State of Utah

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Lieutenant Governor

DEPARTMENT OF TRANSPORTATION

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Deputy Director of Engineering and Operations

September 28, 2021

Mr. Robert Wight, P.E.
Region One Director
Utah Department of Transportation
166 West Southwell Street
Ogden, UT 84404

SUBJECT: UDOT Project Number S-R199(229) – S.R. 177; West Davis Highway; 1-15 & SR-67 to SR-193; West Davis Corridor Trail Crossing near Kays Creek (ATC 62) (PIN 11268)
Environmental Impact Statement Re-evaluation #9-1

Dear Mr. Wight:

A Final Environmental Impact Statement (EIS) and Section 4(f) Evaluation for the West Davis Corridor (WDC) project was completed in June 2017 and approved through the issuance of a Record of Decision (ROD) on September 29, 2017, from the Federal Highway Administration (FHWA). Subsequently, a re-evaluation of the WDC Kaysville roadway, trail, and detention changes was prepared and approved on April 7, 2020. This current Re-evaluation (also referred to herein as Re-evaluation #9-1) addresses proposed changes to the WDC trail crossing design near Kays Creek in Davis County, Utah.

This memorandum is intended to support a decision regarding whether a supplemental EIS is required pursuant to applicable criteria in FHWA's National Environmental Policy Act (NEPA) regulations. The regulations in 23 Code of Federal Regulations (CFR) Section 771.130(a) provide that supplemental EIS is required when "(1) changes to the proposed action would result in significant environmental impacts that were not evaluated in the EIS; or (2) new information or circumstances relevant to environmental concerns and bearing on the proposed action or its impacts would result in significant environmental impacts not evaluated in the EIS."

To support that determination, this memorandum summarizes a proposed refinement to the Final EIS Selected Alternative, describes changes in the affected environment, and considers whether any of the changes in the proposed project and affected environment would require a supplemental EIS. The appendices to this memorandum include supporting figures, technical documentation, and clearance memoranda.

The environmental review, consultation, and other actions required by applicable federal environmental laws for the proposed WDC project are being or have been carried out by the Utah Department of Transportation (UDOT) pursuant to 23 United States Code (USC) Section 327 and a Memorandum of Understanding (MOU) dated January 17, 2017, and executed by FHWA and UDOT. The WDC project was excluded from the assignment MOU, and FHWA maintained NEPA responsibility of the environmental review process until its issuance of a

ROD. Under the assignment MOU, UDOT is responsible for conducting any additional environmental reviews (including Re-evaluations) that are required for the WDC project following issuance of the ROD.

Therefore, this Re-evaluation is being processed in accordance with the assignment MOU, and UDOT is the agency responsible for approving this Re-evaluation.

BACKGROUND OF AND NEED FOR THE RE-EVALUATION

The EIS/Section 4(f) Evaluation and ROD evaluated the environmental impacts of improving regional mobility in western Davis and Weber Counties.

After the completion of the WDC ROD in 2019 and early 2020, UDOT conducted more detailed survey and engineering work to update the WDC design prior to issuing the WDC Request for Proposals (RFP) in April 2020. Changes with the RFP design compared to the Final EIS Selected Alternative's design are considered to be the Refined Selected Alternative and were evaluated in *Kaysville Roadway, Trail and Detention Changes in Davis County Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9* (Re-evaluation #9; UDOT 2020).

Following the RFP, Farmington Bay Constructors (FBC) developed a design that contains Alternative Technical Concepts (ATCs) to the Refined Selected Alternative. The ATCs were submitted to UDOT during the design phase, and UDOT accepted or denied each submittal. UDOT also identified ATCs that required additional environmental re-evaluation.

This Re-evaluation (Re-evaluation #9-1) analyzes the impacts resulting from proposed design changes to the West Davis Corridor Trail crossing near Kays Creek in Davis County, Utah. These design changes are identified as the Final Construction Design.

DESCRIPTION OF THE FINAL CONSTRUCTION DESIGN

The Final Construction Design (ATC 62) modifies the grade-separated West Davis Corridor Trail crossing near Kays Creek that is included in the Refined Selected Alternative. In the Final Construction Design, the trail would cross under the WDC through a box culvert (see Figures 1 and 2). The Final Construction Design eliminates the embankment, retaining wall, and grade-separated structure approaches needed for the grade-separated crossing, thereby improving trail users' experiences and requiring less long-term structural maintenance than the Refined Selected Alternative.

The Final Construction Design also reroutes Stephenson Ditch, through a proposed pipeline, to Kays Creek on the east side of the WDC. The ditch is currently routed via north-south pipeline, which discharges to Kays Creek on the southwest side of the proposed WDC alignment. The proposed pipeline would connect to Stephenson Ditch at the same location as the current pipeline but would route the ditch southeast at that junction. The proposed pipeline would connect with Kays Creek southeast of the proposed WDC alignment. By rerouting the ditch to Kays Creek, the Final Construction Design eliminates trail and roadway drainage impacts as well as potential impacts of settlement due to the WDC roadway fill contained in the Refined Selected Alternative design.

Figure 1 shows the project location and the evaluation area contained in Re-evaluation #9 (Refined Selected Alternative). Figure 2 provides a closer view of the areas of impact compared to Re-evaluation #9. Table 1 provides a summary of the changes evaluated in this Re-evaluation.

Changes from Refined Selected Alternative Incorporated with the Final Construction Design

The elements of the Final Construction Design that are different from the Refined Selected Alternative are described below. Changes associated with the Final Construction Design, indicated in Table 1, could be incorporated into any of the WDC alternatives evaluated in the Final EIS (UDOT 2017) and would not change the basis for choosing Alternative B1 with the Wetland Avoidance Option as the Selected Alternative in the ROD.

West Davis Corridor Trail Crossing

The West Davis Corridor Trail crossing would be changed from a pedestrian overpass to a box culvert that crosses under WDC. The box would have a 14-foot-wide and 10-foot-tall opening. If the full pavement section cannot be provided over the box, the box lid may be used as the driving surface to minimize the amount by which the WDC profile would be raised.

The elevation of the box floor is at or above the Kays Creek 100-year flood elevation and would be designed to facilitate using the nearby drainage system to drain the box.

Eliminate Refined Selected Alternative Trail Overpass Embankment

The long, steep grades needed for the West Davis Corridor Trail crossing structure (overpass) over the WDC would be eliminated with the Final Construction Design. Eliminating the approach embankments would reduce future maintenance costs.

Raise WDC Profile to Accommodate Box Culvert

The WDC roadway profile would be raised by 3.5 feet to provide sufficient elevation for the box culvert. The profile raise would be kept to a minimum to avoid potential settlement issues related to increased fill heights.

Additional Right-of-Way

Additional right-of-way would be required to accommodate the box culvert at-grade approach in the west side of the WDC. The additional right-of-way would be located in Parcel 944, which is owned by UDOT.

Reroute Stephenson Ditch

The Final Construction Design would reroute Stephenson Ditch to Kays Creek by enclosing it in a pipeline. Compared to the Refined Selected Alternative, which would route the ditch under the WDC through a pipe, the Final Construction Design would improve access to the WDC for roadway maintenance and would reduce potential settlement issues on the pipe related to the WDC roadway fill.

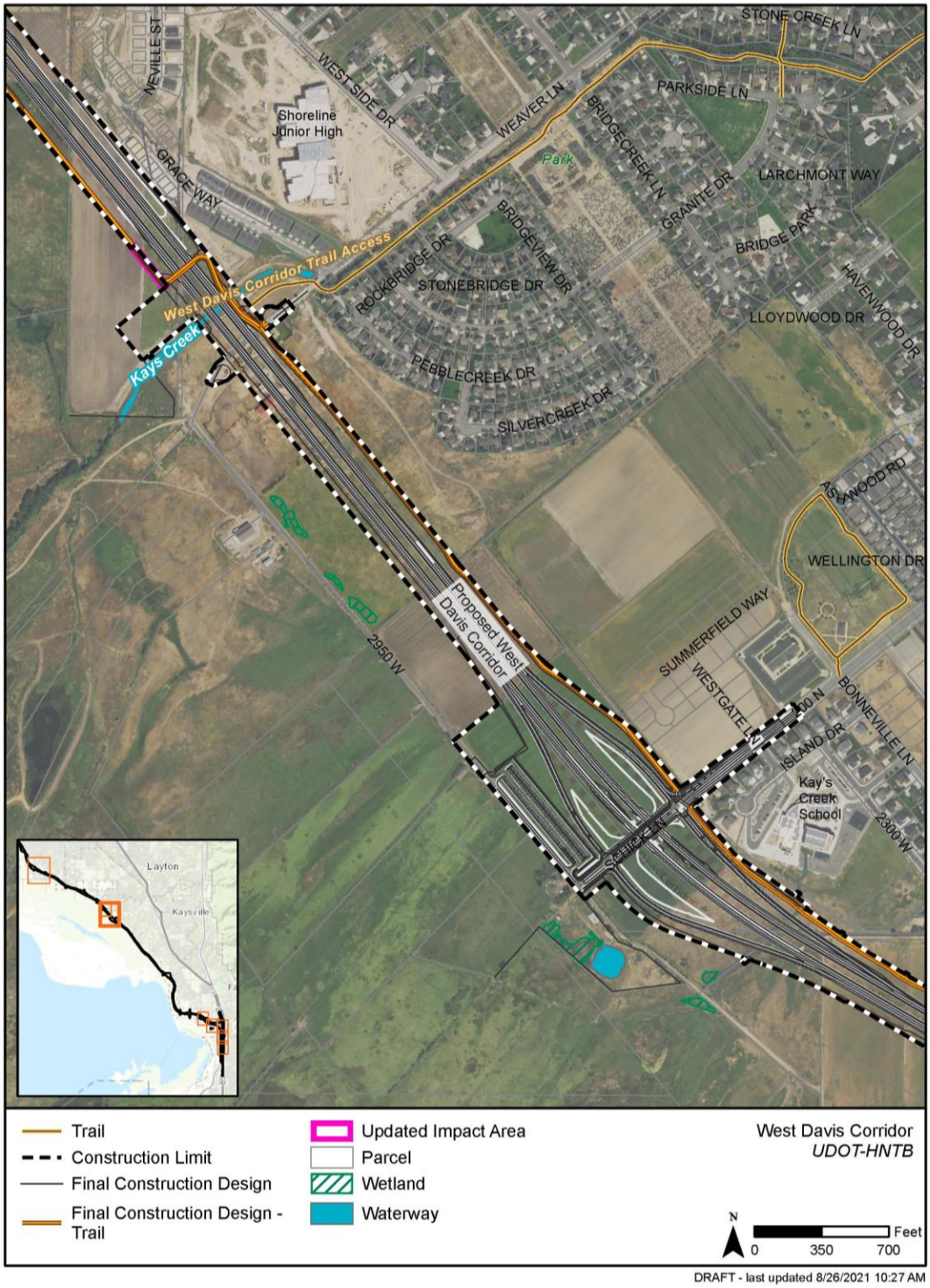

FIGURE 1. Final Construction Design Location and Design Changes to Previously Evaluated Alternatives

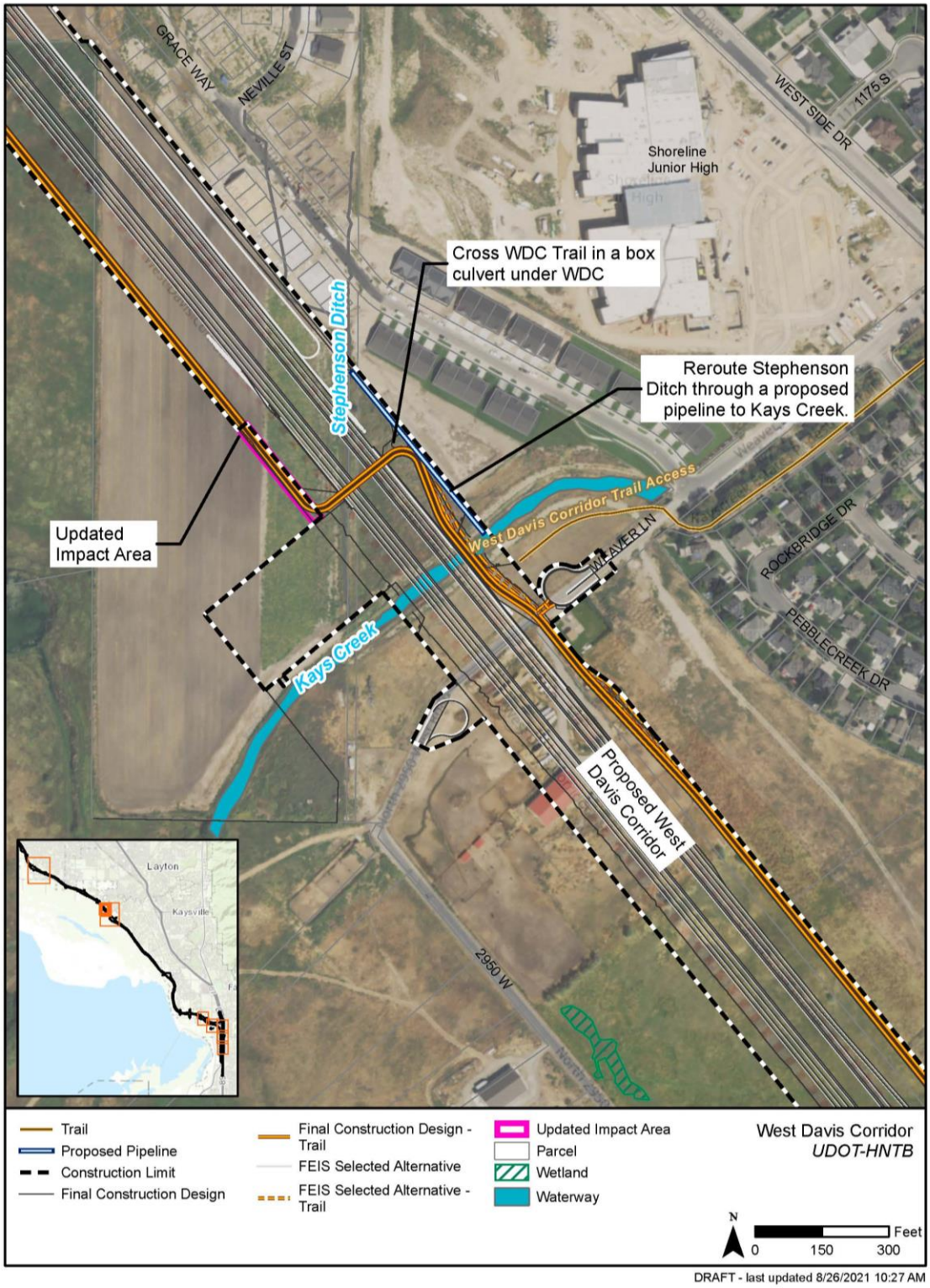

FIGURE 2. Final Construction Design's Proposed Changes to Refined Selected Alternative

TABLE 1
Summary of Roadway Changes in Re-evaluation #9-1

Final EIS Selected Alternative (Alternative B1 with Wetland Avoidance Option)	**Refined Selected Alternative** (Re-evaluation #9)	**Final Construction Design** Alternative Technical Concept 62 – West Davis Corridor Trail near Kays Creek
• WDC Trail on the west side of the WDC roadway in Kaysville • Trail overpass crossing for the Kays Creek Trail near 2950 West/Weaver Lane • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) • Park-and-ride lot at the Schick Lane/200 North interchange • Several detention basins based on the preliminary drainage design	• WDC Trail on the east side of the WDC roadway in Kaysville • WDC Trail connection to the Kays Creek Trail at 2950 West/Weaver Lane and new WDC Trail overpass north of Kays Creek • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) and cul-de-sacs at Galbraith Lane and 2950 West/Weaver Lane • Minor widening and striping on Schick Lane/200 North east of WDC to accommodate turning movements at the WDC Schick Lane/200 North interchange • Park-and-ride lot at the Schick Lane/200 North interchange • Updated number, size, and location of detention basins	• WDC Trail crossing in a box culvert under the WDC north of Kays Creek • Eliminate Refined Selected Alternative trail overpass embankment, including wall and structure approaches to the crossing • WDC profile raised 3.5 feet to provide elevation for box culvert • Requires additional right-of-way from a UDOT-owned parcel • Reroute Stephenson Ditch to Kays Creek via a pipeline east of WDC

NOTES:
WDC = West Davis Corridor

RE-EVALUATION ANALYSIS

Following is a summary of the main components of the Final EIS and any changes associated with each component as a result of proposed Final Construction Design and the re-evaluation of previously known and newly identified environmental resources in the project area.

Purpose and Need

As stated in the Final EIS, the purpose of the WDC project is to improve regional mobility and enhance peak-period mobility in western Davis and Weber Counties. The proposed changes associated with the Final Construction Design do not change the original project concept or project purpose; therefore, the purpose of and need for the project remain valid.

Independent Utility

No additional transportation improvements are necessary for the WDC project to function as intended. The Final Construction Design would not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

Alternatives

The changes with the Final Construction Design described above in Table 1 would apply to any of the WDC alternatives evaluated in the Final EIS and would not change the basis for choosing Alternative B1 with the Wetland Avoidance Option as the Selected Alternative in the ROD.

ENVIRONMENTAL CONSEQUENCES ANALYSIS

UDOT has evaluated the expected impacts to the natural and built environment from the Final Construction Design. No substantial changes would occur to the natural or built environment as a result of the Final Construction Design that would significantly affect the quality of the human and natural environment. The impacts of these changes are not individually or cumulatively significant or significantly different from those described in the 2017 Final EIS and ROD for the EIS Selected Alternative. As part of the Re-evaluation process, UDOT reviewed and updated the ecosystem resources (wildlife, wetlands, and waters of the U.S.) and cultural resources clearances for the WDC project. Clearance memos for ecosystems, cultural, 4(f), and noise resources are provided in Appendices A, B, C, and D, respectively.

Land Use

The Final Construction Design would convert an additional 0.2 acre of agricultural land use to a transportation corridor use, compared to the Refined Selected Alternative. The additional 0.2 acre conversion would be used to accommodate the West Davis Corridor Trail alignment on the west side of the WDC, near the trail crossing of the WDC. UDOT owns the property for this additional 0.2 acre for the WDC Trail. The Final Construction Design would convert 13.4 fewer acres of agricultural land use to a transportation corridor use, compared to the Final EIS Selected Alternative.

Farmland

The Final Construction Design would convert an additional 0.2 acre of land identified in the Final EIS (UDOT 2017) as being used for alfalfa, idle, grass hay, or pasture compared to Re-evaluation #9. The additional 0.2 acre conversion would be used to accommodate the West Davis Corridor Trail alignment on the west side of the WDC, near the trail crossing of the WDC. The Final Construction Design would convert 9.8 fewer acres of land being used for alfalfa, idle, grass hay, or pasture to roadway use compared to the Final EIS Selected Alternative.

The additional 0.2 acre conversion of farmland for the Final Construction Design is not enough to increase the total percentage of affected irrigated cropland evaluated in the Final EIS and Re-evaluation #9.

Pedestrians and Bicyclists

The Final Construction Design would change the type of West Davis Corridor Trail crossing from an overpass structure to a box culvert with approaches at grade level. The box culvert crossing would be a few hundred feet north of the overpass proposed in the Refined Selected Alternative. The Final Construction Design would

eliminate the grade-separated structure, including the long approaches to the structure, described in Re-evaluation #9.

As with the Final EIS Selected Alternative and the Refined Selected Alternative, the Final Construction Design would provide a dedicated crossing of the WDC for pedestrians and bicyclists that would be physically separated from motorized traffic on the WDC. The West Davis Corridor Trail would be located on the east side of WDC south of the trail crossing then west of WDC once it crosses beneath WDC. Layton City prefers the west of WDC trail location, which is consistent with the Final EIS Selected Alternative.

The Final Construction Design would have beneficial impacts for pedestrians and cyclists similar to those described in the Final EIS for the EIS Selected Alternative and in Re-evaluation #9 for the Refined Selected Alternative. The result of the analysis would not change.

Noise

The Final Construction Design includes proposed changes to the WDC Trail crossing design near Kays Creek that require additional noise analysis due to WDC mainline profile changes that are greater than 3 feet when compared to the Refined Selected Alternative.

The Re-evaluation #9 noise analysis evaluated noise impacts and noise walls in the vicinity of Kays Creek. Noise sensitive receptors were analyzed within approximately 600 feet of the WDC mainline and were impacted with the Refined Selected Alternative. Noise walls did not meet UDOT's feasibility and reasonableness criteria and were not recommended.

The Re-evaluation #9-1 noise study area is defined based on the extent of noise-sensitive receptors within approximately 600 feet of WDC mainline, which includes newly developed residential receptors since the Re-evaluation #9 noise analysis. The newly developed residential receptors begin north of station 1451+00 (approximately 500 feet north of Kays Creek). The receptors previously evaluated under Re-evaluation #9 are located south of Station 1451+00 (N1448-N1499). The newly developed residential receptors extend north into the noise study area analyzed in Re-evaluation #7, where there are also WDC mainline profile changes that are greater than 3 feet when compared to the Refined Selected Alternative. One receptor in the Re-evaluation #9-1 noise study area was previously evaluated under Re-evaluation #7 (N1441) at approximately station 1481+00. The WDC mainline profile changes that are greater than 3 feet with the Final Construction Design extend from approximately station 1430+00 to 1460+00 and station 1470+00 to 1480+00.

For the current 155 residential receptors (53 analyzed in Re-evaluations #9 and #7, with 102 added since) located in the noise study area, noise levels substantially increase (10-dBA or more increase over existing noise levels) due to the introduction of new highway alignment for the WDC mainline; therefore, all 155 residential receptors would have traffic noise impacts. Fifty-three (53) of the residential receptors would also experience noise levels that approach or exceed the NAC of 66 dBA Leq(h) for Activity Category B.

UDOT evaluated a noise wall at heights ranging from 11 to 13 feet to provide mitigation to 155 residential receptors, 74 of which are front-row receptors to the WDC mainline. Noise Wall 10 would be located along northbound side of the WDC at a 36-foot offset from the shoulder stripe consistent with the clear zone required for noise walls. An exception to the 36-foot offset is in the vicinity of Kays Creek and WDC Trail box culverts, where the noise wall would be located behind concrete safety barrier adjacent to the edge of pavement in order

to pass over the creek. The noise wall would be limited to 10 feet above the roadway when on box culvert structures. Noise Wall 10 analyzed at a height of 12 feet and 5,406 feet long from approximately station 1440+00 to 1494+00 meets UDOT's noise-reduction (feasible and reasonable) and cost-effectiveness criteria; therefore, Noise Wall 10 is recommended for balloting under UDOT's Noise Abatement Policy.

Noise abatement measures analyzed and deemed feasible and reasonable in the environmental study phase are still subject to final design and balloting. The final decision to construct the proposed noise barrier will not be made until completion of the project design and refined utility relocation and right-of-way costs are available. Reasonableness will be revisited prior to balloting.

Table 2 summarizes the environmental impacts that would change as a result of the Final Construction Design, compared to the Final EIS Selected Alternative and the Refined Selected Alternative. Additional information is provided below.

TABLE 2
Summary of Re-evaluation Analysis of Environmental Impacts

Environmental Resource	Changed? Yes	Changed? No	Comments
Land Use	X		The Final Construction Design would convert 13.4 fewer acres of agricultural use to a transportation corridor compared to the Final EIS Selected Alternative.
Farmland	X		The Final Construction Design would convert 9.8 fewer acres of land used for alfalfa, idle, grass hay, or pasture to roadway use compared to the Final EIS Selected Alternative.
Community		X	No changes identified.
Environmental Justice		X	No changes identified.
Transportation		X	No changes identified.
Economics		X	No changes identified.
Joint Development		X	No changes identified.
Pedestrian and Bicyclist	X		The West Davis Corridor Trail would cross underneath WDC in a box culvert and would eliminate the grade-separated structures described in Re-evaluation #9.
Air Quality		X	No changes identified.
Noise	X		Noise Wall 10 (5,406 feet long and a height of 12 feet) is recommended for balloting.
Water Quality		X	No changes identified.
Ecosystem		X	No changes identified.
Floodplains		X	No changes identified.
Historic, Archaeological, and Paleontological		X	The Area of Potential Effects (APE) for the Final Construction Design is the same as the APE used to evaluate alternatives in the Final EIS APE (Meess and Ellis 2012). No previously recorded archaeological or historic-age properties are located in the vicinity of the Final Construction Design. No cultural resource impacts are anticipated.

Environmental Resource	Changed? Yes	Changed? No	Comments
Hazardous Waste		X	No changes identified.
Visual		X	The vertical profile of WDC would change (raise by 3.5 feet) to accommodate the box culvert for the West Davis Corridor Trail crossing under the roadway in the Final Construction Design. The Final EIS identified a high visual impact from the Selected Alternative. The Final Construction Design would not change that visual impact rating.
Energy		X	No changes identified.
Construction Impacts		X	No changes identified.
Indirect Effects		X	No changes identified.
Cumulative Impacts		X	No changes identified.
Permits, Reviews, and Approvals		X	No changes identified.
Section 4(f) Resources		X	The West Davis Corridor Trail is not included in the Section 4(f) resource evaluation in the Final EIS or ROD. Because the trail would be a newly constructed feature, there would be no impact on Section 4(f) resources. The Final Construction Design would not result in any changes to or additional Section 4(f) uses.
Sequencing		X	No changes identified.

PUBLIC INVOLVEMENT EFFORTS

Based on input from UDOT Environmental Services and Region leadership, no additional formal public involvement opportunities were provided. The project team maintained a project hotline and answered questions when they were submitted.

CONCLUSION

The Final EIS and Section 4(f) Evaluation for the West Davis Corridor has been re-evaluated as required by the FHWA regulations found in 23 CFR Parts 771 and 774, FHWA Technical Advisory T6640.8A, and the National Environmental Policy Act.

UDOT has evaluated the expected impacts to the natural and built environments from the Final Construction Design and evaluated any changes and new information against the analysis in the Final EIS. No substantial changes would occur to the natural or built environment as a result of the Final Construction Design that would significantly affect the quality of the human and natural environment. The impacts of these changes are not individually or cumulatively significant or significantly different from those described in the 2017 Final EIS and ROD for the EIS Selected Alternative.

Per 23 CFR Section 771.130(a), an EIS shall be supplemented whenever (1) changes to the proposed action would result in significant environmental impacts that were not evaluated in the EIS or (2) new information or circumstances relevant to environmental concerns and bearing on the proposed action or its impacts would result in significant environmental impacts not evaluated in the EIS. UDOT has determined that preparing a supplemental EIS is not necessary since the changes to the proposed action, new information, or new circumstances described in this Re-evaluation do not result in significant environmental impacts.

UDOT Environmental Services requests concurrence that the Re-evaluation has demonstrated that the ROD remains valid and that the proposed resources, impacts, and methodology documented in this environmental Re-evaluation are valid in accordance with 23 CFR Section 771.129.

Sincerely,

Brandon D. Weston
UDOT Environmental Services Director

Enclosures

EIS Re-evaluation Approval
UDOT Project Number S-R199(229) – S.R. 177; West Davis Highway; 1-15 & SR-67 to SR-193
West Davis Corridor Trail Crossing near Kays Creek – Davis County, Utah (PIN 11268)

_____ 10/04/2021

Robert J. Wight, PE **Date**
Region One Director
Utah Department of Transportation

REFERENCES

Meess, Sara, and Sheri Murray Ellis. 2012. *Historic Buildings Assessment for the Proposed West Davis Corridor Project, Davis and Weber Counties, Utah.* Antiquities Project Number U-10-ST-0812ps. SWCA Environmental Consultants, Salt Lake City. May.

Utah Department of Transportation (UDOT) 2017. *West Davis Corridor Final Environmental Impact Statement and Section 4(f) Evaluation.* June.

UDOT. 2020. *UDOT Project Number S-0067(14)0, S.R. 67, West Davis Corridor; Kaysville Roadway, Trail, and Detention Changes in Davis County, Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9.* April.

This resource memo identifies design changes as “Alternative Design.”

The “Alternative Design” is the same as the “Final Construction Design” described in the re-evaluation.

The resource memo also includes an incorrect UDOT project number. The correct number is included in the re-evaluation.

Memorandum

Environmental Services

DATE: April 12, 2021

TO: Staci Hill, Environmental Planning Director, HNTB

FROM: Matt Howard, Natural Resources Manager

SUBJECT: S-R199(299); West Davis Corridor Trail Crossing near Kays Creek reevaluation

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Staci,

I have reviewed the environmental reevaluation for the West Davis Corridor Trail Crossing near Kays Creek project concerning potential impacts to threatened and endangered species and concur with its findings. The proposed improvements would not negatively impact federally listed species due to the extensive development in the area and a lack of suitable habitat. The project would not result in direct or incidental take under the BGEPA and MBTA. I have also evaluated the project for impacts to greater sage-grouse. The project does not take place within a SGMA, nor does it take place within mapped habitat for sage-grouse and would therefore have no impact on sage-grouse or its habitat.

Sincerely,

Matt Howard
Natural Resource Manager

Natural Resource Technical Memorandum

DATE: March 19, 2021

TO: Matt Parker, Natural Resources Program Manager

FROM: Farmington Bay Constructors

SUBJECT: **S-R199 (299), West Davis Corridor**
West Davis Corridor Trail Crossing near Kays Creek
Environmental Re-evaluation 9-1

The EIS/Section 4(f) Evaluation and ROD evaluated the environmental impacts of improving regional mobility in western Davis and Weber Counties.

After the completion of the WDC ROD in 2019 and early 2020, UDOT conducted more detailed survey and engineering work to update the WDC design prior to issuing the WDC Request for Proposals (RFP) in April 2020. Changes with the RFP design compared to the Final EIS Selected Alternative's design are considered to be the Refined Selected Alternative and were evaluated in *Kaysville Roadway, Trail and Detention Changes in Davis County Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9* (Re-evaluation #9; UDOT 2020).

Following the RFP, Farmington Bay Constructors (FBC) developed a design that contains Alternative Technical Concepts (ATCs) to the Refined Selected Alternative. The ATCs were submitted to UDOT during the design phase, and UDOT accepted or denied each submittal. UDOT also identified ATCs that required additional environmental re-evaluation.

This memo supports Re-evaluation #9-1 and evaluates natural resource impacts of ATC 62, which proposes design changes to the West Davis Corridor Trail crossing near Kays Creek in Davis County, Utah. These design changes are identified as the Alternative Design.

Description of the Alternative Technical Concept

The Alternative Design (ATC 62) modifies the grade-separated West Davis Corridor Trail crossing near Kays Creek that is included in the Refined Selected Alternative. In the Alternative Design, the trail would cross under the WDC through a box culvert (see Figures 1 and 2). The Alternative Design eliminates the embankment, retaining wall, and grade-separated structure approaches needed for the grade-separated crossing, thereby improving trail users' experiences and requiring less long-term structural maintenance than the Refined Selected Alternative.

The Alternative Design also reroutes Stephenson Ditch, through a proposed pipeline, to Kays Creek on the east side of the WDC. By rerouting the ditch to Kays Creek, the Alternative Design eliminates trail and roadway drainage impacts as well as potential impacts of settlement due to the WDC roadway fill contained in the Refined Selected Alternative design.

Figure 1 shows the project location and the evaluation area contained in Re-evaluation #9 (Refined Selected Alternative). Figure 2 provides a closer view of the areas of impact compared to Re-evaluation #9. Table 1 provides a summary of the changes evaluated in this Re-evaluation.

This assessment has been prepared to address potential for occurrence of and impacts to species or habitate listed under the Endangered Species Act (ESA), as well as birds protected by the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA). Greater sage-grouse (*Centrocercus urophasianus*), which are protected by Governor's Executive Order EO/2015/002, are also addressed.

Project Setting

This project takes place in Davis County, UT. Recent aerial images (2016 - 2020) show land use in the vicinity of the re-evaluation area consists of primarily agricultural, open space and nature conservancy lands, and new residential development. Shoreline Junior High (institutional use) was built in 2018. Vegetation consists of residential landscaping, grass fields, and agricultural crops. Elevation in the vicinity of the project area is approximately 4,200 feet above mean seal level (AMSL).

Determinations

Design changes associated with ATC 62, which are assessed in Re-evaluation #9-1, would not change wildlife determinations from those presented in Re-evaluation #9.

Threatened and Endangered Species

The U.S. Fish and Wildlife Service's Information, Planning and Consultation (IPAC) database was consulted for species considered to have potential to occur in the vicinity of the re-evaluation area. In addition, Utah Natural Heritage Program records of occurrence were reviewed for documentation of species occurrences within the vicinity of the project. Other sources, including aerial imagery, USFWS Critical Habitat shapefiles, USGS, topographic data and surficial geology shapefiles from the State of Utah were used in supporting analysis.

The IPAC report indicates Ute Ladies'-tresses (*Spiranthes diluvialis*) may be located in the re-evaluation area. However, the IPAC report also notes that there are no critical habitats for this species in the re-evaluation area.

Migratory Birds, Bald and Golden Eagles

No known raptor nests have been documented within 1 mile of the re-evaluation area, and little suitable habitat exists. It is unlikely this project would result in direct or indirect take under the BGEPA. The project would not result in direct take under the MBTA and is unlikely to result in indirect take.

Greater Sage-grouse

A review of recent aerial imagery and Utah Sage-grouse Management Area boundaries shows that the project does not occur within a SGMA. The project also does not occur within mapped sage-grouse habitat. The project would not impact greater sage-grouse.

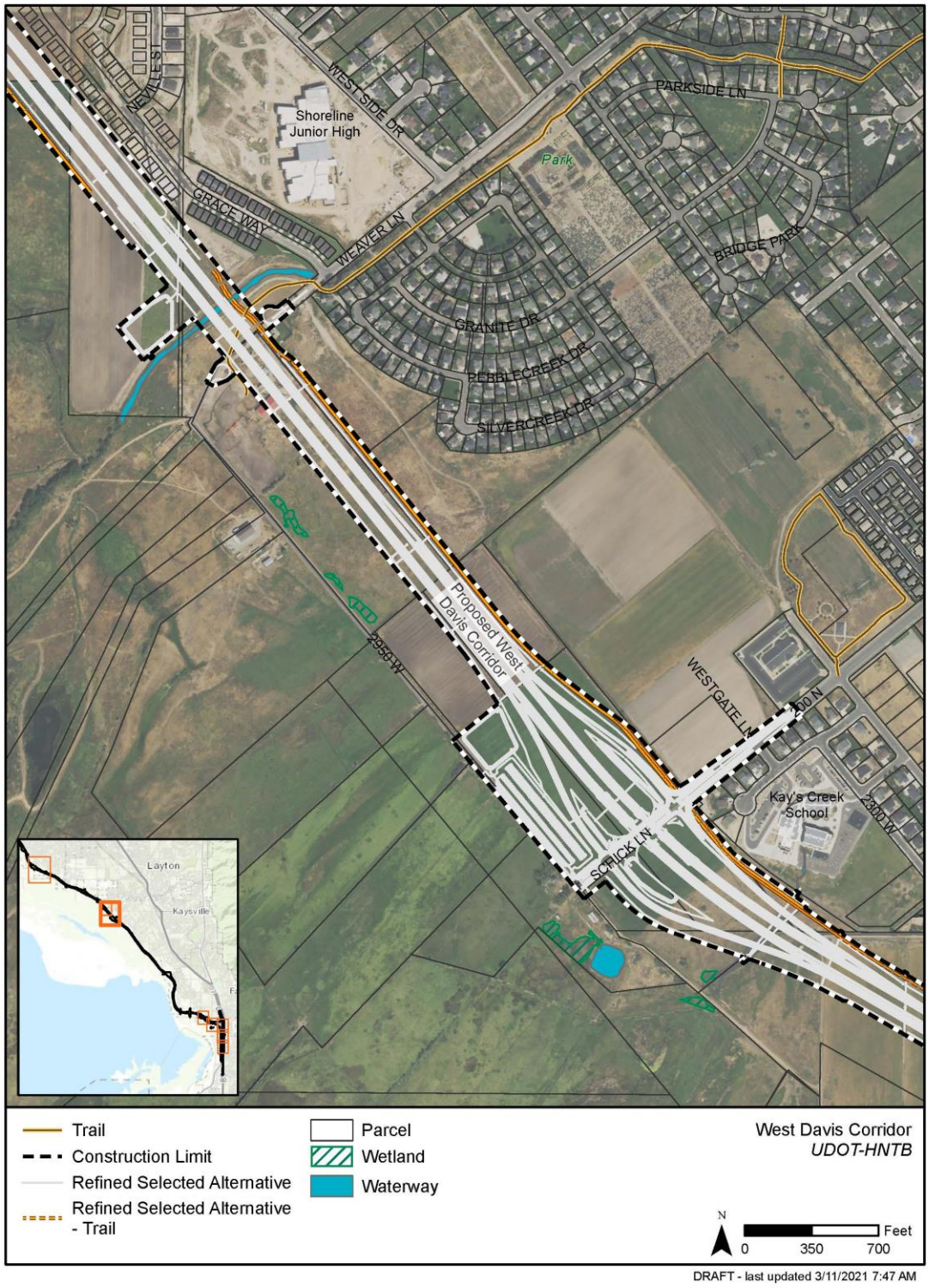


Figure 1. Project Location and Evaluation Area for the Refined Selected Alternative

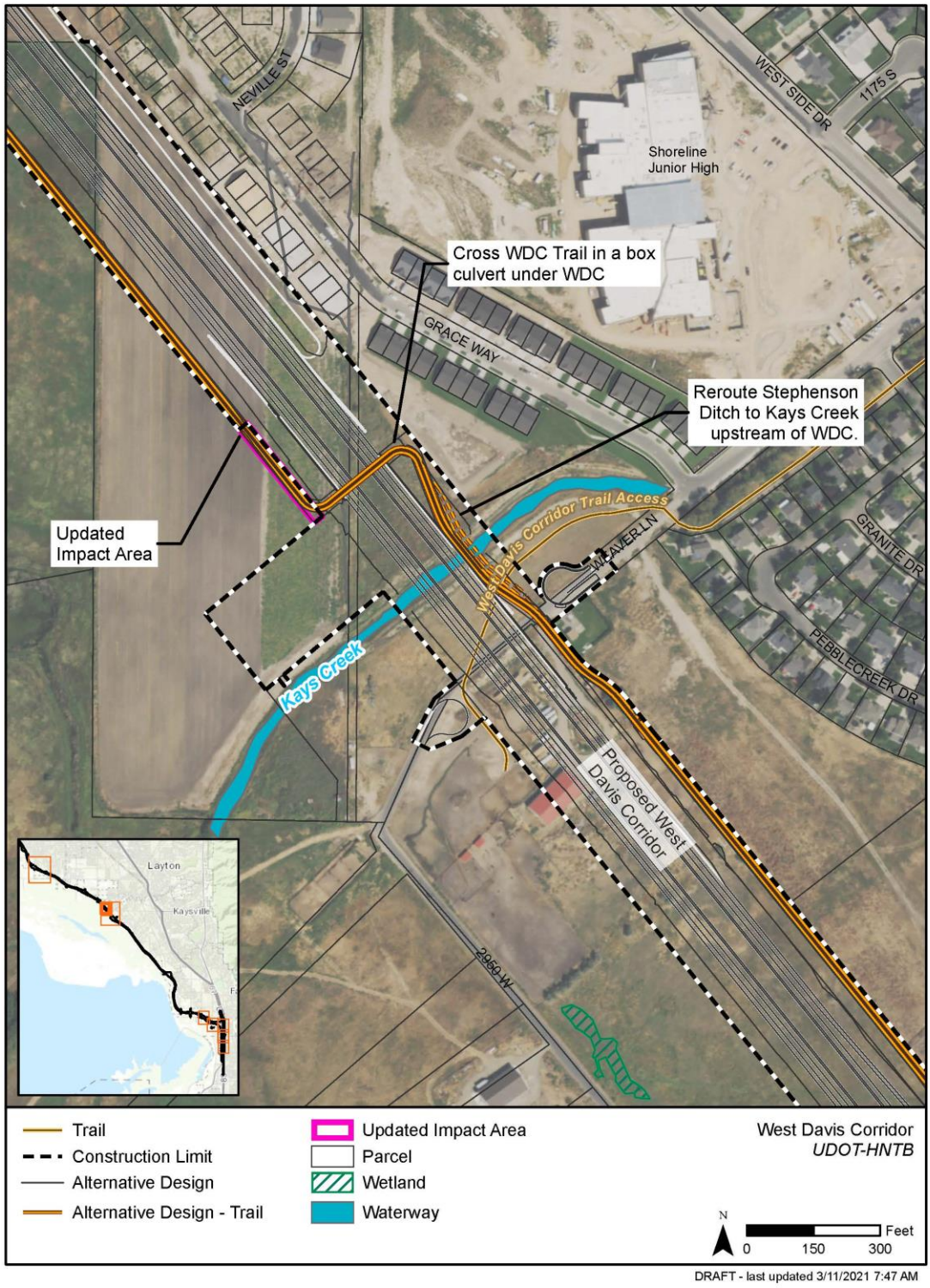


Figure 2. Alternative Design's Proposed Changes to Refined Selected Alternative

TABLE 1
Summary of Roadway Changes in Re-evaluation #9-1

Final EIS Selected Alternative (Alternative B1 with Wetland Avoidance Option)	**Refined Selected Alternative** (Re-evaluation #9)	**Alternative Design** Alternative Technical Concept 62 West Davis Corridor Trail near Kays Creek
• WDC Trail on the west side of the WDC roadway in Kaysville • Trail overpass crossing for the Kays Creek Trail near 2950 West/Weaver Lane • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) • Park-and-ride lot at the Schick Lane/200 North interchange • Several detention basins based on the preliminary drainage design	• WDC Trail on the east side of the WDC roadway in Kaysville • WDC Trail connection to the Kays Creek Trail at 2950 West/Weaver Lane and new WDC Trail overpass north of Kays Creek • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) and cul-de-sacs at Galbraith Lane and 2950 West/Weaver Lane • Minor widening and striping on Schick Lane/200 North east of WDC to accommodate turning movements at the WDC Schick Lane/200 North interchange • Park-and-ride lot at the Schick Lane/200 North interchange • Updated number, size, and location of detention basins	• WDC Trail on east side of the WDC roadway in Kaysville • WDC Trail crossing in a box culvert under the WDC north of Kays Creek • Eliminate Refined Selected Alternative trail overpass embankment, including wall and structure approaches to the crossing • WDC profile raised 3.5 feet to provide elevation for box culvert • Grade-separated interchange at Schick Lane/200 North • Minor widening and striping on Schick Lane • Park-and-ride lot at the Schick Lane/200 North Interchange • No changes to detention basins included in Re-evaluation #9 • Requires additional right-of-way from a UDOT-owned parcel • Reroute Stephenson Ditch to Kays Creek via a pipeline east of WDC

NOTES:
WDC = West Davis Corridor

This resource memo identifies design changes as “Alternative Design.”

The “Alternative Design” is the same as the “Final Construction Design” described in the re-evaluation.

The resource memo also includes an incorrect UDOT project number. The correct number is included in the re-evaluation.

MEMORANDUM

Date: Thursday, April 15, 2021

To: Randy Jefferies
UDOT WDC Project Manager

From: Rod Hess
UDOT Senior Landscape Architect 2021.04.15 08:37:03 -06'00'

RE: **UDOT WEST DAVIS CORRIDOR – Water Resources Memo**
West Davis Corridor Trail Crossing near Kays Creek
Environmental Re-evaluation – #9-1 (ATC 62)

PROJECT PURPOSE, DESCRIPTION AND SCOPE OF WORK

The EIS/Section 4(f) Evaluation and ROD evaluated the environmental impacts of improving regional mobility in western Davis and Weber Counties.

After the completion of the WDC ROD in 2019 and early 2020, UDOT conducted more detailed survey and engineering work to update the WDC design prior to issuing the WDC Request for Proposals (RFP) in April 2020. Changes with the RFP design compared to the Final EIS Selected Alternative's design are considered to be the Refined Selected Alternative and were evaluated in *Kaysville Roadway, Trail and Detention Changes in Davis County Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9* (Re-evaluation #9; UDOT 2020).

Following the RFP, Farmington Bay Constructors (FBC) developed a design that contains Alternative Technical Concepts (ATCs) to the Refined Selected Alternative. The ATCs were submitted to UDOT during the design phase, and UDOT accepted or denied each submittal. UDOT also identified ATCs that required additional environmental re-evaluation.

This memo supports Re-evaluation #9-1 and evaluates the water resources and wetlands impacts of ATC 62, which proposes design changes to the West Davis Corridor Trail crossing near Kays Creek in Davis County, Utah. These design changes are identified as the Alternative Design.

No new waters or wetlands were identified to be impacted by ATC 62. The impacts for this ATC remain as originally shown in the RFP for the project.

Information related to the design changes has been evaluated and summarized in the attached Water Resources and Wetland Re-Evaluation Technical Memorandum completed by Farmington Bay Contractors (FBC) and dated March 19, 2021.

UDOT Water Resources concurrence:

UDOT has reviewed the findings summarized in this WDC Environmental Re-evaluation of the WDC Trail Crossing near Kays Creek (#9-1) and provides the following concurrence:

- UDOT concurs with the findings that the Alternate Design changes to the West Davis Corridor Trail Crossing near Kays Creek will not have any additional Water Resources and wetlands impacts as compared to the Refined Selected Alternative Design for the project.

Table 1 summarizes the changes between the Final EIS, the Refined Selected Alternative and the Alternative Design.

Table 1. Summary of Changes in the Re-evaluation #9-1

Final EIS Selected Alternative (Alternative B1 with Wetland Avoidance Option)	**Refined Selected Alternative** (Re-evaluation #9)	**Alternative Design** Alternative Technical Concept 62 – West Davis Corridor Trail near Kays Creek
• WDC Trail on the west side of the WDC roadway in Kaysville • Trail overpass crossing for the Kays Creek Trail near 2950 West/Weaver Lane • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) • Park-and-ride lot at the Schick Lane/200 North interchange • Several detention basins based on the preliminary drainage design	• WDC Trail on the east side of the WDC roadway in Kaysville • WDC Trail connection to the Kays Creek Trail at 2950 West/Weaver Lane and new WDC Trail overpass north of Kays Creek • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) and cul-de-sacs at Galbraith Lane and 2950 West/Weaver Lane • Minor widening and striping on Schick Lane/200 North east of WDC to accommodate turning movements at the WDC Schick Lane/200 North interchange • Park-and-ride lot at the Schick Lane/200 North interchange • Updated number, size, and location of detention basins	• WDC Trail on east side of the WDC roadway in Kaysville • WDC Trail crossing in a box culvert under the WDC north of Kays Creek • Eliminate Refined Selected Alternative trail overpass embankment, including wall and structure approaches to the crossing • WDC profile raised 3.5 feet to provide elevation for box culvert • Grade-separated interchange at Schick Lane/200 North • Minor widening and striping on Schick Lane • Park-and-ride lot at the Schick Lane/200 North Interchange • No changes to detention basins included in Re-evaluation #9 • Requires additional right-of-way from a UDOT-owned parcel • Reroute Stephenson Ditch to Kays Creek via a pipeline east of WDC

FARMINGTON BAY CONSTRUCTORS

Environmental Review for Water Resources and Wetlands Re-Evaluation - Technical Memorandum

DATE: March 19, 2021

TO: Rod Hess, UDOT Senior Landscape Architect

FROM: Farmington Bay Constructors

SUBJECT: **S-R199 (299), West Davis Corridor**
West Davis Corridor Trail Crossing near Kays Creek
Environmental Re-evaluation 9-1 (ATC 62)

Project Purpose, Description, and Scope of Work

The EIS/Section 4(f) Evaluation and ROD evaluated the environmental impacts of improving regional mobility in western Davis and Weber Counties.

After the completion of the WDC ROD in 2019 and early 2020, UDOT conducted more detailed survey and engineering work to update the WDC design prior to issuing the WDC Request for Proposals (RFP) in April 2020. Changes with the RFP design compared to the Final EIS Selected Alternative's design are considered to be the Refined Selected Alternative and were evaluated in *Kaysville Roadway, Trail and Detention Changes in Davis County Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9* (Re-evaluation #9; UDOT 2020).

Following the RFP, Farmington Bay Constructors (FBC) developed a design that contains Alternative Technical Concepts (ATCs) to the Refined Selected Alternative. The ATCs were submitted to UDOT during the design phase, and UDOT accepted or denied each submittal. UDOT also identified ATCs that required additional environmental re-evaluation.

This memo supports Re-evaluation #9-1 and evaluates the water resources and wetlands impacts of ATC 62, which proposes design changes to the West Davis Corridor Trail crossing near Kays Creek in Davis County, Utah. These design changes are identified as the Alternative Design.

No new waters or wetlands were identified to be impacted by ATC 62. The impacts for this ATC remain as originally shown in the RFP for the project.

Description of the Alternative Technical Concept

The Alternative Design (ATC 62) modifies the grade-separated West Davis Corridor Trail crossing near Kays Creek that is included in the Refined Selected Alternative. In the Alternative Design, the trail would cross under the WDC through a box culvert (see Figures 1 and 2). The Alternative Design eliminates the embankment, retaining wall, and grade-separated structure approaches needed for the grade-separated

crossing, thereby improving trail users' experiences, and requiring less long-term structural maintenance than the Refined Selected Alternative.

The Alternative Design also reroutes Stephenson Ditch, through a proposed pipeline, to Kays Creek on the east side of the WDC. By rerouting the ditch to Kays Creek, the Alternative Design eliminates trail and roadway drainage impacts as well as potential impacts of settlement due to the WDC roadway fill contained in the Refined Selected Alternative design.

Table 1 summarizes the changes between the Final EIS, the Refined Selected Alternative, and the Alternative Design.

TABLE 1
Summary of Roadway Changes in Re-evaluation #9-1

Final EIS Selected Alternative (Alternative B1 with Wetland Avoidance Option)	**Refined Selected Alternative** (Re-evaluation #9)	**Alternative Design** Alternative Technical Concept 62 – West Davis Corridor Trail near Kays Creek
• WDC Trail on the west side of the WDC roadway in Kaysville • Trail overpass crossing for the Kays Creek Trail near 2950 West/Weaver Lane • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) • Park-and-ride lot at the Schick Lane/200 North interchange • Several detention basins based on the preliminary drainage design	• WDC Trail on the east side of the WDC roadway in Kaysville • WDC Trail connection to the Kays Creek Trail at 2950 West/Weaver Lane and new WDC Trail overpass north of Kays Creek • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) and cul-de-sacs at Galbraith Lane and 2950 West/Weaver Lane • Minor widening and striping on Schick Lane/200 North east of WDC to accommodate turning movements at the WDC Schick Lane/200 North interchange • Park-and-ride lot at the Schick Lane/200 North interchange • Updated number, size, and location of detention basins	• WDC Trail on east side of the WDC roadway in Kaysville • WDC Trail crossing in a box culvert under the WDC north of Kays Creek[1] • Eliminate Refined Selected Alternative trail overpass embankment, including wall and structure approaches to the crossing[1] • WDC profile raised 3.5 feet to provide elevation for box culvert[1] • Grade-separated interchange at Schick Lane/200 North • Minor widening and striping on Schick Lane • Park-and-ride lot at the Schick Lane/200 North Interchange • No changes to detention basins included in Re-evaluation #9 • Requires additional right-of-way from a UDOT-owned parcel[1] • Reroute Stephenson Ditch to Kays Creek via a pipeline east of WDC[1]

NOTES:
WDC = West Davis Corridor

Determinations

The water resources and wetlands within ATC 62 were verified and compared to the Refined Selected Alternative Design for the project. The cut and fill slopes of the roadway design and the location of the proposed detention basins, as shown in Figure A, do not impact any new water resources or wetlands within ATC 62.

Trail
Construction Limit
Refined Selected Alternative
Refined Selected Alternative - Trail
Parcel
Wetland
Waterway

West Davis Corridor
UDOT-HNTB

N
Feet
0 350 700

DRAFT - last updated 3/11/2021 7:47 AM

DRAFT - last updated 3/11/2021 7:47 AM

This resource memo identifies design changes as “Alternative Design.”

The “Alternative Design” is the same as the “Final Construction Design” described in the re-evaluation.

The resource memo also includes an incorrect UDOT project number. The correct number is included in the re-evaluation.

Cultural Resource Technical Memorandum

DATE: April 16, 2021

TO: Liz Robinson, Cultural Resources Program Manager

FROM: Farmington Bay Constructors

SUBJECT: **S-R199 (299), West Davis Corridor**
West Davis Corridor Trail Crossing near Kays Creek
Environmental Re-evaluation #9-1

The EIS/Section 4(f) Evaluation (UDOT 2017) and Record of Decision (ROD) evaluated the environmental impacts of improving regional mobility in western Davis and Weber Counties.

After the completion of the West Davis Corridor (WDC) ROD in 2019 and early 2020, UDOT conducted more detailed survey and engineering work to update the WDC design prior to issuing the WDC Request for Proposals (RFP) in April 2020. Changes with the RFP design compared to the Final EIS Selected Alternative's design are considered to be the Refined Selected Alternative and were evaluated in *Kaysville Roadway, Trail and Detention Changes in Davis County Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9* (Re-evaluation #9; UDOT 2020).

Following the RFP, Farmington Bay Constructors (FBC) developed a design that contains Alternative Technical Concepts (ATCs) to the Refined Selected Alternative. The ATCs were submitted to UDOT during the design phase, and UDOT approved or denied each submittal. UDOT also identified ATCs that required additional environmental re-evaluation.

This memo supports Re-evaluation #9-1 and evaluates cultural impacts of ATC 62, which proposes design changes to the West Davis Corridor Trail crossing near Kays Creek in Davis County, Utah. These design changes are identified as the Alternative Design.

Description of the Alternative Technical Concept

The Alternative Design (ATC 62) modifies the grade-separated West Davis Corridor Trail crossing near Kays Creek that is included in the Refined Selected Alternative. In the Alternative Design, the trail would cross under the WDC through a box culvert (see Figures 1 and 2). The Alternative Design eliminates the embankment, retaining wall, and grade-separated structure approaches needed for the grade-separated crossing, thereby improving trail users' experiences and requiring less long-term structural maintenance than the Refined Selected Alternative.

The Alternative Design also reroutes Stephenson Ditch, through a proposed pipeline, to Kays Creek on the east side of the WDC. The ditch is currently routed via a north-south pipeline, which discharges to Kays Creek on the southwest side of the proposed WDC alignment. The proposed pipeline would connect to Stephenson Ditch at the same location as the current pipeline but would route the ditch southeast at that junction. The proposed pipeline would connect with Kays Creek southeast of the

proposed WDC alignment. By rerouting the ditch, the Alternative Design eliminates trail and roadway drainage impacts as well as potential impacts of settlement due to the WDC roadway fill contained in the Refined Selected Alternative design.

Figure 1 shows the project location and the evaluation area contained in Re-evaluation #9 (Refined Selected Alternative). Figure 2 provides a closer view of the areas of impact compared to Re-evaluation #9. Table 1 provides a summary of the changes evaluated in this Re-evaluation.

TABLE 1
Summary of Roadway Changes in Re-evaluation #9-1

Final EIS Selected Alternative (Alternative B1 with Wetland Avoidance Option)	**Refined Selected Alternative** (Re-evaluation #9)	**Alternative Design** Alternative Technical Concept 62 – West Davis Corridor Trail near Kays Creek
• WDC Trail on the west side of the WDC roadway in Kaysville • Trail overpass crossing for the Kays Creek Trail near 2950 West/Weaver Lane • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) • Park-and-ride lot at the Schick Lane/200 North interchange • Several detention basins based on the preliminary drainage design	• WDC Trail on the east side of the WDC roadway in Kaysville • WDC Trail connection to the Kays Creek Trail at 2950 West/Weaver Lane and new WDC Trail overpass north of Kays Creek • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) and cul-de-sacs at Galbraith Lane and 2950 West/Weaver Lane • Minor widening and striping on Schick Lane/200 North east of WDC to accommodate turning movements at the WDC Schick Lane/200 North interchange • Park-and-ride lot at the Schick Lane/200 North interchange • Updated number, size, and location of detention basins	• WDC Trail on east side of the WDC roadway in Kaysville • WDC Trail crossing in a box culvert under the WDC north of Kays Creek[1] • Eliminate Refined Selected Alternative trail overpass embankment, including wall and structure approaches to the crossing[1] • WDC profile raised 3.5 feet to provide elevation for box culvert[1] • Grade-separated interchange at Schick Lane/200 North • Minor widening and striping on Schick Lane • Park-and-ride lot at the Schick Lane/200 North Interchange • No changes to detention basins included in Re-evaluation #9 • Requires additional right-of-way from a UDOT-owned parcel[1] • Reroute Stephenson Ditch to Kays Creek via a pipeline east of WDC[1]

NOTES:
WDC = West Davis Corridor

Project Setting

This project takes place in Davis County, UT. Recent aerial images (2016 – 2020) show land use in the vicinity of the re-evaluation area consists of primarily agricultural, open space and nature conservancy lands, and new residential development. Shoreline Junior High (institutional use) was built in 2018. Vegetation consists of residential landscaping, grass fields, and agricultural crops. Elevation in the vicinity of the project area is approximately 4,200 feet above mean seal level (AMSL).

Figure 1. Project Location and Evaluation Area for the Refined Selected Alternative

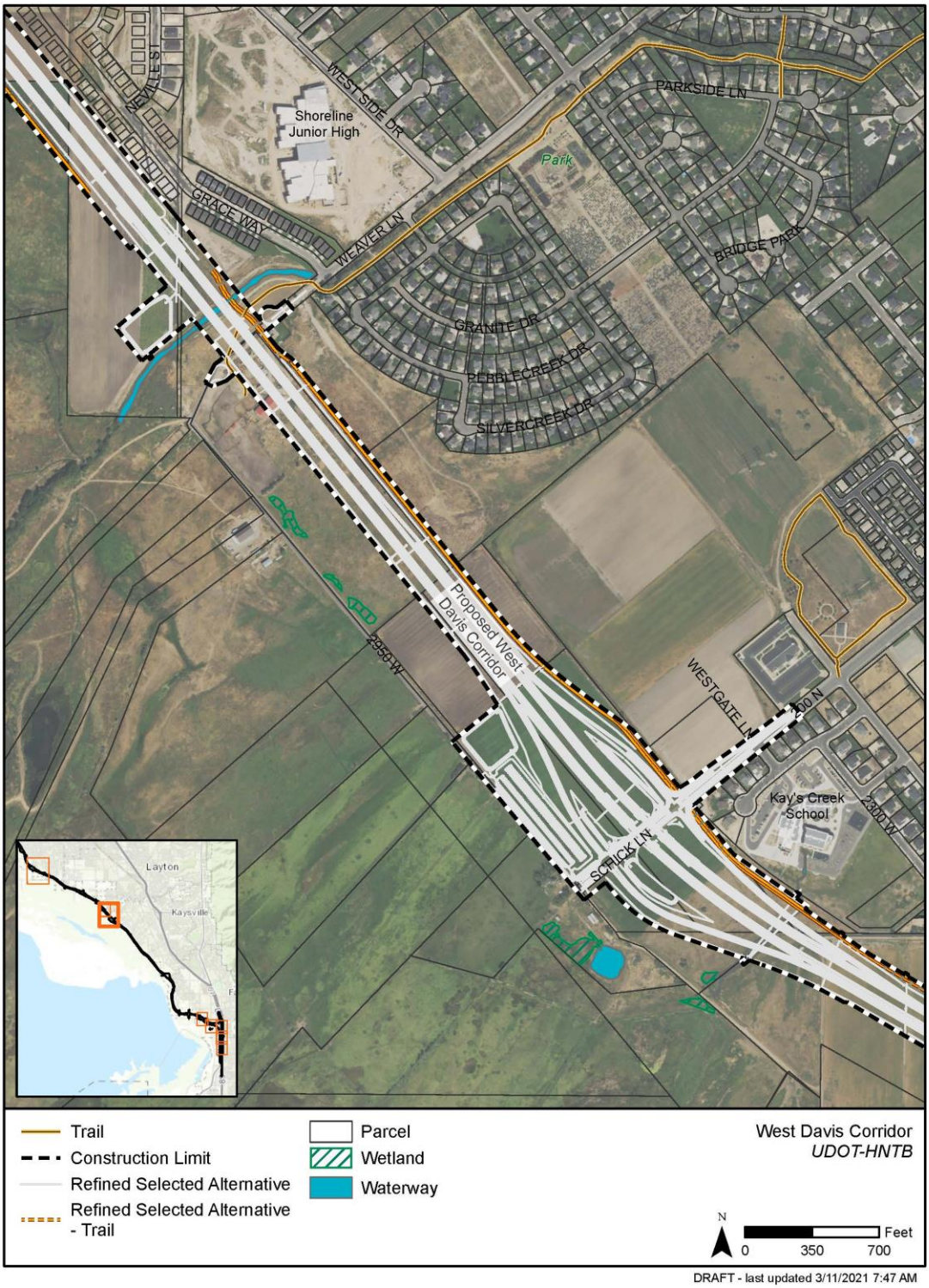
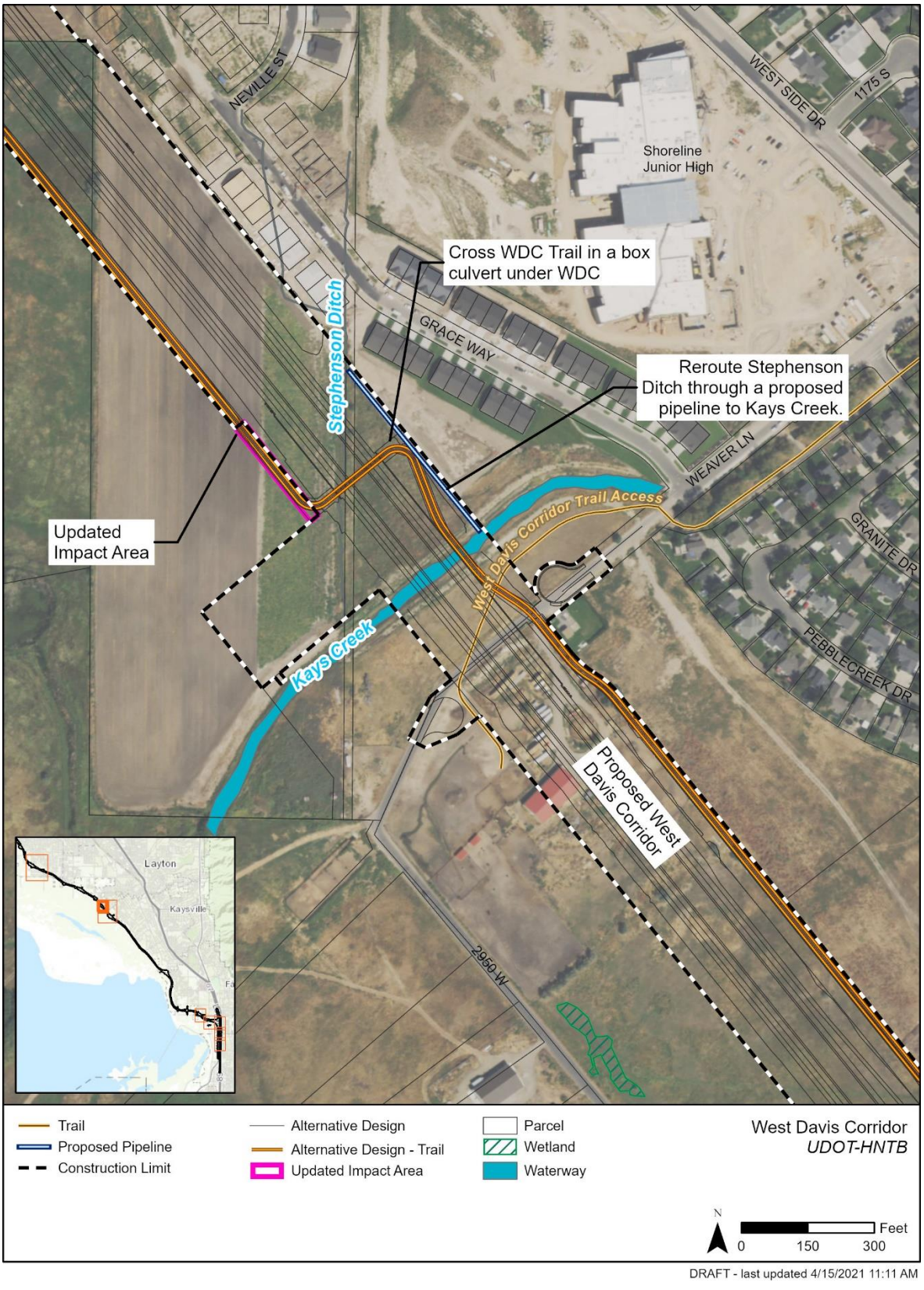


Figure 2. Alternative Design's Proposed Changes to Final EIS Selected Alternative



Determinations

The proposed project improvements are within the original study boundaries of the Final Environmental Impact Statement (FEIS) APE. Therefore, the Area of Potential Effects (APE) for the Alternative Design is the same as APE used to evaluate alternatives in the Final EIS APE (Meess and Ellis 2012). No archaeological or historic resources were identified in the area within or near the re-evaluation area during the 2012, 2014 or 2017 surveys. The closest previously recorded archaeological resource is approximately one (1) mile to the southeast. The closest historic resource is more than 0.5 miles to the northwest. No previously recorded historic-age or archaeological properties are located in the vicinity of the Alternative Design. No cultural resource impacts are anticipated. The project would reroute Stephenson Ditch with a proposed pipeline. The proposed pipeline would connect to Kays Creek on the southeast side of the proposed WDC alignment. Stephenson Ditch corresponds with isolate D-98 and does not connect to a larger irrigation network. Rerouting the ditch would eliminate trail and roadway drainage impacts as well as potential impacts of settlement due to the WDC roadway fill contained in the Refined Selected Alternative design.

As there are no historic or archaeological resources within the APE or project vicinity, no impacts would occur to historic or archaeological resources.

This resource memo identifies design changes as “Alternative Design.”

The “Alternative Design” is the same as the “Final Construction Design” described in the re-evaluation.

The resource memo also includes an incorrect UDOT project number. The correct number is included in the re-evaluation.

Memorandum

Environmental Services

DATE: April 27, 2021

TO: Farmington Bay Constructors

FROM: Liz Robinson, Cultural Resources Program Manager

SUBJECT: S-R199 (299), West Davis Corridor
West Davis Corridor Trail Crossing near Kays Creek
Environmental Re-evaluation #9-1

The Alternative Design (ATC 62) modifies the grade-separated West Davis Corridor Trail crossing near Kays Creek that is included in the Refined Selected Alternative. In the Alternative Design, the trail would cross under the WDC through a box culvert (see Figures 1 and 2). The Alternative Design eliminates the embankment, retaining wall, and grade-separated structure approaches needed for the grade-separated crossing, thereby improving trail users' experiences and requiring less long-term structural maintenance than the Refined Selected Alternative.

The Alternative Design also reroutes Stephenson Ditch, through a proposed pipeline, to Kays Creek on the east side of the WDC. The ditch is currently routed via a north-south pipeline, which discharges to Kays Creek on the southwest side of the proposed WDC alignment. The proposed pipeline would connect to Stephenson Ditch at the same location as the current pipeline but would route the ditch southeast at that junction. The proposed pipeline would connect with Kays Creek southeast of the proposed WDC alignment. By rerouting the ditch, the Alternative Design eliminates trail and roadway drainage impacts as well as potential impacts of settlement due to the WDC roadway fill contained in the Refined Selected Alternative design.

UDOT Cultural Resources staff has reviewed this re-evaluation and concur with the determination that there are no historic properties present within the APE of the Refined Selected Alternative in this re-evaluation area.

4(f) Resource Technical Memorandum

DATE: April 16, 2021

TO: Liz Robinson, Cultural Resources Program Manager

FROM: Farmington Bay Constructors

SUBJECT: **S-R199 (299), West Davis Corridor**
West Davis Corridor Trail Crossing near Kays Creek
Environmental Re-evaluation #9-1

The EIS/Section 4(f) Evaluation and ROD evaluated the environmental impacts of improving regional mobility in western Davis and Weber Counties.

After the completion of the WDC ROD in 2019 and early 2020, UDOT conducted more detailed survey and engineering work to update the WDC design prior to issuing the WDC Request for Proposals (RFP) in April 2020. Changes with the RFP design compared to the Final EIS Selected Alternative's design are considered to be the Refined Selected Alternative and were evaluated in *Kaysville Roadway, Trail and Detention Changes in Davis County Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9* (Re-evaluation #9; UDOT 2020).

Following the RFP, Farmington Bay Constructors (FBC) developed a design that contains Alternative Technical Concepts (ATCs) to the Refined Selected Alternative. The ATCs were submitted to UDOT during the design phase, and UDOT accepted or denied each submittal. UDOT also identified ATCs that required additional environmental re-evaluation.

This memo supports Re-evaluation #9-1 and evaluates 4(f) impacts of ATC 62, which proposes design changes to the West Davis Corridor Trail crossing near Kays Creek in Davis County, Utah. These design changes are identified as the Alternative Design.

Description of the Alternative Technical Concept

The Alternative Design (ATC 62) modifies the grade-separated West Davis Corridor Trail crossing near Kays Creek that is included in the Refined Selected Alternative. In the Alternative Design, the trail would cross under the WDC through a box culvert (see Figures 1 and 2). The Alternative Design eliminates the embankment, retaining wall, and grade-separated structure approaches needed for the grade-separated crossing, thereby improving trail users' experiences and requiring less long-term structural maintenance than the Refined Selected Alternative.

The Alternative Design also reroutes Stephenson Ditch, through a proposed pipeline, to Kays Creek on the east side of the WDC. By rerouting the ditch to Kays Creek, the Alternative Design eliminates trail and roadway drainage impacts as well as potential impacts of settlement due to the WDC roadway fill contained in the Refined Selected Alternative design.

Figure 1 shows the project location and the evaluation area contained in Re-evaluation #9 (Refined Selected Alternative). Figure 2 provides a closer view of the areas of impact compared to Re-evaluation #9. Table 1 provides a summary of the changes evaluated in Re-evaluation #9-1.

Project Setting

This project takes place in Davis County, UT. Recent aerial images (2016 – 2020) show land use in the vicinity of the re-evaluation area consists of primarily agricultural, open space and nature conservancy lands, and new residential development. Shoreline Junior High (institutional use) was built in 2018. Vegetation consists of residential landscaping, grass fields, and agricultural crops. Elevation in the vicinity of the project area is approximately 4,200 feet above mean seal level (AMSL).

Determinations

There are no existing Section 4(f) resources within the re-evaluation area, and the proposed project work would not impact any Section 4(f) resources.

The planned Kays Creek Park is within the re-evaluation area, but the Alternative Design does not result in any additional uses to 4(f) properties than what was evaluated in the ROD. The park is currently undeveloped and functions as an open space. Because it meets the criteria described in 23 CFR 774.15(f)(5), the future Kays Creek Park would not have a constructive use.

The project includes a proposed WDC trail. As this trail is part of the project, it is not considered a Section 4(f) resource.

The Great Salt Lake Shorelands Preserve is in the project vicinity, but this area of the preserve is not publicly owned. Therefore, it is not subject to Section 4(f).

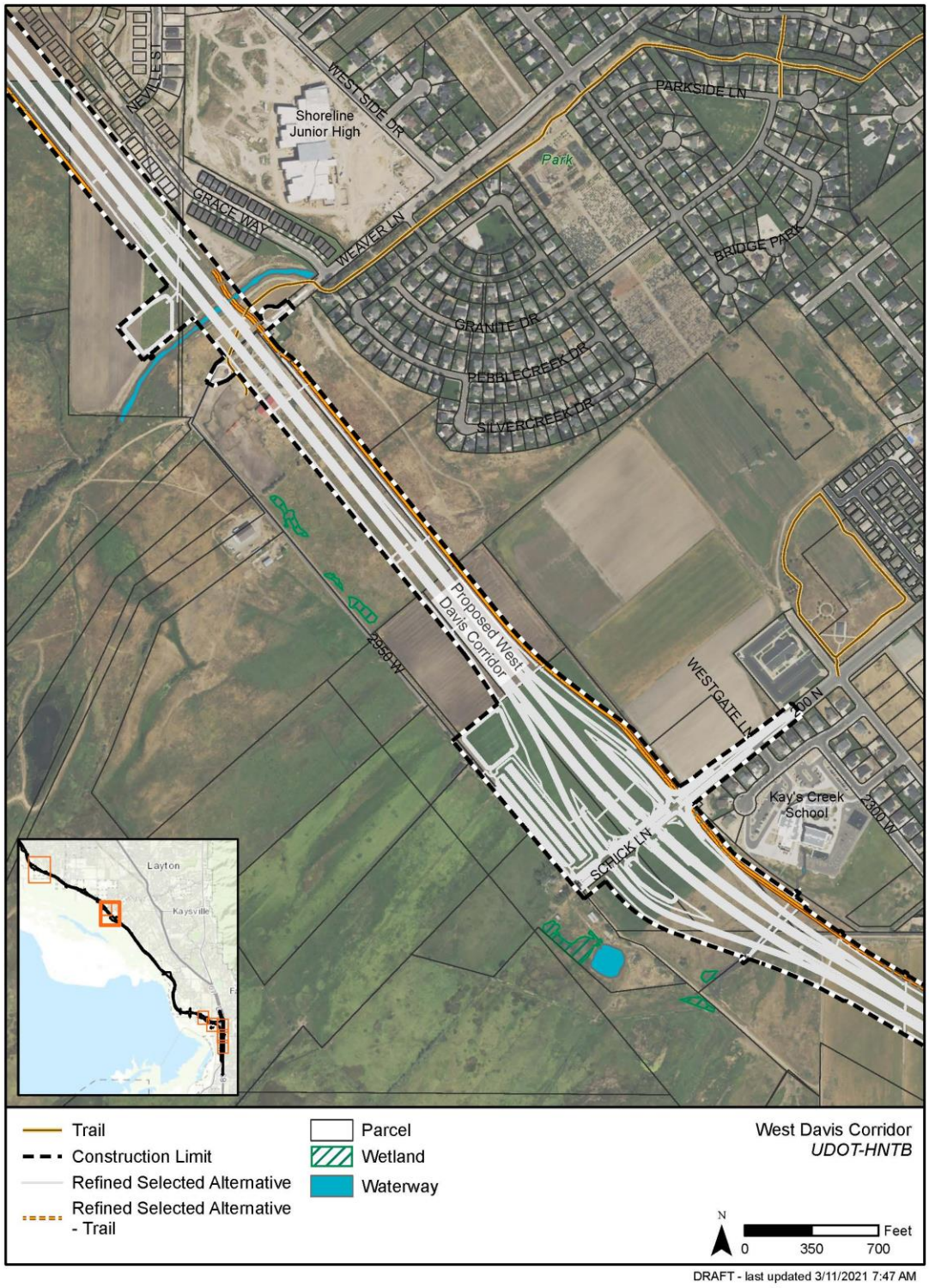


Figure 1. Project Location and Evaluation Area for the Refined Selected Alternative

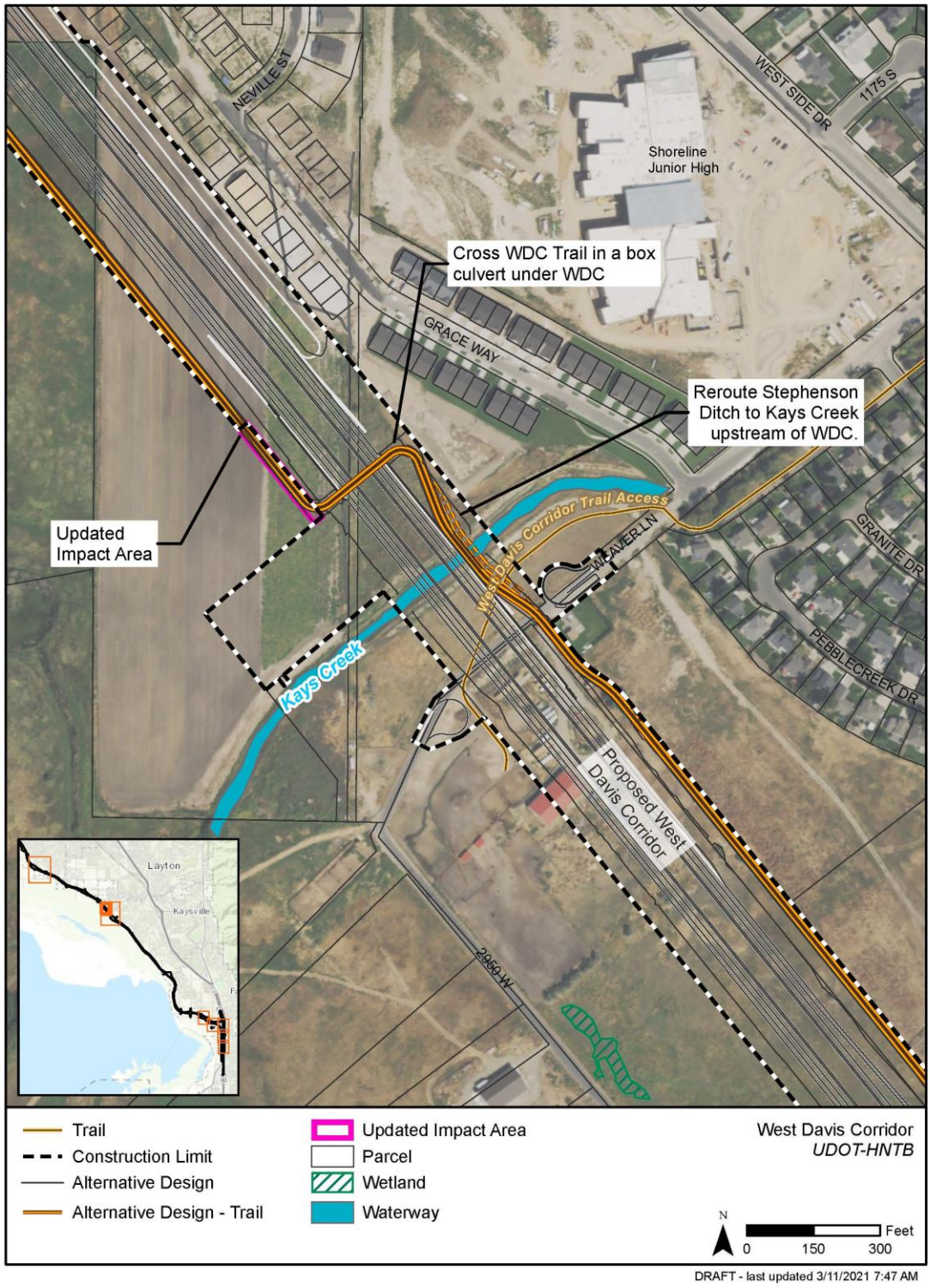


Figure 2. Alternative Design's Proposed Changes to Refined Selected Alternative

TABLE 1
Summary of Roadway Changes in Re-evaluation #9-1

Final EIS Selected Alternative (Alternative B1 with Wetland Avoidance Option)	**Refined Selected Alternative** (Re-evaluation #9)	**Alternative Design** Alternative Technical Concept 62 West Davis Corridor Trail near Kays Creek
• WDC Trail on the west side of the WDC roadway in Kaysville • Trail overpass crossing for the Kays Creek Trail near 2950 West/Weaver Lane • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) • Park-and-ride lot at the Schick Lane/200 North interchange • Several detention basins based on the preliminary drainage design	• WDC Trail on the east side of the WDC roadway in Kaysville • WDC Trail connection to the Kays Creek Trail at 2950 West/Weaver Lane and new WDC Trail overpass north of Kays Creek • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) and cul-de-sacs at Galbraith Lane and 2950 West/Weaver Lane • Minor widening and striping on Schick Lane/200 North east of WDC to accommodate turning movements at the WDC Schick Lane/200 North interchange • Park-and-ride lot at the Schick Lane/200 North interchange • Updated number, size, and location of detention basins	• WDC Trail on east side of the WDC roadway in Kaysville • WDC Trail crossing in a box culvert under the WDC north of Kays Creek • Eliminate Refined Selected Alternative trail overpass embankment, including wall and structure approaches to the crossing • WDC profile raised 3.5 feet to provide elevation for box culvert • Grade-separated interchange at Schick Lane/200 North • Minor widening and striping on Schick Lane • Park-and-ride lot at the Schick Lane/200 North Interchange • No changes to detention basins included in Re-evaluation #9 • Requires additional right-of-way from a UDOT-owned parcel • Reroute Stephenson Ditch to Kays Creek via a pipeline east of WDC

NOTES:
WDC = West Davis Corridor

HNTB

Noise Technical Memorandum for Re-evaluation #9-1

West Davis Corridor Trail Crossing near Kays Creek (ATC 62)

Date: August 16, 2021

Subject: **UDOT Project Number S-R199(229) – S.R. 177; West Davis Highway; I-15 & SR-67 to SR-193; West Davis Corridor Trail Crossing near Kays Creek (ATC 62) (PIN 11268)**
Noise Technical Memorandum in support of the Environmental Impact Statement Re-evaluation #9-1

Introduction

A Final Environmental Impact Statement (EIS) and Section 4(f) Evaluation for the West Davis Corridor (WDC) project was completed in June 2017 and approved through the issuance of a Record of Decision (ROD) on September 29, 2017, from the Federal Highway Administration (FHWA). Subsequently, a re-evaluation of the *Kaysville Roadway, Trail, and Detention Changes in Davis County, Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9* (Re-evaluation #9; UDOT 2020) was prepared and approved on April 8, 2020. The design analyzed in Re-evaluation #9 is referred to herein as the Refined Selected Alternative. The final design is currently being conducted as part of a Design-Build project, awarded in November 2020. A second re-evaluation (referred to herein as Re-evaluation #9-1) analyzes impacts resulting from new residential development not considered in Re-evaluation #9 and proposed design changes to the WDC Trail crossing design near Kays Creek in Davis County, Utah. These changes are identified herein as the Final Construction Design.

This technical memorandum provides the noise analysis for changes proposed with the Final Construction Design, documents the associated traffic-generated noise impacts, analyzes potential noise abatement, and supports additional environmental review provided in the current re-evaluation (Re-evaluation #9-1). This memorandum also includes added residential receptors that have developed in the study area since the noise analysis for Re-evaluation #9. See Table 1 for a summary of design changes proposed since the ROD was issued.

This technical memorandum includes evaluation of noise impacts and mitigation previously documented in the *Layton 2700 West Interchange in Davis County, Utah (PIN 7176) Environmental Impact Statement Re-evaluation #7* (Re-evaluation #7; UDOT 2020). This area is undergoing additional noise analysis due to the presence of newly developed noise-sensitive residential receptors and profile changes to the WDC mainline in this area.

Table 1. Summary of Roadway Changes in Re-evaluation #9-1

EIS Selected Alternative (Alternative B1 with the Wetland Avoidance Option)	**Refined Selected Alternative** (Re-evaluation #9)	**Final Construction Design** Alternative Technical Concept 62 – West Davis Corridor Trail near Kays Creek
• WDC Trail on the west side of the WDC roadway in Kaysville • Trail overpass crossing for the Kays Creek Trail near 2950 West/Weaver Lane • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) • Park-and-ride lot at the Schick Lane/200 North interchange • Several detention basins based on the preliminary drainage design	• WDC Trail on the east side of the WDC roadway in Kaysville • WDC Trail connection to the Kays Creek Trail at 2950 West/Weaver Lane and new WDC Trail overpass north of Kays Creek • Grade-separated interchange at Schick Lane/200 North (WDC over Schick Lane/200 North) and cul-de-sacs at Galbraith Lane and 2950 West/Weaver Lane • Minor widening and striping on Schick Lane/200 North east of WDC to accommodate turning movements at the WDC Schick Lane/200 North interchange • Park-and-ride lot at the Schick Lane/200 North interchange • Updated number, size, and location of detention basins	• WDC Trail crossing in a box culvert under the WDC north of Kays Creek • Eliminate Refined Selected Alternative trail overpass embankment, including wall and structure approaches to the crossing • WDC profile raised 3.5 feet to provide elevation for box culvert • Requires additional right-of-way from a UDOT-owned parcel • Reroutes Stephenson Ditch to Kays Creek via a pipeline east of WDC • Additional noise-sensitive residential receptors developed north of Kays Creek

This noise analysis was prepared in accordance with UDOT's Noise Abatement Policy, last revised May 28, 2020, which is consistent with federal regulation 23 Code of Federal Regulations (CFR) Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, and Utah Administrative Code Rule R930-3, Highway Noise Abatement. The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 United States Code (USC) Section 327 and a Memorandum of Understanding (MOU) dated January 17, 2017, and executed by FHWA and UDOT.

Project Description

The study area for this noise analysis extends from approximately 1,500 feet south of Kays Creek (station 1430+00) to 800 feet north of 2200 West (station 1485+00) in Layton, Utah. The noise study area is defined based on the extent of noise-sensitive receptors. These receptors include newly developed residential receptors within approximately 600 feet of WDC mainline profile changes that are greater than 3 feet when compared to the Refined Selected Alternative. The newly developed residential receptors begin north of station 1451+00. The receptors previously evaluated under Re-evaluation #9 are located south of Station 1451+00 (N1448-N1499) and one receptor was previously evaluated under Re-evaluation #7 (N1441) at approximately station 1481+00.

The profile changes greater than 3 feet extend from approximately station 1430+00 to 1460+00 and station 1470+00 to 1480+00 (see Figures 2 and 3 for station locations).

Applicability

The UDOT Noise Abatement Policy states that "noise abatement will be considered for all Type I projects where noise impacts are identified." A Type I project includes any of the following: the construction of a highway at a new location; the physical alteration of an existing highway that substantially alters its alignment; the addition of a through traffic lane; the addition of an auxiliary lane; the addition or relocation of interchange lanes or ramps; or the addition or substantial alteration of a weigh station, rest stop, ride share lot, or toll plaza. The Final Construction Design includes the construction of a highway at a new location; therefore, this design is a Type 1 project that requires the consideration of noise abatement measures.

UDOT evaluated noise impacts using noise models and methodologies approved by the Federal Highway Administration (FHWA) and UDOT (Noise Abatement, UDOT 08A2-01, revised May 28, 2020). Noise impacts were identified and evaluated at residential locations within approximately 600 feet of the nearest travel lane using level of service (LOS) C traffic volumes to represent the worst-case noise conditions while traffic is operating at uncongested, free-flow speeds. According to UDOT's Noise Abatement Policy, the posted speed limits are to be used as the free-flow speeds for noise modeling.

Characteristics of Noise

Noise is defined as unwanted sound. Sound is what one hears when there are variations in air pressure. The ear is sensitive to this pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness. These pressure differences are most commonly measured in decibels.

The decibel (dB) is the unit of measurement for sound. The decibel scale audible to humans spans approximately 140 dB. A level of zero decibels corresponds to the lower limit of audibility, while 140 dB produces a sensation more akin to pain than sound. The decibel scale is a logarithmic representation of the actual sound pressure variations. The logarithmic nature of decibel scales is such that individual decibel ratings for different noise sources cannot be added directly to give the noise level for the combined noise source. For example, two noise sources that produce equal decibel ratings at a given location will produce a combined noise level that is 3 dBA greater than either sound alone, which would be barely perceptible in the natural environment. People generally perceive a 10-dBA increase in a noise

source as a doubling of loudness. People generally cannot detect a 1-to-2-dBA increase in noise levels. Table 2 provides a comparison of sound level changes with relative loudness.

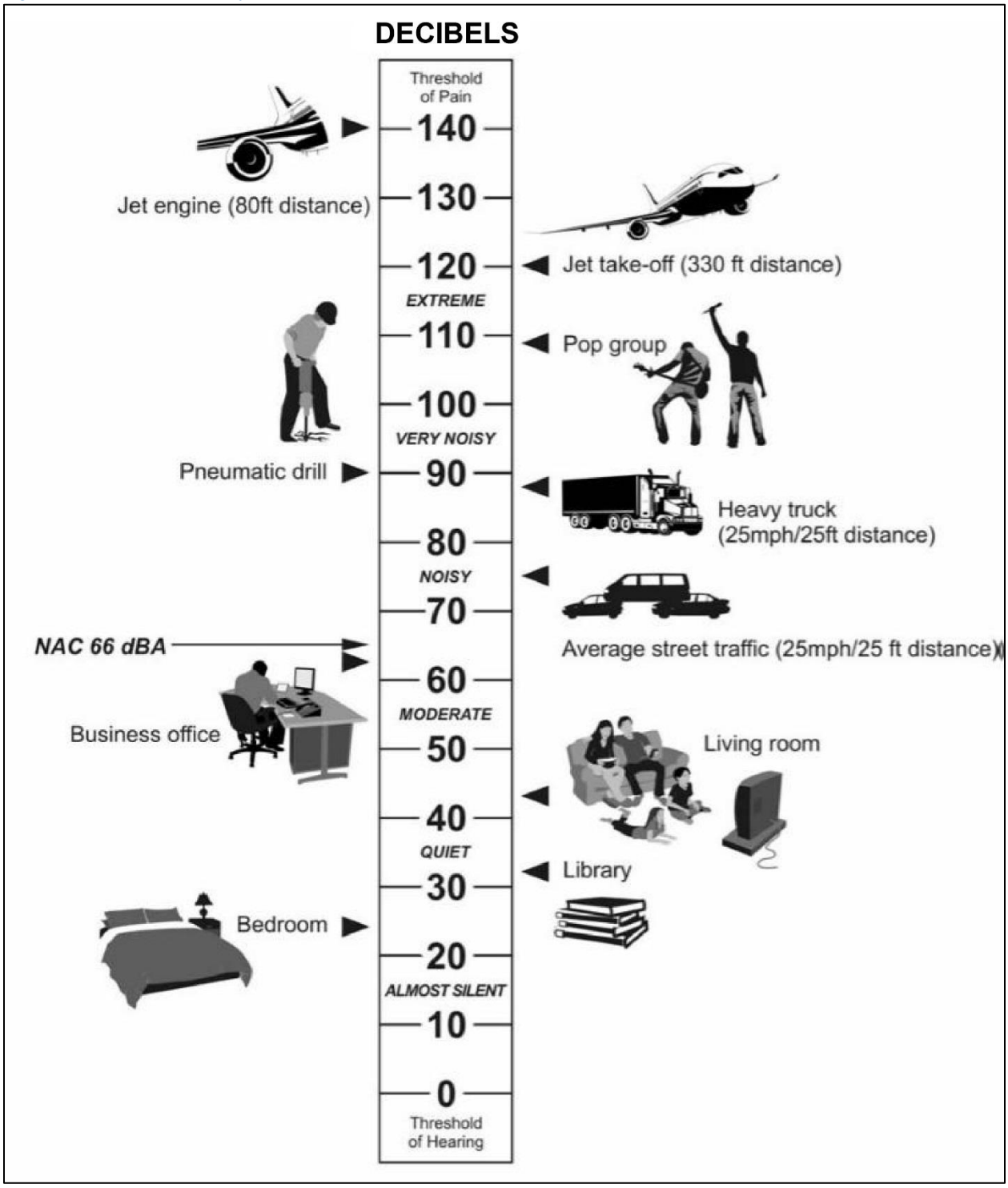
Table 2. Logarithmic Nature of Sound

Sound Level Change in $L_{eq(h)}$ in the Natural Environment	Relative Loudness Change in $L_{eq(h)}$ in the Natural Environment
+/- 1 dBA	No perceptible change
+/- 3 dBA	Barely Perceptible Change
+/- 5 dBA	Readily Perceptible Change
+/- 10 dBA	Perceived as Twice or Half as Loud

Traffic noise is measured in A-weighted sound levels in decibels (dBA) which most closely approximates the way the human ear hears sounds at different frequencies. Since traffic noise varies over time, the sound levels for this noise analysis are expressed as "equivalent levels" or L_{eq}, representing the average sound level over a one-hour period of time ($L_{eq(h)}$). Unless noted otherwise, all sound levels in this noise analysis are expressed in the hourly equivalent noise level. Figure 1 provides sound levels of typical noise sources.

When the noise source is a continuous line (for example, vehicle traffic on a highway), noise levels decrease by about 3 dBA for every doubling of distance away from the source. Noise levels at different distances can also be affected by factors other than the distance from the noise source. Topographic features, including retaining walls and berms, relative elevations of roadway and receiver, ground absorption, and vehicle volumes and speeds are factors that can increase or decrease noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can also affect the degree to which sound is attenuated over distance.

Figure 1. Sound Levels of Typical Noise Sources



Source: Adopted from "Environmental Criteria for Road Traffic Noise", Environmental Protection Authority, South Sydney, NSW, May 1999, Page 38.

Regulatory Setting

FHWA uses federal regulation 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise,* to assess noise impacts. This regulation was most recently updated on July 13, 2010. Utah Administrative Code Rule R930-3, Highway Noise Abatement, and UDOT's Noise Abatement Policy 08A2-01, revised May 28, 2020, establish UDOT's noise impact and abatement policies and procedures, which are compliant with 23 CFR Part 772.

FHWA has established Noise Abatement Criteria (NAC) for several categories of land use activities (see Table 3). FHWA's noise criteria are based on sound levels that are considered to be an impact to nearby property owners, also known as receptors. Primary consideration is given to exterior areas where frequent human use occurs. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT NAC for specified land use activity categories, or (2) the future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level (substantial increase).

Table 3. Noise Abatement Criteria

Activity Category	FHWA Criteria $L_{eq(h)}$	UDOT Criteria $L_{eq(h)}$	Evaluation Location	Activity Description
A	57	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	66	Exterior	Residential.
C	67	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	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	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.

Source: UDOT Noise Abatement Policy (2020)

Noise Analysis

Existing Conditions

The study area for the WDC Trail near Kays Creek includes residential (Activity Category B) land use. Community noise, aircraft and traffic on local roadways are the predominant sources of existing noise in the study area. Existing noise levels in the noise study area were determined on March 24, 2021 by taking short-term (15-minute) measurements at two locations in the area with a Larson Davis model 824 sound level meter. The noise measurement locations were then used to represent the existing noise level for each receptor in the study area. Measured noise levels in the study area ranged from 35 to 37 dBA.

The noise measurement locations (ML-1 and ML-2) are shown in Figures 2 and 3 in the Noise Abatement section of this technical memorandum and described in Table 4 below.

Table 4. Measured Noise Levels in the Noise Study Area

Monitoring Location	Description	Activity Category	Measured Noise Level (dBA L_{eq}, rounded)
ML-1	Open space north of Kays Creek and west of Grace Way	B	35
ML-2	Open space south of W 1000 S (Westside Dr) and west of Grace Way	B	37

Impact Assessment

Traffic-related noise impacts with the Final Construction Design were estimated with TNM version 2.5 based on the proposed roadway design as shown in Figures 2 and 3 in the Noise Abatement section of this technical memorandum. The noise model for the Final Construction Design was developed from the noise models used in the most recent environmental re-evaluations for the Kays Creek and 2200 West areas (Re-evaluation #7 and Re-evaluation #9; UDOT 2020), and updated with MicroStation final roadway design and proposed terrain contour files supplied by the design team. The modeled roadway included the proposed roadway elevation changes necessary to construct the WDC mainline over Kays Creek and the WDC trail via box culvert, as well as additional elevation changes near 2200 West.

The newly developed residential receptors were provided by UDOT. Traffic volumes used in the model were based on LOS C volumes for the WDC mainline and associated ramps as provided in the Re-evaluation #7 and #9 noise models, with traffic operating at future posted speeds on WDC (65 mph) and associated ramps (45 mph) to reflect free flow traffic conditions.

For the current 155 residential receptors (53 analyzed in Re-evaluations #9 and #7, with 102 added since) located in the noise study area, noise levels with the Final Construction Design would range from 48 to 75 dBA, compared to the existing conditions of 35 to 37 dBA. As with UDOT's 2020 Re-evaluation #9, noise levels substantially increase (10-dBA or more increase over existing noise levels) due to the introduction of new highway alignment for the WDC mainline; therefore, all 155 residential receptors would have traffic noise impacts. Fifty-three (53) of the residential receptors would also experience noise levels that approach or exceed the NAC of 66 dBA $L_{eq(h)}$ for Activity Category B. Receptor locations are shown in Figures 2 and 3. Table 5 summarizes the modeled Final Construction Design noise levels. **Bolded** values indicate impact with the Final Construction Design. Receptors shaded blue were previously analyzed in Re-evaluations #9 and #7 (UDOT 2020).

Table 5. Impact Analysis Results by Receptor, dBA $L_{eq(h)}$

Receptor[1]	Activity Category	1st Row Y=Yes	UDOT NAC $L_{eq(h)}$	Existing		Final Construction Design		
				Noise Level (dBA)	≥ UDOT NAC?	Noise Level (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing?
N1441	B	N	66	37	N	**61**	N	**Y**
N1448	B	Y	66	35	N	**60**	N	**Y**
N1449	B	Y	66	35	N	**61**	N	**Y**
N1450	B	Y	66	35	N	**62**	N	**Y**
N1451	B	Y	66	35	N	**62**	N	**Y**
N1452	B	Y	66	35	N	**61**	N	**Y**
N1453	B	Y	66	35	N	**60**	N	**Y**
N1454	B	Y	66	35	N	**60**	N	**Y**
N1455	B	Y	66	35	N	**60**	N	**Y**
N1456	B	Y	66	35	N	**61**	N	**Y**
N1457	B	Y	66	35	N	**61**	N	**Y**
N1458	B	Y	66	35	N	**62**	N	**Y**
N1459	B	Y	66	35	N	**62**	N	**Y**
N1460	B	Y	66	35	N	**63**	N	**Y**
N1461	B	Y	66	35	N	**62**	N	**Y**
N1462	B	Y	66	35	N	**63**	N	**Y**
N1463	B	Y	66	35	N	**63**	N	**Y**
N1464	B	N	66	35	N	**59**	N	**Y**
N1465	B	Y	66	35	N	**63**	N	**Y**
N1466	B	Y	66	35	N	**63**	N	**Y**
N1467	B	N	66	35	N	**59**	N	**Y**
N1468	B	N	66	35	N	**59**	N	**Y**
N1469	B	N	66	35	N	**58**	N	**Y**
N1470	B	N	66	35	N	**58**	N	**Y**
N1471	B	N	66	35	N	**51**	N	**Y**
N1472	B	N	66	35	N	**48**	N	**Y**
N1473	B	N	66	35	N	**48**	N	**Y**
N1474	B	N	66	35	N	**48**	N	**Y**
N1475	B	N	66	35	N	**48**	N	**Y**
N1476	B	Y	66	35	N	**66**	**Y**	**Y**
N1477	B	Y	66	35	N	**68**	**Y**	**Y**
N1478	B	Y	66	35	N	**71**	**Y**	**Y**
N1479	B	N	66	35	N	**50**	N	**Y**
N1480	B	N	66	35	N	**53**	N	**Y**
N1481	B	N	66	35	N	**49**	N	**Y**
N1482	B	N	66	35	N	**49**	N	**Y**
N1483	B	N	66	35	N	**51**	N	**Y**
N1484	B	N	66	35	N	**48**	N	**Y**
N1485	B	N	66	35	N	**49**	N	**Y**
N1486	B	N	66	35	N	**49**	N	**Y**
N1487	B	N	66	35	N	**50**	N	**Y**
N1488	B	N	66	35	N	**49**	N	**Y**
N1489	B	N	66	35	N	**50**	N	**Y**
N1490	B	N	66	35	N	**49**	N	**Y**

Receptor[1]	Activity Category	1st Row Y=Yes	UDOT NAC $L_{eq(h)}$	Existing		Final Construction Design		
				Noise Level (dBA)	≥ UDOT NAC?	Noise Level (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing?
N1491	B	N	66	35	N	**51**	N	**Y**
N1492	B	N	66	35	N	**53**	N	**Y**
N1493	B	Y	66	35	N	**70**	**Y**	**Y**
N1494	B	Y	66	35	N	**71**	**Y**	**Y**
N1495	B	Y	66	35	N	**72**	**Y**	**Y**
N1496	B	Y	66	35	N	**69**	**Y**	**Y**
N1497	B	Y	66	35	N	**68**	**Y**	**Y**
N1498	B	Y	66	35	N	**67**	**Y**	**Y**
N1499	B	Y	66	35	N	**66**	**Y**	**Y**
N1501	B	N	66	37	N	**56**	N	**Y**
N1502	B	N	66	37	N	**57**	N	**Y**
N1504	B	N	66	37	N	**58**	N	**Y**
N1505	B	N	66	37	N	**58**	N	**Y**
N1506	B	N	66	37	N	**61**	N	**Y**
N1507	B	N	66	37	N	**62**	N	**Y**
N1508	B	N	66	37	N	**62**	N	**Y**
N1509	B	N	66	37	N	**58**	N	**Y**
N1510	B	N	66	37	N	**59**	N	**Y**
N1511	B	N	66	37	N	**60**	N	**Y**
N1512	B	N	66	37	N	**60**	N	**Y**
N1513	B	N	66	37	N	**62**	N	**Y**
N1514	B	Y	66	37	N	**64**	N	**Y**
N1515	B	Y	66	37	N	**65**	N	**Y**
N1516	B	Y	66	37	N	**71**	**Y**	**Y**
N1517	B	Y	66	37	N	**72**	**Y**	**Y**
N1518	B	Y	66	37	N	**73**	**Y**	**Y**
N1519	B	Y	66	37	N	**73**	**Y**	**Y**
N1524	B	Y	66	37	N	**72**	**Y**	**Y**
N1525	B	Y	66	37	N	**71**	**Y**	**Y**
N1526	B	Y	66	37	N	**69**	**Y**	**Y**
N1527	B	Y	66	37	N	**67**	**Y**	**Y**
N1528	B	Y	66	37	N	**66**	**Y**	**Y**
N1529	B	N	66	37	N	**65**	N	**Y**
N1530	B	N	66	37	N	**61**	N	**Y**
N1531	B	N	66	37	N	**63**	N	**Y**
N1532	B	N	66	37	N	**64**	N	**Y**
N1533	B	N	66	37	N	**65**	N	**Y**
N1534	B	N	66	37	N	**65**	N	**Y**
N1535	B	Y	66	35	N	**75**	**Y**	**Y**
N1536	B	Y	66	35	N	**75**	**Y**	**Y**
N1537	B	Y	66	35	N	**75**	**Y**	**Y**
N1538	B	Y	66	35	N	**75**	**Y**	**Y**
N1539	B	Y	66	35	N	**75**	**Y**	**Y**
N1540	B	Y	66	35	N	**75**	**Y**	**Y**
N1541	B	Y	66	35	N	**75**	**Y**	**Y**

Receptor[1]	Activity Category	1st Row Y=Yes	UDOT NAC $L_{eq(h)}$	Existing		Final Construction Design		
				Noise Level (dBA)	≥ UDOT NAC?	Noise Level (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing?
N1542	B	Y	66	35	N	**75**	**Y**	**Y**
N1543	B	Y	66	35	N	**75**	**Y**	**Y**
N1544	B	Y	66	35	N	**75**	**Y**	**Y**
N1545	B	Y	66	35	N	**75**	**Y**	**Y**
N1546	B	Y	66	35	N	**75**	**Y**	**Y**
N1547	B	Y	66	37	N	**75**	**Y**	**Y**
N1548	B	Y	66	37	N	**75**	**Y**	**Y**
N1549	B	Y	66	37	N	**74**	**Y**	**Y**
N1550	B	Y	66	37	N	**74**	**Y**	**Y**
N1551	B	Y	66	37	N	**74**	**Y**	**Y**
N1552	B	Y	66	37	N	**74**	**Y**	**Y**
N1553	B	Y	66	37	N	**75**	**Y**	**Y**
N1554	B	Y	66	37	N	**74**	**Y**	**Y**
N1555	B	Y	66	37	N	**75**	**Y**	**Y**
N1556	B	Y	66	37	N	**74**	**Y**	**Y**
N1557	B	Y	66	37	N	**74**	**Y**	**Y**
N1558	B	Y	66	37	N	**74**	**Y**	**Y**
N1559	B	Y	66	37	N	**73**	**Y**	**Y**
N1560	B	Y	66	37	N	**73**	**Y**	**Y**
N1561	B	Y	66	37	N	**72**	**Y**	**Y**
N1562	B	Y	66	37	N	**72**	**Y**	**Y**
N1563	B	Y	66	37	N	**72**	**Y**	**Y**
N1564	B	Y	66	37	N	**68**	**Y**	**Y**
N1565	B	Y	66	37	N	**66**	**Y**	**Y**
N1566	B	Y	66	37	N	**65**	N	**Y**
N1567	B	N	66	37	N	**59**	N	**Y**
N1568	B	N	66	37	N	**63**	N	**Y**
N1569	B	N	66	37	N	**64**	N	**Y**
N1570	B	Y	66	37	N	**70**	**Y**	**Y**
N1571	B	Y	66	37	N	**71**	**Y**	**Y**
N1572	B	Y	66	37	N	**73**	**Y**	**Y**
N1573	B	N	66	37	N	**63**	N	**Y**
N1574	B	N	66	37	N	**58**	N	**Y**
N1575	B	N	66	37	N	**57**	N	**Y**
N1576	B	N	66	37	N	**55**	N	**Y**
N1577	B	N	66	37	N	**59**	N	**Y**
N1578	B	N	66	37	N	**58**	N	**Y**
N1579	B	N	66	37	N	**56**	N	**Y**
N1580	B	N	66	37	N	**55**	N	**Y**
N1581	B	N	66	37	N	**54**	N	**Y**
N1582	B	N	66	37	N	**57**	N	**Y**
N1583	B	N	66	37	N	**54**	N	**Y**
N1584	B	N	66	37	N	**55**	N	**Y**
N1585	B	N	66	37	N	**56**	N	**Y**
N1586	B	N	66	37	N	**56**	N	**Y**

Receptor[1]	Activity Category	1st Row Y=Yes	UDOT NAC $L_{eq(h)}$	Existing		Final Construction Design		
				Noise Level (dBA)	≥ UDOT NAC?	Noise Level (dBA)	≥ UDOT NAC?	≥ 10 dBA Increase over Existing?
N1587	B	N	66	37	N	**56**	N	**Y**
N1588	B	N	66	37	N	**56**	N	**Y**
N1589	B	N	66	37	N	**55**	N	**Y**
N1590	B	N	66	37	N	**55**	N	**Y**
N1591	B	N	66	37	N	**57**	N	**Y**
N1592	B	N	66	35	N	**55**	N	**Y**
N1593	B	N	66	35	N	**53**	N	**Y**
N1594	B	N	66	35	N	**51**	N	**Y**
N1595	B	N	66	35	N	**52**	N	**Y**
N1596	B	N	66	35	N	**53**	N	**Y**
N1612	B	N	66	37	N	**57**	N	**Y**
N1613	B	N	66	37	N	**56**	N	**Y**
N1614	B	N	66	37	N	**55**	N	**Y**
N1615	B	N	66	37	N	**54**	N	**Y**
N1616	B	N	66	37	N	**54**	N	**Y**
N1617	B	N	66	37	N	**52**	N	**Y**
N1618	B	N	66	37	N	**59**	N	**Y**
N1619	B	N	66	37	N	**58**	N	**Y**
N1620	B	N	66	37	N	**57**	N	**Y**
N1621	B	N	66	37	N	**57**	N	**Y**
N1622	B	N	66	37	N	**54**	N	**Y**

Bolded values indicate impact with the Final Construction Design

[1] Receptors shaded **blue** were previously analyzed in Re-evaluations #9 and #7 (UDOT 2020). Unshaded receptors represent new development since UDOT's 2020 analysis.

Noise Abatement

This section discusses UDOT's methodology for evaluating noise abatement mitigation measures for the traffic noise impacts identified with the Final Construction Design.

For a noise wall to be effective, it must be appropriately high and long enough to block the view of the noise source (that is, traffic on the roadway) from the receptor's line of sight. FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011) states that, as a general rule, the noise barrier should extend four (4) times as far in each direction as the distance from the receptor to the barrier. For example, if the receptor is 50 feet from the proposed noise barrier, the barrier needs to extend at least 200 feet on either side of the receptor in order to shield the receptor from noise traveling past the ends of the barrier.

Gaps in a noise wall cause "noise leaks," which reduce the effectiveness of the wall near the gap. In addition, the effectiveness of noise walls decreases with increasing distance from the wall. For example, a residence that is 300 feet from a noise wall might experience noise levels that exceed the residential NAC. However, the noise wall might be ineffective in reducing noise levels by 7 dBA or more at that distance, and, therefore, a noise barrier might not be warranted according to UDOT's Noise Abatement

Policy. The goal of noise abatement is to substantially reduce noise, which does not guarantee noise levels below the residential NAC.

The two primary criteria to consider when evaluating noise abatement measures are feasibility and reasonableness. Noise abatement would be provided by UDOT only if UDOT determines that noise abatement measures are both feasible and reasonable.

Feasibility and Reasonableness Factors

Feasibility Factors

The feasibility of noise abatement measures primarily involves construction and engineering considerations such as safety, location of cross streets, sight distance, and access to adjacent properties, among other considerations. Under UDOT's Noise Abatement Policy, a noise barrier must be considered "acoustically feasible" (that is, the barrier must reduce noise by at least 5 dBA for at least 50% of front-row receptors).

If a noise abatement measure is determined by UDOT to be acoustically feasible, then the abatement measure will be evaluated to determine whether its construction is reasonable. If a noise abatement measure is determined by UDOT to be not feasible, it will not be considered any further.

Reasonableness Factors

Under UDOT's Noise Abatement Policy, reasonableness factors must be collectively achieved for a noise abatement measure to be considered "reasonable." All three reasonableness factors described below must be met for a noise barrier to be considered reasonable.

- **Noise Abatement Design Goal:** Every reasonable effort should be made to obtain substantial noise reductions. UDOT defines the minimum noise reduction (design goal) from proposed abatement measures to be 7 dBA or greater for at least 35% of front-row receptors.
- **Cost Effectiveness:** The cost of a noise abatement measure must be considered reasonable for it to be included in a project. Noise abatement costs are determined by multiplying a fixed unit cost per square foot by the height and length of the barrier. For residential receptors, cost-effectiveness is based on the cost of the abatement measure (for example, a noise wall) divided by the number of benefited receptors (the total number of dwelling units at which noise is reduced by a minimum of 5 dBA as a result of the abatement measure).

  Currently, the maximum cost used to determine the reasonableness of a noise abatement measure is $30,000 per benefiting residence (Activity Category B) based on a unit cost of $20 per square foot of barrier, and $360 per lineal foot for Activity Categories A, C, D, or E. In final design, actual construction costs are used for noise abatement that requires other items associated with the abatement measure that are critical to safety or otherwise only necessary to accommodate the abatement.
- **Viewpoints of Property Owners and Residents:** If a noise abatement measure is both feasible and reasonable, UDOT will also consider the viewpoints of property owners and residents that are either benefited by (receive noise reduction of 5 dBA or more) or abut any portion of the proposed noise abatement to determine whether the noise abatement measures are desired. As part of the final design phase, public balloting would take place for those noise abatement measures that both meet the noise abatement design goal and are cost-effective consistent with the procedures described in UDOT's Noise Abatement Policy.

Noise Wall Evaluations

This section describes the feasibility and reasonableness evaluation for Noise Wall 10 under the Final Construction Design. Refer to Figures 2 and 3 for the location of the noise wall and impacted and benefited receptors. Figure 2 reflects the results for the 12-foot high analysis for Noise Wall 10 presented in Table 6.

As summarized in Table 6, UDOT evaluated a noise wall at heights ranging from 11 to 13 feet to provide mitigation to 155 residential receptors, 74 of which are front-row receptors to the WDC mainline. Noise Wall 10 would be located along northbound side of the WDC at a 36-foot offset from the shoulder stripe consistent with the clear zone required for noise walls. An exception to the 36-foot offset is in the vicinity of Kays Creek and WDC Trail box culverts, where the noise wall would be located behind concrete safety barrier adjacent to the edge of pavement in order to pass over the creek. The noise wall would be limited to 10 feet above the roadway when on box culvert structures.

As analyzed this noise wall is 5,406 feet long and extends from approximately station 1440+00 to station 1494+00. Note, a noise wall was first analyzed at 7,256-foot long from approximately station 1421+50 to approximately station 1494+00 to cover the extent of impacted receptors. However, at a height of 17 feet and a 36-foot offset from the shoulder stripe, the noise wall does not benefit receptors south of Kays Creek; therefore, a shorter length barrier was analyzed and is presented in Table 6.

Because Noise Wall 10 is being evaluated for newly developed residential receptors, not previously considered in UDOTS's 2020 Re-evaluation #9, additional barrier analysis scenarios are presented in Table 6 for informational purposes to show how the Final Construction Design roadway changes directly compare to what was analyzed in the previous Re-evaluation #9 noise analysis.

Table 6. Noise Abatement Analysis for Noise Wall 10

Barrier Height	Feasibility		Reasonableness					Feasible and Reason-able?
	% Front-Row with 5-dBA Reduction	Acoustically Feasible?[1]	% Front-Row with 7-dBA Reduction	Noise Abatement Design Goal Met?[2]	Anticipated Cost	Allowable Cost	Cost-Effective?[3]	
17[a]	25	N	NA	NA	NA	NA	NA	No
17[b]	18	N	NA	NA	NA	NA	NA	No
11	58	Y	16	N	$1,187,940	$1,290,000	Yes	No
12	64	Y	45	Y	$1,294,820	$1,410,000	Yes	Yes
13	68	Y	53	Y	$1,401,740	$1,500,000	Yes	Yes

[1] 5-dBA reduction for at least 50% of front-row receptors.
[2] 7-dBA reduction for at least 35% of front-row receptors.
[3] Anticipated cost is less than allowable cost.

Additional scenarios for informational purposes:

[a] Barrier results from Re-evaluation #9; 52 receptors from Re-evaluation #9 (UDOT 2020)
[b] Barrier results with Final Construction Design roadway; 52 receptors from Re-evaluation #9 (HNTB 2021)

The 12 foot tall, 5,406-foot long wall from approximately station 1440+00 to station 1494+00 meets UDOT's noise-reduction (feasible and reasonable) and cost-effectiveness criteria at the planning cost of

$20 per square foot of barrier; therefore, Noise Wall 10 is recommended for balloting under UDOT's Noise Abatement Policy.

The Final Construction Design noise levels for the modeled receptor sites with and without the incorporation of Noise Wall 10 as analyzed for this report are presented in the tables in Appendix A.

Figure 2. Noise Receptors and Noise Walls Analyzed (1 of 2)

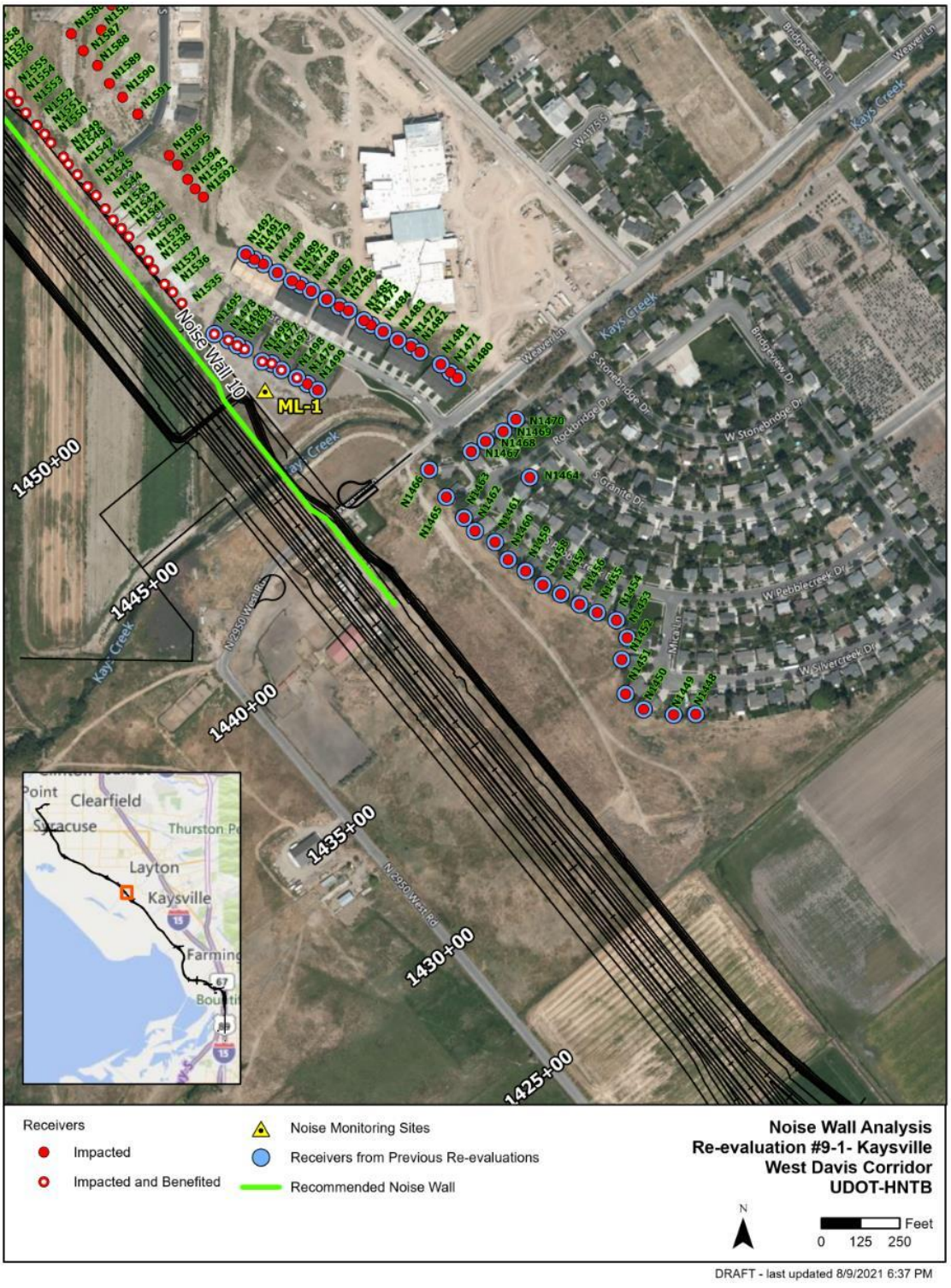
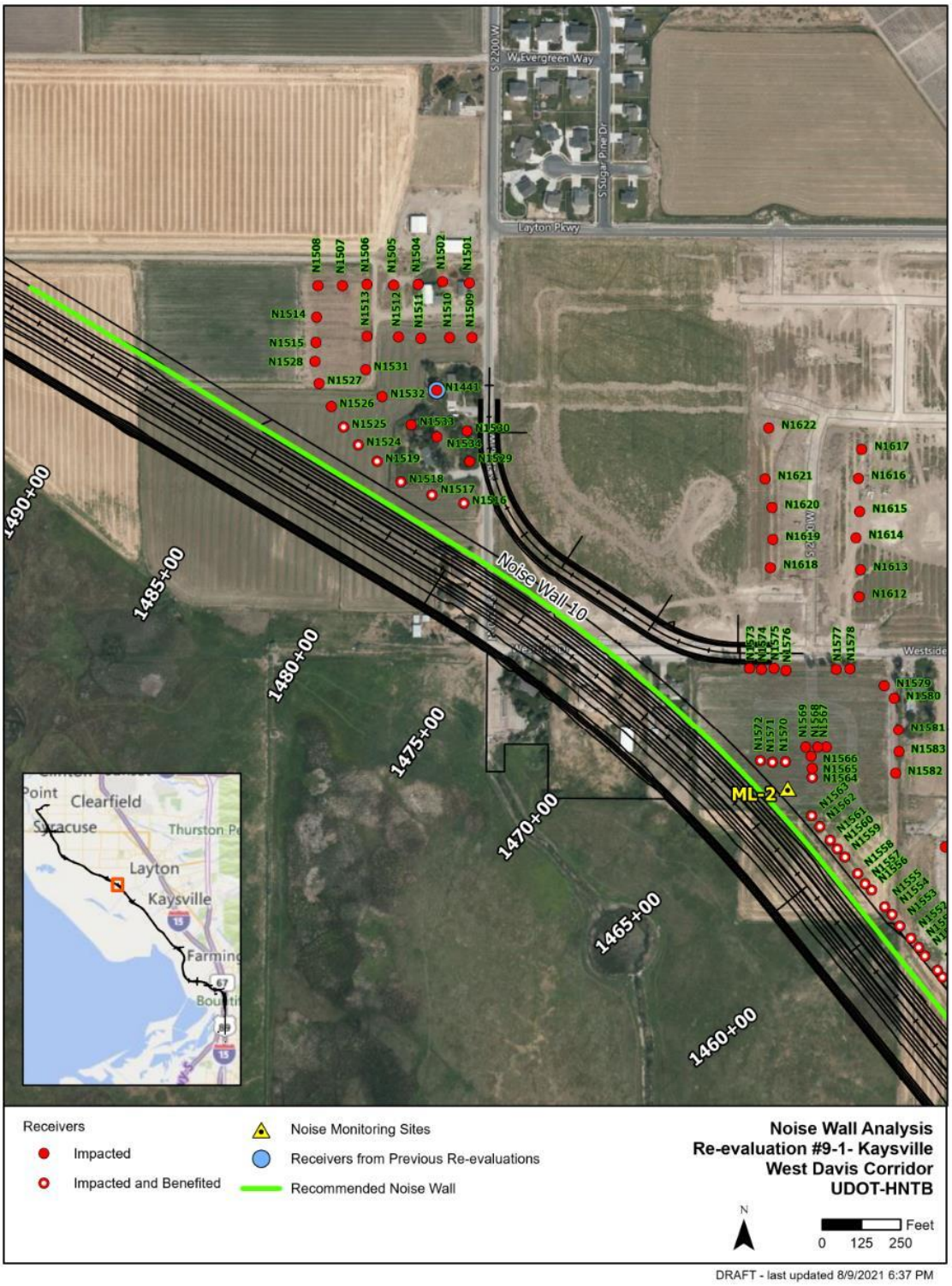


Figure 3. Noise Receptors and Noise Walls Analyzed (2 of 2)



Conclusions

The Final Construction Design would substantially increase (≥ 10 dBA by definition) noise levels throughout the noise study area compared to existing conditions due to the introduction of new highway alignment for the WDC mainline. The 155 modeled residential receptors would experience traffic noise impacts from the Final Construction Design. Noise Wall 10 is recommended for balloting as it meets the feasibility and reasonableness requirements of UDOT's Noise Abatement Policy, with the new receptors added since the prior Re-evaluation #7 and Re-evaluation #9 (UDOT 2020).

UDOT would conduct balloting consistent with the procedures in UDOT's 2020 Noise Abatement Policy. The final decision to build a noise barrier will be made upon completion of the public involvement process. A barrier identified as recommended for balloting is a barrier that has been shown to be both feasible and reasonable; however, that finding is not a commitment to build a barrier.

References

Federal Highway Administration (FHWA), *Highway Traffic Noise: Analysis and Abatement Guidance*, FHWA-HEP-10-025. December 2011. https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf.

Federal Highway Administration (FHWA), *Procedures for Abatement of Highway Traffic Noise and Construction Noise,* Code of Federal Regulations, Title 23 Part 772 (23 CFR 722). July 13, 2010.

Utah Department of Transportation (UDOT), *UDOT Project Number S-0067(14)0, S.R. 67, West Davis Corridor; Kaysville Roadway, Trail, and Detention Changes in Davis County, Utah (PIN 7176) Environmental Impact Statement Re-evaluation #9*. April 2, 2020.

Utah Department of Transportation (UDOT), *UDOT Project Number S-0067(14)0, S.R. 67, West Davis Corridor; Layton 2700 West Interchange in Davis County, Utah (PIN 7176) Environmental Impact Statement Re-evaluation #7*. April 1, 2020.

Utah Department of Transportation (UDOT), *Noise Abatement*, UDOT 08A2-1. Effective November 6, 1987. Revised May 28, 2020. https://www.udot.utah.gov/main/uconowner.gf?n=10496602977480171.

Appendix A – Noise Wall Analysis Noise Levels

Table A-1. Abatement Analysis Results by Receptor with 11-foot Wall, dBA $L_{eq(h)}$

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1441	1	N	61	1	59	2	0	0	0
N1448	1	Y	60	1	60	0	0	0	0
N1449	1	Y	61	1	61	0	0	0	0
N1450	1	Y	62	1	62	0	0	0	0
N1451	1	Y	62	1	62	0	0	0	0
N1452	1	Y	61	1	61	0	0	0	0
N1453	1	Y	60	1	60	0	0	0	0
N1454	1	Y	60	1	60	0	0	0	0
N1455	1	Y	60	1	60	0	0	0	0
N1456	1	Y	61	1	61	0	0	0	0
N1457	1	Y	61	1	61	0	0	0	0
N1458	1	Y	62	1	62	0	0	0	0
N1459	1	Y	62	1	62	0	0	0	0
N1460	1	Y	63	1	62	1	0	0	0
N1461	1	Y	62	1	62	0	0	0	0
N1462	1	Y	63	1	63	0	0	0	0
N1463	1	Y	63	1	63	0	0	0	0
N1464	1	N	59	1	59	0	0	0	0
N1465	1	Y	63	1	62	1	0	0	0
N1466	1	Y	63	1	62	1	0	0	0
N1467	1	N	59	1	58	1	0	0	0
N1468	1	N	59	1	59	0	0	0	0
N1469	1	N	58	1	58	0	0	0	0
N1470	1	N	58	1	57	1	0	0	0
N1471	1	N	51	1	50	1	0	0	0
N1472	1	N	48	1	48	0	0	0	0
N1473	1	N	48	1	48	0	0	0	0
N1474	1	N	48	1	48	0	0	0	0
N1475	1	N	48	1	48	0	0	0	0
N1476	1	Y	66	1	63	3	0	0	0
N1477	1	Y	68	1	64	4	0	0	0
N1478	1	Y	71	1	66	5	1	0	1
N1479	1	N	50	1	50	0	0	0	0
N1480	1	N	53	1	53	0	0	0	0
N1481	1	N	49	1	49	0	0	0	0
N1482	1	N	49	1	48	1	0	0	0
N1483	1	N	51	1	50	1	0	0	0
N1484	1	N	48	1	48	0	0	0	0
N1485	1	N	49	1	49	0	0	0	0
N1486	1	N	49	1	49	0	0	0	0
N1487	1	N	50	1	50	0	0	0	0
N1488	1	N	49	1	49	0	0	0	0
N1489	1	N	50	1	49	1	0	0	0
N1490	1	N	49	1	49	0	0	0	0
N1491	1	N	51	1	51	0	0	0	0

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1492	1	N	53	1	53	0	0	0	0
N1493	1	Y	70	1	65	5	1	0	1
N1494	1	Y	71	1	65	6	1	0	1
N1495	1	Y	72	1	67	5	1	0	1
N1496	1	Y	69	1	64	5	1	0	1
N1497	1	Y	68	1	64	4	0	0	0
N1498	1	Y	67	1	63	4	0	0	0
N1499	1	Y	66	1	63	3	0	0	0
N1501	1	N	56	1	54	2	0	0	0
N1502	1	N	57	1	55	2	0	0	0
N1504	1	N	58	1	56	2	0	0	0
N1505	1	N	58	1	57	1	0	0	0
N1506	1	N	61	1	57	4	0	0	0
N1507	1	N	62	1	58	4	0	0	0
N1508	1	N	62	1	59	3	0	0	0
N1509	1	N	58	1	57	1	0	0	0
N1510	1	N	59	1	58	1	0	0	0
N1511	1	N	60	1	58	2	0	0	0
N1512	1	N	60	1	57	3	0	0	0
N1513	1	N	62	1	59	3	0	0	0
N1514	1	Y	64	1	60	4	0	0	0
N1515	1	Y	65	1	62	3	0	0	0
N1516	1	Y	71	1	65	6	1	0	1
N1517	1	Y	72	1	66	6	1	0	1
N1518	1	Y	73	1	67	6	1	0	1
N1519	1	Y	73	1	67	6	1	0	1
N1524	1	Y	72	1	66	6	1	0	1
N1525	1	Y	71	1	66	5	1	0	1
N1526	1	Y	69	1	65	4	0	0	0
N1527	1	Y	67	1	64	3	0	0	0
N1528	1	Y	66	1	63	3	0	0	0
N1529	1	N	65	1	62	3	0	0	0
N1530	1	N	61	1	59	2	0	0	0
N1531	1	N	63	1	62	1	0	0	0
N1532	1	N	64	1	62	2	0	0	0
N1533	1	N	65	1	63	2	0	0	0
N1534	1	N	65	1	63	2	0	0	0
N1535	1	Y	75	1	68	7	1	1	1
N1536	1	Y	75	1	68	7	1	1	1
N1537	1	Y	75	1	68	7	1	1	1
N1538	1	Y	75	1	69	6	1	0	1
N1539	1	Y	75	1	69	6	1	0	1
N1540	1	Y	75	1	69	6	1	0	1
N1541	1	Y	75	1	69	6	1	0	1
N1542	1	Y	75	1	69	6	1	0	1
N1543	1	Y	75	1	69	6	1	0	1
N1544	1	Y	75	1	69	6	1	0	1

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1545	1	Y	75	1	69	6	1	0	1
N1546	1	Y	75	1	69	6	1	0	1
N1547	1	Y	75	1	69	6	1	0	1
N1548	1	Y	75	1	68	7	1	1	1
N1549	1	Y	74	1	67	7	1	1	1
N1550	1	Y	74	1	67	7	1	1	1
N1551	1	Y	74	1	67	7	1	1	1
N1552	1	Y	74	1	67	7	1	1	1
N1553	1	Y	75	1	68	7	1	1	1
N1554	1	Y	74	1	68	6	1	0	1
N1555	1	Y	75	1	68	7	1	1	1
N1556	1	Y	74	1	68	6	1	0	1
N1557	1	Y	74	1	68	6	1	0	1
N1558	1	Y	74	1	67	7	1	1	1
N1559	1	Y	73	1	67	6	1	0	1
N1560	1	Y	73	1	66	7	1	1	1
N1561	1	Y	72	1	66	6	1	0	1
N1562	1	Y	72	1	66	6	1	0	1
N1563	1	Y	72	1	66	6	1	0	1
N1564	1	Y	68	1	64	4	0	0	0
N1565	1	Y	66	1	63	3	0	0	0
N1566	1	Y	65	1	63	2	0	0	0
N1567	1	N	59	1	57	2	0	0	0
N1568	1	N	63	1	61	2	0	0	0
N1569	1	N	64	1	62	2	0	0	0
N1570	1	Y	70	1	65	5	1	0	1
N1571	1	Y	71	1	66	5	1	0	1
N1572	1	Y	73	1	67	6	1	0	1
N1573	1	N	63	1	61	2	0	0	0
N1574	1	N	58	1	56	2	0	0	0
N1575	1	N	57	1	55	2	0	0	0
N1576	1	N	55	1	54	1	0	0	0
N1577	1	N	59	1	59	0	0	0	0
N1578	1	N	58	1	58	0	0	0	0
N1579	1	N	56	1	56	0	0	0	0
N1580	1	N	55	1	55	0	0	0	0
N1581	1	N	54	1	53	1	0	0	0
N1582	1	N	57	1	55	2	0	0	0
N1583	1	N	54	1	53	1	0	0	0
N1584	1	N	55	1	54	1	0	0	0
N1585	1	N	56	1	55	1	0	0	0
N1586	1	N	56	1	54	2	0	0	0
N1587	1	N	56	1	54	2	0	0	0
N1588	1	N	56	1	55	1	0	0	0
N1589	1	N	55	1	54	1	0	0	0
N1590	1	N	55	1	54	1	0	0	0
N1591	1	N	57	1	57	0	0	0	0

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1592	1	N	55	1	54	1	0	0	0
N1593	1	N	53	1	52	1	0	0	0
N1594	1	N	51	1	50	1	0	0	0
N1595	1	N	52	1	51	1	0	0	0
N1596	1	N	53	1	53	0	0	0	0
N1612	1	N	57	1	53	4	0	0	0
N1613	1	N	56	1	53	3	0	0	0
N1614	1	N	55	1	53	2	0	0	0
N1615	1	N	54	1	52	2	0	0	0
N1616	1	N	54	1	52	2	0	0	0
N1617	1	N	52	1	51	1	0	0	0
N1618	1	N	59	1	57	2	0	0	0
N1619	1	N	58	1	56	2	0	0	0
N1620	1	N	57	1	55	2	0	0	0
N1621	1	N	57	1	54	3	0	0	0
N1622	1	N	54	1	53	1	0	0	0
Totals	74			155			43	12	43
			Feasibility						
			# of First-Row 5 dBA Reduction				43		
			% of First-Row 5 dBA Reduction				58%		
			Acoustic Feasibility (5 dBA reduction for 50% of front-row)				Yes		
			Reasonableness						
			# of First-Row 7 dBA Design Goal				12		
			% of First-Row 7 dBA Design Goal				16%		
			Noise Abatement Design Goal (7 dBA reduction for 35% of front-row)				No		
			Cost (at $20/sq ft)						
			# of Benefited				43		
			Cost of Noise Wall				$1,187,940		
			Allowable Cost ($30,000 per benefited receptor)				$1,290,000		
			Cost-Effective (Anticipated Cost < Allowable Cost)				Yes		
			5 dBA Reduction Goal Met				Yes		
			7 dBA Reduction Goal Met				No		
			Cost Criteria Met				Yes		
			Feasible and Cost Reasonable				No		

Table A-2. Abatement Analysis Results by Receptor with 12-foot Wall, dBA $L_{eq(h)}$

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1441	1	N	61	1	59	2	0	0	0
N1448	1	Y	60	1	60	0	0	0	0
N1449	1	Y	61	1	61	0	0	0	0
N1450	1	Y	62	1	62	0	0	0	0
N1451	1	Y	62	1	62	0	0	0	0
N1452	1	Y	61	1	61	0	0	0	0
N1453	1	Y	60	1	60	0	0	0	0
N1454	1	Y	60	1	60	0	0	0	0
N1455	1	Y	60	1	60	0	0	0	0
N1456	1	Y	61	1	61	0	0	0	0
N1457	1	Y	61	1	61	0	0	0	0
N1458	1	Y	62	1	62	0	0	0	0
N1459	1	Y	62	1	62	0	0	0	0
N1460	1	Y	63	1	62	1	0	0	0
N1461	1	Y	62	1	62	0	0	0	0
N1462	1	Y	63	1	63	0	0	0	0
N1463	1	Y	63	1	62	1	0	0	0
N1464	1	N	59	1	59	0	0	0	0
N1465	1	Y	63	1	62	1	0	0	0
N1466	1	Y	63	1	62	1	0	0	0
N1467	1	N	59	1	58	1	0	0	0
N1468	1	N	59	1	58	1	0	0	0
N1469	1	N	58	1	58	0	0	0	0
N1470	1	N	58	1	57	1	0	0	0
N1471	1	N	51	1	50	1	0	0	0
N1472	1	N	48	1	48	0	0	0	0
N1473	1	N	48	1	48	0	0	0	0
N1474	1	N	48	1	48	0	0	0	0
N1475	1	N	48	1	48	0	0	0	0
N1476	1	Y	66	1	62	4	0	0	0
N1477	1	Y	68	1	63	5	1	0	1
N1478	1	Y	71	1	65	6	1	0	1
N1479	1	N	50	1	50	0	0	0	0
N1480	1	N	53	1	53	0	0	0	0
N1481	1	N	49	1	49	0	0	0	0
N1482	1	N	49	1	48	1	0	0	0
N1483	1	N	51	1	50	1	0	0	0
N1484	1	N	48	1	48	0	0	0	0
N1485	1	N	49	1	49	0	0	0	0
N1486	1	N	49	1	49	0	0	0	0
N1487	1	N	50	1	49	1	0	0	0
N1488	1	N	49	1	49	0	0	0	0
N1489	1	N	50	1	49	1	0	0	0
N1490	1	N	49	1	49	0	0	0	0
N1491	1	N	51	1	51	0	0	0	0
N1492	1	N	53	1	52	1	0	0	0

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1493	1	Y	70	1	64	6	1	0	1
N1494	1	Y	71	1	65	6	1	0	1
N1495	1	Y	72	1	66	6	1	0	1
N1496	1	Y	69	1	63	6	1	0	1
N1497	1	Y	68	1	63	5	1	0	1
N1498	1	Y	67	1	62	5	1	0	1
N1499	1	Y	66	1	62	4	0	0	0
N1501	1	N	56	1	54	2	0	0	0
N1502	1	N	57	1	55	2	0	0	0
N1504	1	N	58	1	56	2	0	0	0
N1505	1	N	58	1	56	2	0	0	0
N1506	1	N	61	1	57	4	0	0	0
N1507	1	N	62	1	58	4	0	0	0
N1508	1	N	62	1	59	3	0	0	0
N1509	1	N	58	1	57	1	0	0	0
N1510	1	N	59	1	57	2	0	0	0
N1511	1	N	60	1	58	2	0	0	0
N1512	1	N	60	1	57	3	0	0	0
N1513	1	N	62	1	59	3	0	0	0
N1514	1	Y	64	1	60	4	0	0	0
N1515	1	Y	65	1	61	4	0	0	0
N1516	1	Y	71	1	64	7	1	1	1
N1517	1	Y	72	1	66	6	1	0	1
N1518	1	Y	73	1	66	7	1	1	1
N1519	1	Y	73	1	66	7	1	1	1
N1524	1	Y	72	1	66	6	1	0	1
N1525	1	Y	71	1	65	6	1	0	1
N1526	1	Y	69	1	65	4	0	0	0
N1527	1	Y	67	1	64	3	0	0	0
N1528	1	Y	66	1	63	3	0	0	0
N1529	1	N	65	1	62	3	0	0	0
N1530	1	N	61	1	58	3	0	0	0
N1531	1	N	63	1	61	2	0	0	0
N1532	1	N	64	1	62	2	0	0	0
N1533	1	N	65	1	62	3	0	0	0
N1534	1	N	65	1	62	3	0	0	0
N1535	1	Y	75	1	67	8	1	1	1
N1536	1	Y	75	1	67	8	1	1	1
N1537	1	Y	75	1	67	8	1	1	1
N1538	1	Y	75	1	68	7	1	1	1
N1539	1	Y	75	1	68	7	1	1	1
N1540	1	Y	75	1	68	7	1	1	1
N1541	1	Y	75	1	68	7	1	1	1
N1542	1	Y	75	1	68	7	1	1	1
N1543	1	Y	75	1	68	7	1	1	1
N1544	1	Y	75	1	68	7	1	1	1
N1545	1	Y	75	1	68	7	1	1	1

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1546	1	Y	75	1	68	7	1	1	1
N1547	1	Y	75	1	68	7	1	1	1
N1548	1	Y	75	1	67	8	1	1	1
N1549	1	Y	74	1	67	7	1	1	1
N1550	1	Y	74	1	67	7	1	1	1
N1551	1	Y	74	1	67	7	1	1	1
N1552	1	Y	74	1	66	8	1	1	1
N1553	1	Y	75	1	67	8	1	1	1
N1554	1	Y	74	1	67	7	1	1	1
N1555	1	Y	75	1	67	8	1	1	1
N1556	1	Y	74	1	67	7	1	1	1
N1557	1	Y	74	1	67	7	1	1	1
N1558	1	Y	74	1	66	8	1	1	1
N1559	1	Y	73	1	66	7	1	1	1
N1560	1	Y	73	1	65	8	1	1	1
N1561	1	Y	72	1	65	7	1	1	1
N1562	1	Y	72	1	65	7	1	1	1
N1563	1	Y	72	1	65	7	1	1	1
N1564	1	Y	68	1	63	5	1	0	1
N1565	1	Y	66	1	63	3	0	0	0
N1566	1	Y	65	1	62	3	0	0	0
N1567	1	N	59	1	56	3	0	0	0
N1568	1	N	63	1	60	3	0	0	0
N1569	1	N	64	1	61	3	0	0	0
N1570	1	Y	70	1	65	5	1	0	1
N1571	1	Y	71	1	65	6	1	0	1
N1572	1	Y	73	1	65	8	1	1	1
N1573	1	N	63	1	60	3	0	0	0
N1574	1	N	58	1	56	2	0	0	0
N1575	1	N	57	1	55	2	0	0	0
N1576	1	N	55	1	54	1	0	0	0
N1577	1	N	59	1	59	0	0	0	0
N1578	1	N	58	1	58	0	0	0	0
N1579	1	N	56	1	56	0	0	0	0
N1580	1	N	55	1	55	0	0	0	0
N1581	1	N	54	1	52	2	0	0	0
N1582	1	N	57	1	55	2	0	0	0
N1583	1	N	54	1	53	1	0	0	0
N1584	1	N	55	1	54	1	0	0	0
N1585	1	N	56	1	54	2	0	0	0
N1586	1	N	56	1	54	2	0	0	0
N1587	1	N	56	1	54	2	0	0	0
N1588	1	N	56	1	55	1	0	0	0
N1589	1	N	55	1	53	2	0	0	0
N1590	1	N	55	1	54	1	0	0	0
N1591	1	N	57	1	57	0	0	0	0
N1592	1	N	55	1	54	1	0	0	0

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1593	1	N	53	1	52	1	0	0	0
N1594	1	N	51	1	50	1	0	0	0
N1595	1	N	52	1	51	1	0	0	0
N1596	1	N	53	1	53	0	0	0	0
N1612	1	N	57	1	53	4	0	0	0
N1613	1	N	56	1	53	3	0	0	0
N1614	1	N	55	1	53	2	0	0	0
N1615	1	N	54	1	52	2	0	0	0
N1616	1	N	54	1	52	2	0	0	0
N1617	1	N	52	1	51	1	0	0	0
N1618	1	N	59	1	57	2	0	0	0
N1619	1	N	58	1	56	2	0	0	0
N1620	1	N	57	1	55	2	0	0	0
N1621	1	N	57	1	54	3	0	0	0
N1622	1	N	54	1	53	1	0	0	0
Totals	74		155			47	33	47	
			Feasibility						
			# of First-Row 5 dBA Reduction			47			
			% of First-Row 5 dBA Reduction			64%			
			Acoustic Feasibility (5 dBA reduction for 50% of front-row)			Yes			
			Reasonableness						
			# of First-Row 7 dBA Design Goal			33			
			% of First-Row 7 dBA Design Goal			45%			
			Noise Abatement Design Goal (7 dBA reduction for 35% of front-row)			Yes			
			Cost (at $20/sq ft)						
			# of Benefited			47			
			Cost of Noise Wall			$1,294,820			
			Allowable Cost ($30,000 per benefited receptor)			$1,410,000			
			Cost-Effective (Anticipated Cost < Allowable Cost)			Yes			
			5 dBA Reduction Goal Met			Yes			
			7 dBA Reduction Goal Met			Yes			
			Cost Criteria Met			Yes			
			Feasible and Cost Reasonable			Yes			

Table A-3. Abatement Analysis Results by Receptor with 13-foot Wall, dBA $L_{eq(h)}$

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1441	1	N	61	1	58	3	0	0	0
N1448	1	Y	60	1	60	0	0	0	0
N1449	1	Y	61	1	61	0	0	0	0
N1450	1	Y	62	1	62	0	0	0	0
N1451	1	Y	62	1	62	0	0	0	0
N1452	1	Y	61	1	61	0	0	0	0
N1453	1	Y	60	1	60	0	0	0	0
N1454	1	Y	60	1	60	0	0	0	0
N1455	1	Y	60	1	60	0	0	0	0
N1456	1	Y	61	1	61	0	0	0	0
N1457	1	Y	61	1	61	0	0	0	0
N1458	1	Y	62	1	62	0	0	0	0
N1459	1	Y	62	1	62	0	0	0	0
N1460	1	Y	63	1	62	1	0	0	0
N1461	1	Y	62	1	62	0	0	0	0
N1462	1	Y	63	1	62	1	0	0	0
N1463	1	Y	63	1	62	1	0	0	0
N1464	1	N	59	1	58	1	0	0	0
N1465	1	Y	63	1	62	1	0	0	0
N1466	1	Y	63	1	61	2	0	0	0
N1467	1	N	59	1	58	1	0	0	0
N1468	1	N	59	1	58	1	0	0	0
N1469	1	N	58	1	57	1	0	0	0
N1470	1	N	58	1	57	1	0	0	0
N1471	1	N	51	1	50	1	0	0	0
N1472	1	N	48	1	48	0	0	0	0
N1473	1	N	48	1	48	0	0	0	0
N1474	1	N	48	1	48	0	0	0	0
N1475	1	N	48	1	49	-1	0	0	0
N1476	1	Y	66	1	61	5	1	0	1
N1477	1	Y	68	1	62	6	1	0	1
N1478	1	Y	71	1	64	7	1	1	1
N1479	1	N	50	1	49	1	0	0	0
N1480	1	N	53	1	53	0	0	0	0
N1481	1	N	49	1	48	1	0	0	0
N1482	1	N	49	1	48	1	0	0	0
N1483	1	N	51	1	49	2	0	0	0
N1484	1	N	48	1	48	0	0	0	0
N1485	1	N	49	1	48	1	0	0	0
N1486	1	N	49	1	49	0	0	0	0
N1487	1	N	50	1	49	1	0	0	0
N1488	1	N	49	1	49	0	0	0	0
N1489	1	N	50	1	49	1	0	0	0
N1490	1	N	49	1	49	0	0	0	0
N1491	1	N	51	1	50	1	0	0	0
N1492	1	N	53	1	52	1	0	0	0

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1493	1	Y	70	1	64	6	1	0	1
N1494	1	Y	71	1	64	7	1	1	1
N1495	1	Y	72	1	65	7	1	1	1
N1496	1	Y	69	1	63	6	1	0	1
N1497	1	Y	68	1	62	6	1	0	1
N1498	1	Y	67	1	62	5	1	0	1
N1499	1	Y	66	1	61	5	1	0	1
N1501	1	N	56	1	54	2	0	0	0
N1502	1	N	57	1	55	2	0	0	0
N1504	1	N	58	1	56	2	0	0	0
N1505	1	N	58	1	56	2	0	0	0
N1506	1	N	61	1	57	4	0	0	0
N1507	1	N	62	1	58	4	0	0	0
N1508	1	N	62	1	58	4	0	0	0
N1509	1	N	58	1	56	2	0	0	0
N1510	1	N	59	1	57	2	0	0	0
N1511	1	N	60	1	57	3	0	0	0
N1512	1	N	60	1	57	3	0	0	0
N1513	1	N	62	1	58	4	0	0	0
N1514	1	Y	64	1	60	4	0	0	0
N1515	1	Y	65	1	61	4	0	0	0
N1516	1	Y	71	1	64	7	1	1	1
N1517	1	Y	72	1	65	7	1	1	1
N1518	1	Y	73	1	65	8	1	1	1
N1519	1	Y	73	1	65	8	1	1	1
N1524	1	Y	72	1	65	7	1	1	1
N1525	1	Y	71	1	65	6	1	0	1
N1526	1	Y	69	1	64	5	1	0	1
N1527	1	Y	67	1	63	4	0	0	0
N1528	1	Y	66	1	62	4	0	0	0
N1529	1	N	65	1	61	4	0	0	0
N1530	1	N	61	1	58	3	0	0	0
N1531	1	N	63	1	61	2	0	0	0
N1532	1	N	64	1	61	3	0	0	0
N1533	1	N	65	1	62	3	0	0	0
N1534	1	N	65	1	62	3	0	0	0
N1535	1	Y	75	1	66	9	1	1	1
N1536	1	Y	75	1	66	9	1	1	1
N1537	1	Y	75	1	66	9	1	1	1
N1538	1	Y	75	1	67	8	1	1	1
N1539	1	Y	75	1	67	8	1	1	1
N1540	1	Y	75	1	67	8	1	1	1
N1541	1	Y	75	1	67	8	1	1	1
N1542	1	Y	75	1	67	8	1	1	1
N1543	1	Y	75	1	67	8	1	1	1
N1544	1	Y	75	1	67	8	1	1	1
N1545	1	Y	75	1	67	8	1	1	1

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1546	1	Y	75	1	67	8	1	1	1
N1547	1	Y	75	1	67	8	1	1	1
N1548	1	Y	75	1	66	9	1	1	1
N1549	1	Y	74	1	65	9	1	1	1
N1550	1	Y	74	1	65	9	1	1	1
N1551	1	Y	74	1	65	9	1	1	1
N1552	1	Y	74	1	65	9	1	1	1
N1553	1	Y	75	1	66	9	1	1	1
N1554	1	Y	74	1	66	8	1	1	1
N1555	1	Y	75	1	66	9	1	1	1
N1556	1	Y	74	1	66	8	1	1	1
N1557	1	Y	74	1	65	9	1	1	1
N1558	1	Y	74	1	65	9	1	1	1
N1559	1	Y	73	1	65	8	1	1	1
N1560	1	Y	73	1	64	9	1	1	1
N1561	1	Y	72	1	64	8	1	1	1
N1562	1	Y	72	1	64	8	1	1	1
N1563	1	Y	72	1	64	8	1	1	1
N1564	1	Y	68	1	63	5	1	0	1
N1565	1	Y	66	1	62	4	0	0	0
N1566	1	Y	65	1	61	4	0	0	0
N1567	1	N	59	1	55	4	0	0	0
N1568	1	N	63	1	60	3	0	0	0
N1569	1	N	64	1	61	3	0	0	0
N1570	1	Y	70	1	64	6	1	0	1
N1571	1	Y	71	1	64	7	1	1	1
N1572	1	Y	73	1	64	9	1	1	1
N1573	1	N	63	1	59	4	0	0	0
N1574	1	N	58	1	55	3	0	0	0
N1575	1	N	57	1	54	3	0	0	0
N1576	1	N	55	1	53	2	0	0	0
N1577	1	N	59	1	58	1	0	0	0
N1578	1	N	58	1	57	1	0	0	0
N1579	1	N	56	1	55	1	0	0	0
N1580	1	N	55	1	55	0	0	0	0
N1581	1	N	54	1	52	2	0	0	0
N1582	1	N	57	1	54	3	0	0	0
N1583	1	N	54	1	52	2	0	0	0
N1584	1	N	55	1	53	2	0	0	0
N1585	1	N	56	1	54	2	0	0	0
N1586	1	N	56	1	53	3	0	0	0
N1587	1	N	56	1	53	3	0	0	0
N1588	1	N	56	1	55	1	0	0	0
N1589	1	N	55	1	53	2	0	0	0
N1590	1	N	55	1	54	1	0	0	0
N1591	1	N	57	1	56	1	0	0	0
N1592	1	N	55	1	54	1	0	0	0

Receptor	# of Receptors	1st Row Y=Yes	Final Construction Design Noise Level (dBA)	Receptors Impacted	Noise Level with NW10 (dBA)	Noise Reduction (dBA)	Front Row with 5 dBA Reduction	Front Row with 7 dBA Reduction	Impacted with 5 dBA Benefit
N1593	1	N	53	1	52	1	0	0	0
N1594	1	N	51	1	50	1	0	0	0
N1595	1	N	52	1	51	1	0	0	0
N1596	1	N	53	1	52	1	0	0	0
N1612	1	N	57	1	53	4	0	0	0
N1613	1	N	56	1	53	3	0	0	0
N1614	1	N	55	1	52	3	0	0	0
N1615	1	N	54	1	52	2	0	0	0
N1616	1	N	54	1	51	3	0	0	0
N1617	1	N	52	1	51	1	0	0	0
N1618	1	N	59	1	56	3	0	0	0
N1619	1	N	58	1	55	3	0	0	0
N1620	1	N	57	1	54	3	0	0	0
N1621	1	N	57	1	54	3	0	0	0
N1622	1	N	54	1	53	1	0	0	0
Totals	74		155			50	39	50	
			Feasibility						
			# of First-Row 5 dBA Reduction			50			
			% of First-Row 5 dBA Reduction			68%			
			Acoustic Feasibility (5 dBA reduction for 50% of front-row)			Yes			
			Reasonableness						
			# of First-Row 7 dBA Design Goal			39			
			% of First-Row 7 dBA Design Goal			53%			
			Noise Abatement Design Goal (7 dBA reduction for 35% of front-row)			Yes			
			Cost (at $20/sq ft)						
			# of Benefited			50			
			Cost of Noise Wall			$1,401,740			
			Allowable Cost ($30,000 per benefited receptor)			$1,500,000			
			Cost-Effective (Anticipated Cost < Allowable Cost)			Yes			
			5 dBA Reduction Goal Met			Yes			
			7 dBA Reduction Goal Met			Yes			
			Cost Criteria Met			Yes			
			Feasible and Cost Reasonable			Yes			