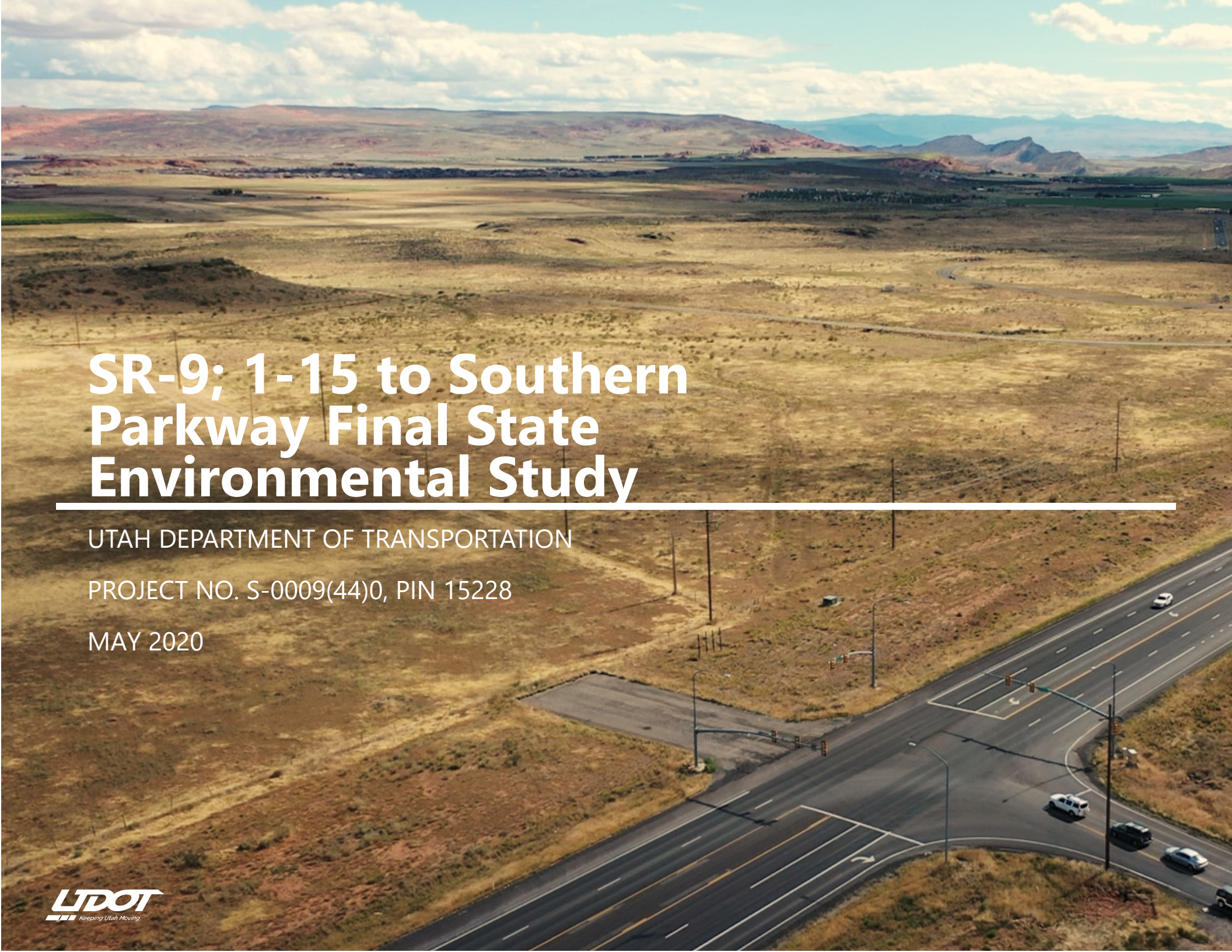

SR-9; I-15 to Southern Parkway Final State Environmental Study

UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NO. S-0009(44)0, PIN 15228

MAY 2020

UDOT Keeping Utah Moving

Approval

The Utah Department of Transportation (UDOT) has completed a State Environmental Study (SES) to evaluate long-term transportation goals and objectives for a 6.5-mile-long section of State Route 9 (SR-9) in Washington County, Utah, between Interstate 15 (I-15) and the future Southern Parkway connection at milepost (MP) 6.5, at approximately 2800 West.

The Preferred Alternative would convert the 6.5-mile portion of SR-9 to a high-speed expressway with a right-of-way width that varies from 263 feet to 600 feet depending on location. SR-9 would consist of four 12-foot travel lanes (two in each direction) and a center median that varies in width from 22 to 50 feet. The intersections at 6300 West (Telegraph Road), 5300 West, 3700 West, 3400 West, and 2800 West (Southern Parkway) would be converted to grade-separated interchanges.

Due to the short proximity between the 3700 West and 3400 West intersections, both streets would be served by a split diamond interchange with frontage roads linking the ramps at either end of the interchange system. The Quail Lake and Lava Bluff neighborhoods would access SR-9 via a two-way frontage road that would connect to the interchange at 3700 West.

The Preferred Alternative provides adequate space in the center median to accommodate future capacity needs when determined to be necessary. Improvements would be made to the Virgin River bridge deck to accommodate future expansion and wider shoulders.

SR-9 would have consistent 12-foot-wide shoulders that accommodate active transportation and frontage roads would be signed and striped for bicycle use. The Preferred Alternative would accommodate a future transit route.

In addition, UDOT is committed to constructing a shared use pathway along the SR-9 corridor to improve pedestrian and bicycle connectivity within and through the study area. The exact location of the facility will be determined in cooperation with Hurricane City, Washington City, and UDOT, to best meet the needs of the community and users of the pathway. Since the exact location has not yet been determined, a separate environmental study will be prepared for the shared use pathway.

Timing for construction of the project has not yet been determined. Similarly, timing for construction of the pathway has not yet been determined, but will likely coincide with the construction along the SR-9 corridor.

During the environmental study process, the alignment was evaluated and adjusted to reduce impacts where possible while still meeting the goals and objectives for the project. All practical measures to minimize environmental harm have been considered and incorporated into the project.

As a result of this SES, UDOT has evaluated the effectiveness, benefits, costs, timetable, and likely effects of the Preferred Alternative. In addition, UDOT has considered comments provided by the public and stakeholders on the Preferred Alternative. As a result, UDOT has selected the Preferred Alternative as the Selected Alternative. Based on the information summarized in this SES, UDOT has determined that the Selected Alternative would best meet the goals and objectives for the project while minimizing environmental impacts.

Reviewed by:

Carissa Watanabe — 05/21/2020

Reviewed by: — Date
Carissa Watanabe, Environmental Performance Manager

Brandon D. Weston — 05/23/2020

Recommended by: — Date
Brandon Weston, Director of Environmental Services

Ben Huot — 05/26/2020

Approved by: — Date
Ben Huot, Program Development Director

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Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials
ACS	American Community Survey
ADT	Average Daily Traffic
AGRC	Automated Geographic Reference Center
APE	Area of Potential Effects
BG	Block Group
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
C/D	Collector/Distributor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CO	Carbon Monoxide
CWA	Clean Water Act
DAQ	Division of Air Quality
dB	Decibel
dB(A)	"A-Weighted" sound level
DEQ	Department of Environmental Quality
DERR	Division of Environmental Response and Remediation

Acronym	Definition
DMPO	Dixie Metropolitan Planning Organization
DOEFOE	Determination of Eligibility and Finding of Effect
DWQ	Division of Water Quality
ECP	Eagle Conservation Plan
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
HHS	Health and Human Services
HSM	Highway Safety Manual
IPaC	Information for Planning and Consultation
LOS	Level of Service
LRTP	Long-Range Transportation Plan
LUST	Leaking Underground Storage Tank
MBTA	Migratory Bird Treaty Act
mg/L	Milligrams per Liter
MP	Milepost
MOA	Memorandum of Agreement

Acronym	Definition
MSAT	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NRHP	National Register of Historic Places
O_3	Ozone
Pb	Lead
PIP	Public Involvement Plan
PJD	Preliminary Jurisdictional Determination
PM	Particulate Matter
$PM_{2.5}$	Particulate matter with a diameter of 2.5 micrometers
PM_{10}	Particulate matter with a diameter of 10 micrometers
RCRA	Resource Conservation and Recovery Act
RTP	Regional Transportation Plan
RV	Recreational Vehicle
SES	State Environmental Study
SHPO	State Historic Preservation Office
SITLA	State and Institutional Trust Lands Administration
SLC	Salt Lake City
SO_2	Sulfur dioxide

Acronym	Definition
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TCE	Temporary Construction Easement
TDS	Total Dissolved Solids
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TMP	Traffic Management Plan
TNM	Traffic Noise Model
TRI	Toxic Release Inventory
UAC	Utah Administrative Code
UCA	Utah Code Annotated
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
UDOT	Utah Department of Transportation
UDWR	Utah Department of Wildlife Resources
UGS	Utah Geological Survey
UNHP	Utah Natural Heritage Program
UPDES	Utah Pollutant Discharge Elimination System
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code

Acronym	Definition
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VISSIM	Software that analyzes traffic data
VMT	Vehicle Miles Traveled
WOTUS	Waters of the United States

CHAPTER ONE

GOALS AND OBJECTIVES

CHAPTER 1: GOALS AND OBJECTIVES

1.1 INTRODUCTION

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) to evaluate long-term transportation goals and objectives for a 6.5-mile-long section of State Route 9 (SR-9) in Washington County, Utah, between Interstate 15 (I-15) and the future Southern Parkway connection at milepost (MP) 6.5, at approximately 2800 West (see Figure 1.1-1). Existing and future traffic conditions evaluated in this SES are based on the *SR-9 Existing and 2050 No Build Traffic and Safety Conditions Memo* (Parametrix 2019). Results are summarized below, and the full report is included in Appendix A.

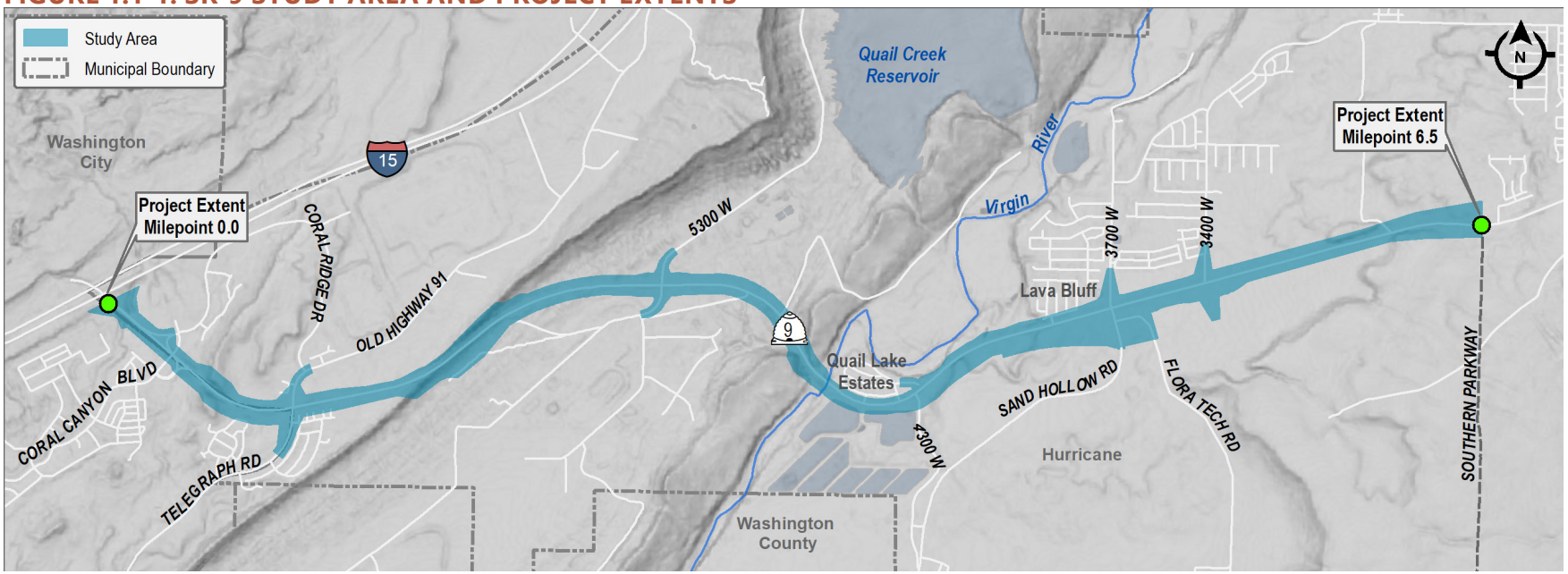
1.2 STUDY AREA

SR-9 is an east-west corridor that provides a major connection from I-15 to the cities of Hurricane, LaVerkin, Rockville, and Springdale. Major intersecting roads include Coral Canyon Boulevard, Telegraph Road, 5300 West, Sand Hollow Road, and 3400 West. The study area generally includes 300 feet on the north and south sides of the SR-9 corridor—primarily in UDOT right-of-way—and also includes widening at major intersections to accommodate the proposed improvements.

1.2.1 PROJECT EXTENTS

Specifically, I-15 (MP 0.0) and 2800 West/Southern Parkway (MP 6.5) were selected as the project extents (see Figure 1.1-1). Although the project is not associated with any improvements to I-15 or its proposed ramps, improvements to SR-9 may be needed up to the northbound I-15 on-ramp. In addition, 2800 West was selected to accommodate the necessary improvements at the future SR-9/Southern Parkway interchange.

FIGURE 1.1-1: SR-9 STUDY AREA AND PROJECT EXTENTS



Project extents are described so that environmental issues can be treated on a sufficiently-broad scope, and to ensure that the proposed project would function properly—without requiring additional improvements elsewhere—and not to restrict consideration of alternatives for other reasonably-foreseeable transportation improvements (see Figure 1.1-1).

1.3 LOCAL AND REGIONAL CONNECTIVITY

SR-9 averages approximately 26,000 vehicles per day, and is the principal east-west corridor for local and commuter traffic. In addition, SR-9 plays a significant role in supporting tourism as it is a direct route to Zion National Park and is an important corridor to access Sand Hollow and Quail Creek state parks.

SR-9 is a key corridor for local and regional freight connectivity, comprising approximately 23 percent of the average daily traffic (ADT). The *2017 Utah Freight Plan* (UDOT 2017) designates SR-9—between I-15 and SR-59—as a secondary route on the Utah Highway Freight Network. Additionally, between I-70 and the I-40 in Arizona—a distance of more than 225 miles—there are only two truck-suitable routes between I-15 and US-89; these include SR-20 and the SR-9/SR-59 connection. The other four routes in Utah—SR-153, SR-143, SR-14, and SR-9, through Zion National Park, are all prohibited or restricted truck traffic routes.

1.3.1 EXISTING CONDITIONS

SR-9 is a principal arterial that extends 6.5 miles from the I-15 interchange to Southern Parkway. The corridor is primarily five lanes—including two travel lanes in each direction, and a shared median lane. Table 1.3-1 summarizes the existing conditions in the corridor.

TABLE 1.3-1: SR-9 EXISTING CONDITIONS

Type	Description
Functional class	Principal arterial
Length	6.5 miles
Number of lanes	Four travel lanes with one center turn lane and right-and left-turn lanes at major intersections
Lane width	12-foot wide travel lanes 12-foot turn lanes 14-foot turn lanes
Shoulder	Several segments have existing shoulder widths below the 12-foot minimum UDOT standard. The majority of acceleration and deceleration lane widths are below the 12-foot minimum standard.
Number of intersections	Four signalized intersections
Posted speeds	60 miles per hour (mph) from MP 0.00 to MP 3.66, 50 mph from MP 3.66 to MP 4.24, and 55 mph from MP 4.24 to MP 6.61.

1.4 TRANSPORTATION PLANNING

The Dixie Metropolitan Planning Office (DMPO), UDOT, Washington City, and the City of Hurricane are responsible for planning in the area. Together, they determine transportation needs and long-term solutions to meet the demands of the traveling public.

The *DMPO Draft 2019–2050 Regional Transportation Plan* (DMPO Draft 2019–2050 RTP) identifies projects that work together to meet the existing and anticipated transportation needs through the year 2050. Projects including roadway, transit, active transportation, and freight are categorized into the following three phases:

- Phase 1: 2019–2030
- Phase 2: 2031–2040
- Phase 3: 2041–2050

Funding for proposed SR-9 improvements are identified as a Phase 1 projects in the *Draft 2019-2050 RTP*.

1.4.1 SR-9 CORRIDOR PRESERVATION AGREEMENT

The purpose of the *Corridor Preservation Agreement on State Route 9 Between I-15 and 860 North in Hurricane City (*Hirshi and Torgensen, 2007) between the City of Hurricane and UDOT was to preserve the integrity of SR-9 by facilitating traffic flow.

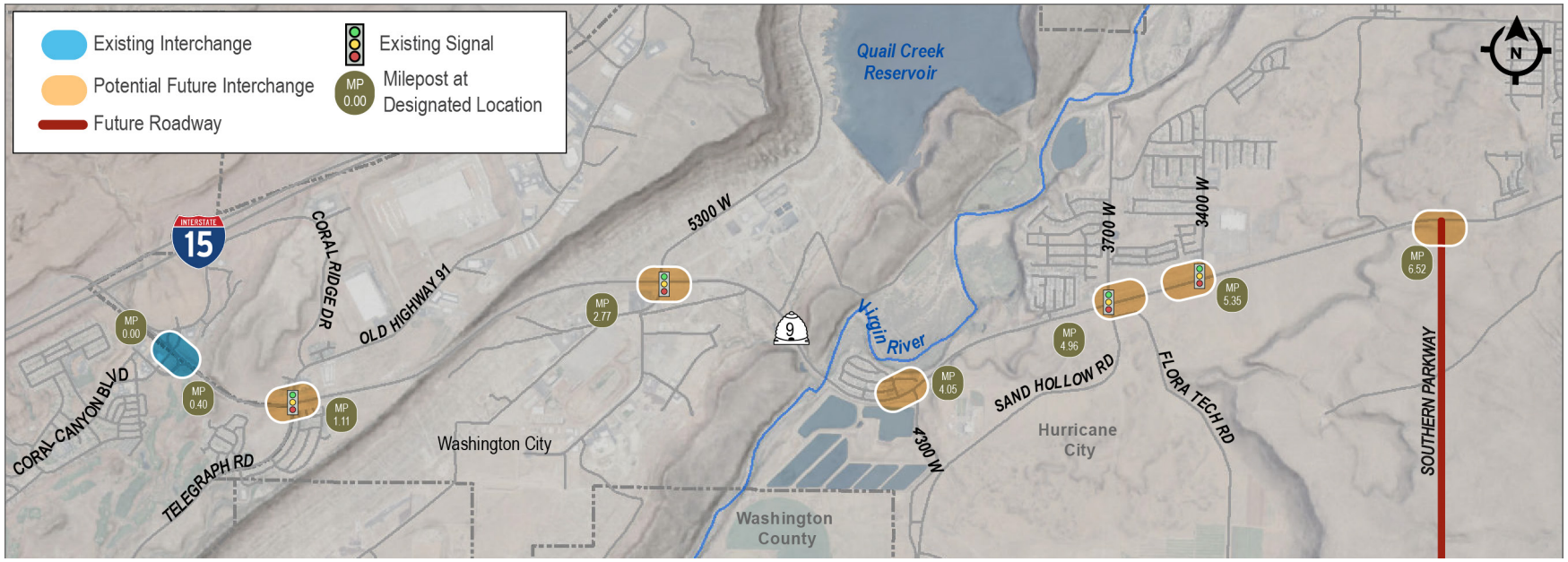
Further, the agreement identifies the segment of SR-9 between I-15 and Southern Parkway as a principal arterial (expressway), with grade-separated interchanges at existing and future intersections (see Table 1.4-1 and Figure 1.4-1).

TABLE 1.4-1: CORRIDOR PRESERVATION AGREEMENT

Location	Mile Post Number	Existing Access Description	Future Access Description
Coral Canyon	MP 0.40	Grade-separated	Grade-separated
Telegraph Road (6300 West)	MP 1.11	Signalized intersection	Grade-separated interchange
5300 West	MP 2.77	Signalized intersection	Grade-separated interchange
4300 West	MP 4.05	Unsignalized intersection	Grade-separated interchange
3700 West	MP 4.96	Signalized intersection	Grade-separated interchange
3400 West	MP 5.35	Signalized intersection	Grade-separated interchange
3100 West	MP 5.84	Private property driveways (both sides of SR-9)	Closed or overpass
Southern Parkway	MP 6.52	Does not exist	Grade-separated interchange

Source: Corridor Preservation Agreement, 2007

FIGURE 1.4-1: CORRIDOR PRESERVATION AGREEMENT



Source: Corridor Preservation Agreement, 2007

1.4.2 ACTIVE TRANSPORTATION PLANNING

The *DMPO Regional Active Transportation Plan* (DMPO 2016) establishes SR-9—east of Telegraph Road—as a designated bike route. Both the *DMPO Plan* and the *Washington City Active Transportation Plan* (Washington City 2017) identify a future shared-use path on SR-9, east of Telegraph Road. The City of Hurricane's *Open Space and Trails Master Plan* does not include any proposed trails along SR-9 in the study area.

What is Active Transportation?

Active Transportation is a means of getting around powered by human energy, primarily walking and bicycling (Rails to Trails 2018).

1.4.3 TRANSIT PLANNING

The *St. George to Springdale Public Transit Feasibility Study* (November 2016) recommended a local and express system between St. George and Springdale so that SR-9 can be accessed via Telegraph Road.

1.5 GOALS AND OBJECTIVES

The goals of the project are divided into two categories—primary and secondary. The primary goals include the fundamental reasons for the project being proposed. The secondary goals include additional goals and objectives that are desirable, but not essential.

1.5.1 PRIMARY GOALS

The project's primary goals include the following:

- Accommodate 2050 travel demand for local traffic on SR-9;
- Accommodate 2050 travel demand for through traffic on SR-9; and
- Decrease safety risk at at-grade intersections on a high speed corridor.

The secondary goals include the following:

- Safely accommodate active transportation for both pedestrians and bicyclists;
- Accommodate future transit; and
- Minimize impacts and cost.

1.5.2 PROJECT JUSTIFICATION

The primary justification for this project is based on travel demand in the current year and in the year 2050. The project is justified because all existing intersections will fail during the weekday PM peak period, and four of the seven intersections will be near or at failing conditions during the AM peak period, in 2050.

Current crash frequency data at intersections report that the number of crashes is higher than the *Highway Safety Manual*-(HSM-) predicted crash frequency.

Secondary justifications for the project include achieving goals that were set to safely accommodate pedestrian and bicycle connectivity, accommodate local and regional transit, and minimize environmental impacts and costs.

1.6 DESCRIPTION OF TRANSPORTATION JUSTIFICATIONS

1.6.1 TRAVEL DEMAND

The travel demand model, owned by the DMPO, was used to predict current and future traffic volume and travel demand. The travel demand model has two primary data inputs: land use data, such as residential and employment data for the entire region, and transportation system data.

The travel demand model assumed a current analysis year of 2019 and compared current traffic conditions to a 2050 model year for future conditions using DMPO model inputs. Future conditions assumed that all projects in the *Draft DMPO 2019–2050 RTP*, except those projects included as part of this proposed action, were built. Future conditions were also referred to as the no-build condition or No-Build Alternative.

VISSIM is a micro-simulation software that was used to evaluate freeways, closely-spaced intersections, and the interaction between the two facilities in the study area.

1.6.2 LEVEL OF SERVICE

Level of Service (LOS) reports the operational performance of a road or intersection. It is measured quantitatively on a scale from A to F, with A representing the best performance and F indicating the worst (see Figure 1.6-1). The term LOS is used to describe how well an intersection or road operates.

Specifically, LOS was analyzed for each intersection along the corridor. In intersections, LOS A represents insignificant delays, while LOS F represents excessive delays. LOS E and LOS F are typically considered unacceptable operating conditions in urban areas, while LOS D and above are considered acceptable.

The arterial performance analysis on SR-9 includes AM and PM peak hour LOS and delay at seven specific intersections, and the average travel time from I-15 to the approximately MP 6.5. See Table 1.6-1 for details.

Overall, under the existing conditions, the intersections along the corridor operate at a LOS D or better during the AM

FIGURE 1.6.1: LEVEL OF SERVICE

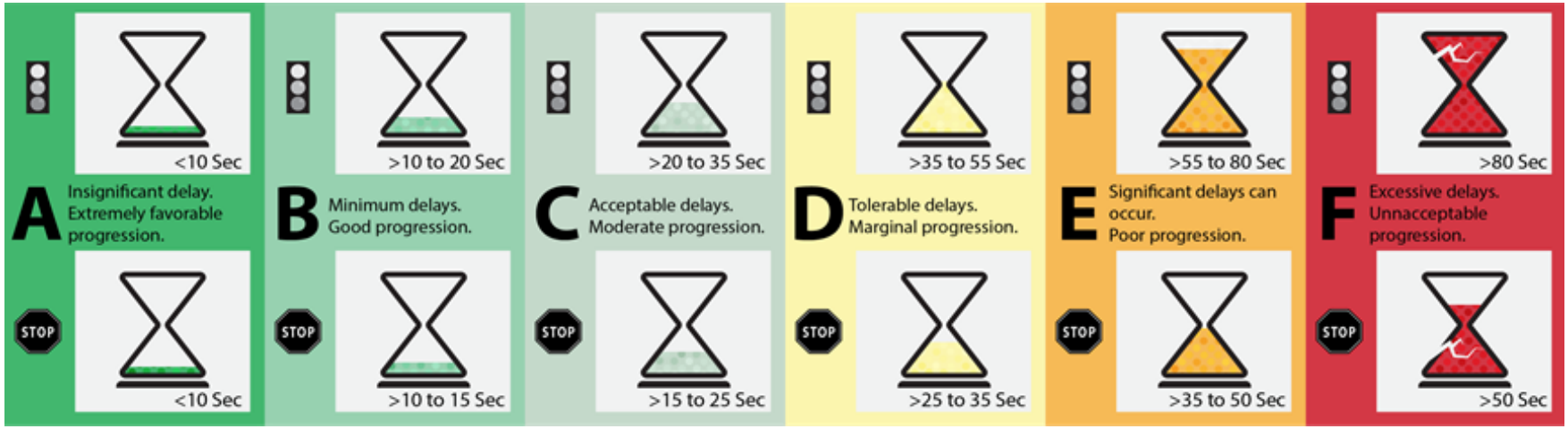


TABLE 1.6-1: EXISTING AND 2050 SR-9 INTERSECTION LOS AND DELAY

Intersection	Type	AM Conditions LOS/Delay (seconds per vehicle)		PM Conditions LOS/Delay (seconds per vehicle)	
		2019	2050	2019	2050
Telegraph Road	Signalized	D/39	F/92	C/26	F/>100
5300 West	Stop-controlled	C/24	E/70	B/16	F/>100
Quail Lake	Stop-controlled	B/11	B/13	B/11	F/>100
4400 West	Stop-controlled	B/13	C/17	B/13	F/>100
3895 West	Stop-controlled	B/11	B/15	B/12	F/>100
3700 West	Signalized	C/26	F/100	B/18	F/>100
3400 West	Signalized	D/37	F/90	C/30	F/>100

Source: : Parametrix, 2019

peak hour and LOS C or better during the PM peak hour. By 2050, the analysis predicts that four of the seven intersections would operate at LOS F during the AM peak hour, and that all intersections would fail during the PM peak hour.

1.6.3 TRAVEL TIME

The travel time analysis included two different measures—through travel time and local travel time. Both are summarized by direction (eastbound and westbound) for both the weekday AM and PM peak hours.

THROUGH TRAVEL TIME

Through travel time was used to capture the average travel time for all vehicles traveling entirely on SR-9 from one end of the corridor to the other. The average through travel times represent an average travel speed of approximately 48 to 50 miles per hour (mph) for both the eastbound and westbound directions during the weekday AM and PM peak hours.

The average 2050 No-Build westbound travel time during the AM peak hour increased by over 100 percent compared to 2019; while the PM peak hour increased by over 400 percent. The majority of AM peak hour traffic consists primarily of commuting trips. PM peak hour traffic typically includes commuting and various non-work related trips.

As a result, there are more vehicles on the road, causing the LOS to worsen and travel times to increase (see Table 1.6-2).

TABLE 1.6-2: 2019 AND 2050 THROUGH TRAVEL TIME

Direction	AM Travel Time/ Speed (mph)		PM Travel Time/ Speed (mph)	
	2019	2050	2019	2050
Westbound	7:40/50	15:55/24	7:50/49	33:55/11
Eastbound	7:25/51	8:22/45	7:45/45	26:59/14

Source: Parametrix, 2019

LOCAL TRAVEL TIME

Local travel time was used to capture the weighted average travel time for all other vehicles on the corridor (not considered through travel). This included vehicles traveling to or from one intersection to any other intersection along the corridor.

As an example, the AM travel time in 2019 for Telegraph Road, which means the average time for local traffic to and from Telegraph Road, and to and from all other intersections in the study area, is currently 3:45 (see Table 1.6-3 for details).

Compared to the existing conditions, the average aggregate 2050 travel time during the AM peak hour would increase by approximately five minutes, while the PM peak hour would increase by approximately 14 minutes—an increase of more than 380 percent.

1.6.4 DESCRIPTION OF SAFETY JUSTIFICATIONS

The HSM crash methods were used to develop predicted crash frequencies for segments and intersections along the SR-9 corridor. HSM methods allow users to calculate predicted crash frequencies for facilities according to each facility's specific roadway features and projected traffic volumes.

TABLE 1.6-3: 2019 AND 2050 LOCAL TRAVEL TIMES

Intersection	2019 Existing Conditions (AM)	No-Build (AM)	2019 Existing Conditions (PM)	No-Build (PM)
Telegraph Road	3:45	5:00	4:15	13:20
5300 West	3:00	6:30	3:40	11:50
Quail Lake	2:50	3:15	3:10	8:40
4400 West (Lava Bluff)	2:45	4:20	2:45	8:45
3700 West	2:40	14:45	3:25	16:50
3400 West	3:15	8:05	3:55	16:05
Aggregrate[1]	2:50	8:00	3:35	14:35

Source: Parametrix, 2019
[1] The aggregate travel time is rounded to the nearest five seconds

The predicted frequency can then be compared to historic crash frequencies to determine whether a facility is over-represented by crashes, which could signify a safety concern.

Tables 1.6-4 and 1.6-5 compare segment and intersection crash frequencies against the existing and 2050 No-Build conditions. Actual crash frequencies for every road segment are well below the HSM-predicted (existing) frequency. The SR-9 corridor has far fewer access points and driveways than typical arterial roadways, resulting in fewer vehicle conflicts and crash frequencies.

Moreover, due to high speeds and long distances between intersections, each intersection has an actual crash frequency rate that is higher than the HSM-predicted (existing) frequency, which indicates a probable safety concern at intersections in the study area.

TABLE 1.6-4: HSM SEGMENT ANALYSIS SUMMARY

Segment	Crash Frequency (crashes per year)		
		Predicted	
	Actual[1]	Existing	2050 No-Build
East of Coral Canyon ramps to Telegraph Road	1.2	2.7	5.4
Telegraph Road to 5300 West	3.8	21.7	38.4
5300 West to Virgin River	1.2	11.3	17.9
Virgin River to end of 55 mph zone	1.0	7.4	11.9
End of 55 mph zone to 3900 West	0.6	5.7	9.2
3900 West to 3700 West	1.2	3.1	5.0
3700 West to 3400 West	0.2	18.4	32.0
3400 West to 2770 West	2.0	15.3	25.3

Crashes are concentrated at signals because of high speeds and long distances between signals. Regarding the 2050 No-Build conditions, the predicted crash frequencies would increase in each segment as well as at intersections, due to growing traffic volumes—actual crash frequencies are likely to follow this pattern. Between 2014 and 2018, 269 crashes occurred on SR-9—including 12 (four percent) severe crashes. Approximately 65 percent of crashes were intersection-related.

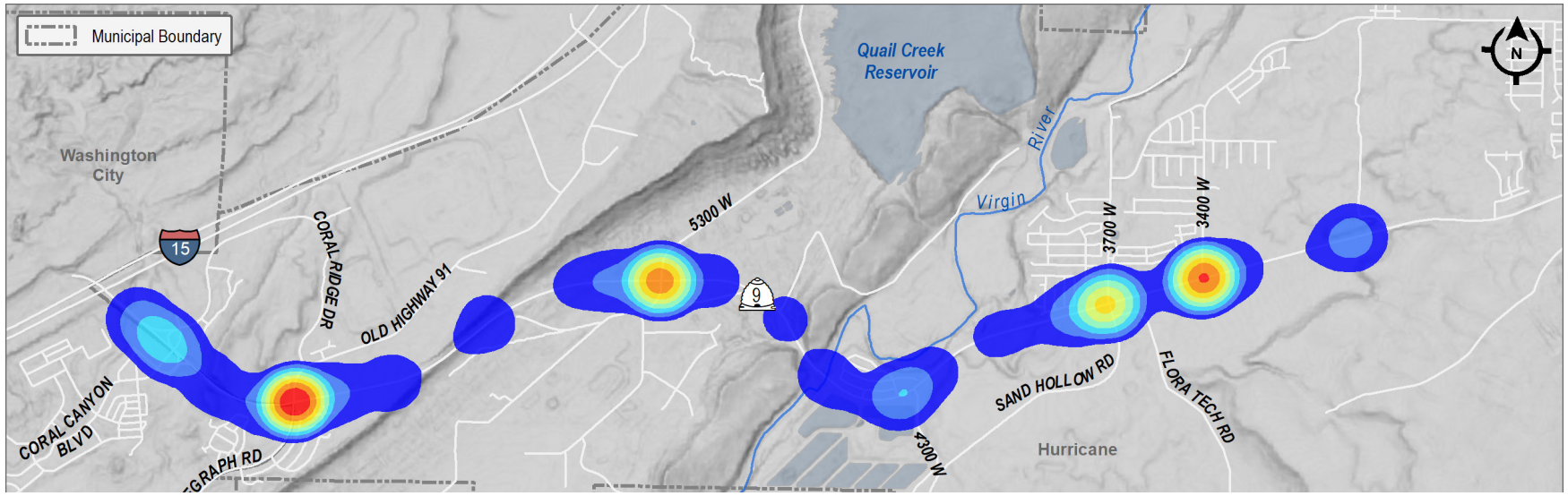
Figure 1.6-2 shows a heat map of the corridor, highlighting the prevalence of crashes.

TABLE 1.6-5: HSM INTERSECTION ANALYSIS SUMMARY

Intersection	Crash Frequency (crashes per year)		
		Predicted	
	Actual[1]	Existing	2050 No-Build
Telegraph Road	12.0	3.5	6.5
5300 West	8.6	2.9	7.1
Quail Lake Estates	0.2	1.2	1.9
4400 West	1.6	1.5	2.3
3900 West	02	1.2	1.9
3700 West	6.2	3.3	7.6
3400 West	9.6	4.0	7.4

Source: Parametrix, 2019
[1] 2014-2018

FIGURE 1.6-2: CONCENTRATIONS OF ALL ROADWAY CRASHES (2014–2018)



Source: Parametrix, 2019

1.7 DESCRIPTION OF SECONDARY GOALS

1.7.1 ACTIVE TRANSPORTATION

The *DMPO Draft 2015-2019* identifies pedestrian and bicycle facilities as an integral part of the region's transportation system (DMPO 2019). DMPO's active transportation goals include:

- Facilitate the appropriate design, construction, and maintenance of bicycle and pedestrian facilities;
- Support multi-modal transportation for all new construction and reconstruction projects; and
- Encourage policies and programs that improve bicycle and pedestrian safety.

Both the *DMPO Plan* and the *Washington City Active Transportation Plan* (Washington City 2017) identify a future shared-use path on SR-9, east of Telegraph Road.

1.7.2 TRANSIT

In response to the urbanization of Washington County and growing visitation numbers to the south entrance of Zion National Park, accommodating transit along the SR-9 corridor has been identified as a project goal.

UDOT, in partnership with local agencies, is seeking to secure funding to implement express and local bus service along the corridor in the next few years. The preferred stop locations, operating time tables, and fare schedules have not been decided.

Preliminary recommendations from the feasibility study locate an express route stop on SR-9—near the 3400 West intersection—and a local route stop near the Telegraph Road intersection. It is unlikely that both stops would be positioned on the SR-9 roadway itself; rather, they would be located on a cross-street or in a parking lot.

1.7.3 IMPACTS

An additional project goal is to minimize impacts to the human and natural environment, and to minimize total project costs.

1.8 GOALS, JUSTIFICATIONS, AND OBJECTIVES CRITERIA

Specific criteria to measure effectiveness were developed to test how well an alternative would meet the project's goals, as detailed in Table 1.8-1. These objectives consider UDOT standards and policies, technical studies, and public input that was received during the scoping period.

Goals of the proposed project are divided into two categories—Tier 1 and Tier 2. The Tier 1 goals are the fundamental reasons this project is proposed. Tier 2 goals and objectives are desirable, but not essential.

TABLE 1.8-1: GOALS, JUSTIFICATIONS, AND OBJECTIVES SUMMARY

Tier 1		
Goal	Justification	Objective
Accommodate 2050 travel demand for local traffic	In 2050, all at-grade intersections will fail Level of Service (LOS) F during PM Peak hours if improvements are not made	LOS D/E at key intersections and local access travel time
Accommodate 2050 travel demand for through traffic	PM westbound travel times will increase from eight minutes to 34 minutes in 2050 if improvements are not made	Travel time between I-15 and Southern Parkway
Decrease safety risk from at-grade intersections on a high-speed corridor	Intersection-related crashes are the dominant form of crashes (65 percent), and will continue to increase as congestion increases	Reduction in number of conflict points

Tier 2		
Goal	Justification	Objective
Safely accommodate active transportation users	Increased demand for bicycle and pedestrian connectivity	Improve: • SR-9 pedestrian/bicycle crossings at key intersections • East-west connectivity on, or adjacent to, the corridor
Accommodate future transit	Lack of local and regional/express transit routes	Consistent with recommendations from the implementation plan
Minimize impacts and costs	Avoid or minimize impacts to: floodplains, wetlands and Waters of the U.S. (WOUS), and rights-of-way. Compare the order of magnitude cost differences between each of the conceptual build alternatives	Compare: • Acres of wetlands and floodplains affected • Linear feet of ephemeral washes affected • Number of full acquisitions and acreages of both full and partial acquisitions • Cost comparison (2019 dollars)

CHAPTER TWO

ALTERNATIVES

CHAPTER 2: ALTERNATIVES

2.1 Introduction

This chapter summarizes the alternatives that were considered and carried forward for detailed evaluation based on screening criteria set forth in this chapter, including a determination of each alternative's ability to meet the project goals and objectives (see Chapter 1, Goals and Objectives). For additional details, see the *SR-9 Build Alternatives Traffic Analysis Memorandum (Parametrix 2019)* in Appendix A.

2.2 Alternative Development

The conceptual alternatives were developed based on previous studies and an understanding of existing and future transportation needs in the study area. In addition, each alternative was developed based on current (2017) UDOT standards and projected future year 2050 traffic volumes.

2.2.1 No-Build Alternative

The No-Build Alternative assumes 2050 traffic conditions without any improvements to the existing SR-9 corridor. Further, the No-Build provides a baseline to compare the impacts that would result from the Build Alternative. This alternative assumes the completion of the proposed active transportation and transit projects, and the implementation of all other projects proposed in the Dixie Metropolitan Planning Organization (DMPO) *Draft 2019-2050 Regional Transportation Plan* (RTP) that intersect the study area (see Table 2.2-1). In addition, it assumes no changes to the existing conditions along the corridor, including the number of lanes and intersection configurations.

TABLE 2.2-1: DIXIE MPO RTP PROJECTS ASSUMED AS PART OF NO-BUILD ALTERNATIVE

Project Name	Project Concept	Dixie RTP Phase
Purgatory Road	New construction	1
Turf Sod Road from 4300 West to Southern Parkway	New construction	1
2800 West: SR-9 to 600 North	New construction	1
Southern Parkway Segment IVb & V, Sand Hollow to SR-9 (first barrel)	New construction	1
3400 West from Dixie Springs Drive to SR-9	New construction	1
SR-9, Phase I: interchange modifications with southbound I-15 auxiliary lane to MP 13	New construction	1
I-15 widening (fourth lane) in southbound direction from MP 16-13	Widen/ reconstruct	2
1500 South: from 700 West to 3000 West	New construction	2
SR-9: increase capacity from SR-59 to Southern Parkway	Widen/ reconstruct	2
Sand Hollow Road: from SR-9 to Southern Parkway	New construction	2
200 North: from 2800 West to 3400 West	New construction	2
3000 West: from 150 South to Southern Parkway	New construction	2
Southern Parkway, Segment IVb: Sand Hollow to 3000 South (second barrel)	New construction	2
Southern Parkway, Segment V: 3000 South to SR-9 (second barrel)	New construction	2
I-15: install interchange at 5500 West	New construction	2
Turf Sod Connector Road: Turf Sod Road to Purgatory Road	New construction	2
SR-9 South Frontage Road: Southern Parkway to Sand Hollow Road	New construction	2
I-15: MP 13 to MP 16 NB (fourth lane) with three-lane exit at MP 16	New construction	2

Source: DMPO Draft 2019-2050 Regional Transportation Plan

2.2.2 Conceptual Alternatives

Three conceptual build alternatives were developed based on the results of previous studies, projects identified in the *Draft DMPO RTP*—including those specific to the SR-9 corridor (see Figure 2.2-1 and Table 2.2-2), and the identified project goals and objectives. Alternatives were designed to meet 2017 UDOT standards and projected 2050 traffic volumes.

The conceptual build alternatives include the following:

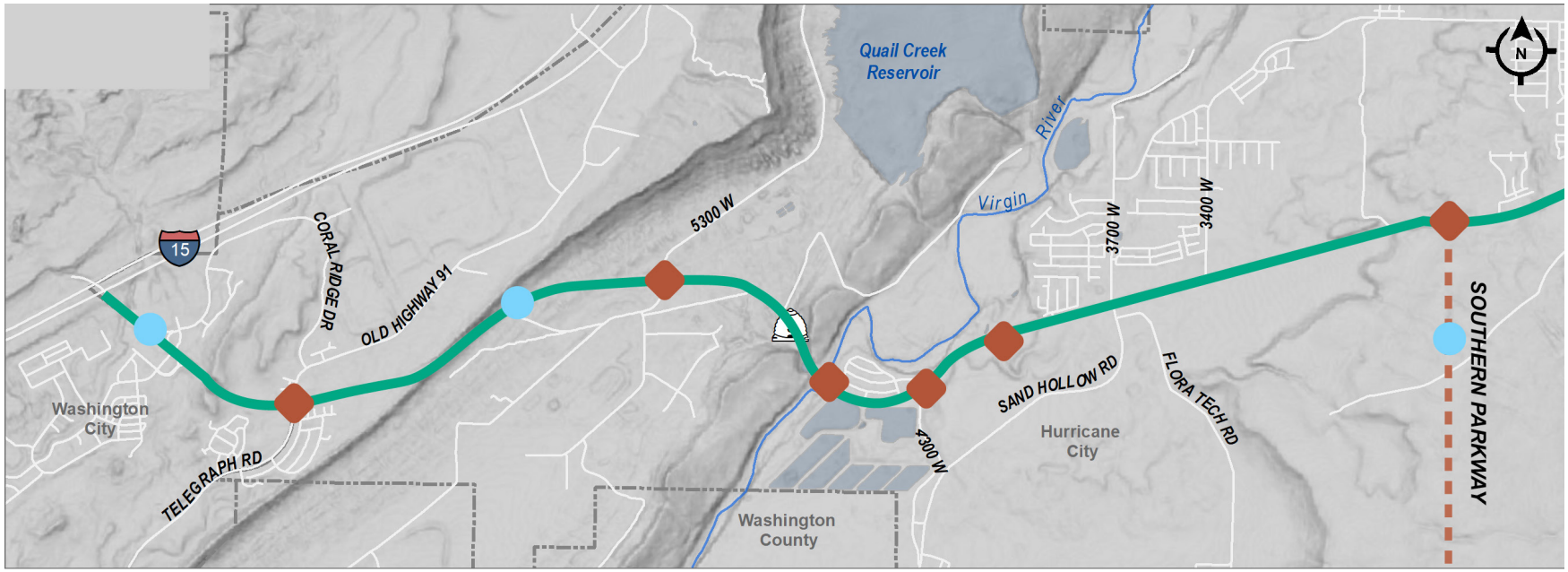
- Expressway
- Collector/Distributor
- Express Lanes

TABLE 2.2-2: DIXIE MPO RTP PROJECTS ASSUMED AS PART OF ALL CONCEPTUAL BUILD ALTERNATIVES

Project Name	Project Concept	Dixie RTP Phase
SR-9 interchanges: Telegraph Road, Sand Hollow Road, 3400 West and 2800 West	New interchanges	1
Southern Parkway, Segment VI: I-15 to 5300 West: widen to freeway standards	New construction	1
SR-9: widen to six lanes from I-15 to Southern Parkway	Widen/ reconstruct	3

Source: DMPO Draft 2019-2050 Regional Transportation Plan

FIGURE 2.2-1 : DIXIE MPO RTP PROJECTS ASSUMED AS PART OF ALL CONCEPTUAL BUILD ALTERNATIVES



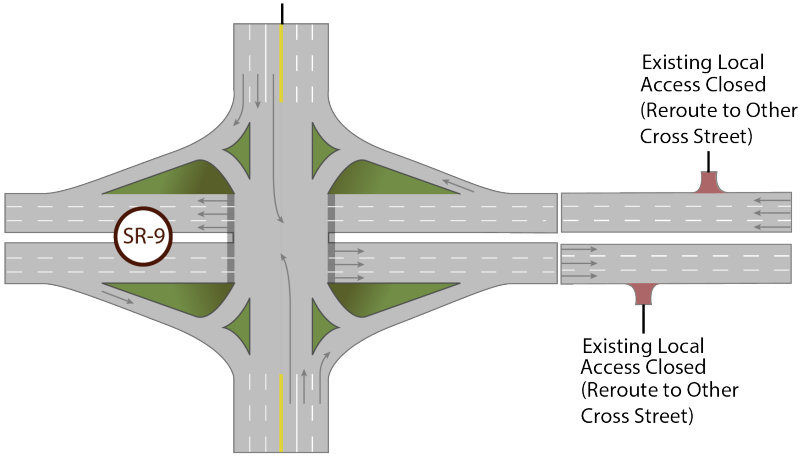
New Interchanges New Construction Widen/Reconstruct

During the early development of conceptual build alternatives, the City of Hurricane (City) indicated that the 4300 West interchange, identified in the 2010 *SR-9 Corridor Preservation Agreement* (see Chapter 1, Goals and Objectives), was removed from the City's *Street Master Plan* because it was determined to not be in the best interest of City residents. In response, the project team proposed an alternative frontage road that would cross under SR-9 to connect to the 3700 West interchange, avoiding impacts to Quail Lake Estates and Lava Bluff residential areas (Lochner 2019).

EXPRESSWAY CONCEPTUAL ALTERNATIVE

The Expressway Alternative functions similar to a limited access freeway, converting all signalized intersections to interchanges and redirecting all driveway access to the local street system (see Figure 2.2-2). Due to the short spacing between the 3400 West and 3700 West intersections, both streets are serviced by a combined interchange with frontage roads linking the ramps at either end.

FIGURE 2.2-2: EXPRESSWAY CONCEPTUAL ALTERNATIVE



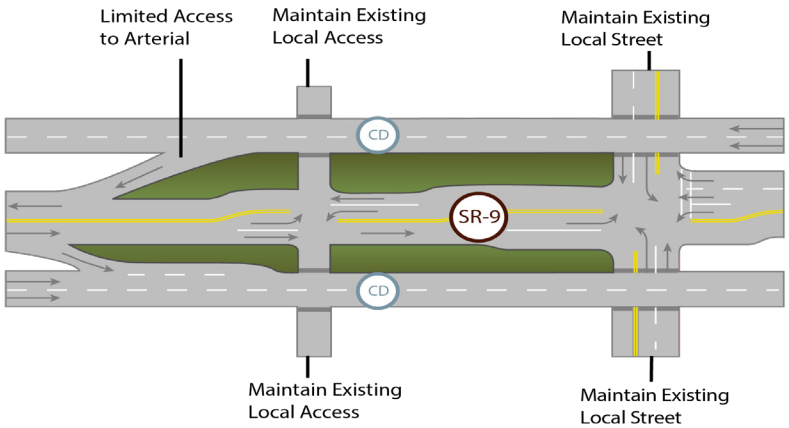
Access to the Lava Bluff and Quail Lake developments are serviced by a two-way frontage road on both sides of SR-9. The frontage road would be connected by an underpass to allow residential and emergency access.

Most remaining unsignalized accesses would connect to future local streets or be closed as per the *SR-9 Corridor Preservation Agreement*. A limited number of low-volume utility accesses may remain as right-in/right-out access points where local street connections are not feasible.

COLLECTOR/DISTRIBUTOR CONCEPTUAL ALTERNATIVE

The Collector/Distributor (C/D) Alternative is similar to the Expressway except it would also include a C/D road system between 5300 West and 3700 West—serving points between 5300 West and 3700 West, including access to the Lava Bluff and Quail Lake developments (see Figure 2.2-3).

FIGURE 2.2-3: COLLECTOR/DISTRIBUTOR CONCEPTUAL ALTERNATIVE

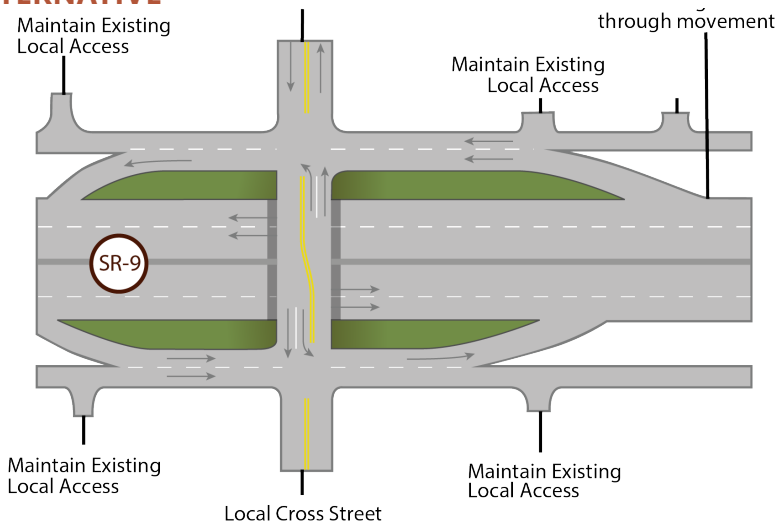


An underpass at MP 4.4 would connect the C/D roads on either side of SR-9, allowing drivers to make U-turns. The C/D Alternative would also feature an eastbound slip ramp to the C/D road and a westbound slip ramp to the SR-9 mainline just west of 3700 West.

EXPRESS LANES CONCEPTUAL ALTERNATIVE

The Express Lanes Alternative would provide grade-separated express lanes to convey SR-9 mainline through traffic from approximately Telegraph Road to 3400 West (see Figure 2.2-4).

FIGURE 2.2-4: EXPRESS LANES CONCEPTUAL ALTERNATIVE



The Express Lanes Alternative would not offer access to intersections except for an eastbound off-ramp and a westbound on-ramp at 3700 West. All remaining access would be served by a two-lane frontage road system on either side of the express lanes. Similar to the collector/distributor alternative, an underpass at Telegraph Road, 5300 West and MP 4.4, would connect the frontage roads on either side of SR-9, allowing drivers to make U-turns.

2.3 Alternatives Screening

This section describes the alternatives screening process and criteria developed to identify the Build Alternative (see Figure 2.3-1. Prior to initiating screening, all conceptual alternatives described in Section 2.2 were developed to show the number of lanes, configuration, and right-of-way requirements. The screening process was separated into two tiers, as explained in Table 2.3-1 and in Figure 2.3-1.

FIGURE 2.3-1: TIER 1 AND TIER 2 SCREENING PROCESS

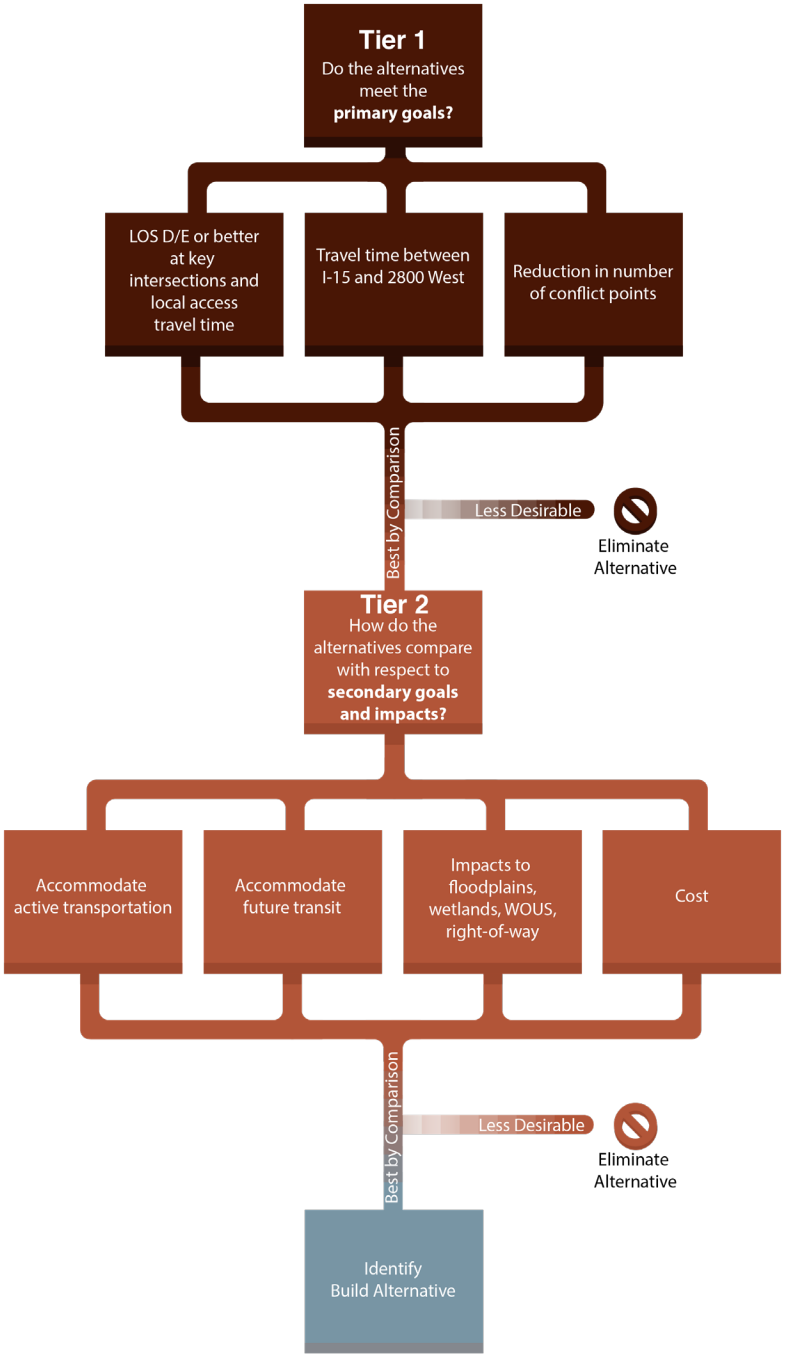


TABLE 2.3-1: PROJECT GOALS AND OBJECTIVES

TIER 1		
Goal	Justification	Objective
Accommodate 2050 travel demand for local traffic	In 2050, all at-grade intersections will fail (LOS F) during PM peak hours if no improvements are made.	LOS D/E at key intersections and local access travel time.
Accommodate 2050 travel demand for through traffic	PM westbound travel times will increase from eight minutes to 34 minutes in 2050 if no improvements are made.	Improve travel time between I-15 and the Southern Parkway.
Decrease safety risk from at-grade intersections on a high-speed corridor	Intersection-related crashes are the dominant form of crashes (65 percent), and will continue to increase as congestions grows.	Reduction in the number of conflict points.
TIER 2		
Goal	Justification	Objective
Safely accommodate active transportation users	There is demand for increased bicycle and pedestrian connectivity.	Improve pedestrian/ bicycle crossings of SR-9 at key intersections. Improve east-west connectivity either on or adjacent to the corridor.
Accommodate future transit	Lack of local and regional/express transit routes.	Consistent with recommendations from the implementation plan.
Minimize impacts and costs	Avoid or minimize impacts to: floodplains, wetlands and Waters of the US, and right-of-way. Compare the order of magnitude cost differences between conceptual build alternatives.	Compare: Acres of wetlands and floodplains affected Linear feet of ephemeral washes affected Compare number of full acquisitions and acres of both full and partial acquisitions Cost comparison (2019 dollars)

2.3.1 Tier 1 Screening

Tier 1 screening focused on the ability of each alternative to reduce congestion and improve safety in the study area.

INTERSECTION LOS

Intersection LOS was calculated for the following four intersections converted to interchange or interchange-like facilities under each conceptual build alternative:

- Telegraph Road
- 5300 West
- 3700 West
- 3400 West

Though interchange designs for each conceptual build alternative consist of two separate directional ramp intersections, intersection LOS is calculated for the interchange as a whole due to the close proximity between the ramp intersections.

INTERSECTION LOS RESULTS

Under the No-Build Alternative, the 5300 West intersection is anticipated to operate at LOS E, and all other intersections are anticipated to operate at LOS F, in 2050.

The screening analysis for all of the conceptual build alternatives performed similarly. Every intersection is anticipated to operate at LOS C or better during the weekday AM peak hour, and LOS D or better during the weekday PM peak hour. Traffic volumes for each concept alternative vary based on the configuration of interchange ramps and frontage roads. As a result, the intersection channelization and signal timing plans for each of the alternative designs were customized to achieve LOS D or better.

LOCAL ACCESS TRAVEL TIME

Local access travel time is a measure of average travel times for local trips along the study corridor. The criteria reflects the ability of drivers to access local destinations in the corridor. This includes vehicles traveling to or from one of the intersections (e.g. Telegraph Road, 5300 West) to any other location on the corridor (e.g. 4300 West, 3400 West). In other words, any trip other than a through trip on SR-9 is included in the local access travel time calculation (see Figure 2.3-2).

LOCAL ACCESS TIME SCREENING RESULTS

The Express Lanes Alternative would result in longer travel times compared to the other conceptual build alternatives for drivers with an origin or destination located at Telegraph Road or 5300 West. This is due to the lack of direct access to the express lanes for vehicles traveling to and from these interchanges.

Vehicles would be required to travel along the one-way frontage system, which would require a lower speed limit than the mainline, and slowing and stopping at the signalized intersections. A summary of the aggregate local travel time for the No-Build Alternative and each conceptual alternative is shown in Table 2.3-2.

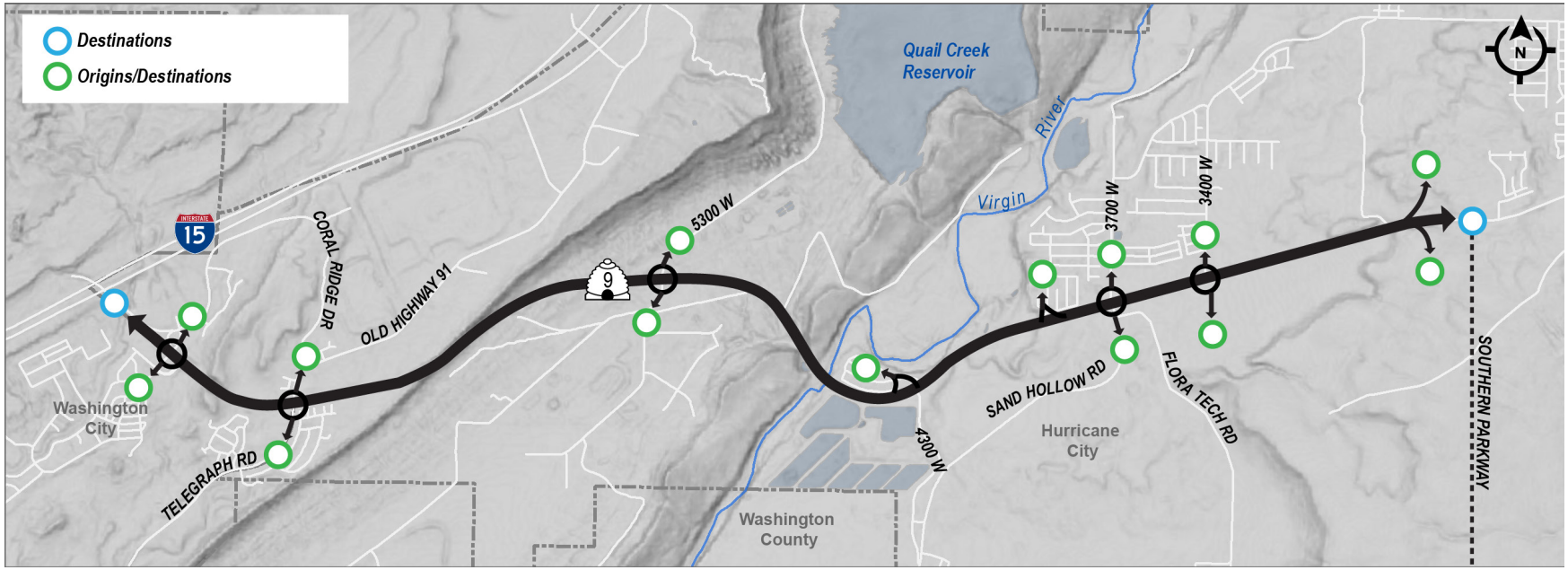
TABLE 2.3-2: AGGREGATE LOCAL TRAVEL TIME SUMMARY[1]

	No-Build	Expressway	Collector/ Distributor	Express Lanes
AM Travel Time	8:25	3:35	3:35	4:05
PM Travel Time	17:25	3:40	3:45	4:20

Source: Parametrix, 2019

[1] The aggregate travel time is rounded to the nearest five seconds

FIGURE 2.3-2: LOCAL ACCESS TRAVEL TIME ORIGINS AND DESTINATIONS



Source: Parametrix, 2019

THROUGH TRAVEL TIME

Through travel time is calculated as the average time for vehicles to travel the entirety of SR-9 from one end of the corridor to the other (I-15 to 2800 West/Southern Parkway). Results are summarized by direction (eastbound and westbound) for both the weekday AM and PM peak hours. Figure 2.3-3 depicts the beginning and end points on SR-9 for through travel time measurements.

THROUGH TRAVEL TIME SCREENING RESULTS

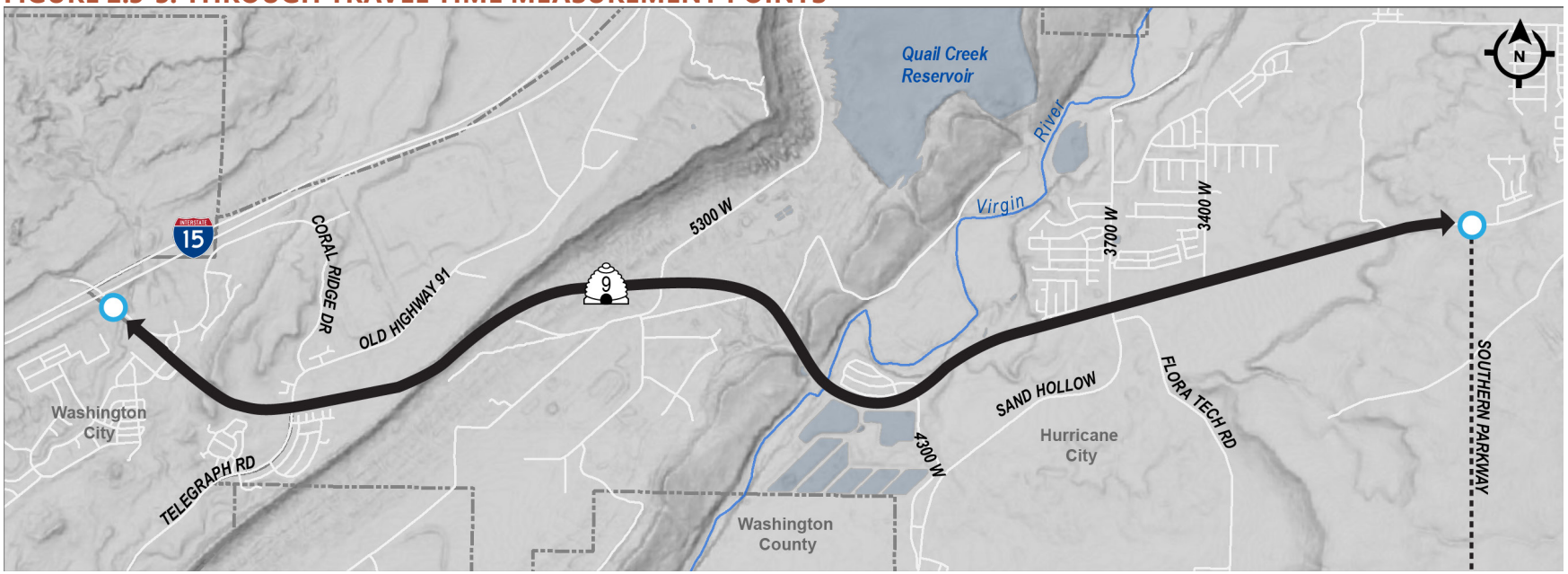
Each conceptual alternative would offer significantly better through travel times compared to the No-Build Alternative; only minor differences between each alternative were observed (see Table 2.3-3). The results indicate that, under each alternative, the SR-9 mainline would operate with adequate capacity during the 2050 horizon year.

TABLE 2.3-3: THROUGH TRAVEL TIME

	Direction	Existing	No-Build	Expressway	C/D	Express Lanes
AM	Westbound	5:40	15:50	6:10	6:10	6:05
	Eastbound	6:05	8:20	6:05	6:05	6:00
PM	Westbound	5:35	33:55	6:10	6:10	6:05
	Eastbound	6:10	27:00	6:20	6:15	6:10

Source: Parametrix, 2019
C/D = Collector Distributor System

FIGURE 2.3-3: THROUGH TRAVEL TIME MEASUREMENT POINTS



Source: Parametrix, 2019

DECREASE SAFETY RISKS

Conflict points represent any point where vehicle paths intersect, including crossing conflicts, merging conflicts, and diverging conflicts. An intersection or driveway can feature between two to 32 conflict points depending on the number of intersection legs, the number of travel directions, and the types of movements permitted.

Figure 2.3-4 illustrates several example intersection configurations on SR-9 and the associated conflict points. Because the conceptual build alternatives would not affect the number of conflict points west of Telegraph Road as compared to the No-Build Alternative, the conflict point analysis was only conducted between Telegraph Road and the Southern Parkway.

DECREASE SAFETY RISK SCREENING RESULTS

All three conceptual build alternatives would reduce the number of conflict points in the analysis area as compared to the No-Build Alternative. This is primarily due to the elimination of the existing signals and unsignalized intersections on the mainline.

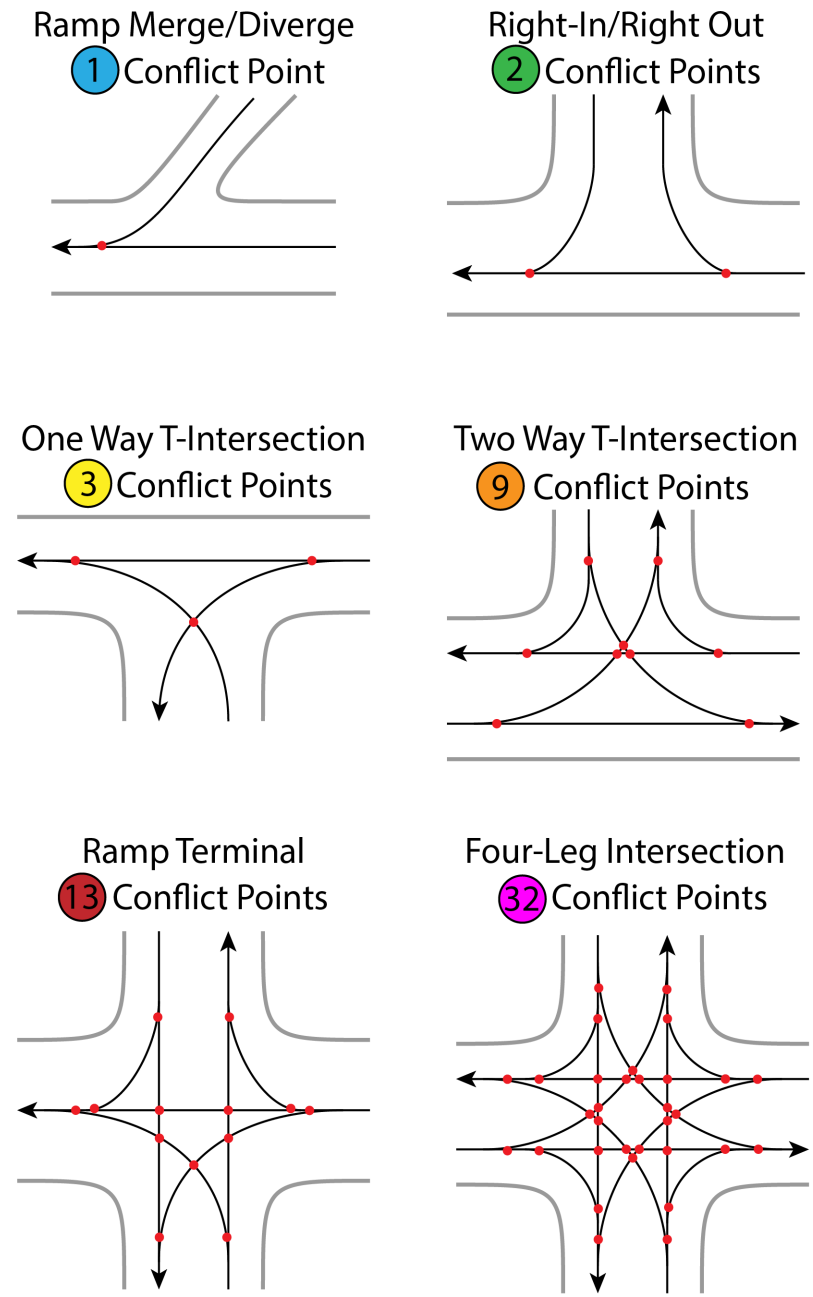
Beyond the benefits of simply reducing the total number of conflict points, each alternative would eliminate all high-speed crossing conflicts on the mainline. All remaining conflict points would require merge or diverge actions, which have a reduced risk of serious injury or fatal crashes (see Table 2.3-4).

TABLE 2.3-4: SUMMARY OF CONFLICT POINTS

	No-Build	Expressway	Collector/ Distributor	Express Lanes
Total Conflict Points	263	152	148	144

Source: Parametrix, 2019

FIGURE 2.3-4: CONFLICT POINT EXAMPLES BY INTERSECTION TYPES



Source: Parametrix, 2019

2.3.2 Tier 2 Screening

All conceptual build alternatives met the primary project goals and objectives under the Tier 1 screening criteria – moving the three alternatives into the Tier 2 screening.

SAFELY ACCOMMODATE ACTIVE TRANSPORTATION

The potential to accommodate active transportation would be a desirable outcome for the project. The DMPO *Regional Active Transportation Plan* (DMPO 2016) identifies SR-9 (east of Telegraph Road) as a designated bicycle route.

Both the DMPO *Regional Active Transportation Plan* and the *Washington City Active Transportation Plan* (Washington City 2017) identify a future shared-use path on SR-9, east of Telegraph Road. In addition, pending the City of Hurricane's finalization of their *Master Plan*, an active transportation facility may be included in their part of the study area.

SAFELY ACCOMMODATE ACTIVE TRANSPORTATION SCREENING RESULTS

Qualitative evaluation demonstrated that all conceptual build alternatives would support active transportation better than the No-Build Alternative, mainly due to the reduction in conflict points along SR-9—which would therefore improve safety.

Each of the conceptual build alternatives would allow for sidewalks and signalized pedestrian crossings at the proposed SR-9 interchanges. This would allow pedestrians to walk between the north and south sides of SR-9 with minimal out-of-direction travel. None of the alternatives screened would incorporate sidewalks on the SR-9 mainline connecting one interchange to the next. As a result, pedestrian connectivity between interchanges would be limited.

Bicycle accommodation along SR-9 focused on areas east of Telegraph Road because there are planned bicycle facilities west of Telegraph Road to I-15, separate from this project. The conceptual build alternatives would accommodate bicycling at grade-separated crossings along the corridor, which would permit bicyclists to cross SR-9 at interchanges. All conceptual build alternatives would accommodate active transportation on SR-9 and would also allow for future development of a multi-use facility adjacent to SR-9 in the future.

Bicycling east of Telegraph Road would be addressed differently as follows:

- **Expressway Alternative:** Would include wide shoulders to accommodate bicycles; however, the ramp junctions would present high-speed conflicts between bicycles and vehicles.
- **Collector/Distributor Alternative:** Would accommodate bicyclists on the lower-speed collector/distributor roadways between 300 West and 3400 West. West of 5300 West, bicyclists would use the wide shoulder on the mainline, but would encounter similar high-speed ramp conflicts at the junction of the Expressway Alternative.
- **Express Lanes Alternative:** Would provide a low-speed bicycle facility from Telegraph Road to 3400 West via the frontage roads.

ACCOMMODATE FUTURE TRANSIT

Conceptual build alternatives were qualitatively evaluated to determine if potential transit service could be accommodated on the corridor. The corridor will likely become a key component of future express and local transit service between St. George and Springdale.

ACCOMMODATE FUTURE TRANSIT SCREENING RESULTS

The conceptual build alternatives would support transit service more than the No-Build Alternative as it would reduce congestion and improve travel times on SR-9. With the current conceptual alignment and stop locations, it is assumed that the Expressway and Collector/Distributor alternatives would offer better transit travel times than the Express Lanes Alternative because there are not any Express Lane access ramps east of Telegraph Road.

MINIMIZE IMPACTS AND COSTS

The project team utilized GIS data from recently performed project field inventories. A footprint for the impact analysis was assumed using the cross-section (number of lanes and estimated disturbance areas) associated with each conceptual build alternative.

Wetlands and Waters of the U.S., floodplains, and right-of-way were used as criteria to identify whether an alternative would potentially result in disproportionate resource impacts resulting in difficulties obtaining future permits, undesirable community impacts, or order-of-magnitude differences in cost. In addition, preliminary construction costs were developed for each conceptual alternative.

MINIMIZE IMPACTS SCREENING RESULTS

Screening results indicated that the Expressway Alternative performed slightly better than the other conceptual build alternatives for each screening criteria (see Table 2.3-5).

TABLE 2.3-5: IMPACT AND COST SCREENING SUMMARY

Alternative	Wetlands (acres)	Waters of the U.S. (linear feet)	Floodplains (acres)	Right-of-Way (number of parcels)	Cost Comparison (2019 dollars)
Expressway	1.1	4,200	0.7	Six full aquisitions 3.15 million square feet of right-of-way (72.35 acres)	$140,442,000
Collector/Distributor System	1.5	4,700	1.3	Five full aquisitions 3.52 million square feet of right-of-way (80.88 acres)	$159,259,000
Express Lanes	1.4	4,500	1.2	Nine full aquisitions 3.36 million square feet of right-of-way (77.06 acres)	$180,103,000

Source: Parametrix, 2019

2.3.3 Tier 1 and Tier 2 Screening Result Summary

Using the Tier 2 secondary goals and objectives, the Expressway Alternative resulted in the least amount of environmental impacts and the lowest cost. In addition, the Expressway Alternative could accommodate active transportation and a future transit route. The other conceptual alternatives evaluated were eliminated because they did not meet the project goals and objectives as well as the Expressway Alternative. As a result, the Expressway Alternative was selected as the Preferred Alternative.

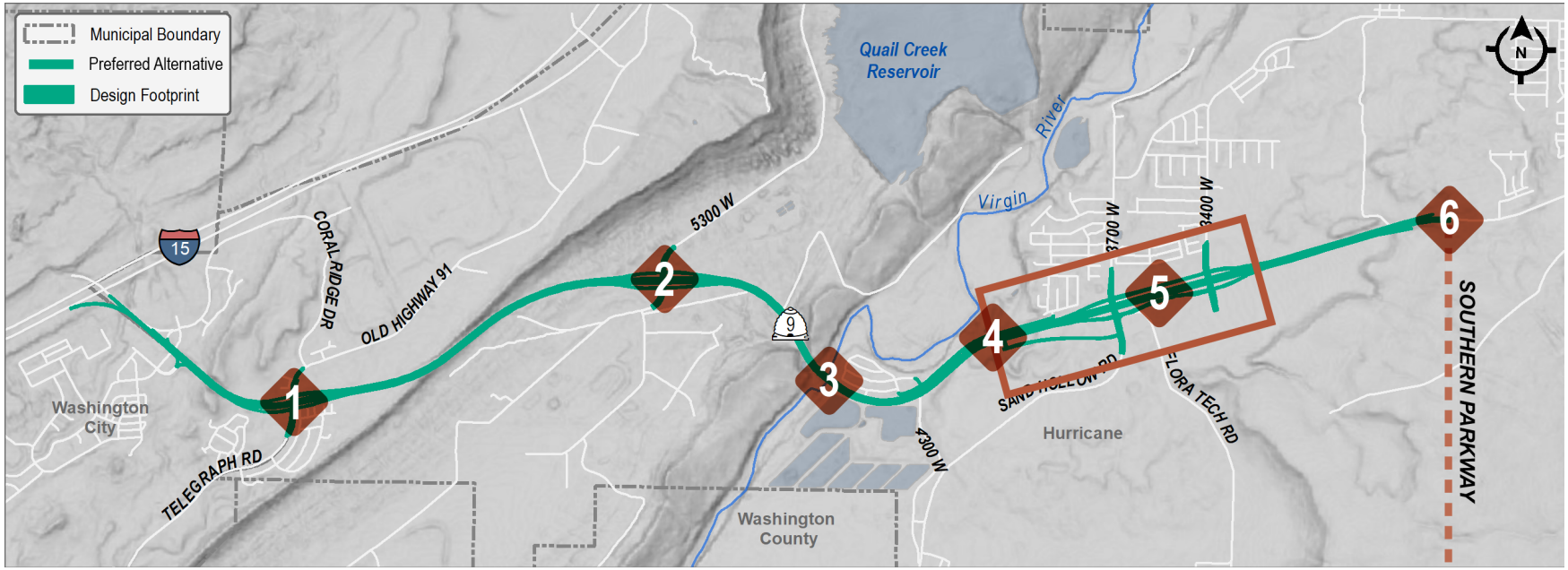
The Preferred Alternative includes the following elements:

- Grade-separated interchanges at 6300 West (Telegraph Road), 5300 West, 3700 West/3400 West, and 2800 West (Southern Parkway).
- Due to the short proximity between the 3400 West and 3700 West intersections, both streets would be served by a combined split diamond interchange with frontage roads linking the ramps at both ends (see Figure 2.3-6).
- The Quail Lake and Lava Bluff neighborhoods would access SR-9 via a proposed frontage road that would connect to the 3700/3400 South interchange (see Figure 2.3-6). The frontage road to Quail Lake would require approximately one-mile of new route to access SR-9.
- Partridge Circle (currently a cul-de-sac) would be extended to connect to the frontage road and provide a secondary access to the community to meet fire department requirements. The proposed frontage road would connect to 3895 West.
- Two travel lanes in the eastbound and westbound directions on SR-9
- Space in the center median to accommodate future capacity needs, when determined to be necessary
- Consistent and adequate shoulders that accommodate active transportation
- Frontage roads would be signed and striped for bicycle use.
- Improvements to the Virgin River bridge deck to accommodate future expansion and wider shoulders
- Accommodates a future transit route

In addition, UDOT is committed to constructing a shared use pathway along the SR-9 corridor to improve pedestrian and bicycle connectivity within and through the study area. The exact location of the facility will be determined in cooperation with Hurricane City, Washington City, and UDOT to best meet the needs of the community and users of the pathway. Since the exact location has not yet been determined, a separate environmental study will be prepared for the shared use pathway.

Timing for construction of the pathway has not yet been determined, but will likely coincide with the construction along the SR-9 corridor.

FIGURE 2.3-5: PREFERRED ALTERNATIVE OVERVIEW



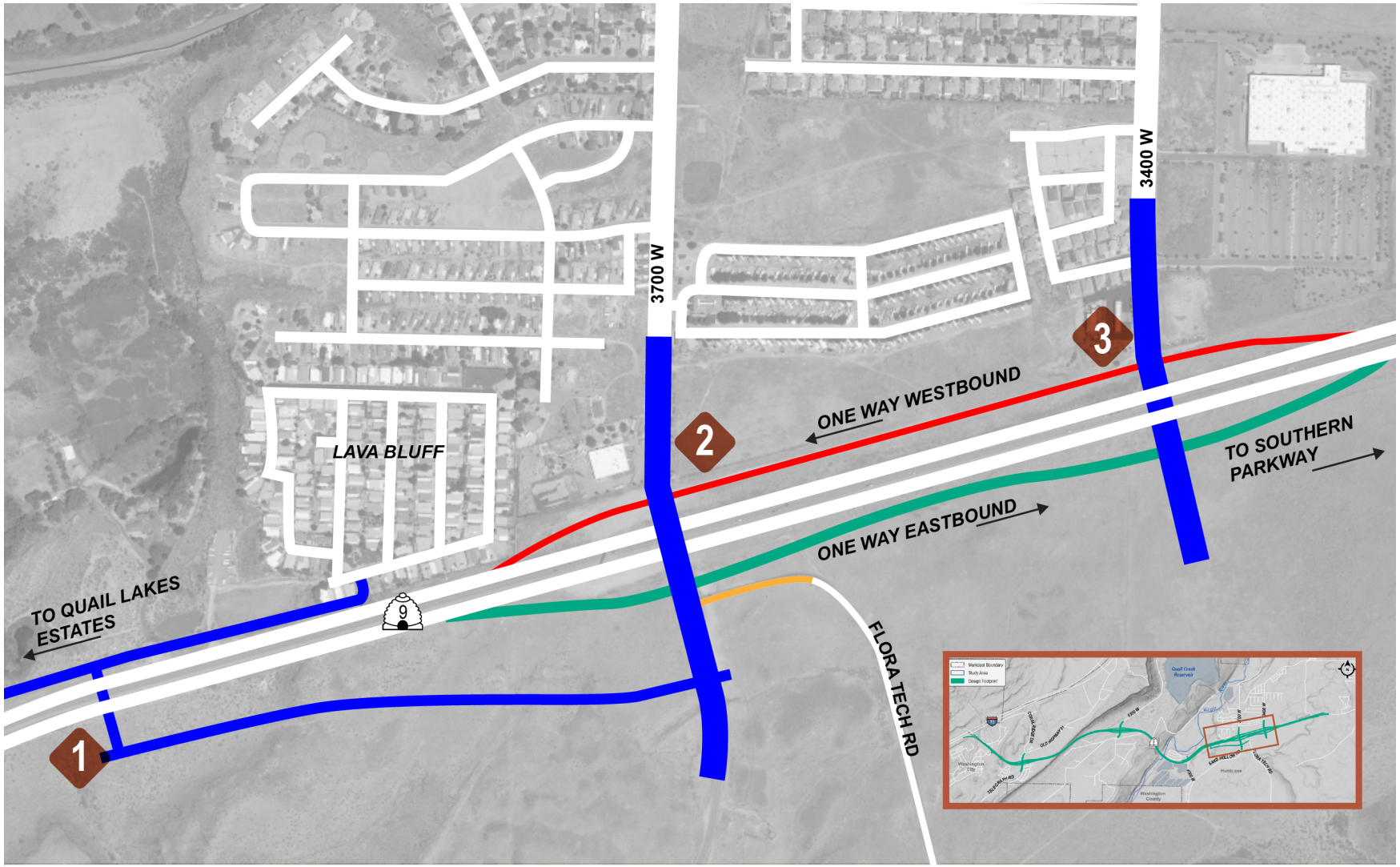
1. 6300 West / Telegraph Rd Interchange: SR-9 Underpass
2. 5300 West Interchange: SR-9 Underpass
3. Virgin River Bridge: Widened for Shoulders and Future Lanes
4. Quail Lakes and Lava Bluff Frontage Road
5. 3400/3700 West interchange & Frontage Road
6. Future Southern Parkway Interchange

See Figure 2.3-6

2.3.4 Selected Alternative

The Preferred Alternative is identified as the Selected Alternative because it meets the project goals and objectives, whereas the No-Build Alternative does not. The Preferred Alternative also better met the project's goals and objectives compared to the other conceptual alternatives evaluated. Therefore, the Preferred Alternative is the Selected Alternative (see Figure 2.3-5 and 2.3-6).

FIGURE 2.3-6: CLOSE-UP OF PREFERRED ALTERNATIVE AT THE 3700 WEST AND 3400 WEST INTERCHANGE



- East-Bound Only Movements
- West-Bound Only Movements
- Both Directional Movements

1. Frontage Road: SR-9 Overpass
2. 3700 West: SR-9 Underpass
3. 3400 West: SR-9 Overpass

Location of Flora Tech / 3400 W intersection will be determined during final design.

CHAPTER THREE

AFFECTED ENVIRONMENT

3.0 Introduction

This chapter describes the existing environmental, community, and economic conditions in the study area which serve as a baseline for evaluating impacts. The study area includes State Route 9 (SR-9) in Washington County, Utah, between Interstate 15 (I-15) and approximately 2800 West, at the future Southern Parkway connection at milepost (MP) 6.5 (see Figure 1.1-1).

The study area analysis extends 300 feet on the north and south sides of the SR-9 corridor, primarily in the Utah Department of Transportation (UDOT) right-of-way, and also involves widening at major intersections to accommodate proposed improvements. Any variations to the study area are described in the relevant resource sections in this chapter.

As part of the project scoping and environmental analysis, multiple environmental resources were considered, some of which do not exist in the study area. As a result, further discussions regarding the resources listed below are excluded from the State Environmental Study (SES) as they will not be impacted:

Prime and Unique Statewide Farmland: This resource is not present in the study area.

Joint Development: There are no major projects in the study area that would allow for joint development.

Section 6(f) Properties: This resource is not present in the study area.

Wild and Scenic Rivers: The portion of the Virgin River in the study area is not considered to be wild or scenic; therefore, this resource is not present in the study area.

Energy: This resource is not discussed as differences between alternatives are negligible.

Existing conditions for resources present in the study area were identified based on literature and data file searches, coordination with state and local agencies, and field investigations.

3.1 LAND USE

3.1.1 REGULATORY SETTING

The *Utah Municipal Land Use, Development, and Management Act* (Utah State Code Title 10 Chapter 09a) and the *County Land Use, Development, and Management Act* (Utah State Code Title 17 Chapter 27a) require that incorporated cities and counties develop a zoning map, zoning ordinance, and general plan.

The study area includes two cities in Washington County—Washington City and the City of Hurricane. In the study area, the documents that govern land use designations are the *2010* (amended 2012) *Washington County General Plan* (Washington County 2012), *2017 Washington City General Plan* (Washington City 2017), and the *2011 City of Hurricane General Plan* (City of Hurricane 2011).

3.1.2 AFFECTED ENVIRONMENT

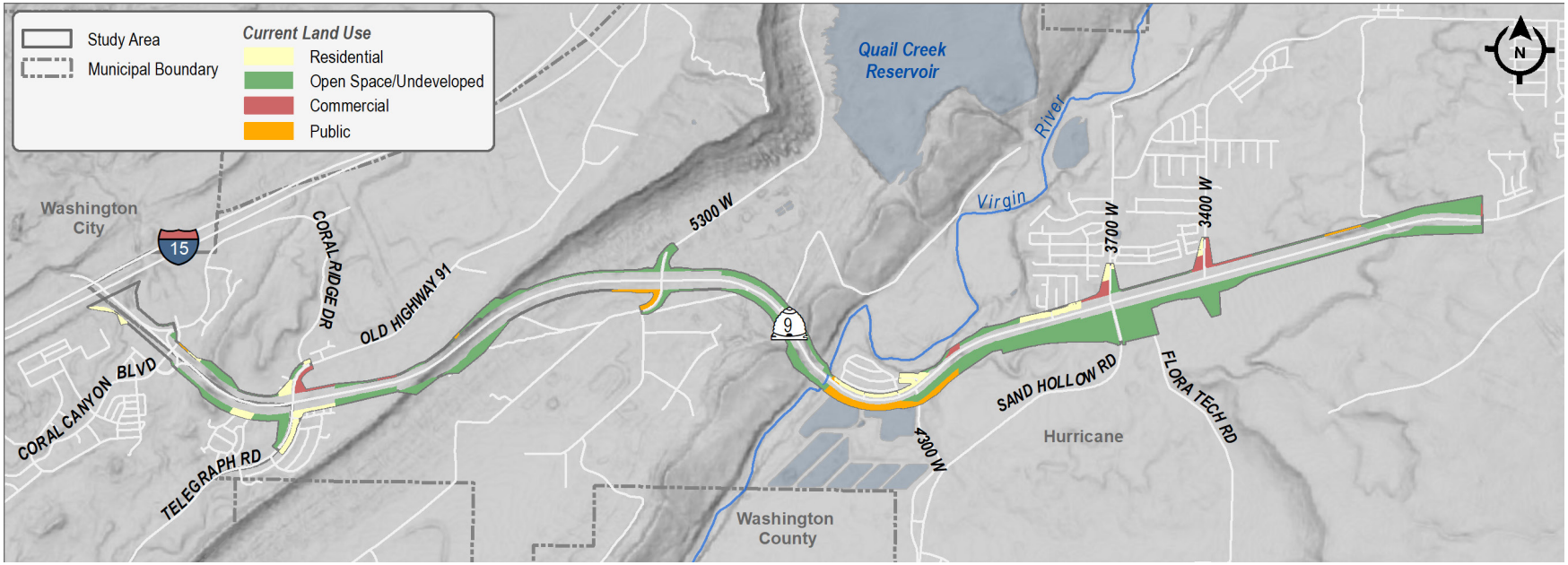
CURRENT LAND USES

Current land uses were inventoried using Geographic Information System (GIS) data from Utah's Automated Geographic Reference Center (AGRC), Washington County, Washington City, and City of Hurricane; followed by a review of aerial photography via Google Earth.

Following the land use inventory, land use designations were categorized into the following general land use types: commercial, public/institutional, open space/undeveloped, and residential, which includes both single-family and multi-family residential land use designations. Land use acreage does not include land that is currently utilized as roadway. The land use designations are defined below and are shown in Table 3.1-1 and Figure 3.1-1.

Commercial: Commercial land uses include retail businesses, service establishments, offices, and other enterprises involving

FIGURE 3.1-1: CURRENT LAND USES



Sources: Washington City, 2019 and City of Hurricane, 2019

TABLE 3.1-1: CURRENT LAND USES

Land Use Type	Acres	Percent of Study Area
Commercial	6.2	3.6
Public/Institutional	10.3	5.9
Open Space/Undeveloped	143.3	82.2
Residential	14.5	8.3
Total	**174.3**	**100**

Sources: Washington City, 2019 and City of Hurricane, 2019

commerce and or trade, and the buying and selling of goods and services. This category commonly includes gas stations, restaurants, and retail shops.

Public/Institutional: Public/institutional uses include land with private or public non-profit educational, recreational, charitable, or public service agency or organization. The purpose of these land use types is to serve the general public.

Open Space/Undeveloped: This category includes undeveloped land and excludes open areas in private residential lots, public roads, private roads, parking areas, land covered by structures not designated for active civic recreational use, and outdoor storage areas.

Residential: The majority of the residential land uses in the study area include single-family units on individual lots, but the designation can accommodate a mix of housing types such as townhouses, mobile homes, and condominiums.

Table 3.1-1 identifies land uses by acreage and percentage of study area. The open space/undeveloped land use type makes up the largest land use category in the study area, followed by residential.

Four densely populated residential developments are near SR-9; they include Canyon Villas at Coral Ridge, Shadow Ridge, Quail Lake Estates, and the Lava Bluff Modular Home Park.

Commercial land uses are the least prominent in the study area.

FUTURE LAND USE

GIS data from Utah's AGRC, Washington County, Washington City, and City of Hurricane were reviewed to determine future land uses in the study area. Land use designations were then categorized into the general land use types used for current land use with the addition of mixed use, defined below.

Mixed-Use: Mixed-use lands include the following types of land: mixed housing, commercial, light industrial, offices, churches, schools, and parks.

Future land use designations are defined below and shown in Table 3.1-2 and Figure 3.1-2.

TABLE 3.1-2: FUTURE LAND USES

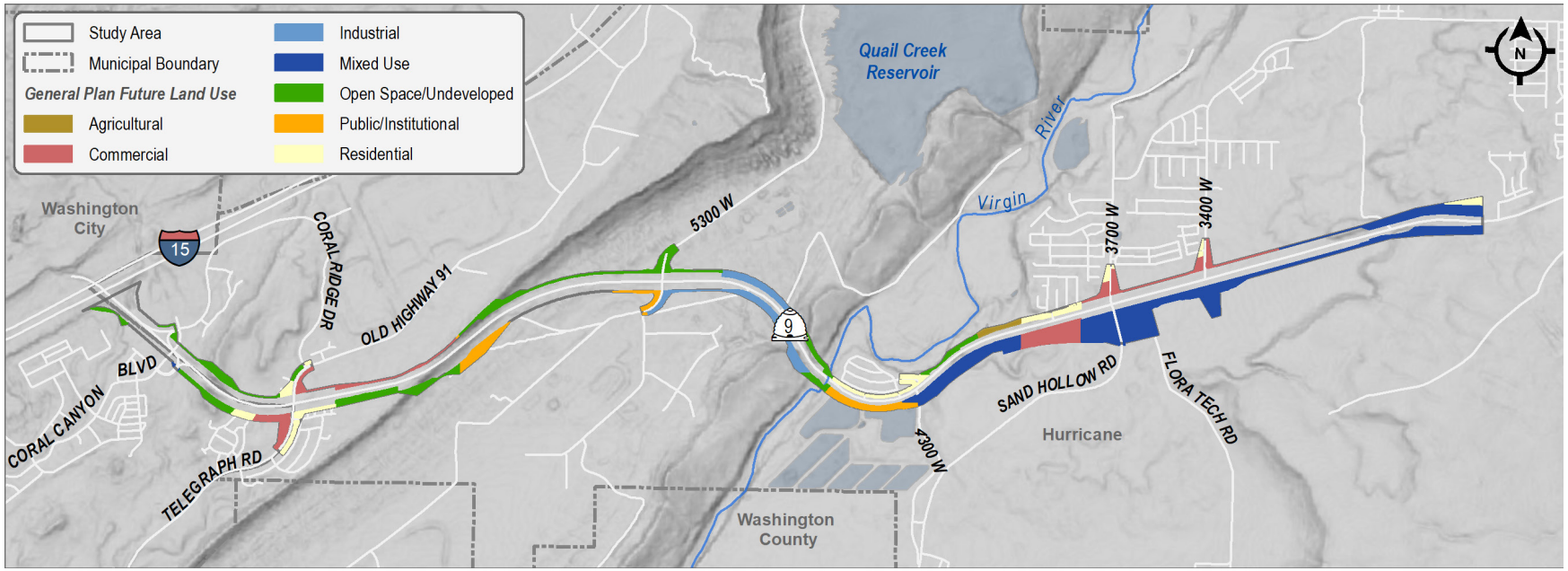
Land Use Type	Acres	Percent of Study Area
Commercial	24.9	14.3
Industrial	13.6	7.8
Public/Institutional	12.7	7.3
Open Space/Undeveloped	33.6	19.3
Mixed-Use	74.1	42.5
Residential	15.3	8.8
Total	**174.3**	**100**

Sources: Washington City, 2019 and City of Hurricane, 2019

PLANNING

Washington County's *2010* (Amended 2012) *General Plan* focuses on land development and the management of natural resources. It acknowledges the balancing effort between demand for land use and management of public lands.

FIGURE 3.1-2: FUTURE LAND USES



Sources: Washington City, 2019 and City of Hurricane, 2019

Washington County is part of the St. George Metropolitan Area, which is one of the fastest growing populations in the nation.

The *Washington County General Plan* notes that as the travel demand in this region increases, it is important to coordinate early with local governments to responsibly control development.

The *Washington City 2017 General Plan* outlines several goals that proactively consider the city's rapid growth. Pursuant to their *General Plan*, the City plans to "develop and grow the city effectively and responsibly, maximizing the cost-effectiveness of public infrastructure and service" (Washington City 2017). The City has strategically identified areas of growth, and are actively working to accommodate residential, commercial, and industrial development in those areas.

The *City of Hurricane 2011 General Plan* describes approaches for city growth, but still maintain the existing community character and landscape. The *General Plan* focuses on aesthetics and efforts to develop with context sensitivity.

With four recreational parks nearby, tourism and commercial development is increasing. The City of Hurricane's goal is to "preserve the natural beauty and features that provide a healthy environment and give Hurricane its unique identity" (City of Hurricane 2011).

PLANNED DEVELOPMENTS

Washington County (Bowers-Iron 2019) and Washington City (Ellerman 2019) were contacted to verify whether any new developments were planned along the SR-9 corridor, in the study area. As a result of the discussions, no planned developments or zoning changes were identified by Washington County or Washington City at the time of this study.

The City of Hurricane (Foran 2019) was also contacted to verify whether there were any new planned developments. No permit applications for developments were filed or issued at the time of this study; however, there were two zone change requests to the General Commercial zone.

One request for a zone change included a parcel on the south

side of SR-9, at the intersection of 3700 West, next to Sand Hollow Road.

The second request was to amend zoning for a parcel on the west side of the Maverik Adventure's First Stop business, at the 3400 West intersection.

3.1.3 DIRECT IMPACTS

This section addresses the expected impacts to land in the study area. In addition, the Preferred Alternative was analyzed to determine its consistency with local land use plans and developments that are currently planned in the study area.

NO-BUILD ALTERNATIVE

The No-Build Alternative would not improve the existing SR-9 corridor. As a result, there would be no direct impacts to current or future land uses under the No-Build Alternative.

PREFERRED ALTERNATIVE

CURRENT LAND USE

The Preferred Alternative would convert approximately 73 acres of existing land use to transportation use. Approximately 90 percent of impacts would occur to land categorized as Open Space/Undeveloped located immediately adjacent to the SR-9 corridor. Table 3.1-3 presents current land uses that would be converted to transportation use as a result of the Preferred Alternative.

TABLE 3.1-3: DIRECT IMPACTS TO CURRENT LAND USES

Land Use Type	Acres	Percent of Study Area
Commercial	1.7	1.0
Public/Institutional	3.7	2.2
Open Space/Undeveloped	65.8	37.7
Residential	1.8	1.0
Total	**73.0**	**41.8**

Sources: Washington City, 2019 and City of Hurricane GIS, 2019

FUTURE LAND USE

The largest impacts to future land use would occur to 38.9 acres of future mixed-use land, currently identified as Open Space/Undeveloped. Table 3.1-4 presents planned land use and zoning designations that would be converted to transportation use as a result of the Preferred Alternative.

Changes to the corridor would not preclude Washington City and the City of Hurricane from implementing their General Plan land use designations. Based on input from both Washington City and the City of Hurricane planners, and review of future growth projections, land use and zoning plans, it is expected that the study area would develop quickly with or without the proposed project. The conversion of land along the SR-9 corridor is not expected to affect future residential or commercial developments in the study area.

TABLE 3.1-4: DIRECT IMPACTS TO FUTURE LAND USES

Land Use Type	Acres	Percent of Study Area
Commercial	16.2	9.3
Industrial	3.5	2.1
Public/Institutional	3.5	2.0
Open Space/ Undeveloped	9.4	5.5
Mixed-Use	38.9	22.4
Residential	1.3	1.0
Total	**72.8**	**42.3**

Sources: Washington City, 2019 and City of Hurricane GIS, 2019

3.1.4 MITIGATION

Mitigation is not proposed.

3.2 SOCIAL IMPACTS

The social environment is generally discussed in terms of community cohesion, or the degree to which individuals have a sense of belonging to their community. This assessment focuses on elements of the community character and cohesion, travel patterns and accessibility, and the availability of and access to recreation facilities, public facilities, and utilities. The study area includes a quarter-mile buffer around the SR-9 corridor.

3.2.1 REGULATORY SETTING

There are no applicable social regulations.

3.2.2 AFFECTED ENVIRONMENT

Social environment data was obtained from the following resources: 2010 (amended 2012) Washington County Community Development Department (Washington County 2012), the Dixie Metropolitan Planning Organization (DMPO), *2017 Washington City General Plan* (Washington City 2017), and the *2011 City of Hurricane Trails Master Plan* (City of Hurricane 2011). In addition, U.S. Census data was used to identify community character of the study area.

The study area was also assessed via aerial imagery and Geographic Information System (GIS) mapping.

COMMUNITY CHARACTER & COHESION

Community character is an attribute of a specific geographic area that has identifiable characteristics, constituting it as unique and giving residents a sense of belonging. Segmentation or division of such an area would reduce community character and the region's desirability to current and future residents.

Washington City and the City of Hurricane serve as gateways to nearby public lands, including Sand Hollow State Park, Quail Creek State Park, and Zion National Park. Both cities are experiencing rapid growth as farming and agriculture in these areas evolve into retail, tourism, and manufacturing sectors.

The demographic profiles of Washington City and the City of Hurricane help to convey community characteristics and trends. Table 3.2-1 compares the demographic statistics between Washington County, Washington City, and the City of Hurricane.

TABLE 3.2-1: 2013/2017 AMERICAN COMMUNITY SURVEY 5-YEAR SURVEY/2010 U.S. CENSUS

	Washington County		Washington City		City of Hurricane	
Year	2010	2013-2017	2010	2013-2017	2010	2013-2017
Population	138,115	155,577	18,761	24,231	13,748	15,676
Median Age	32.5	35.9	31	34.1	33.5	37.1
Homeownership (owner-occupied)	71%	70%	76%	74%	72%	71%

Source: U.S. Census Bureau, 2010 and 2017

Demographic information is referenced from the U.S. Census Bureau's 2010 Survey and from the 2013-2017 American Community Survey (ACS) 5-Year Estimates. An analysis of race, ethnicity, and income follows in Section 3.5, Minority and Low-Income Populations.

Population: Since 2010, Washington City has experienced a 29 percent increase in population, and the City of Hurricane's population grew roughly 14 percent. Washington City expanded at greater rate as compared to the county, which increased by about 12.6 percent since 2010.

Age: The median age in Washington City and in the City of Hurricane is 37.1 and 34.1, respectively. The median age in these two cities is higher than the county with a median age of 32.5 years. These ages are all younger than the nation's median age of 37.8.

Homeownership: For the purposes of this analysis, homeownership is described as housing that is occupied by the owner.

Data retrieved from the 2010 Census and the 2013-2017 ACS 5-Year estimate were compared. Washington County, Washington City, and City of Hurricane all experienced decline of percent in homeownership. These statistics support the current generational trend for millennials, ages 22-37, who tend to be less likely to own homes (Stanford Center on Longevity 2016).

Race and Ethnicity: The majority of the population in Washington City and in the City of Hurricane classify themselves as one race only (White alone). Likewise, both cities do have small populations that identify as Hispanic or Latino.

Income and Poverty: The median incomes in Washington City and in the City of Hurricane fall below the median income in Utah.

TRAVEL PATTERNS

CURRENT TRAVEL PATTERNS

In the study area, SR-9 is a five-lane urban highway with two travel lanes in each direction, a shared median lane, and paved shoulders. Dedicated turn lanes exist at intersections. The SR-9 corridor provides access to the cities of Washington, Hurricane, LaVerkin, Rockville, and Springdale.

In addition, SR-9 is an east-west principal arterial route that connects I-15 to Zion National Park. Beyond the western study area boundary, SR-9 connects to the Zion Park Scenic Byway, which serves the southern gate of Zion National Park. Nearby recreational areas of Quail Creek State Park and Sand Hollow State Park are accessible in this region of the corridor. Because SR-9 is the only east-west corridor in this area, it also serves commuter and freight traffic with heavy a.m. and p.m. peak travel volumes.

Public transit services are limited in the study area. Currently, there is public transit in the form of taxis and shuttles that service local trips in Washington City and in the City of Hurricane. Additionally, the Washington County Council offers on-demand transportation service to senior adults over age 60 for medical appointments, prescription pick-ups, or local shopping in the City of Hurricane.

FUTURE TRAVEL PATTERNS

Future plans for automobile travel in the study area are summarized in Chapter 1 and 2 of this document.

Future plans for transit services are undergoing study via regional transportation planning, feasibility studies, and transit studies. The *St. George to Springdale Public Transit Feasibility Study* (November 2016) recommended a local and express system between St. George and Springdale, accessing SR-9 via Telegraph Road. To date, no other transit improvements are identified in the study area. See Section 3.6, Bicycle and Pedestrian Considerations, for further detail on active transportation.

PUBLIC FACILITIES AND RECREATION

Existing and planned public facilities and recreational areas within the quarter-mile buffer are summarized in Table 3.2-2. Public facilities typically include schools, churches, recreational areas, and medical and emergency facilities (hospitals and fire departments).

One school and two recreation facilities are in the study area, but cannot be directly accessed from SR-9 (see Figure 3.2-1).

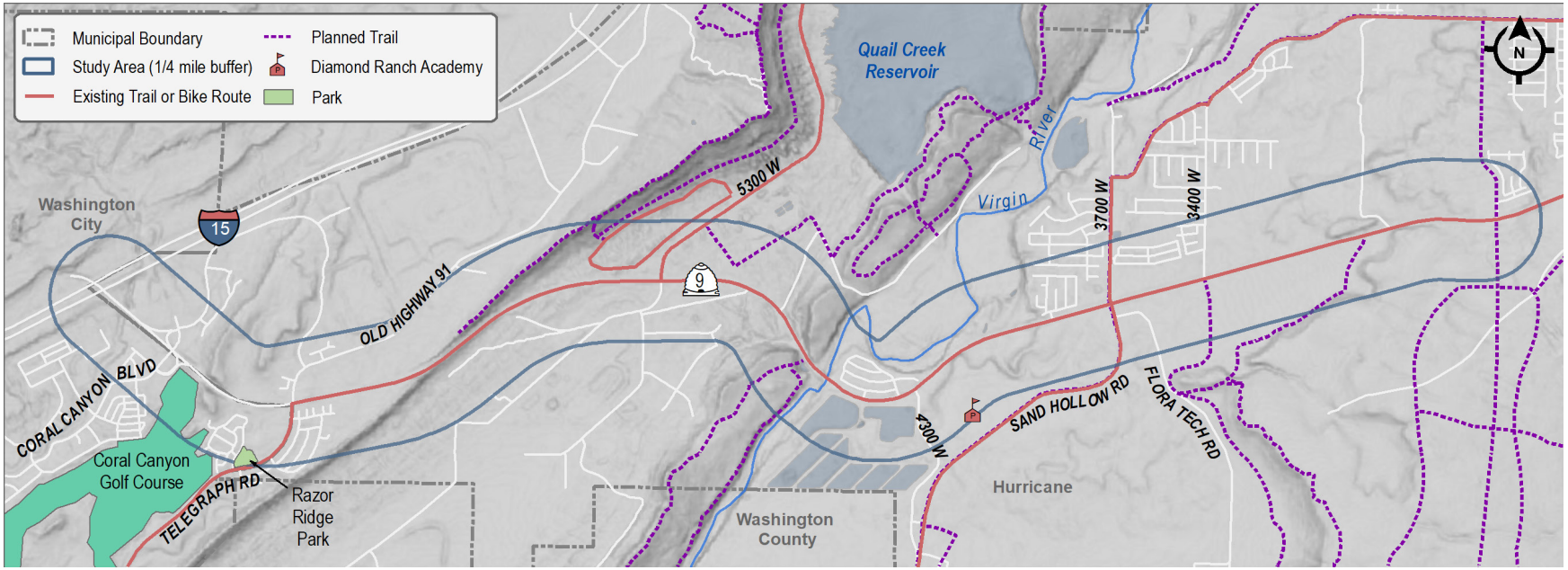
SR-9 is a key component in several local and regional loop routes for cyclists. Recreational resources also include a network of existing and planned trails that can be accessed through the local streets, near SR-9. Three existing bike routes/ trails share the existing SR-9 corridor, which include the Ironman Route, Quail Creek Loop, and Telegraph Trail.

The Quail Creek Loop is a 27.7-mile trail that traverses around the edges of the Quail Creek Reservoir and enters SR-9 at the intersection of 3700 West, continuing east until it intersects with 5300 West.

The Ironman Route is part of a 56-mile route that enters SR-9 at the intersection of 6300 West and continues east past the study area, continuing through the City of Hurricane and heading south, ultimately terminating at Sand Hollow Reservoir.

The Telegraph Trail is a 6.3-mile connector that functions as part of the route from St. George to Zion National Park (see Figure 3.2-1 and Table 3.2-2).

FIGURE 3.2-1: PUBLIC AND RECREATIONAL FACILITIES



Sources: Utah AGRC, 2019 and Washington County, 2019

In addition to the three bike routes that cross SR-9, the Sand Hollow Loop also crosses SR-9 and is an existing bike trail maintained by the City of Hurricane. The Sand Hollow Loop follows along parts of the Quail Creek Loop and the Ironman Route.

Additional analyses of bicycle and pedestrian resources are available in Section 3.6, Bicycle and Pedestrian Considerations.

UTILITIES

The City of Hurricane is the source of public utilities in its city limits; public utilities include culinary water, electricity, and storm drainage. Washington City also sources its water and electricity throughout the study area.

Ash Creek Special Service District and Washington County Solid Waste both provide sewer and garbage services to Washington City and to the City of Hurricane. Gas, power, and telephone/fiber optics are served by Dominion Energy, Rocky Mountain Power, and Century Link, respectively.

3.2.3 DIRECT IMPACTS

This section describes any beneficial or adverse effects that could potentially impact the communities in the study area.

NO-BUILD ALTERNATIVE

Impacts to community character and cohesion, travel patterns and accessibility, and the availability of and access to recreation facilities, public facilities, and utilities under the No-Build Alternative would not occur because the proposed project would not be constructed. The projected congestion anticipated to occur under the No-Build Alternative would result in increased travel times to access existing and planned community resources and facilities in or beyond the corridor. In addition, due to increased delays, future automobile and transit service reliability would be impacted during peak travel times.

TABLE 3.2-2: SR-9 PUBLIC AND RECREATIONAL FACILITIES

Resource Type	Resource Name	Location/ Access Point	Description
School	Diamond Ranch Academy	433 Diamond Ranch Parkway, City of Hurricane	Residential treatment and therapeutic boarding school
Recreational facilities	Coral Canyon Golf Course	1925 North Canyon Greens Circle, Washington City	18-hole public golf course
	Razor Ridge Park	1934 Coral Ridge Park, Washington City	Fishing pond with dock and walking trail, restroom and picnic area
Existing recreational trails	Telegraph Route	6300 West – SR-9, Washington City	Existing bike route/trail
	Sand Hollow Loop	3700 West Sand Hollow Road, City of Hurricane	
	Quail Creek Loop	3700 West – SR-9, City of Hurricane	
	Ironman Route	6300 West – SR-9, CIty of Hurricane	
Planned recreational trails	Old Highway 91 Lookout	City of Hurricane	Planned hiking/ bike trail
	Quail Lake Treatment Plant	City of Hurricane	
	Elim Rim Trail	City of Hurricane	
	Harrisburg Bench East Loop	City of Hurricane	

Sources: City of Hurricane, 2011 and Washington City, 2017

PREFERRED ALTERNATIVE

COMMUNITY CHARACTER & COHESION

The Preferred Alternative would not restrict social interactions from occurring across SR-9. Existing sidewalks would remain in place and sidewalk gaps on cross streets would be addressed to maintain connectivity to existing and future developments at 5300 West, Sand Hollow Road, 3700 West, and 3400 West, which is expected to improve community cohesion along the SR-9 corridor.

The Preferred Alternative is not anticipated to impact the current or future composition of the community, including population, age, homeownership, race and ethnicity, and income and poverty levels.

The Preferred Alternative is consistent with past and existing growth patterns exhibited by the communities. Implementation of the proposed project would allow local municipalities to continue to meet projected growth demands.

The accommodation of future local- and through-traffic, and the safety improvements associated with the implementation of the Preferred Alternative, would benefit existing and future communities adjacent to the corridor.

TRAVEL PATTERNS

The Preferred Alternative would convert all signalized intersections to grade-separated interchanges.

The Preferred Alternative would result in changes to local travel patterns. Although access to Foothills Canyon Drive and North Town Center Drive would remain, all other access points would be closed or redirected to the proposed frontage road or existing and planned facilities between each proposed interchange north and south of each interchange to facilitate local access.

A proposed frontage road would provide access to the Lava Bluff and Quail Lake neighborhoods.

The frontage road would bring travelers to the new interchange at 3500 West at around MP 4.4. Use of the frontage road to access or cross SR-9 would result in out-of-direction travel for area residents.

Although some out-of-direction travel would be required for local trips, safety would improve as a result of the removal of at-grade conflict points along SR-9. In addition, the Preferred Alternative would result in travel time savings in the a.m. and the p.m. peak travel times. As a result, the overall travel time for out-of-direction travel would be minimal when considering the entire trip from origin to destination. Refer to Chapter 2, Alternatives, for further travel time analysis.

Under the Preferred Alternative, Quail Lake Estates residents would experience a change in travel patterns and access to their neighborhood. The gap in the barrier wall between MP 3.6 and MP 4—which currently allows access in and out of the development—would be closed.

The existing 4400 West access into the development would remain. In order to meet the secondary access requirements, a new entrance would be located at the current Partridge Circle cul-de-sac.

Access in and out of the Lava Bluff neighborhood would remain unchanged under the Preferred Alternative.

Through-traffic travel patterns are expected to be similar to existing travel patterns; however, travel times and safety would be improved under the Preferred Alternative.

PUBLIC FACILITIES AND RECREATION

The Preferred Alternative would not affect the way the community uses or accesses nearby public and recreational facilities. Such facilities are not currently accessed directly from SR-9; therefore, connectivity to public and recreational facilities would be maintained similar to existing conditions, with the added feature of frontage roads.

Cyclists would benefit from the 10-foot shoulders on each side of SR-9 and eight-foot ramp shoulders. The implementation of grade-separated interchanges would improve safety conditions by eliminating at-grade conflict points.

Connectivity to nearby cycling routes would be maintained similar to existing conditions; however, cyclists would first exit SR-9 onto the frontage road before continuing onto local streets to connect to nearby cycling routes. Frontage roads would be signed and striped for bicycle use.

See Section 3.6, Bicycle and Pedestrian Considerations.

UTILITIES

Utility conflicts would occur throughout the study area. During the final design phase, the project team would meet with affected utility providers to negotiate utility agreements.

3.2.4 MITIGATION

No mitigation is proposed.

3.3 ECONOMIC CONDITIONS

Economic conditions are assessed to provide a snapshot of existing conditions, identify trends, and analyze the proposed project's effects on those trends and future conditions. Economic data was compiled from the State of Utah, Washington County, Washington City, and City of Hurricane to provide this synopsis.

3.3.1 REGULATORY SETTING

There are no federal, state, or local regulations that require an economic impact analysis for the proposed project. However, due to potential for economic impacts, an economic analysis of the proposed project was prepared.

3.3.2 AFFECTED ENVIRONMENT

POPULATION

The study area is approximately 10 miles north of St. George, and is part of the St. George metropolitan area. This region was the fastest growing metropolitan area in the United States in 2018. Washington County has experienced nearly 25 percent growth between 2010 and 2018, compared to 14.4 percent growth in the state of Utah (U.S. Census Bureau, 2019).

TOURISM

Washington County is surrounded by four national parks within a 130-mile radius, including Zion National Park. Zion was the third most-visited national park in 2017, with more than 4.5 million visitors. The county generated over $7.7 million in transient room tax in 2017, with tourism providing about $750 million in local revenue.

Private sector leisure and hospitality jobs accounted for 16.4 percent of the jobs in Washington County in 2017 (Kem C. Gardner Policy Institute 2018).

EMPLOYMENT

Employment data were obtained from Utah Department of Workforce Services *Annual Report Fiscal Year 2016-2017* (2018). Non-farm employment in Washington County increased from 44,213 in January 2010 to 67,899 in January 2019, representing an increase of 54 percent. The unemployment rates for Washington County and the state have been decreasing since 2010.

The June 2019 unemployment rate was 3.2 percent in Washington County—which was slightly higher than the 2.8 percent unemployment rate in the state.

Employment in the St. George metropolitan area, including the City of Hurricane and Harrisburg Junction, is expected to increase by about 8,000 jobs (or 3.8 percent) annually between 2014 to 2024.

The top five employment sectors in Washington County in 2017 included the following: (1) trade, transportation and utilities; (2) education, healthcare and social services; (3) leisure and hospitality; (4) government, and; (5) construction.

The largest employers in Washington County are Intermountain Healthcare, Washington County School District, Walmart, Dixie State University, St. George City, SkyWest Airlines, and the United States Government.

Most of the large employers are located in St. George or in the City of Hurricane, outside the study area. Walmart operates a large distribution center north of SR-9, and is best accessed from the existing SR-9, 6300 West intersection.

TAX REVENUE

The revenues for all local governments in Utah come from a combination of tax revenues, intergovernmental transfers, and fees. Collectively, property and sales tax revenues constituted 60.9 percent of Washington County's revenue in 2017 (Utah State Tax Commission, 2018).

Taxable sales in Washington County have increased by 11.1 percent between 2012 and 2017, from $2,306,400 to $3,608,600 (Utah Economic Council, 2019).

Property tax rates in Washington County have fluctuated between 0.9 and 1.6 percent since 2008. The 2017 average rate was 1.1 percent (Utah State Tax Commission, 2018).

3.3.3 DIRECT IMPACTS

This section describes adverse and or beneficial economic impacts to businesses, general commerce and employment, local government property and sales tax revenues, and property values, in the study area.

NO-BUILD ALTERNATIVE

The No-Build Alternative would allow SR-9 to remain as it currently exists.

The lack of an adequate transportation corridor could negatively impact economic activity as local and through-travelers will be further delayed. Frustration over travel times could influence travel patterns and alter destinations.

POPULATION

The No-Build Alternative is not anticipated to meaningfully impact population trends because other factors are accelerating growth in the area.

TOURISM

The No-Build Alternative would negatively affect the tourist driving experience, as congestion, travel time and safety risks would continue to increase. This inconvenience is unlikely to affect overall tourism trends, as the location near four national parks and other recreational opportunities would continue to attract tourism.

EMPLOYMENT

The No-Build Alternative is not anticipated to impact current employment trends.

TAX REVENUE

The No-Build Alternative would not convert existing land uses into public transportation facilities, so the existing property tax revenue trends would continue. Existing businesses would not be impacted, so taxes generated by businesses would continue their current trends.

PREFERRED ALTERNATIVE

The Preferred Alternative would result in a more efficient corridor that would be capable of accommodating existing and future travel demands. At-grade crossings would be replaced with safer, grade-separated facilities; however, some residential neighborhoods and businesses that can currently access SR-9 directly would be required to use a frontage road to access their property.

The access modifications would result in overall travel time savings and a safer facility for all users because conflict points would be eliminated.

POPULATION

The Preferred Alternative is not anticipated to have an impact on current population trends. Access to existing neighborhoods would be maintained and opportunities for future development would still remain. The growth rate is expected to continue to increase as a result of other economic factors.

TOURISM

SR-9 would remain an important tourism corridor from I-15 to multiple national parks and other attractions. The Preferred Alternative would improve travel times for through traffic, while maintaining access to local businesses.

The Preferred Alternative would enhance the traveling experience by providing a more appealing roadway network, and would allow new services to develop. The Preferred Alternative is not anticipated to increase tourism.

EMPLOYMENT

The Preferred Alternative would relocate two occupied businesses: the Chevron gas station/convenience store on Old Highway 91, and Trailer Source—a regional retailer of utility trailers approximately a half-mile east of Old Highway 91. An unoccupied commercial building would also be acquired.

As discussed in Section 3.4, Relocations and Right-of-Way Acquisition, these businesses would be afforded relocation assistance and could reopen at a new location in their current city. Impacts to employment rates would be temporary as the businesses relocate, or as new businesses are established, to replace the services or products that were previously offered.

Temporary increases in construction-related employment would occur during construction.

TAX REVENUE

The Preferred Alternative would require UDOT to purchase private property for right-of-way. The majority of the land that is expected to be acquired is currently designated as open space/undeveloped. See Section 3.1, Land Use, for further details.

Over the long-term, roadway improvements could facilitate higher use of the land (changes from vacant land to residential or commercial use, especially near interchanges). An increase in commercial and residential land use along SR-9 could reduce travel by providing goods and services closer to residential areas.

The increased economic competitiveness due to roadway improvements would likely offset any local adverse tax loss from the acquisition of private land under the Preferred Alternative. Quantifying these benefits is difficult because the benefits would occur incrementally over a long period and would be influenced by other economic factors.

3.3.4 MITIGATION

Land owners will be justly compensated under the provisions of the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended*, 42 United States Code (U.S.C.) 46014655 (Uniform Act) and the *Utah Relocation Assistance Act* (Utah Administrative Code 57122).

Mitigation is not offered to local governments that are adversely affected when land is removed from their tax base. Eventually, increased property values as a result of improved regional connectivity would be expected to generate enough revenue to offset the short-term impact of the proposed project.

3.4 RELOCATIONS AND RIGHT-OF-WAY ACQUISITION

This section describes the properties in the right-of-way impacts analysis area, and the right-of-way impacts that would result from the proposed project.

3.4.1 REGULATORY SETTING

UDOT guidelines and policies are consistent with the federal *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended*, 42 United States Code (U.S.C.) 46014655 (Uniform Act).

The *Utah Relocation Assistance Act* (Utah Administrative Code 57122) is implemented by local jurisdictions and UDOT. The Uniform Act and the *Utah Relocation Assistance Act* provide guidance for the fair and equitable treatment of displaced persons regarding the acquisition of real property by government agencies.

3.4.2 METHODOLOGY

Ground and aerial surveys and a search of Washington County's property records (2018) provided the following information: property boundaries, size, ownership, and encumbrances—including easements and structures—inside the proposed right-of-way footprint.

Property impacts are defined based on whether a parcel is in the right-of-way, or is a specific distance from the proposed right-of-way. A detailed description of property impact types are explained below.

Relocations. A relocation occurs when an existing structure is in the proposed right-of-way, or if a property is affected such that the remainder of the property would no longer retain its original functionality. For example, a loss of functionality may include loss of access to a public street, a significant reduction in lot size, or impacts to existing structures. In these cases, the entire property would require acquisition, and the displaced occupants would be required to relocate.

Partial acquisitions. A partial acquisition typically occurs when a property is located in the proposed right-of-way, but the right-of-way would be more than 15 feet from an existing structure or the remaining property is able to retain its original functionality. For this type of impact, only a strip of land would need to be acquired.

Construction Easements. Some properties outside the right-of-way impact area might be affected by cuts or fills required during construction. In these cases, UDOT would require Temporary Construction Easements (TCEs). Such properties may be affected but are not quantified as relocations or partial relocations because the properties would not be permanently used. Therefore, TCEs are not included in this analysis.

Impacts were quantified by using the following three methods: 1) full acquisition of property, 2) relocation of business or residence, and 3) partial acquisition of property. It was assumed that any building within 15 feet of the proposed right-of-way would require a full acquisition.

A commercial building occupied by a business or businesses that would require a full acquisition would be quantified as a relocation.

Properties that do not have a building, or have a building more than 15 feet from the proposed right-of-way were quantified as partial acquisitions without relocations.

Right-of-way acquisitions and relocations were estimated using preliminary engineering drawings, and the impacts identified are preliminary.

Future refinement of the impact area during final design and during property owner negotiations could result in different impacts for the properties in addition to the descriptions outlined below; however, the impacts are expected to be similar to the ones described below.

3.4.3 AFFECTED ENVIRONMENT

The majority of the study area is categorized as open space/ undeveloped land, see Section 3.1.1 for further detail.

3.4.4 DIRECT IMPACTS

This section describes preliminary right-of-way acquisitions and relocations from the proposed project.

NO-BUILD ALTERNATIVE

The No-Build Alternative would not require the full or partial acquisition of any property; therefore, there would not be any direct right-of-way impacts.

PREFERRED ALTERNATIVE

The Preferred Alternative would not result in the full acquisition of any residential properties or unimproved land. The proposed project would require the partial acquisition of 61 parcels, totaling approximately 64 acres.

Three commercial acquisitions, totaling approximately 7.4 acres, would be required as the existing buildings are within 15 feet of the proposed right-of-way. As a result, the displaced tenants in the three impacted commercial buildings would need to be relocated. However, UDOT, in coordination with each property owner, would make a final determination about the viability of these businesses during final design. See Table 3.4-1 and Figures 3.4-1 to 3.4-3.

TABLE 3.4-1: SUMMARY OF FULL ACQUISITIONS AND RELOCATIONS

Parcel ID	Parcel Address	Current Use	Total Acquisition (square feet)	Total Acquisition (acres)
H-4-2-4-1201-RD3*	6054 West State Street	Commercial	55,760	1.3
H-4-2-4-1202-RD3*	6064 West State Street		62,730	1.4
H-QLE-CA-1	4390 West State Street	Commercial	19,170	0.4
H-4-2-1-1400	65 North 3700 West	Commercial	187,310	4.3
Total Acquisition			**324,970**	**7.4**

**Business located on two parcels.*

FIGURE 3.4-1: FULL ACQUISITION OF PARCELS #H-4-2-4-1201-RD3 AND #H-4-2-4-1202-RD3

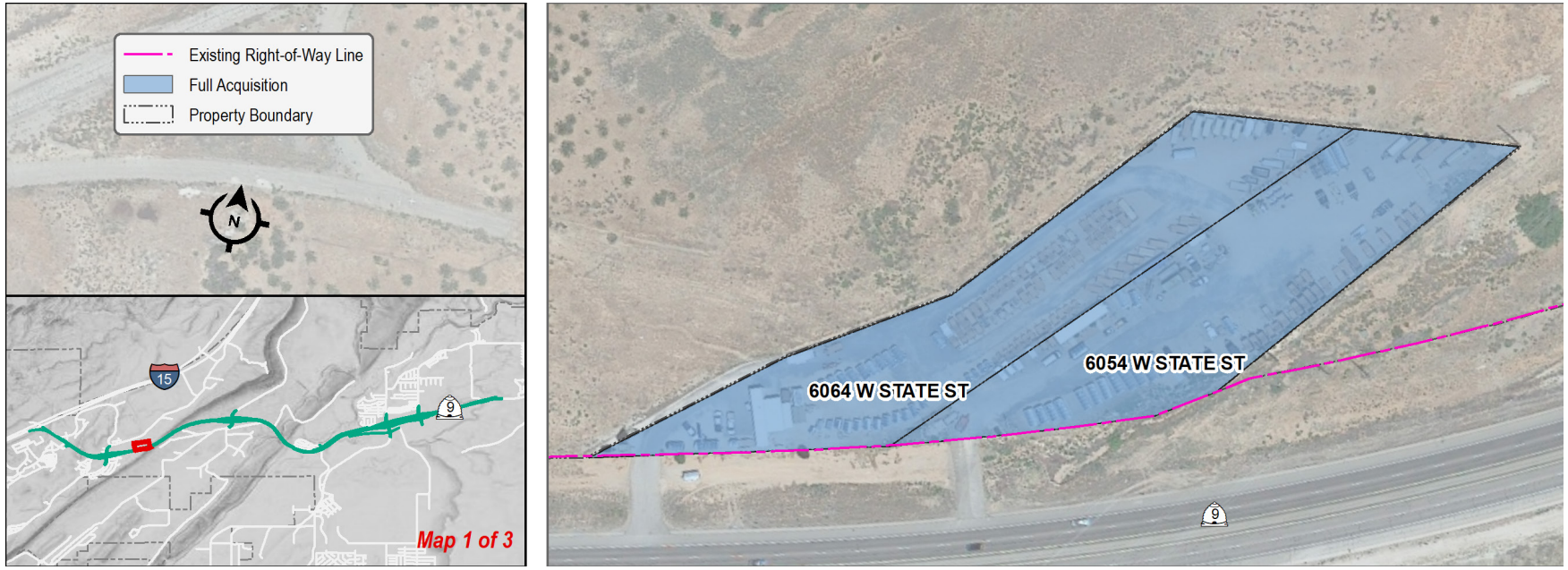


FIGURE 3.4-2: FULL ACQUISITION OF PARCEL #H-QLE-CA-1

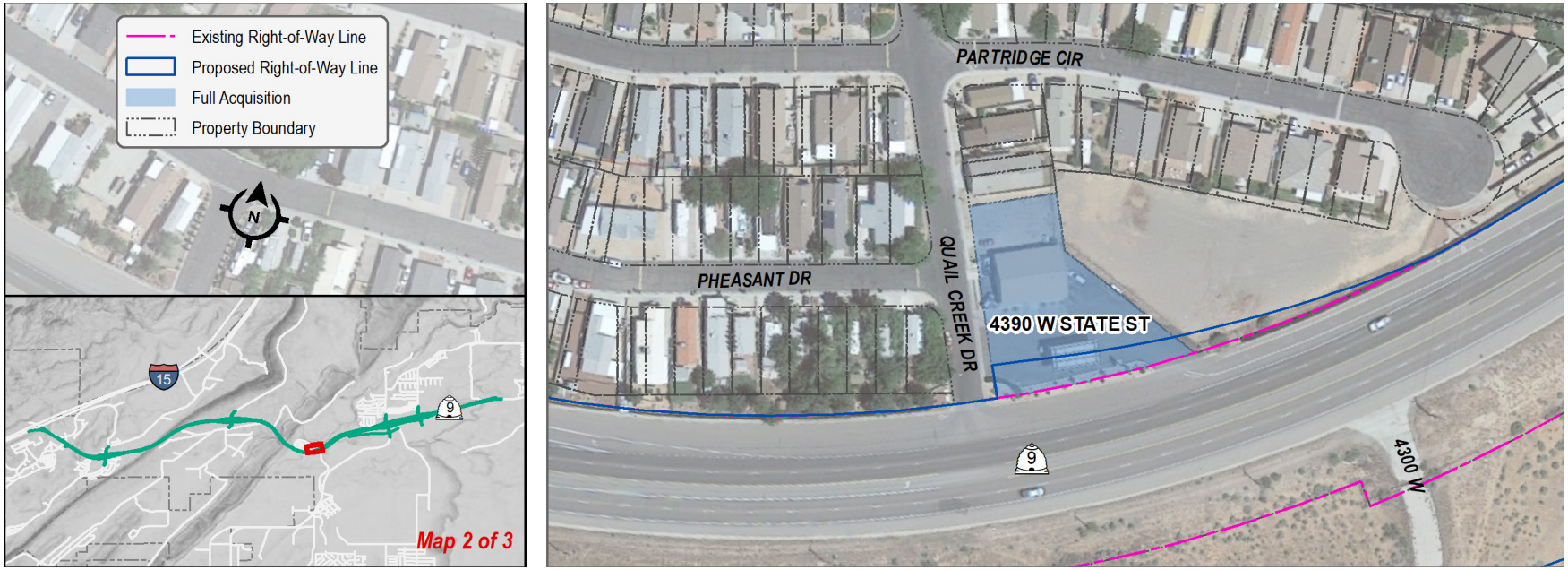


FIGURE 3.4-3: FULL ACQUISITION OF PARCEL #H-4-2-1-1400

3.4.5 MITIGATION

Property acquisitions and relocations will be completed according to the provisions of the Uniform Act, as amended, and the *Utah Relocation Assistance Act*, Utah Code, Section 57-12.

3.5 MINORITY AND LOW-INCOME POPULATIONS

Social and demographic characteristics along the SR-9 corridor were evaluated to identify populations that may be more prone to experience disturbance and relocation. Specifically, the assessment determined whether portions of the project area contained unusually large concentrations of racial or ethnic minority populations, elderly residents, or persons living at or below poverty levels.

3.5.1 REGULATORY SETTING

There are no state regulations or policies to guide the analysis of minority and low-income populations. Guidance in *Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* dated February 11, 1994, was followed to take the appropriate steps to identify and address any potential adverse effects that could result from the proposed project on the health or environment of minority and low-income populations.

As outlined in Executive Order 12898, the evaluation of minority and low-income populations includes persons of any of the following groups:

Black: a person originating from any of the black racial groups in Africa.

Hispanic: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

Asian: a person originating from any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent.

American Indian and Alaskan Native: a person originating from any of the original people of North America and who maintain cultural identification through tribal affiliation or community recognition.

Native Hawaiian or Other Pacific Islander: a person originating from any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands

Low-Income: a person whose household income (or in the case of a community or group, whose median household income) is at or below the Health and Human Services (HHS) poverty guidelines.

3.5.2 AFFECTED ENVIRONMENT

The study area exhibits some racial and ethnic diversity, with a majority of the population identifying themselves as being one race only – White. The next largest population group identifies themselves as Hispanic or Latino (see Table 3.5-1).

The SR-9 corridor traverses Census Tracts 270801 and 270902 (see Figure 3.5-1). Minority population data was available at the Census Block level. Poverty level data was only available at the Census Block Group (BG) level.

Data for the study area was compared to the averages of both Washington County and the state of Utah to determine if there would be higher concentrations of minority or low-income populations affected by the project.

The number of minority-owned or women-owned businesses were analyzed using the Utah Unified Certification Program's Disadvantaged Business Enterprise Directory (2019).

RACE/ETHNICITY

Minority population data was analyzed at the Census Block Level. Minority population data demonstrated that minority populations greater than the county average exist in two blocks along the north side of SR-9, and in five blocks along the south side of the SR-9 corridor.

Census data show that Hispanic residents make up the largest minority population group after residents that identify themselves as White.

TABLE 3.5-1: MINORITY POPULATIONS BY BLOCK

Figure Label	Block Group and Block	Population	Minority Population	Percentage of Minorities
	State of Utah	2,993,941	393,864	22.0
	Washington County	155,577	23,488	15.8
	Tract 270902			
1	BG 1, Block 1057	0	0	0.0
2	BG 2, Block 2060	0	0	0.0
3	BG 2, Block 2001	0	0	0.0
4	**BG 1, Block 1063**	**399**	**72**	**18.0**
5	BG 2, Block 2095	268	29	10.8
6	BG 1, Block 1097	0	0	0.0
7	BG 2, Block 2042	3	0	0.0
8	BG 1, Block 1096	0	0	0.0
9	BG 1, Block 1050	303	13	4.3
10	**BG 2, Block 2048**	**17**	**3**	**17.6**
11	**BG 1, Block 1087**	**44**	**10**	**22.7**
12	BG 1, Block 1064	107	6	5.6
13	BG 1, Block 1098	24	3	12.5
14	**BG 2, Block 2056**	**431**	**134**	**31.1**
15	**BG 2, Block 2061**	**223**	**40**	**17.9**
16	**BG 2, Block 2038**	**27**	**11**	**40.7**
17	BG 1, Block 1078	7	0	0.0
18	BG 2, Block 2027	143	13	9.1
19	BG 1, Block 1093	50	5	10.0
20	BG 1, Block 1080	2	0	0.0
21	BG 2, Block 2058	0	0	0.0
22	BG 1, Block 1028	0	0	0.0
23	BG 1, Block 1055	142	16	11.3
24	BG 1, Block 1068	21	0	0.0
25	BG 1, Block 1082	0	0	0.0
	Tract 270801			
26	BG 2, Block 2107	0	0	0.0
27	BG 2, Block 2002	431	48	11.1
28	**BG 2, Block 2062**	**74**	**13**	**17.6**

Source: U.S. Census Bureau, 2010
**Bold text indicates higher than state or county population.*

This trend is also reflected in the enrollment data available from Washington County public schools, with approximately 14 percent of the student enrollment identifying as Hispanic (February 2019).

INCOME

Poverty level data was only available and analyzed at the Census Block Level. Low-income populations include family units or households with annual incomes below the poverty threshold as determined by the U.S. Department of Health and Human Services (see Table 3.5-2).

TABLE 3.5-2: POVERTY LEVELS BY HOUSEHOLD SIZE

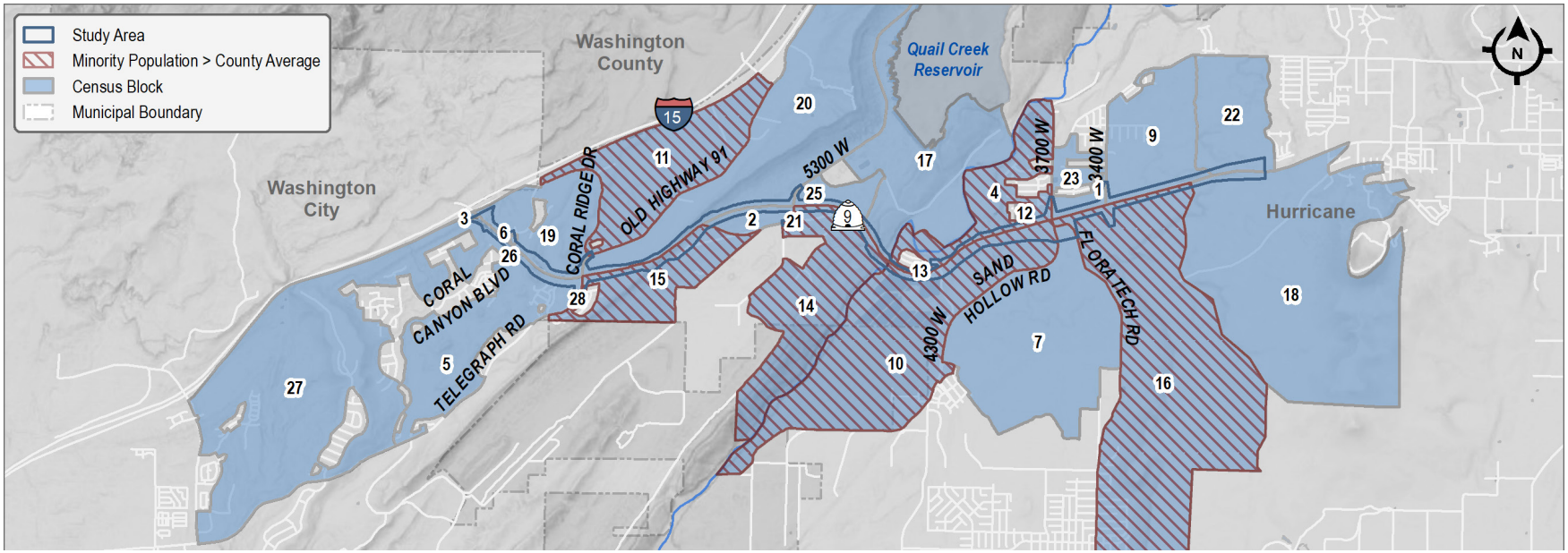
Family Size	Poverty Threshold
1	$12,490
2	$16,910
3	$21,330
4	$25,750
5	$30,170
6	$34,590
7	$39,010
8	$43,430

Source: Department of Health and Human Services, 2019
Note: For families/households with more than eight persons, add $4,420 for each additional person.

According to the Census analysis, the percentage of those living below the poverty level in Tract 27801 is above the County rate (see Figure 3.5-2 and Table 3.5-3). The Tract is located south of SR-9, between 1-15 and 6300 West.

Data from the 2013-2017 American Community Survey indicates that median incomes in Washington City ($59,697) and in the City of Hurricane ($49,961) fall below the state of Utah ($65,325).

FIGURE 3.5-1: MINORITY POPULATIONS HIGHER THAN COUNTY AVERAGE



Source: U.S. Census Bureau, 2010

TABLE 3.5-3: PERCENT POPULATION BELOW POVERTY LEVEL

Block Group and Block	Population	Percentage of Population Below Poverty Level
State of Utah	2,993,941	9.7
Washington County	155,577	14.2
Tract 270801		
BG 2	6,800	19.1
Tract 270902		
BG 1	4,268	2.9
BG 2	3,138	13.9

Sources: 2013-2017 American Community Survey 5-Year Estimates and 2010 U.S. Census
BG = Block Group

3.5.3 DIRECT IMPACTS

This section describes any beneficial or adverse effects that could potentially impact minority or low-income populations.

NO-BUILD ALTERNATIVE

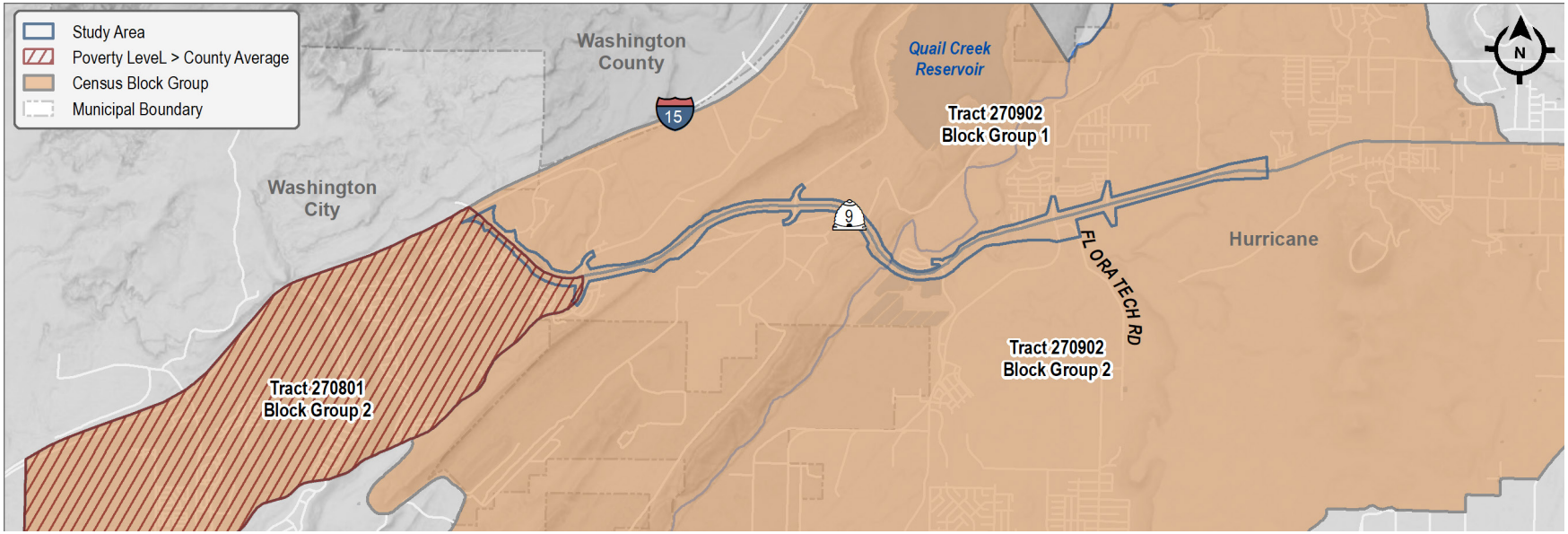
The No-Build Alternative would not change the existing SR-9 corridor and would therefore avoid directly impacting minority or low-income populations. The No-Build Alternative would not relieve congestion or address safety risks at the existing at-grade intersections.

Under this alternative, increased traffic will continue to be a perpetual issue, which would equally affect all populations, and would not result in a disproportionate impact on any minority or low-income groups.

PREFERRED ALTERNATIVE

The Preferred Alternative would improve travel times and would modify existing accesses to adjacent properties, including businesses and residences.

FIGURE 3.5-2: LOW-INCOME POPULATIONS HIGHER THAN COUNTY AVERAGE



Source: U.S. Census Bureau, 2010

The two neighborhoods along SR-9, Quail Lake and Lava Bluff, would be impacted by out-of-direction travel. Neither of these neighborhoods are included in a Census Block or Census Block Group that was identified as either a minority population or low-income population above the state and county average.

As discussed in Chapter 2, Alternatives, all conceptual alignments were adjusted to avoid impacts to residences in these neighborhoods. The removal of direct access to SR-9 and use of frontage roads proposed under the Preferred Alternative removes at-grade conflict points that cause safety issues for residents. As a result, the proposed changes would benefit the traveling public and would not cause a disproportionate impact on minority or low-income populations.

3.5.4 MITIGATION

No mitigation is proposed.

3.6 BICYCLE AND PEDESTRIAN CONSIDERATIONS

This section describes the existing and planned bicycle and pedestrian facilities in the study area.

3.6.1 REGULATORY SETTING

UDOT provides the following guidance regarding the implementation of pedestrians and bicycles into roadway designs: the *Guide for the Development of Bicycle Facilities* (AASHTO 1999), the *Pedestrian & Bicycle Guide* and *Guidelines for Inclusion of Active Transportation* (UDOT, 2008 and 2013).

3.6.2 AFFECTED ENVIRONMENT

The project team reviewed existing and proposed bicycle and pedestrian facilities through the sources listed below.

- Dixie Metropolitan Planning Organization's (DMPO)'s *2019-2050 Regional Transportation Plan* (2019)
- DMPO's *2015-2040 Regional Transportation Plan* (2015)

- DMPO's *Regional Active Transportation Plan* (2015)
- City of Hurricane *Trails Master Plan* (2019)

EXISTING BICYCLE AND PEDESTRIAN FACILITIES

Sidewalks do not currently exist along the SR-9 corridor. Because SR-9 is a state highway, pedestrian destinations are infrequent enough to make pedestrian trips unlikely. Sidewalks are generally present in developed areas on north-south streets that intersect SR-9; although, gaps in sidewalk connectivity do exist. Pedestrian striping exists at Telegraph Road. However, there are no pedestrian safety signals or crosswalks at the three other signalized at-grade intersections in the study area.

Shoulders on SR-9 are typically 10 feet or wider, providing adequate room for cyclists; however, the close proximity to high-vehicle speeds likely discourages inexperienced bicycle commuters or recreational riders.

SR-9 does experience some bicycle activity as it provides local and regional connectivity to nearby bicycle loops; however, compared to other regional roadways, SR-9 is not as heavily used as other connecting roads between the City of Hurricane and St. George. This is likely due to the higher traffic volumes and speeds on SR-9 that create an uncomfortable environment for cyclists (Parametrix 2019).

There are numerous recreational trail and road bicycle facilities that can be accessed from, or cross, SR-9. These facilities are discussed in Section 3.2, Social Environment.

PLANNED BICYCLE AND PEDESTRIAN FACILITIES

Both the DMPO *Draft Transportation Master Draft Plan* (2019) and the DMPO *Regional Active Transportation Plan* (2015) identify the need to deliver a safer, more attractive, and well-connected pedestrian and bicycle infrastructure. Both the DMPO *Plan* (2019) and the *Washington City Active Transportation Plan* (2017) state that the communities desire to implement a shared-use path along SR-9, east of Telegraph Road.

The City of Hurricane does not specifically identify bicycle or pedestrian facility projects on or parallel to SR-9.

See Section 3.2, Social Environment, for a description and a map of the existing and planned recreational bicycle facilities.

3.6.3 DIRECT IMPACTS

This section describes impacts to human-made facilities and any disruption to existing routes for non-motorized paths of travel that could occur in the study area.

NO-BUILD ALTERNATIVE

EXISTING BICYCLE AND PEDESTRIAN FACILITIES

The No-Build Alternative would not affect the existing pedestrian and bicycle conditions because construction would not occur, and as a result, there would be no changes to existing facilities.

PLANNED BICYCLE AND PEDESTRIAN FACILITIES

The No-Build Alternative would not affect the planned pedestrian and bicycle conditions because construction would not occur, and as a result, there would be no impacts to the implementation of planned facilities.

PREFERRED ALTERNATIVE

EXISTING BICYCLE AND PEDESTRIAN FACILITIES

The Preferred Alternative would benefit pedestrians and cyclists by eliminating safety risks at the existing at-grade intersections. The construction of grade-separated interchanges would allow cyclists to use the shoulder of the roadway in the study area and avoid intersection conflicts. Cyclists could utilize the proposed ramp shoulders to access local destinations and also avoid vehicles exiting SR-9 at the proposed interchanges.

Under this alternative, shoulders on both sides of SR-9 would remain 10-feet wide and shoulders on the on-ramps are proposed to be eight-feet wide. The Preferred Alternative would maintain the current east-west bicycle connectivity and would not preclude any cyclists from riding SR-9.

Under the Preferred Alternative, sidewalks would be added at cross streets to maintain and improve connectivity to existing and future developments at 5300 West, Sand Hollow Road, 3700 West, and 3400 West.

PLANNED BICYCLE AND PEDESTRIAN FACILITIES

The Preferred Alternative does not preclude the development of an east-west shared-use pathway, or any other planned bicycle or pedestrian facilities identified in current or future city, county, or DMPO planning documents.

In addition, UDOT is committed to constructing a shared use pathway along the SR-9 corridor to improve pedestrian and bicycle connectivity within and through the study area. The exact location of the facility will be determined in cooperation with Hurricane City, Washington City, and UDOT to best meet the needs of the community and users of the pathway. Since the exact location has not yet been determined, a separate environmental study will be prepared for the shared use pathway

3.6.4 MITIGATION

No mitigation is proposed.

3.7 AIR QUALITY

An air quality assessment was prepared for the SR-9 SES; it focused on the following criteria pollutants:

- Carbon monoxide (CO)
- Ozone (O_3)
- Sulfur dioxide (SO_2)
- Particulate matter that is 2.5 micrometers in diameter or smaller ($PM_{2.5}$)
- Particulate matter that is 10 micrometers in diameter or smaller (PM_{10})

The assessment also includes a qualitative analysis of Mobile Source Air Toxics (MSATs), greenhouse gases, and a review of existing state and federal data on air pollutant levels in the study area. The study area for the air quality assessment is the same as the project study area.

Details on the methodology and results of this analysis can be found in Appendix A in the *State Route 9 Environmental Study; I-15 to Southern Parkway Air Quality Assessment* (Lochner 2019).

3.7.1 REGULATORY SETTING

An air quality assessment was completed in September 2019. Since there is no federal funding or approval, the project is not subject to transportation conformity requirements; however, the air quality assessment and its findings are provided for public disclosure in Appendix A.

3.7.2 AFFECTED ENVIRONMENT

The UDEQ DAQ operates a network of air quality monitoring stations in the state of Utah. Stations are strategically placed to measure both residential and industrial air quality.

The air quality monitoring station closest to the study area is the Hurricane – HC station, located at 147 North 870 West in the City of Hurricane (UDEQ DAQ 2019).

ATTAINMENT STATUS

The study area is in Washington County and is in attainment for all criteria pollutants, according to the *EPA's Green Book: Nonattainment Areas for Criteria Pollutants* (EPA 2019).

3.7.3 DIRECT IMPACTS

This section describes the potential impacts to air quality that could occur in the study area.

NO-BUILD ALTERNATIVE

Under the No-Build Alternative, the proposed project would not be built. Congestion can be assumed to worsen, which would result in higher levels of criteria-pollutant emissions.

PREFERRED ALTERNATIVE

Improvements to mobility and a reduction in congestion is anticipated to occur as part of the Preferred Alternative, which is expected to result in decreased levels of criteria pollutants in

the study area and in surrounding areas.

REGIONAL CONFORMITY

Regional effects of the project on concentrations of the criteria pollutants are described below.

The study area is in Washington County, which is an attainment area for CO, $PM_{2.5}$ and PM_{10}, and SO_2. In addition, there are currently no nonattainment or maintenance areas for NO_2 or lead in Utah. The impacts of the Preferred Alternative on emissions of these criteria pollutants would be minimal and uncertain. For more information, see Appendix A for the report titled: *State Route 9 Environmental Study; I-15 to Southern Parkway Air Quality Assessment*.

OZONE (O_3)

Vehicle exhaust, industrial emissions, and gasoline vapors are major contributors to the production of O_3. Although meteorological conditions combined with changes in the regional land use and transportation patterns could affect O_3 on a regional level, the effects that could result from any one project alone are presumably minimal and uncertain.

OTHER POLLUTANTS AND GREENHOUSE GASES

At this time, no federal laws or regulations have been enacted and the EPA has not established criteria or thresholds for greenhouse gas emissions. The sources and effects of greenhouse gases are global, and to attempt a project-level analysis of negligible increases or decreases of carbon dioxide, which is the primary greenhouse gas transportation-related emission, is technically unfeasible.

PROJECT-LEVEL CONFORMITY

This section examines the project-level effects on concentrations of CO, $PM_{2.5}$, and PM_{10}. On a project level, the air pollutants that are most commonly associated with a transportation project are described below.

CARBON MONOXIDE AND PARTICULATE MATTER

The proposed project is in Washington County, which is in attainment for CO, $PM_{2.5}$, and PM_{10}. No additional project-level analysis is required.

The Preferred Alternative would reduce congestion at each signalized intersection, which would result in decreased emissions of CO, $PM_{2.5}$, and PM_{10}.

MSATS

Under the Preferred Alternative, the quantity of MSATs that are expected to be emitted would be proportional to the VMT. Because improvements under the Preferred Alternative would potentially reduce congestion, the amount of MSAT emissions would effectually decrease.

On the other hand, when a roadway alignment is altered by a corridor widening or shift, the localized level of MSAT emissions that could result from the Preferred Alternative could be higher than the No-Build Alternative. This could be offset due to increased speeds and decreased congestion, which are both associated with lower MSAT emissions.

The EPA's vehicle and fuel regulations coupled with fleet turnover will eventually result in substantial reductions that would decrease region-wide MSAT levels, reducing them to lower levels than they are today.

3.7.4 MITIGATION

Because the Preferred Alternative is not predicted to cause a new exceedance of the NAAQS or impair an existing exceedance, no mitigation is required.

3.8 NOISE

This section describes the existing conditions and anticipated impacts of traffic-generated noise in the noise study area, and the effects of the project on noise-sensitive land uses. The noise study area is generally defined as the extent beyond which noise impacts are not predicted to occur, and; varies in width based on traffic volumes, terrain, and existing development.

Noise-sensitive land uses were identified from aerial mapping, taking into consideration the limits and locations of the proposed improvements.

Additional details about the methodology used and the results of the noise study are available in the *State Route*

9 Environmental Study; I-15 to Southern Parkway Noise Assessment (Lochner 2019b), included in Appendix A of this SES.

Noise is reported in decibel (dB) units. Decibels are logarithmic units and cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. For example, if one vehicle produces 70 dB as it passes an observer, two vehicles passing simultaneously would not produce 140 dB. Rather, the two would combine to produce 73 dB—a difference that is hardly noticeable.

The A-weighted scale most closely represents the range of human hearing. Also, highway sound levels are described using the A-weighted scale dB(A) as shown in Figure 3.8-1 for typical noise levels associated with common activities.

3.8.1 REGULATORY SETTING

Noise impacts for the proposed improvements were assessed in accordance with the *2017 UDOT Noise Abatement Policy (08A2 01)*. The policy was developed to be consistent with the Federal Highway Administration's (FHWA's) regulations as applied to highway traffic noise (23 CFR Part 772).

Traffic noise impacts occur when the predicted noise level in the design-year approaches or exceeds the Noise Abatement Criteria (NAC), or a predicted noise level substantially exceeds the existing noise level by an increase of at least 10 dB(A).

As listed in Table 3.8-1, the NAC represent noise levels that if approached or exceeded, would require a noise abatement analysis. The NAC apply to areas with frequent human use and where a lowered noise level would be of benefit.

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

For noise abatement to be feasible, it must meet engineering considerations (e.g., cannot limit sight distance or obstruct cross streets and driveways), meet wall height safety considerations, and achieve at least a 5 dB(A) reduction in highway traffic noise for at least 50 percent of front-row impacted properties.

For a wall to be considered reasonable, it must reduce highway traffic noise by 7 dB(A) or greater for at least 35 percent of front-row receptors, and it must be cost-effective.

FIGURE 3.8-1: TYPICAL A-WEIGHTED NOISE LEVELS

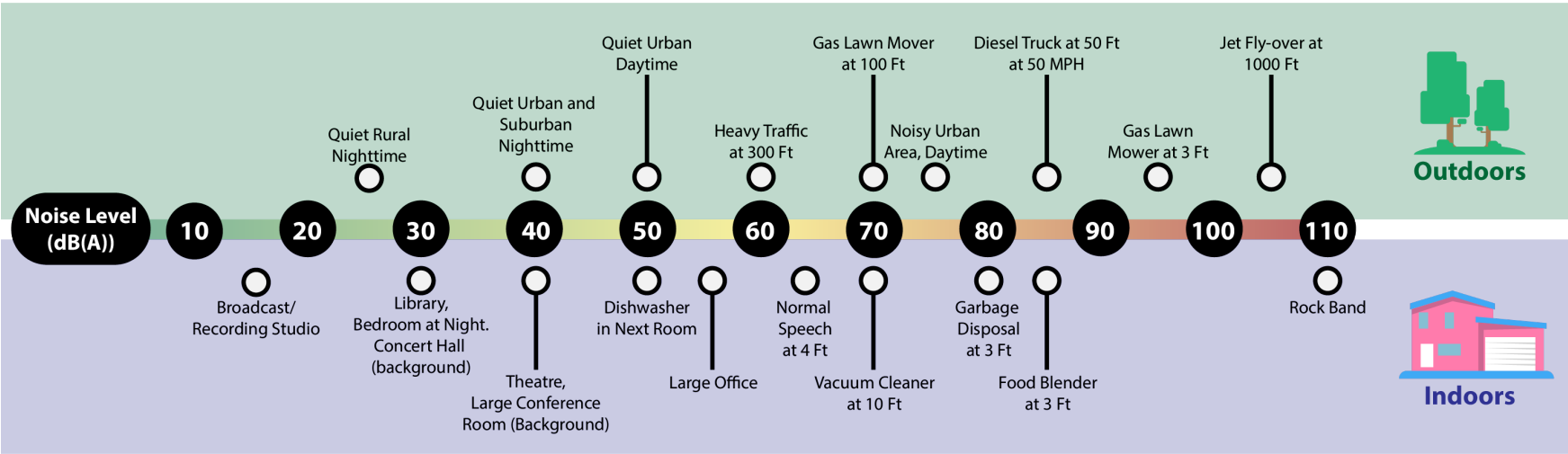


TABLE 3.8-1: NOISE ABATEMENT CRITERIA

Activity Category	FHWA Criteria Leq(h)[1]	UDOT Criteria Leq(h)[1, 2]	Description of Activity
A	57 (Exterior)	56 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	66 (Exterior)	Residential
C	67 (Exterior)	66 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	51 (Interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	71 (Exterior)	Hotels, motels, offices, restaurants/ bars and other developed lands, properties or activities not included in A–D or F.
F	—	—	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing.
G	—	—	Undeveloped lands that are not permitted.

[1] Hourly A-weighted sound level decibels (dB[A])
[2] Hourly A-weighted sound level in decibels reflecting a 1 dB(A) "approach" value below the values listed in 23 CFR 772

3.8.2 AFFECTED ENVIRONMENT

EXISTING LAND USES

Identifying land uses that could be subject to noise impacts resulting from the proposed project's traffic and construction is critical in this evaluation. Existing land uses in the study area were categorized by land use type, activity, and frequency of human use as defined in Table 3.8-1. As stated in the *2017 UDOT Noise Abatement Policy*, noise abatement is only considered where frequent human use occurs and where a lowered noise level would be of benefit.

This impact analysis focuses on locations with defined outdoor activity areas, including residential backyards and common-use areas at multi-family residences, local parks and outdoor recreation facilities.

The noise-sensitive areas were identified from aerial mapping, taking into consideration the limits and locations of the proposed alternatives. An investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project.

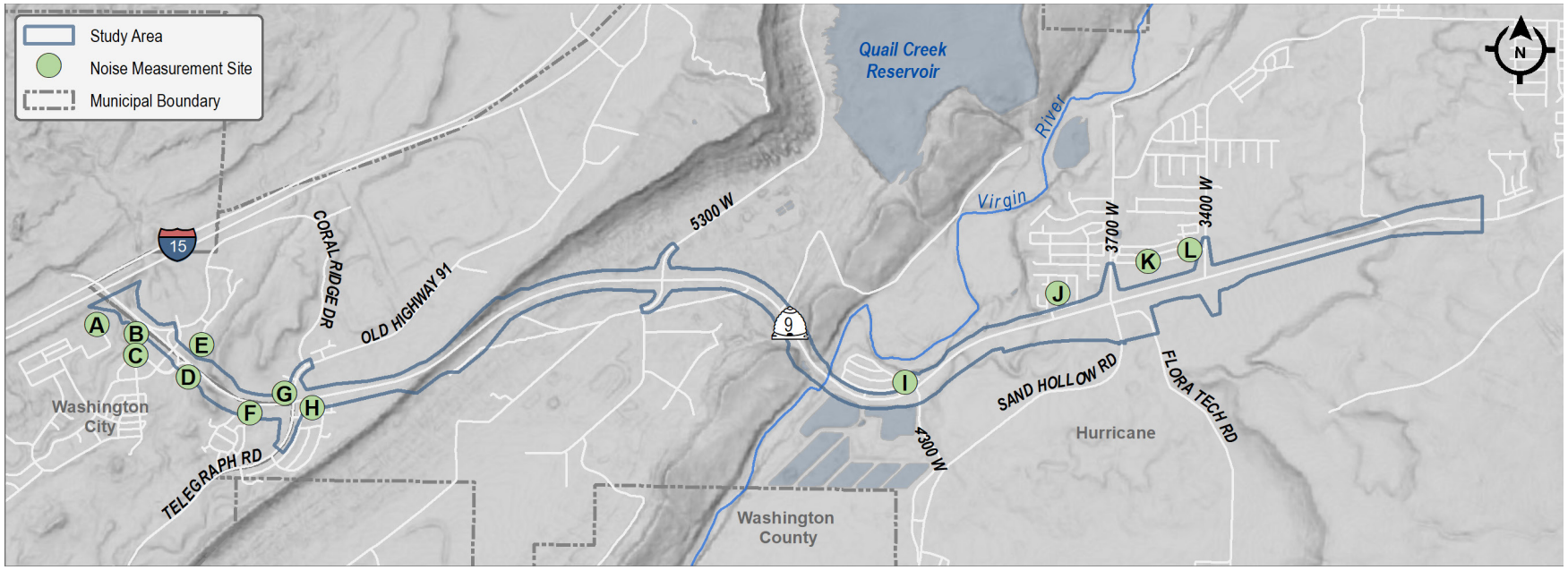
The following land uses were identified in the study area:

- Single and multi-family residences: activity category B
- Recreational properties: activity category C
- Restaurant outdoor seating area: activity category E
- Hotel with an outdoor pool: activity category E

Other commercial and industrial land uses analyzed in the study area did not have any outdoor activities that would be considered noise-sensitive.

Although all developed land uses are evaluated in this analysis, noise abatement is only considered in areas of frequent human use that would benefit from lowered noise levels. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common-use areas at multi-family residences, as well as local parks and outdoor facilities.

FIGURE 3.8-2: NOISE MONITORING SITES IN THE STUDY AREA



A mountain bike trail is located north of SR-9 near 5300 West. NAC Land Use Category C includes trails in the description of typical activities. Usage of the trail appears to be sporadic. The trail would therefore not be considered a site of frequent human use.

EXISTING NOISE LEVELS

The existing noise environment in the study area is characterized in Table 3.8-2 based on a series of field measurements taken at 12 locations (see Figure 3.8-2). The measurements taken at the noise monitoring sites were used to validate the use of the FHWA's Traffic Noise Model (TNM) to predict existing and future noise levels.

Validation of the TNM occurs when predicted noise levels are within 3 dB(A) of the measured noise levels.

The results in Table 3.8-2 indicate that TNM-predicted noise levels for all measurement locations were within 3 dB(A) of the measured values, except Site L. The measured noise level at Site L was 64.0 dB(A) and TNM-predicted a noise level of 53.7 dB(A), a difference of 10.3 dB(A).

Noise observed during the measurement at Site L included nearby jackhammering, a backhoe, and other construction activities. Since the primary noise source was not traffic-based, Site L is not considered a valid noise measurement; however, it does not invalidate the use of TNM as an accurate way of predicting noise levels for the proposed project since the 11 other noise measurements were within 3 dB(A) of the TNM-predicted noise levels.

3.8.3 DIRECT IMPACTS

The NAC listed in Table 3.8-1 and described in the *UDOT Noise Abatement Policy* were used to assess the impacts that resulted from highway traffic noise on human activity. Noise-sensitive land uses were only considered impacted if the noise levels exceeded the UDOT criteria shown in Table 3.8-1.

An FHWA-approved highway noise prediction computer model—FHWA TNM, Version 2.5—was used to determine the traffic-generated noise for existing (2019) and worst-case future (2050) conditions. The model accounted for factors including ground absorption, roadway geometry, receptor

TABLE 3.8-2: COMPARISON OF RECORDED AND MODELED NOISE LEVELS AT SELECT MONITORING SITES

Site	Field Measurement Location	Field Measured Noise Level dB(A)	TNM-Predicted Noise Level dB(A)	Difference
A	Residence at 3580 East Hidden Springs Drive	49.0	51.7	2.7
B	Pool at the Holiday Inn Express	62.1	60.7	1.4
C	Center of the park at the corner of Park Center Drive and Town Center Drive	50.7	51.0	0.3
D	Coral Canyon Golf Course on the green closest to SR-9	56.4	54.2	2.2
E	Southeast corner of the Coral Springs Condos at 80 North 6680 West	61.8	60.8	1.0
F	Residence at 4285 East Razor Ridge Drive	51.4	49.3	2.1
G	Playground associated with the multi-family residences at 6325 West 25 North	66.7	67.2	0.5
H	Residence at 55 South 6175 West	59.2	57.3	1.9
I	Residence at 4400 West Partridge Circle	58.9	61.8	2.9
J	Residence at 68 North 3880 West	47.2	50.0	2.8
K	Residence at 150 North 3700 West	55.0	55.7	0.7
L	Residence at 98 North 3450 West	64.0	53.7	10.3

distance, vehicle speeds, volumes of passenger cars, medium trucks (vehicles with two axles/six tires), and heavy trucks (three or more axles).

Noise levels were predicted for specific times of the day when the vehicle volume, operating speeds, volume of cars, medium trucks, and heavy trucks, combine to produce the worst traffic noise conditions. That worst noise hour is typically experienced when traffic is flowing at LOS C.

Impact assessments have been performed for 567 residential properties, 1 park, 1 public golf course, 1 athletic field at a school, 1 restaurant with an outdoor seating area, 1 neighborhood playground, 1 pool area at a hotel and 1 outdoor seating area at an office building. These properties were represented by 74 receptors, which are listed in Appendix A of this SES, and shown in Figure 3.8-2.

Included for each study area is the applicable NAC land use category and the worst hourly equivalent sound levels that will occur on a regular basis for the existing and build conditions.

Apartment complexes were modeled for first, second, and third story impacts. Second and third story units that have balconies constitute an outdoor use. See Appendix A for detail of impact at each receptor.

NO-BUILD ALTERNATIVE

Under the No-Build Alternative, traffic-generated noise is predicted to approach or exceed the NAC at eight residential properties and at two areas along a recreational mountain bike trail.

PREFERRED ALTERNATIVE

Under the Preferred Alternative, there are no receptors predicted to be impacted by traffic noise. Noise levels at properties would not be substantially higher than existing levels (defined as a 10 dB[A] increase).

No further investigation of noise abatement or balloting is recommended at this time. See *State Route 9 Environmental Study; I-15 to Southern Parkway Noise Assessment* (Lochner 2019b) in Appendix A for additional information.

3.8.4 MITIGATION

No mitigation is proposed.

3.9 CULTURAL RESOURCES

This section describes the known historic properties resources, and evaluates the ways in which these resource would be affected by the proposed project. The term historic property is defined in the *National Historic Preservation Act* (NHPA) as any prehistoric or historic district, site, building, structure, or object included in, or eligible for, inclusion in the *National Register of Historic Places* (NRHP) (54 USC §300308). This includes artifacts, records, and remains that are related to a district, site, building, structure, or object. To be considered historic, resources generally must be at least 50 years old.

The historic properties impact analysis area is also known as the Area of Potential Effects (APE). The APE is the geographic area in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. For the proposed project, the APE is an irregular polygon encompassing all areas where UDOT anticipates acquiring right-of-way or easements and or disturbing ground.

3.9.1 REGULATORY SETTING

In compliance with UCA 9-8-404, each state agency must consider the effects of an expenditure or undertaking on historic properties before funds are allocated for the undertaking's completion.

According to the Programmatic Agreement between UDOT and the Utah State Historic Preservation Officer (SHPO), which was signed into effect March 19, 2008, UDOT will be in compliance with UCA 9-8-404 for state projects by following the process outlined in Section 106 of the NHPA.

The NHPA requires that historic properties be identified in a proposed project's APE and that the agency identify and invite appropriate consulting parties, providing an opportunity for them to comment on the undertaking. The agency must make eligibility and effects findings in consultation with the SHPO and other participating parties. In addition, under UCA 9-8-404, UDOT assumes responsibility for Tribal consultation.

Once the historic properties in a project's APE are identified, the significance of the archaeological or architectural properties are analyzed in order to determine whether the properties qualify for inclusion in the NRHP.

A resource may be considered eligible for inclusion in the NRHP if it:

- Is associated with events that have made a significant contribution to the broad patterns of our history; or
- Is associated with the lives of persons significant in our past; or
- Embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

Historic properties considered potentially eligible under one of the above criteria also need be assessed for integrity of location, design, setting, materials, workmanship, feeling, and association. To be eligible for inclusion in the NRHP, a historic property must possess integrity of those elements directly related to the criterion or criteria under which it would be determined eligible.

The agency must also determine effects findings in consultation with the SHPO. Possible effects are defined as follows (36 CFR Part 800):

No historic properties affected. A no historic properties affected determination is made when it is determined that either there are no historic properties present or there are historic properties present but the undertaking would have no effect on them as defined in 36 CFR §800.16(i).

No adverse effect. A no adverse effect determination is

made when the undertaking's effects do not meet the criteria described in the item below for an adverse effect, or the undertaking is modified or conditions are imposed, such as the subsequent review of plans for rehabilitation by the SHPO. This ensures consistency with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines, to avoid adverse effects.

Adverse effect. An adverse effect determination is made when an undertaking may indirectly or directly alter any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration is given to all qualifying characteristics of a historic property, including those that might have been identified after the original evaluation of the property's eligibility for inclusion in the NRHP. Adverse effects can include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

3.9.2 AFFECTED ENVIRONMENT

RESOURCE IDENTIFICATION

The project team used literature reviews and field inspections to determine what historic properties were present in the APE. Field inspections were conducted in spring 2019 to identify historic properties that could be affected by the proposed project.

CONSULTATION

As part of the effort to identify cultural resources in the APE, UDOT is coordinating with the Utah SHPO and federally recognized Native American tribes.

The 12 tribes listed below possess patrimonial claims over the general project area. They were contacted by UDOT in April 2019 and were invited to provide feedback on known or potential properties or issues of concern to the tribes, and offered a meeting with UDOT.

- Cedar Band of Paiute Indians
- Hopi Tribe
- Indian Peaks Band of Paiute Indians
- Kanosh Band of Paiute Indians
- Koosharem Band of Paiute Indians
- Navajo Nation
- Paiute Indian Tribe of Utah
- San Juan Southern Paiute Indian Tribe
- Shivwits Band of Paiute Indians
- Southern Ute Indian Tribe
- Ute Indian Tribe of the Uintah & Ouray Reservation
- Ute Mountain Ute Tribe

The Hopi Tribe, Paiute Indian Tribe of Utah and Shivwits Band of Paiute Indians responded to UDOT's inquiry and are participating as consulting parties.

ARCHAEOLOGICAL RESOURCES

A class III cultural resources survey was completed in the APE between March 4 and 12, and again on October 1, 2019. As a result of the survey, 19 previously identified cultural resource sites were located in, or intersected, the APE (see Table 3.9-1).

Ten of these previously recorded sites were not relocated or they no longer exist in the survey area. Two new cultural resource sites were identified in the APE.

TABLE 3.9-1: IDENTIFIED CULTURAL RESOURCES

Site Number	Site Description	Eligibility	Site Condition
42WS0054	Multicomponent: prehistoric open habitation, petroglyphs, and artifact scatter; historic artifact scatter and road	Eligible – C, D	Good

42WS0087	Prehistoric rockshelter and artifact scatter	N/A	Destroyed
42WS0089	Prehistoric campsite	N/A	Destroyed
42WS1226	Prehistoric lithic and ceramic scatter with features and rockshelter	N/A	Destroyed
42WS1229	Prehistoric lithic, groundstone and burned stone scatter	N/A	Destroyed
42WS2233	Prehistoric rockshelter and artifact scatter	N/A	Destroyed
42WS2346	Prehistoric open campsite	Eligible - D	Good
42WS2347	Prehistoric lithic scatter	N/A	Destroyed
42WS2349	Prehistoric lithic source and lithic scatter	N/A	Destroyed
42WS2352	Prehistoric lithic source and lithic scatter	N/A	Destroyed
42WS2353	Historic artifact scatter	N/A	Destroyed
42WS2354	Multicomponent: prehistoric and historic artifact scatters	Not Eligible	Good
42WS2355	Historic artifact scatter with features	Not Eligible	Good
42WS2549	Historic road segment	Not Eligible	Good
42WS2550	Historic artifact scatter	Not Eligible	Good
42WS2828	Historic ditch	Not Eligible	Good
42WS3543	Prehistoric petroglyphs	Eligible – C, D	Good
42WS4264	Historic corral w/ isolated prehistoric tool	Not Eligible	Good
42WS2356	Historic Bridge (Harrisburg/Virgin River/ Berry Springs Bridge)	Not Eligible	Destroyed (replaced)
42WS6355	Historic artifact scatter	Not Eligible	Good
42WS6356	Historic road and artifact scatter	Not Eligible	Good

Source: Transcon Environmental, Inc. 2019

N/A = not available

ARCHITECTURAL RESOURCES

In accordance with UDOT guidelines, and to accommodate a time lag between the compilation of the survey data and any future construction associated with the undertaking, the project team used a cutoff age of 45 years old to designate historical properties. Given the timing of the survey reported in the SES, this meant that a resource had to be created during or before 1974 to be considered historical.

No architectural resources were present in the SR-9 Project APE. Given the lack of historic architectural properties in the APE, this resource type will not be further addressed in this study.

3.9.3 DIRECT IMPACTS

This section describes the findings that can be made regarding impacts that a project could have on NRHP-eligible cultural resources under the Section 106 process, see Section 3.9.1 for descriptions of potential finding of effects.

NO-BUILD ALTERNATIVE

The No-Build Alternative would have a no historic properties affected determination on both archaeological and architectural resources because no action in the study area would occur, which would result in no impacts to any historic properties.

PREFERRED ALTERNATIVE

Three eligible archaeological sites are in the study area. In finalizing the Determination of Eligibility and Finding of Effect (DOEFOE), UDOT shifted the alignment to only have a No Adverse Effect on 42WS3543. Therefore, UDOT has made a finding of no historic properties affected for Site 42WS2346; a no adverse effect finding for Site 42WS3543, and an adverse effect finding for Site 42WS54. Therefore, the overall Finding of Effect for the Preferred Alternative would be an Adverse Effect on historic properties.

The Utah SHPO concurred with the recommended Determinations of Eligibility and Findings of Effect on January 17, 2020 (see Appendix B, Agency Correspondence).

3.9.4 MITIGATION

Mitigation has not been determined yet, however, archaeological and tribal monitors may be necessary. UDOT is currently consulting with the Paiute Indian Tribe of Utah and Shivwits Band of Paiute Indians to resolve these adverse effects. UDOT and SHPO will enter into a Memorandum of Agreement (MOA) that will stipulate the necessary measures to mitigate the adverse effects on NRHP-eligible historic properties. The MOA will be finalized prior to publication of the Final SES..

3.10 PALEONTOLOGICAL RESOURCES

Paleontological resources, often referred to as fossils, are the remains, traces, or imprints of ancient organisms preserved in or on the earth's crust that give information about the history of life on earth.

3.10.1 REGULATORY SETTING

The state of Utah has enacted legislation (UCA 79-3-508) that requires state agencies to analyze the effect(s) of an undertaking on a specimen that is included in, or eligible for, inclusion in the State Paleontological Register.

As part of this state-level legislation, UDOT entered into a Memorandum of Understanding with the Utah Geological Survey (UGS) for the purposes of consultation to identify known or potential paleontological localities of importance that could be affected by UDOT's projects, and to consider measures to avoid or minimize the impacts.

3.10.2 AFFECTED ENVIRONMENT

In accordance with UDOT guidelines and the UGS memorandum of understanding (signed March 25, 2010), the project team consulted with the UGS regarding the presence and or absence of, and potential to, encounter fossil resources in the APE. This consultation was undertaken via a letter; a written response was received from the UGS on March 7, 2019 (see Appendix B, Coordination).

The UGS determined that paleontological localities consisting of plant impressions from the Shinarump Conglomerate, and vertebrate tracksites in the Monekopi Formation, could be located in the study area.

Due to the potential for paleontological resources in the study area, a field survey was conducted on October, 26, 2019. Examination of the study area resulted in the identification and documentation of small, sparsely scattered petrified wood fragments, which are considered as a non-significant paleontological resource, along both the north and south sides of SR-9.

3.10.3 DIRECT IMPACTS

This section describes the potential impacts to paleontological resources that could occur in the study area.

NO-BUILD ALTERNATIVE

The No-Build Alternative would not impact paleontological resources because no actions would occur in the study area under this alternative.

PREFERRED ALTERNATIVE

The Preferred Alternative would impact the petrified wood in the study area by burial in roadway fill. If present, the Preferred Alternative may impact significant paleontological localities in the Shinarump Conglomerate and Moenkopi Formation.

3.10.4 MITIGATION

Small fragments of petrified wood in sparse scatters are not considered to be significant paleontological resources and as such, no mitigation or construction restrictions for this resource will be required.

Due to the possibility of significant paleontological resources in and near the Preferred Alternative, monitoring would be required in Moenkopi Chinle, Moenave, and Kayenta formations during construction. If significant resources are discovered in construction areas, then they should be recovered in accordance with UGS standards.

3.11 WATER RESOURCES AND WATER QUALITY

Water resources include floodplains, streams, and water quality. Wetlands and Waters of the U.S. (WOTUS) are addressed in Section 3.12. The water resource study area is the same as the project study area.

3.11.1 REGULATORY SETTING

This water resources analysis was prepared in compliance with federal laws, including sections 401 and 404 of the *Clean Water Act*, which are administered by the United States Army Corps of Engineers (USACE), and; the *National Flood Insurance Act of 1968* (Public Law 90-448), which is administered by the Federal Emergency Management Agency (FEMA).

In addition to federal regulations, UDOT must comply with the State of Utah's regulations pursuant to water wells (Utah Administrative Code [UAC] R655-4); stream alterations (UAC R655-13), and; water quality (UAC R317) – specifically UAC R317-8 as it pertains to the Utah Pollutant Discharge Elimination System (UPDES).

3.11.2 METHODOLOGY

FLOODPLAINS

Effective Flood Insurance Rate Maps (FIRMs) for the study area were found at the FEMA Map Service Center (FEMA 2009).

PERENNIAL, INTERMITTENT, OR EPHEMERAL STREAMS

Stream data were obtained from the Utah Automated Geographic Reference Center (Utah AGRC 2019) for all streams that cross the study area, and a WOTUS investigation and delineation was completed for the study area (Transcon 2019). No annual or other flow data were available.

POINTS OF DIVERSION

Points of diversion data were obtained from the Utah Division of Water Rights as a Geographic Information Systems (GIS) shapefile on October 15, 2019 (Utah Department of Environmental Quality [UDEQ] 2019). There are not any water rights that include points of diversion in the study area; therefore, the resource does not warrant further discussion.

WATER QUALITY

Roadway drainage facilities in the study area were verified during the WOTUS investigation (Transcon 2019).

3.11.3 AFFECTED ENVIRONMENT

FLOODPLAINS

The 100-year floodplain includes three water resources that intersect the study area from north to south: (1) the Cottonwood Wash, which is an ephemeral stream at MP 0.3; (2) an unnamed ephemeral stream at MP 0.63, and; (3) the Virgin River at MP 3.64.

PERENNIAL, INTERMITTENT, OR EPHEMERAL STREAMS

With the exception of the Virgin River, all streams and washes that intersect the study area are intermittent or ephemeral.

The Virgin River and its tributaries, with the exception of Quail Creek and Leeds Creek, from the Santa Clara confluence to the Quail Creek Diversion, were assessed by the Utah Division of Water Quality (DWQ), and are included on the *DWQ Clean Water Act* 303(d) list of impaired waters for all designated beneficial uses (e.g., secondary recreation, warm-water aquatic life, agricultural).

The main pollutants of concern include total dissolved solids (TDS), water temperature, and boron; the DWQ assessment results are described in Table 3.11-1.

A total maximum daily load (TMDL) study of the Virgin River Watershed that was approved by the Environmental Protection Agency (EPA) in 2004, stated that the main sources contributing to TDS loading in this part of the Virgin River include the following:

- Pah Tempe or LaVerkin Hot Springs
- Land erosion
- Geothermal activity

TABLE 3.11-1: SURFACE WATER IMPAIRMENT

Water Body	Beneficial Use Class	Results of DWQ Assessment
Virgin River (from Santa Clara River confluence to Quail Creek diversion, excluding Quail, Ash, and LaVerkin Creeks)	Secondary recreation	Not assessed
	Warm-water aquatic life	Not supporting due to water temperature
	Agricultural	Not supporting due to boron
		Not supporting due to TDS

Source: DWQ, 2010

The Pah Tempe or LaVerkin Hot Springs contribute large amounts of water that are naturally high in TDS directly into the Virgin River near the City of Hurricane, and are a natural contributor of salts and other minerals into this segment of the Virgin River (EPA 2004). To date, a TMDL for water temperature and boron has not been completed.

Drought-related impacts have been cited as the primary contributor of temperature impairment. According to the DWQ, a source for boron contamination has not yet been identified (DWQ 2010). Moreover, water temperature and boron are not typically associated with highway runoff (FHWA 2016).

WATER QUALITY

SR-9 is a shouldered, five-lane highway with a normal crown. Precipitation runoff is carried via roadside swales along the SR-9 corridor toward the Virgin River. Culverts transport flows from the north side of SR-9 to swales on the south side, which connect to roadside ditches under roadway crossings.

Although roadway runoff in the study area primarily discharges into the Virgin River at approximately MP 3.6, some runoff infiltrates into the swales and land adjacent to the roadway and some will evaporate when conditions are conducive.

There is curb and gutter on the north side of SR-9, which extends along the residential development east of the Virgin River and at existing intersections. All storm drainage will be regulated in accordance with UDOT's municipal separate storm sewer system (MS4s) permit.

3.11.4 DIRECT IMPACTS

This section describes direct impacts to water resources that could occur in the study area.

NO-BUILD ALTERNATIVE

The No-Build Alternative would not affect floodplains, streams, or water quality because no changes to existing conditions would occur.

PREFERRED ALTERNATIVE

FLOODPLAINS

The Preferred Alternative would alter the stream floodplains by adding larger culverts that will span the width of the proposed right-of-way; however, it would not alter the Virgin River floodplain. As part of the proposed project, the bridge deck over the Virgin River would be replaced while the existing piers and abutments would remain in place.

No disturbance is anticipated in or along the Virgin River banks.

PERENNIAL, INTERMITTENT, OR EPHEMERAL STREAMS

The Preferred Alternative would alter the existing intermittent and ephemeral streams with the addition of larger culverts that would span the width of the proposed right-of-way. Roadway fill would be added as part of the proposed widening and constructing the highway access points (e.g., on- and off-ramps). Intermittent and ephemeral streams identified as WOTUS are discussed in Section 3.12, Wetlands and Waters of the U.S.

WATER QUALITY

The Preferred Alternative would not affect the water quality in intermittent and ephemeral streams and washes crossing the study area because there is only a limited, periodic flow in the stream channels. Water quality in the Virgin River would not be impacted because the project will avoid impacting the riverbed and bank.

The increase to impervious areas proposed by the Preferred Alternative would result in an increase in stormwater runoff peak flows. The increase in peak discharge would be offset through the use of three detention ponds, as described in Table 3.11-2.

TABLE 3.11-2: PROPOSED DETENTION PONDS

Location	Existing Storage (ac-ft)	Proposed Storage (ac-ft)	Storage Increase Required (ac-ft)
Telegraph	1.98	2.24	0.26
5300 West	1.90	2.18	0.28
3700 West & 3400 West	4.00	4.96	0.96

All ponds would be constructed inside the UDOT right-of-way. The pond at Telegraph Road would be constructed on the southwest side of the Telegraph Road and SR-9 intersection; the pond at 5300 West would be constructed south east of the intersection, and; the pond at 3700 West would be northeast of the intersection.

In addition to regulating flow, detention ponds would also serve to treat stormwater runoff as a non-point-source pollutant by slowing the discharge of stormwater and allowing suspended solids to settle before being discharged to receiving waters. Therefore, impacts to surface water quality are not anticipated under the Preferred Alternative.

3.11.5 MITIGATION

FLOODPLAINS

Floodplain impacts will be mitigated through a floodplain development permit and coordination with the local floodplain administrator and FEMA.

PERENNIAL, INTERMITTENT, OR EPHEMERAL STREAMS

UDOT will obtain stream alteration permits for the construction impacts anticipated to occur to streams as required through the Stream Alteration Program, administered by the Utah Division of Water Resources. Mitigation for streams identified as WOTUS will be quantified during final design, and the appropriate permit under Section 404 of the Clean Water Act will be obtained before construction.

WATER QUALITY

Stormwater runoff from the roadway surface and embankments will be conveyed inside the UDOT right-of-way in constructed ditches, swales, culverts, and pipes. It is anticipated that some runoff from SR-9 would either infiltrate the lands near the roadway or evaporate—and the remainder would discharge into the Virgin River.

Stormwater runoff could contain common roadway contaminants including copper, lead, zinc, and salts.

Project improvements will be covered by UDOT's MS4s permit for water quality that will be issued by the Utah Division of Water Rights. Further, project improvements would be analyzed and designed in accordance with UDOT's *Stormwater Quality Design Manual*. UDOT will develop and abide by a Stormwater Pollution Prevention Plan (SWPPP) during all construction activities, and will implement feasible permanent Best Management Practices (BMPs) during design.

3.12 WETLANDS AND WATERS OF THE U.S.

This section evaluates wetlands and other potentially jurisdictional Waters of the United States (WOTUS) that were identified as part of an aquatic resource assessment of the study area, and also analyzes the potential effects that could result from the proposed project.

3.12.1 REGULATORY SETTING

As described in 33 Code of Federal Regulations (CFR), Part 328, § 328.4, the objective of the Clean Water Act is to maintain and restore the chemical, physical, and biological integrity of the WOTUS. Any person, firm, or agency planning to alter or work in any WOTUS, including the discharge of dredged or fill material, must first obtain authorization from the United States Army Corps of Engineers (USACE) under Clean Water Act Section 404 and, if applicable, Section 10 of the Rivers and Harbors Act of 1899 (33 United States Code [U.S.C.] §403) for work in navigable waters of the U.S.

Section 401 of the Clean Water Act requires state certification to obtain any permit or license issued by a federal agency for an activity that could result in a discharge into waters of the U.S. This requirement allows each state to provide input into federally approved projects that could affect its waters (e.g., rivers, streams, lakes, and wetlands) and to ensure that the project will comply with applicable state water quality standards and any other state water quality requirements.

Any Section 401 certification in Utah also ensures that a proposed project will not adversely affect impaired waters (waters that do not meet water quality standards) and that the project complies with applicable water quality improvement plans.

Section 73-3-29 of the Utah Code requires any person, governmental agency, or other organization proposing to alter the bed or banks of a natural stream obtain written authorization from the State Engineer before beginning work. Natural streams are considered to be any natural waterway that receives enough water to develop an ecosystem differing from the surrounding upland environment.

Although it cannot be applied to permit wetland impacts, USACE

Programmatic General Permit 10 allows an applicant to obtain both state approval and authorization under the Clean Water Act, Section 404, through a single application process.

3.12.2 METHODOLOGY

An aquatic resource assessment was performed between March 25, 2019 and April 12, 2019 to identify potential jurisdictional aquatic resources in the study area. The study area for the WOTUS is the same as the project study area.

Water resources in the study area were delineated and mapped in accordance with the *USACE Wetland Delineation Manual* and the *Interim Regional Supplement to the USACE Wetland Delineation Manual: Arid West Region, and the USACE Jurisdictional Determination Form Instructional Guidebook; A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States*.

A detailed explanation of WOTUS criteria and field methodology is available in Appendix A of this SES and is titled: *SR-9; I-15 to Southern Parkway Environmental Study, Preliminary Aquatic Resource Delineation Report* (Transcon 2019).

3.12.3 AFFECTED ENVIRONMENT

WETLANDS

No areas of potential wetlands were located in the study area.

WATERS OF THE U.S.

Seven potentially jurisdictional intermittent or ephemeral streams, one perennial stream—the Virgin River—and three ponds were identified in the study area. The intermittent or ephemeral streams total 1.94 acres, the Virgin River totals 0.33 acres, and the three collection ponds total 0.83 acres.

Table 3.12-1 lists the aquatic resources that could be subject to the USACE's jurisdiction based on preliminary jurisdictional determinations (PJDs).

TABLE 3.12-1: POTENTIALLY JURISDICTIONAL AQUATIC FEATURES

Aquatic Resource	Aquatic Resource Type	WOTUS Status	Length (linear feet)	Size (acres)
PJD 1	Ephemeral Stream (Cottonwood Wash)	Jurisdictional	850	0.29
PJD 2	Ephemeral Stream	Jurisdictional	204	0.04
PJD 3	Ephemeral Stream	Jurisdictional	288	0.04
PJD 4	Ephemeral Stream	Jurisdictional	473	0.06
PJD 5a	Intermittent Stream	Jurisdictional	373	0.13
PJD 5b	Intermittent Stream	Jurisdictional	409	0.17
PJD 6	Ephemeral Stream	Jurisdictional	553	0.13
PJD 7	Ephemeral Stream	Jurisdictional	4,336	1.08
Pond 1	Pond	Jurisdictional	N/A	0.32
Pond 2	Pond	Jurisdictional	N/A	0.18
Pond 3	Pond	Jurisdictional	N/A	0.34
Virgin River	River	Jurisdictional	391	0.33
Ephemeral Stream Total			6,704	1.64
Intermittent Stream Total			782	0.30
Pond Total			N/A	0.83
River Total			391	0.33
Grand Total			**7,877**	**3.10**

Source: Transcon, 2019
N/A = not applicable

PJDS 1-7

All seven of the potentially jurisdictional intermittent or ephemeral streams that were delineated connect downstream with the Virgin River. All the PJDs identified—with the exception of PJD 5a/b and PJD 7—are ephemeral drainages.

PJD 5a/b and PJD 7 are both intermittent streams, consisting of an ephemeral wash and in-stream collection ponds.

PJD 1, PJD 2, and PJD 5a/b contained active flow at the time surveys were conducted in August 2019, which may indicate these are fed through a spring or seep and flow is not solely reliant on precipitation and snowmelt accumulation or runoff.

The upstream sources for PJD 5a/b most likely stem from Quail Creek Reservoir's effluent releases, which are collected in Ponds 1 and 3.

PONDS 1-3

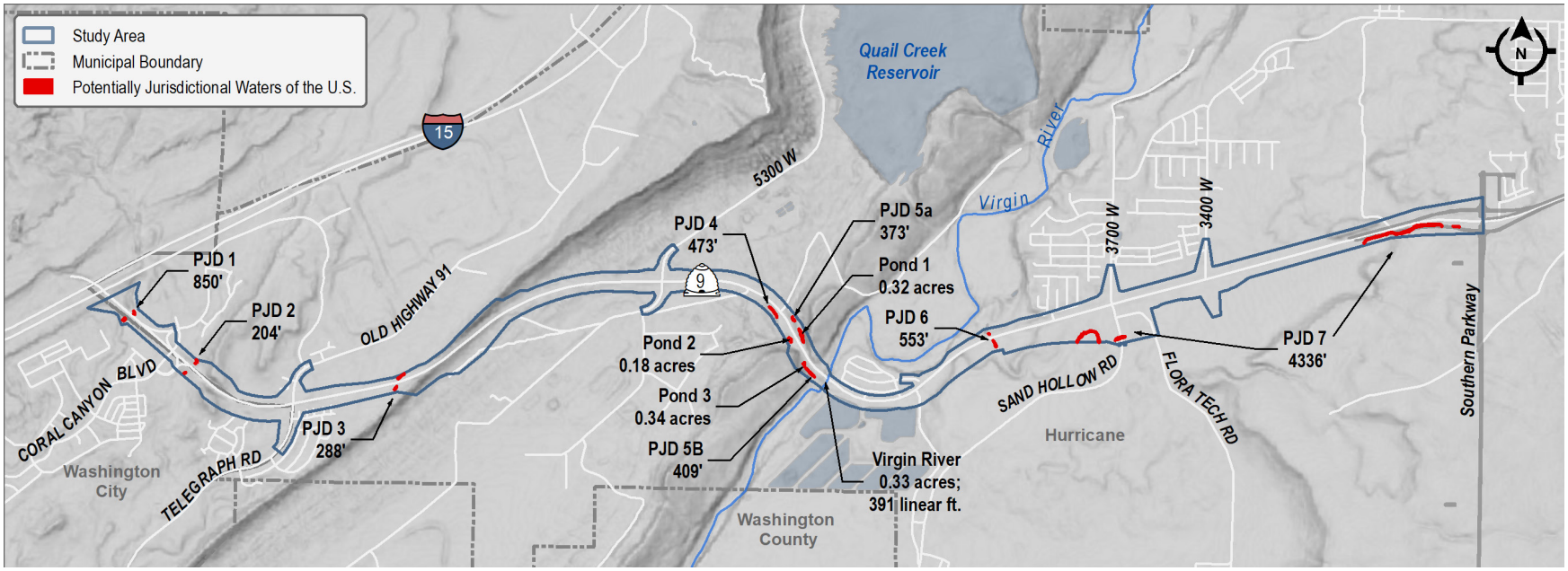
All three in-stream ponds discovered in the study area exhibited anthropogenic influences, are man-made, or have been altered from their original state by other nearby man-made features.

VIRGIN RIVER

The Virgin River is a perennial stream that intersects the study area from north to south between MP 3.6 and 3.7. The Virgin River's jurisdictional status is a WOTUS, and as a result, would be subject to regulation by the USACE under Section 404 of the Clean Water Act, following USACE review.

Figure 3.12-1 shows the locations of the potential jurisdictional aquatic features in the study area.

FIGURE 3.12-1: POTENTIALLY JURISDICTIONAL AQUATIC FEATURES



Source: Transcon, 2019

3.12.4 DIRECT IMPACTS

This section describes direct impacts to WOTUS that could occur in the study area.

NO-BUILD ALTERNATIVE

There would be no direct impacts to wetlands or other WOTUS under the No-Build Alternative.

PREFERRED ALTERNATIVE

WETLANDS

No wetlands were identified in the study area; therefore no impacts would occur.

WATERS OF THE U.S.

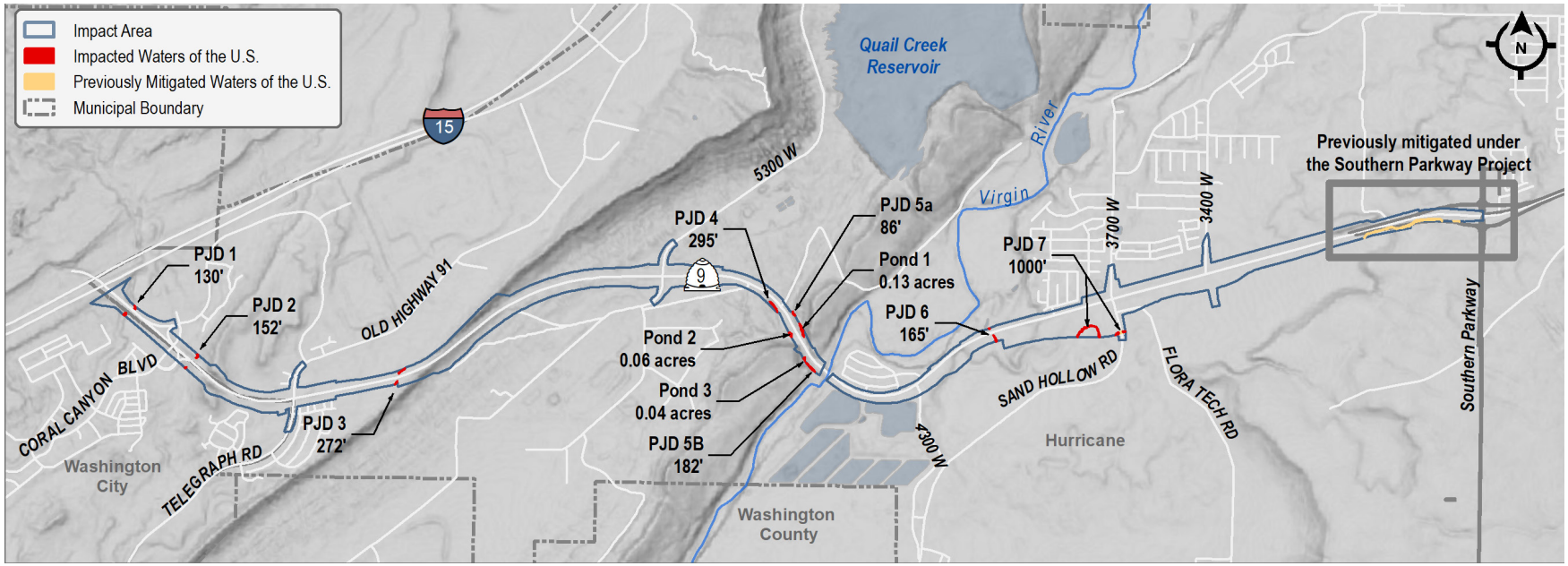
Direct impacts to WOTUS were calculated using the physical footprint and proposed right-of-way under the Preferred Alternative. WOTUS in a temporary construction easement, in the proposed right-of-way, or in the existing right-of-way, were all assumed to be impacted.

As shown in Table 3.12-2, approximately 2,014 linear feet of ephemeral streams, 268 linear feet of intermittent streams (for a total impact of 2,282 linear feet of stream channel) and 0.22 acres of ponds would be impacted by the Preferred Alternative.

These resources are considered jurisdictional WOTUS due to their downstream connection to the Virgin River and Lake Mead, which are navigable waters.

The Preferred Alternative would not alter the Virgin River channel or the associated floodplains in the study area; therefore, no impacts would occur. See Table 3.12-2 and Figure 3.12-2 for more details.

FIGURE 3.12-2: IMPACTED WOTUS IN PROJECT AREA



Source: Transcon, 2019

TABLE 3.12-2: IMPACTS TO WOTUS IN PROJECT AREA

Aquatic Resource	Aquatic Resource Type	WOTUS Status	Length of impact (linear feet)	Size of impact (acres)
PJD 1	Ephemeral Stream (Cottonwood Wash)	Jurisdictional	130	0.05
PJD 2	Ephemeral Stream	Jurisdictional	152	0.03
PJD 3	Ephemeral Stream	Jurisdictional	272	0.03
PJD 4	Ephemeral Stream	Jurisdictional	295	0.02
PJD 5a	Intermittent Stream	Jurisdictional	86	0.02
PJD 5b	Intermittent Stream	Jurisdictional	182	0.04
PJD 6	Ephemeral Stream	Jurisdictional	165	0.03
PJD 7	Ephemeral Stream	Jurisdictional	1,000	0.22

Aquatic Resource	Aquatic Resource Type	WOTUS Status	Length of impact (linear feet)	Size of impact (acres)
Pond 1	Pond	Jurisdictional	N/A	0.12
Pond 2	Pond	Jurisdictional	N/A	0.06
Pond 3	Pond	Jurisdictional	N/A	0.04
Virgin River	River	Jurisdictional	0.0	0.00
Ephemeral Stream Total			2,014.00	0.39
Intermittent Stream Total			268.00	0.06
Pond Total			N/A	0.22
River Total			0.00	0.00
Grand Total			**2,282.00**	**0.67**

N/A = not applicable

3.12.5 MITIGATION

The proposed project is anticipated to impact approximately 2,282 linear feet (0.45 acres) of ephemeral and intermittent streams. It would also impact 0.22 acres of pond that connects to the Virgin River, for a total impact of 0.68 acres to WOTUS in the project area.

Impacts to WOTUS will be permitted as required under Section 404 of the Clean Water Act and if necessary, the Utah State Stream Alteration program.

3.13 WILDLIFE, THREATENED & ENDANGERED SPECIES, AND SPECIAL-STATUS SPECIES

This section addresses wildlife, federally threatened, endangered, or candidate species, and special-status species with the potential to occur in or near the study area. It also addresses the presence of critical habitat on federal lands that could potentially require a federal decision.

This analysis is based on data in the technical report titled: *UDOT SR-9; I-15 to Southern Parkway Environmental Study, Project Biological Evaluation* (Transcon 2019), in Appendix A.

3.13.1 REGULATORY SETTING

The proposed project is categorized as a non-federal action and most of the project would occur on UDOT, state, or privately owned lands. Land managed by the Bureau of Land Management (BLM) and the Virgin River, which is under United States Army Corps of Engineers (USACE) jurisdiction, are present in the study area.

Although this SES is led by UDOT, Section 7 of the *Endangered Species Act (ESA) of 1973, as amended* (16 United States Code [U.S.C.] §1531 et seq.), would apply to lands under BLM jurisdiction, and wetlands and WOTUS under USACE jurisdiction.

Section 10 of the ESA is used by state and local government agencies, tribes, and private landowners to consult with the United States Fish and Wildlife Service (USFWS) about the development of private or public property that is inhabited by species listed in the ESA.

If USFWS sections 7, 9, and or 10 consultations are required in the future, they would be addressed according to the measures and guidelines specific to each species. In addition, the Mojave desert tortoise would be addressed pursuant to the *Washington County Habitat Conservation Plan for the Red Cliffs Desert Reserve*.

The *Migratory Bird Treaty Act (MBTA) of 1918, as amended* (16 U.S.C. 703–712), prohibits the taking of any migratory birds, their eggs, feathers, or nests. The migratory bird species that are protected by the MBTA are listed in 50 Code of Federal Regulations (CFR) §10.13.

Bald and golden eagles are protected under the *Bald and Golden Eagle Protection Act* (BGEPA) (16 U.S.C. §668 et seq.). Projects with the capacity to affect these species could require the development of an *Eagle Conservation Plan* (ECP).

The Utah Division of Wildlife Resources (UDWR), in cooperation with the Utah Department of Natural Resources (UDNR), developed the *Utah Sensitive Species List* which contains species categorized as "Species of Special Concern" and "Conservation Agreement Species." Species included in this list were classified as being vulnerable to population and or habitat loss, and may also be federally listed.

3.13.2 AFFECTED ENVIRONMENT

The study area for wildlife, federally threatened, endangered, or candidate species and special-status species includes a 300-foot buffer on both sides of the SR-9 corridor and major intersections, as well as a half-mile buffer for avian species.

Species were identified using the USFWS's Information for Planning and Consultation (IPaC) tool and BLM/state-sensitive species lists. The Utah Natural Heritage Program (UNHP) online species search tool was used to obtain information on documented occurrences of sensitive species in the study area.

Areas not under federal jurisdiction were not required to be examined for sensitive plants; therefore, surveys did not occur in these areas.

Field visits occurred between March 25, 2019 and April 17, 2019 to verify the desktop review results, assess habitat for species that may occur in the study area, and to conduct USFWS protocol surveys on federal lands.

Part of the suitable desert tortoise, dwarf bear-poppy, and Siler pincushion cactus habitat, south of SR-9 near MP 1.6, were not surveyed due to safety concerns regarding a nearby active shooting range.

THREATENED AND ENDANGERED SPECIES

Following an analysis of habitat requirements, known ranges, and documented records of occurrence, it was determined that one federally listed animal species—the Mojave desert tortoise, and two federally listed plant species—the dwarf bear-poppy and Siler pincushion cactus—have the potential to occur in the region of the study area under federal jurisdiction.

MOJAVE DESERT TORTOISE

Mojave desert tortoise (*Gopherus agassizii*) is a USFWS-threatened species. The study area is located at the extreme northeastern edge of the species range, which falls in the Upper Virgin River Recovery Unit, as designated by the *Revised Recovery Plan for the Desert Tortoise*.

Desert tortoises in this recovery unit often live in complex topography including canyons, mesas, sand dunes, and sandstone outcrops. Desert tortoises use sandstone and lava caves instead of burrows. They travel to sand dunes to lay eggs and use other habitats for foraging.

CRITICAL HABITAT

Designated critical habitat for the desert tortoise occurs in the study area, approximately 0.2 miles west of SR-9, in the Red Cliffs Desert Reserve. Interstate 15 (I-15) bisects the project area, thereby separating the habitat from the proposed project. Tortoise-proof fencing also exists between I-15 and the boundary of the Red Cliffs Desert Reserve.

Desert tortoises are known to occur within a half-mile of the study area, with the most recent occurrence recorded in 2011. Throughout the study area, habitat was observed as a mix of unsuitable and generally low- to medium-quality. Most of the suitable habitat in the study area is fragmented by gravel roads; paved highways; public trails; steep terrain, and; agricultural, municipal, and residential developments.

Tortoise habitat is also present north of SR-9, between MP 2.7 and 2.9, on BLM-managed lands that could require a federal decision. Habitat in this area was considered low in overall quality due to the presence of “badland” soils, sparse vegetation, and limited forage opportunity.

During protocol surveys, no desert tortoise or sign of desert tortoise were observed. No other areas under federal jurisdiction were considered suitable for desert tortoise; therefore, tortoises are not expected to inhabit the study area.

DWARF BEAR-POPPY

Dwarf bear-poppy is a federally protected endangered plant species endemic to Washington County, Utah. The dwarf bear-poppy is a perennial herb that flowers from April to May, and can grow up to 10 inches.

Bear-poppy habitat is limited to gypsiferous clay soils derived from the Moenkopi Formation, most notably the Upper Red, Shnabkaib, and Middle Red Members. It exists on rolling hills and ridgetops in warm desert shrub communities.

Dwarf bear-poppy habitat exists on the two parcels of BLM-administered public lands in the study area. The first location is near MP 1.6 in the Upper Red Member of the Moenkopi Formation, south of SR-9. The second location is near MP 2.8 in the Shnabkaib Member of Moenkopi Formation surrounding 5300 West, north of SR-9.

The majority of the existing UDOT right-of-way in these areas has experienced substantial surface disturbances associated with established road infrastructure, traffic, parking, and the presence of invasive/non-native species. These surface disturbances have resulted in poor habitat conditions for this species.

During the flowering season, surveys were conducted in the two areas of BLM-managed lands with suitable habitat for dwarf bear-poppy. Surveys were only conducted on lands that could require a federal decision; no state or private lands were surveyed. Further, no dwarf bear-poppies were observed during the field survey.

The UNHP database does not contain records of occurrence for dwarf bear-poppy within two miles of the study area.

CRITICAL HABITAT

Critical habitat has not been designated for dwarf bear-poppy.

SILER PINCUSHION CACTUS

Siler pincushion cactus is a federally protected, threatened plant species endemic to a narrow strip along the Arizona–Utah border. Individuals bloom between March and May and can grow to approximately five inches high. The cactus is considered habitat-specific to white, and occasionally red, gypsiferous and calcareous sandy or clay soils that are predominantly derived from various members of the Moenkopi Formation, and occasionally, the Chinle and Kaibab formations.

Siler pincushion cactus habitat exists on the two parcels of BLM-administered public lands in the study area. The first location is near MP 1.6, in the Upper Red Members of the Moenkopi Formation, and in the Shinarump Conglomerate Member of the Chinle Formation, south of SR-9.

The second location is near MP 2.8, in the Shnabkaib Member of Moenkopi Formation surrounding 5300 West, north of SR-9. The majority of the existing UDOT right-of-way in the federal action area has experienced substantial surface disturbances associated with established road infrastructure, traffic, parking, and the presence of invasive/non-native species. These surface disturbances have resulted in poor habitat conditions for this species.

Surveys were conducted in the two locations of BLM-managed lands that have suitable habitat for Siler pincushion cactus during the flowering season. Surveys were only conducted on lands where a federal decision may be required; no state or private lands were surveyed.

During the field surveys, Siler pincushion cactus was not observed, and there are no records of occurrence for Siler pincushion cactus within two miles of the study area.

CRITICAL HABITAT

Critical habitat has not been designated for this species.

BLM-SENSITIVE SPECIES

BLM-administered lands were surveyed for BLM-sensitive species. The UNHP database contains records of occurrence for western banded gecko (*Coleonyx variegatus*), Arizona toad (*Anaxyrus microscaphus*), and Gila monster (*Heloderm suspectum*) within a half-mile of the federal action area.

The database also contains records of sidewinder (*Crotalus cerastes*), common chuckwalla (*Sauromalus ater.*), zebra-tailed lizard (*Callisaurus draconoides*), and big free-tailed bat (*Nyctinomops macrotis*) within two miles of the federal action area.

No BLM-sensitive species were observed during field surveys. The *UDOT SR-9; I-15 to Southern Parkway Environmental Study, Project Biological Evaluation* in Appendix A contains a list of species with the potential to occur in the study area, and describes their habitat requirements.

UTAH SENSITIVE SPECIES

Eight Utah state-sensitive species were identified as having occurred within a half-mile radius of the study area. These species include the following: Arizona toad (*Anaxyrus microscaphus*), western banded gecko (*Coleonyx variegatus*), American white pelican (*Pelecanus erythrorhynchos*), Virgin spinedace (*Lepidomeda mollispinis*), desert sucker (*Catostomus clarkii*), flannelmouth sucker (*C. latipinnis*), Gila monster (*Heloderma suspectum*), and relict leopard frog (*Lithobates onca*).

Records of occurrence within a two-mile radius of the study area include the following species: common chuckwalla (*Sauromalus ater*), Gila monster (*Heloderma suspectum*), sidewinder (*Crotalus cerastes*), zebra-tailed lizard (*Callisaurus draconoides*), and big free-tailed bat (*Nyctinomops macrotis*). No Utah-sensitive species were observed during field surveys.

MIGRATORY BIRDS

Thirteen migratory birds of conservation concern that have the potential to occur near the study area were identified as follows: bald eagle (*Haliaeetus leucocephalus*), black-chinned sparrow (*Spizella atrogularis*), Brewer's sparrow (*Spizella breweri*), Clark's grebe (*Aechmophorus clarkii*), golden eagle

(*Aquila chrysaetos*), lesser yellowlegs (*Tringa flavipes*), Lewis's woodpecker (*Melanerpes lewis*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), olive-sided flycatcher (*Contopus cooperi*), rufous hummingbird (*Selasphorus rufus*), Virginia's warbler (*Vermivora virginiae*), and willet (*Tringa semipalmata*).

During field visits, avian species were observed in and around the study area. Species that were noted during these field visits include the following: common raven (*Corvis corax*), red-tailed hawk (*Buteo jamaicensis*), coot (*Fulica americana*), Canada goose (*Branta Canadensis*), sharp-shinned hawk (*Accipiter striatus*), great blue heron (Ardea Herodias), turkey vulture (Cathartes aura), and house finch (Haemorhous mexicanus).

One unoccupied stick nest was observed during a field survey on March 28, 2019. The stick nest structure was north of SR-9, near the intersection of SR-9 and 5300 West, on a cliff face within a half-mile of the study area. While the species that constructed this nest is unknown, red-tailed hawks were observed flying in the area near the nest.

BALD EAGLES AND GOLDEN EAGLES

No bald or golden eagles individuals or nests were observed during the field surveys. Although there are not any UNHP records of occurrence for bald eagles or golden eagles within two miles of the study area, a desktop review of the Cornell Lab of Ornithology's online citizen birder resource, eBird, revealed that both bald eagles and golden eagles were observed in the study area as recently as 2017.

Lands surrounding the study area likely support a variety of prey species, and therefore, may serve as suitable foraging habitat for golden eagles, and could offer migrating or wintering habitat for bald eagles, particularly near water resources like the Virgin River, or nearby ponds.

3.13.3 DIRECT IMPACTS

This section describes direct impacts to wildlife, threatened and endangered species, and special status species that could occur in the study area.

NO-BUILD ALTERNATIVE

Under the No-Build Alternative, no construction would occur; therefore, no impacts to threatened and endangered species, or wildlife, would occur.

PREFERRED ALTERNATIVE

THREATENED AND ENDANGERED SPECIES

MOJAVE DESERT TORTOISE

There is no potential for take of individual Mojave Desert tortoise in areas not under federal jurisdiction under the Preferred Alternative. The Red Cliffs Desert Reserve is included in the Upper Virgin Recovery Unit, and is isolated from any potential project-related disturbances.

Impacts to desert tortoise individuals are not anticipated in lands under federal jurisdiction, under the Preferred Alternative.

Furthermore, it anticipated that desert tortoises would not be encountered during construction activities based on the following:

- Lack of species presence observed during field surveys
- Desert tortoise habitat on BLM-managed land is fragmented and ranges from low-quality to unsuitable
- Substantial geographical barriers exist between construction activities and the Red Cliffs Desert Reserve
- Previous disturbance of habitat in and around the study area

CRITICAL HABITAT

Desert tortoise-designated critical habitat does occur approximately 0.2 mile west of the study area; however, this area is isolated from the study area by existing residential and commercial developments, tortoise-proof fencing, and I-15. Therefore, no impacts to desert tortoise-designated critical habitat are anticipated under the Preferred Alternative.

DWARF BEAR-POPPY

No individual plants were identified during field surveys in areas under federal jurisdiction, and there are no documented

records of occurrence for dwarf bear-poppy within two miles of the study area. As a result, impacts to individual poppies are not anticipated under the Preferred Alternative.

SILER PINCUSHION CACTUS

No individual plants were located in the federal action area during protocol surveys, and the UNHP has no documented records of occurrence for Siler pincushion. Therefore, no impacts to Siler pincushion cactus on public lands are anticipated as a result of the Preferred Alternative.

BLM-SENSITIVE SPECIES

No impacts to BLM-sensitive species are anticipated under the Preferred Alternative. The Preferred Alternative would not impact the Virgin River channel or the 100-year floodplain; therefore, species inhabiting these areas would not be impacted. Refer to Appendix A for the *UDOT SR-9; I-15 to Southern Parkway Environmental Study, Project Biological Evaluation,* which describes the findings that have the potential to impact each BLM-sensitive species.

UTAH-SENSITIVE SPECIES

No Utah-Sensitive Species are anticipated to be impacted under the Preferred Alternative, with the exception of the Arizona toad. The Arizona toad may occur in the study area, and there is the potential to impact flood channels and willow clumps that serve as Arizona toad habitat under the Preferred Alternative.

The Preferred Alternative would not impact the Virgin River channel or its floodplains. Therefore, species inhabiting these areas are not expected to be impacted. The *UDOT SR-9; I-15 to Southern Parkway Environmental Study Project Biological Evaluation* (see Appendix A for this technical report) summarizes the anticipated impacts that could result under the Preferred Alternative.

MIGRATORY BIRDS

Impacts to migratory birds are not expected. The Preferred Alternative is not anticipated to result in any takes of individual migratory birds or their habitat in the study area. In addition, the study area is not suitable for nesting. The study area currently experiences high levels of noise resulting from traffic and human presence; therefore, the construction of the proposed project would not reasonably increase disturbance levels that could potentially cause nest failure if birds choose to nest within a half-mile of the study area.

BALD EAGLES AND GOLDEN EAGLES

No impacts to bald eagles or golden eagles are anticipated under the Preferred Alternative. UNHP records indicate occurrence for bald eagles or golden eagles within two miles of the study area; however, no potential eagle nests were noted during field surveys.

3.13.5 MITIGATION

Mitigation is not proposed.

3.14 HAZARDOUS WASTE SITES

The purpose of the hazardous materials and hazardous waste sites investigation was to determine if hazardous materials and or regulated substances are present in or near the proposed right-of-way.

The study area for hazardous materials and waste sites consists of a quarter-mile buffer from the centerline of SR-9—between I-15 and 2800 West, which is the future Southern Parkway connection.

3.14.1 REGULATORY SETTING

Hazardous waste sites are regulated by the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and; by Utah Administrative Code Title 19 (Environmental Quality Code). These regulations define clean-up requirements and designate liability to persons involved in hazardous waste releases.

The RCRA regulates waste management and provides framework to avoid potential threats to human health and to the environment. Secondly, the CERCLA authorizes the Environmental Protection Agency (EPA) to act if there is an imminent threat posed from hazardous waste.

The Division of Environmental Response and Remediation (DERR), a division of the Utah Department of Environmental Quality, regulates underground storage tanks (USTs) and leaking underground storage tanks (LUSTs).

3.14.2 AFFECTED ENVIRONMENT

This section lists the parcels known to contain hazardous materials or hazardous waste; these parcels are within a quarter-mile area from the centerline of SR-9, between I-15 and approximately 2800 West (future Southern Parkway connection).

To detect the presence of hazardous materials or hazardous waste sites in the study area, the following databases were reviewed: Utah Department of Environmental Quality DERR's Interactive Map, EPA EnviroFacts, and EPA EnvironMapper.

The presence of hazardous materials or waste sites presents the following concerns associated with hazardous materials:

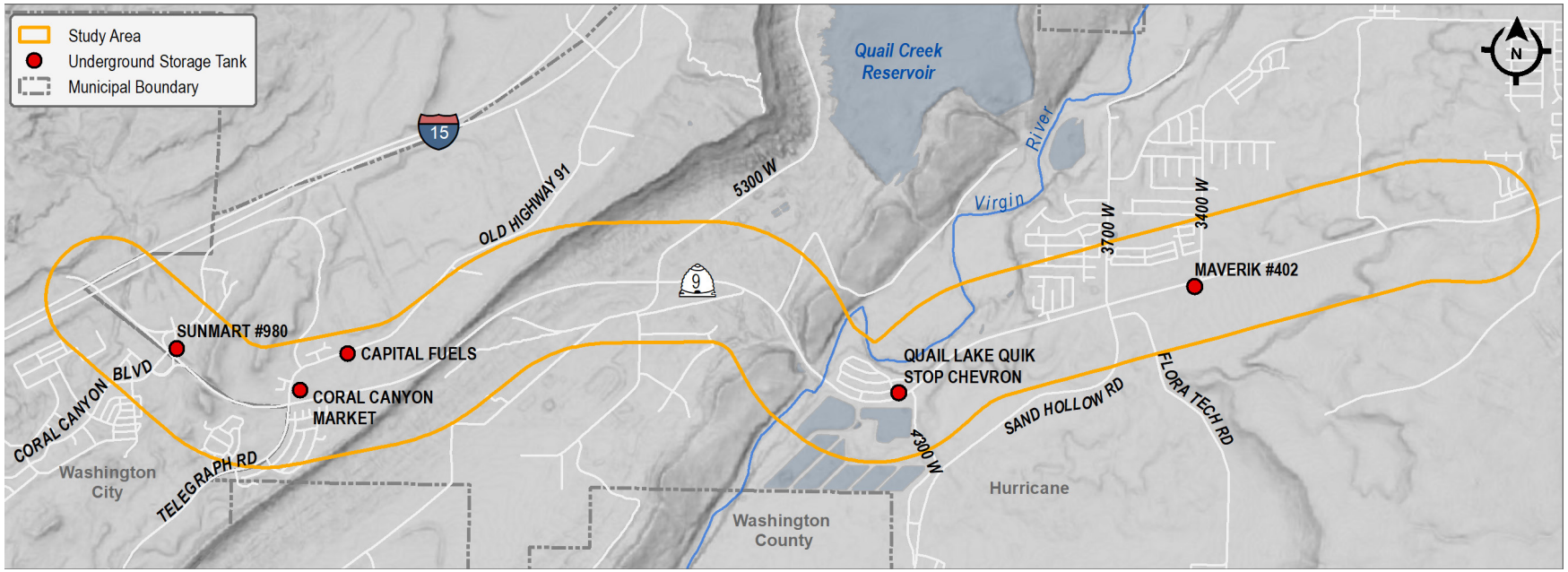
- The spread of existing soil and groundwater contamination through road-construction activities
- The potential for increased construction costs and delays
- Public health and safety concerns for construction workers and nearby residents
- The short-term and long-term liabilities associated with acquiring environmentally-distressed properties

Hazardous waste sites recorded in the study area are listed in Table 3.14-1 and are shown in Figure 3.14-1.

3.14.3 DIRECT IMPACTS

This section describes the potential for impacts to hazardous waste sites in the study area.

FIGURE 3.14-1: HAZARDOUS MATERIALS AND WASTE SITES



Source: UDEQ, 2019

TABLE 3.14-1: HAZARDOUS MATERIALS AND WASTE SITES

DERR ID	Facility/ Property Name	Address	Facility Type
6000709	Coral Canyon Market	41 North 6300 West, Hurricane	Gas Station, Open UST/ Closed LUST
6000764	Sunmart #980	82 North Coral Canyon Boulevard, Hurricane	Gas Station, Open UST/ Closed LUST
6000353	Quail Lake Quik Stop Chevron	4390 West State Street, Hurricane	Gas Station, Open UST
6000797	Maverik #402	55 North 3400 West, Hurricane	Gas Station,Open UST
6001001	Capital Fuels	130 North Highway 91, Hurricane	Gas Station, Open UST

Source: UDEQ, 2019

NO-BUILD ALTERNATIVE

The No-Build Alternative would not change the existing conditions and therefore would not impact hazardous materials or hazardous waste sites.

PREFERRED ALTERNATIVE

Geographic Information System (GIS) data was used to analyze potential impacts that could result from hazardous materials or hazardous waste sites. The impact area for hazardous materials and waste included the proposed right-of-way for the Preferred Alternative.

Table 3.14-2 identifies the potential risks involved if contaminated soil and or groundwater are encountered using criteria established in the *UDOT Environmental Manual of Instruction* (2019).

The Preferred Alternative would require the full or partial acquisition of three sites categorized as moderate risk; Coral Canyon Market, Quail Lake Quik Stop Chevron, and Maverick #402. Under the Preferred Alternative, a full acquisition of the Quail Lake Quik Stop Chevron service station would occur.

TABLE 3.14-2: HAZARDOUS MATERIALS AND SITE RISKS

Risk Level	Site Type
High	• CERCLA Sites • National Priority List sites • Open LUST
Moderate	• Toxic Release Inventory (TRI) System sites • Resource Conservation and Recovery Information System –Treatment, Storage, or Disposal Facilities sites • Open UST • Closed LUST • Active UST sites • Active or closed landfills • MINES sites
Low	• RCRA Information System sites • Registered Aboveground Storage Tanks (ASTs) • Federal Insecticide, Fungicide, and Rodenticide Act/ Toxic Substances Control Act Tracking System sites • Emergency Response Notification System hazardous material spill sites (environmental incidents) • Removed and closed UST

Source: UDOT, 2019

According to the DERR database, two USTs exist on the Chevron service station property. Due to the nature of activities at this property, it is possible that undetected leaks have resulted in contaminated soil and or groundwater that could be encountered during excavation. UDOT would coordinate with DERR during the closure of the USTs on this site.

Minor acquisition of right-of-way would be required from the Coral Canyon Market and Maverick #402 properties. Coral Canyon Market property has a registered LUST that is now closed. According to the DERR LUST database, clean-up activities at this site are complete, and the tank was removed.

Maverick #402 is an active service station with operational USTs. According to DERR, no petroleum contamination has been reported for this property. Right-of-way impacts are proposed adjacent to the UST tank filling ports. It is recommended that impacts to this location be minimized so that the USTs are not disturbed.

No impacts are anticipated to occur to the Capital Fuels property.

3.14.4 MITIGATION

During the final design phase, UDOT will coordinate with DERR and or the EPA, the construction contractor, and the relevant property owners to determine the status of the sites of concern. Also, during this time, the nature and extent of any remaining contamination will be identified to minimize project risks.

During final design, UDOT will identify the potential to affect newly-discovered sites by reviewing the Utah DERR records. After the DERR data is analyzed, the need for a Phase I or Phase II Environmental Site Assessment will be determined.

The Phase I or Phase II Environmental Site Assessment will further evaluate the potential to encounter hazardous materials in the proposed right-of-way.

If the assessment(s) conclude the presence of contamination, then remedial measures will be implemented based on the nature and extent of contamination through coordination with the Utah DERR and or the EPA.

3.15 VISUAL RESOURCES

This section describes the potential impacts to existing visual resources, the relationships of the impacts to potential viewers of and from the project, as well as measure to avoid, minimize, or reduce adverse impacts.

Representative viewpoints were chosen in areas where proposed interchanges would be located near existing commercial and residential development.

3.15.1 REGULATORY SETTING

There are no applicable visual quality regulations.

3.15.2 AFFECTED ENVIRONMENT

The visual resource study area includes all areas where physical changes associated with the proposed project could be seen.

The SR-9 corridor is predominantly made up of five lanes—with two lanes in each direction, and a shared median lane. The study area includes the SR-9 corridor and surrounding clustered developments.

Refer to Figure 3.15-1, Representative Viewpoints, and Section 3.1, Land Use, for further details.

Representative viewpoints along SR-9 at key areas of development were identified at the locations below to describe the visual character of the area.

- MP 1; Old Highway 91 (6300 West) intersection
- MP 4 at Quail Creek Estates
- MP 5 Lava Bluff residential area and Zions Gate RV Resort

In general, the SR-9 corridor is rolling with minor ascents and descents. The corridor is paved with black, coarse asphalt, which presents a clear and discernible travel path. Between I-15 and Telegraph Road (6300 South), development exists on the north and south sides of SR-9.

After the Telegraph Road intersection, the foreground consists of undeveloped land on the south side of SR-9 and a mix of commercial and residential developments on the north side.

The relatively-undeveloped foreground transitions to a mountainous landscape in the background of the study area. See Figure 3.15-1, Representative Viewpoints, that was used for evaluation purposes.

VIEWPOINT 1: MILE POST 1; OLD HIGHWAY 91 (6300 WEST) INTERSECTION

The Old Highway 91 (6300 West) and SR-9 intersection allows access to nearby residential developments, including the following:

- Renee Ann Apartments at the northwest corner
- Canyon Villas at Coral Ridge at the southwest corner
- Shadow Ridge Town homes at the southeast corner

The northeast corner of the intersection also includes a commercial development with a gas station and two fast food restaurants.

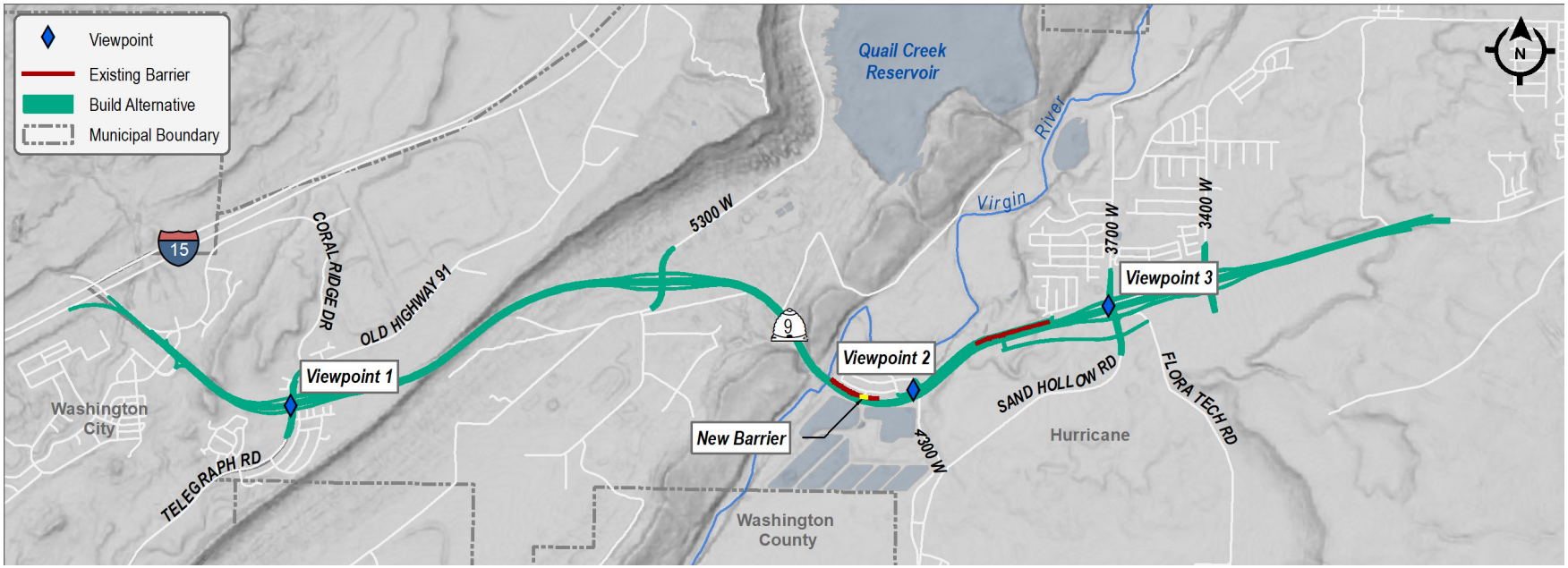
At Viewpoint 1, vegetation next to the corridor is sparse and includes native and non-native trees, shrubs, forbs, and grasses. See Figure 3.15-2 for the viewpoint.

FIGURE 3.15-2: VIEWPOINT 1, OLD HIGHWAY 91

VIEWPOINT 2: MILE POST 4; QUAIL LAKE ESTATES

Near MP 4, there are two entrances to the Quail Lake Estates residential area on the north side of SR-9. A barrier wall is on

FIGURE 3.15-1: REPRESENTATIVE VIEWPOINTS



the north side of the corridor, between MP 3.7 and MP 4. It obscures the view of the residential development from the SR-9 corridor. A Chevron fronts SR-9 at MP 4 near the eastern entrance to the Quail Lake Estates residential area. See Figure 3.15-3.

FIGURE 3.15-3: VIEWPOINT 2, QUAIL LAKES ESTATE

On the south side of SR-9, vegetation near the corridor is made up of grasses and evergreen trees, which obscure the view of the ponds at the Ash Creek Special Service District Water Treatment Plant. East of the treatment plant, the landscape is undeveloped and the horizon is blocked by a sparsely-vegetated ridgeline in the foreground.

VIEWPOINT 3: MILE POST 5; LAVA BLUFF MOBILE HOME PARK AND ZIONS GATE RV RESORT

The entrance to the Lava Bluff Mobile Home Park is located at MP 4.7. A barrier wall is in place on both sides of the entrance between MPs 4.6 and 4.8, which obscures the view of the residential development. Vegetation on both the north and south sides of SR-9 consists of native and non-native shrubs, forbs, and grasses near the corridor.

A vacant commercial building with signage for both Moab 4x4 and Sand Hollow Offroad, along with the entrance to Zion Gate RV Resort, are on the northwest corner of SR-9 and 3700 West. The actual RV Resort is set back off of SR-9, lying outside the study area boundary. The south side of the intersection is undeveloped. See Figure 3.15-4.

FIGURE 3.15-4: LAVA BLUFF AND ZION GATE MOBILE HOME PARK

3.15.3 DIRECT IMPACTS

This section describes direct impacts to visual conditions that could occur in the study area.

NO-BUILD ALTERNATIVE

Implementation of the No-Build Alternative would not alter the visual character of the study area. Rather, future development along SR-9 will continue to modify the visual characteristics along the corridor.

PREFERRED ALTERNATIVE

A qualitative visual resource impact analysis was conducted to evaluate the following:

- Compatibility of the project with existing visual resource conditions
- Corridor user experience for both corridor users and the adjacent community

Compatibility is the degree to which the project contrasts with the surrounding environment. The Preferred Alternative was compared to the existing visual character to determine the degree of contrast expected under build conditions at each representative viewpoint.

User experience evaluates how similar the Preferred Alternative is to the character of the existing corridor, and whether the proposed improvements would result in a coherent visual condition that motorists will easily understand at a representative viewpoint.

VIEWPOINT 1: MILE POST 1, OLD HIGHWAY 91 (6300 WEST) INTERSECTION

The Preferred Alternative would result in a grade-separated interchange at Telegraph Road, at approximately MP 1. The proposed interchange would include the SR-9 corridor elevated over Telegraph Road, and associated ramps would serve as access points to commercial and residential developments on both sides of SR-9.

The SR-9 user experience would not change substantially from the current condition. While views of the distant horizon may be temporarily obscured for the driver due to the grade change, the resulting impact would be minor.

Existing north and south views from nearby residential properties would be impacted due to the elevation gain that would be required to construct the proposed grade separated interchange. However the project would be compatible and similar to the character of the existing corridor, which is currently dominated by transportation use.

VIEWPOINT 2: MILE POST 4, AT QUAIL CREEK ESTATES

Near MP 4, the proposed alignment would shift south approximately 80 feet of its existing alignment in order to accommodate a proposed frontage road on the north side of the corridor. The frontage road would connect the Quail Lake Estates and Lava Bluff neighborhoods to the proposed 3700 West and 3400 West interchange. See Chapter 2, Alternatives.

The proposed roadway would be near the existing grade at Quail Lake, but would increase in elevation as it continues eastbound. As a result of the shift south, the roadway would cut into the existing slope and hillside on the south side—modifying the south-facing view from the corridor.

The elevation of the proposed frontage road, on the north side of SR-9, would be constructed below the grade of the SR-9 roadway in order to appropriately connect to the existing Partridge Circle cul-de-sac (see Chapter 2, Alternatives). Travelers heading eastbound and westbound would be adjacent to a wall on the south side of the frontage road, with heights ranging from five to 10 feet. As a result, views to the south would be obstructed.

An existing barrier wall currently limits south facing views from the Quail Lake Estates neighborhood. The proposed improvements are not anticipated to further obstruct views facing south, as the proposed corridor would match the existing grade at this location.

The Preferred Alternative would result in the full acquisition of the Chevron gas station located at the easternmost entrance to Quail Lake Estates. The removal of the gas station would alter the visual character of the area; however, the modifications would be consistent and similar to the character of the existing corridor, which is currently dominated by transportation use.

The proposed changes at Viewpoint 2 would integrate with the existing corridor, and would result in a coherent visual condition that motorists would easily understand.

VIEWPOINT 3: MP 5 LAVA BLUFF MOBILE HOME PARK AND ZIONS GATE RV RESORT

As eastbound drivers approach MP 5 and the proposed 3700 West/3400 West interchange, the SR-9 roadway would be near existing grade. The SR-9 corridor would continue under the proposed grade-separated interchange at 3700 West.

The anticipated height of the 3700 West crossing over SR-9 would be approximately 30 feet, and would alter views of the horizon from SR-9. In addition, approximately 500 feet west of 3700 West, the eastbound and westbound ramps would ascend up to 3700 West, altering the existing views facing south and east.

Similar to MP 4, the elevation of the proposed frontage road, used to access Lava Bluff, would be below SR-9. Those traveling eastbound and westbound on the frontage road would be next to a wall, obstructing southbound views. In addition, the proposed frontage road would connect to 3700 West via an underpass near MP 4.5—connecting to Sand Hollow Road/3700 West. Currently, there is no development on the south side of

SR-9. The addition of the frontage road on the south side of SR-9 would modify the views of the landscape.

As a result of the grade-separated interchange and ramps at 3700 West, views facing south may be altered. While views from Lava Bluff are currently obstructed by the existing barrier wall, 3700 West and the associated ramps would most likely be visible from points in the neighborhood—changing the views of the horizon.

The Preferred Alternative would require the acquisition of the commercial property on the northwest corner of the intersection at 3700 West. The removal of this building would alter the visual character of the area; however, the proposed modifications would be consistent and similar to the character of the existing corridor, which is largely transportation uses.

3.15.4 MITIGATION

No mitigation is proposed.

3.16 CONSTRUCTION IMPACTS

Under the Preferred Alternative, temporary construction-related impacts from ground disturbances and from the operation of construction equipment are anticipated. The nature and timing of the impacts would depend on the construction methods used.

3.16.1 LAND USE

As a result of the Preferred Alternative, there would be temporary construction impacts along the roadway. The contractor would coordinate with Washington County, Washington City, the City of Hurricane, and property owners to maintain access to the properties, to the extent possible.

3.16.2 SOCIAL ENVIRONMENT

COMMUNITY CHARACTER & COHESION

Construction activities would not affect the community character or cohesion of the study area.

TRAVEL PATTERNS

UDOT plans to develop a *Traffic Management Plan* (TMP) that would address local and through traffic during construction. The TMP would describe a plan of action that would be implemented to notify area residents, businesses, commuters, tourists, and trucking companies about any temporary changes to access to community facilities and services and during construction.

In addition, UDOT would develop a *Public Involvement Plan* (PIP) that would outline methods to inform residents, tourists, and trucking companies about traffic delays, rerouting, temporary lane closures, and reminders that local businesses would remain open during construction.

PUBLIC FACILITIES & RECREATION

UDOT's PIP would be developed before construction occurs, to allow adequate time to notify area residents, businesses, and commuters about any temporary impacts to public facilities and utilities.

Access to recreation facilities—specifically trails that cross SR-9—may be disturbed during construction. UDOT's PIP would notify the community of any temporary impacts to recreational resources in the study area. Public involvement activities may include the following:

- Conducting door-to-door visits to business owners/ tenants along the affected routes
- Distributing flyers in the study area
- Developing a project website that provides real-time construction updates
- Using social media
- Maintaining a project hotline

Each activity identified above would serve as a medium to inform the public about the project construction and its potential impacts.

UTILITIES

Temporary disruption of utilities and services could occur during construction; UDOT would coordinate with utility providers to minimize any disruption of these services.

3.16.3 ECONOMIC CONDITIONS

During construction, access to the affected businesses would be maintained; however, businesses along the corridor could experience short-term decreases in sales associated with travel delays and construction activities.

The area businesses would experience temporary construction inconveniences from dust, noise, traffic delays, and detours associated with roadway construction.

Access to all properties in the area would be maintained; however, temporary construction impacts to access select properties are expected.

3.16.4 RELOCATIONS AND RIGHT-OF-WAY ACQUISITION

Under the Preferred Alternative, Temporary Construction Easements (TCEs) may be required as UDOT would temporarily use properties for construction activities, and would provide compensation to the landowners for the temporary use. Such properties would be regraded and revegetated after construction is complete, or when the use of the property is no longer required.

3.16.5 MINORITY AND LOW-INCOME POPULATIONS

During construction, minority and low -income populations and non-minority and low income populations would experience the same increases in noise and dust near the study area. Also, traffic delays, rerouting, and temporary lane closures would occur.

3.16.6 BICYCLE AND PEDESTRIAN CONSIDERATIONS

Bicycle and pedestrian access—including access to sidewalks—may be disturbed during construction. As outlined in the PIP, UDOT would notify the community of any temporary impacts to bicycle or pedestrian facilities.

3.16.7 AIR QUALITY

Air quality impacts resulting from construction activities are typically not a concern when contractors use appropriate control measures in accordance with the *UDOT 2017 Standard Specifications for Road and Bridge Construction*.

During construction, all materials that result from clearing and grubbing, demolition, or other operations, would be removed from the project or otherwise disposed of by the contractor.

Actions to reduce dust generated by construction when the control of dust is necessary for the protection and comfort to motorists, pedestrians, and residents. During construction, dust

suppression techniques would be applied in accordance with the *UDOT 2017 Standard Specifications for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.5 Fugitive Dust*.

3.16.8 NOISE

Land uses that are sensitive to traffic noise are also sensitive to construction noise. Methods to control construction noise include establishing the hours that construction equipment can be operated and permissible sound levels during those designated time periods.

UDOT has developed a specification that establishes construction noise control. This specification is available in the *UDOT 2017 Standard Specifications, Section 00555M*. The contractor would be required to conform to the specification to reduce construction noise impacts to the surrounding communities.

3.16.9 CULTURAL RESOURCES

During construction, additional archaeological or historical resources might be discovered other than those identified during the historic properties surveys.

In the case of an inadvertent discovery during construction, activities in the area of discovery would immediately stop and the procedures in UDOT's 2017 Standard Specifications for Road and Bridge Construction, Section 01355, Environmental Protection, Part 3.8, Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites, or Human Remains would be followed.

The construction contractor would notify UDOT of the nature and exact location of the finding and would not damage or remove the resource. Work in the area of the discovery would be delayed until UDOT can evaluate the extent and cultural significance of the site in consultation with the Utah State Historic Preservation Office (SHPO). The course of action and the construction delay would vary depending on the nature and location of the discovery.

Construction would not resume until the contractor receives written authorization from UDOT to continue.

3.16.10 PALEONTOLOGICAL RESOURCES

Due to the probability of encountering significant paleontological resources, archaeological and tribal monitors may be necessary.

Ground-disturbing activities during construction could result in the discovery of previously unidentified subsurface paleontological resources. In the case of an inadvertent discovery during construction, activities in the area of discovery would immediately stop and the procedures in UDOT's 2017 Standard Specifications for Road and Bridge Construction, Section 01355, Environmental Protection, Part 3.8, Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites, or Human Remains would be followed.

The construction contractor would notify UDOT of the nature and exact location of the finding and would not damage or remove the resource. Work in the area of the discovery would be delayed until UDOT can evaluate the extent and cultural significance of the site in consultation with the Utah SHPO. The course of action and the construction delay would vary depending on the nature and location of the discovery.

Construction would not resume until the contractor receives written authorization from UDOT to continue.

3.16.11 WATER RESOURCES AND WATER QUALITY

The potential for temporary construction impacts to occur to surface water quality during construction does exist. Construction activities such as clearing and grubbing, grading, stockpiling, and material staging all disturb vegetation, which causes erosion. Runoff from disturbed areas could temporarily increase pollutant loading into receiving waters. Pollutant loading — largely in the form of discharged sediment — can be minimized by using Best Management Practices (BMPs), which would prevent soil from leaving the construction site.

Because more than one acre of ground would be disturbed, a Utah Pollutant Discharge Elimination System (UPDES) permit and a Stormwater Pollution Prevention Plan (SWPPP), consistent with UDOT *Standard Specifications for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.3 Water Resource Permits*, would be required.

3.16.12 WETLANDS AND WATERS OF THE U.S.

There is the potential for Waters of the United States (WOTUS) to be affected by construction in the same manner as discussed in Section 3.11, Water Resources. In addition to same BMPs that would be employed for overall water quality, fencing would also help mitigate potential construction impacts to WOTUS.

3.16.13 WILDLIFE, THREATENED & ENDANGERED SPECIES, AND SPECIAL-STATUS SPECIES

Construction activities could disrupt the feeding, nesting, and reproductive activities of wildlife in or near the right-of-way due to higher noise levels, construction equipment activity, and lighting. The study area currently experiences high levels of noise resulting from traffic and human presence; therefore, the construction of the proposed project would not reasonably increase disturbance levels that could potentially cause nest failure if birds choose to nest within a half-mile of the study area.

Construction operations would remove the existing hard surfaces and established vegetation, which would expose the underlying soils, risking the infiltration of invasive weeds. Materials and equipment delivered to the job site could introduce invasive weeds into the area if seeds are present in imported soil or if they are on equipment that is not properly cleaned.

To mitigate the possibility of introducing any invasive weeds during construction, the invasive weed BMPs that are described in UDOT's *2017 Standard Specifications for Road and Bridge Construction* would be implemented and monitored, and included in the plans and specifications.

3.16.14 HAZARDOUS MATERIALS

As with any ground-disturbing activity, the potential to encounter materials on any previously unknown site would result from underground storage tanks (USTs), leaking underground storage tanks (LUSTs), and other hazardous materials sites.

Exposure to these sites could pose potential health risks. Because the general public would not be allowed onto the construction sites, no health risks to the public would result from ground contamination.

If contamination is discovered during construction, mitigation measures would be coordinated in accordance with *UDOT Standard Specification 01355, Environmental Compliance*, which directs the construction contractor to immediately stop work and notify the engineer about any possible contamination. Any hazardous materials will be disposed of according to applicable state and federal guidelines.

If previously unidentified sites or contaminated materials are encountered during construction, work would stop in the contaminated area, in accordance with *UDOT Standard Specification 01355, Part 3.1, Hazardous Waste*, and the contractor would consult with UDOT and the DERR to determine necessary remediation.

Any hazardous waste spills by the construction contractor would be handled according to *UDOT Standard Specification 01355, Part 3.2, Spill of Petroleum-Based Product or Used Oil*, and the requirements and regulations of the Utah Department of Environmental Quality (DEQ) and of the Environmental Protection Agency (EPA).

3.16.15 VISUAL RESOURCES

Construction equipment operating in the roadway, lane closures and lane shifts, construction signs, modifications to business access points, and potential detours during construction, could temporarily and adversely affect visual

quality. Construction equipment including cranes and dust would be visible from a distance and would therefore alter views of the surrounding landscape.

During construction, UDOT would implement dust suppression techniques in accordance with the *UDOT Standard Specifications for Road and Bridge Construction, Section 01355 Environmental Protection, Part 3.5 Fugitive Dust*.

CHAPTER FOUR

PUBLIC AND AGENCY INVOLVEMENT

CHAPTER 4: PUBLIC AND AGENCY INVOLVEMENT

Public and agency involvement is important to the success of any project. The planning for the *State Route 9 (SR-9) State Environmental Study* (SES) includes extensive coordination and consultation with the affected communities, agencies, and other stakeholders. The affected communities include residents, business owners, land owners, tribes, individuals, and other interested parties.

This chapter summarizes the public and agency outreach that the project team organized and carried out to ensure that affected stakeholders were notified of the project and had an opportunity to submit their comments. The project team will continue to work with the public to keep them informed.

4.1 LOCAL GOVERNMENTS AND AGENCY INVOLVEMENT

During the environmental process, the project team coordinated with local governments, state and federal agencies, and Native American Tribes that may have jurisdiction over lands in the study area, or may have an interest in the proposed project.

4.1.1 LOCAL GOVERNMENTS

The project team held monthly coordination meetings with Washington City, the City of Hurricane, and the Dixie Metropolitan Planning Organization (DMPO) staff to discuss the SES process and involve them in the development of the project. In addition to the monthly coordination meetings, Washington City, City of Hurricane, and DMPO. Personnel attended the project workshops listed below.

- **June 4, 2019: Goals and Objectives Workshop.** This workshop included attendees from Washington City, the City of Hurricane, DMPO, and UDOT. Meeting participants discussed the project's goals and objectives and identified performance criteria to be used during the conceptual alternatives analyses.
- **July 2, 2019: Alternatives Screening Workshop #1.** This screening workshop included Washington City, the City of Hurricane, DMPO, and UDOT representatives. Meeting attendees analyzed and discussed conceptual alternatives and the ability of each to meet the project's goals and objectives.
- **August 6, 2019: Alternatives Screening Workshop #2.** This alternatives screening workshop included Washington City, the City of Hurricane, DMPO, and UDOT team members. Meeting attendees reviewed the Tier 2 analysis results, including the preliminary impacts of each conceptual alternative and each alternative's ability to meet the Tier 2 goals and objectives.

4.1.2 STATE AND FEDERAL AGENCIES

The project team sent letters to the United States Army Corps of Engineers (USACE) and the Utah Division of Wildlife Resources (UDWR) for federal and state agency review, respectively. The letters requested input regarding the resources under their jurisdiction in the study area.

The letters requested that the agencies identify resources with the capacity to be affected by the project, identify concerns that warrant further analyses in the SES, and determine whether construction would require any permits or approvals.

The project team received one response letter from the USACE that recommended an aquatic resource delineation be completed; the letter also stated that the anticipated project impacts may be eligible for permits. In addition, one response letter from the UDWR suggested that improvements and or mitigation near the intersection of the SR-9 Bridge and the Virgin River be addressed. For more information regarding the federal and state agency responses, refer to Appendix B.

4.1.3 TRIBAL COORDINATION AND CULTURAL RESOURCE CONSULTATION

As part of identifying historic properties in the Area of Potential Effects (APE) and assessing the potential effects on those properties, consultation was conducted between UDOT and the Utah State Historic Preservation Officer (SHPO) preservation and antiquities departments, the Bureau of Land Management (BLM), and Utah State and Institutional Trust Lands Administration (SITLA) as per Utah Code Annotated (UCA) 9-8-404. Federally recognized Native American tribes were also consulted as per Utah Governor's Executive Order 2014-005.

On January 17, 2020, The Utah SHPO concurred with the recommended Determinations of Eligibility and Findings of Effect of Adverse Affect (see Appendix B, Coordination).

UDOT consulted with federally recognized Native American tribes. The 12 tribes listed below possess patrimonial claims over the general project area. They were contacted by UDOT in May 2019 and were invited to provide feedback on known or potential properties or issues of concern to the tribes, and offered a meeting with UDOT.

- Cedar Band of Paiute Indians
- Hopi Tribe
- Indian Peaks Band of Paiute Indians
- Kanosh Band of Paiute Indians
- Koosharem Band of Paiute Indians
- Navajo Nation
- Paiute Indian Tribe of Utah
- San Juan Southern Paiute Indian Tribe
- Shivwits Band of Paiute Indians
- Southern Ute Indian Tribe
- Ute Indian Tribe of the Uintah & Ouray Reservation
- Ute Mountain Ute Tribe

The Navajo Nation declined participation. The Hopi Tribe, Paiute Indian Tribe of Utah and Shivwits Band of Paiute Indians responded to UDOT's inquiry and are participating as consulting parties.

Through ongoing communication with the tribes, UDOT completed the following consultation activities:

- August 15, 2019: Meeting with Shivwits Band
- December 9, 2019: Council Meeting with Paiute Tribe
- January 6, 2020: Site visit with Paiute Tribe
- January 9, 2020: Site visit with Shivwits Band of Paiute Indians
- January 13, 2020: Council Meeting with Paiute Tribe

UDOT has consulted with the Paiute Indian Tribe of Utah and Shivwits Band of Paiute Indians to resolve adverse effects from the proposed project, although they have declined to participate in mitigation development at this time. The Paiute Indian Tribe of Utah and Shivwits Band of Paiute Indians requested that they are kept informed of the project and may re-engage in consultation in the future. UDOT and SHPO entered into a Memorandum of Agreement (MOA) that stipulates the necessary measures to mitigate the adverse effects on NRHP-eligible historic properties. The MOA was signed on May 1, 2020 and is included in Appendix B, Coordination.

4.2 PUBLIC INVOLVEMENT

In addition to agency coordination, public participation is important in developing practical recommendations that are supported by the community. UDOT's commitment at the beginning of the environmental review process was to proactively involve the public so that decision-making includes the input of those who live, work, and travel in the study area.

During the environmental review process, UDOT has

consistently informed the public about project updates, and has considered all public feedback received.

A project website was set up at: https://www.udot/utah.gov/sr9improved for the public to view the project and submit comments. To gain public participation, the City of Hurricane posted project meeting advertisements on their website while other mediums of social media also contained project updates, including the City of Hurricane Facebook page, City of Hurricane police Facebook page, City of Hurricane recreation Facebook page, and the City of Hurricane Twitter page.

4.2.1 PUBLIC SCOPING MEETING

UDOT held a public scoping meeting in an open-house format on March 28, 2019 at the Hurricane Community Center. Invitations were sent via postcards to residents near the SR-9 corridor in Washington City and in the City of Hurricane. UDOT Region Four posted a meeting invitation on its Twitter page.

The public scoping meeting included a series of display boards and a scroll plot to help meeting attendees visualize the project and to help explain the environmental process and schedule. The purpose of the scoping meeting was to educate the public by presenting a project update; collect public input on issues and concerns and; collect public comment. This scoping meeting included 73 persons who had signed in. Project team representatives were available to assist the public with any questions and to listen to their concerns.

Attendees were invited to submit comments at the scoping meeting, or online. The majority of the comments received focused on maintaining access to different types of properties, and property impacts. Other comments received included safety concerns regarding access. Comments and all meeting materials can be found in Appendix B.

4.2.2 PUBLIC HEARING AND DRAFT SES COMMENT PERIOD

The Draft SES was circulated to the public and agencies for a 30-day comment period from February 11 to March 12, 2020. Emails were sent to the public and agencies listed on the project email distribution list, notifying them about the comment period and about locations to review the SES. An electronic version of the document was posted on the project website and paper hard copies were distributed to the Washington County Library, Washington City Library, and City of Hurricane Library. Copies were also available at Washington City, at the City of Hurricane, and at the UDOT Region Four office. Comments and all meeting materials can be found in Appendix B.

CHAPTER FIVE

CONCLUSIONS, PERMITS & CLEARANCES, AND MITIGATION

CHAPTER 5: CONCLUSIONS, PERMITS & CLEARANCES, AND MITIGATION

5.1 CONCLUSIONS

Based on the environmental analyses included in this SES, a number of impacts from constructing and operating the proposed project are anticipated. Table 5.1-1 summarizes the impacts by resource.

For further information, refer to Chapter 3, Affected Environment.

TABLE 5.1-1: ENVIRONMENTAL IMPACTS

Impact Category	Impact	Mitigation
Land Use		
Land converted to transportation use.	Approximately 73 acres.	No mitigation is proposed.
Social Environment		
Community character & cohesion	No impacts are anticipated.	No mitigation is proposed.
Travel patterns	No impact to through-traffic travel patterns. Changes to access from SR-9, and changes to access in and out of Quail Lake Estates, would occur.	No mitigation is proposed.
Public facilities & recreation	No impacts are anticipated.	No mitigation is proposed.
Utilities	Utility impacts are expected.	No mitigation is proposed.
Economic Conditions		
Acquisition of commercial business	Three businesses would be fully acquired and would require relocation.	Three commercial property owners would be compensated under the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended* (Uniform Act) and the *Utah Relocation Assistance Act*.

Impact Category	Impact	Mitigation
Acquisitions and Relocations		
Full acquisitions and relocations	Relocations would be required due to the proposed acquisition of 7.4 acres from three commercial properties.	Property owners with acquisitions would receive just compensation for their property; they would also be entitled to relocation assistance under the *Uniform Act* and the *Utah Relocation Assistance Act*.
Partial acquisitions	Partial acquisition of 61 parcels, totaling approximately 64 acres.	
Minority and Low-Income Populations		
Minority populations	No impacts are anticipated.	No mitigation is proposed.
Low-income populations	No impacts are anticipated.	No mitigation is proposed.
Bicycle and Pedestrian Considerations		
Existing bicycle and pedestrian facilities	No impacts are anticipated.	No mitigation is proposed.
Planned bicycle and pedestrian facilities	No impacts are anticipated.	No mitigation is proposed.
Air Quality		
Regional conformity	No impacts are anticipated.	No mitigation is proposed.
Project-level conformity	No impacts are anticipated.	No mitigation is proposed.
Noise		
N/A	**No-Build Alternative:** Eight residential properties and two areas along a recreational mountain bike trail would exceed Noise Abatement Criteria (NAC) as the NAC would result in an increase of 10 dB(A) above existing levels. **Preferred Alternative:** No substantial increase over existing noise levels at any property are anticipated.	No mitigation is proposed.

Impact Category	Impact	Mitigation
Cultural Resources		
Potential for impacts to historic properties	Adverse effect for Site 42WS54.	UDOT and SHPO entered into a memorandum of agreement signed May 1, 2020.
Paleontological Resources		
Paleontological resources	Impact would occur to petrified wood located within the study area. If present, the Preferred Alternative may impact significant paleontological localities (within the Moenkopi Chinle, Moenave, and Kayenta formations).	Small fragments of petrified wood in sparse scatters are not considered significant paleontological resources and no mitigation is required. Due to the possibility of significant paleontological resources within and adjacent to the Preferred Alternative, archaeological and tribal monitoring would be required (within the Moenkopi Chinle, Moenave, and Kayenta formations) during construction.
Water Quality and Resources		
Floodplains	Larger culverts would alter intermittent and ephemeral stream floodplains; however, it would not alter the Virgin River floodplain.	If required a Floodplain Development Permit will be obtained prior to construction.
Perennial, intermittent, or ephemeral streams	Larger culverts would alter intermittent and ephemeral stream floodplains, and would add roadway fill as part of the proposed widening and constructing the highway access points.	Permit required under Section 404 of the *Clean Water Act* will be obtained prior to construction. If required, Stream Alteration Permit will be obtained prior to construction.
Water quality	No impacts are anticipated.	Comply with UDOT's MS4s Permit and *Stormwater Pollution Prevention Plan* (SWPPP).
Wetlands and Waters of the U.S.		
Wetlands	No impacts are anticipated.	No mitigation is proposed.
Waters of the U.S.	Impact of 2,282 linear feet (0.45 acres) of stream channel and 0.22 acres of a pond for a total of 0.67 acre impact.	Section 404 of the *Clean Water Act* will require a permit be obtained prior to construction.
Wildlife, Threatened and Endangered Species		
Threatened and endangered species	No impacts are anticipated.	No mitigation is proposed.

Impact Category	Impact	Mitigation
Utah sensitive species	No impacts are anticipated	No mitigation is proposed.
Migratory Birds	No impacts are anticipated	No mitigation is proposed.
Bald eagles and golden eagles	No impacts are anticipated	No mitigation is proposed.
Hazardous Waste Sites		
Impacts to sites categorized as low, moderate, or high risk	Impacts to sites categorized as moderate risk; partial acquisition from Coral Canyon Market and Maverick #402 and full acquisition of Quail Lake Quik Stop Chevron.	No mitigation is proposed.
Visual Resources		
Compatibility of the project with existing visual resource conditions and corridor user experience	Impacts related to commercial property acquisition and grade-separated interchanges along the SR-9 corridor.	No mitigation is proposed.

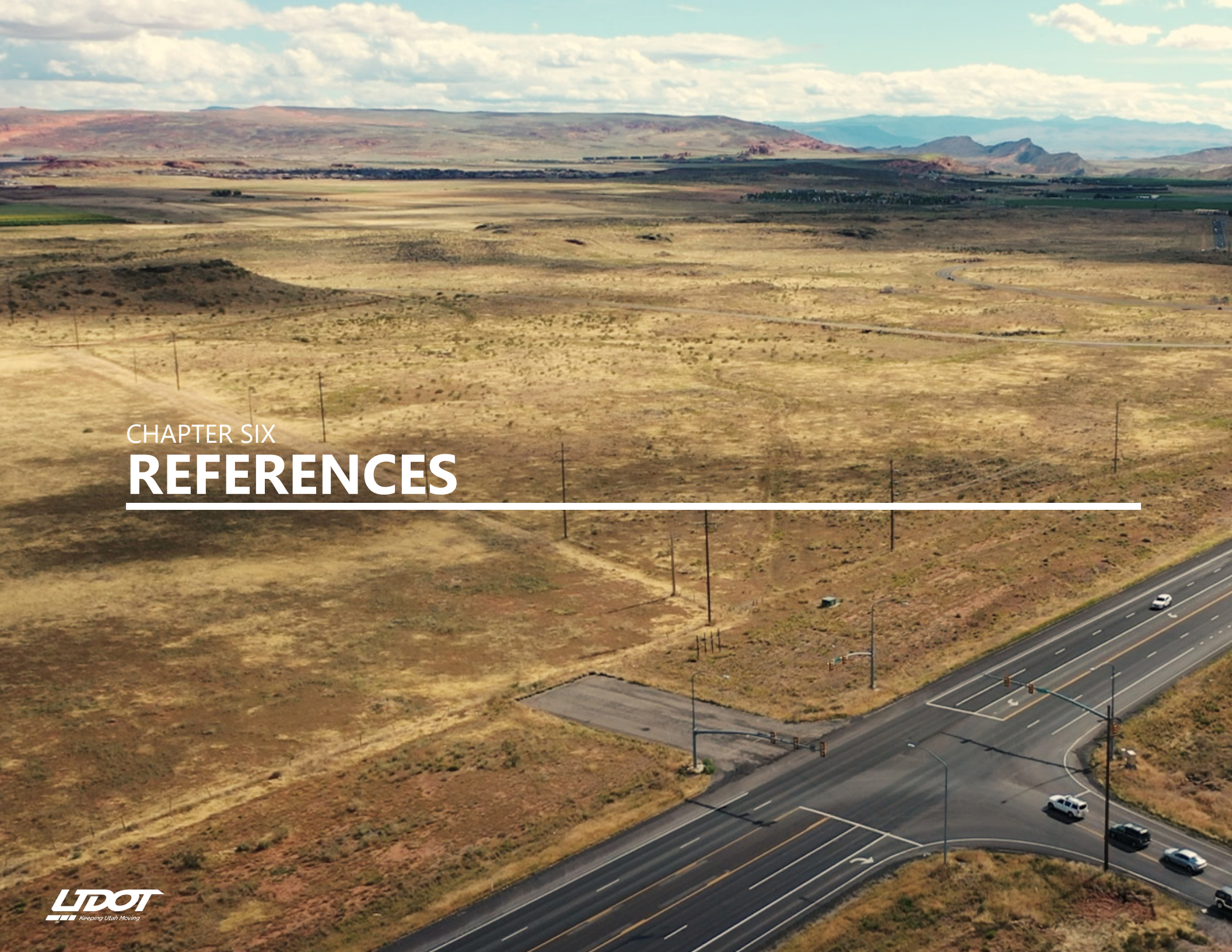
5.1.1 PERMITS AND CLEARANCES

Table 5.1-2 lists the permits, reviews, clearances, and approvals that may be required as part of the Preferred Alternative. The table outlines the mitigation and project commitments under the Preferred Alternative. All UDOT Standard Specifications and Best Management Practices (BMPs) will be followed and are excluded from Table 5-1-2.

The contractor would be responsible for obtaining all construction-related permits and other environmental clearances for activities occurring outside of the right-of-way (e.g., activities in construction staging areas, borrow areas, and batch plant sites).

TABLE 5.1-2: PERMITS, CLEARANCES, AND APPROVALS THAT MAY BE REQUIRED

Permit	Granting Agency(ies)	Applicant	Application Time	Granting Time	Applicable Area of Project
Federal Permits, Reviews, and Approvals					
Individual permit under Section 404 of the *Clean Water Act*	United States Army Corps of Engineers (USACE)	UDOT	After Final SES	Before construction	Parts of roadway that cross ephemeral and intermittent streams and ponds.
Compliance with U.C.A. 9.8.404; Memorandum of Agreement to Resolve Adverse Effects to Historic Properties	Utah State Historic Preservation Officer (SHPO)	UDOT	Concurrent with SES	Final SES (Section 106 process was completed)	Historic property impacts include consultation between agencies and interested parties.
Application for Transportation and Utility Systems and Facilities on Public Land	Bureau of Land Management (BLM)	UDOT	After FInal SES	Before construction	Parts of roadway that cross BLM land outside of existing easement.
State Permits, Reviews, and Clearances					
Floodplain Development Permit	Washington County	UDOT and Contractor	Before construction	Before construction	Areas of ground disturbance that will occur in the floodplain during construction
Utah Pollutant Discharge Elimination System (UPDES) permit under Section 402 of the *Clean Water Act*	Utah Division of Water Quality	Contractor	Construction phase	Before construction	Stormwater quality during construction phase.
Stream alteration permit	Utah Division of Water Rights	UDOT	Final design phase	Before construction	Required for any new or modified stream crossings proposed.
Local Permits and Clearances					
Construction-related permits	Various	Contractor	Contractor	Before construction	Impacts associated with off-site activities (e.g., in construction staging areas, borrow areas, batch plant sites).



CHAPTER SIX

REFERENCES

UDOT Keeping Utah Moving

CHAPTER 6: REFERENCES

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CHAPTER SEVEN

LIST OF PREPARERS

UDOT Keeping Utah Moving

CHAPTER 7: LIST OF PREPARERS

This SES was prepared by the individuals listed in Table 7-1.

TABLE 7-1: LIST OF PREPARERS

Name	Organization	Project Role
Kim Manwill	UDOT	Project Manager
Naomi Kisen	UDOT	Environmental Lead
Carissa Watanabe	UDOT	Environmental Lead
Liz Robinson	UDOT	Cultural Resources
Elizabeth Giraud	UDOT	Architectural Historian
Branden Anderson	UDOT	Preconstruction Engineer
Robert Dowell	UDOT	Operations Engineer
Elisa Albury	UDOT	Noise Specialist
Anne Ogden	UDOT	Traffic
Clayton Wilson	UDOT	District Engineer
Cody Marchant	UDOT	Design Manager
Jeff Sanders	UDOT	Planning Manager
Tyrell Wood	UDOT	Right-of-Way
Kim O'Reilly	UDOT	Right-of-Way
Gernice White	UDOT	Utilities
Riley Lindsay	UDOT	Survey
Jared Dastrup	UDOT	Pavement Manager
Ray Cook	UDOT	Structures Design
Kevin Kitchen	UDOT	Region Four Communications Manager
Randall Taylor	UDOT	Region Four Cost-Based Estimator
Josh Brooks	UDOT	Region Four Station Supervisor
Dana Holmes	Lochner	Environmental Lead
Jason Green	Lochner	Environmental Support
Phil Logsdon	Lochner	Environmental Support
Shannon Radulovic	Lochner	Environmental Support
Elise McCollister	Lochner	Environmental Support
Derek Adams	Lochner	Environmental Support
Chuck Easton	Lochner	Environmental Support
Dave Shannon	Lochner	Environmental Support
Connor Roberts	Lochner	Graphic Design
John Martin	Lochner	GIS Specialist
Kent Jorgenson	Lochner	Public Involvement
Andrea Clayton	Lochner	Environmental Lead (former)
Myron Lee	Dixie MPO	DMPO Manager
Arthur LeBaron	City of Hurricane	City Engineer
Darrin LeFevre	City of Hurricane	Assistant City Engineer
Bronson Bundy	Washington City	Roads Project Manager
Charles Allen	Parametrix	Traffic Lead
Tim Green	Transcon	Biological Resources
Brian Parker	Transcon	Biological Resources
Lindsey Evenson	Transcon	Cultural Resources
Michael Nadeau	Meridian	Survey/Right-of-Way
Travis Jensen	Meridian	Survey/Right-of-Way