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U.S. Department of Transportation
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Henderson Interchange Environmental Assessment

FHWA-NV-EA 22-01 | May 2022

HENDERSON INTERCHANGE

Environmental Assessment for Henderson Interchange

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NDOT Project ID: 74271
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This Environmental Assessment has been prepared in accordance with the provisions and requirements of Chapter 1, Title 23, 23 CFR Part 771, relating to implementation of the National Environmental Policy Act of 1969.

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Mitigation Measures

The following list describes measures that will be implemented by the Nevada Department of Transportation (NDOT) to avoid, reduce, or otherwise mitigate potential impacts associated with the proposed project. Mitigation measures and requirements for compliance with federal, state, and local laws will be specified in the construction contractor's contract with NDOT. The following list of mitigation measures and commitments are not subject to change without prior written approval of the Federal Highway Administration (FHWA).

Mitigation Measures

Resource (Section Reference)	Preferred Alternative
Biological Resources (Section 3.1.1)	If construction alters any breeding habitat (vegetation/structure removal) that occurs during the migratory bird breeding season (March 1 through July 31), the contractor shall employ a qualified biologist (one with experience in bird identification, general nesting behavior, nest and egg identification, and knowledge of habitat requirements for migratory birds) to conduct a migratory bird nest search of all vegetation within seven days prior to commencement of construction activities. This shall include burrowing and ground nesting species in addition to those nesting in vegetation. Vegetation may be removed if it has been surveyed and no active bird nests are present. The contractor shall avoid any active nests. The contractor shall maintain an appropriately-sized buffer area if any active nests (containing eggs or young) are found and must avoid the area until the young birds fledge. The contractor will develop and follow a Noxious Weed Management Plan to prevent the establishment and spread of Nevada State listed noxious weeds per Nevada Revised Statute 555.
Floodplains (Section 3.1.2)	The Build Alternative improvements require modifications to existing CCRFCD Master Plan and local drainage facilities that exist along the project corridor and are summarized in the Water Resources Technical Memorandum. Potential impacts to existing drainage facilities to accommodate the Build Alternative include relocation of drop inlets and storm drain; extending/shortening storm drain laterals; relocating storm drain systems and channels; and extending culvert crossings. Overall, conveyance of stormwater will maintain historic drainage patterns with minor rerouting to accommodate new bridges through extension and rebuild of existing drainage facilities. The Build Alternative would not adversely affect existing flow patterns, thereby avoiding impacts to downstream facilities and adjacent properties.
Water Resources: Waters of the United States (Section 3.1.3)	The project will require a U.S. Army Corps of Engineers (USACE) 404 Permit (Nationwide Permit 14). The project will also require a Section 401 Water Quality Certification issued by Nevada Division of Environmental Protection (NDEP), Bureau of Water Quality Planning, as required for a USACE 404 Permit.
Water Resources: Water Quality (Section 3.1.3)	NDOT will implement Best Management Practices (BMPs) during construction. As part of the development of BMPs for the project, NDOT's construction contractor must file a Notice of Intent with NDEP's Bureau of Water Pollution Control to obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activity (NVR100000). A Stormwater Pollution Prevention Plan (SWPPP) will be developed before the Notice of Intent is submitted. The SWPPP will outline temporary and permanent erosion and sediment controls, locate stormwater discharge points, and describe BMPs to be implemented to prevent or reduce stormwater pollutant discharge associated with construction activities to the maximum extent practical. NDOT and the City of Henderson will implement temporary erosion control and stormwater control measures during construction per the NDOT *Storm Water Quality Manuals* (References 4 and 5). Typical BMPs that may be selected for this project include: ◆ Street sweeping and vacuuming during construction ◆ Storm drain inlet protection ◆ Fiber rolls, silt fences, and gravel bag berms ◆ Stockpile and construction site management

Mitigation Measures

Resource (Section Reference)	Preferred Alternative
Land Use and Socioeconomic Conditions: Temporary Construction Easements (Section 3.2.3)	Temporary construction easements will be needed during construction and will be determined during final design. Property owners are protected by the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (Uniform Act). NDOT will pay fair market value for the loss or use of any property.
Land Use and Socioeconomic Conditions: Traffic Circulation and Access (Section 3.2.3)	NDOT will develop a plan to communicate with the public and property owners regarding construction schedule, street closures, and detours throughout construction. Access to residences and business will be maintained during construction. NDOT will maintain Americans with Disabilities Act-compliant pedestrian access, including temporary safe street crossings and sidewalks.
Traffic Noise and Vibration (Section 3.3.3)	To reduce construction noise impacts and vibration, NDOT will require that its contractor maintain and operate motorized equipment in compliance with all local, state, and federal laws and regulations relating to noise levels. All motorized construction equipment will have mufflers installed in accordance with the equipment manufacturer's specifications or a system of equivalent noise-reducing capacity. Mufflers and exhaust systems will be maintained in good operating condition and free of leaks and holes. If feasible, new and replacement traffic noise barriers and screening walls will be constructed early in each phase to mitigate construction noise. NDOT will minimize the use of vibratory equipment and conduct high-vibration construction during the day, where feasible and appropriate. The Build Alternative will construct three new soundwalls in the following locations: ◆ Area 6 – eastbound I-215 from just west of Gibson Road to the system interchange (**see Figure 3.5**). This soundwall will be approximately 11.5 feet high for 1,492 feet and 13.5 feet high for 2,057 feet, for a total distance of 4,549 feet. ◆ Area 8 and 9 – southbound I-11 from UPRR crossing to Horizon Drive off-ramp (**see Figure 3.6**). This soundwall will be approximately 6,240 feet in length and 11.5 feet in height. ◆ Area 11 – northbound I-11 from Horizon Drive on-ramp to the UPRR crossing (see **Figure 3.6**). This soundwall will be approximately 6,324 feet in length and 15.5 feet in height. The following existing soundwalls will remain under the Build Alternative: ◆ Area 2 – Soundwall 5, westbound I-215 Gibson Road to Stephanie Street (see **Figure 3.7**) ◆ Area 3 – Soundwall 6, westbound I-215 Stephanie Street to Arroyo Grande Boulevard (see **Figure 3.8**) ◆ Area 3 – Soundwall 7, westbound I-215 Arroyo Grande Boulevard to Valle Verde Drive (see **Figure 3.8**) ◆ Area 4 – Soundwall 1, eastbound I-215 Valle Verde Drive to Arroyo Grande Boulevard (see **Figure 3.8**) ◆ Area 5 – Soundwall 2, eastbound I-215 Stephanie Street to Gibson Road (see **Figure 3.7**) ◆ Area 10 – Soundwall 9, northbound I-11 Horizon Drive on-ramp (see **Figure 3.6**) ◆ Area 13 – northbound I-515 Galleria Drive off-ramp (see **Figure 3.9**) Mitigation measures for stationary and mobile equipment shall be addressed in the contract documents; as needed, and could address placement, hours of operation, noise level limits, or proper maintenance of equipment.
Air Quality (Section 3.4.3)	Equipment and vehicles used for construction would comply with EPA's emissions standards for on-road vehicles and off-road construction equipment. NDOT will require its construction contractor to comply with applicable dust- control requirements in DAQ regulations and implement best management practices to minimize emissions from construction. The project will comply with the requirements of the Standard Specifications for Road and Bridge Construction (NDOT 2014).

Mitigation Measures

Resource (Section Reference)	Preferred Alternative
Visual Resources (Section 3.5.3)	Aesthetic treatments already required through NDOT's Landscape and Aesthetic program for color and texture would result in visual blending of proposed facilities into the broader urban background when compared to the existing facilities. These measures include applying medium tan colored paint and decorative textures on all new proposed structures, including new bridge barrier rails, piers, pier caps, retaining walls, and flyovers, see **Figure 3.18.** Decorative rock consistent in color and texture with the existing Henderson Interchange aesthetics treatments will be placed on all bare ground slopes to the NDOT right-of-way line along I-215 and I-11 to provide slope protection, which also serves to blend new slopes into the visual background. The lighting system for the Build Alternative will use LED fixtures designed to help mitigate sky glow and light spillover.
Hazardous Materials (Section 3.6.3)	An Environmental Protection Plan will be developed during final design to address areas of concern and how to test for constituents to control work environment conditions and address special waste management and disposal concerns. NDOT will survey all structures to be disturbed or demolished to determine the presence of regulated materials, including universal wastes, asbestos-containing materials, and heavy metals. NDOT will remove, manage, and dispose all regulated materials in accordance with applicable regulations.
Recreation Resources (Section 3.7.3)	NDOT will develop a plan to communicate with the public regarding construction schedule, trail closures, and detours throughout construction. NDOT will work with the City of Henderson to identify trail route detours that may be needed during construction.

Table of Contents

Table of Contents

Table/Figure **Page No.**

Table/Figure **Page No.**

Appendices

Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AGTS	Area Groundwater Treatment System
APE	Area of Potential Effects
BLM	Bureau of Land Management
BMI	Black Mountain Industrial Complex
BMP	Best Management Practices
CAA	Clean Air Act
CCRFCD	Clark County Regional Flood Control District
CFR	Code of Federal Regulations
CH4	Methane
CO	Carbon monoxide
CO2e	Carbon dioxide equivalents
DAQ	Division of Air Quality
dBA	A weighted sound level decibels
EA	Environmental Assessment
EB	eastbound
EDR	Environmental Data Resources, Inc.
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
GHG	Greenhouse Gases
GWP	Global Warming Potential
HA	Hydrographic Area
HOV	High Occupancy Vehicle
I-11	Interstate 11
I-215	Interstate 215
I-515	Interstate 515
Leq	peak-hour equivalent noise levels
LMP	Lake Mead Parkway
MBTA	Migratory Bird Treaty Act
MOE	Measure of effectiveness
mph	miles per hour
MSAT	Mobile Source Air Toxics
MS4	Las Vegas Valley Municipal Separate Storm Sewer System Permit
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NB	northbound
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NO2	Nitrogen dioxide
O3	Ozone
Pb	Lead
PDO	Property damage only
PEPCON	Pacific Engineering and Production Company
PEL	Planning and Environmental Linkages
PM2.5	Particulate matter less than 2.5 micrometers in diameter
PM10	Particulate matter less than 10 micrometers in diameter
REC	Recognized Environmental Condition
RTC	Regional Transportation Commission of Southern Nevada
SB	southbound
sec/veh	seconds per vehicle
SHPO	State Historic Preservation Office
SFHA	Special Flood Hazard Area
SO2	Sulfur dioxide
SR-564	Lake Mead Parkway
STIP	Statewide Transportation Improvement Program
SWPPP	Stormwater Pollution Prevention Plan
TAC	Technically Advisory Committee
TCE	Temporary Construction Easement
USC	United States Code
US 93	US Route 93
VA	Value Analysis
WB	westbound

HENDERSON INTERCHANGE

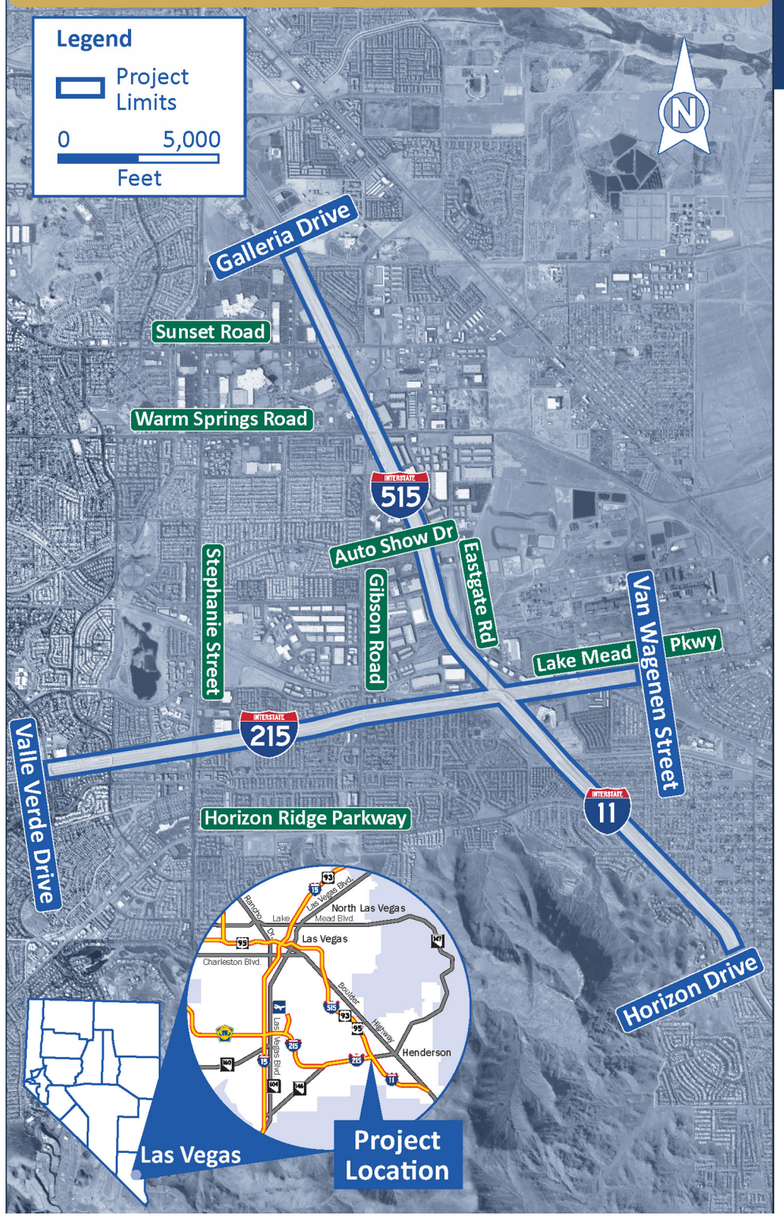
Chapter 1

Why is the Project Needed?

Section | Page No.

Chapter 1 | Why is the Project Needed?

Figure 1.1 Project Limits



1.1 | Project Background

The Nevada Department of Transportation (NDOT) and the Federal Highway Administration (FHWA) are proposing a project consisting of reconstructing the Henderson Interchange to increase traffic capacity and reduce travel delay on Interstate 11 (I-11), Interstate 215 (I-215), Interstate 515 (I-515), Lake Mead Parkway (SR 564), and the surrounding freeway ramps. The Henderson Interchange serves as the junction between I-11 to the south, I-215 to the west, I-515 to the north, and Lake Mead Parkway to the east.

I-215 and I-515 connect the City of Henderson to the metropolitan center of Las Vegas and provide access across southern Nevada. Heading east, Lake Mead Parkway provides access to downtown Henderson, Lake Las Vegas, and Lake Mead National Recreation Area. To the south, I-11 connects to Boulder City and Hoover Dam, and continues across Arizona state border as US Route 93 (US 93).

The proposed project is an outgrowth of the Henderson Interchange Feasibility Study. The City of Henderson prepared a Feasibility Study, which was completed in 2020, to identify potential improvements to the Henderson Interchange. The Feasibility Study was prepared based on FHWA's guidance for Planning and Environmental Linkages (PEL). The Feasibility Study serves as the basis for this Environmental Assessment.

The limits of the project are Valle Verde Drive to the west, Galleria Drive to the north, Horizon Drive to the south, and Van Wagenen Street to the east. The project limits are shown on **Figure 1.1**.

The National Environmental Policy Act (NEPA) directs transportation officials to consider balancing engineering and transportation needs with social, economic, and natural environmental factors in making project decisions. The Environmental Assessment (EA) documents the NEPA process for the project undertaken by NDOT and FHWA in accordance with 23 Code of Federal Regulations (CFR) Part 771 and other applicable regulations.

1.2 | What is the Need for the Project?

Roadway Deficiencies | Travel Delay | Restore Connectivity | Safety | Regional/Local Plans

A combination of the following critical needs demonstrates why improvements must be considered for the Henderson Interchange:

- Roadway deficiencies will continue to contribute to travel delays.
- Existing travel delays will worsen with projected increases in passenger vehicles, trucks, and public transit vehicles along I-11, I-215, I-515, and Lake Mead Parkway.
- Connectivity to surrounding roadways needs to be restored to improve access.
- Traffic safety will further degrade as higher crash rates are experienced in and around the Henderson Interchange.

1.2.1 Roadway Deficiencies

The existing system interchange between I-11/I-215/I-515/Lake Mead Parkway was constructed between 2004 and 2006 when the population of the Las Vegas Valley was approximately 1.5 million people. The population has since increased to 2.2 million people in 2018 and is projected to continue to increase. Traffic volumes at the interchange exceed the original design year forecasts. Additionally, a service interchange was constructed on I-215 at Gibson Road, close to the system interchange creating eastbound weaving conflicts between vehicles entering at Gibson Road traveling to Lake Mead Parkway and vehicles transitioning to the System interchange ramps. The westbound Gibson Road off-ramp is also closer than desirable to the I-515 ramps entering westbound I-215. The American Association of State Highway and Transportation Officials (AASHTO)[1] recommends at least 2,000 feet from one freeway entrance ramp to the following exit ramp between system and service interchanges. The distance for the westbound approach to Gibson Road is approximately 1,500 feet.

AASHTO is an international leader in setting technical standards for all phases of highway system development. Standards are issued for design, construction of highways and bridges, materials, and other technical areas.

AASHTO

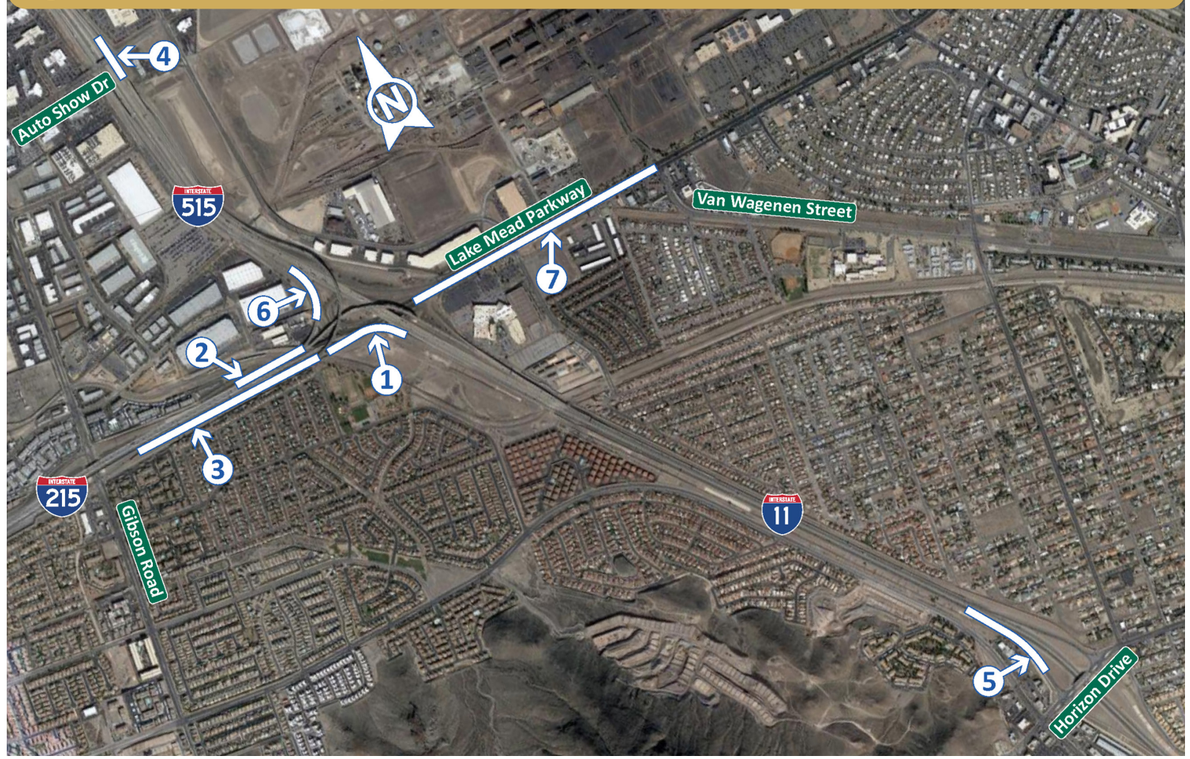
Specific areas where deficient traffic operations are observed are identified on **Figure 1.2** and include:

(1) The I-215 eastbound to I-11 southbound interchange ramp merges from two lanes to one lane, and then joins the I-11 southbound mainline. The ramp merge results in upstream queues (vehicles waiting in line) on the ramp itself and I-215 eastbound during peak traffic times. The I-215 eastbound crash rate exceeds the state average.

(2) The approximately 1,500-foot-long weaving movement along I-215 westbound, between the system interchange ramps and Gibson Road off-ramp, results in increased travel time and delay. In 2017, I-215 was re-striped and barriers were placed to prevent motorists traveling westbound on Lake Mead Parkway and I-215 from exiting at Gibson Road. These barriers eliminated access for motorists westbound on I-215 from Lake Mead Parkway from exiting at Gibson Road.

(3) The approximately 1,300-foot-long weaving movement along eastbound I-215 between the Gibson Road on-ramp and the system interchange ramps results in increased travel time and delay. Traffic on eastbound I-215 experiences speeds as slow as 40 mph during the PM peak period. This segment also exceeds the statewide average for crashes.

Figure 1.2 Areas of Roadway Deficiencies



(4) The I-215 eastbound system ramp merges on to I-515 northbound, followed by the Auto Show Drive on-ramp merge onto I-515 northbound. These ramp merges occur within about one-quarter mile and do not include an auxiliary or parallel merge lane. These successive merges result in traffic slowing to 50 mph on the freeway.

(5) During peak periods, traffic exiting southbound I-11 at Horizon Drive backs up onto mainline I-11 as a result of deficiencies along Horizon Drive at the interchange. When this traffic backup occurs, freeway speeds are as low as 30 mph in the PM peak period on I-11. Local street improvements on Horizon Drive are not part of this project; however, minimizing the impacts on I-11 is a roadway deficiency that can be addressed.

(6) The southbound I-515 to westbound I-215 system-to-system ramp experiences substantial increased travel time and delay. Traffic backs up on southbound I-515 and blocks the southbound on-ramp from Auto Show Drive. There is insufficient capacity on the system ramp to meet the traffic demand.

(7) Westbound Lake Mead Parkway drops from two lanes to one lane at the system interchange. This lane reduction results in traffic extending to the Lake Mead Parkway and Eastgate Road intersection. Lake Mead Parkway exceeds the statewide average crash rate for urban principal arterials.

[1] A Policy on Geometric Design of Highways and Streets, 7th Edition (2018), Figure 10-70. AASHTO recommends one-mile spacing between interchanges in urban areas.

1.2.2 Travel Delay

Existing roadway deficiencies result in increased travel time that could contribute to crashes and travel delays for motorists. The I-215 eastbound to I-11 southbound interchange ramp merges from two lanes to one lane, and then joins the I-11 southbound mainline. This lane reduction, ramp-merge, and insufficient capacity results in traffic backing up on the ramp and I-215 eastbound during peak periods of traffic. The weaving movement along I-215 eastbound, between the Gibson Road on-ramp and the system interchange ramps, results in increased travel time and backups. This section of I-215 eastbound experiences slow speeds during the AM and PM peak periods of travel.

By the year 2040, traffic demand for the I-215 eastbound to I-515 northbound ramp is expected to exceed the available capacity. In the year 2040 PM peak hour, a demand of more than 3,400 vehicles is expected along this ramp. This bottleneck is expected to result in extensive upstream queuing and increased travel time along I-215 eastbound. If no improvements are constructed, in the year 2040, the I-215 eastbound section between Gibson Road and the I-515 system ramps is expected to experience speeds as low as 20 mph in the PM peak period. Similarly, year 2040 traffic demands exceed existing capacity for some of the other ramp movements between the I-215 and I-515 freeways. Capacity improvements to the system interchange are needed to meet the projected year 2040 demand.

Traffic analysis of existing conditions was completed using the Aimsun Next traffic model developed and calibrated as part of the Feasibility Study. Measures of effectiveness (MOE) were determined and evaluated for the existing conditions. Total network delay measures the amount of time each vehicle is delayed and sums them into a single delay time. Average network delay measures the average delay experienced by vehicles. The better the network operates, the lower the total network delay and average network delay. The existing (2017) total network delay is 1, 522 hours with an average network delay of 97 seconds per vehicle (sec/veh).[2]

1.2.3 Restore Connectivity

Interim safety and capacity improvement projects completed in 2019, including the restriping of I-215 and I-515, resulted in loss of connectivity to important local commercial and residential areas in the project area. Motorists heading west on Lake Mead Parkway towards I-215 are no longer permitted to exit at Gibson Road (see **Figure 1.3**). Motorists heading south on I-515 from Auto Show Drive are no longer able to exit to I-215 or Lake Mead Parkway (see **Figure 1.4**).Members of the public that attended the March 2019 public meeting commented that the connectivity should be restored.

Figure 1.3 No Access from Lake Mead to Gibson

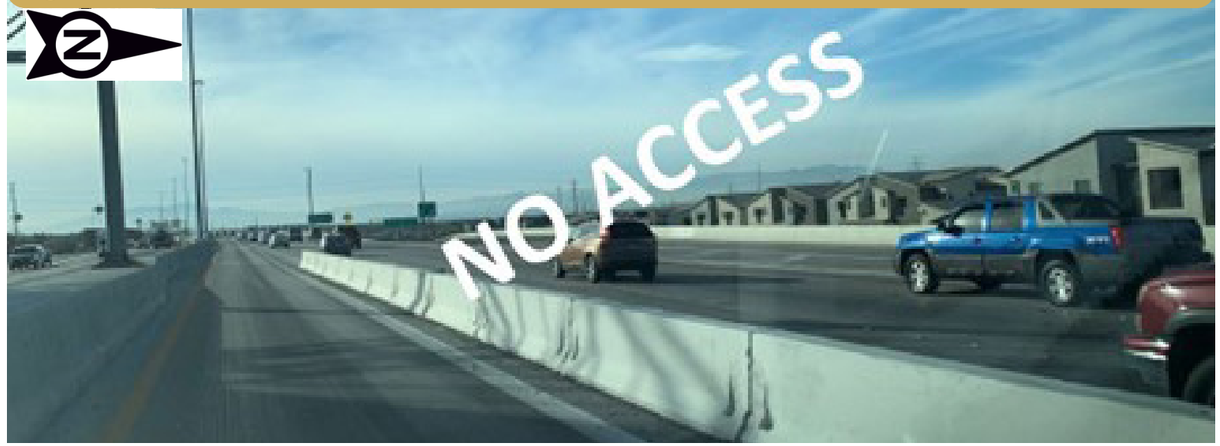


Figure 1.4 No Access from Auto Show Drive

[2] CA Group. 2021. Alternatives Analysis Report. May.

1.2.4 Safety

NDOT measures roadway safety by the frequency and severity of vehicular crashes and pedestrian injuries/fatalities. Crash information for the study area was obtained from NDOT Traffic Safety Engineering Division databases for a 3-year period from January 1, 2017 through January 1, 2020. Crash rates are expressed as crashes per million vehicle miles traveled and include all reported crashes that caused a fatality, injury, or property damage only. The crash rates for each of the project's roadways were compared to the NDOT 2018 Functional Classification Crash Rates (statewide) for the same roadway classification[3]. The study area is:

- I-11, I-215, and I-515 system interchange
- I-215 from Valley Verde Drive to the system interchange
- I-515 from the system interchange to Galleria Drive
- I-11 from Horizon Drive to the system interchange
- Lake Mead Parkway from the system interchange to Van Wagenen Street

Lake Mead Parkway Safety

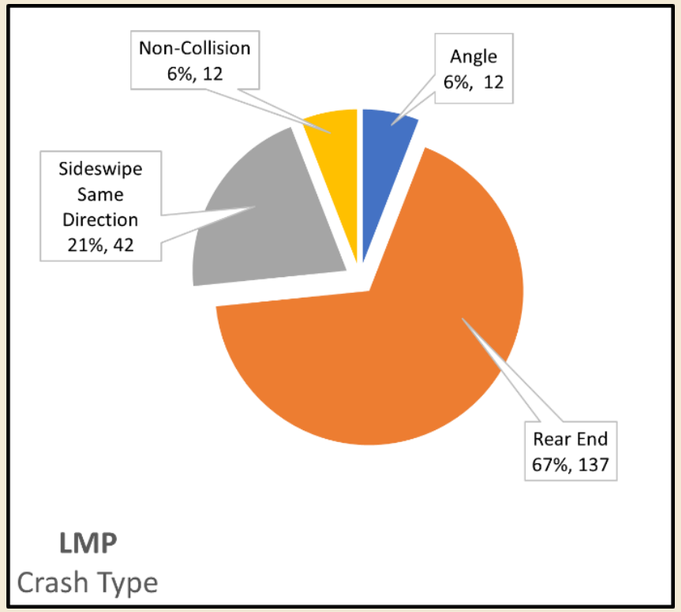
Lake Mead Parkway was analyzed between the system interchange and the Van Wagenen Street intersection. Lake Mead Parkway had a total of 205 crashes in the 3-year time period. Of these crashes, there was one crash involving a pedestrian, three disabling injury crashes with three disabling injuries, and 61 injury crashes with 96 injuries. The charts shown in **Figure 1.5** provide a breakdown of the types of crashes and severity for this period.

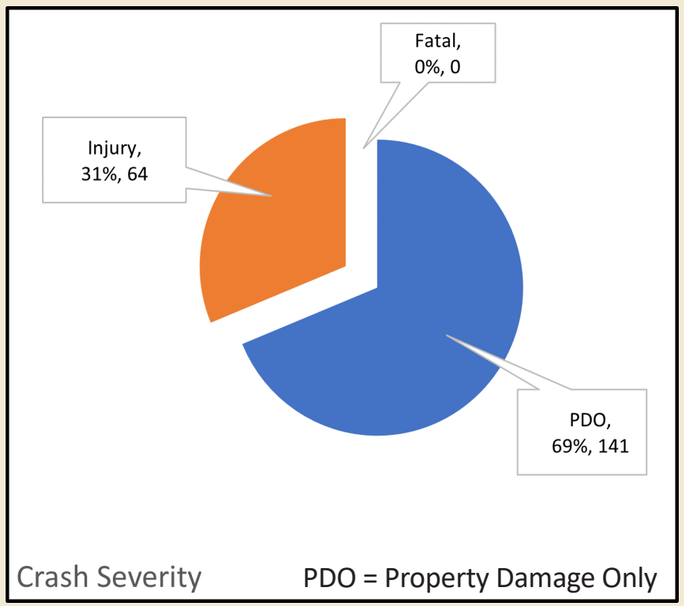
Table 1.1 summarizes the analysis of the Lake Mead Parkway corridor crash rates (shown in **bold**) and indicates the severe injury crashes, and injury crashes are slightly higher and the property damage crashes are more than double the amount of property damage only crashes compared to similar roads.

Table 1.1 Lake Mead Parkway Crash Rates[4] (System Interchange to Van Wagenen Street)

Crash Severity	NDOT Principal Arterial Interstate (2018)	Lake Mead Parkway Total
Fatal	0.0197	0.0000
Injury	1.4953	**1.6057**
Property Damage Only	1.7556	**3.5376**
Total	3.2705	**5.1433**

Figure 1.5 Lake Mead Parkway: Number of Crashes by Type and Severity





[3] The crash analysis for this project was prepared in April 2021. | [4] Crash rates are expressed as crashes per million vehicle miles traveled.

I-215 Freeway Safety

The crash data for I-215 westbound were analyzed between Valle Verde Drive and the system interchange. A total of 227 crashes were recorded in the 3-year period. Of these crashes, there were two disabling injury crashes with three disabling injuries, and 79 injury crashes with 111 injuries. The most common crash types were rear-end, sideswipes, and non-collision, which are typical for congested roadways. The charts shown in **Figure 1.6** provide a breakdown of the types of crashes and severity for this period.

The crash data for the I-215 eastbound corridor were analyzed between Valle Verde Drive and the system interchange. A total of 372 crashes were recorded. Of these crashes, there was one fatality from one fatal crash, two disabling injury crashes with seven disabling injuries, and 137 injury crashes with 207 injuries. The predominant crash types were rear-end, sideswipes, and non-collision, which are typical for congested roadways. The charts shown in **Figure 1.7** provide a breakdown of the types of crashes and severity for this period.

Table 1.2 summarizes the NDOT I-215 crash rate data. The I-215 westbound crash rates were lower compared to the NDOT average crash rates, the I-215 eastbound crash rates (shown in **bold**) all exceed the NDOT average crash rates compared to similar roads.

Table 1.2 I-215 Westbound and Eastbound Crash Rates[5] (Valle Verde Drive to System Interchange)

Crash Severity	NDOT Principal Arterial Interstate (2018)	I-215 WB TOTAL	I-215 EB TOTAL
Fatal	0.0045	0.0000	**0.0066**
Injury	0.5722	0.3690	**0.9199**
Property Damage Only	1.2447	0.6652	**1.5353**
Total	1.8214	1.0342	**2.4618**

Figure 1.6 I-215 Westbound: Number of Crashes by Type and Severity

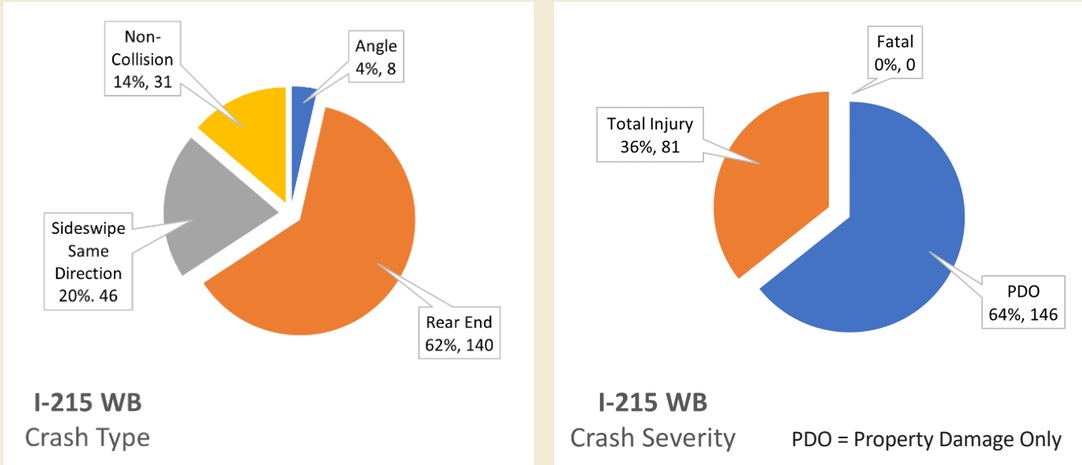
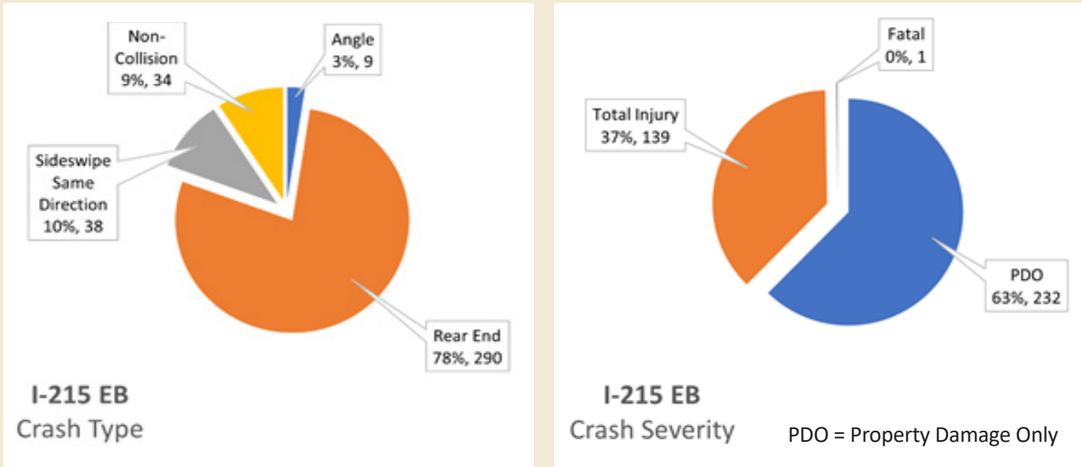


Figure 1.7 I-215 Eastbound: Number of Crashes by Type and Severity



[5] Crash rates are expressed as crashes per million vehicle miles traveled.

I-515 Freeway Safety

The crash data for I-515 northbound were analyzed between the system interchange and Galleria Drive. A total of 136 crashes were recorded in the 3-year period. Of these crashes, there were 43 injury crashes with 63 injuries. The most common crash types were rear-end, non-collision, and sideswipes.

The crash data for the I-515 southbound corridor were analyzed between the system interchange and Galleria Drive. A total of 218 crashes were recorded. Of these crashes, there was one disabling injury crash with one disabling injury, and 75 injury crashes with 113 injuries. The predominant crash types were rear-end, non-collision, and sideswipes, which are typical for congested roadways.

Table 1.3 summarizes the NDOT I-515 crash rate data. The I-515 northbound and I-515 southbound crash rates were lower compared to the NDOT average crash rates compared to similar roads.

Table 1.3 I-515 Northbound and Southbound Crash Rates[6] (System Interchange to Galleria Drive)

Crash Severity	NDOT Principal Arterial Interstate (2018)	I-515 NB TOTAL	I-515 SB TOTAL
Fatal	0.0045	0.0000	0.0000
Injury	0.5722	0.2626	0.4063
Property Damage Only	1.2447	0.5679	0.7592
Total	1.8214	0.8304	1.1656

I-11 Freeway Safety

Crash data for I-11 northbound were analyzed between Horizon Drive and the system interchange. There were a total of 84 crashes were recorded in the 3-year period. Of these crashes there were 33 injury crashes with 51 injuries. The most common crash types were rear-end, non-collision, and sideswipes, which are typical for congested roadways.

The crash data for the I-11 southbound corridor were analyzed between Horizon Drive and the system interchange. A total of 52 crashes were recorded. Of these crashes, there were two disabling injury crashes with nine disabling injuries, and 13 injury crashes with 16 injuries. The predominant crash types were rear-end, non-collision, and sideswipes.

Table 1.4 summarizes the NDOT I-11 crash rate data. The I-11 northbound and I-11 southbound crash rates were lower compared to the NDOT average crash rates compared to similar roads.

Table 1.4 I-11 Northbound and Southbound Crash Rates[7] (Horizon Drive to System Interchange)

Crash Severity	NDOT Principal Arterial Interstate (2018)	I-11 NB TOTAL	I-11 SB TOTAL
Fatal	0.0045	0.0000	0.0000
Injury	0.5722	0.2831	0.1314
Property Damage Only	1.2447	0.4375	0.3242
Total	1.8214	0.7206	0.4556

System Interchange Safety

The crash data for the ramps of the I-11/I-215/I-515/Lake Mead Parkway system interchange were analyzed. A total of 136 crashes were recorded in the 3-year period. Of these crashes, there were two disabling injury crashes with six disabling injuries, and 48 injury crashes with 68 injuries. The most common crash types were rear-end, sideswipes, and non-collision.

Table 1.5 summarizes system interchange crash rate data, which are lower compared to the NDOT average crash rates compared to similar roads.

Table 1.5 I-11/I-215/I-515/LMP System to System Interchange Crash Rates

Crash Severity	NDOT Principal Arterial Interstate (2018)	I-11/I-215/I-515/LMP Interchange Total
Fatal	0.0045	0.0000
Injury	0.5722	0.5330
Property Damage Only	1.2447	0.9168
Total	1.8214	1.4499

[6] Crash rates are expressed as crashes per million vehicle miles traveled. | [7] The 2018 NDOT Functional Classification Crash Rates were the latest available at that time.

1.2.5 Accommodate Regional and Local Plans

The Henderson Interchange project would accommodate NDOT's ongoing development of a valley-wide High Occupancy Vehicle (HOV) network through the study area and not preclude NDOT's siting of an I-11 corridor within the Las Vegas Valley. While the current HOV Plan does not identify HOV lanes in the Henderson Interchange, all future freeway improvement projects in the Las Vegas Valley must provide forward compatibility with at least one HOV lane in each direction[8]. The I-11 corridor location will be identified upon completion of NDOT's current Planning and Environmental Linkages (PEL) study, anticipated in 2022. The PEL study has determined that I-11 would utilize the Henderson Interchange, but the decision to use I-215 or I-515 has not been finalized.

The I-11 Traffic Study considers the impact of having a four-lane facility from Phoenix, Arizona through Nevada to I-80 near Reno. The study team considered whether designation of the existing highway as I-11 would increase peak traffic volumes for the Henderson Interchange. The existing US 93 highway between Phoenix and Las Vegas has been widened to four lanes throughout much of the corridor. Therefore, future interstate traffic is not anticipated to increase by an amount that would impact the traffic operations of the interchange. As part of the evaluation, for comparison purposes the study team observed traffic on I-15 during AM and PM peak travel times tapers off dramatically south of Las Vegas, even though the I-15 corridor connects to the much larger Los Angeles metro area. Therefore, the study team concluded that the majority of traffic at the Henderson Interchange during peak times is and would remain from local sources. Traffic projections from the I-11 Tier 1 Environmental Impact Statement Traffic Section Report were compared with the traffic projections developed as part of this study[9], and the data supports the conclusion that the majority of the traffic at the Henderson Interchange would remain from local sources. The I-11 designation of the full route between the Henderson Interchange and Phoenix would not result in meaningful increases to peak traffic volumes at the Henderson Interchange.

1.3 | What is the Purpose of the Project?

The purpose of the proposed project is to:

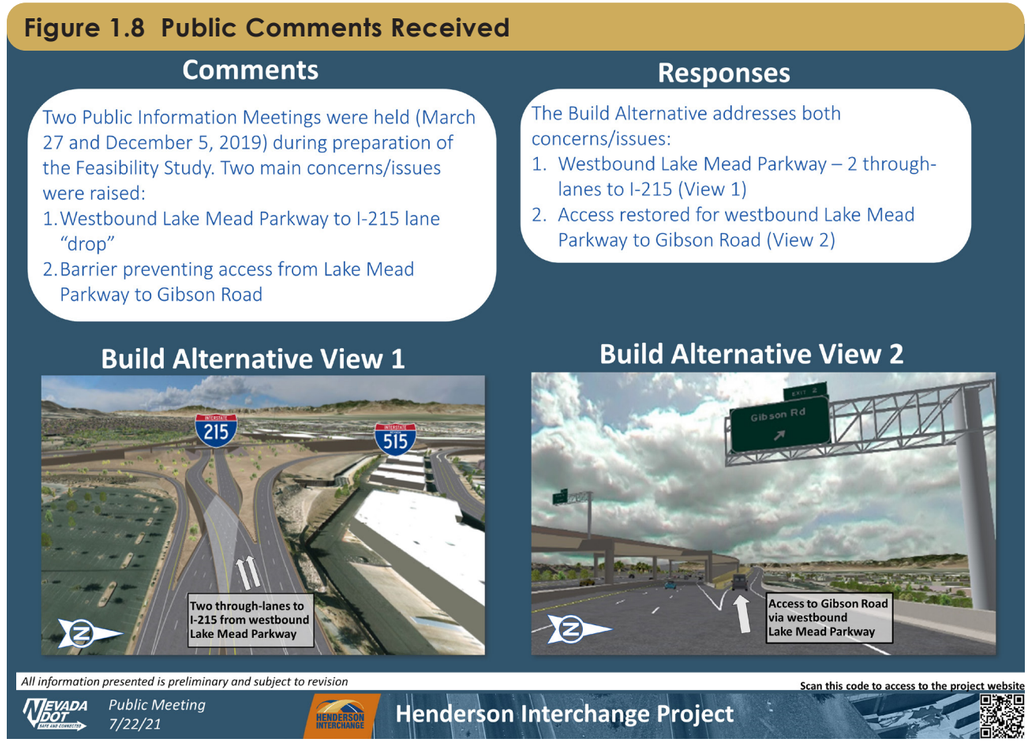
- Eliminate existing roadway deficiencies in the Henderson Interchange and surrounding roadways.
- Provide transportation improvements to serve existing and future growth areas.
- Restore local traffic connectivity.
- Accommodate regional and local plans.

1.4 | Public Contribution to the Purpose and Need

Two public information meetings were held during preparation of the Henderson Interchange Feasibility Study to obtain input from area residents and businesses. The first meeting was held on March 27, 2019 and was attended by over 100 people. The second public meeting was held on December 5, 2019 and was attended by approximately 50 people. At both public meetings, members of the public expressed their frustration with the recent I-515/215 Restriping Project completed by NDOT. This short-term project resulted in the loss of connectivity between I-515/Auto Show Drive, I-215, Gibson Road, and Lake Mead Parkway and a reduction in through lanes from Lake Mead Parkway to I-215.

As part of the NEPA phase, an in-person public information meeting on was held on July 22, 2021, with a virtual public comment period from July 6 through August 5, 2021. The in-person public meeting was attended by 42 people and the project website had over 600 site visits during the comment period. An exhibit titled Public Comments Received (see **Figure 1.8**) summarized the issues raised at the previous public meetings and how the Build Alternative addresses these concerns. The majority of the comments received express support for the project resolving these issues.

Figure 1.8 Public Comments Received



[8] NDOT. 2018. Southern Nevada HOV Plan 2015 Plan and 2018 Addendum. October. | [9] CA Group. 2021. Henderson Interchange Alternatives Analysis Report. May.

1.5 | Logical Termini and Independent Utility

FHWA environmental regulations and related guidelines outline three general principles (codified at 23 Code of Federal Regulations 771.111[f]) that are used to help justify a transportation improvement project. In conducting an evaluation of a proposed project under NEPA, it must be demonstrated that the project will:

1. Connect Logical Termini and be of sufficient length to address environmental matters on a broad scope.
2. Have independent utility or independent significance (i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made).
3. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

Four routes begin or end at the Henderson Interchange. The project limits along the north-south highway starting at Galleria Drive (northern terminus) on I-515 and ending at Horizon Drive (southern terminus) on I-11; and the east-west highway on Lake Mead Parkway beginning at Van Wagenen Street (eastern terminus) and ending on I-215 at Valle Verde Drive (western terminus). These logical termini, shown on **Figure 1.9**, allow for the development of a project that could be constructed alone, serving a significant purpose, addressing environmental impacts on a sufficient scale, and without requiring implementation of other future projects.

The specific project characteristics and attributes that justify its logical termini and independent utility are as follows:

- The project termini are the necessary limits to meet the design parameters and traffic movement needs of the system interchange improvements, and they are sufficient to address the environmental issues – specifically local circulation and access, and traffic noise associated with those improvements.
- The improvements are independent of future improvements to I-11, I-215, and I-515 but do not preclude or restrict any future improvements; nor do they require other adjacent roadway improvements to be fully functional.

Figure 1.9 Logical Termini

1.6 | Project Cost

NDOT developed and maintains a spreadsheet based conceptual cost estimating tool known as the *Wizard*. The spreadsheet allows the user to input quantities for generalized items such as widening, new roadways, bridges, walls, and demolition, and returns costs that are based on unit prices for previous construction projects. Construction and project cost estimates for the Build Alternative were developed using the *Wizard* tool. Results of the Wizard cost estimate for Year of Expenditure 2023 are estimated to be $261.4 million.

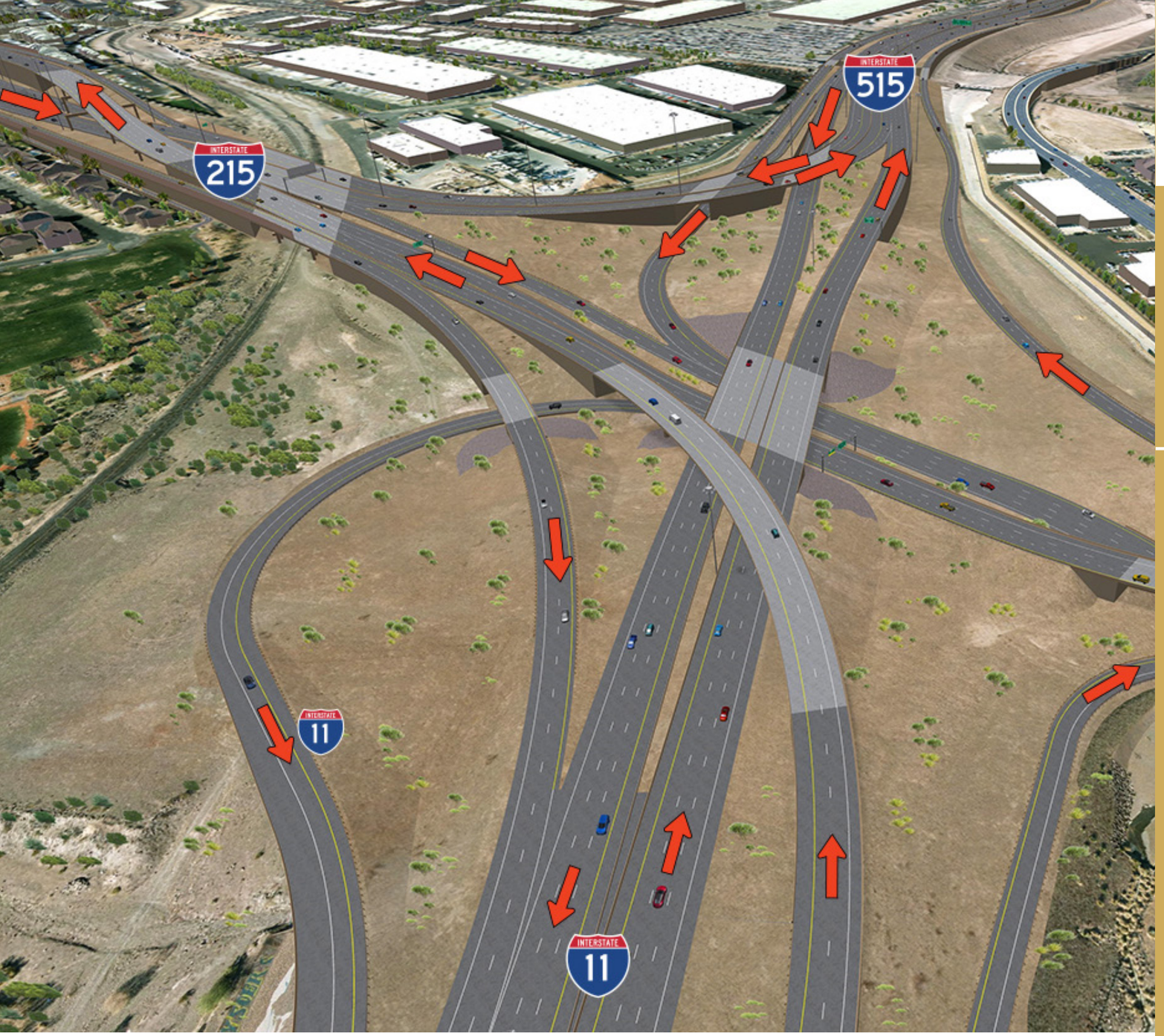
A Cost Risk Assessment (CRA) workshop was held with participation by NDOT, FHWA, City of Henderson, and the consultant team. The goal of the CRA was to consider potential risks that affect cost and schedule and to arrive at a 70th percentile cost and construction completion date for use by NDOT in programming the project, and to manage or mitigate the risks as appropriate. Examples of risks considered by the workshop team included post-COVID construction price volatility, potential for encountering and mitigating hazardous wastes in the project area, utility relocation time and cost, and railroad coordination time and costs. The CRA process uses statistical and probabilistic methods to analyze multiple scenarios, with the resulting 70th percentile cost being $330.6 million with the associated 70th percentile construction completion date of February 2029. This means that there is a 70 percent chance that the project would cost less than $330.6 million and a 70 percent chance that it would be completed prior to the end of February 2029.

Further refinements to the eastern crossover configuration were made after the CRA was completed in order to increase the weaving distance available to eastbound motorists on Lake Mead Parkway approaching the Eastgate Boulevard/Fiesta Henderson Boulevard intersection. These refinements are estimated to add $4.4 million to the project cost.

For planning purposes, the project cost is estimated to be $335 million with an estimated construction completion date of February 2029.

The project is listed in the 2021 Statewide Transportation Improvement Program (STIP)[10] as NEPA project CL20180052 for $7,000,000 and preliminary engineering and construction project CL20200029 for $277,000,000.

[10] https://estip.nevadadot.com



HENDERSON INTERCHANGE

Chapter 2

Alternatives

Section | Page No.

Chapter 2 | Alternatives

2.1 | Alternatives Development and Evaluation Process

This chapter describes the development and evaluation of alternative solutions to improve the Henderson Interchange to meet the project purpose and need described in **Chapter 1**. The Henderson Interchange connects I-515 from the north, I-215 from the west, I-11 from the south, and Lake Mead Parkway (SR-564) from the east. Each of the four routes begin or end at the interchange. This project has been defined and refined through two stages of development: the Feasibility Study and the Environmental Assessment. These two stages are described in detail in the following sections.

2.1.1 Henderson Interchange Feasibility Study

The Henderson Interchange Feasibility Study[1] (Feasibility Study) was completed in 2020 and developed a full range of project concepts through a design workshop and public meetings. Initial concepts were screened and resulting project alternatives were subjected to traffic analysis and design refinement. This study resulted in a recommendation to advance two build options to the National Environmental Policy Act (NEPA) process. The Feasibility Study is available at http://dot.nv.gov/hendersoninterchange.

2.1.2 Environmental Assessment

The NEPA process was initiated in 2020 following completion of the Feasibility Study. The proposed alternatives recommended by the feasibility study were evaluated in a Value Analysis Study[2] and refined in the Alternatives Analysis Report[3] to identify a build alternative and no build alternative for evaluation in the environmental document. The Alternatives Analysis Report is available at http://dot.nv.gov/hendersoninterchange.

2.1.2 Range of Alternatives Studied

The Feasibility Study provides a detailed summary of the project alternatives considered and rejected, as well as an explanation of the alternatives development and evaluation process that was followed. All the design improvement concepts identified during the alternatives development workshop were evaluated and ranked under a specific set of evaluation criteria and used to create the build alternative.

The study team used a collaborative decision-making process to develop consensus among the communities and agencies, including the City of Henderson, NDOT and FHWA, on the elements in the alternatives. A collaborative decision-making process was used because of the need for broad community support and to make the most informed use of limited financial resources available for transportation improvements in the region. Broad community support sets the stage for local agency participation, partnerships, and commitment to implementation through policies, zoning, and adoption of complementary land use and transportation plans.

The Feasibility Study recommended for further study during NEPA an Option 1 and an Option 2 (**Figures 2.1** and **2.2** shown on page 2-2). The existing interchange style would be retained under Option 1 with ramp and freeway reconstruction with additional lanes to accommodate 2040 traffic volumes. Option 2 is a crossover style interchanges with both the east-west (I-215 and Lake Mead Parkway) and north-south (I-515 and I-11) roadways crossover.

Feasibility Study Alternatives Screening Criteria

Safety, consideration of whether the idea could result in improved safety for users and if the idea could meet design criteria without the need for design exceptions.

Mobility, consideration of whether the idea could provide opportunities for users to efficiently move from their origin to their destination and minimize delay.

Accessibility, consideration of whether the idea could maintain existing connection or add access points between the local road network and the interstate highway system.

Implementability, consideration of relative construction costs and whether the idea would be accepted by the public.

Environmental, considers whether ideas could result in adverse impacts to the environment.

Schedule, considers whether ideas would result in the need for additional right-of-way or utility relocations that could lead to delays in implementation.

[1] CA Group, Henderson Interchange Feasibility Study, February 2020. | [2] CA Group, Henderson Interchange Value Analysis Study Report, August 2020. | [3] CA Group, Henderson Interchange Alternatives Analysis Report, May 2021.

Figure 2.1 Feasibility Study Option 1

Existing interchange style retained.
Ramp and freeway reconstruction with additional lanes to accommodate 2040 traffic volumes.

Figure 2.2 Feasibility Study Option 2

Crossover style interchange with ramps and freeway widened to accommodate 2040 traffic volumes.

2.1.3 Value Analysis Study

A week-long Value Analysis (VA) workshop was held in June 2020 with independent subject matter experts drawn from NDOT, FHWA, and the consultant team. The VA team developed 14 recommendations detailed in the VA Study Report and five VA Study ideas were accepted by NDOT[4]. These modifications are discussed in the following section.

2.1.4 Alternatives Refinement

The study team modified the geometric layouts of Feasibility Study Option 1 (**Figure 2.1**) and Feasibility Study Option 2 (**Figure 2.2**) to incorporate the VA Study recommendations. The study team retained the original Feasibility Study Option 1 for consideration and incorporated the VA Study recommendations as new Option 3 (**Figure 2.4**) for further evaluation in the Alternatives Analysis Report. Key modifications for development of the new Option 3 included retaining as much of the existing system interchange as possible while constructing a median-to-median flyover connector between I-215 and I-515. The VA Study recommendations for Feasibility Study Option 2 were incorporated as new Option 2A (**Figure 2.3**) and Feasibility Study Option 2 was discarded and replaced by new Option 2A. Key modifications for new Option 2A included not crossing over the north-south I-11/I-515 highway and reconfiguring ramps beneath the central system interchange bridge.

Throughout the study process, workshops and meetings were held with agency representatives from FHWA, NDOT, and City of Henderson. Meetings were held at key milestones with the technical team and the public (see **Chapter 4**) to review the study results and to provide direction.

Alternative Ranking - Weighted Scoring System

Feasibility Study Option 1	New Option 2A	New Option 3
Median Weighted Score	Highest Weighted Score	Lowest Weighted Score
8.0/10	**9.1/10** Recommended as Singe Build Alternative	**7.4/10**

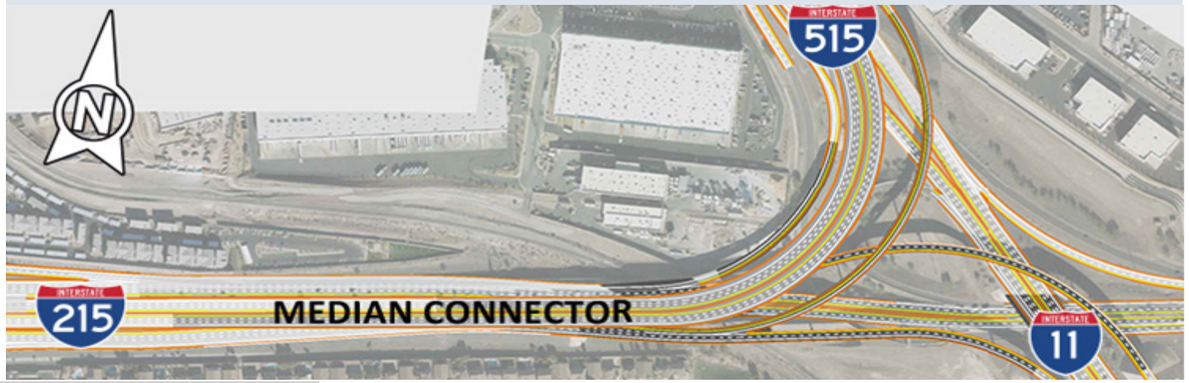
Based on results of the weighted scoring conducted in January 2021, **the Technical Advisory Committee identified new Option 2A as the recommended Build Alternative to be evaluated further in the NEPA environmental study**. The Build Alternative (Option 2A) is the least-cost alternative and meets each of the needs of the project. Even though other options retain much of the existing system interchange and most of the existing flyover bridges, the Build Alternative has the least structure cost because crossover style interchanges require fewer and smaller bridges with most ramps on only two levels. Options 1 and 3 require large new flyover bridges that would require replacement at a future date and Option 3 would have unsatisfactory traffic operations performance in the PM peak sensitivity analysis. Refer to the Henderson Interchange Alternatives Analysis Report for full analysis and ranking information.

Figure 2.3 New Option 2A

Modification of Option 2 crossover, where only the east-west roadways (I-215 & Lake Mead Parkway) cross over.

Figure 2.4 New Option 3

Existing “core” interchange retained, with a flyover median connector added between I-515 and I-215.



[4] Detailed information regarding concepts developed and evaluated are found in the Henderson Interchange Alternatives Analysis Report, May 2021.

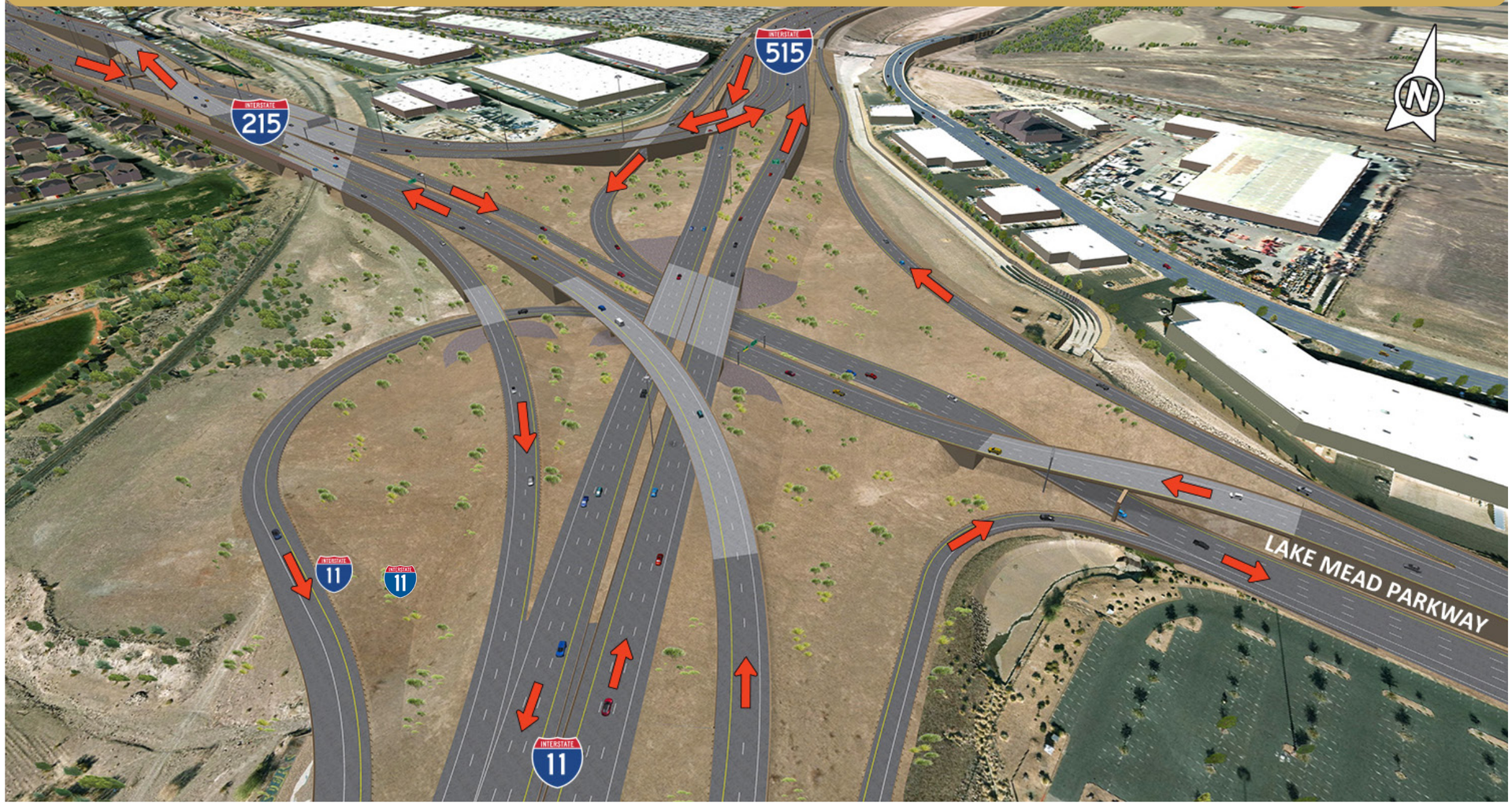
2.2 | No Build Alternative

The No Build Alternative would take no action to address the existing deficiencies and safety concerns within the project limits. The No Build Alternative provides a baseline for evaluating future conditions and for evaluating impacts of the Build Alternative. The No Build Alternative assumes regular maintenance and other planned/permitted transportation improvements proposed by others in proximity to the project area would be constructed. Under the No Build alternative, traffic operations would continue to degrade, with demand substantially exceeding the roadway capacity. The complete traffic operations analysis is included in the Alternatives Analysis Report (**Appendix A**).

2.3 | Build Alternative

The Build Alternative is a crossover style interchange with the east-west highway directions crossing each other at special grade separation structures east and west of the central interchange, shown in **Figure 2.5**. By crossing the traffic similar to the diverging diamond interchange on Horizon Drive at I-11, motorists would be positioned to freely enter and exit on the side that is in the direction they are intending to travel, thus eliminating the need for most of the large 'flyover' bridge structures commonly associated with a directional interchange.

Figure 2.5 Build Alternative



The Build Alternative includes the following major components:

- Crossover style interchange for the east-west highway directions (see **Figure 2.5**).
- Travel between I-215 and Auto Show Drive using braided ramps (see **Figure 2.6**). Braided ramps are ramps that cross over each other and are vertically separated, with one ramp elevated over the other.
- Reconnection of travel from Lake Mead Parkway to Gibson Road using braided ramps, as shown by the blue route on **Figure 2.7**.
- Re-use of 22 out of the 27 existing bridges in the project area.
- Built-in capacity to add a future lane in each direction between I-215 and I-515, either as general purpose or HOV lanes.
- Auxiliary lanes on I-11 between Horizon Drive and the system interchange.
- Widen Lake Mead Parkway to four through lanes in each direction from Eastgate Road/Fiesta Henderson Boulevard to Van Wagenen Street (see **Figure 2.8**).

Stakeholder outreach conducted during development of this Environmental Assessment resulted in the eastern crossover shifting approximately 400 feet to the west. This shifted location increases the weaving length between the I-11 north-to-east ramp merge to eastbound Lake Mead Parkway and the intersection with Eastgate/Fiesta Henderson Boulevard. This improvement has been evaluated as part of the Build Alternative.

Figure 2.6 Auto Show Connectivity with I-215

Figure 2.7 Lake Mead Parkway to Gibson Road Connectivity

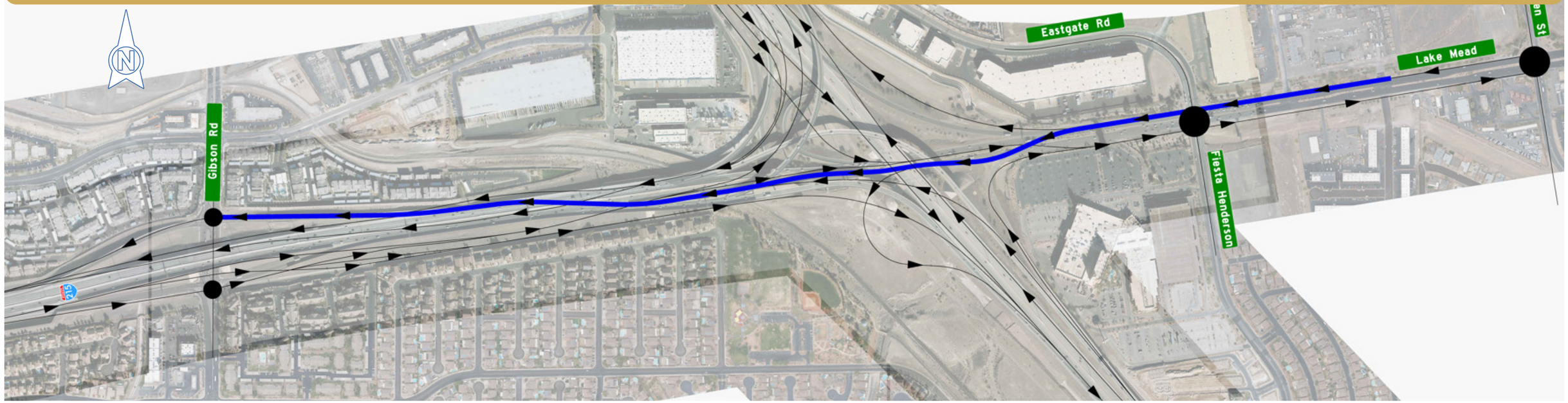
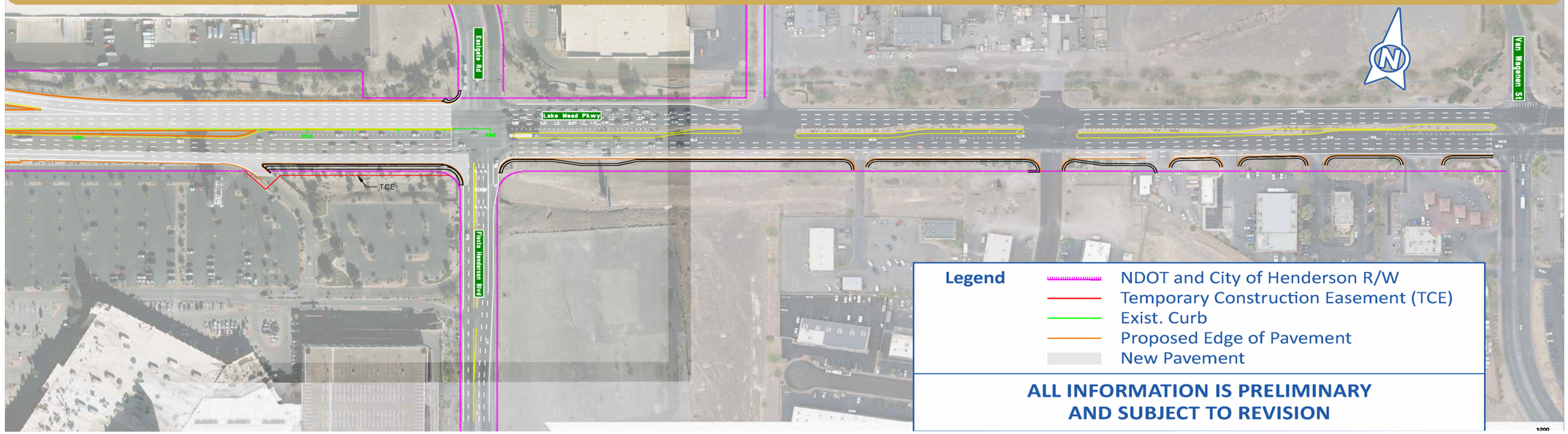


Figure 2.8 Lake Mead Parkway Improvements



2.4 | How Does the Build Alternative Meet the Purpose and Need of the Project?

As discussed in **Chapter 1**, purpose of the project is to:

- Eliminate existing roadway deficiencies in the Henderson Interchange and surrounding roadways.
- Provide transportation improvements to serve existing and future growth areas.
- Restore local traffic connectivity.
- Accommodate regional and local plans.

The Henderson Interchange serves as a junction between I-11 to the south, I-215 to the west, I-515 to the north, and Lake Mead Parkway to the east. The Build Alternative would improve connectivity and traffic operations at the Henderson Interchange which connects the City of Henderson to the metropolitan center of Las Vegas, serving existing and future growth areas across southern Nevada.

The Build Alternative would accommodate NDOT's ongoing development of a valley-wide HOV network through the study area and would not preclude NDOT's siting of an I-11 corridor within the Las Vegas Valley. While the current HOV Plan does not identify HOV lanes through the Henderson Interchange, all future freeway improvement projects in the Las Vegas Valley must provide forward compatibility with at least one HOV lane in each direction[5]. Future physical HOV improvements, such as roadway pavement and wider bridge decks, are incorporated into the original design for the Build Alternative. Use of these improvements as HOV lanes could be accomplished with a re-striping project when needed as the HOV network is developed.

The I-11 corridor may be selected upon completion of NDOT's current Planning and Environmental Linkages (PEL) study anticipated in 2022. The PEL study has determined that I-11 would utilize the Henderson Interchange, but the decision to use I-215 or I-515 has not been finalized. The study team considered whether designation of the existing highway as I-11 would substantially increase peak traffic volumes for the Henderson Interchange. Future interstate traffic is not anticipated to increase by an amount that would impact traffic operations of the Henderson Interchange since most of the existing US Route 93 (US 93) between Phoenix and Las Vegas has already been widened to four lanes. Additionally, the traffic volumes on the routes served by the Henderson Interchange are mostly local trips within the metropolitan area.[6]

The Build Alternative would mitigate the existing roadway deficiencies, thereby reducing travel delay and improving safety, and would restore important local traffic connectivity. **Figure 2.9** explains how the Build Alternative addresses existing roadway deficiencies and restores local traffic connectivity.

[5] 2018. NDOT. Southern Nevada HOV Plan Update. July. | [6] A comparison of traffic projections from the I-11 Tier 1 EIS Traffic Section Report and traffic projections developed as part of the Henderson Interchange traffic study are presented in the Alternatives Analysis Report. CA Group. 2021. Henderson Interchange Alternatives Analysis Report. May.

Figure 2.9 How the Build Alternative Meets the Need for the Project

Why is the Project Needed?

1. I-215 eastbound to I-11 southbound interchange ramp merges from two (2) lanes to one (1) lane. This merge results in vehicles waiting in line on the ramp and on eastbound I-215.
2. The weaving movement on I-215 westbound between the system interchange ramps and the Gibson Road off-ramp resulted in increased travel time and delay. In 2017, I-215 was re-striped and barriers were placed to prevent motorists on Lake Mead Parkway and I-215 West from exiting at Gibson Road. These barriers eliminated access for westbound motorists to exit at Gibson Road.
3. The weaving movement on I-215 eastbound between the Gibson Road on-ramp and the system interchange ramps results in increased travel time and delay. Traffic on eastbound I-215 experiences speeds as slow as 40 miles per hour during the PM peak period. This segment also exceeds statewide average for crashes.
4. The I-215 eastbound system ramp merges on to I-515 northbound, followed by the Auto Show Drive on-ramp merge. These ramp merges occur within about 1/4 mile and do not include an auxiliary or parallel merge lane. These successive merges result in traffic slowing on the freeway.
5. Traffic exiting southbound I-11 to Horizon Drive extends to mainline I-11 as a result of deficiencies along Horizon Drive at the interchange.
6. The southbound I-515 to westbound I-215 system interchange ramp experiences substantial travel delay. Traffic backs up on southbound I-515 and blocks the on-ramp from Auto Show Drive.
7. Westbound Lake Mead Parkway drops from two (2) lanes to one (1) lane at the system interchange. This lane reduction results in traffic extending to the Lake Mead Parkway and Eastgate Road intersection. Lake Mead Parkway exceeds the statewide average crash rate for urban principal arterials.

How Does the Build Alternative Address the Need for the Project?

1. The Build Alternative would include two (2) 12-foot-wide lanes on the I-215 eastbound to I-11 southbound ramp, eliminating the merge to one lane.
2. The Build Alternative would remove the barriers on I-215 westbound and restore connectivity for motorists traveling from Lake Mead Parkway to Gibson Road.
3. The Build Alternative reduces the I-215 eastbound weaving movements by separating the traffic heading to northbound I-515 via a median (left-side exit) from the traffic heading to southbound I-11 via a right-hand exit prior to Gibson Road. The configuration reduces the concentration of vehicles on the outside lanes of the freeway. Additionally, the ramp to I-515 southbound is located earlier, between the Gibson Road off- and on-ramps.
4. The Build Alternative separates traffic from eastbound I-215 entering northbound I-515 via a median entrance on the left from the Auto Show Drive on-ramp entrance on the right; and repurposes the existing on-ramp from I-215 to I-515 to instead convey the much lower traffic volumes from westbound Lake Mead Parkway to northbound I-515. While the successive right-side merges would be retained, the traffic volumes would be reduced to a point that can be accommodated by the successive merges.
5. The Build Alternative would construct an auxiliary lane on southbound I-11 that is forced to exit at the Horizon Drive interchange. The auxiliary lane is anticipated to prevent backups and slowdowns at the Horizon Drive interchange from impacting traffic flow on I-11.
6. The Build Alternative would construct a three-lane (in each direction) median-to-median connection between I-215 and I-515. This median connector would accommodate future projected traffic volumes.
7. The Build Alternative includes two (2) lanes for westbound Lake Mead Parkway through the system interchange. Lake Mead Parkway would be four (4) lanes in each direction between Eastgate Road/Fiesta Henderson Boulevard and Van Wagenen Street.

HENDERSON INTERCHANGE

Chapter 3

Existing Conditions, Environmental Impacts, and Mitigation

Chapter 3 | Existing Conditions, Environmental Impacts and Mitigation

3.1 | Areas of No Impact

The Federal Highway Administration (FHWA) and Nevada Department of Transportation (NDOT) considered all relevant environmental and social issues during the environmental analysis. Data collection and analysis determined that the environmental resources and other factors listed below are not applicable to the study area or would only be very minimally affected by the proposed project.

3.1.1 Biological Resources[1]

The project would occur within an urban transportation corridor. The project area, as well as areas adjacent, are within developed areas and a small area of undisturbed habitat. The project will have no effect on the federally threatened Mojave Desert Tortoise.

The larger project area has small patches of undisturbed native vegetation that may contain the Las Vegas Bearpoppy, a Nevada Bureau of Land Management (BLM) special status species, but those areas are outside of the proposed improvements.

If bats are identified roosting within the project limits, the Nevada Department of Wildlife (NDOW) will be contacted for guidance.

If construction alters any breeding habitat (vegetation/structure removal) occurs during the migratory bird breeding season (March 1 through July 31), the contractor shall employ a qualified biologist (one with experience in bird identification, general nesting behavior, nest and egg identification, and knowledge of habitat requirements for migratory birds) to conduct a migratory bird nest search of all vegetation within seven days prior to commencement of construction activities. This shall include burrowing and ground nesting species in addition to those nesting in vegetation. Vegetation may be removed if it has been surveyed and no active bird nests are present. The contractor shall avoid any active nests.

The contractor shall maintain an appropriately-sized buffer area if any active nests (containing eggs or young) are found and must avoid the area until the young birds fledge.

The contractor will develop and follow a Noxious Weed Management Plan to prevent the establishment and spread of Nevada State listed noxious weeds per Nevada Revised Statute 555.

3.1.2 Floodplains

The project is located on Federal Emergency Management Agency (FEMA) FEMA Flood Insurance Rate Map (FIRM) panels 2583, 2595 and 2615. The majority of the project lies within Zone X defined by FEMA as areas determined to be outside the 0.2% annual chance floodplain. From Auto Show Drive to Galleria Drive, the project lies within Shaded Zone X, defined by FEMA as areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. Portions of the project are crossed by Special Flood Hazard Areas (SFHA) Zone A. SFHA are defined as the area that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year. Zone A is a SFHA for which no base flood elevations have been determined.

The Clark County Regional Flood Control District (CCRFCD) publishes and updates a drainage master plan that inventories major existing flood control facilities and shows locations of proposed facilities. These master planned facilities include several storm drainage systems that cross and run parallel to the I-215 and I-515 freeways, all of which are designed to hold and control the 1% annual chance flood, thus reducing the potential for flooding.

Both local and master planned facilities crossing I-215 generally convey storm runoff from south to north; facilities crossing I-515 generally convey storm runoff from west to east. Storm runoff continues northeast away from the project site to the lower Las Vegas Wash, which ultimately drains into Lake Mead.

The FEMA SFHAs Zone A crossings of the project are listed in the Water Resources Technical Memorandum[2], most of which are contained within storm drain facilities.

The Build Alternative improvements require modifications to existing CCRFCD Master Plan and local drainage facilities that exist along the project corridor and are summarized in the Water Resources Technical Memorandum. Potential impacts to existing drainage facilities to accommodate the Build Alternative include relocation of drop inlets and storm drain; extending/shortening storm drain laterals; relocating storm drain systems and channels; and extending culvert crossings. Overall, conveyance of stormwater will maintain historic drainage patterns with minor rerouting to accommodate new bridges through extension and rebuild of existing drainage facilities. The Build Alternative would not adversely affect existing flow patterns, thereby avoiding impacts to downstream facilities and adjacent properties. Additionally, NDOT requires improvements located within SFHAs be preserved or improve the existing condition. The Build Alternative would have no adverse impact on floodplain elevations.

[1] NDOT. 2021. Project Review Determination. September. | [2] CA Group. 2021. Water Resources Technical Memorandum. December.

3.1.3 Water Resources

The dredge and fill impacts within the ordinary high water mark of Waters of the United States residing within the project area (notably the flood control facilities under the jurisdiction of the Clark County Regional Flood Control District) are subject to Section 404/401 permitting. The project will require a U.S. Army Corps of Engineers (USACE) 404 Permit (Nationwide Permit 14). The project will also require a Section 401 Water Quality Certification issued by Nevada Division of Environmental Protection (NDEP), Bureau of Water Quality Planning, as required for a USACE 404 Permit.

Both NDOT and the City of Henderson are committed to minimizing the impact of stormwater pollution on Lake Mead and therefore manage compliance activities under their respective municipal separate storm sever systems (MS4) permits, which are issued by the Nevada Division of Environmental Protection (NDEP). In accordance with this permit, and the stormwater Construction General Permit also issued by NDEP, NDOT will implement Best Management Practices (BMPs) during construction.

As part of the development of BMPs for the project, NDOT's construction contractor must develop a Stormwater Pollution Prevention Plan (SWPPP), then file a Notice of Intent with NDEP's Bureau of Water Pollution Control to obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activity (NVR100000). The SWPPP will outline temporary and permanent erosion and sediment controls, locate stormwater discharge points, and describe BMPs to be implemented to prevent or reduce stormwater pollutant discharge associated with construction activities to the maximum extent practical.

NDOT will require that the temporary erosion control and stormwater control measures implemented during construction comply with the NDOT Storm Water Quality Manuals (References 4 and 5). Typical BMPs that may be selected for this project include:

- Street sweeping and vacuuming during construction
- Storm drain inlet protection
- Fiber rolls, silt fences, and gravel bag berms
- Stockpile and construction site management

3.1.4 Energy Resources and Minerals

Energy resources and mineral resources were not subject to detailed evaluation since no energy sources or minerals are present within or near the study area.

3.1.5 Environmental Justice

Environmental justice analyses are required by Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, to ensure that federal actions, such as the Henderson Interchange project, do not result in disproportionally high and adverse impacts on minority and low-income populations. According to FHWA environmental justice policy (Order 6640.23A), minority means a person who is black or African American, Asian American, American Indian/Alaskan Native, Native Hawaiian and other Pacific Islander, or Hispanic or Latino (of any race). Low-income refers to a person whose median household income is at or below the Department of Health and Human Services (HSS) poverty guideline, which was $26,500 for a family of four in 2021.

To address potential impacts on minority and low-income populations for the Henderson Interchange project, race, ethnicity, and income data from the 2020 Census Redistricting Data and 2015-2019 American Community Survey were compiled for the demographic study area and compared to a reference area to determine the existence of environmental justice populations in the demographic study area. The demographic study area is comprised of Census tracts intersecting with the project area. Environmental justice populations are considered to exist in any Census tract in which the minority population exceeds 50 percent, or the minority or low-income population is meaningfully greater than the population of the reference area. For the purposes of this assessment, "meaningfully greater" is considered to be a population 10 percentage points higher than the reference area.

The minority population within the demographic study area is generally consistent with the overall minority population within the Henderson city reference area (see Section 3.2 **Table 3.1** and **3.2**). According to the threshold criteria identified above, minority environmental justice populations reside in Census Tracts 51.12, 51.13, and 51.14 (minority population greater than 50 percent)[3] and Hispanic or Latino population (meaningfully greater than the reference population). The population within Census Tract 51.13 is located south of Galleria Drive east of I-515 and is a gated single-family residential community. The residential populations within Census Tracts 51.12 and 51.14 are not adjacent to the freeway, with commercial businesses located between the freeway and the residential areas and would not suffer any adverse impacts.

Data from the 2015-2019 American Community Survey for this location (Census Tract 51.05) indicates the median household income was $63,964 which is above the poverty guideline.

No minority or low-income populations have been identified that would be adversely impacted by the proposed project as determined above. Therefore, in accordance with the provisions of EO 12898 and FHWA Order 6640.23, no further EJ analysis is required.

3.1.6 Cultural Resources

NDOT and FHWA consulted with the Nevada State Historic Preservation Office (SHPO) to determine if the project would have an adverse effect on cultural resources within the project's area of potential effects (APE). The SHPO reviewed and approved the project screening form on August 24, 2021 and the boundaries of the proposed APE. Based on a field and literature survey conducted for the proposed project, it was determined that the project would have a finding of No Adverse Effect to historic properties. SHPO concurred with this Finding on January 14, 2022. See **Appendix C** for SHPO documentation.

NDOT will use the public process in accordance with the Programmatic Agreement to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

[3] The 2020 Census divided Census Tract 51.05 into three tracts: 51.12, 51.13, and 51.14.

3.2.1 Existing Conditions

Land Use and Planning

The project area is located within the City of Henderson, Clark County, Nevada. The limits of the project are Valle Verde Drive to the west, Galleria Drive to the north, Horizon Drive to the south, and Van Wagenen Street to the east as shown on **Figure 3.1**. Land uses in the project area are a mix of commercial and residential, typical of suburban development. Along the north and south sides of I-215 from Valle Verde to the system interchange, land use is primarily residential development. Commercial shopping centers are located at the major cross streets of Valle Verde and Stephanie Street. Industrial land uses are located on the north side of I-215 between Gibson Road and the system interchange. Residential development is located along both sides of I-11 from the system interchange to Horizon Drive, with the Fiesta Henderson Hotel and Casino located in the southeast quadrant. Areas immediately adjacent to both sides of I-515 are mostly commercial land uses, including Black Mountain Industrial Center in the northeast quadrant and the Valley Auto Mall surrounding the Auto Show Drive interchange (see **Figure 3.1**). Galleria at Sunset, a shopping mall, is located in the southwest quadrant of I-515/Galleria Drive interchange. Sunset Station Hotel and Casino is located south of Sunset Road and west of I-515. Residential developments are located east of I-515 between Galleria Drive and Sunset Road and west of I-515 between Warm Springs Road and American Pacific Drive.

Hannah Marie Brown Elementary School, which opened in 2021, is located at 10 Chapata Drive, south of I-215 and Stephanie Street. Lorna Keterson Elementary School is located at 231 Bailey Island Drive, west of I-515 near Gibson Road and Auto Show Drive. Lyal Burkholder Middle School is at 171 West Van Wagenen Street, approximately half a mile to the east of I-11. The schools are shown in **Figure 3.1**.

Figure 3.1 Land Use

City of Henderson land use policies are documented in the Henderson Strong Comprehensive Plan, which was adopted on July 11, 2017[1]. Henderson Strong is the citywide planning document that communicates the vision, long-term goals and objectives that guide the development and growth of Henderson for the next 20 years. Henderson has aligned local plans with the Southern Nevada Strong Regional Plan, which identified a series of priorities and goals and objectives for the region's economic development. The City of Henderson was the lead agency in developing the Southern Nevada Strong Regional Plan, which was adopted by the Southern Nevada Regional Planning Coalition, the Regional Transportation Commission of Southern Nevada, and all local municipalities.

The Henderson Strong Plan identifies three priority areas for reinvestment. One of these priority areas is the Lake Mead Parkway corridor[2], which should serve as an attractive and inviting gateway into downtown Henderson. Transportation Goals G, H, and I outline the priorities for greater access to transit, enhanced safety and connectivity for bicyclists and pedestrians, and improvements for all modes of travel for the Lake Mead Parkway Corridor priority area. The Henderson Strong Plan transformed the City of Henderson's transportation planning policies and regulations. A New Master Transportation Plan was the result.

Community services are provided by several agencies in Henderson. The Henderson Police Department is the law enforcement agency, with two stations providing services for the project area. The North Police Station is located near Sunset Road and Boulder Highway serving the east side of the project area, and the West Police Station is located on Green Valley Parkway south of I-215. Henderson Fire Department Station 85 is located in the southwest quadrant of the I-11 and Horizon Drive interchange. The Office of Emergency Management is responsible for all-hazard mitigation, preparedness, protection, prevention, response, and recovery program for the City of Henderson.

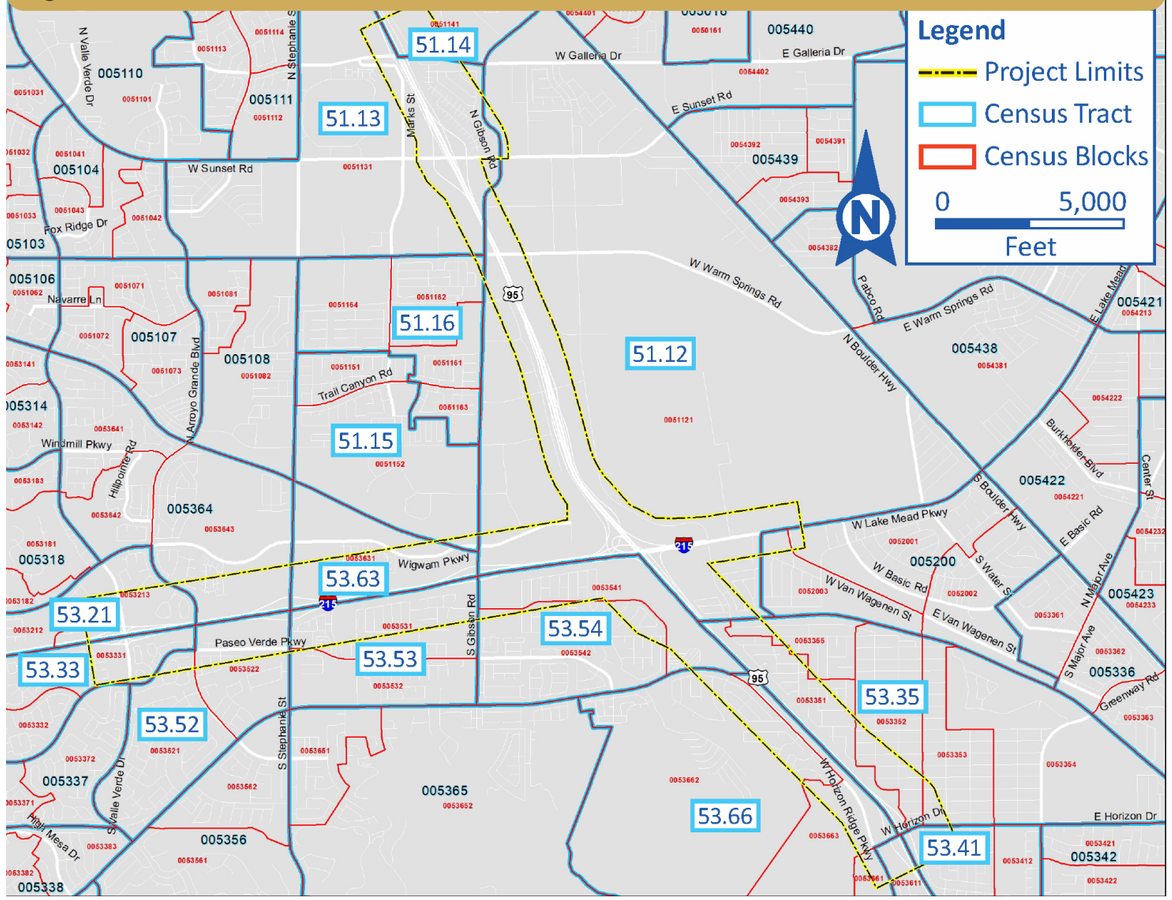
Population Characteristics

The following discussion of the demographic characteristics of the project area is based on US Census Bureau data, including 2020 Census data and 2019 American Community Survey data. Demographics is the statistical study of populations. The American Community Survey is a nationwide survey that collects local demographic data every year, rather than every 10 years like the Census. The demographic study area is defined as the Census tracts intersecting the project limits as shown in **Figure 3.2**.

Based on the 2020 Census Redistricting Data, there are 55,853 people within the demographic study area, while the total population of the City of Henderson is 317,610 people (see **Table 3.1**). The population within the demographic study area represents approximately 17.6 percent of the total population within Henderson.

The minority population within the demographic study area is generally consistent with the overall minority population within the City of Henderson as shown in **Table 3.1**. The percentage of Black or African American population in the study area is slightly higher at 7.8 percent than the 6.7 percent in the overall City of Henderson. Census Tract 51.14, located at the northern limits of the study area at I-515 and Galleria Drive has approximately 18 percent Black or African American population.

Figure 3.2 Census Tracts and Blocks



Within the City of Henderson, approximately 17.9 percent of the population is Hispanic or Latino as shown in **Table 3.2**. The overall demographic study area is generally consistent with the Hispanic or Latino population approximately 20 percent.

The median household income for the City of Henderson is $81,505. Based on data available from the 2015-2019 American Community Survey 5-Year Estimates[3] for Census Tracts in the demographic study area, the median household income within the study area is $83,988.

According to data from the 5-year period of 2015-2019, the unemployment rate in the study area ranged from 3.6 percent to 10 percent. The Henderson Strong Metrics Dashboard, updated in October 2020, shows that the overall unemployment rate for Henderson was 7.2 percent in 2018 and decreased to 5.5 percent in 2019. It is anticipated that the unemployment rate in the study area would show a similar decrease.

[1] City of Henderson. 2020. Henderson Comprehensive Plan January 2017 – Amended May. | [2] City of Henderson. 2017. Henderson Comprehensive Plan, Priority Areas. January. | [3] The 2020 Census divided Census Tract 51.05 into Tracts 51.12, 51.13, and 51.14.

Table 3.1 Population and Race

	Henderson		Total Study Area		Census Tract 51.12		Census Tract 51.13		Census Tract 51.14		Census Tract 51.15		Census Tract 51.16		Census Tract 53.21		Census Tract 53.33		Census Tract 53.35		Census Tract 53.41		Census Tract 53.52		Census Tract 53.53		Census Tract 53.54		Census Tract 53.63		Census Tract 53.66	
Total	**317,610**	**Percent**	**55,853**	**Percent**	**3,048**	**Percent**	**3,337**	**Percent**	**5,149**	**Percent**	**2,914**	**Percent**	**5,691**	**Percent**	**3,583**	**Percent**	**3,150**	**Percent**	**4,600**	**Percent**	**2,323**	**Percent**	**4,071**	**Percent**	**5,340**	**Percent**	**6,369**	**Percent**	**2,317**	**Percent**	**3,961**	**Percent**
White	200,585	63.2%	33,377	59.8%	1,450	47.6%	1,476	44.2%	2,148	41.7%	1,680	57.7%	3,118	54.8%	2,377	66.3%	2,157	68.5%	3,52	76.6%	1,674	72.1%	2,754	67.6%	3,113	58.3%	3,831	60.2%	1,187	51.2%	2,887	72.9%
Black or African American	21,355	6.7%	4,357	7.8%	366	12.0%	342	10.2%	939	18.2%	170	5.8%	410	7.2%	161	4.5%	96	3.0%	96	2.1%	99	4.3%	169	4.2%	515	9.6%	461	7.2%	357	15.4%	176	4.4%
American Indian or Alaskan Native	2,366	0.7%	473	0.8%	33	1.1%	50	1.5%	45	0.9%	24	0.8%	28	0.5%	24	0.7%	20	0.6%	40	0.9%	30	1.3%	26	0.6%	40	0.7%	66	1.0%	21	0.9%	26	0.7%
Asian	29,684	9.3%	5,414	9.7%	348	11.4%	529	15.9%	527	10.2%	313	10.7%	778	13.7%	293	8.2%	312	9.9%	138	3.0%	61	2.6%	459	11.3%	545	10.2%	669	10.5%	212	9.1%	230	5.8%
Native Hawaiian and Other Pacific Islander	2,430	0.8%	511	0.9%	9	0.3%	36	1.1%	73	1.4%	55	1.9%	79	1.4%	20	0.6%	13	0.4%	26	0.6%	15	0.6%	17	0.4%	66	1.2%	57	0.9%	21	0.9%	24	0.6%
Some Other Race	19,276	6.1%	3,787	6.8%	332	10.9%	341	10.2%	602	11.7%	207	7.1%	417	7.3%	209	5.8%	152	4.8%	201	4.4%	136	5.9%	165	4.1%	285	5.3%	402	6.3%	179	7.7%	159	4.0%
Two or More Races	41,914	13.2%	7,934	14.2%	510	16.7%	563	16.9%	815	15.8%	465	16.0%	861	15.1%	499	13.9%	400	12.7%	574	12.5%	308	13.3%	481	11.8%	776	14.5%	883	13.9%	340	14.7%	459	11.6%

Table 3.2 Hispanic or Latino Origin

	Henderson		Total Study Area		Census Tract 51.12		Census Tract 51.13		Census Tract 51.14		Census Tract 51.15		Census Tract 51.16		Census Tract 53.21		Census Tract 53.33		Census Tract 53.35		Census Tract 53.41		Census Tract 53.52		Census Tract 53.53		Census Tract 53.54		Census Tract 53.63		Census Tract 53.66	
Total	**317,610**	**Percent**	**55,853**	**Percent**	**3,048**	**Percent**	**3,337**	**Percent**	**5,149**	**Percent**	**2,914**	**Percent**	**5,691**	**Percent**	**3,583**	**Percent**	**3,150**	**Percent**	**4,600**	**Percent**	**2,323**	**Percent**	**4,071**	**Percent**	**5,340**	**Percent**	**6,369**	**Percent**	**2,317**	**Percent**	**3,961**	**Percent**
Not Hispanic or Latino	260646	82.1%	44666	79.8%	2216	72.7%	2429	72.8%	3665	71.2%	2319	79.6%	4446	78.1%	2956	82.5%	2690	85.4%	3844	83.6%	1838	79.1%	3556	87.3%	4367	81.8%	5096	80.0%	1809	78.1%	3435	86.7%
Hispanic or Latino	56964	17.9%	11187	20.0%	832	27.3%	908	27.2%	1484	28.8%	595	20.4%	1245	21.9%	627	17.5%	460	14.6%	756	16.4%	485	20.9%	515	12.7%	973	18.2%	1273	20.0%	508	21.9%	526	13.3%

3.2.2 Impacts

A summary of land use and socioeconomic conditions impacts is presented in **Table 3.3**.

Table 3.3 Land Use and Socioeconomic Conditions Impacts

Resource	No Build Alternative	Build Alternative
Land Use and Planning	No impact.	The Build Alternative meets goals and policies identified in the Henderson Strong Comprehensive Plan and Master Transportation Plan. **Goal T1**: Comprehensive Transportation Systems - The City of Henderson is collaborating and coordinating with federal, state, and local agency partners to advocate, plan and invest in regional capital projects and the City's priorities (Strategies T1.6 and 1.10). **Goal T4**: Master Transportation Plan – The Build Alternative provides a connection to nearby multi-use paths and parks (Strategy T4.14).
Land Use: Right-of-Way Acquisition	No impact.	The Build Alternative would not result in the acquisition of new right-of-way and would not require the relocation of homes or businesses.
Land Use: Temporary Construction Easements	No impact.	The Build Alternative would result in a temporary construction easement of 0.13 acre from the Fiesta Henderson property (APN 178-13-301-017) to reconstruct the driveway access to the property (see **Figure 3.3**). This easement would not disrupt operations and alternative access would be provided during reconstruction of the driveway. The landscaping and parking for the Fiesta Henderson occupies a portion of NDOT's right-of-way by revocable permit. That permit would be revoked or amended for this project.
Population: Community Cohesion[4], Community Facilities, and Services	No impact.	Residents who travel the Henderson Interchange would benefit from the improved connectivity and access under the Build Alternative. The Build Alternative would improve community cohesion by restoring connectivity from westbound Lake Mead Parkway to Gibson Road and by providing access to and from Auto Show Drive and I-215/Lake Mead Parkway (see **Chapter 2**, **Figures 2.6** and **2.7**). The Build Alternative would maintain all existing pedestrian and bicycle facilities. The improved traffic operations would result in shorter response times for emergency services providers.
Traffic Circulation and Access	The existing traffic backups and travel delay are predicted to worsen.	The Build Alternative would result in improved traffic operations in comparison to the No Build Alternative. As stated previously, the Build Alternative would restore access to Gibson Road from westbound Lake Mead Parkway and to southbound I-515 at Auto Show Drive to westbound I-215. All existing driveway access would be maintained for businesses location along Lake Mead Parkway. Detours and street closures would be necessary during construction of the Build Alternative. Access to residences and businesses would be maintained during construction.

3.2.3 Mitigation Measures

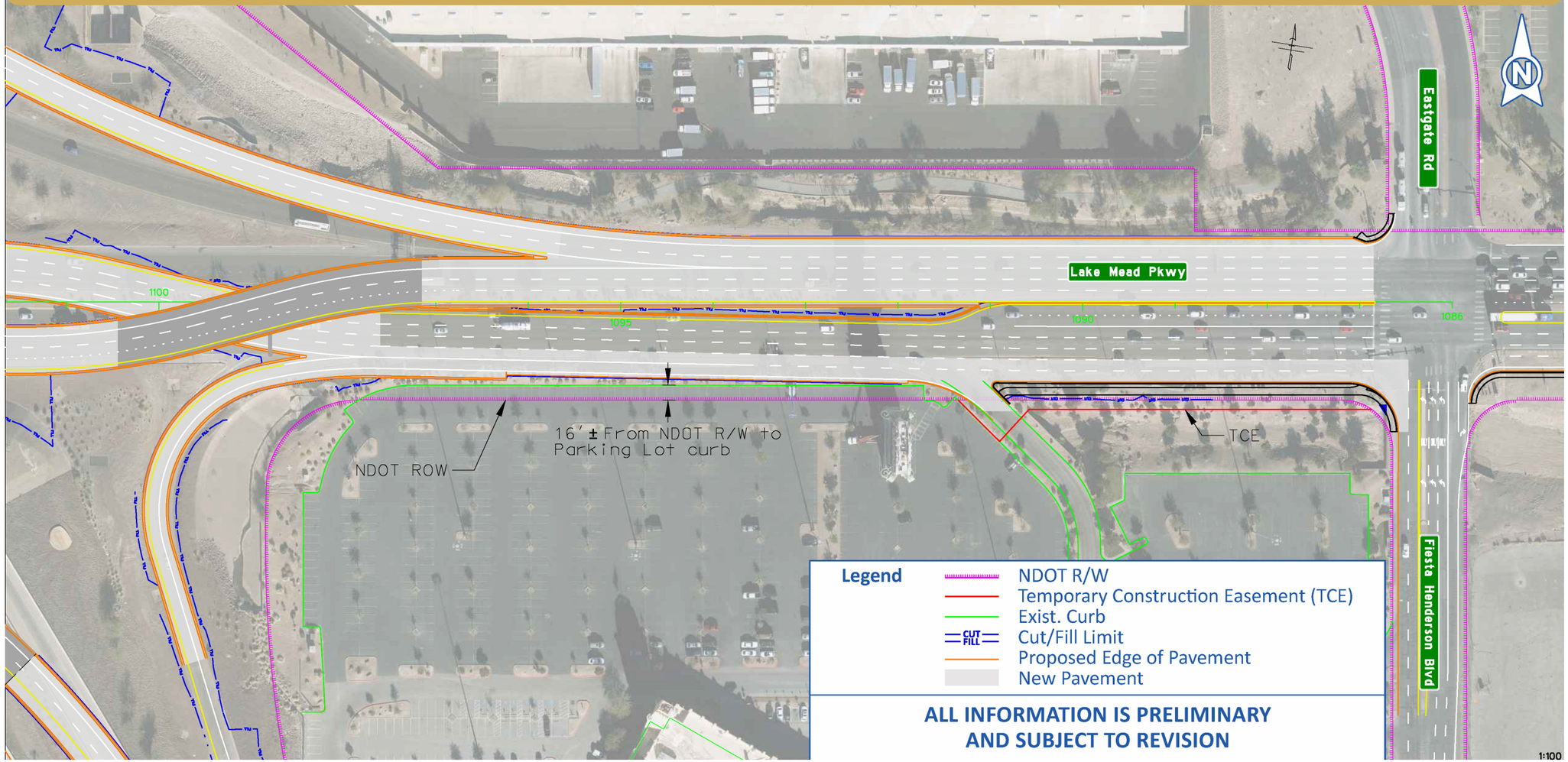
Mitigation measures for land use and socioeconomic conditions is shown in **Table 3.4**.

Table 3.4 Land Use and Socioeconomic Conditions Mitigation Measures

Resource	Build Alternative
Temporary Construction Easements	Property owners are protected by the Uniform Relocation Assistance and Real Property Acquisition Policy of 1970 (Uniform Act). NDOT will pay fair market value for the loss or use of any property.
Traffic Circulation and Access	NDOT will develop a plan to communicate with the public and property owners regarding construction schedule, street closures, and detours throughout construction. Access to residences and business will be maintained during construction. NDOT will maintain Americans with Disabilities Act-compliant pedestrian access, including temporary safe street crossings and sidewalks.

[4] Community cohesion is the ability of neighborhoods to function together in ways that lead to a sense of community. The overall community cohesion for the study area is moderate. The elimination of access from Lake Mead Parkway to Gibson Road resulted in a loss of connectivity that is important to local residents and businesses.

Figure 3.3 Temporary Construction Easement



3.3 | Traffic Noise and Vibration

3.3.1 Existing Conditions

Current traffic noise sources within the project area primarily consist of traffic on I-11, I-215, I-515, Lake Mead Parkway (SR 564), and local roadways. The noise contributions from interstate sections are dominant in residential areas along the corridor. There are many existing property walls and soundwalls alongside the highway that reduce noise level impacts in the adjacent community areas. In contrast, areas without property walls or soundwalls typically experience higher traffic noise levels.

The study area was divided into 13 noise sensitive areas (see **Figure 3.4**). The noise setting is different on each leg of the project. Noise sensitive areas exist throughout all legs of the project to differing degrees. Vehicular traffic is the dominant noise source within all parts of the study area. Short-term field monitoring was conducted at locations along each leg of the project for model validation. The results of these measurements combined with estimate noise levels in other areas along the project indicate that existing peak-hour equivalent noise levels (Leq) vary between 52 and 72 dBA.

Additional information can be found in the *Henderson Interchange Traffic Noise Report* [1] in **Appendix D**.

3.3.2 Impacts

The criteria for evaluating traffic noise impacts in this analysis are contained in Title 23 of the Code of Federal Regulations (CFR), Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772) and NDOT's *Traffic and Construction Noise Abatement Policy*. NDOT's noise guidelines are consistent with those of FHWA (23 CFR 772). FHWA has approved them for use on federal-aid projects in Nevada. NDOT conducted the traffic noise analysis to evaluate the change in conditions that could result from the Build Alternative. The No Build Alternative was analyzed and compared to the existing and future (2040) traffic noise levels. Traffic noise levels were evaluated using FHWA's Traffic Noise Model (TNM) Version 2.5, which is the latest analytical method developed for highway traffic noise prediction.

FHWA guidelines state that traffic noise abatement must be considered when a traffic noise impact occurs at a particular land use or activity category. FHWA traffic noise abatement criteria (NAC) under Activity Categories B and C of 67 A-weighted sound level decibels (dBA) apply to residences, churches, schools, recreation areas, and similar land use activities. Other developed lands (e.g., hotels/motels or other business areas) are included in Activity Category E, with an NAC of 72 dBA. NDOT determines a traffic noise impact to occur when predicted future traffic noise levels approach or exceed the established FHWA NAC for a given Activity Category. NDOT defines approach as within 1 dBA of the NAC [66 dBA for Activity Categories B and C or 71 dBA for Category E].

There are no Federal or State requirements directed specifically to highway traffic induced vibration. Studies conducted by highway agencies to assess the impact of operational traffic induced vibrations demonstrate both measured and predicted vibration levels are less than any known criteria for structural damage to buildings. Normal living activities (e.g., closing doors, walking across floors, operating appliances) within a building have been shown to create greater levels of vibration than highway traffic. Additionally, vibrations can also emanate from activities in the local neighborhoods.

Across the nation and within Nevada, there are thousands of miles of freeway adjacent to residences and businesses and traffic induced vibration issue does not commonly occur. Dump trucks, graders, cranes, bulldozers, pile-driving equipment, and pavement construction equipment would generate noise and vibration during construction. Replacing existing traffic noise barriers would also temporarily increase noise at nearby receivers. Adverse effects related to construction noise and vibration are anticipated to be localized and transient. Construction vibrations can often be perceived at levels far less than would be considered damaging to residential buildings. Only the largest equipment anticipated has the capability to produce damaging vibrations. However, vibrations rapidly decrease as they pass through soils, and vibrations are anticipated to be well below expected damage threshold limits near structures. Although construction-related vibration should not cause damage to homes and other structures, residents are encouraged to secure valuable items as normal construction activities can cause shifting of loose or precariously perched objects.

[1] Nevada Department of Transportation. 2021. Henderson Interchange Draft Traffic Noise Report. December.

Figure 3.4 Noise Sensitive Areas

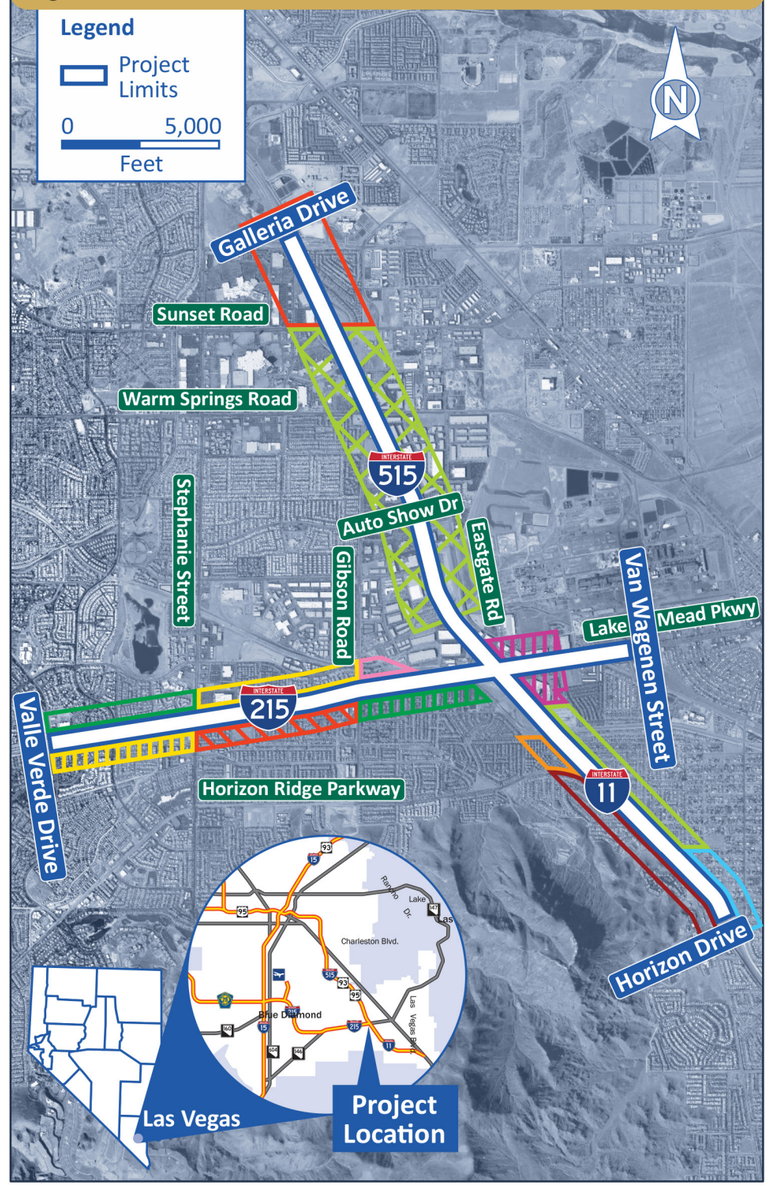


Table 3.5 Noise Level Criteria by Land Use Category

Activity Category	Leq (decibel)	Activity Description
A	57 (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)	Residential (single and multi-family units)
C	67 (exterior)	Active sport 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)	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)	Hotels, motels, offices, restaurants, bars, and other developed lands, properties, or activities not included in A–D or F. Includes undeveloped land permitted for these activities.
F	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	---	Undeveloped lands that are not permitted.

The predicted future traffic noise levels for the design year are expected to exceed the Noise Abatement Criteria (NAC) at many of the noise sensitive receivers along the project.

Table 3.6 summarizes the impacts for the No Build and Build Alternatives.

Table 3.6 Traffic Noise Impacts

Resource	No Build Alternative	Build Alternative
Traffic Noise	• Under No Build Alternative, no receivers evaluated met or exceeded the NDOT noise level criteria in Areas 1, 2, 3, 4, 8, 10, 11, 12, and 13. Any mitigation in place will not be removed in the No Build Alternative. • Twenty-two (22) receivers in Area 5 are predicted to meet or exceed the NAC under the No Build Alternative. • Under the No Build Alternative, seven (7) receivers in Area 6 are predicted to meet or exceed the NAC. • Four (4) receivers in Area 7 are predicted to meet or exceed the NAC under the No Build Alternative. • Under the No Build Alternative, nine (9) first row and sixteen (16) total receivers in Area 9 are predicted to meet or exceed the NAC without mitigation.	• Under the Build Alternative, no receivers evaluated met or exceeded the NDOT noise level criteria in Areas 1, 2, 3, 4, 10, and 13. • Seven (7) first row[2] and eight (8) total receivers in Area 5 are predicted to meet or exceed the NAC without mitigation under the Build Alternative. These receivers would be below the NAC with the mitigation measures discussed in **Table 3.7**. • Under the Build Alternative, 23 first row and 47 total receivers in Area 6 are predicted to meet or exceed the NAC without mitigation. These receivers would be below the NAC with the mitigation measures discussed in **Table 3.7**. • Under the Build Alternative, 14 receivers in Area 8 are predicted to meet or exceed the NAC without mitigation. These receivers would be below the NAC with the mitigation measures discussed in **Table 3.7**. • Nine (9) first row and ten (10) total receivers in Area 9 are predicted to meet or exceed the NAC without mitigation under the Build Alternative. These receivers would be below the NAC with the mitigation measures discussed in **Table 3.7**. • Under the Build Alternative, 46 first row and 82 total receivers in Area 11 are predicted to meet or exceed the NAC without mitigation. These receivers would be below the NAC with the mitigated measures discussed in **Table 3.7**. • Two (2) receivers in Area 7 are predicted to meet or exceed the NAC without the mitigation. Two (2) receivers in Area 12 are predicted to meet or exceed the NAC without mitigation under the Build Alternative. New traffic noise mitigation is not proposed in Areas 7 and 12 due to the current land use and limited noise sensitive areas. Additionally, commercial enterprises adjacent to the highway generally do not want their highway frontage blocked. • Construction noise would be temporary, intermittent, and the intensity would vary for different areas of the project and the construction activity. Construction operations will adhere to local construction noise ordinances.

[2] First, or front row, is defined as a noise-sensitive receptor which is located in the first row/front row immediately adjacent to the highway right-of-way. Total receivers are all receivers in the area that are modeled.

3.3.3 Mitigation Measures

A barrier analysis must be conducted for receptors that would experience a traffic noise impact. To be recommended for further consideration, a barrier must be both feasible and reasonable as defined by the NDOT Traffic and Construction Noise Analysis and Abatement Policy (see **Appendix D**). Because traffic noise impacts are expected for this project, various mitigation options were evaluated. Barrier analysis was performed to identify the maximum benefit in noise reduction, which was then measured against the feasible and reasonableness criteria. This included evaluating if existing soundwalls that would not be damaged in the roadway expansion could remain, if they still met the minimum abatement criteria, or if they would need to be modified. It was determined the multiple existing soundwalls would still provide adequate noise reduction.

Avoidance, minimization, and mitigation measures will be implemented, as practical, to reduce or eliminate traffic noise impacts. Mitigation measures are identified in **Table 3.7**. In areas where soundwalls are recommended, they meet the feasibility and reasonableness requirements for traffic noise reduction at impacted areas and can be proposed for construction.

Figure 3.5 Area 6 Soundwalls

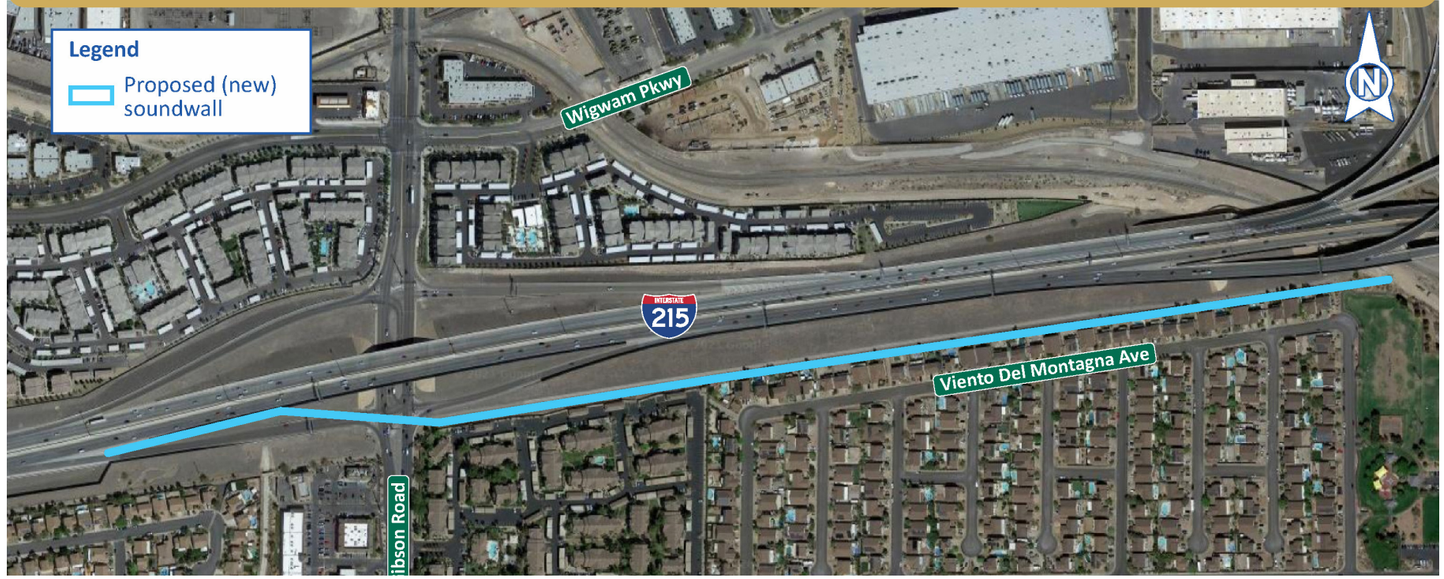


Table 3.7 Traffic Noise Mitigation

Resource	Build Alternative
Traffic Noise	To reduce construction noise impacts and vibration, NDOT will require that its contractor maintain and operate motorized equipment in compliance with all local, state, and federal laws and regulations relating to noise levels. All motorized construction equipment will have mufflers installed in accordance with the equipment manufacturer's specifications or a system of equivalent noise-reducing capacity. Mufflers and exhaust systems will be maintained in good operating condition and free of leaks and holes. If feasible, new and replacement traffic noise barriers and screening walls will be constructed early in each phase to mitigate construction noise. NDOT will minimize the use of vibratory equipment and conduct high-vibration construction during the day, where feasible and appropriate. The Build Alternative will construct three new soundwalls in the following locations: • Area 6 – eastbound I-215 from just west of Gibson Road to the system interchange (see **Figure 3.5**). This soundwall will be approximately 11.5 feet high for 1,492 feet and 13.5 feet high for 2,057 feet, for a total distance of 4,549 feet. • Area 8 and 9 – southbound I-11 from UPRR crossing to Horizon Drive off-ramp (see **Figure 3.6**). This soundwall will be approximately 6,240 feet in length and 11.5 feet in height. • Area 11 – northbound I-11 from Horizon Drive on-ramp to the UPRR crossing (see **Figure 3.6**). This soundwall will be approximately 6,324 feet in length and 15.5 feet in height. The following existing soundwalls will remain under the Build Alternative: • Area 2 – Soundwall 5, westbound I-215 Gibson Road to Stephanie Street (see **Figure 3.7**) • Area 3 – Soundwall 6, westbound I-215 Stephanie Street to Arroyo Grande Boulevard (see **Figure 3.8**) • Area 3 – Soundwall 7, westbound I-215 Arroyo Grande Boulevard to Valle Verde Drive (see **Figure 3.8**) • Area 4 – Soundwall 1, eastbound I-215 Valle Verde Drive to Arroyo Grande Boulevard (see **Figure 3.8**) • Area 5 – Soundwall 2, eastbound I-215 Stephanie Street to Gibson Road (see **Figure 3.7**) • Area 10 – Soundwall 9, northbound I-11 Horizon Drive on-ramp (see **Figure 3.6**) • Area 13 – northbound I-515 Galleria Drive off-ramp (see **Figure 3.9**) Mitigation measures for stationary and mobile equipment shall be addressed in the contract documents; as needed, and could address placement, hours of operation, noise level limits, or proper maintenance of equipment.

Figure 3.6 Existing and Proposed Soundwalls along I-11

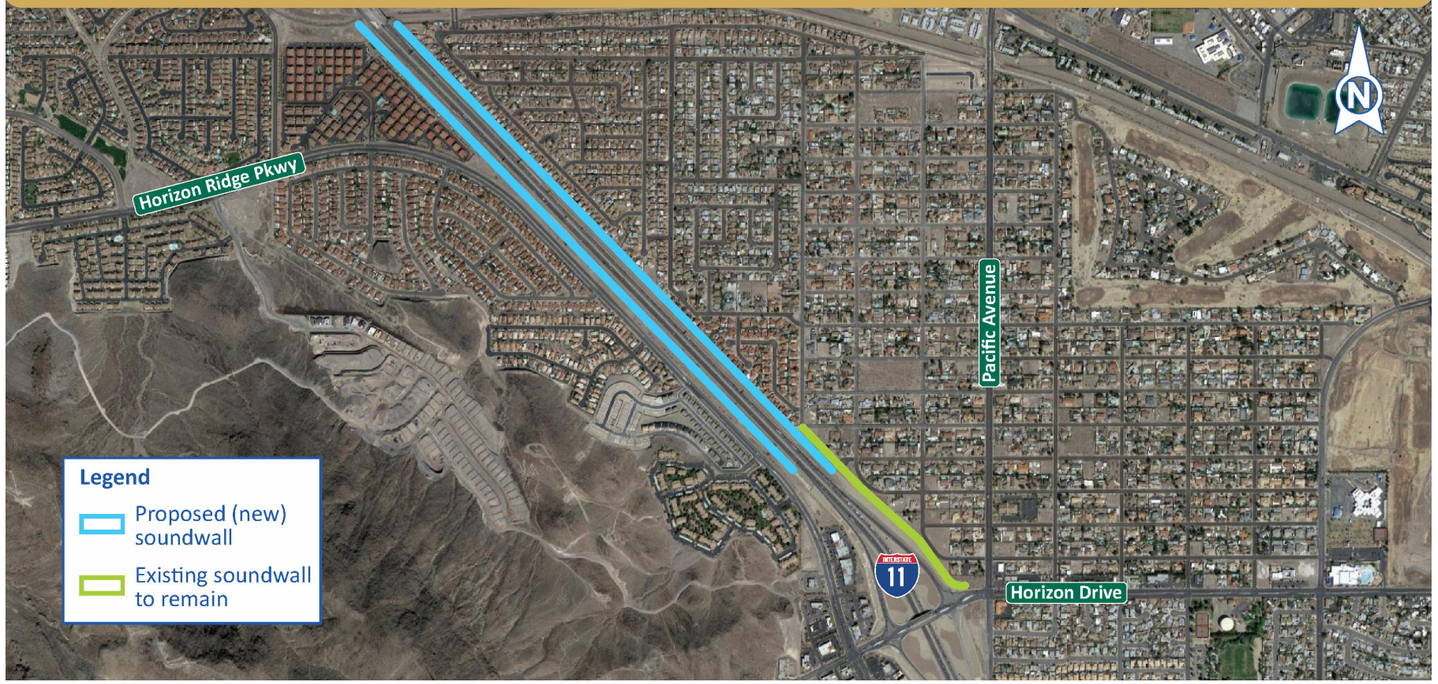


Figure 3.7 Existing Soundwalls in Areas 2 and 5

Figure 3.8 Existing Soundwalls in Areas 3 and 4

Figure 3.9 Existing Soundwall in Area 13

3.4 | Air Quality

3.4.1 Existing Conditions

The Division of Air Quality (DAQ) of the Clark County Department of Environment and Sustainability is the air pollution control agency for Clark County, Nevada. DAQ administers the permitting of stationary sources and oversees regulatory compliance, air quality monitoring, and Clark County air pollution control program under the Clark County Air Quality Regulations provisions[1].

The proposed project is in Henderson in Clark County within Las Vegas Valley (Hydrographic Area [HA] 212). Currently, HA 212 is classified as in maintenance for the carbon monoxide (CO) and particulate matter less than 10 micrometers in diameter (PM_{10}) National Ambient Air Quality Standards (NAAQS). The area is in attainment/unclassified for other criteria pollutants (EPA 2021c). The latest State Implementation Plan (SIP) documents for the area are the PM_{10} Redesignation Request and Maintenance Plan (Clark County 2012), and the Second 10-Year Carbon Monoxide Limited Maintenance Plan (Clark County 2019). HA 212 is designated as marginal nonattainment for the 2015 ozone NAAQS. Clark County 2018 Ozone Maintenance Plan was approved by EPA in July 2019 with conditions on commitments from the Clark County Department of Environment and Sustainability and the Nevada Division of Environmental Protection (NDEP) to submit a SIP revision within one year of final conditional approval. On September 3, 2020, a revised SIP was submitted to NDEP for review and submission to the EPA (RTCSN 2021).

Clark County DAQ implements an ambient air monitoring program in Clark County. There are two air quality monitoring stations near the study area. The Green Valley Station is located at 298 Arroyo Grande in Henderson and the Jerome Mack-NCore Station is located at 4250 Karen Avenue in Las Vegas. The 8 hour ozone concentrations exceeded NAAQS in the most recent 4 years over the last 5-year period from 2016 to 2020 at Green Valley Station and in 3 over the 5 years at the Jerome Mack-NCore Station. The 24-hour average PM_{10} concentrations exceeded NAAQS in 2 of the 5 years at the Green Valley Station and in 4 years at the Jerome Mack-NCore Station. The 24-hour average $PM_{2.5}$ concentration exceeded the NAAQS in 2018 at the Jerome Mack-NCore Station. NAAQS were not exceeded for other pollutants and averaging time periods.

Federal air quality policies are regulated through the federal Clean Air Act (CAA). The U.S. Environmental Protection Agency (EPA) has established national air quality standards to protect public health and welfare with an adequate margin of safety. These federal standards, known as the National Ambient Air Quality Standards (NAAQS), were developed for six criteria pollutants:

1. **ozone (O3)**
2. **nitrogen dioxide (NO2)**
3. **carbon monoxide (CO)**
4. **particulate matter**
   - **less than 10 micrometers in aerodynamic diameter (PM_{10})**
   - **particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$)**
5. **sulfur dioxide (SO2)**
6. **lead (Pb)**

[1] Jacobs. 2021. Henderson Interchange Air Quality Technical Report. December.

Mobile Source Air Toxics

In addition to the criteria pollutants, EPA also regulates air toxic emissions. Controlling air toxic emissions became a national priority with the CAA Amendments of 1990. Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from EPA's National Air Toxics Assessment (EPA 2014). These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics (MSATs), the list is subject to change and may be adjusted in future EPA rules. Unlike the criteria pollutants, MSATs do not have ambient air quality standards.

Transportation projects may affect the regional or local air toxics concentrations due to the MSAT emissions from vehicles. MSAT emissions are expected to be lower than present levels in future years nationwide due to the implementation of stringent emission standards, improvements in fuel economy, and fleet turnover. Using EPA's MOVES2014a model, FHWA estimates that even if vehicle miles traveled (VMT) increase by 45 percent from 2010 to 2050 as forecasted, a combined reduction of 91 percent in the total annual emissions for the priority MSATs is projected for the same period. Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on the calendar year.

Greenhouse Gases

Each greenhouse gas' (GHG) effect on global warming is a combination of the volume of their emissions and their 100 year global warming potential (GWP). GWP indicates how much a given GHG could contribute to global warming relative to how much warming would be caused by the same mass of CO_2. Methane (CH_4) and nitrous oxide are substantially more potent than CO_2. In emissions inventories, GHG emissions are typically reported in terms of carbon dioxide equivalents (CO_2e), which are calculated as the product of the mass emitted of a given GHG and its specific GWP.

GHG emissions in Nevada peaked in 2005 when net GHG emissions[2] totaled 49.397 million metric tons of CO_2e. Overall, net GHG emissions in 2017 were 22.9 percent below 2005 levels. In 2015, transportation exceeded electricity generation and became the state's largest sector of GHGs, mainly driven by Nevada's increasing reliance on renewable energy and lower GHG emitting natural gas. In 2017, the statewide net GHG emissions were 38.066 million metric tons of CO_2e. The transportation sector (passenger cars, light-duty trucks, other trucks, buses, and motorcycles) accounts for about 36 percent of the statewide GHG emissions inventory. The electric power and industrial sectors account for 30 and 15 percent, respectively, of the total statewide GHG emissions inventory (NDEP 2020). The dominant GHG emitted is CO_2, primarily from fossil fuel combustion.

Sensitive Receptors

Sensitive air quality receptors include residences, schools, daycare centers, nursing homes, and hospitals. Land uses near the study area are mixed commercial and residential. Land use in the study area along the north side of I-215 and on both sides of I-11 south of the Union Pacific Railroad Trail is primarily residential development. The Hannah Marie Brown Elementary School is approximately 100 feet to the south of the I-215. Areas immediately adjacent to both sides of I-515 are mostly commercial land uses. The Coral Academy of Science, a public charter school, is in the southeast quadrant of the Auto Show Interchange at I-515. Lyal Burkholder Middle School is on West Van Wagenen Street, approximately half a mile to the east of I-11. Lorna Kesterson Elementary School is approximately 0.7 mile west of I-515 near Auto Show Drive. The St. Rose Dominican Hospital is about 0.8 mile to the west of the study area on Lake Mead Parkway.

[2] Net emissions are used to describe the sum of all sectors acting as sources of GHG emissions minus all sectors acting as GHG emissions sinks (NDEP 2020).

3.4.2 Impacts

The long-term operational impact analysis includes evaluating project conformity at the regional and project levels and analyzing MSAT effects. In the long-term, the project would improve travel times, improve the level of service (LOS), reduce delays from incidents, and thereby reduce emissions for the build alternative and benefit regional air quality. The analyses show that the project meets the transportation conformity requirements and that impacts associated with project operation would not have a substantial adverse effect on air quality. Air quality impacts are summarized in **Table 3.8.**[3]

Table 3.8 Air Quality Impacts

Resource	No Build Alternative	Build Alternative
Regional Transportation Conformity	No impact.	Regional conformity for transportation projects is satisfied by the project's inclusion in a federally approved Regional Transportation Plan (RTP) and Transportation Improvement Plan (TIP) (a subset of projects in the RTP). The project is included in the RTCSN's Access 2050: Regional Transportation Plan for Southern Nevada 2021-2050 Amendment 21-11 (Project Number CL20200029; 2021) and NDOT's Statewide Transportation Improvement Program (STIP). Inclusion in the conforming RTP and TIP demonstrates that the project was evaluated for regional impacts, meets the planning and regional requirements for demonstration of federal conformity, and is consistent with local air quality planning efforts.
Project Level Conformity: PM_{10} **Hot-Spot Analysis**	No impact.	NDOT evaluated the project's potential to cause localized PM_{10} impacts and concluded the project is unlikely to cause new violations of the PM_{10} NAAQS. The evaluation followed the criteria listed in Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (EPA 2015). According to this guidance, the first step in the PM_{10} hot spot evaluation is determining if the project is a Project of Air Quality Concern (POAQC). Projects that are not POAQC do not require a detailed PM_{10} hot-spot analysis because, in general, they would not substantially affect ambient PM_{10} concentrations and are unlikely to cause or contribute to a new or continued localized violation of the NAAQS. Following EPA criteria, NDOT determined that the project would not be a POAQC. A memorandum documenting NDOT's determination was submitted to the RTCSN's Air Quality Interagency Consultation Group for discussion. On July 27, 2021, RTCSN's interagency consultation group, consisting of representatives from EPA, FHWA, NDOT, DAQ, and RTC, concurred with the NDOT conclusion that the project is not of air quality concern, and further quantitative hot-spot analysis is not needed to demonstrate conformity. The project is not expected to cause or contribute to new localized PM_{10} violations. The project will meet the conformity requirements of 40 CFR 93.116.
Project Level Conformity: **Carbon Monoxide (CO) Hot Spot Analysis**	No impact.	Intersection screening was conducted to evaluate whether the project would cause localized increases of CO concentrations that violate NAAQS due to traffic delay at congested intersections. The intersections were screened by comparing the traffic conditions at the affected intersections of the project to the intersections modeled in Clark County's CO Maintenance Plan (Clark County 2000). A screening analysis was conducted to identify intersections requiring a quantitative CO hot spot analysis. These intersections are: • I-215 Westbound Ramps at Stephanie Street • Lake Mead Parkway at Eastgate Road • I-11 Southbound Ramp at Horizon Drive • I-11 Northbound Ramp at Horizon Drive Hot spot modeling results demonstrated that the CO concentrations at these intersections would not exceed the 1-hour or 8-hour CO air quality standards (see **Table 3.9**).

[3] Additional air quality information and analysis of potential impacts is available in the Henderson Interchange Air Quality Technical Report (Jacobs 2021).

Table 3.8 Air Quality Impacts

Resource	No Build Alternative	Build Alternative
Mobile Source Air Toxics	No impact.	MSAT emissions would likely be lower than present levels in the 2040 design year as a result of EPA's programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases. The proposed interchange modifications and widening of the freeway would have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, there may be localized areas where ambient concentrations of MSATs could be higher under the Build Alternative than the No Build Alternative. The distance of the shifting of travel lanes is anticipated to be minimal and within the existing NDOT right-of-way. However, the magnitude and the duration of these potential increases compared to the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information for forecasting project-specific MSAT health impacts. As concurred by the interagency consultation, the Build Alternative would not cause a substantial increase of the total vehicle volume or diesel truck volume, or affect the overall vehicle mix in the study area. Therefore, the Build Alternative would have a low potential for MSAT effects. In summary, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative at certain locations, but this could be offset by increases in speeds and reductions in traffic delays (which are associated with lower MSAT emissions). Also, MSATs would be lower in other locations when traffic shifts away from them. On a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause regionwide and corresponding localized MSAT levels to be substantially lower than today.
Greenhouse Gases (GHG)	No impact.	No national standards have been established regarding GHGs, nor has the EPA established criteria or thresholds for ambient GHG concentrations pursuant to its authority to establish motor vehicle emission standards for CO2 under the CAA. GHGs are different from other air pollutants evaluated in federal environmental reviews because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is a characteristic of these gases. The environment for CO2 and other GHG emissions is the planet. In addition, from a quantitative perspective, fluctuations in global climate are the cumulative result of numerous and varied parameters, which may include emission sources (in terms of both absolute numbers and types). Each emission source may make a relatively small contribution to global atmospheric GHG concentrations. However, it is not meaningful or useful to attempt to translate those relatively small emission differences into climate outcomes (e.g., temperature changes, drought/flooding severity). At this time, there is no scientific methodology for attributing specific climatological changes to emissions from a particular transportation project. NDOT has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of proposed projects, that GHG emissions from proposed actions will not result in “reasonably foreseeable significant adverse impacts on the human environment” (40 CFR 1502.22(b)). The GHG emissions from the Build Alternative would be insignificant during project construction and would be similar to the No Build Alternative during operation. Therefore, the GHG emissions from the project would not play a meaningful role in determining the environmentally preferable alternative or selecting the preferred alternative. For these reasons, no alternatives-level GHG analysis has been performed for this project.
Construction	No impact.	Project construction would result in short-term, temporary emissions of fugitive dust and equipment-related exhaust emissions such as NOx, CO, VOCs, SO2, and particulate matter (PM_{10} and/or $PM_{2.5}$) in the study area. Construction of the project is not expected to last longer than 5 years. Therefore, a project-level conformity analysis is not required, and construction emissions do not need to be accounted for in a hot-spot analysis per 40 CFR 93.123(c)(5). Sources of fugitive dust (PM_{10} and $PM_{2.5}$) during project construction would include disturbed surface areas at the construction site and trucks carrying uncovered loads of soil and/or debris. Fugitive dust emissions would vary daily, depending on the nature and magnitude of construction activity and local weather conditions. Dust emissions would depend on soil moisture, silt content of the soil, wind speed, and the number of equipment operating. Exhaust emissions during construction would be generated by fuel combustion in motor vehicles and construction equipment. Construction vehicles and disruption of normal traffic flow could result in increased motor vehicle emissions in certain areas. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Table 3.9 CO Hot Spot Modeling Results

Intersection	2040 No Build		2040 Build Alternative	
	1-hour	8-hour	1-hour	8-hour
	ppm	ppm	ppm	ppm
NAAQS	35	9	**35**	**9**
I-215 Westbound Ramps at Stephanie Street	3.1	2.8	**3.1**	**2.8**
Lake Mead Parkway at Eastgate Road	3.3	2.9	**3.2**	**2.8**
I-11 Southbound Ramp at Horizon Drive	3.0	2.7	**3.0**	**2.7**
I-11 Northbound Ramp at Horizon Drive	3.0	2.7	**3.0**	**2.7**

Note: The results presented in the table include the maximum 1-hour and 8-hour background concentrations of 2.6 and 2.4 ppm, respectively, measured from 2016 to 2020 at Jerome Mack-NCore Station at 4250 Karen Avenue.

3.4.3 Mitigation Measures

Table 3.10 Air Quality Mitigation Measures

Resource	Build Alternative
Construction	Equipment and vehicles used for construction would comply with EPA's emissions standards for on-road vehicles and off-road construction equipment. NDOT will require its construction contractor to comply with applicable dust-control requirements in DAQ regulations and implement best management practices to minimize emissions from construction. The project will comply with the requirements of the Standard Specifications for Road and Bridge Construction (NDOT 2014).

3.5 | Visual Resources

3.5.1 Existing Conditions

Visual impacts of the project were analyzed following the FHWA Guidelines. The FHWA visual assessment methodology requires that visual impacts be determined by assessing changes[1] to the landscape as seen both by people traveling on the freeway (to determine how people traveling on the proposed project might be affected) and by neighbors adjacent to it (to determine how people near the proposed project would be affected). Changes to the visual environment are measured by determining how a proposed project would alter the visual quality for selected representative views, called key viewpoints.

Because of the proposed project's location within an existing freeway corridor, which itself is within a highly developed, urbanized setting, minimal visual concerns are anticipated. The level of change overall is low given the existing development/urbanized setting compared to an entirely new freeway within this setting. Accordingly, the FHWA guidelines for an Abbreviated Visual Impact Analysis were implemented.

The project study area is part of a developed urban setting with a wide variety of land uses. In the northwestern quadrant of the study, between Valle Verde Drive to I-515 land uses are varied with low-, medium- and high-density residential, commercial, public/semipublic space and business industry, retail shopping centers, recreational uses, and schools. The northeastern quadrant includes a mix of business industry, light business industry, commercial, medium density residential, public/semi-public space, planned community, transit oriented development, tourist commercial and downtown commercial along with government facilities and two schools. In the southwest quadrant the land uses include neighborhood commercial, high, medium, and low density residential, commercial, tourist commercial, and public/semi-public space. There are also several parks and trailheads, along with schools and public facilities. In the southeast quadrant uses include tourist commercial, downtown commercial, commercial, high, medium and low density residential, planned community, public/semi-public, transit-oriented development, neighborhood commercial.

The existing Henderson I-11 and Interchange flyover ramps are higher in elevation than the existing I-215 and surrounding land uses. Existing freeway and roadway features include the following characteristics:

- The existing I-11 is higher in elevation than the I-215 freeway.
- The existing flyover ramps from I-515 to and from I-215 are higher in elevation than the I-11 and I-215 freeways.
- The existing flyover ramps from I-11 to and from I-215 are higher in elevation than the I-11 and I-215 freeways.
- The existing interchange and flyover ramps are visible from Gibson Road and from most land uses adjacent to the freeways.
- Existing freeway and roadway structures, bridges and roadway barrier rails, piers, and walls are white with earth-tone brown colors.

Roadway lighting is visible from within the project area, which can result in potential visual impacts to travelers on the I-11, I-215 and I-515 and residential neighbors. Existing lighting along the freeway within the project area includes 100-foot-tall high mast light poles in the median along the I-215, I-515 and I-11 freeways. Additionally, 30-foot-tall light poles with 15-foot arms are used on the existing highway 564 east of the existing interchange at the back of sidewalk. These existing roadway lighting consists of yellow high-pressure sodium (HPS) bulbs or white LED bulbs, both of which are commonly used for outdoor area lighting. The fixtures have full cut offs that direct the light downwards onto the roadway and reduce light spillover from the freeway.

Analyzed together, the visual character elements described above establish the existing visual quality. The existing visual quality is highly vivid and is associated with distinctive, contrasting, and diverse structures and illuminated signs. The visual quality of specific representative views or key viewpoints is discussed below.

Key Viewpoints

Key viewpoints were selected to show views that would most clearly demonstrate the change to existing conditions resulting from the proposed project and to represent the sensitive viewer groups. The area of project visibility and key viewpoint's locations are shown on **Figure 3.10**.

Figure 3.10 Area of Project Visibility and Key Viewpoints

[1] FHWA. 2015. Guidelines for the Visual Impact Assessment of Highway Projects. January.

3.5.2 Impacts

Visual resource impacts are defined by how the visual character of the corridor would change as a result of the project and the experience of viewers to the changes. This analysis was done by comparing photo simulations of the proposed project to the existing conditions at each key viewpoint. **Table 3.11** summarizes the impacts at the five key viewpoints.

Table 3.11 Visual Resource Impacts

Resource	No Build Alternative	Build Alternative
Key Viewpoint 1	No impact.	The overall change to resources as seen in Key Viewpoint 1 would be low and changes would not be substantial. See **Figure 3.12**.
Key Viewpoint 2	No impact.	The overall change to resources as seen in Key Viewpoint 2 would be moderate and changes would be moderately substantial. See **Figure 3.14**.
Key Viewpoint 3	No impact.	The overall change to resources as seen in Key Viewpoint 3 would be moderate with fewer contrasting features. See **Figure 3.16**.
Key Viewpoint 4	No impact.	The overall change to resources as seen in Key Viewpoint 4 would be low. The Build Alternative would be similar to existing conditions. See **Figure 3.18**.
Key Viewpoint 5	No impact.	The overall change to resources as seen in Key Viewpoint 5 would be low and changes would not be substantial. See **Figure 3.20**.
Key Viewpoint 6	No impact.	The overall change to resources as seen in Key Viewpoint 6 would be moderate, changes would be moderately substantial. See **Figure 3.22**.

3.5.3 Mitigation Measures

Mitigation measures for visual resources are summarized in **Table 3.12**.

Table 3.12 Mitigation Measures for Visual Resources

Resource	Build Alternative
Visual Resources	Aesthetic treatments already required through NDOT's Landscape and Aesthetic program for color and texture would result in visual blending of proposed facilities into the broader urban background when compared to the existing facilities. These measures include applying medium tan colored paint and decorative textures on all new proposed structures, including new bridge barrier rails, piers, pier caps, retaining walls, and flyovers, see **Figure 3.11**. Decorative rock consistent in color and texture with the existing Henderson Interchange aesthetics treatments will be placed on all bare ground slopes to the NDOT right-of-way line along I-215 and I-11 to provide slope protection, which also serves to blend new slopes into the visual background. The lighting system for the Build Alternative will use LED fixtures designed to help mitigate sky glow and light spillover.

Figure 3.11 Example of color that would be used and type of decorative texture that could be used for retaining walls within the Henderson Interchange.

Figure 3.12 Key Viewpoint 1 – Existing Condition – I-215 south side looking northeast towards South Gibson Road Interchange

Figure 3.13 Key Viewpoint 1 – Build Alternative – I-215 south side looking northeast towards South Gibson Road

The visual character of the area visible from **Key Viewpoint 1** (see **Figure 3.12**) is defined by the strong linear form of the existing multi-use path and chain link fence along with rear lot fence lines behind the existing single-family subdivision on the south side of I-215, the existing visual screen wall slopes downhill of the I-215 freeway and the backdrop of the existing Gibson Road bridge in the background. High mast lighting is visible at the skyline above the I-215 roadway. Viewers from Key Viewpoint 1 are primarily multi-use path users—pedestrians and cyclists. The visual quality is somewhat orderly due to the linear simplicity of the structure, multi-use path, fencing, and lighting. There is a moderate level of coherence of the project area due to the mostly consistent character of existing features.

Key Viewpoint 1 – Build Alternative is shown on **Figure 3.13**[2]. The strong linear form of the existing multi-use path along with rear lot fence lines behind the existing single-family subdivision on the south side of I-215, the existing visual screen wall and slopes downhill of the I-215 freeway and the backdrop of the existing Gibson Road bridge in the background would remain nearly the same as in the existing condition. The high mast lighting would be removed and replaced using LED white lights with heights and placement similar to the existing condition. There would be no added light spillover. Color brightness for the existing features to remain and new visual screen wall, bridge, barrier rails, and retaining walls would be more subdued compared to the existing condition when painted with medium tan color. Texture on the proposed walls would be similar to the existing or decorative compared to the existing texture (see **3.5.3 Mitigation Measures**).

[2] Photo simulations of the Build Alternative depicted in Figures 3.13, 3.15, 3.17, 3.19, 3.21, and 3.23 were developed by RDV Systems.

Figure 3.14 Key Viewpoint 2 – Existing Condition – I-215 south side looking northeast towards Henderson Interchange

Figure 3.15 Key Viewpoint 2 – Build Alternative – I-215 south side looking northeast towards Henderson Interchange

The visual character of the area visible from **Key Viewpoint 2** (see **Figure 3.14**) is defined by the strong linear form of the existing multi-use path and chain link fence along with rear lot slope and fence lines behind the existing multi-family development on the south side of I-215, the existing slopes downhill of the I-215 freeway and the existing visual screen wall are visible in the background. High mast lighting is visible at the skyline above the I-215 roadway. Viewers from Key Viewpoint 2 are primarily multi-use path users—pedestrians and cyclists, and residential unit residents of the multi-family development on upper floors. The visual quality is orderly due to the linear simplicity of the structures, multi-use path, fencing, and lighting. There is a moderate level of coherence of the project area due to the mostly consistent character of existing features.

Key Viewpoint 2 – Build Alternative is shown in **Figure 3.15**. The proposed visual screen walls on top of new retaining wall at the new I-215 eastbound are taller than the existing top of barrier rail and closer to the multi-use path, and rear lot slopes and fence lines and are defined by strong line converging to the background. The converging lines of walls are the same as the converging line of existing chain link fence and rear lot slopes and fencing. Vertical lines of high mast lighting may be visible and the same as under existing conditions. The high mast lighting would be removed and replaced using white LED lights with heights and placement similar to the existing condition. There would be no added light spillover. Color brightness for the proposed walls and barrier rails would be subdued when painted with the medium tan color. The smooth multi-use path paving in the foreground and middle ground emphasize the moderately darker hues and smoother textures seen from this location and would remain the same. Texture on the proposed retaining walls would be articulated and decorative.

Figure 3.16 Key Viewpoint 3 – Existing Condition – View from Acacia Park northeast towards elevated ramps at Henderson Interchange

The visual character of the area visible from **Key Viewpoint 3** (see **Figure 3.16**) is defined by the strong horizontal form and vertical piers of elevated I-215 to I-11 ramps in the middle ground with the backdrop of additional elevated freeway ramps. The existing high mast lighting is visible faintly on top of the freeway. The Acacia Park surface textures including ballfield and turf are smooth and the shapes are broad and simple in the foreground. The dominance of the roadways in the middle ground emphasizes the moderate to light hues and smoother textures seen from this location in the park. However, these components are offset by the smooth and broad forms and moderate colors of the ballfield and turf in the foreground along with tree buffering a portion of the elevated freeways. Viewers from Key Viewpoint 3 are users of Acacia Park in multiple locations and viewing in multiple directions. The visual quality is somewhat orderly due to the moderate level of visual complexity of structures, roadway facilities, and lighting. There is a moderate level of coherence of the project due to varied character of existing features.

Figure 3.17 Key Viewpoint 3 – Build Alternative – Acacia Park northeast towards elevated ramps at Henderson Interchange

Key Viewpoint 3 – Build Alternative is shown on **Figure 3.17**. Removal of the existing elevated I-215 to I-11 ramps with vertical piers simplify the proposed middle ground view from this key viewpoint. The proposed retaining walls and slopes from this key viewpoint would provide screening of the strong horizontal form and vertical piers of elevated I-215 to I-11 ramps in the middle ground and background. The high mast lighting would remain faintly visible on top of the freeway. The high mast lighting and roadway lighting would be removed and replaced using white LED lights with heights and placement similar to the existing condition. There would be no added light spillover. Color brightness for the proposed bridge, barrier rails, and retaining walls would be more subdued compared to the existing condition when painted with the medium tan color. The Park surface textures including ballfield and turf are smooth and the shapes are broad and simple in the foreground and would remain the same. With the proposed visual screen walls, the existing condition dominance of the roadways in the middle ground as seen from this location in the park would be lessened as these features would be faintly visible above the screen wall and vegetation.

Figure 3.18 Key Viewpoint 4 – Existing Condition – view from multi-use path behind Waterwheel Falls Drive and Opal Drive looking northwest towards the Henderson Interchange

The visual character of the area visible from **Key Viewpoint 4** (see **Figure 3.18**) is defined by the strong linear form of the I-11 roadway on top of the retaining wall converging with the rear lot walls of the adjacent townhome development, the horizontal line of the railroad tracks and chain link fencing and the backdrop of the multi-story tourist commercial development and billboard. High mast lighting is visible on the roadway above the path. Viewers from Key Viewpoint 4 are users of the multi-use pathway, both pedestrians and cyclists, with some viewers from the rear yards of the single-family residences north of Waterwheel Falls Drive. The visual quality is somewhat orderly due to the moderate level of visual complexity of roadway facilities, retaining walls, screen walls and ground plane. There is a low to moderate level of coherence of the project due to consistent character of existing features.

Figure 3.19 Key Viewpoint 4 – Build Alternative – View from multi-use path users behind Waterwheel Falls Drive and Opal Drive looking northwest towards the Henderson Interchange

Key Viewpoint 4 – Build Alternative is shown in **Figure 3.19**. The existing retaining walls at the I-11 with strong linear form converging into the distance would remain the same. The rear lot walls of the adjacent townhome development, the horizontal line of the railroad tracks is not expected to change. The high mast lighting would remain faintly visible on top of the freeway. The high mast lighting and roadway lighting would be removed and replaced using white LED lights with heights and placement similar to the existing condition. There would be no added light spillover. Color brightness for the proposed barrier rails and retaining walls would be similar to the existing subdued condition when painted with the medium tan color. The view from the multi-use path would remain the same and would be improved with modifications to lighting.

Figure 3.20 Key Viewpoint 5 – Existing Condition – View looking west to the I-215 from residences in multi-family homes at the Dream Apartments from Wigwam Parkway west of Gibson Road where units are on the north side of I-215

Figure 3.21 Key Viewpoint 5 – Build Alternative – View looking west to the I-215 from residential neighbors in multi-family homes at the Dream Apartments from Wigwam Parkway west of Gibson Road where units are on the north side of I-215

The visual character of the area visible from **Key Viewpoint 5** (see **Figure 3.20**) is defined by the strong horizontal line of the I-215 barrier rail and lower private visual screen wall converging together, and the garage structure form in the foreground. Viewers from Key Viewpoint 5 are multi-family residential neighbors living in the Dream Apartments with views from the parking lot and their units facing southwest. The visual quality is orderly due to the low to moderate level of visual complexity of roadway facilities, slopes, ground plane and structure. There is a moderate level of coherence of the project due to consistent character of existing features.

Key Viewpoint 5 – Build Alternative is shown on **Figure 3.21**. For the Build Alternative, the proposed barrier rail with retaining wall at the new I-215 westbound are approximately 40 feet closer to the lower private visual screen wall than the existing condition. The private visual screen wall would remain the same. The elevation of the roadway is the same. The proposed barrier rail with retaining wall is defined by strong horizontal line converging to the background. The converging lines of walls and vertical lines of high mast lighting are the same as visible under existing conditions. The high mast lighting would be removed and replaced using white LED lights with heights and placement similar to the existing condition. There would be no added light spillover. Color brightness for the proposed walls and barrier rails would be subdued when painted with the medium tan color. The smooth parking lot paving in the foreground and middle ground emphasize the moderately darker hues and smoother textures seen form this location in the parking lot at the southern edge of the Dream Apartment complex and would remain the same. Texture on the proposed retaining walls would be articulated and decorative.

Figure 3.22 Key Viewpoint 6 – Existing Condition – View looking north from the street through the space between the single family homes, 764 and 768 Viento del Montagna at the I-215.

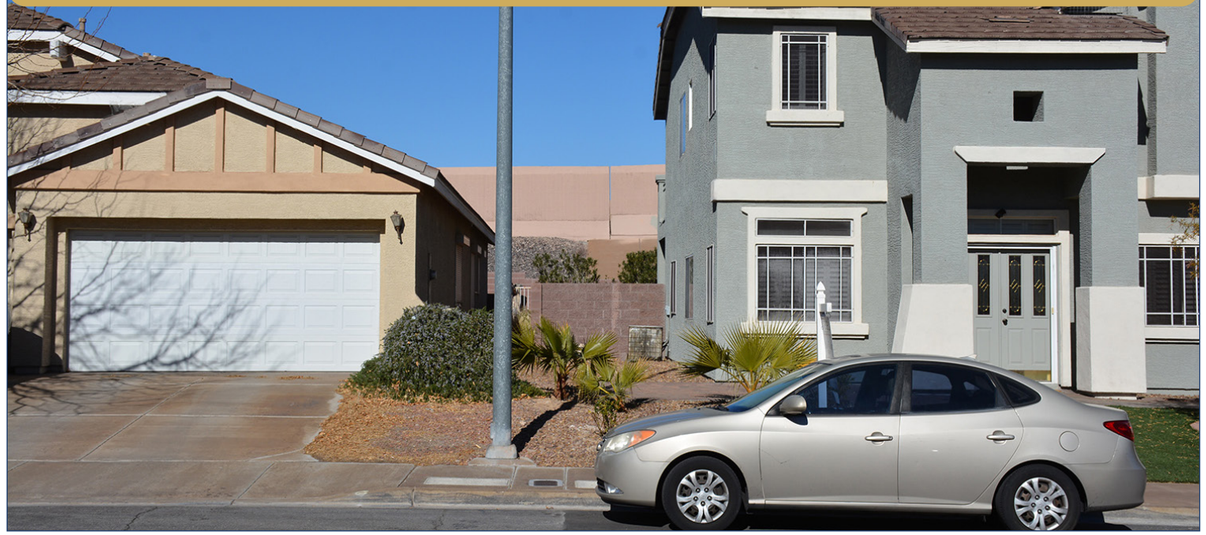


Figure 3.23 Key Viewpoint 6 – Build Alternative – View looking north from the street through the space between the single family homes, 764 and 768 Viento del Montagna at the I-215.

The visual character of the area visible from **Key Viewpoint 6** (see **Figure 3.22**) is defined by the blocky forms of the existing residential structures and vertical line of the existing light pole in the foreground. The simple horizontal line, smooth texture and middle hues of the existing barrier rail with soundwall are visible between the residential structures in the background from this location. Viewers from Key Viewpoint 6 are primarily the single family residents at the location and seldom drivers on the local roadway. These viewers are mainly interested in project coherence or seeing logical and consistent facilities. They are also interested in having the freeways screened from view. The visual quality of the cultural environment from Key Viewpoint 6 is orderly due to the linear simplicity of the structures. There is a high level of coherence of the project area due to the consistent character of existing features.

Key Viewpoint 6 – Build Alternative is shown on **Figure 3.23.** For the Build Alternative, the proposed barrier rail with soundwall is approximately 59 feet closer to the right of way than in the existing condition and would be at the same height. The elevation of the bridge deck as shown is approximately 23 feet above the existing roadway surface. The simple horizontal line, smooth texture and middle hues of the proposed barrier rail with soundwall, and elevated freeway with vertical, smooth piers are visible between the residential structures in the background from this location. The blocky forms of the existing residential structures and vertical line of the existing light pole in the foreground are the same as in the existing condition. A high mast light pole may be visible. The high mast lighting would use white LED lights with heights and placement similar to the existing condition. There will be no added light spillover. Color brightness for the proposed barrier rails, walls, and bridge structures will be subdued when painted with the medium tan color. Texture on the proposed retaining walls will be articulated and decorative.

3.6 | Hazardous Materials

3.6.1 Existing Conditions

A Phase I Environmental Site Assessment (ESA) was prepared for the project in December 2021[1] . The purpose of the Phase I ESA was to identify, to the extent feasible, recognized environmental conditions (REC) in the study area. REC means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. A site reconnaissance noted gas stations and dry cleaners, unlabeled 55-gallon drums, and pad-mounted transformers in the study area.

Regulatory database reports were purchased through Environmental Data Resources, Inc. (EDR). Five REC locations were identified in the project area. The REC locations are identified on **Figure 3.24** and listed below.

REC 1. The known historic uncontrolled dumping and burning of industrial wastes in the vacant land at the southwest corner of the interchange, to the east of Acacia Park and west of I-11, beginning in the 1940's is a REC to the subject site, as remaining contamination is likely within the soils. Contamination discovered through previous investigations included, but was not limited to, asbestos within soil, dioxins, furans, PCBs, arsenic, metals, pesticides, and perchlorate.

REC 2. Central Telephone Company, located at 681 Lake Mead Parkway, Facility ID 8-000071, previously contained a 500-gallon Underground Storage Tank (UST) for storage of gasoline. Given the adjoining and upgradient location of this site and lack of soil samples and site closure, the presence of this site is a REC to the subject site.

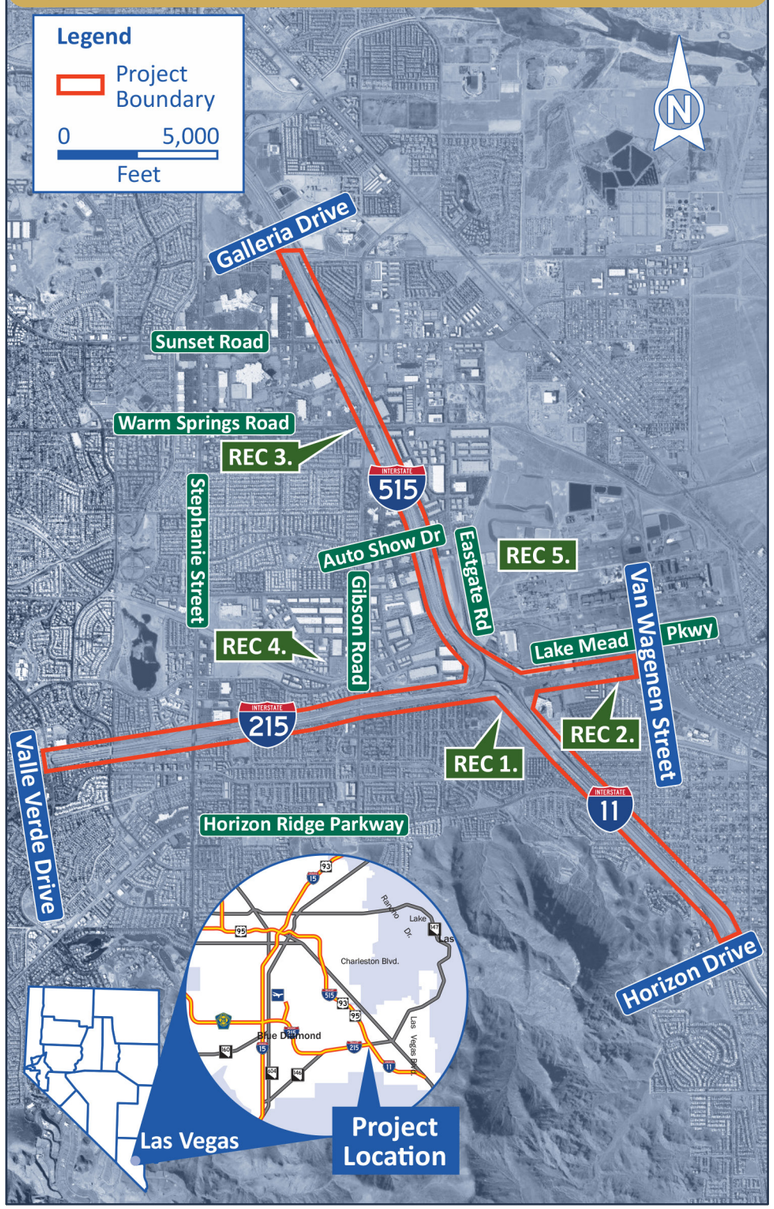
REC 3. Northwest corner of Gibson Road and Warm Springs, Facility ID 8-000011 – Information states this is a location of a former asphalt plant. The site is located upgradient to the subject side and there is a potential of groundwater impacts associated with a leaking underground storage tank.

REC 4. Pacific Engineering and Production Company (PEPCON) was located approximately in the southwest corner of Gibson Road and Mary Crest Road, north of the Union Pacific Railroad. PEPCON was a chemical plan that produced ammonium perchlorate. In 1988, the plant was destroyed by fire and explosions that released ammonium perchlorate to the environment. The Nevada Division of Environmental Protection (NDEP) has overseen investigations to determine the extent of perchlorate contamination in soil and groundwater. A groundwater plume extends from the former facility and flows north/northeast to the Las Vegas Wash. The Athens Road/Galleria Drive and Auto Mall Area Groundwater Treatment System (AGTS), located to the northeast near East Galleria Drive and Athens Drive, is in place to treat the perchlorate-impacted groundwater and has been in operation since 2012. Given that the regional perchlorate plume travels through the subject site, the PEPCON perchlorate groundwater plume is a REC.

REC 5. Black Mountain Industrial (BMI) Complex began during World War II as a magnesium plant in the northeast quadrant of the interchange. After the war, various portions of the plant were leased to industrial entities involved in the projection of chemicals and products containing chemicals. Historical disposal practices that were in place at the time has resulted in contamination that has migrated through groundwater to the Las Vegas Wash and Lake Mead. The BMI Complex has multiple listings within the regulatory databases as a result of the industrial history and known contamination. Because the subject site is upgradient from the BMI Complex, groundwater contamination is not a concern. However, due to the close proximity of the BMI Complex to the subject site, especially along Lake Mead Parkway, remnant soil contamination from historical site usage may be present.

[1] BEC Environmental. 2021. Phase 1 Environmental Site Assessment Henderson Interchange, December.

Figure 3.24 Recognized Environmental Conditions (REC)



REC 1.
General area of historical uncontrolled dumping/burn pits

REC 2.
Central Telephone Company (Facility ID 8-000071)

REC 3.
Northwest Corner of Gibson Road and Warm Springs Road (Facility ID 8-000011)

REC 4.
Approximate Location of former PEPCON Plant

REC 5.
BMI Complex

3.6.2 Impacts

Table 3.13 summarizes the impacts for the No Build and Build Alternatives.

Table 3.13 Hazardous Materials Impacts

Resource	No Build Alternative	Build Alternative
Recognized Environmental Conditions (REC)	No impact.	The Build Alternative would not result in acquisition of properties identified as REC. However, there is a potential for soil and groundwater contamination within the project limits.

3.6.3 Mitigation Measures

Avoidance, minimization, and mitigation measures will be implemented, as practical, to reduce or eliminate impacts to hazardous materials. Mitigation measures are identified below in **Table 3.14**.

Table 3.14 Hazardous Materials Mitigation

Resource	Build Alternative
Hazardous Materials	An Environmental Protection Plan will be developed during final design to address areas of concern and how to test for constituents to control work environment conditions and address special waste management and disposal concerns. NDOT will survey all structures to be disturbed or demolished to determine the presence of regulated materials, including universal wastes, asbestos-containing materials, and heavy metals. NDOT will remove, manage, and dispose all regulated materials in accordance with applicable regulations.

3.7 | Recreation Resources

3.7.1 Existing Conditions

Land Use and Planning

The City of Henderson has 66 parks and over 220 miles of trails within its jurisdiction. In the northwest quadrant of the project area, recreational areas include Cornerstone Park, Arroyo Grande Sports Complex, and Trail Canyon Park (see **Figure 3.25**). Reunion Trails Park and Amargosa Trailhead is located south of I-215 near Stephanie Street. Acacia Park and Acacia Demonstration Gardens are located in the southwest quadrant of the project area. Burkholder Park is located off Van Wagenen Street in the southeast quadrant.

The 215 Trail runs along the south side of I-215 for approximately 6 miles from Eastern Avenue to Acacia Park where it connects with the Harry Reid – UPRR Trail. The Harry Reid – UPRR Trail continues to the south for 6.72 miles to Paradise Hills Drive near Nevada State College. The City of Henderson recently completed construction of the UPRR Trail to the north, under I-215, connecting to Pecos Road (see **Figures 3.26** and **3.27**).

3.7.2 Impacts

Impacts to recreation resources are identified in **Table 3.15**.

Table 3.15 Recreation Resources Impacts

Resource	No Build Alternative	Build Alternative
Recreation Resources: Parks	No impact.	The Build Alternative would not impact and park facilities, including Acacia Park and Acacia Demonstration Gardens located immediately adjacent to the system interchange.
Recreation Resources: Trails	No impact.	The Build Alternative would require reconstruction of approximately 2,560 feet of the 215 Trail (see **Figure 3.28**) from Gibson Road to near Acacia Park. The 215 Trail would be moved to be closer and parallel to the right-of-way line. Reconstruction of the 215 Trail segment is anticipated to last approximately six months. Construction of the Build Alternative would result in temporary and intermittent closures of the Harry Reid – UPRR Trail under the freeway. It is anticipated that the temporary and intermittent closures would occur within a six-month timeframe while construction activities occur in the vicinity of the trail. Trail connectivity under I-11 would not be impacted.

Figure 3.25 Henderson Parks

Figure 3.26 UPRR Trail Looking North

Figure 3.27 UPRR Trail Looking South

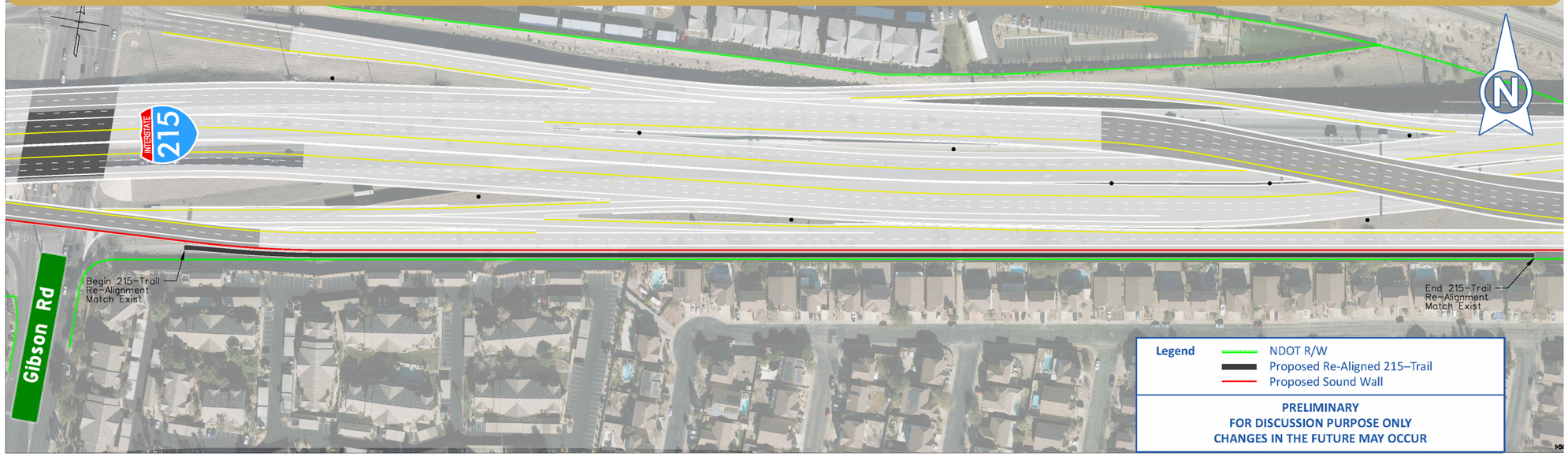
3.7.3 Mitigation Measures

Mitigation measures for recreation resources are listed in **Table 3.16**.

Table 3.16 Recreation Resources Mitigation Measures

Resource	Build Alternative
Recreation Resources: Trails	NDOT will develop a plan to communicate with the public regarding construction schedule, trail closures, and detours throughout construction. NDOT will work with the City of Henderson to identify trail route detours that may be needed during construction.

Figure 3.28 Limits of 215 Trail Reconstruction



3.8 | Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 (49 United States Code [U.S.C.] 303 and 23 U.S.C. 138) states it is the policy of the federal government "that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." Section 4(f) specifies that FHWA and other DOT agencies cannot approve the use of land from a publicly owned park, recreation area, wildlife or waterfowl refuge, or any significant historic site unless it is determined that there is no feasible and prudent alternative to the use of land from such properties.

As defined in 23 Code of Federal Regulations (CFR) 774.17, a "use" of a protected resource occurs when any of the following conditions are met:

- **Direct Use**: Land is permanently incorporated into a transportation facility.
- **Temporary Use**: There is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose as determined by the criteria in 23 CFR 774.13(d). A temporary occupancy does not constitute a use of a Section 4(f) resources when all of the following conditions are satisfied:
    1. Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;
    2. Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;
    3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;
    4. The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and
    5. There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.
- **Constructive Use**: There is a constructive use of a Section 4(f) property as determined by the criteria in 23 CFR 774.15.

Identification of Section 4(f) Properties

Research was conducted to identify publicly owned parks, recreational areas, wildlife and waterfowl refuges, and historic sites within the project study area. As discussed in **Section 3.7 Recreation Resources**, Acacia Park and Acacia Demonstration Gardens, 215 Trail, and Harry Reid – UPRR Trail are located immediately adjacent to the project (see **Figure 3.29**).

Impacts on Section 4(f) Properties

Section 4(f) resources within the study area were analyzed for potential direct and indirect impacts under the Build Alternative.

Figure 3.29 Section 4(f) Properties

Acacia Park and Acacia Demonstration Gardens

The Build Alternative would not impact the Acacia Park and Acacia Demonstration Gardens.

215 Trail

The 2012 FHWA Section 4(f) Policy Paper provides guidance regarding what types of trails and paths are protected under Section 4(f). The Policy Paper states that "FHWA must comply with 23 CFR 774.13(f) when determining if a Section 4(f) approval is necessary for the use of a trail, path, bikeway, or sidewalk. If the publicly owned facility is primarily used for transportation and is an integral part of the local transportation system, the requirements of Section 4(f) would not apply since it is not a recreational area."

Additionally, as stated in 23 CFR 774.13(f) Certain trails, paths, bikeways, and sidewalks, [are exceptions to the requirement for Section 4(f) approval] in the following circumstances:

(3) Trails, paths, bikeways, and sidewalks that occupy a transportation facility right-of-way without limitation to any specific location within that right-of-way, so long as the continuity of the trail, path, bikeway, or sidewalk is maintained; and

(4) Trails, paths, bikeways, and sidewalks that are part of the local transportation system and which function primarily for transportation.

The 215 Trail is located within an existing transportation facility right-of-way (I-215) and is part of the local transportation system, used for active transportation. Therefore, the exceptions identified in 23 CFR 774.13(f) apply and the 215 Trail is not subject to the requirements of Section 4(f).

Harry Reid – UPRR Trail

The Harry Reid – UPRR Trail is located within an existing transportation facility right-of-way under the existing I-215.

Construction of the Build Alternative would result in temporary and intermittent closures of the Harry Reid – UPRR Trail under the freeway. It is anticipated that the temporary and intermittent closures would occur within a six-month timeframe while construction activities occur in the vicinity of the trail. The public would be notified in advance of anticipated closures and detour routes would be identified.

This temporary occupancy does not constitute a Section 4(f) use when all the conditions listed in 23 CFR 774.13(d) are satisfied. The duration of closures would be temporary; scope of work would be minor (closure of trail facility); there would be no anticipated permanent adverse physical effects or interference with the activities of functions of the resource; temporarily disturbed areas would be fully restored to pre-project conditions; and the agency with jurisdiction is in agreement with these conditions. See Appendix E for concurrence documentation from the official with jurisdiction (pending). Therefore, the conditions set forth in 23 CFR Section 774.13 (d) are met.

Potential Section 4(f) Uses by the No Build Alternative

There would be no uses of park, recreational, or historic resources subject to Section 4(f) provisions with the No Build Alternative. No direct use, temporary use, or constructive use of Section 4(f) resources would be required for the No Build Alternative.

Potential Section 4(f) Uses by the Build Alternative

The Build Alternative would not result in the direct use or constructive use of a Section 4(f) resource.

The Build Alternative would require temporary occupancy of a Section 4(f) resource. The conditions identified in 23 CFR 774.13(d) are met and the temporary occupancy of the Harry Reid – UPRR Trail is not considered a “use” of a Section 4(f) resource.

The duration of the closure would be temporary and intermittent while construction activities occur at the system interchange. Post construction, there would be no anticipated permanent adverse physical effects of other interference with the activities and functions of the resource. Temporarily disturbed areas would be fully restored to pre-project conditions. The City of Henderson, the agency with jurisdiction over the trail, has concurred with this determination as documented in **Appendix E**.

3.9 | Indirect and Cumulative Impacts

The National Environmental Policy Act (NEPA) requires that the potential indirect (also known as secondary) and cumulative impacts of federally funded or approved projects must be evaluated, in addition to direct project impacts. Indirect impacts are those resulting from an action but occurring later in time, or effects that are farther removed in distance but still predictable. Based on the analysis of the proposed project in this Environmental Assessment, the Henderson Interchange Project has no discernable indirect impacts.

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the present project. A cumulative impact assessment looks at the collective impacts posed by individual land use actions and projects. Cumulative impacts can result from individually minor but collectively substantial impacts taking place over a period of time. If a project does not directly or indirectly impact a specific environmental resource (e.g., air quality) or factor (e.g., environmental justice), that project would not contribute to a cumulative impact on that resource or factor.

A list of past, present, and reasonably foreseeable future actions within the Henderson Interchange vicinity was compiled and is presented in **Table 3.17**. These projects were considered in conjunction with the proposed project for potential cumulative impacts.

Table 3.17 Past, Present, and Reasonably Foreseeable Future Projects

Project	Status and Description
Interstate 11 (I-11)	Past and Future: The I-11 Corridor is a new major north-south multimodal corridor that will provide enhanced transportation mobility and goods movement. In 2012, the U.S. Congress identified US 93 from Phoenix, Arizona to Las Vegas, Nevada as a high Priority Corridor as part of the Moving Ahead for Progress Act (MAP-21) and designated it as the future I-11 Corridor. NDOT and the Arizona Department of Transportation (ADOT) jointly completed the I-11 and Intermountain West Corridor Study in 2014. In 2018 the Boulder City Bypass opened and was designated as I-11 from US 93 near the Arizona state line to the I-215 interchange in Henderson. The I-11 Las Vegas Metropolitan Area Planning and Environmental Linkages (PEL) study was initiated in early 2021 to identify and evaluate reasonable corridor alternatives considered for I-11 through the Las Vegas metropolitan area. The result of the PEL process will select an I-11 corridor through the Las Vegas metropolitan area, between the Henderson Interchange and the vicinity of Kyle Canyon Road on US 95. A thorough review and evaluation of initial corridor alternatives have identified western (utilizing I-215) and central (utilizing I-515) corridor alternatives to be advanced for further study. The PEL study is anticipated to be completed in mid-2022.
I-215 Widening, Pecos Road to Stephanie Street	Future: Clark County Public Works is planning a project to widen I-215 from a six-lane facility (three lanes in each direction) to an eight-lane facility (four lanes in each direction) with auxiliary lanes between interchanges from Pecos Road to Stephanie Street. Construction of these improvements is anticipated to begin in 2023.
Various Pavement Preservation Projects	Future: NDOT has identified various pavement preservation projects within the vicinity of the Henderson Interchange. These projects are identified along I-215 from Warm Springs Road to Pecos Road, and along I-515 from Sunset Road to Wyoming Avenue. Construction of these improvements is anticipated to begin in 2023.

An assessment of environmental resources or factors for which post-mitigation, non-significant adverse impacts were possible was conducted, as documented in **Sections 3.1** through **3.7** of this Environmental Assessment. It was determined that the Henderson Interchange project would not result in adverse impacts to the environmental resources or factors evaluated in this Environmental Assessment and therefore would not contribute to cumulative impacts on the environmental resources or factors evaluated.

HENDERSON INTERCHANGE

Chapter 4

Agency Coordination and Public Involvement

Section | Page No.

Chapter 4 | Agency Coordination and Public Involvement

This chapter discusses public involvement activities and coordination with local, state, and federal agencies, and other stakeholders during preparation of the previous Feasibility Study and this Environmental Assessment (EA) for the proposed project.

4.1 | Early Coordination for Feasibility Study

Agency and public outreach for the project began in 2019 as part of the Henderson Interchange Feasibility Study process. A Technical Advisory Committee (TAC) included representatives from the City of Henderson, Federal Highway Administration (FHWA), Nevada Department of Transportation (NDOT), and Regional Transportation Commission of Southern Nevada (RTC). An Alternatives Development Workshop was held to identify existing problems, develop decision-making criteria, and identify potential alternative solutions related to the Henderson interchange. Representatives from the City of Henderson, NDOT, RTC and the consultant team used a collaborative process to develop alternatives. Two Public Information Meetings were held on March 27, 2019 and December 5, 2019 to inform the public about the study, seek input from the public on issues that could contribute to the project purpose and need, and present two build alternatives.

4.2 | Federal, State, and Local Agency Coordination

Cooperating agencies are those that have jurisdiction by law or special expertise with respect to a proposed project. Participating Agencies are those with an interest in the project. The roles and responsibilities of cooperating and participating agencies are similar, but cooperating agencies have a higher degree of responsibility and involvement in the environmental review process.

4.2.1 Cooperating Agencies

On August 2, 2021, NDOT emailed invitations to the U.S. Environmental Protection Agency (EPA) and the City of Henderson to participate in the Henderson Interchange Environmental Assessment as a Cooperating Agency in accordance with 23 CFR 771. Participation of the Cooperating Agencies was sought throughout all stages of the EA for technical information, resolution of issues, and identification of specific review and approval requirements. The EPA and City of Henderson have participated in the development of the EA as Cooperating Agencies and have been involved throughout the project development process.

4.2.2 Participating Agencies

On August 2, 2021, NDOT emailed invitations to key agencies with a direct interest in the Henderson Interchange Environmental Assessment to participate as Participating Agency. The Regional Transportation Commission of Southern Nevada (RTC) accepted the invitation to participate as a Participating Agency and has been involved throughout the project development process.

4.2.3 Nevada State Historic Preservation Office

NEVADA STATE HISTORIC PRESERVATION OFFICE

NDOT and FHWA consulted with the Nevada State Historic Preservation Office (SHPO) to determine if the project would have an adverse effect on cultural resources within the project's area of potential effects (APE). SHPO reviewed and approved the project screening form on August 24, 2021 and concurred with the proposed APE. Based on a field and literature survey conducted for the proposed project, it was determined that the project would have a finding of No Adverse Effect to historic properties. SHPO concurred with this finding on January 14, 2022. (See all SHPO correspondence in **Appendix C.**)

4.3 | Stakeholder Meetings

NDOT met with project stakeholders listed below to discuss the project and solicit feedback on the proposed improvements. Meeting minutes from the various stakeholder meetings and related email correspondence will be documented in the Stakeholder Meetings Summary section of the Public Outreach Summary Report.

- Harbor Freight
- Fiesta Henderson – Station Casinos Red Rock Resorts
- Henderson Development Association (economic development arm of Henderson Chamber of Commerce)

As a result of coordination with Station Casinos, the project team evaluated the potential to move the eastern crossover further west in order to improve visibility and access to the Fiesta Henderson Casino. It was determined that it would be possible to shift the crossover approximately 400 feet to the west, allowing the configuration along the north property frontage of the Fiesta Henderson Casino to remain similar to the existing condition. Shifting the eastern crossover to the west is an overall improvement to the project due to increased weaving length between the I-11 north-to-east ramp merge to eastbound Lake Mead Parkway and the intersection with Eastgate/Fiesta Henderson Boulevard. These improvements have been incorporated into the Build Alternative as described in Chapter 2 and evaluated in this Environmental Assessment.

4.4 Public Involvement

4.4.1 Public Involvement Plan

A Public Outreach and Agency Coordination Plan (Outreach Plan) was prepared in January 2021 (see **Appendix B**). The purpose of the Outreach Plan is to identify the outreach efforts for NDOT to take during the environmental review process for the project. A key focus of the Outreach Plan is to facilitate awareness and understanding by the public and governmental agencies regarding the study process, key milestones, project development details, and decision points. The Outreach Plan describes the overall approach and coordination methods to be used to obtain public and agency insights during the environmental review process.

A virtual and in-person public hearing will be held when this Environmental Assessment is circulated for public review. Notices providing information on how to participate in the public hearing will be mailed to homes and businesses within the project area. Notices (advertisements) will be placed in newspapers in addition to being posted on local agency websites and NDOT's public information website.

Figure 4.1 Public Information Meeting

4.4.2 Public Information Meeting

A virtual Public Information Meeting was available at www.henderson-interchange.com from July 6 to August 5, 2021 and an in-person Public Information Meeting was held on July, 22 2021 at Lifeguard Arena 222 S Water Street Henderson. The in-person meeting was held from 4:00 p.m. to 7:00 p.m. with a presentation at 5:30 p.m. An Intent to Study letter and Transportation Notice were mailed to approximately 28,000 homes and businesses within the project area. Transportation notices (advertisement) were placed in the Las Vegas Review-Journal on June 27, July 6, July 21, and July 22, 2021. Notices were placed in the Spanish language newspaper El Tiempo on July 7 and July 14, 2021. A digital ad program ran on the newspaper websites from July 13 through August 5, 2021. Meeting notices were also posted on local agency websites and NDOT's public information web page.

Figure 4.2 Virtual Meeting Site

Approximately 42 individuals attended the in-person public information meeting (see **Figure 4.1**). A livestream of the presentation portion of the in-person presentation was also conducted with 15 people joining. Attendees were provided with a meeting packet, which included a welcome letter, fact sheet, PowerPoint presentation, display boards, and comment form. Display boards were arranged around the room showing key technical information. A video monitor was available with 3D modeled animations of traffic movements for attendees to view.

In-person meeting attendees could provide comments by speaking with a court reporter, commenting during the question and answer session after the formal presentation, by completing the comment form, or by email after the meeting. The public comment period was open from July 6 through August 5, 2021.

The virtual meeting site shown in **Figure 4.2** (www.henderson-interchange.com) was accessed approximately 600 times during the 30 day comment period. The website was available in English and Spanish. Content on the website included a project overview, alternatives development process from the feasibility study, and alternatives refinement which identified the Build Alternative. Video animations of traffic movements were also available from the virtual meeting site. The Public Meeting Summary Report is included in **Appendix B**.

The public information meeting materials and additional project documentation is available on NDOT's website at http://dot.nv.gov/hendersoninterchange.

4.4.3 Summary of Public Comments

Members of the public had opportunities to provide comments and feedback at the virtual and in-person Public Information Meeting discussed in Section 4.4.2. **Table 4.1** on the following pages summarizes comments received during the public comment period (July 6 through August 5, 2021) and provides responses.

Table 4.1 Summary of Public Comments Received

Comment Summary	Response
July 22, 2021 In-Person Public Information Meeting	
Questions During Q&A Period at Meeting	
For the flyover northbound I-515 to westbound I-215, needed to be 2 lanes. Thank you for Option 2A! I feel that is the best option.	Thank you for your comment and support! For the Build Alternative, the northbound I-515 to westbound I-215 flyover ramp would be constructed as two continuous lanes. The website and virtual meeting contain information that you can review at your convenience—including numerous video animations for the interchange's travel routes.
Is traffic still going to be able to flow during construction phases? Have options on detours been looked at to keep traffic flow on all affected roads?	Traffic movements will be maintained during construction of the Build Alternative. Options for construction phasing and how traffic will be accommodated as the work progresses have been examined in a preliminary manner to show that the Build Alternative is feasible. As the project is developed further and nears construction, phasing would be developed to a greater level of detail including how we can maintain traffic flow on the freeways and local roads. NDOT will develop a plan to communicate with the public and business owners regarding construction schedule, street closures, and detours throughout construction. Access to residences and businesses will be maintained during construction.
Comments Received During Public Comment Period via the Website, Email, and Phone	
When considering how to reduce traffic & pollution I would like to purpose that a light-rail system be reviewed. A light-rail system could easily moved residence about & benefit our air quality as well as move us into the 21 century. This would not only transport residence from work to home but reduce the already clogged roads & highways. When SLC was preparing for the Olympics they put in one track line 'TRACKS' to be able to move massive amounts of people quickly and efficiently. The residence were not in favor of 'TRACKS' but NOW 19 years later they have extended their tracks & it is well used by both residence & visitors.	This project's focus is improving safety, access, and mobility in a local valley freeway interchange, the Nevada Department of Transportation-along with partner agencies such as the Federal Highway Administration, Regional Transportation Commission of Southern Nevada, and local municipalities-continues to include light-rail options (in addition to other multimodal facilities) in planning for growth and mobility in southern Nevada. The most complete source of information on light-rail, bus rapid transit, and other high-capacity transit options is www.rtcsnv.com.
We haven't even seen the traffic survey report that was supposed to be done for the development of Fiesta Marketplace and I'm wondering if this project was taken into account in that survey, as well as the desire for the NW corner to build a tenantless car wash. Doesn't seem to fit.	Traffic operations performance for the Build Alternative was analyzed using Year 2040 projected traffic volumes that reflect current and continued development growth in southern Nevada. The traffic projections are based on regional planning models that are intended to reflect known near-term developments such as the one you mention as well as future (but not currently known) developments that are anticipated to occur over the next two decades. Therefore, the traffic from the proposed car wash and other developments that occur through the Design Year 2040 can be considered to be reflected in the projected traffic volumes.
Ahead of the virtual presentation, is there an architectural overview picture of the vision of the interchange. My home is in the front line of view. We have known this was coming and unfortunately I am out of town on the 22nd.	This project also has a virtual meeting site. Here is the link: www.dot.nv.gov/hendersoninterchange. The virtual meeting site has illustrations of the current and proposed interchange, along with numerous 3D modeled videos showing how the interchange would look and feel to motorists.
I agree that plan build 2A looks best for the future. As long as we do not get shut out of Fiesta Parkway, as that is our only entrance to our community and based on the video presentation it does not appear to affect that.	The Build Alternative does not affect access to Fiesta Henderson Boulevard. The area of concern at the NW corner of Eastgate and Lake Mead was examined and determined that there are no impacts to the project limits. There are no current plans to widen Lake Mead Pkwy beyond it's current geometry so there are no concerns at this time. Any encroachment upon NDOT right of way will need to be reviewed separately by NDOT.

Table 4.1 Summary of Public Comments Received

Comment Summary	Response
The representatives of Station Casinos are interested in the plans being considered and potential impacts to Fiesta Henderson. Could we organize a meeting?	We can bring plans to an office on site if you would like and discuss the potential impacts, which appear to be minimal at this time. Stakeholder meeting held with Fiesta Henderson representatives on October 12, 2021
I hope the plans for I-11 include adding lanes up the hill and down the hill from the 215 to Horizon exit! Slow trucks going up toward Horizon exit slows traffic badly! That would relieve pressure on the 215 when coming onto the I-11!	The Build Alternative would add an auxiliary lane to I-11 in both directions between Horizon Drive and the system interchange.
I remember about 2 years ago, a major portion of the 515 (from Galleria to the 215 onramp) was reconstructed. Before there was one lane for215 onramp and Lake Mead. Now there is two separate ones. Why wasn't this project done at the same time? I also see part of this project will redo some of that same work?!As a resident living in Valle Verde, I foresee years of construction right next to my home. Increasing my time to get to places and the noise the construction will generate. Will lanes be reduced to one on the 515 and 215 for the duration of the project or will the work mostly take place at night?	The recent restriping project was done by NDOT to make interim safety and capacity improvements without widening pavement. The Henderson Interchange project is intended to bring long-term improvements and would include widening and reconstruction of much of the interchange roadways to serve projected traffic needs to the year 2040. Note that interchange reconstruction projects can take several years to construct and there are inevitable temporary impacts to existing traffic patterns and capacity. NDOT endeavors to minimize and mitigate the temporary impacts resulting from reconstruction projects and also restricts nighttime construction operations near residential areas to keep construction noise levels within NDOT guidelines. Lane reductions during construction phasing operations will be guided by current traffic volumes for each roadway to minimize impacts to the traveling public.
Please consider a bike path underneath the interchange from the railroad tracks north to Acacia Park on the Southside. Hopefully one day there will be a continuance of that bike trail next to the railroad tracks going northwest to the Pittman wash bike trail.	Multi-use trails are an important component of our community and we want to make sure that we have accommodated them in this project to the best of our ability. The Planning Division at the City of Henderson are working to complete this portion of the multi-use trail. Our project will accommodate this improvement.
How does this address traffic entering from Galleria to the 95 South and the traffic entering from sunset to the 95 south? There's currently not enough space between the on Ramps. I feel a lane need to be added from Sunset to Autoshow to accommodate the traffic merging on to the 95 from Galleria and Sunset. The exit to Lake Mead and the 215 west should be incorporated into the Autoshow exit. With the ramp exiting Autoshow shifted to the west while traffic continues on to Lake Mead and the 215 west. This would all depend on what percentage of traffic from Galleria and Sunset use the 215 west vs continues onto to the I-11 south.	The existing configuration for southbound traffic entering I-515 from Galleria Drive has the entrance ramp braided over the southbound off ramp to Sunset Road to reduce points of conflict between motorists. That configuration would be retained in the Build Alternative, as would the configuration of the southbound entrance ramps from Sunset Road to I-515. The Build Alternative would, however, result in both the southbound entrance ramp from Galleria Drive and the southbound entrance ramp from Sunset Road becoming additional lanes on I-515, with no merging needed to remain on the highway until vehicles pass beneath the Auto Show Drive bridge where the right-most lane that entered from Sunset Road would become an exit-only lane to eastbound Lake Mead Parkway.
I have long felt that there should be an exit only lane along 1-11 southbound between the I-215 interchange and Horizon. Through traffic, which includes semi trucks and large RVs, struggle to maintain freeway speeds going up the grade and the high volume of traffic exiting at Horizon stack up and back up behind them. Accidents are caused by sudden stops or slow downs in the lane or by cars moving around the large, slow vehicles and then cutting back in to exit at Horizon.	The Build Alternative would provide a southbound auxiliary lane that is forced to exit at Horizon Drive. The auxiliary lane is anticipated to keep backups and slowdowns at the Horizon Drive interchange from impacting traffic flow on I-11.
On the letter for the project for I-11, I would like to address the noise. I live just before Horizon on the incline and the noise level is so loud that we have a hard time sleeping at night, along with my neighbors. We turn on noise fans, noise machines, anything to distract so we can sleep and the trucks back break. I have called numerous times on this and no one's called me back. I have spoken with my neighbors and we did have at one point where you had put something on the road that reduce the noise, but that was years ago and that's wore off. I would really appreciate a wall that extended all the way to horizon. I am on the south side of the freeway and the noise is terrible.	NDOT is currently conducting a noise analysis for Build Alternative to determine where there are traffic noise impacts and where noise abatement measures are warranted. The analysis is following NDOT's Traffic and Construction Noise Analysis and Abatement Policy (available here: https://www.dot.nv.gov/home/showpublisheddocument/14255/636637253326570000). Your concerns have been shared with the noise analysis team. The results of the noise analysis will be available when the environmental study is complete and will be shared at the public hearing, anticipated in Spring 2022. We will add you to the project email list so that you will be notified when this information is available.
I am glad that improvements are planned, particularly for traffic entering onto westbound 215 from any direction at this interchange. These bottlenecks must be addressed as this area continues to grow.	Thank you for your comment and we appreciate your support. Visit our project website (www.dot.nv.gov/hendersoninterchange), as it contains information on the proposed project, including animated videos for the traffic movements.

Table 4.1 Summary of Public Comments Received

Comment Summary	Response
The Henderson Interchange is terrible. Especially if you live in the area of Gibson and Horizon. If I'm heading west I have to get off of Stephanie and it causes me to miss my home to go to home. I'm not the only one , plenty of people that live in this area are upset.	NDOT is aware of the limited access that you noted, as well as other traffic operational shortcomings in the immediate area of the Henderson interchange where Lake Mead Parkway, and Interstates 11, 515, and 215 all converge together. NDOT is currently in the planning stages to improve or reconstruct the Henderson Interchange which will address the concerns you have brought up with direct access to Gibson and Stephanie. The plan is to be under construction by the middle of the decade, pending funding.
I drive thru this interchange often, two to four times a week. Whatever else you do here, the signage definitely needs to be improved & lines repainted. There are some merge left signs drivers ignore if they can get their vehicle thru there. The exit from 11 going to 215W also includes an exit for Lake Mead Pkwy. Drivers speed up the Lake Mead exit only lane and cut over to the 215 lane at the end. It might make more sense to move the Lake Mead exit to an earlier spot on 11 before it starts climbing. I think the lane order needs to be changed so that the 515 is on the right side and 215 on the left side. That would make it easier for carrier trucks to stay on the right instead of having to move to the middle of the road, competing for lane space with people trying to move right. I'm sure I'll have more thoughts on this subject next time I drive thru there. Thank you for reading my concerns/suggestions.	Signing for the Build Alternative would be designed in accordance with established NDOT and national criteria to accommodate driver expectations. Roadway striping within the interchange area would be newly installed at the completion of construction. The Build Alternative would retain the configuration of the northbound exit from I-11 to westbound I-215/eastbound Lake Mead Parkway, where three lanes exit from I-11 with one lane going to Lake Mead Parkway and two lanes going to I-215. Three lanes on the left would continue to northbound I-515, providing opportunities for faster cars to stay to the left of slower trucks.
I just wanted to provide some feedback on the Henderson Interchange, as I can not attend the in-person meeting. I think one specific need from residents is the connectivity to North Gibson Rd. from Lake Mead Pkwy. Currently the only way to access N. Gibson from Lake Mead Pkwy is Eastgate Rd, or exiting Stephanie and turning around. I think most residents understand the move to remove this exit initially to allow traffic to flow from the 95 freeway, but it is time to rebuild and bring this Gibson exit back, as well as add pedestrians and bicyclists a space to get underneath this interchange and get them back on Lake Mead Pkwy faster.	The Build Alternative is designed to provide an exit ramp for motorists traveling westbound on Lake Mead Parkway to access Gibson Road as it was prior to the restriping project. Motorists can also access Gibson Road via Eastgate Road to Auto Show Drive. Regarding connectivity for bikes and pedestrians, the project would maintain the trails that currently exists south of I-215 with connectivity through Acacia Park to the UPRR trail that extends to Fiesta Henderson Blvd.
I approve and support the Build Alternative for NDOT's Henderson Interchange Project. The aspect's that I love about the Build Alternative for NDOT's Henderson Interchange Project is the Auxiliary Lanes to be added to I-11, and the NV 564/ Lake Mead Parkway will cross over I-215 which will greatly improve safety.	Thank you for your comment and we appreciate your support. Please visit this link to see more information: www.dot.nv.gov/hendersoninterchange. Through this link, you can review and comment on the latest project information. And you can continue to stay up to date on the project as it moves from planning to design to construction.
Does this option make the southbound traffic from 515 easily to merge to 215, and access to Gibson exit?	The Build Alternative allows southbound traffic on I-515 to go west on I-215 and to exit at Gibson Road, while also re-establishing access to Gibson Road from westbound Lake Mead Parkway/I-215. Videos showing the driver's vantage point for various movements including southbound I-515 to westbound I-215 are available at the website here: https://www.henderson-interchange.com/. The video for southbound I-515 to westbound I-215 can be viewed by clicking here: https://youtu.be/tfQDqR-mkuI.
I am concerned about landscaping and aesthetics of this project. I believe Henderson can do better than the crappy sheet metal structures and half-baked art prevalent around Las Vegas Freeways. Please consider making native revegetation a priority. We have the beauty of Lake Mead, River Mountain, Sloan canyon. Our freeway landscape design should blend with and celebrate the natural Mojave desert. And please eliminate mauve from our color palette.	We appreciate your comments and suggestions regarding landscaping and aesthetic treatments. Aesthetic treatments required through NDOT's Landscape and Aesthetic program for color and texture will be applied to visually blend the proposed freeway improvements into the broader urban background. Landscape and aesthetic treatments will utilize regionally appropriate materials and drought-tolerant landscaping. Additional information regarding NDOT's Landscape and Aesthetics program is available on our website: https://www.dot.nv.gov/projects-programs/landscape-aesthetics.
The northbound I-515 to westbound I-215 flyover needs to be two lanes. Thank you for Option 2A. I feel that is the best option.	Thank you for your comment and support! For the Build Alternative, the northbound I-515 to westbound I-215 flyover ramp would be constructed as two continuous lanes.
Is traffic still going to be able to flow during construction phases? Have options on detours been looked at to keep traffic flow on all affected roads?	Traffic movements will be maintained during construction of the Build Alternative. Options for construction phasing and how traffic will be accommodated as the work progresses have been examined in a preliminary manner to show that the Build Alternative is feasible. As the project is developed further and nears construction, phasing would be developed to a greater level of detail including how we can maintain traffic flow on the freeways and local roads.

Table 4.1 Summary of Public Comments Received

Comment Summary	Response
Please make it artistic and beautiful like the metal statues and landscape along 215 and near airport. Not just a utilitarian practical system, but a creative and visually interesting roadway.	We appreciate your comment/suggestion regarding landscaping/aesthetic treatments and we share your sentiment. Aesthetic treatments required through NDOT's Landscape and Aesthetic program for color and texture will be applied to visually blend the proposed freeway improvements into the broader urban background. Landscape and aesthetic treatments will utilize regionally appropriate materials and drought-tolerant landscaping. Additional information regarding NDOT's Landscape and Aesthetics program is available on our website: https://www.dot.nv.gov/projects-programs/landscape-aesthetics.
Some feedback on the Henderson interchange draft sign concept plans: 1. Is it possible within the confines of the MUTCD to use the Las Vegas Strip as a control city for 215 W, or to otherwise sign the Strip as a destination (as NDOT has done at the 95/15 interchange and on 215W at 15). Should the airport glyph be on the 215 W signs? Hoover Dam generates 20,000 visitors daily. Most will arrive by car. Can that be signed on 11S within the confines of the MUTCD? (This also has issues further downstream where it is signed quite poorly on the new Boulder City Bypass but I digress) It seems odd to sign 'Henderson' on 215/564 E when I-215 has already been in Henderson for 7 miles. Does 'Downtown Henderson' comply with the MUTCD? The eastbound mileage sign at Stephanie St has 95 and 93 listed out of order (unless NDOT is considering eliminating US 93 later?) The Lake Mead NRA guide sign on 11 NB at Horizon Ridge seems oddly placed - it's on the one direction where drivers would be coming *from* Lake Mead access.	Thank you for your insightful questions and interest in this project. The guide sign layout is conceptual at this point and will be further developed utilizing your input as the project moves forward. While possible to sign LAS VEGAS STRIP as a control city for westbound I-215, the design team was concerned with the distance to the strip and with potential confusion with I-515 that is signed with LAS VEGAS as the control city. Use of a control city for westbound I-215 will be evaluated further during final design. Regarding an airport glyph on the westbound I-215 signs, this interchange is sufficiently far from the airport that the design team's opinion was that it should not be used at this location. There is no airport glyph in the existing condition, and one first appears just west of the Eastern Avenue interchange. The design team will evaluate the use of HOOVER DAM signage in addition to SOUTH BOULDER CITY in final design. The design team will evaluate use of alternatives such as DOWNTOWN HEND. Or DOWNTOWN HENDERSON (as will fit on the sign) as a destination for eastbound Lake Mead Parkway during final design. The route order on the eastbound mileage sign at Stephanie will be revised with the next iteration of guide sign layout. Regarding the Lake Mead National Recreational Area guide sign on northbound I-11 at Horizon Ridge, the concept plan replicated an existing sign at this location. The design team will further evaluate the need (and placement) of this sign during final design.
I live near the 215 and Gibson area near Acacia Park. It's terrible heading back from any stores near the Target, Marshall's, Petco on Lake Mead Pkwy heading west. You have to get off at Stephanie exit or head towards Horizon and Horizon. This area has over hundred of people dealing with this Issue!!	The Build Alternative offers solutions to the problem you mention. Namely, a direct connection to Gibson Road from Lake Mead Parkway, southbound I-515, Auto Show Drive, and from northbound I-11.
Westbound Lake Mead Parkway is the connecting route from Cadence, Lake Las Vegas, Tuscany, and all of East Henderson to the I-215 Westbound and into Las Vegas. You must have more than one lane for westbound Lake Mead Parkway onto westbound I-215. Anything less will be atrocious.	Westbound Lake Mead Parkway will have five lanes just beyond the Eastgate intersection. Two lanes will exit to northbound I-515, leaving three continuing westbound. Then, one will exit to I-11 southbound, leaving two continuous lanes leading toward westbound I-215. Those two lanes will be joined by two lanes coming from the northbound to westbound flyover ramp, making four lanes that will be further increased when the lanes from the southbound to westbound median connector join up near Gibson Road.
I vote for Option 2A. I really like the access to Gibson Rd with this alternative and it appears to solve a lot of the problems we currently have with this interchange. Peeling off the traffic to I-11 SB from EB I-215 before the Gibson Bridge is a great idea.	Thank you for your positive comment and your interest in this project.
There is clearly a traffic issue to be resolved; new or expanded construction is obvious. Why expend limited resources on a 'No-Build Plan'? Construction is not slated to commence before 2023 - IF it starts on time. The plan is to meet 2040 traffic demand as it was anticipated 1-2 years ago. How is the likely change to that demand to be factored into planning.	Although the No Build Alternative might not seem reasonable, it must always be included in the analysis as part of the National Environmental Policy Act (NEPA) process. The No Build Alternative generally serves as a baseline against which the other alternatives can be evaluated. Regarding your question on factoring traffic demand into planning; for this project to be eligible for federal funding participation, NDOT and FHWA agreed that the year 2040 was to be used as the design year date. Planning work by agencies such as RTC of Southern Nevada has been incorporated into the projections for year 2040 traffic used in the design of the Build Alternative.

Table 4.1 Summary of Public Comments Received

Comment Summary	Response
This is absolutely ridiculous the noise already is so extreme that whenever there's an accident my house shakes. My backyard is the 215. I live on Viento del Montagna Avenue. I also did not receive a letter and many others didn't either we just found this out last night. Also debris flies over the wall on the freeway and hits my backyard. A car part recently flew over the freeway wall and landed on top of my roof. This is a danger to anyone who is behind the freeway.	Thank you for reaching out to NDOT regarding your concerns associated with the environmental study for the proposed Henderson Interchange project. One of the reasons that NDOT is performing this environmental study is to better understand the impacts that the project would have on the adjacent property owners. These impacts include local access, noise and air quality during construction as well as the long term impacts due to the final configuration of the interchange. Population growth and the associated growth in traffic volumes drive the need for projects of this nature, however local impacts are an important part of the environmental study and we are required to minimize and mitigate these impacts to the best of our ability. We would like to offer to meet with you in-person to share information on the project and discuss your concerns.
My neighbors and I would like to express our concerns about the proposed changes to the Henderson Interchange. Specifically we are worried about the increased noise levels if there are additional traffic lanes placed between the current flyover lanes and our homes on Viento del Montagna Avenue. We would like some additional time to study the proposed changes, and if possible to be able to see true scale models of how our homes would be affected by these changes. It is already extremely noisy because of the current interchange both in our yards and inside our homes. The problem is not the fact that the southbound ramp merges from 2 lanes to 1 lane. The main problem is the fact that once you get on the southbound 95 the 5 lanes merge to 3. We would like to see the plans and scale of option 1. Both of the other options look like the flyover ramps will be practically on top of our homes. We need more time and information and we would like to see true scale models of all the proposed options. As a homeowner on Viento del Montagna Avenue, we and our neighbors have had to tolerate the noise and lack of view since 2005 or whenever this interchange was originally began. We cannot possibly imagine the increase in noise and intrusion into our privacy with the proposed options. Also, it is not possible to see how close the new flyover ramps will be to our homes. We would like addition time and information such as scale models of the proposals. Also, it states that there are 3 options but we can only see 2.	Thank you for reaching out to NDOT regarding your concerns associated with the environmental study for the proposed Henderson Interchange project. One of the reasons that NDOT is performing this environmental study is to better understand the potential impacts that the project may have on the adjacent property owners. These impacts include local access, traffic noise, air quality, and temporary construction impacts. Population growth and the associated growth in traffic volumes drive the need for projects of this nature, however local impacts are an important part of the environmental study and we are required to minimize and mitigate these impacts to the best of our ability. We would like to offer to meet with you in-person to share information on the project and discuss your concerns.
Objection to the Henderson Interchange: Dear Mr. Bowers, My husband and I own the property at 760 Viento del Montagna Ave., Henderson, NV 89012. Your proposal for the Henderson Interchange will be devastating for many reasons. Having the 215 a stone's throw behind our house is bad enough, but having it basically invading our backyard will destroy our property value, and that of all our neighbors on Viento del Montagna Ave. The construction process alone will be a grueling hardship for anyone nearby. This is a residential area, full of people trying to sleep, eat, and enjoy their lives, so they can contribute to our community. Even if they can persevere through the building process, the end result is no prize. The traffic noise alone will be deafening. The noxious fumes from the fuel will create a severe environmental hazard for those with health issues, such as my husband. You will block out more sunlight, thus ruining the visual, aesthetic ambiance we worked so hard to create (in a backyard with a freeway close by), and our plants we depend on for our food supplements will die. You will create an uninhabitable, intolerant environment for us to live in, inside and outside. We understand trying to improve traffic flow, but feel there are many alternatives to this invasive breach of our privacy and right to enjoy life. Why don't you close the Gibson on ramp (heading east) for a few months and see if that doesn't help the problems associated with the merge onto north and south bound 515? This on ramp shouldn't have been there in the first place. It is way too dangerous to try to merge over in such a short space, and this is the crux of the problem. There is plenty of access to the freeway from Auto Show, or from Stephanie. How about building more to the north of 215, where there are mostly industrial and business properties that will be impacted? How about moving the entire interchange further east, making use of the vacant Fiesta property? How about going up above the existing highway, rather than spreading out? It seems there are a lot of alternatives that have not been explored. You are also assuming traffic will increase - many residents are now working from home, and some people are now afraid to relocate here for fear the water supply will run out! Please note we are vehemently against this abhorrent project and vote "NO BUILD".	Thank you for reaching out to the NDOT regarding your concerns associated with the environmental study for the proposed Henderson Interchange project. One of the reasons that NDOT is performing this environmental study is to better understand the potential impacts that the project may have on the adjacent property owners. These impacts include local access, traffic noise, air quality, and temporary construction impacts. Population growth and the associated growth in traffic volumes drive the need for projects of this nature, however local impacts are an important part of the environmental study and we are required to minimize and mitigate these impacts to the best of our ability. We would like to offer to meet with you in-person to share information on the project and discuss your concerns. NDOT project team met with the residents at their home on September 4, 2021. The resident had the NDOT team observe the noise and his view of the freeway from both inside his home and the backyard. The NDOT team has ongoing communication with this resident.

Table 4.1 Summary of Public Comments Received

Comment Summary	Response
Mr. Bowers, I have reviewed the Henderson Interchange proposal and I must say that for some reason the easiest and least expensive option has not been put forward. I live at 760 Viento del Montagna Ave., and have lived here since before the freeway was ever built. When being constructed, there was no on-ramp at the Gibson interchange heading east on 215. However one was constructed and once completed I attempted to drive on this on-ramp on many occasions, only to find it the most dangerous stretch of road I have ever seen and this was way back when, when it was first built. I do not and will not access the freeway from this on-ramp. I either go 6 blocks north to the Auto Show on-ramp or 6 blocks west to Stephanie ramp. Your project alternatives do NOT list “close the Gibson on-ramp”. Simply doing this and re-lining 215 would eliminate the entire problem for hardly any cost both monetarily and environmentally. If a lion has a thorn in his paw, you don’t keep wrapping it with more bandages, changing the bandages, and reconfiguring the bandages. You simply remove the thorn. I purpose that before everyone’s lives and the environment are totally ruined you shut down this on-ramp and see what happens to the level of accidents in this interchange area. You can then use the 260 million dollars to fix all the water leaks in Henderson so we all don't run out of water. I vote “NO BUILD on the Henderson Interchange”.	Thank you for reaching out to the NDOT regarding your concerns associated with the environmental study for the proposed Henderson Interchange project. One of the reasons that NDOT is performing this environmental study is to better understand the potential impacts that the project may have on the adjacent property owners. These impacts include local access, traffic noise, air quality, and temporary construction impacts. Population growth and the associated growth in traffic volumes drive the need for projects of this nature, however local impacts are an important part of the environmental study and we are required to minimize and mitigate these impacts to the best of our ability. We would like to offer to meet with you in-person to share information on the project and discuss your concerns. We note that your residence at 760 Viento Del Montagna is adjacent to the first span of the large flyover bridge serving the eastbound-to-southbound and the eastbound-to-northbound ramps. This structure along with the eastbound Gibson on-ramp were constructed with the original Contract No. 3150 plans dated February 2003. The Gibson Road on-ramp was not added later, and further, the bridge adjacent to your residence that serves the eastbound to northbound and eastbound to southbound movements would not be located further from your residence if the Gibson Road on-ramp was closed. NDOT project team met with the residents at their home on September 4, 2021. The resident had the NDOT team observe the noise and his view of the freeway from both inside his home and the backyard. The NDOT team has ongoing communication with this resident.

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In the Las Vegas area, some major entrances, exits, and splits contribute to traffic backups and accidents. Drivers unfamiliar with a roadway have limited time to read, comprehend, and react. Locating overhead advance guide signs a minimum of two miles in advance of major exits and splits to improve traffic flow. A minimum of two-mile advance notice for splits is more important in a tourist town than anywhere else. More guide signs will help prevent last-second jockeying of vehicles which causes backups and accidents at many locations in the valley. Confirming highway pavement signs can also prevent unnecessary and last-second lane changes. Section 2E.21 Design of Overhead Arrow-per-Lane Guide Signs for Option Lanes: Guidance: 06. Per FHWA MUTCD, Overhead Arrow-per-Lane guide signs should be located at approximately 1/2 mile and 1 mile in advance of the exit or split, and at approximately 2 miles in advance of the exit or split where space is available, and conditions allow. Examples: Even during light traffic conditions, backups and accidents occur at the new entrance from Tropicana onto NB I-15 which has a minimal merge lane to efficiently blend traffic with existing NB traffic. EB 215 past Gibson has a guide sign only 1/2 mile before the Las Vegas/Boulder City split, which gives drivers only 30 seconds to make their move, resulting in drivers making frantic last-second decisions and abrupt lane changes. Traffic flow would be improved here with more than a 30-second warning. The existing guide signs are not correct for the Las Vegas and Boulder City split. Many accidents and very close calls at the entrance from Horizon onto SB US 93/95 I-11 which does not have a merge lane and shoots vehicle vehicles out into existing traffic. Approaching the Spaghetti Bowl on NB US 95 has advanced signage that may have been sufficient for traffic 30 years ago, but the lack of proper advance guide signs forces drivers unfamiliar with the roadway to make last-second decisions and abrupt lane changes. If not done so already for this project, design roadways to account for inclines or sharp curves that cause semi-trailer trucks, recreational vehicles, and vehicles with travel trailers to slow and reduce traffic efficiency. For example new interchange at Railroad Pass, entrance lane onto NB I-11 coming from Boulder City. An incline exists where it is not uncommon to have two semi-trailer trucks in both lanes, causing traffic to slow and making entering NB I-11 from Boulder City unnecessarily dangerous and inefficient. Traffic flow can be greatly improved here if the entrance did not end, and a third lane was present between Railroad Pass and connecting with the existing third lane just past Wagon Wheel. Another example is the Fiesta flyover from NB US 95 to WB 215 with traffic efficiency reduced due to large and slow vehicles navigating an incline and curve. As a major tourist city with many visitors and an influx of new residents, we have a disproportionate share of drivers completely unfamiliar with our highways and interchanges. Tourists more than ever are leaving the strip to visit Lake Mead, Hoover Dam, Death Valley, Utah, Grand Canyon, etc. combined with local drivers that are not familiar with areas they only drive to occasionally, need ample time to read and comprehend sign messages. Overhead Arrow-per-Lane guide signs that were placed a half-mile or a mile from a split were sufficient many years ago when traffic was lighter. Please look at the FHWA MUTCD as only minimum recommendations, and designs in the Las Vegas area can exceed these due to unique conditions increasing tourism traffic and a constant influx of new residents that are unfamiliar with our roads.	Thank you for your comments. The guide sign concept plan was prepared based on MUTCD and NDOT guidelines and will be refined as the project develops. Urban interchanges are challenging because of the close spacing of service interchanges, and this interchange is further complicated by having four routes converging instead of just two crossing. The northbound entrance from Horizon Drive will bring two lanes on that add to the existing three lanes, with no merging required. A lane change would be needed prior to the Lake Mead Parkway exit if your destination is further north on I-515. Design speeds for curves are based on trucks, and most ramp curves (except for relatively low volume ramps) are designed for at least 45 mph. The geography of this site combined with the need for grade separations results in longitudinal roadway grades of up to 5% on the highways and ramps. Additional lanes heading up the hills to the west and to the south may help mitigate the issue of slower trucks impeding the movement of faster vehicles. Your suggestion for signing geared to tourists will be shared with the design team. Better signage combined with smartphone mapping technology can help in getting unfamiliar drivers to their destinations.
I am an attorney here in Las Vegas reaching out on behalf two local businesses which are situated along the highways for the Henderson exchange. I just wanted to reach out to ask a few questions about the project, I believe currently in the environmental feasibility phase between the No Build and Build Alternative. I understand that the public comment period was until last week, however, the Las Vegas Review journal notice was really the first widely available notice that my clients have received and so I'm just trying to find out, learn a little bit more, and potentially share their input in terms of if and how it might affect their business.	Thank you for interest in the Henderson Interchange project. The proposed improvements made under the Build Alternative would improve traffic circulation and access within the project area. Additional information can be found on the project website at https://www.dot.nv.gov/projects-programs/transportation-projects/henderson-interchange. We are currently only at a conceptual design level, however, prior to construction, NDOT will develop a plan to communicate with the public and property owners regarding construction schedule, potential closures, and detours throughout construction. Access to businesses would be maintained during construction.

Table 4.1 Summary of Public Comments Received

Comment Summary	Response
NRS – Nevada Revised Statutes NAC – Nevada Administrative Code General: Compliance with Nevada water law is required. All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions of NRS Chapters 533 and 534 and not otherwise. Water shall not be used from any source unless the use of that water is authorized through a permit issued by the State Engineer. For underground sources, certain uses of water may be authorized through the issuance of a waiver pursuant to NRS Chapter 534 and NAC Chapter 534. Water for Construction Projects Ensure that any water used on a project for any manner of use shall be provided by an established utility or under permit or temporary change application or waiver issued by the State Engineer's Office with a manner of use acceptable for suggested project's water needs.	NDOT will comply with NRS Chapters 533 and 534. NDOT will also ensure that water used for the project shall be provided as described in your request.
Any relocation of potable water infrastructure will be required to be reviewed and approved by the Bureau of Safe Drinking Water.	NDOT will request that any relocation of potable water infrastructure shall be reviewed and approved by the Bureau of Safe Drinking Water.
NDOT has not indicated that it intends to utilize the public scoping as part of compliance with the National Environmental Policy Act (NEPA) to involve the public in the National Historic Preservation Act of 1966, as amended, (NHPA) Section 106 process to procure relevant information concerning cultural resources issues in the project area. If NDOT will use this public process to involve members of the public with concerns about cultural resources and historic properties in accordance with the Programmatic Agreement we share with FHWA and NDOT regarding the implementation of federal-aid transportation project (Stipulation IV.B), the SHPO recommends the inclusion of a clear statement that the federal agency intends to comply with NHPA as well as NEPA public notification requirements is recommended by guidance provided by CEQ and ACHP as found here: https://www.achp.gov/sites/default/files/201702/ NEPA_NHPA_Section_106_ Handbook_Mar2013_0.pdf	NDOT will use the public process in accordance with the Programmatic Agreement to comply with Section 106 of the NHPA. The Environmental Assessment will include a clear statement that the project will comply with the NHPA and NEPA public notification requirements.
The Moapa Band of Paiutes, does not have any questions, or comments at this time with the proposal to improve traffic operations at the Interstate 515 (I-515) and Interstate 11 (I-11) interchange between Galleria and Horizon Drive at the Interstate 215 (I-215) interchange from Valle Verde Drive to Van Wagenen Street on Lake Meade Parkway. We however, would like to be continually informed throughout the proposed project planning stages. Thank you for contacting the Moapa band of Paiutes.	The Moapa Band of Paiutes has been added to the distribution list for project notifications and we look forward to our continued work with you and your organization.

HENDERSON INTERCHANGE