, 33, 34 in T1S, R1W
Sections 3, 4 in T2S, R1W

Legend

Project Area

Projection:
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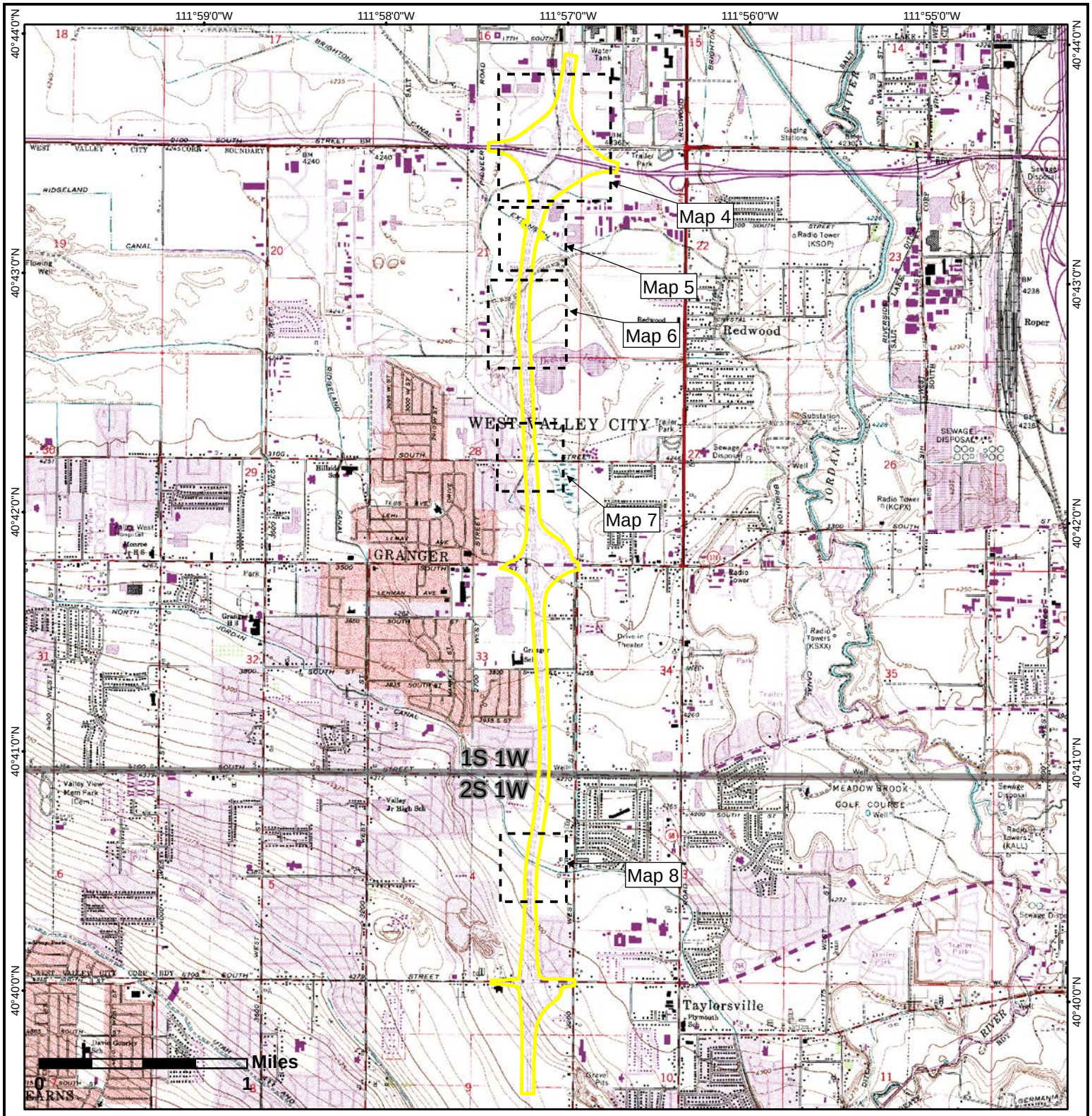

Topographic Overview

I-215
SR-201 to 4700 South

Sections 15, 16, 21, 22, 27, 28, 33, 34 in T1S, R1W
Sections 3, 4 in T2S, R1W

Legend

Project Area

Projection:
NAD 83 UTM Zone 12N

Source:
Utah AGRC Hybrid-Basemap

Survey Performed by
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Wetland Resources, Inc.

Created: 7/2/2015
Author: Cody Mittanck

Map 3

Delineation Detail
I-215
SR-201 to 4700 South

Project Dimensions:
Note: dimensions include entire project area

Project Area:
= 299.40 ac
Ditches/Canals
= 0.585 ac; 2,110 l.f.
Open Water
= 0.414 ac
Wetlands
= 2.074 ac
Unvegetated Areas
= 0.425 ac

Legend
- Project Area
- Ditches/Canals with OHWM
- Open Water with OHWM
- Sample Point (SP)
- Palustrine Emergent Wetlands (PEM)
- Unvegetated Areas
- Soils
- Contours (1m height interval)

Projection:
NAD 83 UTM Zone 12N

Source:
Utah AGRC Hybrid-Basemap

Survey Performed by
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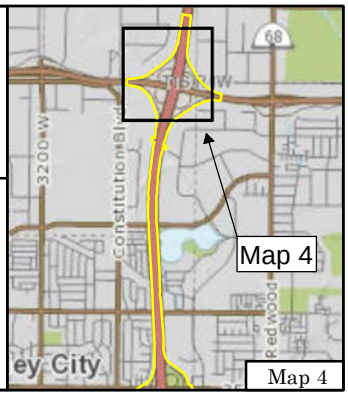

Map 4

Delineation Detail
I-215
SR-201 to 4700 South

Project Dimensions:
Note: dimensions include entire project area

Project Area:
= 299.40 ac
Ditches/Canals
= 0.585 ac; 2,110 l.f.
Open Water
= 0.414 ac
Wetlands
= 2.074 ac
Unvegetated Areas
= 0.425 ac

Legend
- Project Area
- Ditches/Canals with OHWM
- Open Water with OHWM
- Sample Point (SP)
- Palustrine Emergent Wetlands (PEM)
- Unvegetated Areas
- Soils
- Contours (1m height interval)

Projection:
NAD 83 UTM Zone 12N

Source:
Utah AGRC Hybrid-Basemap

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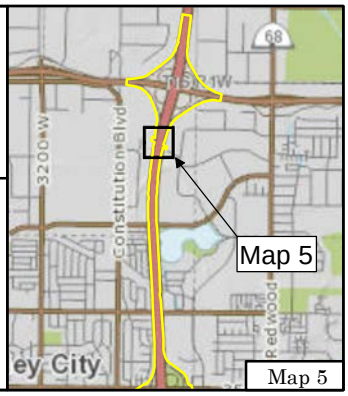
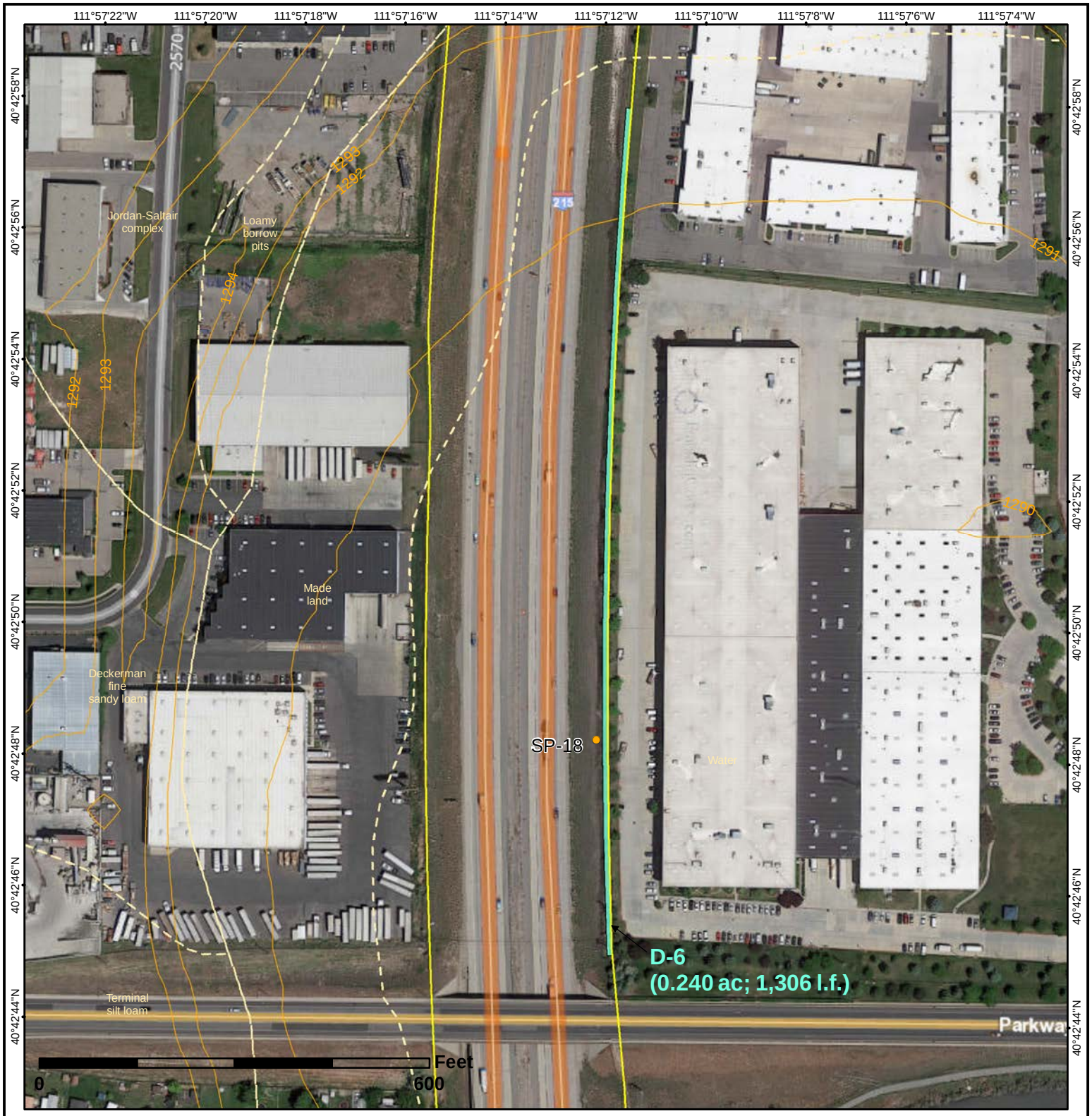


Map 5



Delineation Detail
I-215
SR-201 to 4700 South

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Note: dimensions include entire project area

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= 0.585 ac; 2,110 l.f.
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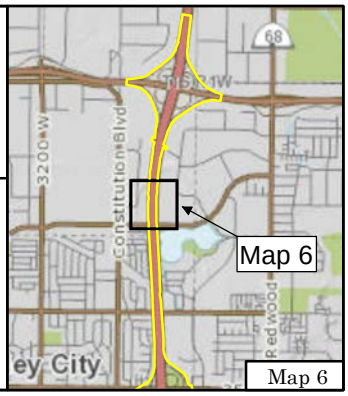

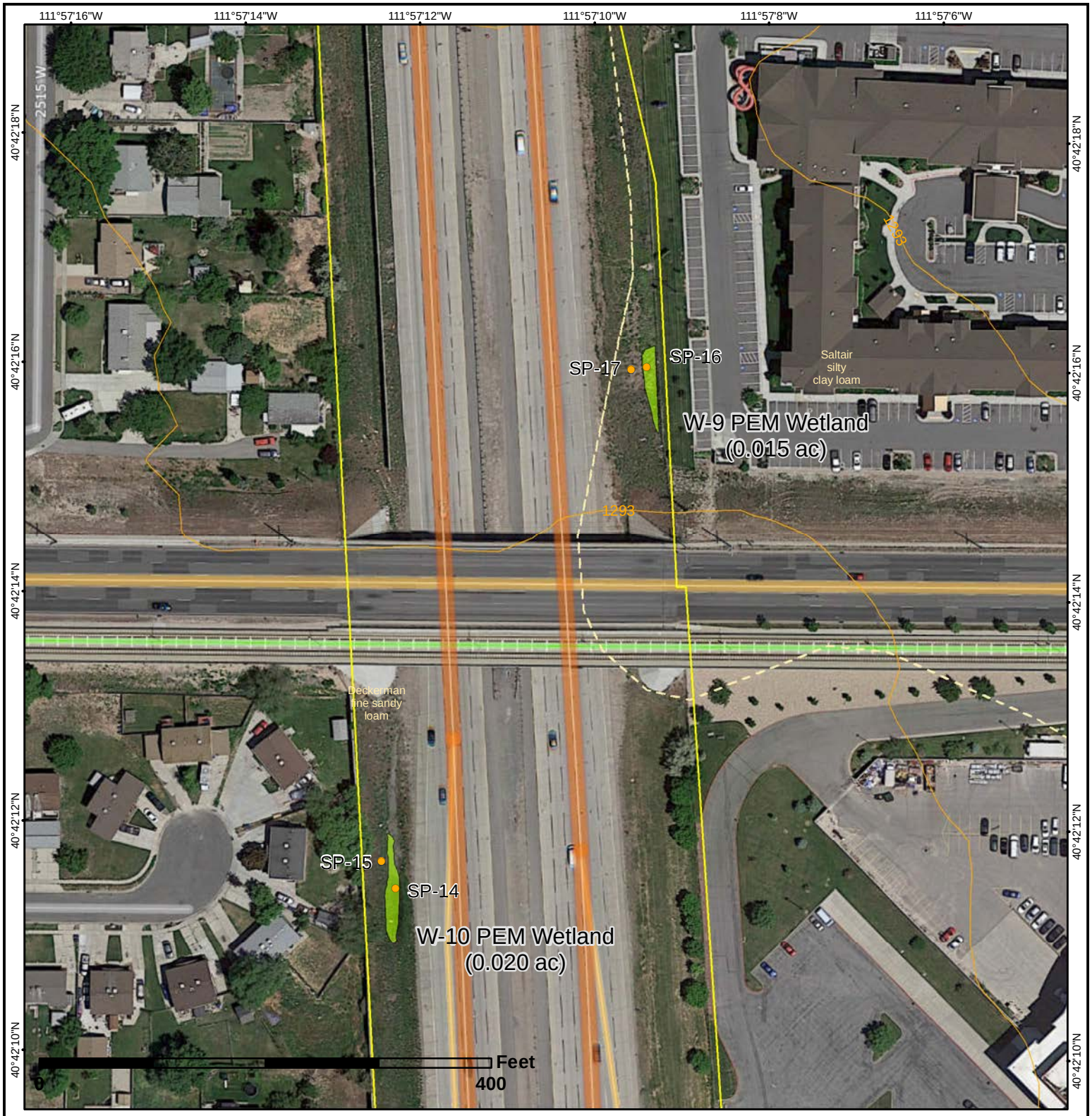

Delineation Detail
I-215
SR-201 to 4700 South

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Note: dimensions include entire project area

Project Area:
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Legend
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Projection:
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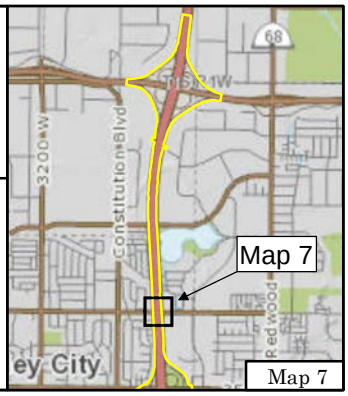

Delineation Detail
I-215
SR-201 to 4700 South

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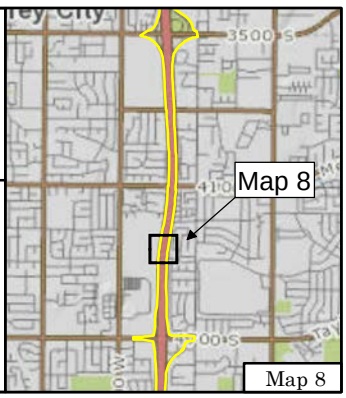


APPENDIX B: PHOTOS

Photo 1. Wetland W-1 vegetated and unvegetated areas.

Photo 2. Wetland W-1 unvegetated area with island of vegetation in background.

Photo 3. Wetland W-2 with junkyard in the background.

Photo 4. Wetland W3.

Photo 5. Wetland W-4 vegetated and unvegetated areas.

Photo 6. Wetland W-5.

Photo 7. Unvegetated area of W-5.

Photo 8. Wetland W-6 adjacent to SR-201 construction project.

Photo 9. Wetland W-7.

Photo 10. Wetland W-8 vegetated and unvegetated areas.

Photo 11. Drainage ditch D-1.

Photo 12. Drainage ditch D-2.

Photo 13. Drainage ditch D-3.

Photo 14. Brighton Canal Extension (D-4).

Photo 15. Drainage ditch D-5.

Photo 16. Drainage ditch D-6.

Photo 17. North Jordan Canal. D-7.

APPENDIX C: WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 01

Investigator(s): Todd Sherman **Section, Township, Range:** S 16 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 10.0 % / 5.7 °

Subregion (LRR): LRR D **Lat.:** 419524 E **Long.:** 4508819 N **Datum:** NAD83

Soil Map Unit Name: Lasil silt loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉ No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Hydric Soil Present?	Yes ◉ No ○	
Wetland Hydrology Present?	Yes ◉ No ○	

Remarks: Wetland fringe around a man-made pond.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1. Tamarix chinensis	10	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	10		= Total Cover	
Herb Stratum (Plot size:)				
1. Distichlis spicata	75	☑	93.8%	FAC
2. Phragmites australis	5	☐	6.3%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	80		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 20 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	85	x 3 =	255
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		265 (B)

Prevalence Index = B/A = 2.944

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Area is dominated by alkaline-tolerant facultative species.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 01

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	4/2	85%	5YR	4/6	15%	C	M	Clay Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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):	12
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches):	5

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Soils are saturated in the upper profile.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 02

Investigator(s): Todd Sherman **Section, Township, Range:** S 16 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** flat **Slope:** 1.0 % / 0.6 °

Subregion (LRR): LRR D **Lat.:** 419532 E **Long.:** 4508821 N **Datum:** NAD83

Soil Map Unit Name: Lasil silt loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○ No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Upland adjacent to SP-1.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	
Herb Stratum (Plot size:)				
1. Agropyron elongatum	60	☑	66.7%	UPL
2. Distichlis spicata	20	☑	22.2%	FAC
3. Agropyron cristatum	5	☐	5.6%	UPL
4. Bassia hyssopifolia	5	☐	5.6%	FAC
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	90		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 10 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	65	x 5 =	325
Column Totals:	90 (A)		400 (B)

Prevalence Index = B/A = 4.444

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 02

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
0-7	2.5Y	4/3	100%						Loam	
7-20	2.5Y	5/4	100%						Clay Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 03

Investigator(s): Todd Sherman **Section, Township, Range:** S 16 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 3.0 % / 1.7 °

Subregion (LRR): LRR D **Lat.:** 419861 E **Long.:** 4508743 N **Datum:** NAD83

Soil Map Unit Name: Lasil silt loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉ No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Small depression near culvert inlet that supports saltgrass, but does not meet the soil or hydrology criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	
Herb Stratum (Plot size:)				
1. Distichlis spicata	50	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	50		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 50 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	50 (A)		150 (B)

Prevalence Index = B/A = 3.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

The area supports only saltgrass, which occurs in uplands approximately 50% of the time (FAC).

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 03

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	4/3	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology. There is a very small area of non-brittle salt crust where water temporarily ponds near the culvert inlet, but it is a small area and non-brittle salt crust is not a hydrology indicator.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 04

Investigator(s): Todd Sherman **Section, Township, Range:** S 16 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419909 E **Long.:** 4508730 N **Datum:** NAD83

Soil Map Unit Name: Lasil silt loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Wetland in a gore area.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Suaeda occidentalis	20	☑	66.7%	FACW
2. Distichlis spicata	10	☑	33.3%	FAC
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	30		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 70 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		70 (B)

Prevalence Index = B/A = 2.333

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Area is dominated by alkaline-tolerant species.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 04

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	4/2	98	5YR	4/6	20%	C	M	Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☑ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

Abundant brittle salt crust and surface soil cracks.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 05

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** convex **Slope:** 4.0 % / 2.3 °

Subregion (LRR): LRR D **Lat.:** 419900 E **Long.:** 4508719 N **Datum:** NAD83

Soil Map Unit Name: Lasil silt loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○ No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Upland area between W2 and W3. Supports saltgrass, but does not meet the vegetation, soils, or hydrology criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Distichlis spicata	50	☑	66.7%	FAC
2. Lepidium perfoliatum	20	☑	26.7%	FACU
3. Bassia hyssopifolia	5	☐	6.7%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	75		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 25 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	55	x 3 =	165
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	75 (A)		245 (B)

Prevalence Index = B/A = 3.267

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 05

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
0-20	2.5Y	4/4	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 06

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419897 E **Long.:** 4508714 N **Datum:** WGS84

Soil Map Unit Name: Lasil silt loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉ No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Hydric Soil Present?	Yes ◉ No ○	
Wetland Hydrology Present?	Yes ◉ No ○	

Remarks: Wetland pond in a gore area.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	
Herb Stratum (Plot size:)				
1. Typha latifolia	40	☑	50.0%	OBL
2. Phragmites australis	40	☑	50.0%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	80		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 20 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	40	x 1 =	40
FACW species	40	x 2 =	80
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		120 (B)

Prevalence Index = B/A = 1.500

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Emergent marsh vegetation with 20% open water.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 06

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR	4/2	90%	5YR	4/6	10%	C	M	Clay Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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): 6

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, monitor well, aerial photos, previous inspections), if available:

Remarks:

The wetland is inundated.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 07

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419401 E **Long.:** 4508690 N **Datum:** NAD83

Soil Map Unit Name: Loamy borrow pits **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Wetland in a gore area.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Distichlis spicata	30	☑	75.0%	FAC
2. Bassia hyssopifolia	5	☐	12.5%	FAC
3. Suaeda occidentalis	5	☐	12.5%	FACW
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	40		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	40 (A)		115 (B)

Prevalence Index = B/A = 2.875

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Area is dominated by alkaline-tolerant facultative species.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 07

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 %	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y	4/3	100%						Clay Loam	
8-20	2.5Y	5/2	90%	5YR	4/6	10%	C	M	Clay Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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): 12

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Soils are saturated in the upper profile.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 08

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419403 E **Long.:** 4508682 N **Datum:** NAD83

Soil Map Unit Name: Loamy borrow pits **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉ No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Upland area adjacent to SP-7. Supports saltgrass, but does not meet the soils or hydrology criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Distichlis spicata	80	☑	80.0%	FAC
2. Agropyron elongatum	10	☐	10.0%	UPL
3. Bassia hyssopifolia	10	☐	10.0%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	100 (A)		320 (B)

Prevalence Index = B/A = 3.200

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

The area is dominated by saltgrass, which occurs in uplands approximately 50% of the time (FAC).

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 08

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	4/3	100%						Sandy Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 09

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 1.0 % / 0.6 °

Subregion (LRR): LRR D **Lat.:** 419503 E **Long.:** 4508676 N **Datum:** NAD83

Soil Map Unit Name: Loamy borrow pits **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Wetland in a gore area.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Distichlis spicata	35	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	35		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 65 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	35 (A)		105 (B)

Prevalence Index = B/A = 3.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

The area supports only saltgrass.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 09

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 %	Type[1]	Loc[2]	Texture	Remarks
0-9	2.5Y	4/2	100%						Loam	
9-20	2.5Y	6/2	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

The area exhibits a brittle salt crust on the soil surface.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 10

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** convex **Slope:** 10.0 % / 5.7 °

Subregion (LRR): LRR D **Lat.:** 419501 E **Long.:** 4508676 N **Datum:** NAD83

Soil Map Unit Name: Loamy borrow pits **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○ No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Upland adjacent to SP-9.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	
Herb Stratum (Plot size:)				
1. Agropyron elongatum	40	☑	53.3%	UPL
2. Poa bulbosa	20	☑	26.7%	UPL
3. Cardaria draba	10	☐	13.3%	UPL
4. Bromus tectorum	5	☐	6.7%	UPL
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	75		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 25 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	75	x 5 =	375
Column Totals:	75 (A)		375 (B)

Prevalence Index = B/A = 5.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 10

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	3/2	100%						Sandy Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 11

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 1.0 % / 0.6 °

Subregion (LRR): LRR D **Lat.:** 419749 E **Long.:** 4508560 N **Datum:** NAD83

Soil Map Unit Name: Lewiston loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Wetland in a gore area.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Distichlis spicata	90	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	90		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 10 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		270 (B)

Prevalence Index = B/A = 3.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

The area supports only saltgrass.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 11

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 %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR	4/2	100%						Loam	
10-20	10YR	6/2	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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): 10
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 4

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Soils are saturated in the upper profile.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 12

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419746 E **Long.:** 4508548 N **Datum:** NAD83

Soil Map Unit Name: Jordan-Saltair complex **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉ No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Upland area on 2 to 3 feet above the elevation of W6. The upland meets the vegetation criteria, but not the soils or hydrology criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)				
1. Allenrolfea occidentalis	25	☑	100.0%	FACW
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	25		**= Total Cover**	
Herb Stratum (Plot size:)				
1. Distichlis spicata	5	☑	100.0%	FAC
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	5		**= Total Cover**	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		**= Total Cover**	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	30 (A)		65 (B)

Prevalence Index = B/A = 2.167

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Area is dominated by iodine bush.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 12

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 %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR	4/3	100%						Loam	
6-20	10YR	4/4	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology. There is non-brittle salt crust on the soil surface, but non-brittle salt crust is not a hydrology indicator.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 13

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** _____ **Slope:** 2.0 % / 1.1 °

Subregion (LRR): LRR D **Lat.:** 419459 E **Long.:** 4508115 N **Datum:** NAD83

Soil Map Unit Name: Bramwell silty clay loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○ No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Phragmites patch adjacent to a ditch. Area does not meet the vegetation, soils, or hydrology criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Phragmites australis	70	☑ 70.0%	FACW
2. Cardaria draba	30	☑ 30.0%	UPL
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	100	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	30	x 5 =	150
Column Totals:	100 (A)		290 (B)

Prevalence Index = B/A = 2.900

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 13

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 %	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR	3/2	100%						Loam	
15-20	10YR	4/3	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 14

Investigator(s): Todd Sherman **Section, Township, Range:** S 28 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419463 E **Long.:** 4508244 N **Datum:** NAD83

Soil Map Unit Name: Deckerman fine sandy loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Isolated wetland in a low spot of the roadside drainage swale.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1. Typha latifolia	25	☑	33.3%	OBL
2. Eleocharis palustris	25	☑	33.3%	OBL
3. Hordeum jubatum	10	☐	13.3%	FAC
4. Puccinellia nuttalliana	10	☐	13.3%	FACW
5. Phragmites australis	5	☐	6.7%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	75		= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 25 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	50	x 1 =	50
FACW species	15	x 2 =	30
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	75 (A)		110 (B)

Prevalence Index = B/A = 1.467

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

The area is dominated by 100% wetland species.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 14

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR	4/2	98%	5YR	4/6	2%	C	M	Clay Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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):	2
Water Table Present?	Yes ◉	No ○	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches):	0

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

The wetland is inundated.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 15

Investigator(s): Todd Sherman **Section, Township, Range:** S 28 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** convex **Slope:** 3.0 % / 1.7 °

Subregion (LRR): LRR D **Lat.:** 419459 E **Long.:** 4506252 N **Datum:** NAD83

Soil Map Unit Name: Deckerman fine sandy loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉
Hydric Soil Present?	Yes ○	No ◉
Wetland Hydrology Present?	Yes ○	No ◉

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks: Upland adjacent to SP-14.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size:)			
1. Agropyron elongatum	60	☑ 60.0%	UPL
2. Elymus repens	20	☑ 20.0%	FAC
3. Cardaria draba	20	☑ 20.0%	UPL
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	100 (A)		460 (B)

Prevalence Index = B/A = 4.600

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 15

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
0-20	10YR	5/3	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 16

Investigator(s): Todd Sherman **Section, Township, Range:** S 28 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419530 E **Long.:** 4506385 N **Datum:** NAD83

Soil Map Unit Name: Saltair silty clay loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Isolated wetland in a low spot of the roadside drainage swale.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Typha latifolia	50	☑	50.0%	OBL
2. Schoenoplectus pungens var. pungens	50	☑	50.0%	OBL
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Area is dominated by obligate vegetation.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 16

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	4/2	90%	5YR	4/6	10%	C	M	Clay Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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): 12

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Soils are saturated in the upper profile.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 17

Investigator(s): Todd Sherman **Section, Township, Range:** S 28 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** convex **Slope:** 4.0 % / 2.3 °

Subregion (LRR): LRR D **Lat.:** 419526 E **Long.:** 4506384 N **Datum:** NAD83

Soil Map Unit Name: Saltair silty clay loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○ No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Upland adjacent to SP-16.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	**Absolute % Cover**	**Dominant Species? Rel.Strat. Cover**	**Indicator Status**
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Agropyron elongatum	100	☑ 100.0%	UPL
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	100	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 17

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
0-20	10YR	4/2	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 18

Investigator(s): Todd Sherman **Section, Township, Range:** S 28 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419478 E **Long.:** 4507381 N **Datum:** NAD83

Soil Map Unit Name: Water **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉ No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Phragmites patch adjacent to a ditch. Area does not meet the soils or hydrology criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size:)			
1. Phragmites australis	100	☑ 100.0%	FACW
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of dominant Species That Are OBL, FACW, or FAC:	100.0%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A = 2.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Area supports exclusively common reed.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 18

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	4/3	100%						Clay	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 19

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR D **Lat.:** 419545 E **Long.:** 4508058 N **Datum:** NAD83

Soil Map Unit Name: Bramwell silty clay loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Phragmites patch that meets the wetland criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Phragmites australis	40	☑	40.0%	FACW
2. Juncus balticus	25	☑	25.0%	FACW
3. Cardaria draba	25	☑	25.0%	UPL
4. Cirsium arvense	10	☐	10.0%	FACU
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	65	x 2 =	130
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	25	x 5 =	125
Column Totals:	100 (A)		295 (B)

Prevalence Index = B/A = 2.950

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

The area meets the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 19

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 %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR	2/1	100%						Loam	
3-20	2.5Y	4/2	98%	5YR	4/6	2%	C	M	Clay Loam	redox below 8"

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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): 11

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Soils are saturated in the upper profile and exhibit oxidized rhizospheres.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 20

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** convex **Slope:** 8.0 % / 4.6 °

Subregion (LRR): LRR D **Lat.:** 419540 E **Long.:** 4508062 N **Datum:** NAD83

Soil Map Unit Name: Bramwell silty clay loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○ No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○ No ◉	
Wetland Hydrology Present?	Yes ○ No ◉	

Remarks: Upland adjacent to SP-19.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	
Herb Stratum (Plot size:)				
1. Agropyron elongatum	100	☑	100.0%	UPL
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100		= Total Cover	
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 20

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
0-20	10YR	3/3	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 21

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** concave **Slope:** 1.0 % / 0.6 °

Subregion (LRR): LRR D **Lat.:** 419540 E **Long.:** 4508062 N **Datum:** NAD83

Soil Map Unit Name: Deckerman fine sandy loam **NWI classification:** PEM

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Phragmites patch that meets the wetland criteria.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
	0		= Total Cover	

Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
	0		= Total Cover	

Herb Stratum (Plot size:)				
1. Phragmites australis	100	☑	100.0%	FACW
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
	100		= Total Cover	

Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
	0		= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A = 2.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

The area meets the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 21

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 %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y	5/2	95%	5YR	4/6	5%	C	M	Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Soils meet the criteria for depleted matrix, and emit a hydrogen sulfide odor.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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): 6
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 0

Wetland Hydrology Present? Yes ◉ No ○

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

Remarks:

Soils are saturated in the upper profile, emit a hydrogen sulfide odor, and exhibit oxidized rhizospheres.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Interstate 215 **City/County:** Salt Lake **Sampling Date:** 21-Apr-15

Applicant/Owner: Utah Department of Transportation **State:** UT **Sampling Point:** 22

Investigator(s): Todd Sherman **Section, Township, Range:** S 21 T 1S R 1W

Landform (hillslope, terrace, etc.): Valley bottom **Local relief (concave, convex, none):** convex **Slope:** 5.0 % / 2.9 °

Subregion (LRR): LRR D **Lat.:** 419552 E **Long.:** 4508118 N **Datum:** NAD83

Soil Map Unit Name: Bramwell silty clay loam **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ○ No ◉

Hydric Soil Present? Yes ○ No ◉

Wetland Hydrology Present? Yes ○ No ◉

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks: Upland adjacent to SP-21.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	

Herb Stratum (Plot size:)			
1. Agropyron elongatum	100	☑ 100.0%	UPL
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	100	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0 **% Cover of Biotic Crust** 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.000

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, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

The area does not meet the vegetation criteria.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: 22

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
0-20	10YR	3/3	100%						Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck 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: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No indicators of hydric soil.

Hydrology

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift deposits (B3) (Noneriverine)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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)
- ☐ 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology.

APPENDIX D: SOIL INFORMATION

Salt Lake Area, Utah

BsA—Bramwell silty clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6gv
Elevation: 4,300 to 4,450 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bramwell and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bramwell

Setting

Landform: Lake plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

A11 - 0 to 2 inches: silty clay loam
A12 - 2 to 8 inches: silty clay loam
C1ca - 8 to 22 inches: silty clay loam
C2ca - 22 to 35 inches: silty clay loam
C3 - 35 to 47 inches: silty clay
C4 - 47 to 72 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 36 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Alkali bottom (alkali sacaton) (R028AY001UT)

Minor Components

Welby
Percent of map unit: 5 percent

Bluffdale
Percent of map unit: 5 percent

Harrisville
Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 7, Aug 5, 2014

Salt Lake Area, Utah

De—Deckerman fine sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6hb
Elevation: 4,200 to 4,300 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Deckerman and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deckerman

Setting

Landform: Flood plains, lake plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or lacustrine deposits

Typical profile

A11&A12 - 0 to 6 inches: fine sandy loam
C1 - 6 to 12 inches: loam
C2ca - 12 to 20 inches: loam
C3 - 20 to 35 inches: sandy loam
C4 - 35 to 43 inches: loam
IIC5 - 43 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 60.0
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Alkali bottom (alkali sacaton) (R028AY001UT)

Minor Components

Lasil

Percent of map unit: 5 percent
Ecological site: Alkali bottom (alkali sacaton) (R028AY001UT)

Saltair

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Desert salty silt (iodinebush) (R028AY132UT)

Data Source Information

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 7, Aug 5, 2014

Salt Lake Area, Utah

Jo—Jordan-Saltair complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6jb
Elevation: 4,200 to 4,250 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Jordan and similar soils: 80 percent
Saltair and similar soils: 15 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jordan

Setting

Landform: Lake plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

A - 0 to 2 inches: silt loam
E - 2 to 5 inches: silty clay loam
Btn - 5 to 9 inches: silty clay loam
Btkn1&Btkn2 - 9 to 18 inches: silty clay
Czg1 - 18 to 43 inches: silty clay
2Czg2&2Czg3 - 43 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Strongly saline (30.0 to 60.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 60.0
Available water storage in profile: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali flat (black greasewood) (R028AY004UT)

Description of Saltair

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 1 inches: silty clay loam
H2 - 1 to 4 inches: silty clay loam
H3 - 4 to 8 inches: silty clay loam
H4 - 8 to 12 inches: silty clay loam
H5 - 12 to 40 inches: silty clay loam
H6 - 40 to 57 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Strongly saline (100.0 to 250.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1,000.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: C/D
Ecological site: Desert salty silt (iodinebush) (R028AY132UT)

Minor Components

Lasil

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Ecological site: Alkali bottom (alkali sacaton) (R028AY001UT)

Data Source Information

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 7, Aug 5, 2014

Salt Lake Area, Utah

LcA—Lasil silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: j6jx
Elevation: 4,200 to 4,300 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lasil and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lasil

Setting

Landform: Lake plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 9 inches: silt loam
H3 - 9 to 14 inches: clay loam
H4 - 14 to 29 inches: silt loam
H5 - 29 to 48 inches: silt loam
H6 - 48 to 78 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 60.0
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: Alkali bottom (alkali sacaton) (R028AY001UT)

Minor Components

Terminal

Percent of map unit: 5 percent

Deckerman

Percent of map unit: 5 percent

Jordan

Percent of map unit: 3 percent
Ecological site: Alkali flat (black greasewood) (R028AY004UT)

Saltair

Percent of map unit: 2 percent
Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Desert salty silt (iodinebush) (R028AY132UT)

Data Source Information

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 7, Aug 5, 2014

Salt Lake Area, Utah

lr—Lewiston loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6j9
Elevation: 4,210 to 4,450 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Lewiston and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lewiston

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: loam
A1&AC - 7 to 20 inches: very fine sandy loam
C1ca - 20 to 26 inches: silt loam
A1b - 26 to 31 inches: very fine sandy loam
IIC2 - 31 to 38 inches: silt loam
IIIC3-5 - 38 to 68 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 20 to 40 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: Semiwet fresh meadow (R028AY012UT)

Minor Components

Kidman

Percent of map unit: 5 percent

Magna

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Dip, talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Wet saline meadow (saltgrass) (R028AY024UT)

Chipman

Percent of map unit: 5 percent

Data Source Information

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 7, Aug 5, 2014

Salt Lake Area, Utah

Sa—Saltair silty clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6kn
Elevation: 4,200 to 4,250 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Saltair and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saltair

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 1 inches: silty clay loam
H2 - 1 to 4 inches: silty clay loam
H3 - 4 to 8 inches: silty clay loam
H4 - 8 to 12 inches: silty clay loam
H5 - 12 to 40 inches: silty clay loam
H6 - 40 to 57 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Strongly saline (100.0 to 250.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1,000.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: C/D
Ecological site: Desert salty silt (iodinebush) (R028AY132UT)

Minor Components

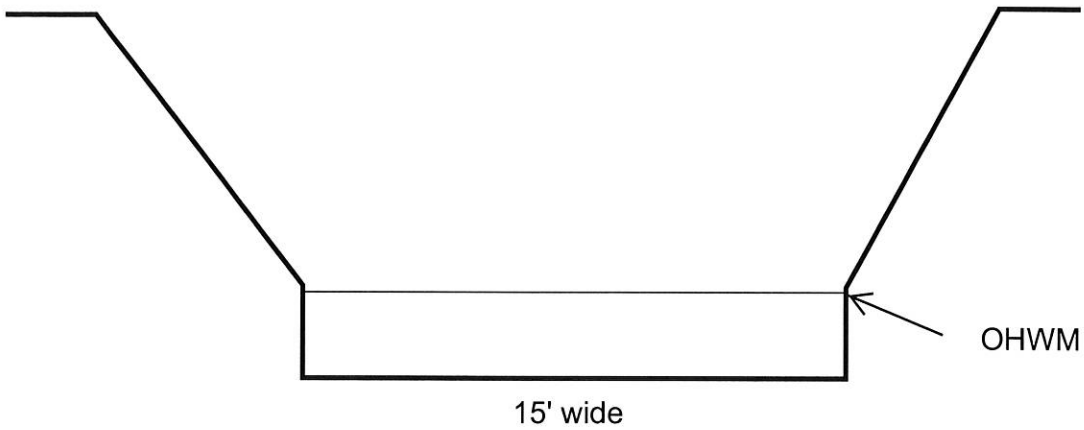
Jordan

Percent of map unit: 5 percent
Ecological site: Alkali flat (black greasewood) (R028AY004UT)

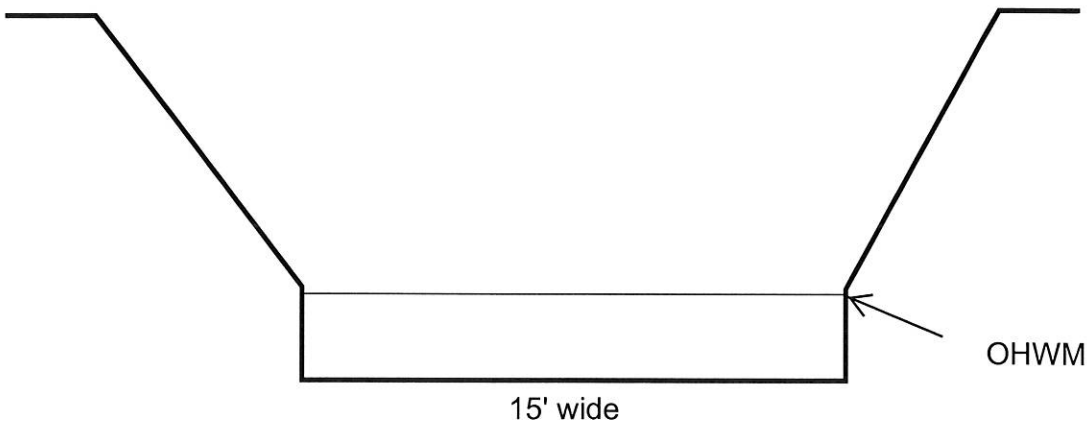
Data Source Information

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 7, Aug 5, 2014

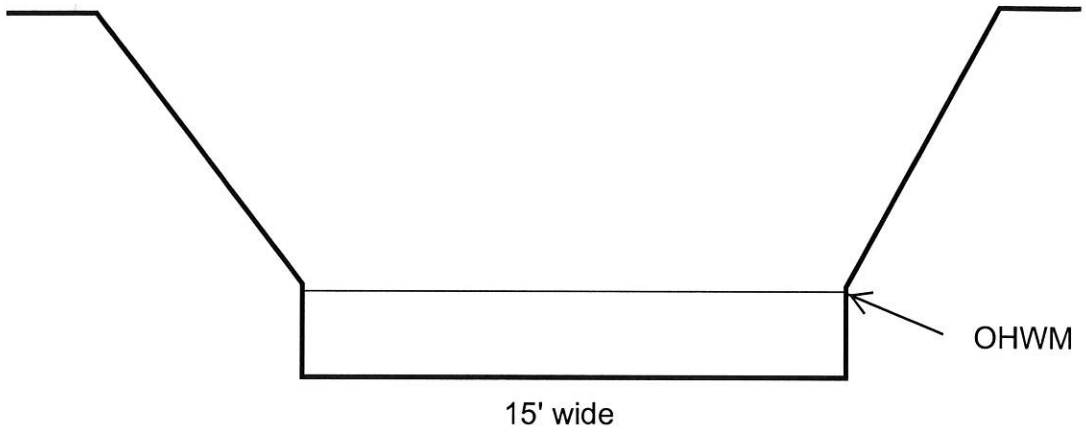
APPENDIX E: CANAL/DITCH CROSS-SECTIONS



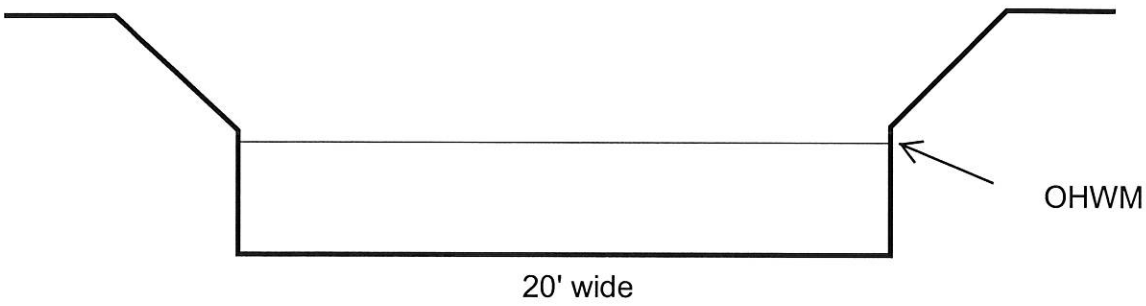
Cross-Section 1. Drainage ditch D-1.



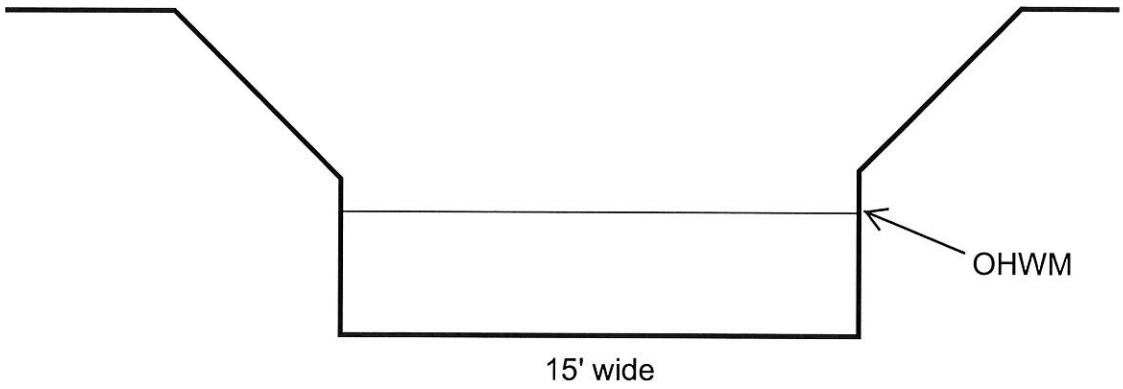
Cross-Section 2. Drainage ditch D-2.



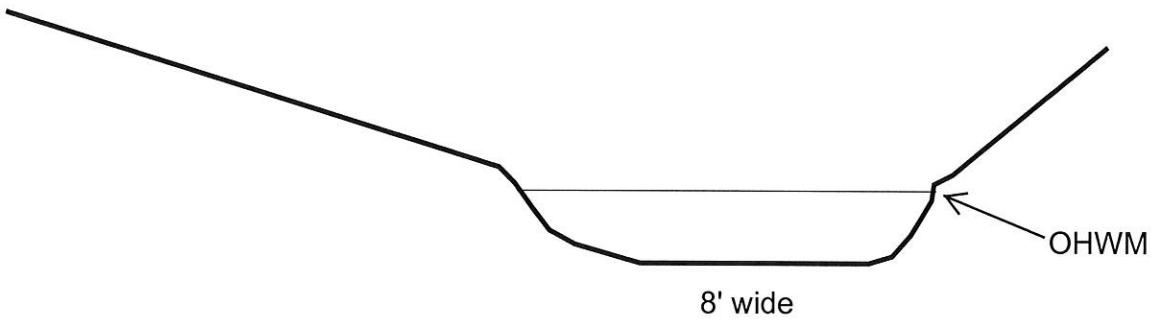
Cross-Section 3. Drainage ditch D-3.



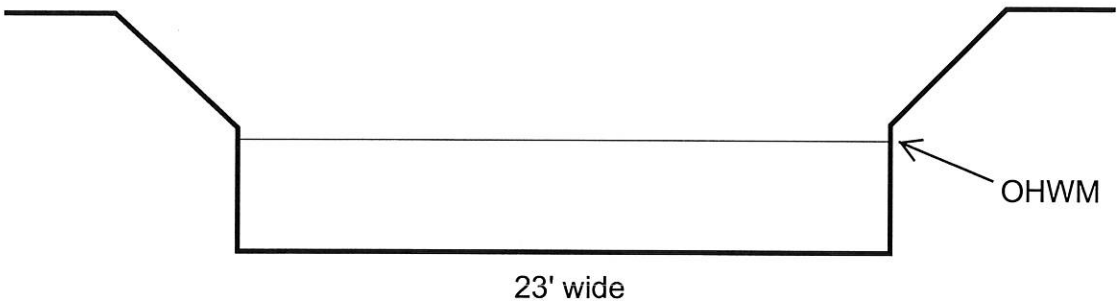
Cross-Section 4. Brighton Canal Extension (D-4).



Cross-Section 5. Drainage ditch D-5.



Cross-Section 6. Drainage ditch D-6.



Cross-Section 7. North Jordan Canal (D-7).

- Hazardous Waste Coordination

September 2, 2015

Craig,

Avenue Consultants efforts for the purpose of managing risk associated with the handling of Kennecott Slag material encountered during construction of the I-215 project have occurred as follows.

1. We conducted a review of the Summary, Profile and Materials Sheets developed for the I-215-9(28)301 construction project from South of 4700 So. to North of 2100 So. (completed in June, 1972). These documents infer the use of Tailings for earthwork from a stockpile south of US-50 and west of 9180 West in Magna. (See Attachment A)

2. We reviewed the results of soil testing provided to the Department from their contractor on the 3500 South Street and Interstate 215 project conducted in July, 2011. Only one sample was analyzed. (See Attachment B)

3. We identified six locations for soil sampling and testing in an effort to characterize the embankment materials in locations most likely to be encountered during construction. We engaged Terracon Consultants, Inc. to conduct field exploration, field observations, sampling, and testing using x-ray fluorescence (XRF) to screen samples for elevated metals concentrations (lead and arsenic), and for selecting biased samples for confirmation analysis in the laboratory. The samples were analyzed for copper and the 8 Resource Conservation and Recovery Act (RCRA) metals, using the Toxicity Characteristic Leaching Procedure (TCLP) as described in the Analytical Test Summary from Terracon (See Attachment C). RCRA metals were not detected. Copper was detected below apparent action levels. Visual, textural, odor and XRF observations of the boreholes and samples were unremarkable for tailings.

4. Prior to the field exploration and upon completion of analysis we have informally discussed and coordinated our objectives and approach with Douglas Bacon, Kennecott/Superfund Project Manager, of the Utah Department of Environmental Quality (UDEQ). Mr. Bacon is a recognized authority on the history, location and waste characteristics of Kennecott slag and tailings in the Salt Lake Valley.

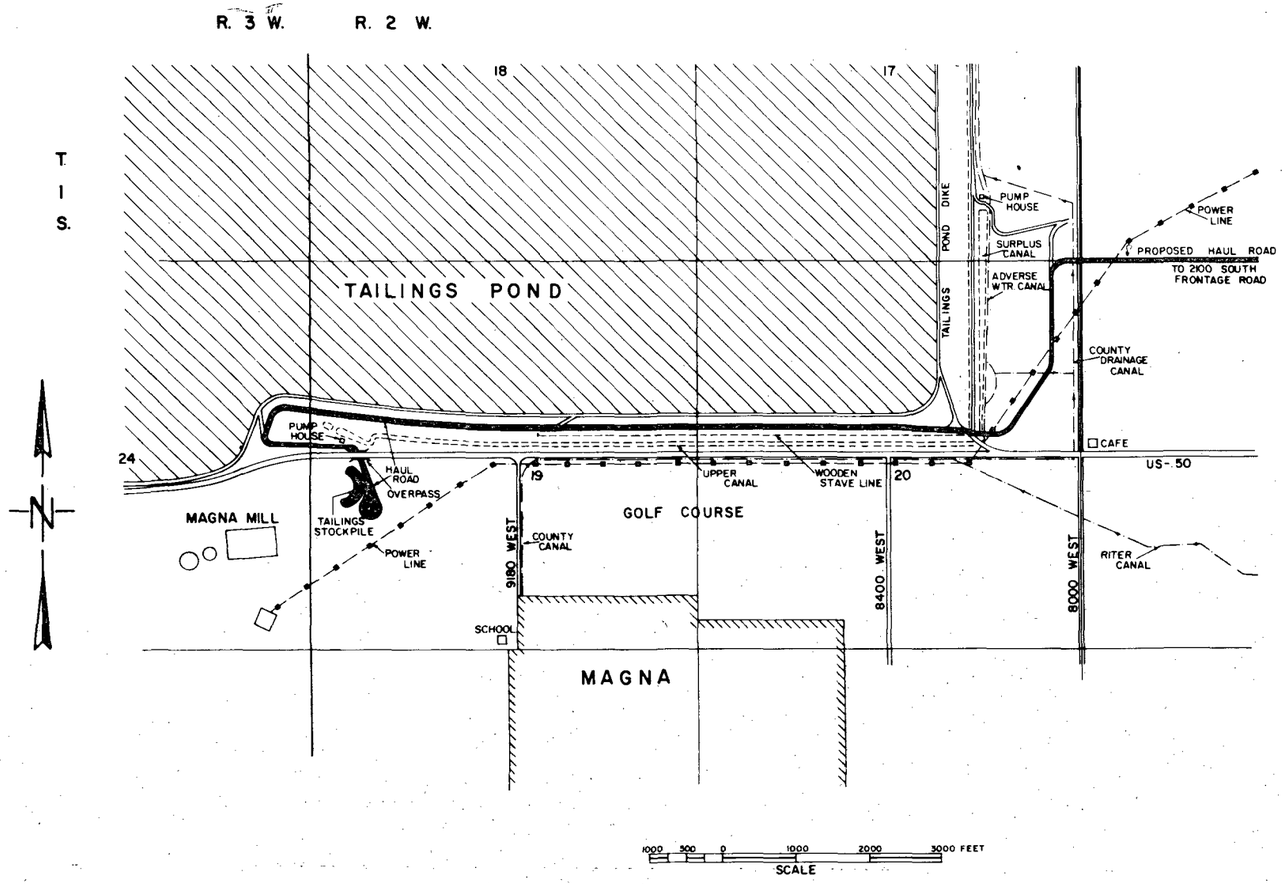
The resultant findings of our investigation and discussions with the UDEQ to date indicate:

A. Based on the TCLP analytical results associated with the soils sampled and tested to date, the embankment materials tested would not be considered a characteristic hazardous waste.

B. Existing Department environmental specifications appear sufficient to deal with suspect soils that may be encountered during the construction.

More formal documentation of our coordination with the UDEQ will be obtained, prior to advertisement.

FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301		2-M	



Proposed haul road right of way shown on seperate sheets in plans for this project.

NOTE

The information on these materials prospects shall in no way be construed so as to conflict with Sub-Section 106.02 "Local Material Source" of the State of Utah Standard Specifications, Edition of 1970.

Haul routes are indicated not designated. The contractor shall select his own routes. He must be prepared to meet load limits or other controls required for hauling over the route he selects.

Lab. Number	70-2S-365	70-2S-377
Test Hole Number		
Depth		
Screen Analysis		
Passing 3" %		
Passing 2" %		
Passing 1" %		
Passing 3/4" %		
Passing No. 4 %		
Passing No. 10 %	100	
Passing No. 40 %	97	100
Passing No. 200 %	10	21
Liquid Limit		
Plasticity Index	V.N.P.	V.N.P.
Swell	0	0
C.B.R. Min. %	16	13
A.A.S.H.O. Class	A-3	A-2-4
Dry Weight	97.6	94.5

NO.	BY	DATE	TYPE	REMARKS

REVISIONS

LEGEND

Clay, Silt, Sand, Gravel or Bldrs., Bedrock or Hardpan

Ground Water Table (G.W.T.) — Test Hole
Section Line — 1/4 Section Line
1/16 Section — ℄ Proposed Highway
Prospect Boundary — Property Boundary
Backhoe Cuts — Dozer Cuts
Canal — Power Line

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO MATERIALS & TEST UNIT

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.

MATERIALS SHEET

DRAWN ____ CHECK ____ REVIEW
APPROVAL RECOMM 9-12-72 DATE — MATERIALS ENGINEER — DESIGN
APPROVED 9-12-72 DATE — DIST. MATERIALS ENGINEER — R/W
APPROVED 9-12-72 DATE — DIST. ROWY DESIGN ENGINEER
SALT LAKE COUNTY
PROJECT NUMBER I-215-9(28)301
SHEET NO. 2M

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301	3-S	

SUMMARY SHEET

EARTHWORK

LINE STATION TO STATION		C.M. STATION	EMB.	TAILINGS EMB. X FACTOR (1.17)	TAILINGS ROADWAY EXCAV.	TAILINGS		TAYLORSVILLE PIT EMB.	TAYLORSVILLE PIT BORROW	EMB.	GRANULAR BORROW		EMB. X FACTOR (1.20)	ROADWAY EXCAVATION	DRAINAGE AREA COVER	REMARKS	CONSTRUCTION SOURCE REFERENCE
			CU. YD.	CU. YD.	CU. YD.	CU. YD.	TON	CU. YD.	TON	CU. YD.	CU. YD.	TON	CU. YD.	CU. YD.	TON		
I-215 N.B. & S.B.																	
370+00±	373+00±									11,800		21,476				SURCHARGE MATERIAL FOR 3500 SO. STRUCTURE (DWG. C-520-S&N)	
375+00±	378+00±									14,100		25,662				SURCHARGE MATERIAL FOR 3500 SO. STRUCTURE (DWG. C-520-S&N)	
480+75±	483+75±									11,000		20,020				SURCHARGE MATERIAL FOR 2100 SO. STRUCTURE (DWG. C-617)	
485+25±	488+25±									11,000		20,020				SURCHARGE MATERIAL FOR 2100 SO. STRUCTURE (DWG. C-617)	
I-215 S.B. & N.B.																	
253+00±	505+00									134,450		244,699				12" THICK GRANULAR BORROW ON I-215 MAIN LINE	
I-215 N.B. & S.B.																	
252+00	260+00		74344	86982		86982	120,437										
260+00	270+00		180203	210837		210837	291,929										
265+00±	267+00±														1555	USE SURCHARGE MATERIAL (4700 SOUTH INTERCHANGE)	
268+75±	270+75±														1555	USE SURCHARGE MATERIAL (4700 SOUTH INTERCHANGE)	
270+00	280+00		178885	209295		209295	289,794										
280+00	291+00		54995	64344		64344	89,091										
291+00	300+00		36824	43084		43084	59,655										
300+00	310+00		57422	67183		67183	93,023										
310+00	320+00		38889	45500		45500	63,000										
320+00	330+00		37133	43446		43446	60,155										
330+00	340+00																
340+00	350+00		26033	30459		30459	42,173										
343+75±	346+50±									10,800		19,656				SURCHARGE MATERIAL FOR 3800 SO. STRUCTURE (DWG. P-9)	
348+50±	351+50±									10,800		19,656				SURCHARGE MATERIAL FOR 3800 SO. STRUCTURE (DWG. P-9)	
344+00±	346+93±							39,260	62,423								
348+08±	351+50±							47,250	75,128								
350+00	362+56		138461	161999		161999	224,306										
360+00	370+00		113176	132416		132416	183,345								9315	3500 SOUTH INTERCHANGE	
370+00	380+00		21193	24796		24203	34,333								9315	3500 SOUTH INTERCHANGE 593 CU. YDS. EXCESS MATERIAL FROM FRONTAGE ROAD "H"	
369+00±	372+53±							50,284	79,952								
374+98±	379+00±							91,082	144,820								
380+00	390+00		100101	117118		115980	162,163									1138 CU. YDS. EXCESS MATERIAL FROM FRONTAGE ROADS "A" AND "B"	
390+00	402+00		18609	21773	5411	16362	30,147									HAUL 215 CU. YDS. EXCAVATED MATERIAL TO U.P.&L. ACCESS RD. & FRONTAGE RD. "L"	
402+00	410+00		34591	40471		40471	56,037										
410+00	420+00		93598	109509		109509	151,628										
420+00	430+00		97852	114486		114486	158,520										
430+00	440+00		84676	99071		99071	137,175										
440+00	450+00		4836	5658	935	4723	7834										
450+00	460+00		63747	74584		74584	103,270										
460+00	470+00		116385	136170		136170	188,543										
470+00	480+00		109987	128685		128685	178,179								25000	2100 SOUTH INTERCHANGE	
PAGE TOTAL			1681940	1967866	6346	1959789	2,724,737	227,876	362,323	203,950		371,189			46740		

NO	BY	DATE	TYPE	REMARKS
2	D.J.K.	10/20/72		ADJUST EMB. QUANTITIES

REVISIONS

QUANTITIES SHOWN ON THIS SUMMARY ARE APPROXIMATE

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO ROADWAY DESIGN

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.

EARTHWORK

SUMMARY SHEET

DESIGN T.K. 6/8/72 CHECK L.T. 6/8/72
DRAWN L.J.D. 6/8/72 CHECK D.J.K. 6/8/72
QUANT G.O.B 6/8/72 CHECK R.T. 6/8/72
APPROVAL RECOMM 6-16-72 DATE PROJ. DESIGN ENGINEER
APPROVED 6-16-72 DATE DIST. HWY. DESIGN ENGINEER

REVIEW
DESIGN 6-15-72
R/W

SALT LAKE COUNTY

PROJECT NUMBER I-215-9(28)301

SHEET NO 3-S

FED ROAD DIST NO	STATE	PROJECT NO	SHEET NO	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301	3-S	

SUMMARY SHEET

LINE STATION TO STATION	C.M. STATION	EARTHWORK: EMB. CU. YD.	TAILINGS: EMB. X FACTOR (1.17) CU. YD.	TAILINGS: ROAD-WAY EXCAV. CU. YD.	TAILINGS: TAILINGS CU. YD.	TAILINGS: TAILINGS TON	TAYLORSVILLE PIT: EMB. X FACTOR (1.20) CU. YD.	TAYLORSVILLE PIT: BORROW CU. YD.	TAYLORSVILLE PIT: BORROW TON	EMB. X FACTOR (1.10) CU. YD.	GRANULAR BORROW CU. YD.	GRANULAR BORROW TON	EMB. X FACTOR (1.20) CU. YD.	ROADWAY EXCAVATION CU. YD.	DRAINAGE AREA COVER TON	REMARKS	CONSTRUCTION SOURCE REFERENCE
I-215 N.B.																	
240+00 505+00		67195								73914	73914	124730					
370+00± 373+00±		5400								5940	5940	10024					
375+00± 378+00±		5400								5940	5940	10024					
480+75± 483+75±		5500								6050	6050	10209					
485+25± 488+25±		5500								6050	6050	10209					
I-215 S.B.																	
240+00 505+00		67255								73981	73981	124848					
I-215 N.B. & S.B.																	
252+00 260+00		74344	86987		86982												
260+00 270+00		180203	210837		210837	341,556											
265+00± 267+00±		10800								11880	11880	20048			1555	USE SURCHARGE MATERIAL (4700 SOUTH INTERCHANGE)	
268+75± 270+75±		10800								11880	11880	20048			1555	USE SURCHARGE MATERIAL (4700 SOUTH INTERCHANGE)	
270+00 280+00		178885	209295		209295	339,058											
280+00 291+00		54995	64344		64344	104,237											
291+00 300+00		36824	43084		43084	69796											
300+00 310+00		57422	67183		67183	108,836											
310+00 320+00		38889	45500		45500	73710											
320+00 330+00		37133	43446		43446	70382											
330+00 340+00																	
340+00 350+00		26033	30459		30459	49344											
343+75± 346+50±		10800								11880	11880	20048					
348+50± 351+50±		10800								11880	11880	20048					
345+43± 346+93±		39260					47112	47112	72039								
348+08± 349+58±		47250					56700	56700	86700								
350+00 362+56		138461	161999		161999	262,438											
360+00 370+00		113176	132416		132416	214,514									9315	3500 SOUTH INTERCHANGE	
370+00 380+00		21193	24796		24203	39209									9315	3500 SOUTH INTERCHANGE 593 CU. YDS. EXCESS MATERIAL FROM FRONTAGE ROAD "H"	
371+03± 372+53±		50284					60340	60340	92266								
374+98± 376+98±		91082					109298	109298	167128								
380+00 390+00		100101	117118		115980	187,888										1138 CU. YDS. EXCESS MATERIAL FROM FRONTAGE ROADS "A" AND "B"	
390+00 402+00		18609	21722	5411	16311	26424										HAUL 215 CU. YDS. EXCAVATED MATERIAL TO U.P.&L. ACCESS RD. & FRONTAGE RD. "L"	
402+00 410+00		34591	40471		40471	65563											
410+00 420+00		93598	109509		109509	177,405											
420+00 430+00		97852	114486		114485	185,467											
430+00 440+00		84676	99071		99071	160,495											
440+00 450+00		4836	5658	935	4723	7651											
450+00 460+00		63747	74584		74584	120,821											
460+00 470+00		116385	136170		136170	220,595											
470+00 480+00		109987	128685		128685	208470									25000	2100 SOUTH INTERCHANGE	
PAGE TOTAL		2092266	1967815	6346	1959736	3174776	273,450	273,450	418,133	219,395	219,395	370,231			46740		

QUANTITIES SHOWN ON THIS SUMMARY ARE APPROXIMATE

NO	BY	DATE	TYPE	REMARKS

REVISIONS

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO ROADWAY DESIGN

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.

EARTHWORK

SUMMARY SHEET

DESIGN T.K. 6/8/72 CHECK L.T. 6/8/72
DRAWN L.J.D. 6/8/72 CHECK D.J.K. 6/8/72
QUANT G.O.B. 6/8/72 CHECK R.T. 6/8/72
APPROVAL RECOMM 6-16-72 DATE PROJ. DESIGN ENGINEER
APPROVED 6-16-72 DATE DIST. RDWY. DESIGN ENGINEER

REVIEW
DESIGN 6-15-72
R/W
SALT LAKE COUNTY

PROJECT NUMBER I-215-9(28)30i

SHEET NO 3-S

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301	3-T	

SUMMARY SHEET

EARTHWORK

LINE STATION TO STATION	C.M. STATION	EMB. CU. YD.	TAILINGS EMB. X FACTOR (1.17) CU. YD.	TAILINGS ROAD-WAY EXCAV. CU. YD.	TAILINGS TAILINGS CU. YD.	TAILINGS TAILINGS TON	TAYLORSVILLE PIT EMB. CU. YD.	TAYLORSVILLE PIT BORROW TON	EMB. CU. YD.	GRANULAR BORROW CU. YD.	GRANULAR BORROW TON	EMB. X FACTOR (1.20) CU. YD.	ROADWAY EXCAVATION CU. YD.	DRAINAGE AREA COVER TON	REMARKS	CONSTRUCTION SOURCE REFERENCE
I-215 N.B. & S.B. 480+00 490+00		170002	198902		198902	275403								25000	2100 SOUTH INTERCHANGE	
490+00 500+00		200571	234668		234668	324925										
500+00 505+00		61865	72382		72382	100221										
IRRIGATION DITCH BERM 240+00 365+00									9783		17805					
"A" RAMP 10+00.00 21+70.69		42973	50278		50278	69620										
10+00.00 21+70.69									2126		3869					
"B" RAMP 10+00.00 22+95.97		47553	55637		55637	77036										
10+00.00 22+95.97									2354		4284					
"C" RAMP 10+00.00 22+15.07		42557	49792		49792	68942										
10+00.00 22+15.07									2207		4017					
"D" RAMP 10+00.00 22+46.33		41541	48603		48603	67296										
10+00.00 22+46.33									2264		4120					
"E" RAMP 10+00.00 32+80.29		52601	61543		61543	85214										
10+00.00 32+80.29									3973		7231					
"F" RAMP 8+13.33 34+38.79		45602	53354		53354	73875										
8+13.33 34+38.79									4574		8325					
"G" RAMP 10+00.00 33+32.23		38479	45020		45020	62336										
10+00.00 33+32.23									4063		7395					
"H" RAMP 10+00.00 32+91.74		35390	41406		41406	57332										
10+00.00 32+91.74									3982		7247					
"J-1" RAMP 10+00 22+35.56		47115	55125	722	54403	76326										
10+00 22+35.56									2244		4084					
"J-2" RAMP 9+38.80 28+23.74		51907	60731	247	60484	84089										
9+38.80 28+23.74									3284		5976					
17+50± 20+50±									2500		4550				SURCHARGE MATERIAL FOR STRUCTUCE (DWG. P-12)	
22+50± 25+50±									2500		4550				SURCHARGE MATERIAL FOR STRUCTURE (DWG. P-12)	
"J-3" RAMP 10+03.27 25+31.52		33527	39227	1096	38131	54314										
10+03.27 25+31.52									2663		4847					
PAGE TOTAL		911683	1,066,668	2,065	1,064,603	1,476,929			48517		88300			25000		
PREVIOUS PAGE TOTAL		1,681,940	1,967,866	6,346	1,959,789	2,724,737	227,876	362,323	203,950		371,189			46,740		
SUB TOTAL		2,593,623	3,034,534	8,411	3,024,392	4,201,666	227,876	362,323	252,467		459,489			71,740		

QUANTITIES SHOWN ON THIS SUMMARY ARE APPROXIMATE

NO	BY	DATE	TYPE	REMARKS
2	D.J.K.	10/20/72		ADJUST EMB QUANTITIES

REVISIONS

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO ROADWAY DESIGN

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.

EARTHWORK

SUMMARY SHEET

DESIGN	L.T.	6/8/72	CHECK T.B.	6/8/72	REVIEW
DRAWN	P.B.	6/8/72	CHECK T.K.	6/8/72	DESIGN RDG 9-15-72
QUANT	G.O.B.	6/8/72	CHECK A.K.	6/8/72	R/W

APPROVAL RECOMM. 6-16-72 DATE PROJ. DESIGN ENGINEER

APPROVED 6-16-72 DATE [illegible]

SALT LAKE COUNTY

PROJECT I-215-9(28)301

SHEET NO. 3-T

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301	3-T	

SUMMARY SHEET

EARTHWORK

LINE STATION TO STATION	C.M. STATION	EMB.	TAILINGS EMB. X FACTOR (1.17)	TAILINGS ROADWAY EXCAV.	TAILINGS TAILINGS		TAYLORSVILLE PIT EMB. X FACTOR (1.20)	TAYLORSVILLE PIT BORROW		EMB. X FACTOR (1.10)	GRANULAR BORROW		EMB. X FACTOR (1.20)	ROADWAY EXCAVATION	DRAINAGE AREA COVER	REMARKS	CONSTRUCTION SOURCE REFERENCE
		CU. YD.	CU. YD.	CU. YD.	CU. YD.	TON	CU. YD.	CU. YD.	TON	CU. YD.	CU. YD.	TON	CU. YD.	CU. YD.	TON		
I-215 N.B. & S.B. 480+00 490+00		170002	198902		198902	322221									25000	2100 SOUTH INTERCHANGE	
490+00 500+00		200571	234668		234668	380162											
500+00 505+00		61865	72382		72382	117259											
IRRIGATION DITCH BERM 240+00 365+00		9783								11740	11740	19811					
"A" RAMP 10+00.00 21+70.69		42973	50278		50278	81450											
10+00.00 21+70.69		2126								2339	2339	3947					
"B" RAMP 10+00.00 22+95.97		47553	55637		55637	90132											
10+00.00 22+95.97		2354								2589	2589	4369					
"C" RAMP 10+00.00 22+15.07		42557	49792		49792	80663											
10+00.00 22+15.07		2207								2428	2428	4097					
"D" RAMP 10+00.00 22+46.33		41541	48603		48603	78737											
10+00.00 22+46.33		2264								2490	2490	4202					
"E" RAMP 10+00.00 32+80.29		52601	61543		61543	99700											
10+00.00 32+80.29		3973								4370	4370	7374					
"F" RAMP 8+13.33 34+38.79		45602	53354		53354	86433											
8+13.33 34+38.79		4574								5031	5031	8490					
"G" RAMP 10+00.00 33+32.23		38479	45020		45020	72932											
10+00.00 33+32.23		4063								4469	4469	7541					
"H" RAMP 10+00.00 32+91.74		35390	41406		41406	67078											
10+00.00 32+91.74		3982								4380	4380	7391					
"J-1" RAMP 10+00 22+35.56		47115	55125	722	54403	88133											
10+00 22+35.56		2244								2468	2468	4165					
"J-2" RAMP 9+38.80 28+23.74		51907	60731	247	60484	97984											
9+38.80 28+23.74		3284								3612	3612	6095					
17+50± 20+50±		2500								2750	2750	4641					
22+50± 25+50±		2500								2750	2750	4641					
"J-3" RAMP 10+03.27 25+31.52		33527	39227	1096	38131	61772											
10+03.27 25+31.52		2663								2929	2929	4943					
PAGE TOTAL		960,200	1,066,668	2,065	1,064,603	1,724,657				54,345	54,345	91,707			25000		
PREVIOUS PAGE TOTAL		2,109,266	1,967,815	6,346	1,959,738	3,174,776	273,450	273,450	418,133	219,395	219,395	370,231			46,740		
SUB TOTAL		3,069,466	3,034,483	8,411	3,024,341	4,899,433	273,450	273,450	418,133	273,740	273,740	416,938			71,740		

QUANTITIES SHOWN ON THIS SUMMARY ARE APPROXIMATE

NO.	BY	DATE	TYPE	REMARKS

REVISIONS

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO ROADWAY DESIGN

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.

EARTHWORK

SUMMARY SHEET

DESIGN L.T.	6/8/72	CHECK T.B.	6/8/72	REVIEW	
DRAWN P.B.	6/8/72	CHECK T.K.	6/8/72	DESIGN	2069-15-72
QUANT G.O.B.	6/8/72	CHECK A.K.	6/8/72	R/W	
APPROVAL RECOMM. 6-16-72 DATE		PROJ. DESIGN ENGINEER			
APPROVED 6-16-72 DATE		DIST. ROAD DESIGN ENGINEER		SALT LAKE COUNTY	
PROJECT I-215-9(28)301				SHEET NO. 3-T	

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301	3-U	

SUMMARY SHEET

EARTHWORK

LINE STATION TO STATION	C.M. STATION	EMB. CU. YD.	TAILINGS EMB. X FACTOR (1.17) CU. YD.	TAILINGS ROAD-WAY EXCAV. CU. YD.	TAILINGS TAILINGS CU. YD.	TAILINGS TAILINGS TON	TAYLORSVILLE PIT EMB. CU. YD.	TAYLORSVILLE PIT BORROW TON	EMB. CU. YD.	GRANULAR BORROW CU. YD.	GRANULAR BORROW TON	EMB. X FACTOR (1.20) CU. YD.	ROADWAY EXCAVATION CU. YD.	DRAINAGE AREA COVER TON	REMARKS	CONSTRUCTION SOURCE REFERENCE
"J-4" RAMP 10+00.00 31+46.55		19287	22566	324	22242	31245										
10+00.00 31+46.55									4438		8077					
"J-5" RAMP 10+00.00 20+48.20		29859	34935	411	34524	48372										
10+00.00 20+48.20									2283		4155					
"J-6" RAMP 10+00.00 22+89.25		15119	17689	1522	16167	24493										
10+00.00 22+89.25									2819		5131					
"H-1" RAMP 21+98.94 31+18.76		26944	31524	154	31370	43649										
21+98.94 31+18.76									1608		2917					
"H-2" RAMP 10+00.00 25+23.62		46453	54350	163	54187	75254										
10+00.00 25+23.62									2654		4830					
"H-3" RAMP 10+10.05 25+37.17		50500	59085	750	58335	81810										
10+10.05 25+37.17									2661		4843					
"H-4" RAMP 10+01.29 21+98.94		34557	40432	154	40278	55982										
10+01.29 21+98.94									2087		3798					
"H-5" RAMP 10+00.00 20+79.89		60526	70815	1181	69634	98052										
10+00.00 20+79.89									1961		3569					
4100 SOUTH 6+50± 8+73±							40975	65150	1900		3494					
6+50± 8+73±									9700		17654				SURCHARGE MATERIAL FOR STRUCTURE (DWG. C-629)	
11+25± 15+00±							40975	65150	1700		3058					
11+25± 15+00±									9700		17654				SURCHARGE MATERIAL FOR STRUCTURE (DWG. C-629)	
3100 SOUTH 16+74± 19+00±							38946	61924	2963		5393					
16+74± 19+00±									8400		15288				SURCHARGE MATERIAL FOR STRUCTURE (DWG. P-8)	
21+29± 25+00±							38946	61924	3333		6066					
21+29± 25+00±									8400		15288				SURCHARGE MATERIAL FOR STRUCTURE (DWG. P-8)	
2700 SOUTH 9+00.33 30+00		105,000	122,850		122,850	170,100			3270		5951					
9+00.33 19+14±		23,452	27,439		27,439	37,992									FOR CONTOUR GRADING	
PAGE. TOTAL		411,697	481,685	4,659	477,026	666,949	159842	254148	69877		127166					
PREVIOUS PAGE SUB TOTAL		2,593,623	3,034,534	8,411	3,024,392	4201666	227876	362323	252,467		459,489			71,740		
SUB TOTAL		3,005,320	3,516,219	13,070	3,501,418	4868615	387718	616471	322 344		586655			71,740		

NO	BY	DATE	TYPE	REMARKS
2	D.J.K.	10/20/72		ADJUST EMB. QUANTITIES

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO ROADWAY DESIGN

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.
EARTHWORK
SUMMARY SHEET

DESIGN	L.T.	6/8/72	CHECK	R.T.	6/8/72	REVIEW
DRAWN	V.W.S.	6/8/72	CHECK	P.B.	6/8/72	DESIGN
QUANT	G.O.B.	6/8/72	CHECK	R.T.	6/8/72	R/W

APPROVAL RECOMM 6-16-72 DATE — PROJ. DESIGN ENGINEER
APPROVED 6-16-72 DATE — DIST. HGWY. DESIGN ENGINEER

SALT LAKE COUNTY

QUANTITIES SHOWN ON THIS SUMMARY ARE APPROXIMATE

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301	3-U	

SUMMARY SHEET

EARTHWORK

LINE STATION TO STATION	C.M. STATION	EMB. CU. YD.	TAILINGS EMB. X FACTOR (1.17) CU. YD.	TAILINGS ROAD-WAY EXCAV. CU. YD.	TAILINGS TAILINGS CU. YD.	TAILINGS TAILINGS TON	TAYLORSVILLE PIT EMB. X FACTOR (1.20) CU. YD.	TAYLORSVILLE PIT BORROW CU. YD.	TAYLORSVILLE PIT BORROW TON	EMB. X FACTOR (1.10) CU. YD.	GRANULAR BORROW CU. YD.	GRANULAR BORROW TON	EMB. X FACTOR (1.20) CU. YD.	ROADWAY EXCAVATION CU. YD.	DRAINAGE AREA COVER TON	REMARKS	CONSTRUCTION SOURCE REFERENCE
"J-4" RAMP																	
10+00.00 31+46.55		19287	22566	324	22242	36032											
10+00.00 31+46.55		4438								4882	4882	8238					
"J-5" RAMP																	
10+00.00 20+48.20		29859	34935	411	34524	55929											
10+00.00 20+48.20		2283								2511	2511	4237					
"J-6" RAMP																	
10+00.00 22+89.25		15119	17689	1522	16167	26191											
10+00.00 22+89.25		2819								3100	3100	5231					
"H-1" RAMP																	
21+98.94 31+18.76		41944	49074	154	48920	79250											
21+98.94 31+18.76		1603								1763	1763	2975					
"H-2" RAMP																	
10+00.00 25+23.62		46453	54350	163	54187	87783											
10+00.00 25+23.62		2654								2919	2919	4926					
"H-3" RAMP																	
10+10.05 25+37.17		50500	59085	750	58335	94503											
10+10.05 25+37.17		2661								2927	2927	4939					
"H-4" RAMP																	
10+01.29 21+98.94		34557	40432	154	40278	65250											
10+01.29 21+98.94		2087								2296	2296	3875					
"H-5" RAMP																	
10+00.00 20+79.89		60526	70815	1181	69634	112807											
10+00.00 20+79.89		1961								2157	2157	3640					
4100 SOUTH																	
6+50± 8+73±		40975					49170	49170	75186								
6+50± 8+73±		9700								10670	10670	18006					
11+25± 15+00±		40975					49170	49170	75186								
11+25± 15+00±		9700								10670	10670	18006					
3100 SOUTH																	
16+74± 19+00±		38946					46735	46735	71462								
16+74± 19+00±		8400								9240	9240	15593					
21+29± 25+00±		38946					46735	46735	71462								
21+29± 25+00±		8400								9240	9240	15593					
PAGE TOTAL		514,793	348,946	4,659	344,287	557,745	191,810	191,810	293,296	62,375	62,375	105,259					
PREVIOUS PAGE SUB TOTAL		3,069,466	3,034,483	8,411	3,024,341	4,899,433	273,450	273,450	418,133	273,740	273,740	461,938			71,740		
SUB TOTAL		3,584,259	3,383,429	13,070	3,368,628	5,457,178	465,260	465,260	711,429	336,115	336,115	567,197			71,740		

QUANTITIES SHOWN ON THIS SUMMARY ARE APPROXIMATE

NO.	BY	DATE	TYPE	REMARKS

REVISIONS

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO ROADWAY DESIGN

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.
EARTHWORK
SUMMARY SHEET

DESIGN L.T. 6/8/72	CHECK R.T. 6/8/72	REVIEW	
DRAWN V.W.S. 6/8/72	CHECK P.B. 6/8/72	DESIGN	6/8/72
QUANT G.O.B. 6/8/72	CHECK R.T. 6/8/72	R/W	
APPROVAL RECOMM 6/8/72 DATE	PROJ. DESIGN ENGINEER		
APPROVED 6/8/72 DATE	DIST. HWY. DESIGN ENGINEER	SALT LAKE COUNTY	
PROJECT NUMBER I-215-9(28)301		SHEET NO. 3-U	

SUMMARY SHEET

EARTHWORK

LINE STATION TO STATION	C.M. STATION	EMB. CU. YD.	TAILINGS EMB. X FACTOR (1.17) CU. YD.	TAILINGS ROAD-WAY EXCAV. CU. YD.	TAILINGS TAILINGS CU. YD.	TAILINGS TAILINGS TON	TAYLORSVILLE PIT EMB. CU. YD	TAYLORSVILLE PIT BORROW TON	EMB. CU. YD.	GRANULAR BORROW CU. YD.	GRANULAR BORROW TON	EMB. X FACTOR (1.20) CU. YD.	ROADWAY EXCAVTION CU. YD.	DRAINAGE AREA COVER TON	REMARKS	CONSTRUCTION SOURCE REFERENCE
2700 SOUTH 16+50± 18+50±									6500		11830				SURCHARGE MATERIAL FOR STRUCTURE (DWG. P-7)	
21+50± 23+50±									6500		11830				SURCHARGE MATERIAL FOR STRUCTURE (DWG. P-7)	
FRONTAGE ROAD "A" 10+00.00 14+95.00												488	1074		586 CU. YDS. EXCESS HAUL TO I-215 STA. 380±	
FRONTAGE ROAD "B" 10+00.00 26+20.08												867	1419		552 CU. YDS. EXCESS MATERIAL, HAUL TO I-215 STA. 380±	
FRONTAGE ROAD "H" 10+00.00 14+82.00												262	855		593 CU. YDS. EXCESS MATERIAL, HAUL TO I-215 STA. 373±	
FRONTAGE ROAD "L" 0+00.00 4+89.11												531	335		HAUL 196 CU. YDS. FROM I-215 STA. 402±	
"M" (AT 3360 SO. & 2700 W.) 10+00.00 12+15.00											441	500	254			
UTAH POWER & LIGHT SER. RD. 11+50.00 20+00.00												473			HAUL 19 CU. YDS. FROM STA. 402±	
4100 SO. DETOUR 2+82.38 18+93.73							4800	7632							HAUL 5760 CU. YD. FROM TAYLORSVILLE P.T.	
BEPM IRRIGATION DITCHES								741								
GRANULAR BORROW FOR BSMT.											5914				TRANSFERRED FROM DEMOLITION SUMMARY	
I-215 240+00 505+00									50,000		91,000				COVER FOR HAUL ROAD DOWN I-215 ALIGNMENT	
ROADWAY EXCAVATION													13,070		FROM TAILINGS COLUMN	
PAGE TOTAL							4800	8374	63,000		121,051	3121	4391			
PREVIOUS PAGE TOTAL		3,005,320	3,516,219	13,070	3,501,418	4,868,615	387,718	616,471	322,344		586,655			71,740		
TOTAL		3,005,320	3,516,219	13,070	3,501,418	4,868,615	392,518	624,845	385,344		707,670	3121	17,461	71,740		
USE		3,310,000						687,330			777,955			79,730		

HIGHWAY TRAFFIC PAINT

LANE OR LINE	4" SKIP WHITE LINE 7 GAL. PER MILE MILE	GAL.	4" SOLID WHITE LINE 19 GAL. PER MILE MILE	GAL.	8" SOLID YELLOW LINE 38 GAL. PER MILE MILE	GAL.	4" SOLID YELLOW LINE 19 GAL. PER MILE MILE	GAL.	17" EXPOSED CURB SURFACE 82 GAL. PER MILE MILE	GAL.	CONSTRUCT.-STRIPPING MILE	GAL.	CONST. SOURCE REFERENCE
4700 SO.	1.122	7.9	0.699	13.3	0.1271	4.8	0.108	2.1	0.532	43.6			
4100 SO.			1.536	29.2	0.395	15.0			0.602	49.4			
4100 SO. TEMP. DET.												25.0	
3500 SO.	1.532	10.7	1.326	25.2	0.100	3.8			1.049	86.0			
SUB TOTAL		18.6		67.7		23.6		2.1		179.0		25.0	
TOTAL	316												
USE	330												

QUANTITIES SHOWN ON THIS SUMMARY ARE APPROXIMATE

NO.	BY	DATE	TYPE	REMARKS
	T.K. L.C.T.	6-7-73	Const.	Quantities
2	D.J.K.	10/20/72		ADJUST EMB. QUANTITIES
1	D.J.K.	10/10/72	CHANGE	GRANULAR BORROW TOTALS

REVISIONS

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
DISTRICT TWO ROADWAY DESIGN

SOUTH OF 4700 SO. TO NORTH OF 2100 SO.
EARTHWORK
SUMMARY SHEET

DESIGN T.B. 6/8/72 CHECK D.J.K. 6/8/72
DRAWN R.J.O. 6/8/72 CHECK L.J.D. 6/8/72
QUANT G.O.B. 6/8/72 CHECK T.K. 6/8/72
APPROVAL RECOMM. DATE PROJ. DESIGN ENGINEER
APPROVED 6-16-72 DATE DIST. ROWY. DESIGN ENGINEER

REVIEW
DESIGN
R.W.

SALT LAKE COUNTY

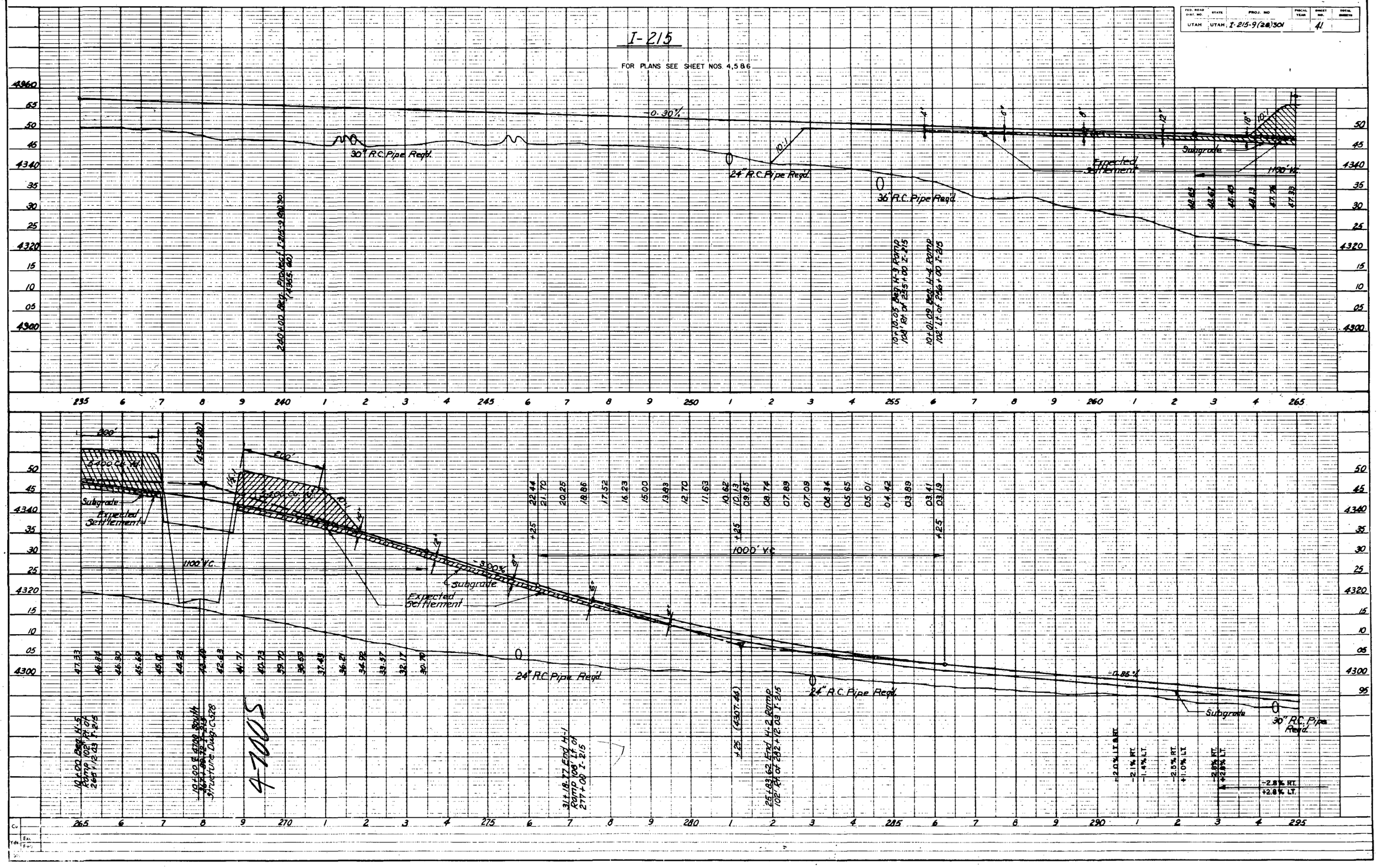
PROJECT NUMBER I-215-9(28)301

SHEET NO. 3-V

FED. ROAD DIST. NO.	STATE	PROJ. NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301		41	

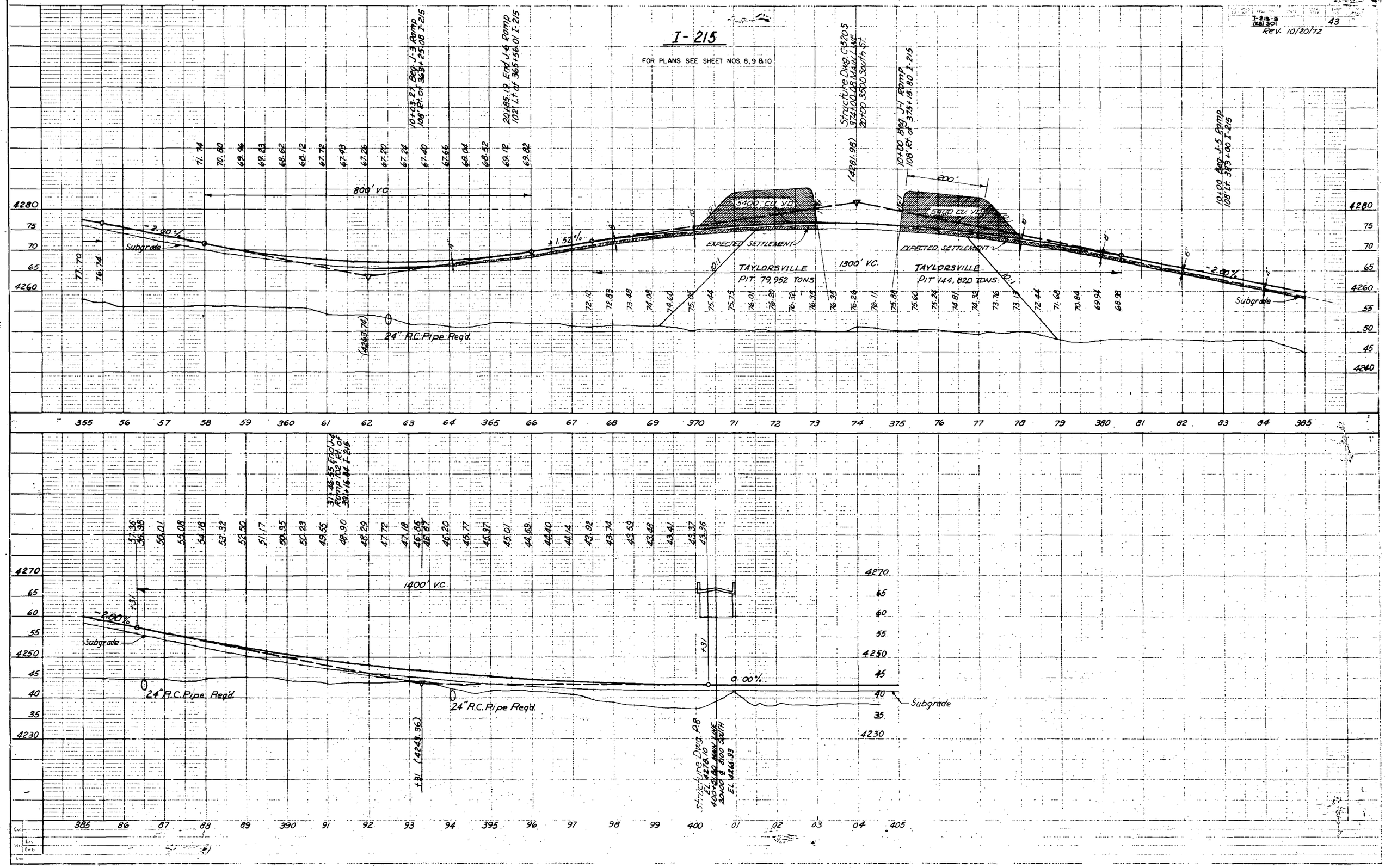
I-215

FOR PLANS SEE SHEET NOS. 4,5 & 6



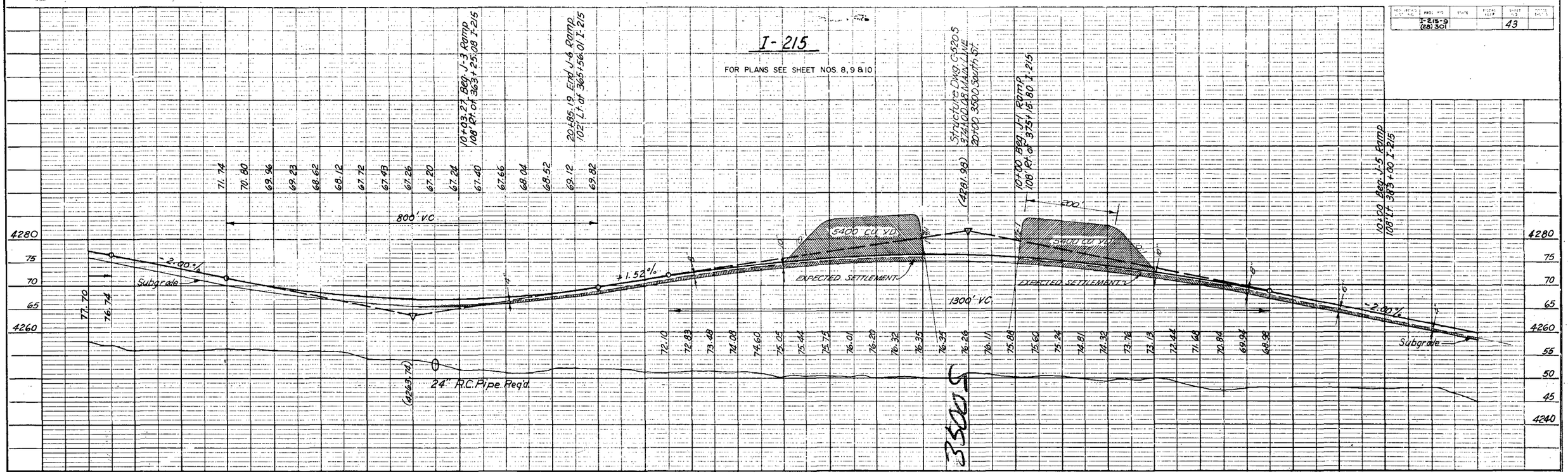
I-215

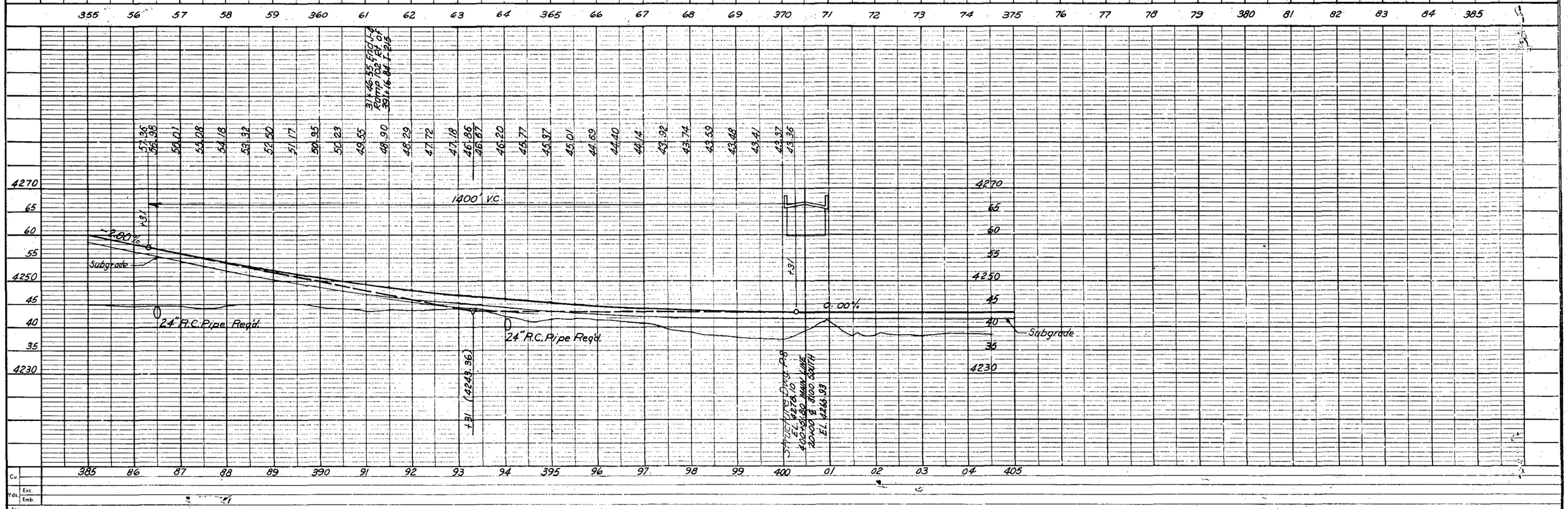
FOR PLANS SEE SHEET NOS. 8, 9 & 10



I-215

FOR PLANS SEE SHEET NOS. 8, 9 & 10





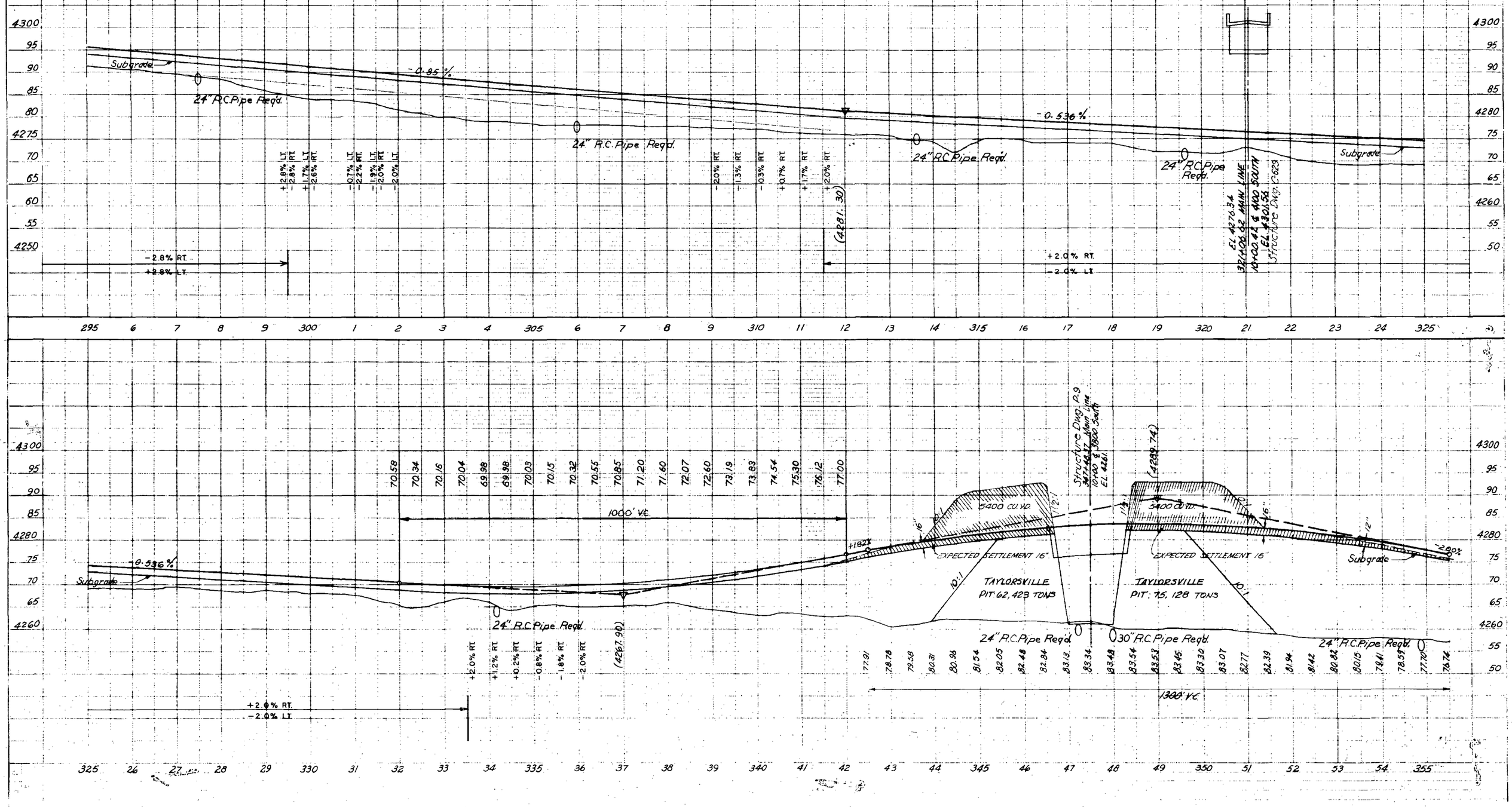
Cu. Yds.	Exc.	
	Emb.	
Sta		

STATE	PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
UTAH	I-215-9(28)301		42	

Rev. 10/20/72

I-215

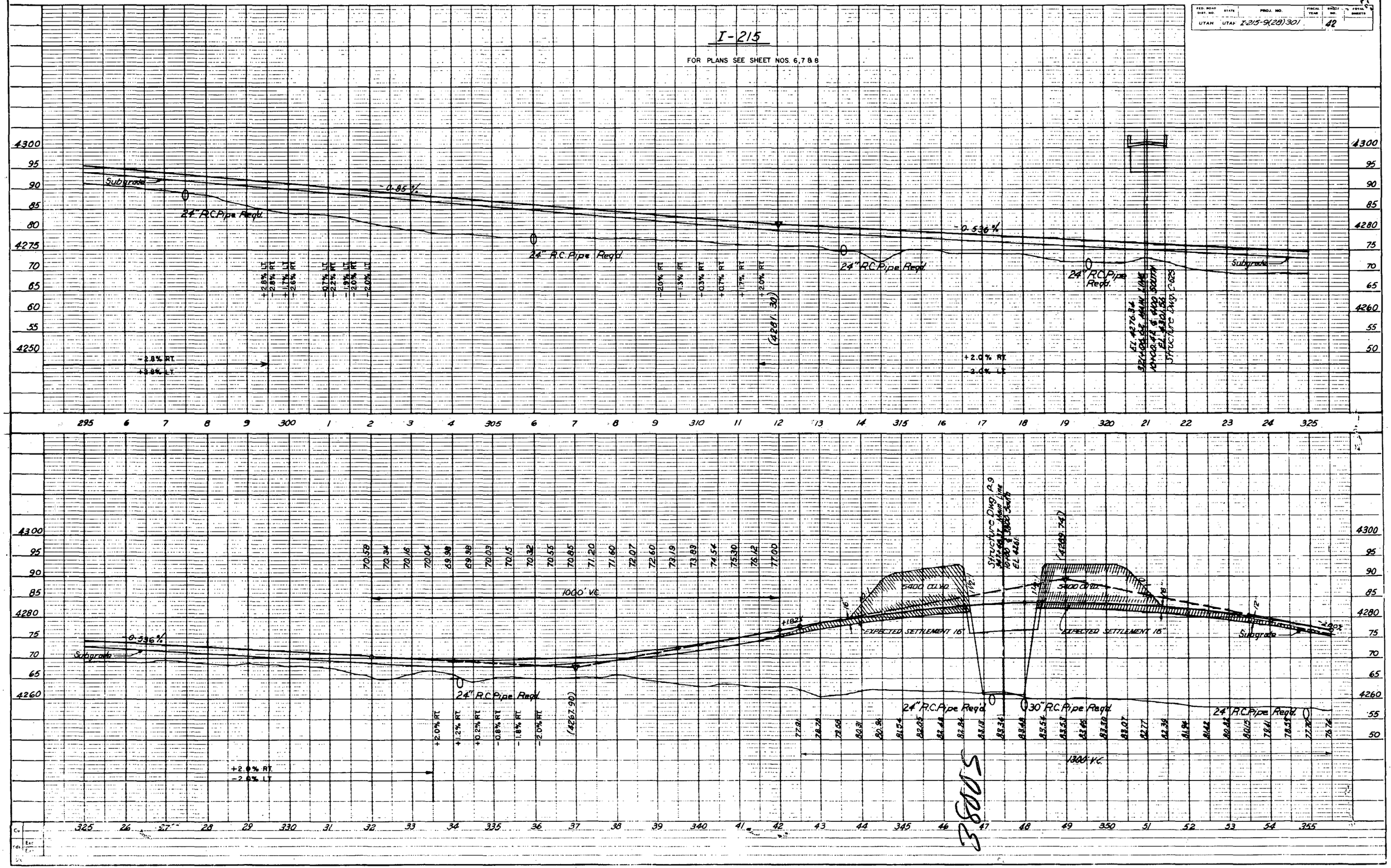
FOR PLANS SEE SHEET NOS. 6, 7 & 8



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
UTAH	UTAH	I-215-9(28)301		42	

I-215

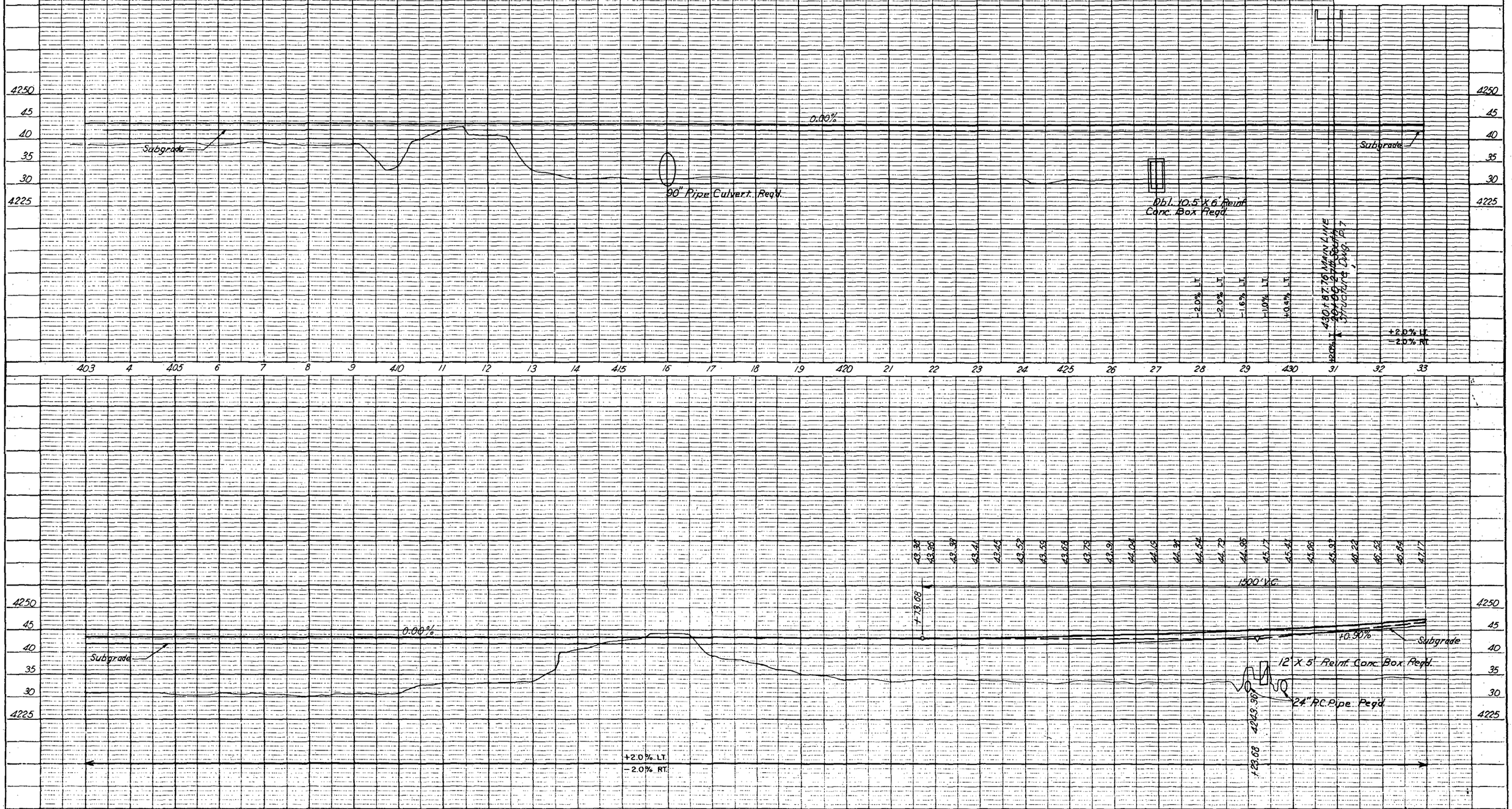
FOR PLANS SEE SHEET NOS. 6, 7 & 8



FED. ROAD DIST. NO.	PROJ. NO.	STATE	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
UTAH	I-215-3 (24) 301	UTAH		44	

I-215

FOR PLANS SEE SHEET NOS. 10, 11 & 12



ENVIRONMENTAL

July 19, 2011

Mr. Tom Walbom
Environmental Operations Manager
Granite Construction Incorporated
P.O. Box 30429
Salt Lake City, UT 84130

Via email: Tom.Walbom@gcinc.com

RE: Soil Sampling Results – 3500 South Street and Interstate 215
IHI Project No. 11U-E7162

Dear Mr. Walbom:

On July 15, 2011, IHI Environmental (IHI) was retained by Granite Construction Incorporated (Granite) to collect a soil sample, for waste characterization purposes, of soils encountered during the above-referenced construction project. Based on information provided to IHI by Granite, the soils encountered were suspected of being Kennecott mine wastes.

Methodology

Mr. Jeffrey Kolmel, IHI Project scientist, conducted the sampling on July 15, 2011. Mr. Justin Rayburn, Granite, showed Mr. Kolmel where the soil in question was encountered and assisted with sample collection. One four-point composite sample was collected form a small excavated area (Photographs 1 through 3) following IHI's Standard Operating Procedures. The soil in question was a greenish yellow sand located near the soil/groundwater interface. A slight unidentifiable odor (i.e. not typical of petroleum hydrocarbons or solvents) was noted during sample collection.

The composite sample was collected and homogenized by hand, then transferred to laboratory-supplied sample containers, labeled, logged onto a chain-of-custody form, and hand-delivered to American West Analytical Laboratories (AWAL), a Utah-certified laboratory. The sample was analyzed for the eight Resource Conservation and Recovery Act (RCRA) metals following the Toxicity Characteristic Leaching Procedure (TCLP), using EPA Methods 6010C, 6020A, and 7470A. A split sample was collected from the original composite sample and was screened for the presence of total metals, using a Niton XLp 702A X-ray fluorescence (XRF) multi-element analyzer.

Results

The results of the TCLP analysis are shown in **Table 1** with the U.S. Environmental Protection Agency's RCRA limits used to determine if a material should be characterized as hazardous waste. The complete laboratory analytical report, including chain-of-custody documentation, is attached.

Table 1
TCLP Results – Composite Soil Sample
(Results reported in mg/L or parts per million)

Sample ID	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Comp-1	0.00463	0.0101	<0.009	<0.0100	<0.002	<0.0100	<0.004	<0.002
RCRA Limit[a]	5.0	100	1.0	5.0	5.0	0.2	1.0	5.0

a – The RCRA limit is the threshold for classification as a hazardous waste.

As shown in **Table 1**, the TCLP analytical results for the composite sample reported levels of arsenic and barium above the laboratory method reporting limits; however, the concentrations were well below the TCPL hazardous waste characterization thresholds for the eight RCRA metals. Based on the TCLP analytical results and Granite's information regarding the suspected source of the soils, the soil in question would not be considered a characteristic hazardous waste.

The results of the XRF screening for total metals concentrations are shown in **Table 2** with typical background concentrations reported in soils located within the Salt Lake City area for comparison.

Table 2
XRF Results – Composite Soil Sample
(Results reported in parts per million)

Sample ID	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Comp-1	<11.0	NA	NA	<187	19.5	<13.1	<7.6	NA
Background[a]	3-35	85-544	<0.1-2.5	8-23	17-327	<0.05-0.3	<0.1-0.7	<0.5-2.7

a – DERR "Draft" Background Soil Data in the Salt Lake City Area, May 21, 1991. NA – Not analyzed. NE – Regional screening level is not established.

As shown in **Table 2**, lead was reported in the sample above the reporting limit; however, the concentration was within the range of background concentrations typically present in the area. It should be noted that the reporting limits for chromium, mercury, and selenium are higher than the range of typical background concentrations; therefore, these metals may be present in the sample above the ranges of background concentrations. Barium, cadmium, and silver cannot be analyzed using the XRF due to equipment limitations and may also be present in the soils. Based on the concentrations of metals reported in the XRF sample, it is IHI's opinion that the soil in question does not have elevated concentrations (i.e. higher than typical background concentrations) of the heavy metals that were analyzed.

Because this sampling was limited to the single open excavation, additional soils may be present that could have different characteristics and concentrations of heavy metals than those documented. If additional suspect soils are encountered, they should be evaluated on a case-by-case basis.

Furthermore, the soils in question were only evaluated for heavy metals concentrations. Due to the soil discoloration and the slight unidentifiable odor that was observed during the sampling

effort, and because not all of the metals could be evaluated with the XRF, additional contaminants may be present that have not yet been identified. As such, IHI recommends the soils be treated as an environmentally suspect waste and disposed of at an appropriately-permitted disposal facility.

IHI Environmental would be pleased to answer any questions you may have regarding this sampling effort. Please feel free to contact me at (801) 466-2223.

Sincerely,

Craig D. Eaton

Craig D. Eaton, P.G.
Manager, Environmental Services

Attachments: Project Limitations
Photo Log
Laboratory Analytical Report

PROJECT LIMITATIONS

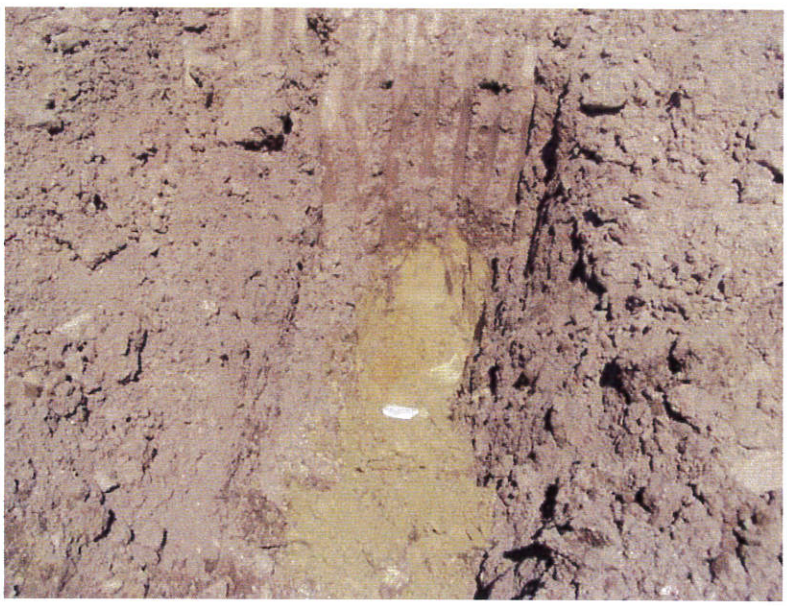
This Project was performed using, as a minimum, practices consistent with standards acceptable within the industry at this time, and a level of diligence typically exercised by environmental consultants performing similar services.

The procedures used attempt to establish a balance between the competing goals of limiting investigative and reporting costs and time, and reducing the uncertainty about unknown conditions. Therefore, because the findings of this report were derived from the scope, costs, time and other limitations, the conclusions should not be construed as a guarantee that all environmental liabilities have been identified and fully evaluated. Where sample collection and testing have been performed, IHI's professional opinions are based in part on the interpretation of data from discrete sampling locations that may not represent conditions at non-sampled locations. Furthermore, IHI assumes no responsibility for omissions or errors resulting from inaccurate information, or data, provided by sources outside of IHI or from omissions or errors in public records.

It is emphasized that the final decision on how much risk to accept always remains with the client since IHI is not in a position to fully understand all of the client's needs. Clients with a greater aversion to risk may want to take additional actions while others, with less aversion to risk, may want to take no further action.

Photograph 1
Excavated area with exposed soil, looking south.

Photograph 2
Excavated area with exposed soil and groundwater.



Photograph 3
Test pit next to excavated area.

American West
ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, UT 84115

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Craig Eaton
IHI Environmental
640 East Wilmington Avenue
Salt Lake City, UT 84106
TEL: (801) 466-2223

RE: Granite 3500 S., I-215

Dear Craig Eaton:

Lab Set ID: 1107317

American West Analytical Laboratories received 1 sample(s) on 7/15/2011 for the analyses presented in the following report.

All analyses were performed in accordance to The NELAC Institute protocols unless noted otherwise. American West Analytical Laboratories is certified by The NELAC Institute in Utah and Texas; and is state certified in Colorado and Idaho. Certification document is available upon request. If you have any questions or concerns regarding this report please feel free to call.

The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or purging efficiency. The "Reporting Limit" found on the report is equivalent to the practical quantitaion limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit. Analytical results are reported to three significant figures for quality control and calculation purposes.

Thank You,

Approved by: Kyle F. Gross — Digitally signed by Kyle F. Gross DN: cn=Kyle F. Gross, o=AWAL, ou=AWAL, email=kyle@awal-labs.com, c=US Date: 2011.07.18 16:14:18 -06'00'

Laboratory Director or designee

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

INORGANIC ANALYTICAL REPORT

American West
ANALYTICAL LABORATORIES

463 West 3600 South
Salt Lake City, UT 84115

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Client: IHI Environmental
Project: Granite 3500 S., I-215
Lab Sample ID: 1107317-001
Client Sample ID: Comp-1
Collection Date: 7/15/2011 1619h
Received Date: 7/15/2011 1648h

Contact: Craig Eaton

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 7/15/2011 1720h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	7/17/2011 1333h	7/18/2011 0054h	SW6020A	0.00300	**0.00463**	
Barium	mg/L	7/17/2011 1333h	7/18/2011 0054h	SW6020A	0.00200	**0.0101**	
Cadmium	mg/L	7/17/2011 1333h	7/18/2011 0054h	SW6020A	0.000900	< 0.000900	*
Chromium	mg/L	7/17/2011 1333h	7/18/2011 0909h	SW6010C	0.0100	< 0.0100	
Lead	mg/L	7/17/2011 1333h	7/18/2011 0054h	SW6020A	0.00200	< 0.00200	*
Mercury	mg/L	7/16/2011 1245h	7/18/2011 0831h	SW7470A	0.0100	< 0.0100	*
Selenium	mg/L	7/17/2011 1333h	7/18/2011 0054h	SW6020A	0.00400	< 0.00400	*
Silver	mg/L	7/17/2011 1333h	7/18/2011 0054h	SW6020A	0.00200	< 0.00200	*

** - The reporting limits were raised due to sample matrix interferences.*

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

August 21, 2015

Avenue Consultants
6575 South Redwood Road, Suite 101
Taylorsville, Utah 84123

Attn: Mr. Andrew Gemperline, P.E.
P: [801] 207-7660
E: andrew@avenueconsultants.com

Re: Analytical Test Summary
I-215 West Side; SR-201 to 4700 South
West Valley City, Utah
UDOT Project No. F-I215(175)16, PIN: 9419
Terracon Project Number: 61155005

Mr. Gemperline:

Terracon Consultants, Inc. (Terracon) has completed the soil sampling and analytical testing at the requested locations along the I-215 West Side; SR-201 to 4700 South project. This letter summarizes the results of the sampling and testing.

FIELD EXPLORATION

Six soil borings were advanced to depths of approximately 12 feet below existing roadway grade along the I-215 alignment from SR-201 to 4700 South using a truck-mounted hollow-stem auger drill rig. Samples were obtained using a 2.0-inch outside diameter split-barrel sampler driven with a 140 pound hammer falling 30 inches. The number of blows required to advance the sampler the last 12 inches of the typical total 18-inch penetration is the standard penetration resistance value (SPT-N).

Five soil samples were collected from each boring, for a total of 30 samples, at approximate 2.5-foot intervals throughout the drill depth. The samples were tagged for identification, sealed in new re-sealable plastic bags and labeled with the Terracon project number, sample name, date and time of collection. Samples were then taken to our laboratory for further examination. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

Logs of the soil borings along with Boring Location Plans are included at the end of this summary letter. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in situ, the transition between materials may be gradual.

Based on the results of the soil borings, subsurface conditions at the boring locations can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum (feet)[1]	Material Encountered	Consistency/Density
Stratum 1 [1]	1	Asphaltic Concrete	---
Stratum 2	2 - 4½	Fill consisting of Silty Sand with Gravel. A layer of Silty Clay encountered in B-5	---
Stratum 3 [3]	12	Fill: Poorly Graded Sand with silt	---
Stratum 4 [2, 3]	12	Lean Clay and Silty Clay	Medium Stiff to Stiff

Notes:
1. Encountered in boring B-3 only.
2. Encountered in boring B-3 and B-6 only.
3. Maximum depth explored.

LABORATORY TESTING

For metals testing, the soils were homogenized inside the baggies by gloved hand, so that the metals analyses represent the average concentrations of metals in the samples. Once homogenized, a Niton XLp 702A multi-element x-ray fluorescence (XRF) analyzer was used to screen each of the 30 samples. One 30-second XRF reading, which correlated to a real-time XRF screening time of approximately one minute due to the age of the XRF's source, was performed on each sample. Results of the XRF are included on the soil boring logs. The bags were stored at Terracon's locked facility for potential future analyses.

Soil samples representative of the concentrations and geographical and depth distribution of the soil samples screened using the XRF were transferred to laboratory-supplied sample containers, placed in an iced cooler, and transported to the analytical laboratory. The samples with the highest observed lead and arsenic XRF concentrations were included in the samples submitted to the analytical laboratory. The samples were analyzed for copper and the 8 Resource Conservation and Recovery Act (RCRA) metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), using the Toxicity Characteristic Leaching Procedure (TCLP), using EPA Method 1311/6010B and 1311/7470A. Samples from the following locations were analyzed in the laboratory.

Soil Boring	Sample Depth (feet)
B-1	5 – 6.5
B-2	0 - 1.5
	2.5 – 4

Soil Boring	Sample Depth (feet)
	5 – 6.5
B-3	10 – 11.5
B-4	2.5 – 4
B-5	0 – 1.5
B-6	0 – 1.5

Results of the analytical laboratory testing performed on soil samples obtained from the site during the field exploration are included.

The information presented in this report is based upon the data obtained from the borings at the indicated locations and from other information discussed in this letter. This letter does not reflect variations that may occur between the exploration points, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction.

The scope of services for this project does not include either specifically or by implication any environmental interpretation of test results, assessment of the site or prevention of pollutants, hazardous materials or conditions. Interpretation of the laboratory test results presented in this report and environmental recommendations and action plans will be completed by others.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

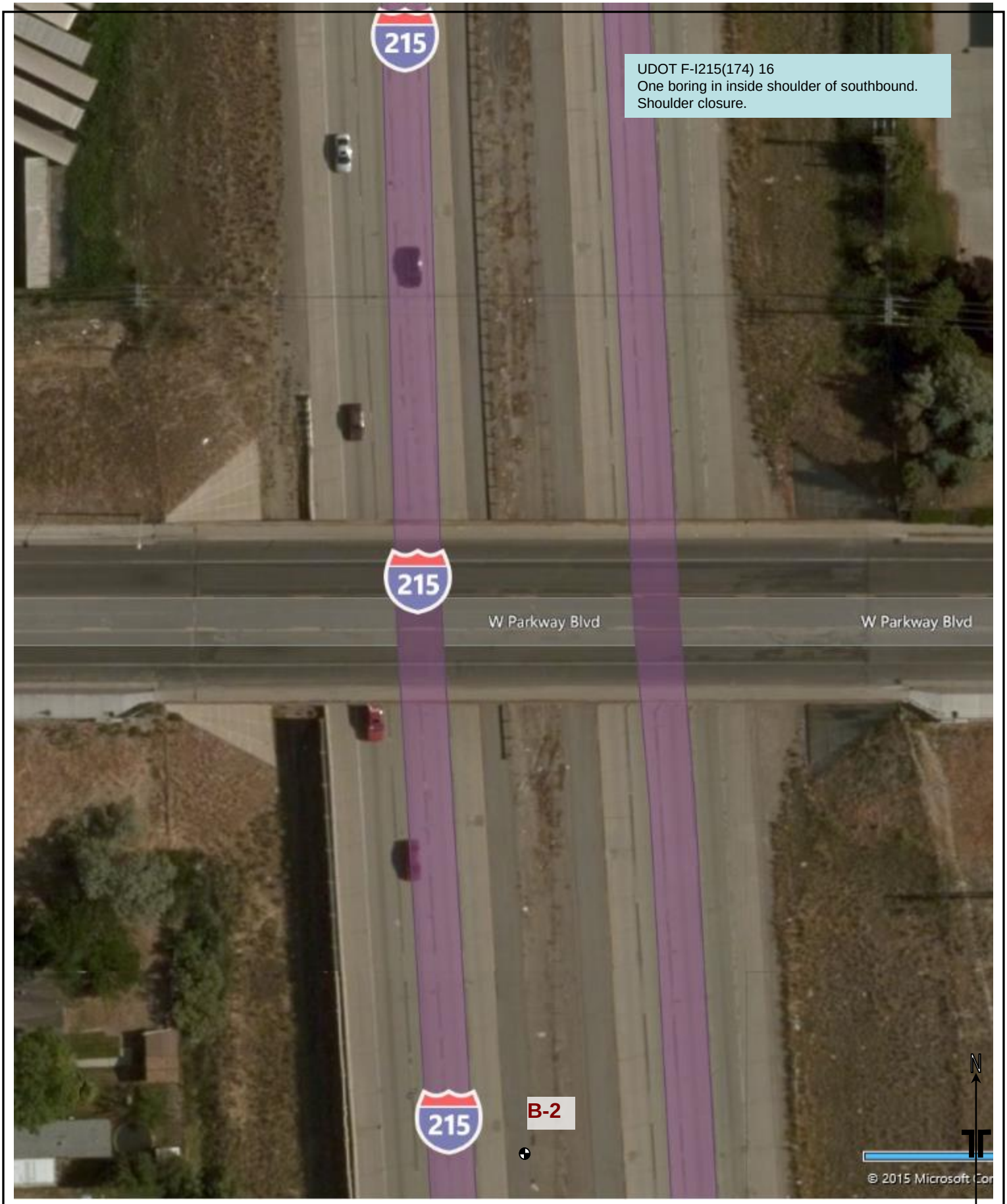
Sincerely,
Terracon Consultants, Inc.

Rick L. Chesnut, P.E., P.G.
Principal

RLC for
Jeff W. Gilbert
Geotechnical Engineer

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

Project Mngr:	Project No. 61155005	Terracon Consulting Engineers & Scientists	BORING LOCATION PLAN	EXHIBIT
Drawn By: Google Earth Pro	Task No. 0	14850 S Pony Express Rd., Ste 150N Bluffdale, Utah 84065	**I-215 Widening- SR-201**	1
Checked By: jwg	Scale: Not to Scale		Salt Lake County, Utah	
Approved By:	Date: 6/15/2015		Avenue	



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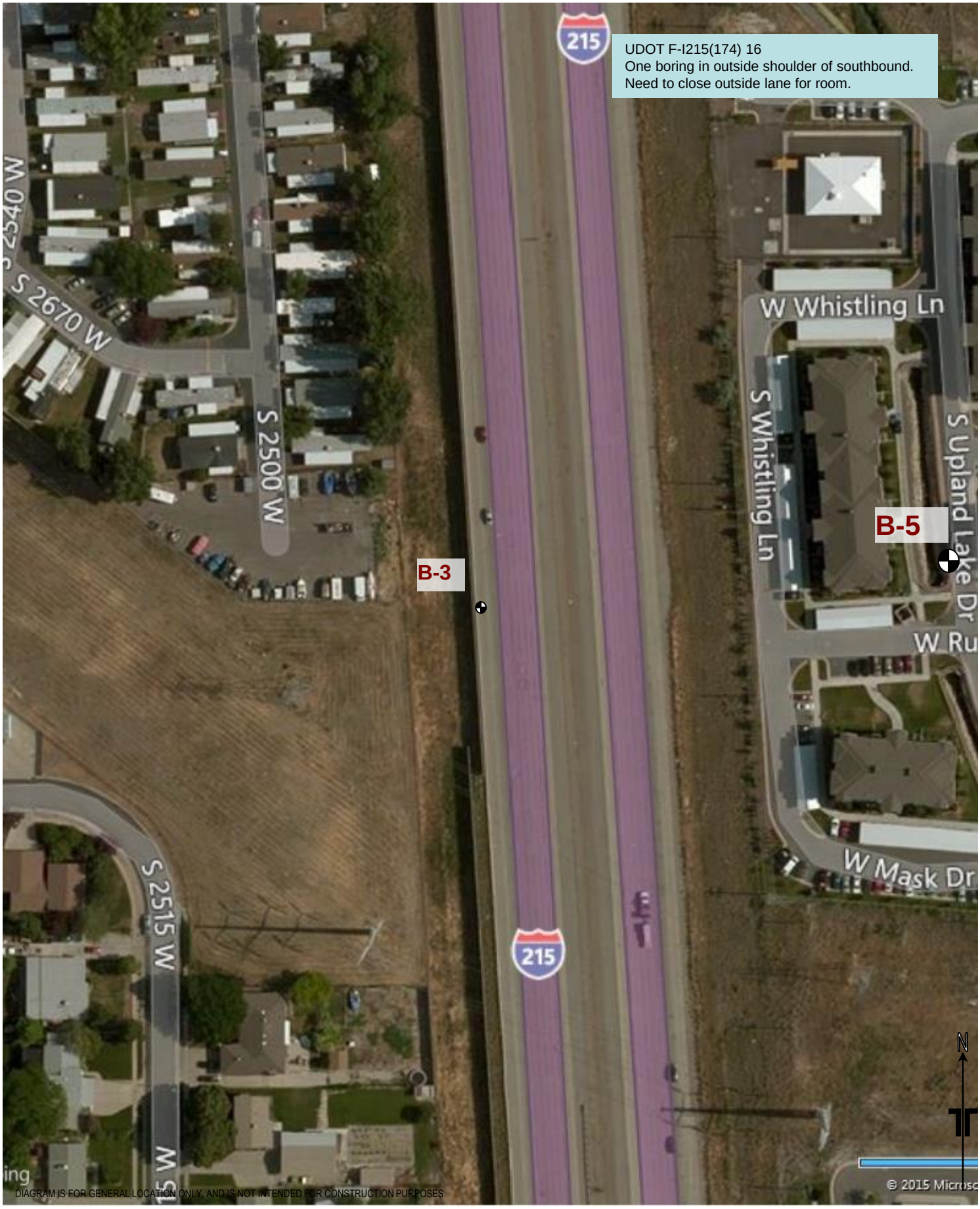
Project Mngr:	Project No. 61155005	Terracon Consulting Engineers & Scientists	BORING LOCATION PLAN	EXHIBIT
Drawn By: Google Earth Pro	Task No. 0	14850 S Pony Express Rd., Ste 150N Bluffdale, Utah 84065	**I-215 Widening- SR-201**	2
Checked By: jwg	Scale: Not to Scale		Salt Lake County, Utah	
Approved By:	Date: 6/15/2015		Avenue	



Project Mngr:	Project No. 61155005	Terracon Consulting Engineers & Scientists	BORING LOCATION PLAN	EXHIBIT
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Checked By: jwg	Scale: Not to Scale		Salt Lake County, Utah	
Approved By:	Date: 6/15/2015		Avenue	

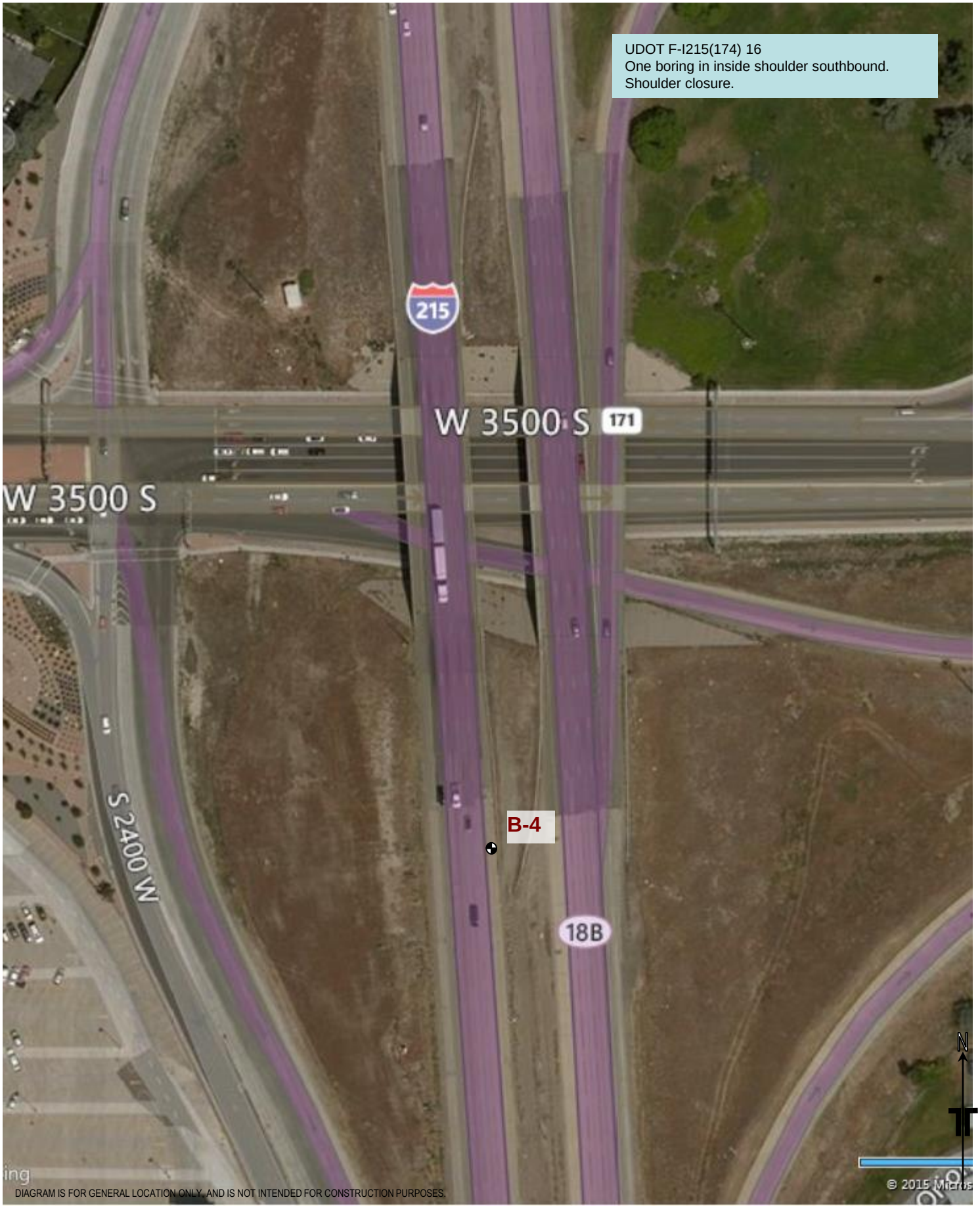
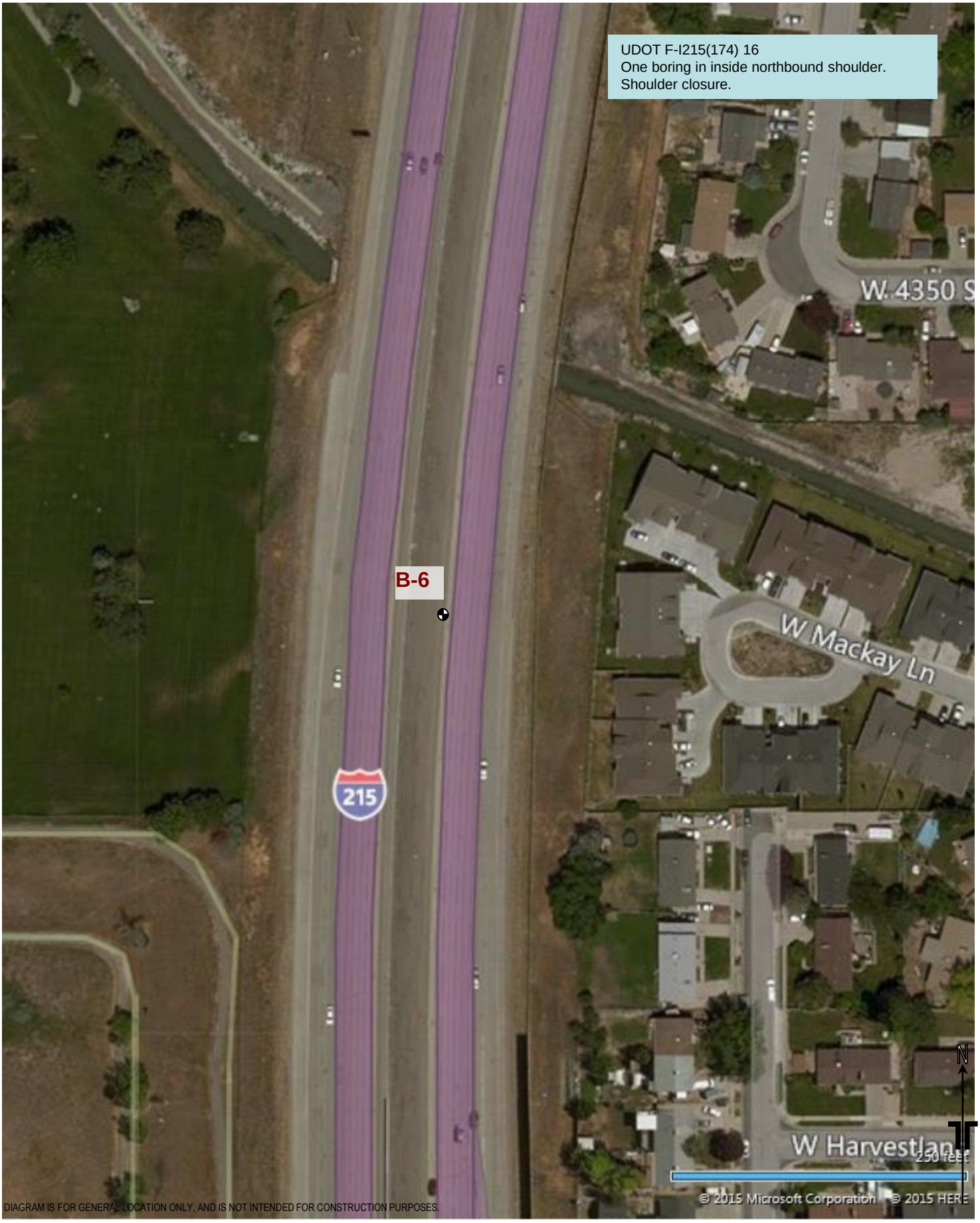


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

Project Mngr:	Project No. 61155005	Terracon Consulting Engineers & Scientists	BORING LOCATION PLAN	EXHIBIT
Drawn By: Google Earth Pro	Task No. 0	14850 S Pony Express Rd., Ste 150N Bluffdale, Utah 84065	**I-215 Widening- SR-201**	4
Checked By: jwg	Scale: Not to Scale		Salt Lake County, Utah	
Approved By:	Date: 6/15/2015		Avenue	

Project Mngr:	**Project No.** 61155005	Terracon Consulting Engineers & Scientists	**BORING LOCATION PLAN**	**EXHIBIT**
Drawn By: Google Earth Pro	**Task No.** 0	14850 S Pony Express Rd., Ste 150N Bluffdale, Utah 84065	**I-215 Widening- SR-201**	5
Checked By: jwg	**Scale:** Not to Scale		**Salt Lake County, Utah**	
Approved By:	**Date:** 6/15/2015		**Avenue**	



Project Mngr:	Project No. 61155005	Terracon Consulting Engineers & Scientists	BORING LOCATION PLAN	EXHIBIT
Drawn By: Google Earth Pro	Task No. 0	14850 S Pony Express Rd., Ste 150N Bluffdale, Utah 84065	**I-215 Widening- SR-201**	6
Checked By: jwg	Scale: Not to Scale		Salt Lake County, Utah	
Approved By:	Date: 6/15/2015		Avenue	

BORING LOG NO. B-1

PROJECT: I-215; SR 201 to 4700 So. Environmental Assesment

CLIENT: Avenue Consultants, Inc
Taylorsville, Utah

SITE: I-215; SR 201 to 4700 South
West Valley City, Utah

LOCATION

Latitude: 40.72071° Longitude: -111.95324°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Pb content (ppm)	As content (ppm)
	FILL - SILTY SAND (SM), brown				14-15-17-21	Pb <LOD 25.5	As <LOD 19.0
3.0	**FILL - POORLY GRADED SAND WITH SILT (SP-SM)**, yellowish-brown				11-11-11-10	Pb <LOD 30.2	As <LOD 18.4
		5			11-15-19-26	Pb <LOD 30.4	As <LOD 20.1
	grayish-brown				8-24-31-36	Pb <LOD 24.7	As <LOD 18.9
	gray and brown layers	10			10-7-10-9	Pb <LOD 27.8	As <LOD 19.6
12.0	***Boring Terminated at 12 Feet***						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow stem auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix Refert o attached Key to Symbols for explanation of symbols and abbreviations.

Notes:

LOD = Level of Detection
Soil samples collected were screened with X-Ray Fluorescent Analyzer (XRF) to identify Pb and As content
Soil sample selected from 5' to 7' for further analytical testing

WATER LEVEL OBSERVATIONS

Not encountered

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

Boring Started: 8/12/2015 | Boring Completed: 8/12/2015

Drill Rig: Simco 2800 | Driller: A-Cache

Project No.: 61155005

DRAFT

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 61155005 I-215 ENVIRONMENTAL ASSESMENT.GPJ TERRACON2015.GDT 8/27/15

BORING LOG NO. B-2

PROJECT: I-215; SR 201 to 4700 So. Environmental Assesment

CLIENT: Avenue Consultants, Inc
Taylorsville, Utah

SITE: I-215; SR 201 to 4700 South
West Valley City, Utah

LOCATION

Latitude: 40.7117° Longitude: -111.95367°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Pb content (ppm)	As content (ppm)
0 – 2.0	**FILL - SILTY SAND WITH GRAVEL (SM)**, brown to light brown				18-17-15-13	Pb <LOD 28.4	As <LOD 20.2
2.0 – 4.0	**FILL - SILTY CLAY WITH SAND (CL-ML)**, brown to gray, very stiff, trace gravel				6-8-14-17	Pb = 143.1 +/- 31.1	As <LOD 34.9
4.0 – 12.0	**FILL - POORLY GRADED SAND (SP)**, gray to brown	5			10-18-15-25	Pb <LOD 26.4	As = 47.2 +/- 16.1
					9-18-16-14	Pb <LOD 28.8	As <LOD 22.4
		10	▽		3-3-3-5	Pb <LOD 26.9	As <LOD 19.5
12.0	***Boring Terminated at 12 Feet***						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow stem auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix Refert o attached Key to Symbols for explanation of symbols and abbreviations.

Notes:

LOD = Level of Detection
Soil samples selected at 0' ,2.5', and 5' for further analytical testing
Soil samples collected were screened with X-Ray Fluorescent Analyzer (XRF) to identify Pb and As content

WATER LEVEL OBSERVATIONS

▽ *11' While drilling*

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

Boring Started: 8/12/2015
Boring Completed: 8/12/2015
Drill Rig: Simco 2800
Driller: A-Cache
Project No.: 61155005

DRAFT

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 61155005 I-215 ENVIRONMENTAL ASSESMENT.GPJ TERRACON2015.GDT 8/27/15

BORING LOG NO. B-3

PROJECT: I-215; SR 201 to 4700 So. Environmental Assesment

CLIENT: Avenue Consultants, Inc
Taylorsville, Utah

SITE: I-215; SR 201 to 4700 South
West Valley City, Utah

LOCATION

Latitude: 40.70752° Longitude: -111.95359°

DEPTH	Description	FIELD TEST RESULTS	Pb content (ppm)	As content (ppm)
1.0	**ASPHALT CONCRETE**			
3.5	**FILL - SILTY SAND WITH GRAVEL (SM)**, brown to light brown	23-27-19-13	Pb <LOD 19.1	As <LOD 15.0
5.5	**FILL - POORLY GRADED SAND (SP)**, gray, fines content increasing with depth	5-11-32-38	Pb <LOD 26.2	As <LOD 17.9
8.0	**LEAN CLAY (CL)**, gray, stiff, interbedded silt lenses	2-4-6-5	Pb <LOD 25.7	As <LOD 20.2
9.5	**POORLY GRADED SAND (SP)**, gray, loose	1-3-5-5	Pb <LOD 25.1	As <LOD 17.7
12.0	**LEAN CLAY (CL)**, brown to gray, soft	2-2-2-6	Pb <LOD 28.0	As <LOD 20.0
	Boring Terminated at 12 Feet			

DEPTH (Ft.): 5, 10

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow stem auger

Abandonment Method:
Backfilled with soil cuttings upon completion and repatched with concrete.

See Appendix Refert o attached Key to Symbols for explanation of symbols and abbreviations.

Notes:

LOD = Level of Detection
Soil samples collected were screened with X-Ray Fluorescent Analyzer (XRF) to identify Pb and As content
Soil sample selected from 10' to 12' for further analytical testing

WATER LEVEL OBSERVATIONS

Not encountered

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

Boring Started: 8/12/2015 | Boring Completed: 8/12/2015

Drill Rig: Simco 2800 | Driller: A-Cache

Project No.: 61155005

DRAFT

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 61155005 I-215 ENVIRONMENTAL ASSESMENT.GPJ TERRACON2015.GDT 8/27/15

BORING LOG NO. B-4

PROJECT: I-215; SR 201 to 4700 So. Environmental Assesment

CLIENT: Avenue Consultants, Inc
Taylorsville, Utah

SITE: I-215; SR 201 to 4700 South
West Valley City, Utah

LOCATION

Latitude: 40.69568° Longitude: -111.9523°

DEPTH	Description	Depth (Ft.)	Field Test Results	Pb content (ppm)	As content (ppm)
2.0	**FILL - SILTY SAND WITH GRAVEL (SM)**, brown		5-11-9-13	Pb <LOD 24.4	As <LOD 17.4
3.5	**FILL - SANDY LEAN CLAY (CL)**, brown, silt lenses, trace gravel, orange mottling		4-4-9-14	Pb = 36.1 +/- 22.1	As <LOD 23.2
8.0	**FILL - POORLY GRADED SAND WITH SILT (SP-SM)**, yellow, oxidation stains	5	14-29-27-22	Pb <LOD 28.6	As <LOD 19.6
12.0	**FILL - POORLY GRADED SAND (SP)**, grayish-brown		6-17-28-40	Pb <LOD 25.1	As <LOD 18.5
	FILL - , darker with depth	10	12-31-40-55	Pb <LOD 25.4	As <LOD 17.7
	Boring Terminated at 12 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow stem auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix Refert o attached Key to Symbols for explanation of symbols and abbreviations.

Notes:

LOD = Level of Detection
Soil samples collected were screened with X-Ray Fluorescent Analyzer (XRF) to identify Pb and As content
Soil sample selected from 2.5' to 4.5' for further analytical testing

WATER LEVEL OBSERVATIONS

Not encountered

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

Boring Started: 8/12/2015
Boring Completed: 8/12/2015
Drill Rig: Simco 2800
Driller: A-Cache
Project No.: 61155005

DRAFT

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 61155005 I-215 ENVIRONMENTAL ASSESMENT.GPJ TERRACON2015.GDT 8/27/15

BORING LOG NO. B-5

PROJECT: I-215; SR 201 to 4700 So. Environmental Assesment

CLIENT: Avenue Consultants, Inc
Taylorsville, Utah

SITE: I-215; SR 201 to 4700 South
West Valley City, Utah

LOCATION

Latitude: 40.68864° Longitude: -111.95176°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	Pb content (ppm)	As content (ppm)
	FILL - SILTY SAND WITH GRAVEL (SM), brown				13-27-32-32	Pb <LOD 27.2	As <LOD 20.5
3.5	**FILL - SILTY CLAY (CL-ML)**, brown				12-14-9-4	Pb <LOD 18.3	As <LOD 15.8
4.5	**FILL - POORLY GRADED SAND (SP)**, gray to brown	5			5-16-17-21	Pb <LOD 27.8	As <LOD 18.7
					6-14-21-31	Pb <LOD 27.6	As <LOD 19.2
		10			13-26-30-35	Pb <LOD 26.9	As <LOD 20.2
12.0	***Boring Terminated at 12 Feet***						

DRAFT

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow stem auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix Refert o attached Key to Symbols for explanation of symbols and abbreviations.

Notes:

LOD = Level of Detection
Soil sample selected from 0 to 2' for further analytical testing
Soil samples collected were screened with X-Ray Fluorescent Analyzer (XRF) to identify Pb and As content

WATER LEVEL OBSERVATIONS

Not encountered

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

Boring Started: 8/12/2015
Boring Completed: 8/12/2015
Drill Rig: Simco 2800
Driller: A-Cache
Project No.: 61155005

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BORING LOG NO. B-6

PROJECT: I-215; SR 201 to 4700 So. Environmental Assesment

CLIENT: Avenue Consultants, Inc
Taylorsville, Utah

SITE: I-215; SR 201 to 4700 South
West Valley City, Utah

LOCATION

Latitude: 40.67525° Longitude: -111.95252°

DEPTH	Description	FIELD TEST RESULTS	Pb content (ppm)	As content (ppm)
	FILL - SILTY SAND WITH GRAVEL (SM), brown, orange mottling	11-14-17-12	Pb = 57.2 +/- 23.2	As <LOD 23.0
2.5	**LEAN CLAY WITH SILT (CL)**, brown, medium stiff to stiff	2-4-5-5	Pb <LOD 23.5	As = 26.9 +/- 13.6
		2-2-3-4	Pb <LOD 26.9	As <LOD 20.0
7.0	**LEAN CLAY (CL)**, light brown, medium stiff	2-3-4-5	Pb <LOD 23.3	As = 31.9 +/- 13.7
9.5	**SILTY CLAY (CL-ML)**, brown, medium stiff, interbedded silt lenses	1-3-4-4	Pb <LOD 25.2	As <LOD 18.9
12.0	***Boring Terminated at 12 Feet***			

DEPTH (Ft.): 5, 10

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow stem auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix Refert o attached Key to Symbols for explanation of symbols and abbreviations.

Notes:

LOD = Level of Detection
Soil sample selected from 0 to 2' for further analytical testing
Soil samples collected were screened with X-Ray Fluorescent Analyzer (XRF) to identify Pb and As content

WATER LEVEL OBSERVATIONS

Not encountered

Terracon
14850 S. Pony Express Rd, Suite 150N
Bluffdale, Utah

Boring Started: 8/12/2015
Boring Completed: 8/12/2015
Drill Rig: Simco 2800
Driller: A-Cache
Project No.: 61155005

DRAFT

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 61155005 I-215 ENVIRONMENTAL ASSESMENT.GPJ TERRACON2015.GDT 8/27/15

ANALYTICAL REPORT

August 27, 2015

Terracon - Salt Lake City, UT

Sample Delivery Group:	L783206
Samples Received:	08/15/2015
Project Number:	61155005 Task 1
Description:	AveCon - I-215 West Side; 201 to 4700 South
Report To:	Craig Eaton 640 E Wilmington Avenue Salt Lake City, UT 84106

Entire Report Reviewed By: Daphne R Richards

Daphne Richards
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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B-1 AT 5 L783206-01 Waste

Collected by: Ashley Scothern
Collected date/time: 08/13/15 14:30
Received date/time: 08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:04	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:23	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

B-2 AT 0 L783206-02 Waste

Collected by: Ashley Scothern
Collected date/time: 08/13/15 14:35
Received date/time: 08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:06	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:07	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

B-2 AT 2.5 L783206-03 Waste

Collected by: Ashley Scothern
Collected date/time: 08/13/15 14:40
Received date/time: 08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:08	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:26	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

B-2 AT 5 L783206-04 Waste

Collected by: Ashley Scothern
Collected date/time: 08/13/15 14:45
Received date/time: 08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:11	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:29	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

B-3 AT 10 L783206-05 Waste

Collected by: Ashley Scothern
Collected date/time: 08/13/15 14:50
Received date/time: 08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:17	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:32	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

B-4 AT 2.5 L783206-06 Waste

Collected by: Ashley Scothern
Collected date/time: 08/13/15 14:55
Received date/time: 08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:19	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:35	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

B-5 AT 0 L783206-07 Waste

Collected by	Collected date/time	Received date/time
Ashley Scothern	08/13/15 15:00	08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:22	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:38	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

B-6 AT 0 L783206-08 Waste

Collected by	Collected date/time	Received date/time
Ashley Scothern	08/13/15 15:05	08/15/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Mercury by Method 7470A	WG810426	1	08/21/15 09:34	08/21/15 11:24	TRB
Metals (ICP) by Method 6010B	WG810404	1	08/20/15 11:27	08/20/15 15:46	ST
Preparation by Method 1311	WG810236	1	08/19/15 17:47	08/19/15 17:48	BG

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the

Daphne R Richards

Daphne Richards
Technical Service Representative

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:04	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:23	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:23	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:23	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:23	WG810404
Copper	0.635		0.450		1	08/20/2015 15:23	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:23	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:23	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:23	WG810404

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:06	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:07	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:07	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:07	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:07	WG810404
Copper	ND		0.450		1	08/20/2015 15:07	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:07	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:07	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:07	WG810404

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:08	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:26	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:26	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:26	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:26	WG810404
Copper	ND		0.450		1	08/20/2015 15:26	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:26	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:26	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:26	WG810404

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:11	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:29	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:29	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:29	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:29	WG810404
Copper	12.7		0.450		1	08/20/2015 15:29	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:29	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:29	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:29	WG810404

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:17	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:32	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:32	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:32	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:32	WG810404
Copper	ND		0.450		1	08/20/2015 15:32	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:32	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:32	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:32	WG810404

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:19	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:35	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:35	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:35	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:35	WG810404
Copper	1.48		0.450		1	08/20/2015 15:35	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:35	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:35	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:35	WG810404

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:22	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:38	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:38	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:38	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:38	WG810404
Copper	ND		0.450		1	08/20/2015 15:38	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:38	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:38	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:38	WG810404

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		8/19/2015 5:47:35 PM	WG810236

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	08/21/2015 11:24	WG810426

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.450	5	1	08/20/2015 15:46	WG810404
Barium	ND		1.35	100	1	08/20/2015 15:46	WG810404
Cadmium	ND		0.450	1	1	08/20/2015 15:46	WG810404
Chromium	ND		0.450	5	1	08/20/2015 15:46	WG810404
Copper	ND		0.450		1	08/20/2015 15:46	WG810404
Lead	ND		0.450	5	1	08/20/2015 15:46	WG810404
Selenium	ND		0.450	1	1	08/20/2015 15:46	WG810404
Silver	ND		0.450	5	1	08/20/2015 15:46	WG810404

Method Blank (MB)

(MB) 08/21/15 10:51

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Mercury	ND		0.0100

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 08/21/15 10:53 • (LCSD) 08/21/15 10:55

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.0300	0.0314	0.0303	105	101	80-120			3	20

L782993-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 08/21/15 10:57 • (MS) 08/21/15 11:00 • (MSD) 08/21/15 11:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.0300	ND	0.0288	0.0314	96	105	1	75-125			9	20

Method Blank (MB)

(MB) 08/20/15 14:36

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Arsenic	ND		0.450
Barium	ND		1.35
Cadmium	ND		0.450
Chromium	ND		0.450
Copper	ND		0.450
Lead	ND		0.450
Selenium	ND		0.450
Silver	ND		0.450

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 08/20/15 14:56 • (LCSD) 08/20/15 14:58

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Arsenic	9.00	8.71	8.68	97	96	80-120			0	20
Barium	9.00	8.52	8.46	95	94	80-120			1	20
Cadmium	9.00	8.81	8.76	98	97	80-120			1	20
Chromium	9.00	8.91	8.86	99	98	80-120			1	20
Copper	9.00	8.61	8.50	96	94	80-120			1	20
Lead	9.00	9.12	9.04	101	100	80-120			1	20
Selenium	9.00	8.97	8.96	100	100	80-120			0	20
Silver	9.00	8.76	8.74	97	97	80-120			0	20

L783206-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 08/20/15 15:07 • (MS) 08/20/15 15:13 • (MSD) 08/20/15 15:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	9.00	0.00271	9.09	9.09	101	101	1	75-125			0	20
Barium	9.00	0.652	9.02	8.98	93	93	1	75-125			0	20
Cadmium	9.00	ND	9.04	9.00	100	100	1	75-125			0	20
Chromium	9.00	0.0101	8.97	8.98	100	100	1	75-125			0	20
Copper	9.00	ND	8.67	8.59	96	95	1	75-125			1	20
Lead	9.00	0.00893	9.29	9.26	103	103	1	75-125			0	20
Selenium	9.00	0.0182	9.43	9.46	105	105	1	75-125			0	20
Silver	9.00	0.000193	8.90	8.84	99	98	1	75-125			1	20

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ACCREDITATIONS & LOCATIONS

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**

State Accreditations

Alabama	40660
Alaska	UST-080
Arizona	AZ0612
Arkansas	88-0469
California	01157CA
Colorado	TN00003
Conneticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia [1]	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
Iowa	364
Kansas	E-10277
Kentucky [1]	90010
Kentucky [2]	16
Louisiana	AI30792
Maine	TN0002
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086
Nebraska	NE-OS-15-05
Nevada	TN-03-2002-34
New Hampshire	2975
New Jersey–NELAP	TN002
New Mexico	TN00003
New York	11742
North Carolina	Env375
North Carolina [1]	DW21704
North Carolina [2]	41
North Dakota	R-140
Ohio–VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	221
South Carolina	84004
South Dakota	n/a
Tennessee [1 4]	2006
Texas	T 104704245-07-TX
Texas [5]	LAB0152
Utah	6157585858
Vermont	VT2006
Virginia	109
Washington	C1915
West Virginia	233
Wisconsin	9980939910
Wyoming	A2LA

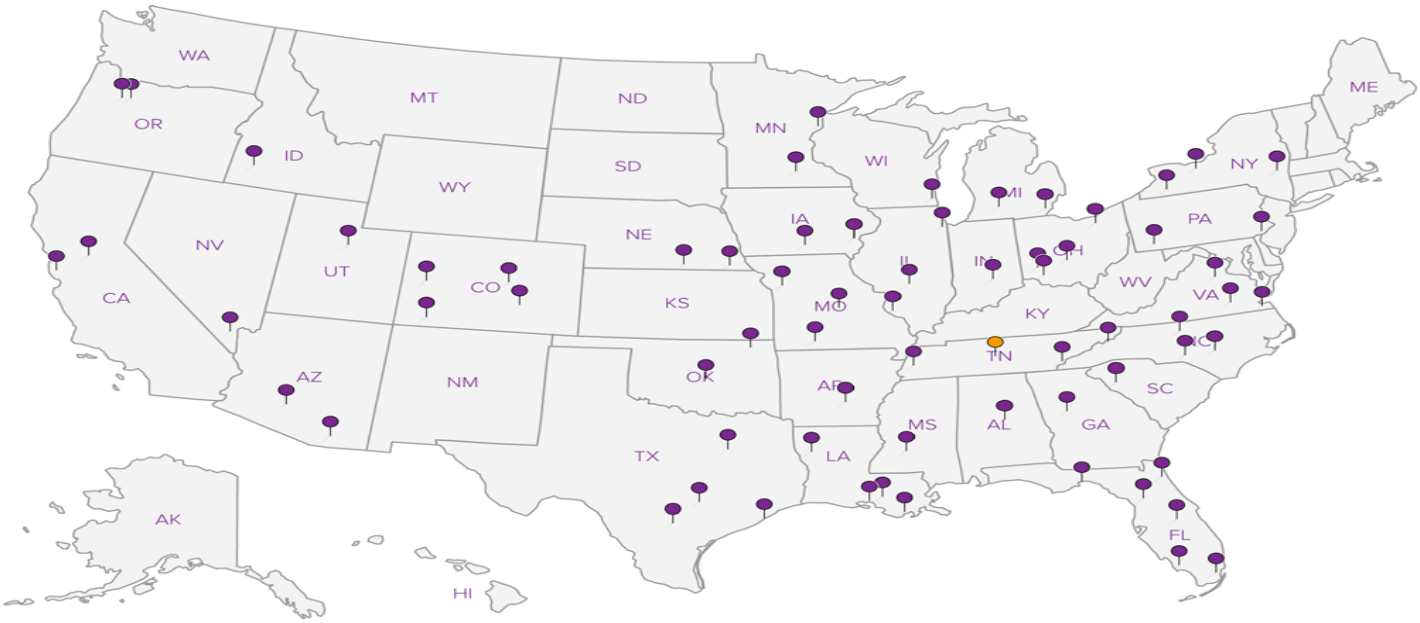
[1.] Drinking Water [2.] Underground Storage Tanks [3.] Aquatic Toxicity [4.] Chemical/Microbiological [5.] Mold [n/a] Accreditation not applicable

Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01
Canada	1461.01
EPA–Crypto	TN00003
AIHA	100789
DOD	1461.01
USDA	S-67674

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Company Name/Address:
Terracon Consultants, Inc.
640 E. Wilmington Avenue
Salt Lake City, Utah 84106

Billing Information: Same

Report to: Craig Eaton

Email To: Craig.Eaton@terracon.com

Project Description: AveCon - I-215 West Side; 201 to 4700 South

City/State Collected: West Valley City, UT

Phone: (801) 746-5446
Fax:

Client Project # 61155005 Task 1

Lab Project #

Collected by (print): Ashley Scothern

Site/Facility ID #

P.O. #

Collected by (signature): Ashley Scothern

Immediately Packed on Ice N ____ Y ✔

Rush? (Lab MUST Be Notified)
____ Same Day 200%
____ Next Day 100%
____ Two Day 50%
____ Three Day 25%

Date Results Needed

Email? ___No ✔Yes
FAX? ✔No ___Yes

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

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YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L783206
E217

Acctnum:
Template:
Prelogin:
TSR:
PB:
Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	8 RCRA Metals by TCLP	Copper by TCLP	Rem./Contaminant	Sample # (lab only)
B-1 @ 5	Comp	SS	5-7 ft	8/13/15	14:30	1	X	X		-01
B-2 @ 0	Comp	SS	0-2 ft	8/13/15	14:35	1	X	X		-02
B-2 @ 2.5	Comp	SS	2.5-4.5	8/13/15	14:40	1	X	X		-03
B-2 @ 5	Comp	SS	5-7 ft	8/13/15	14:45	1	X	X		-04
B-3 @ 10	Comp	SS	10-12 ft	8/13/15	14:50	1	X	X		-05
B-4 @ 2.5	Comp	SS	2.5-4.5	8/13/15	14:55	1	X	X		-06
B-5 @ 0	Comp	SS	0-2 ft	8/13/15	15:00	1	X	X		-07
B-6 @ 0	Comp	SS	0-2 ft	8/13/15	15:05	1	X	X		-08

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

6089 7175 8591

Hold #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Ashley Scothern	8-14-15	16:05	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____

Temp: 3.2 °C Bottles Received: 8-4oz

Date: 8.15.15 Time: 900

Condition: (lab use only) GOOD

COC Seal Intact: ____Y ____N ✓NA

pH Checked: NCF:

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

Bulk	Shelby Tube	Split Spoon
Rock Core	Macro Core	Modified California Ring Sampler
Grab Sample	No Recovery	Modified Dames & Moore Ring Sampler

WATER LEVEL

- Water Initially Encountered
- Water Level After a Specified Period of Time
- Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
N	N value
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

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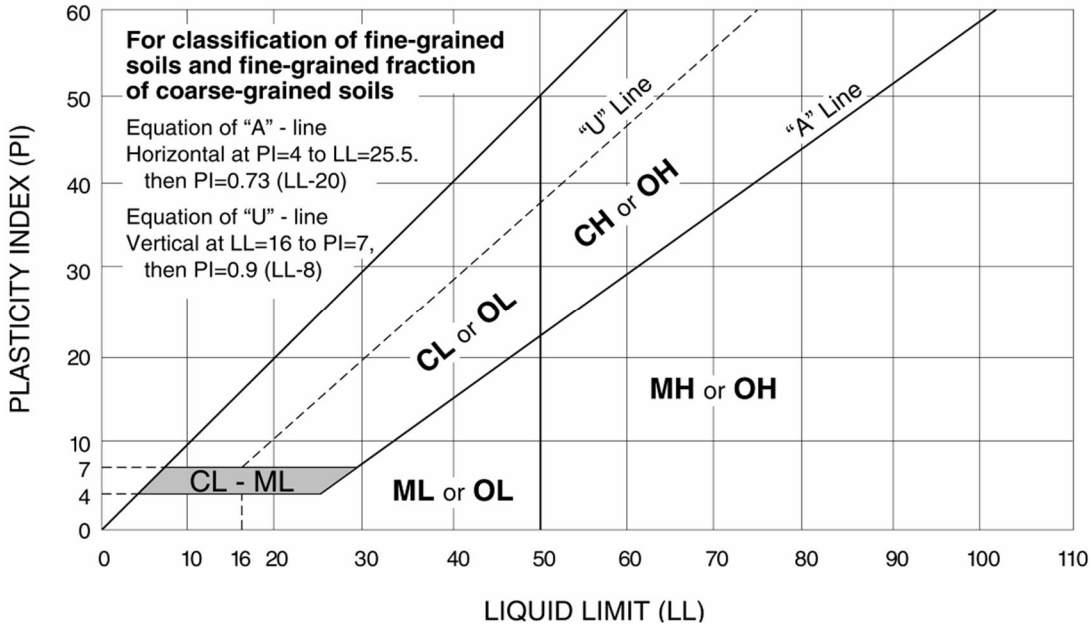
UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	$PI > 7$ and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			$PI < 4$ or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay [K,L,M,N]
						Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay [K,L,M,P]
						Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] $PI \geq 4$ and plots on or above "A" line.
[O] $PI < 4$ or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



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