
Impact Assessment Methodologies

As part of the Environmental Review Process for

Downtown Access Project
(I-11/US 95/US 93)

Las Vegas, Nevada

Prepared by

Federal Highway Administration, Nevada Division
Nevada Department of Transportation



NDOT Project Number: 74291
FHWA Project Number: SPI-515-1(040)

April 2024

ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
APE	Area of Potential Effects
BA	Biological Assessment
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
DOT	U.S. Department of Transportation
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FR	<i>Federal Register</i>
GIS	geographic information system
I-15	Interstate 15
I-11	Interstate 11 (formerly I-515)
IPaC	Information for Planning and Conservation
KOP	key observation point
LWCF	Land and Water Conservation Fund
MSAT	mobile source air toxic
NAAQS	national ambient air quality standards
NCHRP	National Cooperative Research Program
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NNHP	Nevada Natural Heritage Program
NO ₂	nitrogen dioxide

NRHP	National Register of Historic Places
PM	particulate matter
PM _{2.5}	PM less than or equal to 2.5 microns in diameter
PM ₁₀	PM less than or equal to 10 microns in diameter
POAQC	project of air quality concern
RTC	Regional Transportation Commission of Southern Nevada
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHPO	State Historic Preservation Officer
T&E	threatened and endangered
TNM	Traffic Noise Model
US 93	United States Highway 93
US 95	United States Highway 95
U.S.C.	United States Code

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Impact Assessment Methodology document is to communicate the lead agencies' proposed tools, assumptions, level of detail, evaluation criteria, and screening procedures used to evaluate environmental impacts for the Downtown Access Project in Las Vegas. The lead agencies seek collaboration on this Impact Assessment Methodology from other cooperating and participating agencies to promote an efficient and streamlined process and early resolution of concerns or issues.

United States Code (U.S.C.) Title 23 Section 139 requires lead agencies for proposed federally funded transportation projects to determine the appropriate methodology and level of detail for analyzing impacts, in collaboration with cooperating and participating agencies.¹ Consensus on the methodology is not required, but the lead agency must consider the views of the cooperating and participating agencies with relevant interests before making a decision on a particular methodology.² Well documented, widely accepted methodologies, such as those for noise impact assessment and evaluation of impacts under Section 106 of the National Historic Preservation Act, require minimal collaboration. If a cooperating or participating agency has concerns about the proposed methodology for a particular environmental factor, the agency should describe its preferred methodology and why it is recommended.

1.2 PROJECT BACKGROUND

NDOT, in coordination with FHWA, is preparing an EIS to evaluate potential improvements to address aging bridges and provide reliable travel along a 4-mile-long segment of Interstate 11 (I-11)/U.S. Highway 95 (US 95)/U.S. Highway 93 (US 93).³ The project is referred to as the Downtown Access Project (Figure 1).

¹ The congressional Conference Report accompanying the 2005 federal transportation bill, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) states: "Collaboration means a cooperative and interactive process. It is not necessary for the lead agency to reach consensus with the participating agencies on these issues; the lead agency must work cooperatively with the participating agencies and consider their views, but the lead agency remains responsible for decision making." FHWA's National Environmental Policy Act (NEPA) regulations (Code of Federal Regulations [CFR] Title 23 Section 771) require that those federal agencies with jurisdiction by law (permitting or land transfer authority) be invited to be cooperating agencies for an environmental impact statement. SAFETEA-LU created a new "participating agency" category for the environmental impact statement process. Participating agencies are federal and non-federal governmental agencies that may have an interest in the project because of their jurisdictional authority, special expertise, and/or statewide interest.

² The methodology used by the lead agency must be consistent with any methodology established by statute or regulation under the authority of another federal agency.

³ I-11 was formerly I-515.

Figure 1. Study Area



The study area extends along I-11/US 95/US 93 from Rancho Drive (western limit) to Mojave Road (eastern limit). The study limits include the recently reconstructed Spaghetti Bowl (the system interchange of I-15 and I-11) to address traffic congestion on I-11/US 95/US 93 through the Spaghetti Bowl and to assess the effects of proposed improvements on the adjacent sections of the freeways. The recent improvements to ramps and I-15 will not be affected. Northern and southern study limits along I-15 are Alta Drive on the south and Bonanza Road on the north. Northern and southern study limits along I-11/US 95/US 93 will vary by resource but will extend far enough to assess potential traffic, socioeconomic and environmental impacts from improving I-11/US 95/US 93 and necessary changes to local streets.

The purpose of the project is to address aging infrastructure, safety, and congestion along I-11/US 95/US 93 between Rancho Drive and Mojave Road in Las Vegas to increase the efficiency of the movement of people, goods, and services on the freeway. Improvements are necessary to address the following needs: (1) aging bridges; (2) closely spaced ramps that create short weave and merge distances; and (3) unacceptable congestion caused by increased traffic volumes on a freeway structure that has never been widened in a city that has grown 1,000 percent since US 95 opened to traffic in 1968.

In addition to the needs, NDOT and the community identified several goals to revitalize and reconnect the community. These reflect topics important to the public, stakeholders, and agencies.

Restore Community	Advance Sustainability
<ul style="list-style-type: none"> • Improve Neighborhood Multimodal Mobility • Reconnect Neighborhoods • Enhance Public Health and Wellness 	<ul style="list-style-type: none"> • Improve Human and Natural Environment • Improve Infrastructure Resiliency • Support Economic Growth

The Downtown Access Project will provide necessary National Environmental Policy Act (NEPA) and design studies to identify a preferred alternative to address the roadway and bridge deficiencies and accommodate the future travel demands.

The EIS will discuss why the project is needed, reasonable alternatives considered (including a no build alternative), the affected environment, environmental consequences of the proposed action, and the results of coordination with agencies and the public. The EIS will also demonstrate compliance with applicable environmental laws and regulations and will be available for public review.

2.0 ALTERNATIVES TO BE EVALUATED IN THE ENVIRONMENTAL IMPACT STATEMENT

The EIS will evaluate the following alternatives (15 percent level of design detail) and the No Build Alternative (the No Build is Alternative 4):

- Elevated with HOV Interchange at City Parkway (Alternative 5)
- Elevated with No HOV Interchanges (Alternative 6)
- Elevated with No HOV Interchanges plus Revised I-11/US 95/US 93 Connection to I-15 North (Alternative 7)

The concepts will include refined locations and alignments, conceptual interchange layouts, off-system improvements, if needed, and worst-case construction footprints.

3.0 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION

3.1 TRAFFIC NOISE IMPACT METHODOLOGY

The project team will evaluate highway noise impacts in accordance with the following key laws, regulations, and guidelines:

- FHWA, 23 CFR Part 772 - Procedures for Abatement of Highway Traffic Noise and Construction Noise, July 2010
- FHWA, *Highway Traffic Noise: Analysis and Abatement Guidance* (2011a)
- FHWA, Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, 1987
- NDOT, Traffic and Construction Noise Analysis and Abatement Policy, May 2018 update

3.1.1 Goals

Transportation projects are evaluated for traffic noise impacts and abatement measures to help protect the public health and welfare and to provide information to local officials for land use planning near highways. The traffic noise analysis also provides information on noise generated from typical construction equipment during the construction period.

3.1.2 Methodology

The project team will identify land uses and locate noise-sensitive properties impacted by the project, as described in 23 CFR 772. The team will note physical and terrain features that affect traffic noise propagation and features that may be altered during construction. The team will then conduct a traffic noise study based on the FHWA and NDOT procedures listed above.

The team will conduct noise measurements at representative noise-receptor monitoring-site locations to calibrate the traffic noise model and to document existing noise levels. All measurements will be conducted for 15-minute-minimum sampling periods during free-flow traffic conditions during off-peak hours. At each measurement site, traffic counts will be conducted concurrently with the noise measurements. All noise sources will be noted, and those that may interfere with future mitigation determination will be identified. Traffic volumes counted during the noise measurement survey along with the field sound-level measurements will be modeled using the current version of the FHWA Traffic Noise Model (TNM), and the team will compare the resulting sound levels with the measured sound levels to validate the model.

Once the traffic has been approved, existing peak-hour traffic will be used with posted-speed-limit speeds to calculate existing maximum noise levels using the model. The team will model the design-year traffic noise level (2050) for each of the reasonable alternatives and the No Build Alternative with posted-speed-limits. The team will identify the noise-sensitive areas and associated receptors (discrete or representative locations in noise-sensitive land uses listed in 23 CFR 772) within 500 feet of the roadway for each alternative. Peak-hour or adjacent-to-peak-hour traffic noise will be modeled at all first row receptors and selected additional noise-sensitive receptors based on forecast traffic volumes in

the design year for the reasonable alternatives. The TNM analysis will be used to predict the traffic noise levels at each of the receptors, assess the number of properties within 500 feet of the project that would be affected, determine the increase in traffic noise, and estimate the amount of reduction at each noise sensitive receptor as a result of mitigation.

In accordance with FHWA guidance and NDOT's Traffic and Construction Noise Analysis and Abatement Policy, traffic noise abatement barriers (soundwalls) will be considered at locations along the alignments where traffic noise impacts are predicted. The analysis will provide location, length, height, profile, estimated cost, and number of benefiting noise-sensitive properties for each proposed soundwall following NDOT's noise reduction design goal. The analysis will discuss affected areas that do not meet NDOT's criteria for abatement and specifically note reasons for not including mitigation.

Construction activities that may cause annoyance at nearby noise-sensitive land uses will be qualitatively assessed and evaluated in relation to local laws on construction noise.

A Traffic Noise Technical Report will document the methodology, assumptions used to guide the analysis, impact assessment, and evaluation of abatement measures. The appendices will include all raw data and analysis.

3.2 AIR QUALITY IMPACT METHODOLOGY

Air quality impacts will be evaluated in accordance with the following key laws, regulations, and guidelines:

- Clean Air Act as amended (42 U.S.C. 7401)
- U.S. Environmental Protection Agency (EPA), Determining Conformity of Federal Actions to State or Federal Implementation Plans (40 CFR 93)
- EPA, *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (1992)
- EPA, *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Non-attainment and Maintenance Areas* (2015b)
- FHWA, *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* (2016)
- FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, 1987
- U.S. Environmental Protection Agency (EPA). 1992. Guideline for Modeling Carbon Monoxide from Roadway Intersections.
- U.S. Environmental Protection Agency (EPA). 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas.
- U.S. Environmental Protection Agency (EPA). 2021. EPA Greenbook: Nevada Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants, as of April 30, 2021.

3.2.1 Goals

EPA has set National Ambient Air Quality Standards (NAAQS) for six principal air pollutants (also referred to as criteria pollutants): carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), and sulfur dioxide (SO₂). Transportation contributes to CO, NO₂, ozone, and PM

emissions. The goal of the air quality analysis is to evaluate whether the proposed project will cause new violations, or exacerbate existing violations, of the NAAQS.

EPA has designated the project area as in attainment for lead, sulfur dioxide, NO₂ and PM less than or equal to 2.5 microns in diameter (PM_{2.5}). The project area is in a marginal nonattainment area for ozone (2015 NAAQS) and a designated maintenance area for CO and PM less than or equal to 10 microns in diameter (PM₁₀). The project is therefore subject to transportation conformity requirements. The air quality analysis will evaluate whether the project demonstrates conformity at both the regional level and project level. Mobile source air toxic (MSAT) and greenhouse gas impacts will also be evaluated.

The evaluation will also consider the temporary impacts to air quality from construction.

3.2.2 Methodology

3.2.2.1 Regional Conformity

Regional conformity of the project will be demonstrated by the inclusion of the project in the latest conforming regional transportation plan and the federal transportation improvement program by the Regional Transportation Commission of Southern Nevada (RTC).

3.2.2.2 Project-level Conformity

Project-level conformity will be evaluated for nonattainment or maintenance pollutants, including CO and PM₁₀, as described below.

CO Hot-spot Analysis

Up to four worst-case intersections will be selected for each alternative following the EPA *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (1992). NDOT will perform quantitative CO hot-spot modeling for these intersections using the MOVES3 and CAL3QHC models for the No Build Alternative and the three build alternatives for the year 2050. The results of the modeling will be compared to the CO NAAQS to demonstrate compliance with the NAAQS.

PM₁₀ Hot-spot Analysis

PM₁₀ hot-spot analysis will be conducted following the *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* (EPA 2015b). Determination of whether the project is a “project of air quality concern” (POAQC) will be made through the interagency consultation process. If the project is determined to be a POAQC, a quantitative PM₁₀ air dispersion modeling analysis will be conducted on the preferred alternative following EPA’s guidance to demonstrate project-level conformity for PM₁₀. Vehicle PM₁₀ emissions from the project roadway segments will be estimated using EPA’s MOVES2014b or MOVES3 program. The PM₁₀ ground-level concentrations will be modeled using EPA’s preferred air dispersion model, AERMOD.

If the project is not a POAQC, further analysis of PM₁₀ hot-spot is not needed. The Air Quality Technical Report and the EIS will document the determination and the analysis results if a quantitative PM₁₀ modeling analysis is triggered.

3.2.2.3 MSAT Analysis

In addition to the conformity analysis, the team will perform a mobile source air toxics (MSAT) analysis following FHWA's 2016 *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. According to the guidance, minor widening projects and new interchanges and projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT) are considered to have low potential MSAT effects. Because the project's AADT is anticipated to be over 150,000 vehicles per day, a quantitative MSAT analysis will be performed for the build and no-build alternatives for 2050.

Sensitive air quality receptors in the study area include residences, schools, health care providers, and daycare centers. Nonresidential sensitive receptors within 600 feet from the nearest travel lanes will be identified and plotted on an exhibit. A table will also be created identifying locations where roadways could shift closer to sensitive receptors.

The initial air quality analysis for this project has not yet started, but it is anticipated that the alternatives carried forward for further study would not result in substantial increases in MSATs.

3.2.2.4 Construction Impacts

Short-term air quality impacts from project construction will be evaluated qualitatively based on anticipated construction duration, construction activities, and the implementation of emission minimization and reduction measures.

3.2.2.5 Greenhouse Gas Impacts

Greenhouse gas impacts will be assessed per the Council on Environmental Quality's January 2023 interim guidance.

3.2.2.6 Mitigation Measures

Once the impacts of the project construction and operation are determined, mitigation measures for identified significant impacts (if any) will be investigated.

A separate Air Quality Technical Report will describe the methods and results of the air quality analyses and mitigation measures in detail. A map indicating nearby land use and sensitive receptors will be included in the Air Quality Technical Report and the EIS.

3.3 VISUAL CHARACTER/AESTHETICS METHODOLOGY

Visual impacts will be evaluated based on the following key guidance:

- FHWA, *Guidelines for the Visual Impact Assessment of Highway Projects* (2015b)
- FHWA's Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)

3.3.1 Goals

The goal of the visual impact assessment is to identify the visual character of the project corridor, characterize the visual quality of the viewshed, identify viewer groups to the extent practicable, describe

the visual change that will occur because of the proposed transportation improvements, qualitatively characterize the change, identify areas where adverse visual impacts would occur, and identify measures to mitigate adverse visual effects.

3.3.2 Methodology

The analysis will be based on FHWA's methodology to objectively consider potential visual effects from roadway projects on adjacent landscapes, as described in the *Guidelines for the Visual Impact Assessment of Highway Projects* (FHWA 2015b).

The area of potential aesthetic/visual effects analysis will encompass areas from which proposed project features would be visible. In most places, this distance will be approximately 0.25 to 0.5 mile on either side of the existing freeway. The team will review local and state plans, policies, and design guidelines to identify important views and visual resources. Online resources (such as Google Earth) and aerial photographs will be examined to identify locations within the analysis area that contain sensitive viewers (people who may be concerned with changes to the views they have). Sensitive viewers are typically found in residential areas, parks, etc.

Using FHWA methodology, the project team will establish preliminary key observation points (KOPs) for assessment. KOPs related to historic properties will be selected in consultation with historic resource technical staff and reviewing agencies. Visual simulations of alternatives will be developed for each of the KOPs.

The project team will photograph views toward the proposed project from each KOP. In addition, photographs from other locations will be used to illustrate the existing landscape character of the analysis area. The locations of the KOPs will be mapped for inclusion in the affected environment and impact assessment sections of the EIS.

The project team will divide the analysis area into landscape units (smaller geographic areas that assist in evaluating large areas), according to the FHWA methodology. The project team will describe the general visual/aesthetic conditions of the landscape units and will assemble a series of character photographs to depict the general landscape character and visual quality.

The project team will develop visual simulations of the reasonable alternatives for each of the KOPs. Changes in visual quality will be evaluated using the simulations for each of the KOPs, in accordance with the FHWA methodology.

The analysis will consider potential mitigation measures that could be employed by NDOT along portions of I-11/US 95/US 93 in the vicinity of the project. In addition, the team will consult *Pattern and Palette of Place: A Landscape and Aesthetics Master Plan for the Nevada State Highway System* (NDOT 2002) when considering mitigation measures. The project team will prepare visual simulations of the potential visual mitigation measures.

3.4 COMMUNITY IMPACTS METHODOLOGIES

The highly urbanized I-11/US 95/US 93 corridor is bordered by mostly residential, commercial, and industrial land. Community recreational facilities, police stations, City of Las Vegas Central Fire Station, a

school, senior services providers, and government buildings are also located adjacent to this segment of I-11/US 95/US 93.

3.4.1 Commercial/Residential Displacement Impact Methodology

Commercial and residential displacements will be evaluated in accordance with the following key laws, regulations, and guidance:

- FHWA, *Community Impact Assessment: A Quick Reference for Transportation* (2018)
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (42 U.S.C. 4601 as implemented through 49 CFR 24)
- FHWA's Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)
- NDOT, *Environmental Services Procedure Guide User Handbook*, Chapter 9 (2018)

3.4.1.1 Goals

Widening I-11/US 95/US 93 and modifying cross streets would likely require residential and commercial relocations. The goal of the displacements analysis is to assess each alternative's impact on residences and commercial and industrial interests in terms of access changes, ease of moving goods, and relocations during and after construction.

3.4.1.2 Methodology

Using available geographic information system (GIS) databases, aerial photography, or other mapping, confirmed through field reconnaissance, the team will identify businesses and residences within a quarter mile of the freeway and incorporate them into the project base map. Impacts will be evaluated using design drawings of each alternative overlaid on the existing base map.

Impacts to businesses will include an estimate of the number and types of businesses potentially displaced, number of employees/jobs affected, any special characteristics, and availability of replacement business sites. The team will also evaluate impacts to businesses as a result of changes in access, which could include relocating, combining, or eliminating existing driveways; reductions in parking; restricting turning movements to and from adjacent properties due to median barriers; and modifying or closing existing intersections or interchanges.

The evaluation of impacts to residences will estimate the number of homes to be potentially displaced, changes in access during and after construction, and available comparable, decent, safe, and sanitary housing in the area. The project team will identify measures to be taken if replacement housing is insufficient and any special relocation needs. The team will also evaluate impacts on populations living adjacent to the project, mobility and transportation access to health care services, employment, government services, and shopping.

The EIS will include a conceptual stage relocation discussion that will estimate the availability of replacement housing and business sites based on available information, such as property listings and cost estimates.

A Relocation Impact Analysis Report will tally the expected land acquisition and business and residential displacements of the alternatives. The EIS will summarize the results of the relocation analysis and the impacts of the alternatives on mobility and access to services due to the relocations.

3.4.2 Socioeconomic Impact Methodology

General socioeconomic impacts will be evaluated in accordance with:

- FHWA, *Community Impact Assessment: A Quick Reference for Transportation* (2018)
- FHWA's Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)
- Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, 1997 (*Federal Register* [FR] Volume 62, Issue 78, page 19885)
- NDOT, *Environmental Services Procedure Guide User Handbook*, Chapter 9 (2018)

3.4.2.1 Goals

The socioeconomic impact assessment includes a review of the social conditions and economic conditions in the study area. The intent is to evaluate the potential impacts of the project on business operations, neighborhoods, tax revenues, social groups, and travel accessibility.

3.4.2.2 Methodology

The socioeconomic impact analysis will use project mapping of businesses and residences; information on neighborhoods, services, and other social amenities from local and regional land use plans, comprehensive plans, and development plans; economic information from the most recent American Community Survey (ACS) 5-Year Estimate; and discussion with city and county officials. NDOT and FHWA will use other demographic information obtained from local agencies, as available, in addition to the U.S. Census American Community Survey. The team will conduct a study area reconnaissance to supplement and verify this information.

Using alternative overlays, design drawings, traffic volume projections, and input from service providers, the EIS will describe the neighborhoods and the potential impacts to community cohesion, social groups (i.e., elderly, handicapped, transit-dependent, low-income, and minority), travel patterns, and accessibility including non-motorized travel, public services, and safety.

A qualitative economic analysis will identify current economic conditions in the study area, describe impacts of the reasonable build alternatives, and identify mitigation measures. The project may result in construction-period economic impacts, temporary and long-term changes in traffic patterns and business access, changes in parking (on-street and off-street), effects on economic development trends and viability, effects on employment opportunities, and effects on existing and planned business development.

3.4.3 Recreational Resources

Impacts to recreational resources will be evaluated in accordance with the following key laws, regulations, and guidance:

- Section 4(f) of the U.S. Department of Transportation (DOT) Act (23 U.S.C. 138; 49 U.S.C. 303)
- 23 CFR 774, regulations for implementing Section 4(f) requirements for parks, recreation areas, wildlife and waterfowl refuges and historic sites
- FHWA, *Section 4(f) Policy Paper* (2012)
- Section 6(f) of the Land and Water Conservation Fund (LWCF) Act as amended (16 U.S.C. 4601)
- NDOT *Environmental Services Procedure Guide User Handbook*, Chapter 8 (2018)

3.4.3.1 Goals and Methodology

The assessment of impacts to recreational resources includes an inventory and description of resources in the study area, including existing and planned use, funding sources, and jurisdictional owning and management agencies. The goal is to ensure the transportation improvements are located and designed to avoid or minimize impacts to recreational properties to the greatest extent practicable.

Impacts to publicly owned parks and recreational resources are regulated under Section 4(f) of the DOT Act (23 U.S.C. 138; 49 U.S.C. 303) and Section 6(f) of the Land and Water Conservation Fund (LWCF) Act (16 U.S.C. 4601). FHWA guidance specifies for projects evaluated with an EIS that the Section 4(f) evaluation should be included as a separate section of the EIS. Given the overlap in regulation under Sections 4(f) and 6(f), the full evaluation of the project on parks and recreational resources under both statutes will be addressed in the Section 4(f)/6(f) Evaluation (see Section 3.13 below).

3.4.4 Land Use Impact Methodology

Land use impacts will be evaluated in accordance with the FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987).

3.4.4.1 Goals

The goal of this task is to assess changes in land use that would be caused by the reasonable build alternatives, and the consistency of the reasonable alternatives with the comprehensive development plans adopted for the area by local and state officials.

3.4.4.2 Methodology

The team will collect available land use and/or zoning information from the City of Las Vegas and Clark County. The team will describe existing land use from available land use data sources and aerial photography interpretation of the study area.

The team will analyze the project's potential impacts to existing land use, evaluate the consistency of the reasonable build alternatives with land use plans, and develop and consider measures to avoid, minimize, and mitigate potential impacts.

No separate technical report will be created for this topic. Results of the analysis will be documented in the EIS.

3.4.5 Schools, Churches, and Public Services Impact Methodology

Institutional impacts will be evaluated in accordance with the following key laws, regulations, and guidance:

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (42 USC 4601 as implemented through 49 CFR 24)
- FHWA's Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)

3.4.5.1 Goals

The impact assessment will include a review of the public services and institutions in the study area, such as churches, schools, publicly owned buildings, police, and emergency medical and fire protection. The intent is to evaluate the potential impacts of the project on the accessibility and delivery of these services in the study area.

3.4.5.2 Methodology

Using available GIS databases, aerial photography, or other mapping, with confirmation through field reconnaissance, the team will locate schools, churches, police and fire stations⁴, senior service providers and publicly owned buildings or recreation facilities within and surrounding the study area and incorporate them into the project base map.

The team will use design drawings to evaluate impacts by overlaying the alternatives onto the existing base map. The EIS will evaluate each reasonable alternative's impact on these properties and services in terms of access changes and relocations (if required) both during and after construction.

This topic will not be documented in a separate technical report. The EIS will describe the analysis and results.

3.5 ENVIRONMENTAL JUSTICE IMPACT METHODOLOGY

Based on U.S. Census data collected for the I-515 *Alternatives Development Study Concept Report* (NDOT, 2017b), all census block groups located along the study corridor east of I-15 have low-income and/or minority population percentages greater than Clark County as a whole.

Environmental justice impacts will be evaluated in accordance with the following key Executive Order and federal guidance:

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994)
- Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All (2023)

⁴ The Las Vegas Fire & Rescue Headquarters is adjacent to the freeway and may be affected.

- FHWA, *Guidance on Environmental Justice and NEPA* (2011b); and *The Environmental Justice Reference Guide* (2015); and *Environmental Justice Analysis in Transportation Planning: State of Practice* (2019).
- USDOT Order 5610.2C, *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2021) FHWA Order 6640.23A, *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (2012)
- Federal Interagency Working Group on Environmental Justice & NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (2016)
- NDOT *Environmental Services Procedure Guide User Handbook*, Chapter 16 (2018)

3.5.1 Goals

The goal of the environmental justice analysis is to determine whether the proposed project would result in disproportionately high and adverse impacts on minority and/or low-income populations with respect to human health and the environment.

3.5.2 Methodology

To the extent possible, the distribution of minority and low-income populations in the study area will be mapped based on income and race information at the block-group level from the most recent American Community Survey 5-Year Estimate by the U.S. Census Bureau and from other records, as available (e.g., public school data). The demographics assessment will also be based on an environmental justice door-to-door survey of residents, businesses, and service providers within the study area. This survey will be described in the Environmental Justice Targeted Outreach Plan, completed in mid-2021. Information from local agencies/organizations and the public gained through public involvement and community outreach will supplement the demographics assessment.

The project team developed measures in conjunction with the public outreach team to involve minority and low-income populations in assessing project impacts. These measures include reaching out to advocacy groups for minority and low-income populations, targeted briefings, and community events. NDOT translates all material to Spanish and uses interpreters at all public meetings. The measures used to engage minority and low-income populations are documented in the Environmental Justice evaluation. A summary of effects identified by minority and low-income populations within the study area is provided in the Environmental Justice evaluation.

The impact analysis will consider the location, intensity, and duration of anticipated impacts in relation to the environmental justice populations. For each resource evaluated in the EIS, the team will qualitatively assess the project's likelihood for causing adverse impacts on minority and/or low-income populations and will determine if there would be disproportionately high and adverse impacts by comparing the impacts to these populations with impacts to the general population. The analysis will assess whether benefits would accrue to a higher degree to minority and/or low-income populations. The evaluation will also consider the effectiveness of avoidance, minimization, and mitigation measures to address potential adverse impacts to minority and low-income populations.

If data and information on children's health status and asthma rates in specific locations are available, they will be used for a qualitative discussion of environmental health effects for children who may be exposed to noise or air quality effects from the project improvements.

The evaluation will include FHWA's final determination of whether or not the project would result in disproportionately high and adverse impacts on minority and/or low-income populations.

The methods, data, and analysis will be documented in a separate Environmental Justice Technical Report and summarized in the EIS.

3.6 WATER RESOURCES IMPACT METHODOLOGY

Water resource impacts will be evaluated in accordance with the following key laws, regulations, and guidelines:

- Clean Water Act, 33 U.S.C. 1251, including Section 303(d), impaired waters, and Section 404 and Section 401
- Clean Water Act, 40 CFR Part 230, Section 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material
- U.S. Army Corps of Engineers Regulatory Guidance Letter No. 16-01, Jurisdictional Determinations (October 2016)
- Executive Order 11990, Protection of Wetlands, 1977 (42 FR 26961)
- EPA and U.S. Army Corps of Engineers joint rule on Compensatory Mitigation for Losses of Aquatic Resources (33 CFR 325 and 332; 40 CFR 230)
- U.S. DOT Order 5660.1A, Preservation of the Nation's Wetlands
- Fish and Wildlife Coordination Act as amended (16 U.S.C. 661-667)
- 23 U.S.C. 650 Subpart B, Erosion and Sediment Control on Highway Construction Projects, FHWA Policy Guide, December 1994
- FHWA policy and procedures for evaluation and mitigation of impacts to wetlands and natural habitat (23 CFR 777)
- FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)
- Clark County 208 Area-wide Water Quality Management Plan (2009)
- City of Las Vegas Code of Ordinances, Chapter 14 Stormwater and Stormwater Management
- *NDOT'S Stormwater Quality Manuals Planning and Design Guide* (2017a)
- Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. 408 [Section 408])

Floodplain impacts will be evaluated in accordance with the following key laws, regulations, and guidelines:

- Executive Order 11988, Floodplain Management, 1977 (42 FR 26951)
- DOT Executive Order 5650.2, Floodplain Management and Protection; Policies and Procedures (23 CFR 650)
- FHWA, 23 U.S.C. 650 Subpart A, Location and Hydraulic Design of Encroachments on Floodplains, FHWA Policy Guide, December 1994
- City of Las Vegas Code of Ordinances, Title 20 Flood Control

3.6.1 Goals

Transportation improvement alternatives are developed to minimize impacts to waters, and water quality to the extent practicable through a sequence of avoiding waters where possible, minimizing impacts to waters that cannot be avoided, minimizing water quality impacts through the use of sound erosion control and stormwater management practices, and mitigating unavoidable aquatic habitat loss.

No wetlands or floodplain would be affected by the preferred alternative.

3.6.2 Water Impact Methodology

Based on the U.S. Geological Survey 7.5-minute topographic maps, U.S. Fish and Wildlife Service National Wetland Inventory maps, Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, and aerial photo interpretation, the only waterway in the study area is Las Vegas Creek. Las Vegas Creek is contained in a culvert for nearly its entire length through the study area. A short section of the creek is in an open channel just southeast of the system interchange.

To evaluate impacts of the reasonable alternatives, field studies will assess all surface waters to determine if they are subject to regulation under the Clean Water Act. Potential wetlands will be identified and delineated in accordance with the *Wetland Delineation Manual* (1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (U.S. Army Corps of Engineers 2008a). Other waters will be delineated in accordance with *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps 2008b). Delineated wetland and water boundaries will be located in the field using the Global Positioning System and incorporated into the project base map. A jurisdictional determination will be requested from the U.S. Army Corps of Engineers to confirm the extent of waters and wetlands that are regulated under the Clean Water Act.

The project team will assess direct impacts by overlaying the alternatives on the waters and wetlands using GIS and then evaluating the extent and quality of waters and wetlands that fall within each alternative's area of impact. Impacts to water quality from highway stormwater runoff will also be assessed in light of the stormwater best management practices (BMPs) that are typically included in highway design, per NDOT design standards. The team will evaluate stormwater runoff quantity based on factors including the area of impervious surface, soil conditions, vegetation, drainage patterns, and existing stormwater infrastructure. This analysis will be used to approximate the type and size of BMPs needed to control post-construction discharge rates and quality.

The team will prepare a conceptual stormwater management plan that will be summarized in the EIS. The conceptual stormwater management plan will include information on existing drainage conditions, conceptual stormwater quantity and quality control measures, and preliminary locations for BMPs. A final stormwater management plan will be developed in a future design phase when more detailed information is available with respect to drainage and other factors.

The extent to which erosion control and stormwater management measures are proposed in the EIS depends on the type of transportation improvements being proposed, the construction timeframe, and the extent of wetland and water resources in the study area.

3.7 PLANT, ANIMAL, AND FISH IMPACT METHODOLOGY

Plant, animal, and fish impacts, including threatened, endangered, and sensitive species, will be evaluated in accordance with the following key laws, regulations, and guidelines:

- Fish and Wildlife Coordination Act as amended (16 U.S.C. 661-667)
- FHWA policy and procedures for evaluation and mitigation of impacts to wetlands and natural habitat (23 CFR 777)
- Endangered Species Act of 1973 (ESA) (7 U.S.C. 136; 16 U.S.C. 1531)
- FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)
- FHWA guidance memo, *Management of the Endangered Species Act Environmental Analysis and Consultation Process* (2002)
- FHWA/U.S. Fish and Wildlife Service guidance memo on ESA consultation process (2005)
- Migratory Bird Treaty Act (16 U.S.C. 661 and 50 CFR 10.12)
- The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. Sec. 668[a])
- Nevada Division of Forestry's list of fully protected plant species and Nevada Administrative Code Chapter 527, Protection and Preservation of Timbered Lands, Trees and Flora
- NDOT *Environmental Services Procedure Guide User Handbook*, Chapter 10 (2018)

3.7.1 Goals

The goal of this analysis is to identify the natural habitats that may remain within the highly urbanized study area and to consider the impacts to vegetation, wildlife, and fish in evaluating the reasonable alternatives.

The impact evaluation for threatened and endangered (T&E) species includes a determination of the presence or absence of any federally listed threatened or endangered species or their critical habitat in the project "action area." For the T&E species analysis, the action area can differ from the area of potential effect for other resources because it includes the area of T&E habitat directly or indirectly affected by the project. It includes the area of ground disturbance of the project and areas peripherally affected by changes such as lighting, noise, water quality, and water quantity. For this project, the action area includes the study area around the freeways and extends downstream along Las Vegas Creek to Las Vegas Wash because of potential impacts to T&E fish species.

The impact evaluation for migratory birds, bald and golden eagles, and state-listed sensitive species includes a determination of the likely presence or absence of federally protected migratory birds and eagles, fully protected state-listed plant species, and species on the Nevada protected and at-risk species lists.

3.7.2 Plant, Animal, and Fish Impact Methodology

The natural habitats in the study area will be inventoried using current aerial photographs. Field reconnaissance will confirm the identified areas and generally assess the habitat characteristics. The wildlife population will be assessed from observations and available data on fish and wildlife that are typical of the identified habitats.

Impacts of the alternatives will be assessed by identifying habitats in the area of the proposed alternatives, using aerial photos and data collected from field surveys such as the water resources and wetlands surveys. The evaluation will take into account peripheral impacts. Impacts to aquatic habitats will also include potential downstream water quality impacts based on water resources impact assessment (as described in Section 3.7.2).

3.7.3 Threatened and Endangered Species Impact Methodology

The T&E species evaluations will follow the steps outlined under Section 7(a)(2) of the ESA.

The initial analysis will include a search of the project action area using the U.S. Fish and Wildlife Service's Information for Planning and Conservation (IPaC) online feature, powered by the Fish and Wildlife Service Environmental Conservation Online System. The data obtained through IPaC will be used to formally assess the potential for T&E species or critical habitat to be present in the action area.

Eleven federally listed T&E animal species are known to exist in Clark County (Table 1). Only one species, desert tortoise, has designated critical habitat near the study area.

Table 1. Species Federally Listed as Threatened or Endangered under the ESA and Designated Critical Habitat in Clark County, Nevada

Common Name	Scientific Name	Designated Critical Habitat
Humpback chub	<i>Gila cypha</i>	No
Moapa dace	<i>Moapa coriacea</i>	No
Pahrump poolfish	<i>Empetrichthys latos</i>	No
Lahontan cutthroat trout	<i>Oncorhynchus clarkii henshawi</i>	No
Woundfin	<i>Plagopterus argentissimus</i>	No
Bonytail	<i>Gila elegans</i>	No
Virgin River chub	<i>Gila seminuda (=robusta)</i>	No
Razorback sucker	<i>Xyrauchen texanus</i>	No
Mount Charleston blue butterfly	<i>Icaricia shasta charlestonensis</i>	No
Mojave poppy bee	<i>Perdita meconis</i>	No
Desert tortoise	<i>Gopherus agassizii</i>	Yes

Source: IPaC Environmental Conservation Online System, <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=32003>, accessed November 18, 2019.

If T&E species or critical habitat may be affected by the proposed action, the team will contact Nevada Department of Wildlife (NDOW), Nevada Natural Heritage Program (NNHP), and the U.S. Fish and Wildlife Service to obtain known records of the species and potential habitat locations within the action area.

Given the highly urbanized study area, aquatic surveys are not expected to be necessary. If needed, biologists will perform a field examination for evidence of threatened or endangered species or habitat in the construction staging area, which is yet to be determined.

In accordance with Section 7(a)(2) of the ESA, NDOT will initiate informal consultation with the U.S. Fish and Wildlife Service for any T&E species that may be affected by the project. A Biological Assessment (BA) would be prepared to evaluate the project's impact on any listed species that it might affect. If NDOT anticipates no effects to certain species, a No Effects Letter will be prepared for those species and included in the BA. If no species will be affected, a BA will not be required. NDOT will request formal consultation with the U.S. Fish and Wildlife Service for any T&E species that would likely be adversely affected by the project. The BA will be prepared in accordance with standard methodologies.

If a BA is required, it will meet the needs and requirements of the U.S. Fish and Wildlife Service and will include the following:

- A brief description of the proposed project, and of the project action area where impacts are anticipated
- A brief description of alternatives considered and the reasons for their elimination
- Information on the general methods and timing of project construction
- A description of the target species and a qualitative description of the habitats within the project action area
- An assessment of the potential impacts of the proposed project on the target species and designated critical habitat
- A preliminary determination of effect, and the supporting justification, for each target species and critical habitat
- Recommended conservation measures (both general and specific to individual target species)
- A bibliography and list of experts consulted in preparing the BA

The BA will include, as appropriate, an assessment of the cumulative and indirect effects of the proposed action on the target species and their habitats and will identify and address any interrelated or interdependent actions. Based in part on information provided in the BA, the U.S. Fish and Wildlife Service will concur with the effects of each alternative on the target species and propose conservation measures. If the U.S. Fish and Wildlife Service does not concur with the effects analysis, it will propose an alternative effects analysis and/or specify additional measures to avoid, minimize, or mitigate impacts on which its determination is contingent.

3.7.4 Sensitive Species Impact Methodology

Initially, the team will query the NNHP's database for the list of Nevada's protected and sensitive species with potential to occur in the action area. Using this list, the team will contact NDOW and NNHP to verify the list and to obtain known records of the species and potential habitat locations in the study area. The likely presence or absence determination is made in consultation with the NDOW and the NNHP. The team will also consult the state agencies and U.S. Fish and Wildlife Service to identify known occurrences or areas of potential habitat for migratory birds and eagles.

The team will determine potential effects by identifying and evaluating habitats in and surrounding the highly urbanized study area from aerial photographs and by using data collected through agency consultation and other resource studies. The team will field-verify areas of potential habitat identified

through the aerial photo interpretation. Avoidance and minimization measures will be developed as part of the analyses.

The research, field studies, and coordination regarding state-sensitive species, migratory birds, and eagles will be described in the Biological Resources Report and summarized in the EIS.

3.8 HAZARDOUS MATERIALS IMPACT METHODOLOGY

Based on data collected from federal and state environmental databases for the 2017 *Alternatives Development Study Concept Report*, numerous potential hazardous materials sites occur within one quarter mile of freeway, many associated with the industrial land uses near the system interchange.

The impacts of potential environmental contaminants will be evaluated in accordance with the following key laws, regulations, and guidelines:

- Resource Conservation and Recovery Act of 1976 as amended (42 U.S.C. 6901)
- National Emission Standard for Hazardous Air Pollutants of 1973 as amended (40 CFR 61)
- ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process
- FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)
- NDOT *Environmental Services Procedure Guide User Handbook*, Chapter 14 (2018)

3.8.1 Goals

Investigations for contamination are typically performed in advance of property acquisition because of the risk to the buyer of assuming liability for remediation of hazardous waste. Protective measures may also be needed to protect workers from contact with the waste during construction, and there may be special disposal requirements for contaminated soils or groundwater. Therefore, the presence of hazardous waste can affect the cost and construction of a project.

3.8.2 Methodology

The project team will identify the presence of hazardous/contaminated sites in the project corridor as follows:

- Conduct a search of available federal and state online GIS maps to identify potential sites of environmental releases within the corridor as an initial screening step.
- Conduct a regulatory database search for the project corridor area using search criteria specified in standard ASTM E1527-13, including available historical aerial photos, Sanborn maps, and historical topographic maps.
- Conduct a site reconnaissance of the project corridor where ground disturbance will occur, using the results of the GIS and database searches described above as a guide for focusing on parcels that are more likely to have hazardous waste and to potentially be encountered during construction. The site reconnaissance will be conducted from the public right-of-way or parking/driveway areas open to the public. The field crew will record site observations for each site on a field documentation sheet.

- Document the findings of the site screening process and list identified sites/parcels that have an increased potential to contain hazardous waste/contamination that may affect the planned parcel acquisition and construction. Identified sites/parcels will be incorporated into the project base map.
- Rank sites/parcels according to the following categories to prioritize the sites for Phase 2 sampling investigations. The three general categories are:
 - **High Risk:** Sites where petroleum constituents or other hazardous substances are documented to have been released into the environment (generally in soil or groundwater) or where petroleum constituents or other hazardous substances are likely present in soil or groundwater as a result of a regulatory listing or other condition.
 - **Medium Risk:** Sites where petroleum constituents or other hazardous substances have the potential to be present in the environment (generally in soil or groundwater) based on records that petroleum constituents or other hazardous substances were used or stored on the site or where site features suggest conditions or activities that are potentially associated with petroleum constituent or other hazardous substance storage or disposal. Generally, medium-risk sites do not have specific indication that petroleum constituents or other hazardous substances were actually released into the environment.
 - **Low Risk:** Sites where petroleum constituents or other hazardous substances have a reduced potential to be present in the environment as a result of the site activities, based on available documentation.

For high-risk sites/parcels found in the project corridor, additional available information will be collected from appropriate agencies including:

- Agency interviews:
 - At the local level – fire department, public works/environmental service, economic development/redevelopment (brownfields)
 - On the state level – Nevada Division of Environmental Protection and NDOT Environmental Service
- National Response Center spills database search, in particular reports of spills along highways and railroads
- U.S. DOT, Pipeline and Hazardous Material Safety Administration database search

The collected information will be used to identify where Phase 2 subsurface sampling for soil or groundwater contamination may be needed during detailed design/prior to construction, but Phase 2 sampling will not be performed.

The process and information used to screen for the presence of hazardous or contaminated sites in the project corridor will be documented in a Hazardous Materials Technical Report. The report will also describe the potential conflicts with contaminated sites for each reasonable alternative, and the need for future Phase 2 field investigations to characterize actual contamination.

3.9 CULTURAL RESOURCES

The assessment of effects to cultural resources will follow the processes set forth in the Programmatic Agreement between FHWA, NDOT, the Nevada State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation for federal-aid transportation projects in Nevada. Per this agreement, originally signed in 2014 and amended in 2020, FHWA will work with other federal agencies to establish FHWA as the lead agency for compliance with Section 106 of the National Historic Preservation Act. Through the agreement, FHWA authorizes NDOT to initiate and, in most cases, conclude consultation with SHPO and other consulting parties for purposes of compliance with Section 106. After establishing that FHWA is the lead federal agency, FHWA and NDOT will formally open consultation with Native American Tribes early in the project planning process to identify cultural, confidentiality, or other concerns and ensure that consultation continues with the tribes throughout the Section 106 review process.

3.9.1 Area of Potential Effects and Identification

The NDOT Cultural Resources staff, in consultation with the NDOT project manager, is responsible for describing and establishing the cultural resources Area of Potential Effects (APE). The APE will include separate APEs for direct and indirect (visual) impacts. The direct impacts APE will include the cumulative footprint for each of the project alternatives, which encompasses all areas of ground disturbance, acquisitions, staging areas, access roads, and project improvements. The indirect APE will consider the project's visual, noise, and vibrational effects. It is assumed the indirect APE will extend up to four parcels past the limits of the direct APE to consider impacts from highly visible elements such as the elevated freeway areas and ramps, lighting and signage, tunnel shafts, and ventilator structures. NDOT submitted a screening form and the SHPO accepted it on February 6, 2020. NDOT will compile and address any comments received. After those comments have been addressed, NDOT and FHWA will assess if further consultation is needed at that time. Formal consultation and request for concurrence with the SHPO, FHWA, agencies, and tribes will happen at a later point when the reports are prepared.

Cultural resources in the APE, including known historic properties (National Register and Nevada State Register-eligible or listed historic properties, including districts), will be identified using archival research, GIS, and field inventory. The project team will use information available from the I-515 *Alternatives Development Study Concept Report* on previously recorded cultural resources and past survey coverage to the greatest extent possible.

Archival research will focus on obtaining copies of assessor's records and previous cultural resources surveys from the SHPO, federal agencies, and other appropriate sources for the project APE plus a half-mile buffer around the APE to identify known or potential historic properties. At a minimum, this will include searching the Nevada Cultural Resource Information System, the National Register of Historic Places (NRHP) database, the Nevada Register of Historic Places, federal agencies and the Las Vegas Historic Property Register. The team will overlay the APE on the assessor's property map using GIS, and then cross-reference the assessor's records to determine the age and location of other potential historic properties within the APE. The team will also use shapefiles available from Nevada Cultural Resource Information System to identify historic properties that are within the APE or potentially intersect it.

The survey may be broken up into sections, depending on the number of potential historic properties. This survey will allow the earlier survey batches to be completed and then reviewed by NDOT staff and the SHPO, so that the surveyor can learn from NDOT and SHPO comments and then incorporate comments to subsequent areas, accomplishing a more streamlined and efficient survey of such a large area. Secondly, this survey allows the SHPO to review smaller batches of survey forms and provide concurrence as the batches are submitted rather than NDOT having to wait for SHPO concurrence on all properties at the end of the months-long identification and evaluation process.

3.9.2 Architectural Resources Impact Methodology

Based on records searches of the Nevada Cultural Resources Information System and previous studies cited in the 2017 *Alternatives Development Study Concept Report*, numerous historic sites eligible for the National Register of Historic Places occur within one quarter mile of the freeway corridor. The historic sites include residences, buildings, a railroad facility, a trail, and several historic districts.

Architectural resources impacts will be evaluated in accordance with the following key laws, regulations, and guidance:

- Section 106 of the National Historic Preservation Act as amended (54 U.S.C. 306108) and its implementing regulations at 36 CFR 800
- 23 CFR 774, regulations for implementing Section 4(f) for parks, recreation areas, wildlife and waterfowl refuges, and historic sites
- FHWA, *Section 4(f) Policy Paper* (2012)
- NDOT, *Nevada Department of Transportation Cultural Resources Handbook* (2014)
- NDOT, *Environmental Services Procedure Guide User Handbook*, Chapter 7 (2018)
- Programmatic Agreement among the Federal Highway Administration, the Nevada Department of Transportation, the Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Implementation of Federal-Aid Transportation Projects in the State of Nevada (FHWA et al. 2014)

3.9.2.1 Goals

The goal of the architectural resources analysis is to evaluate historic buildings and other features to determine their eligibility for listing in the NRHP, in consultation with the Nevada SHPO, federal agencies, Native American tribes, and other parties indicating an interest in the historic resources. Qualified cultural resources specialists will determine the effects on the historic properties from the project and will prepare and implement agreements to mitigate and resolve adverse effects, if necessary.

3.9.2.2 Methodology

Fieldwork to document architectural resources will include descriptive notes and photographs. Resources may consist of buildings, bridges, walls, railroads, other structures, objects, or districts. The team will assess the condition and integrity of these resources to the degree possible, depending on access/right of entry. The team will then assemble all field and archival data to update existing documentation, if needed, or produce new documentation for all historic-age architectural resources identified within the APE, as defined in the NDOT Cultural Resources Handbook.

All historic-age resources within the APE will be evaluated by applying the NRHP criteria for eligibility. For this study, historic-age resources are defined as those built prior to 1981, to include sites that will turn 50 years old or older (the typical definition of historic-age) by the estimated project completion date of 2031.

An Architectural Survey Report will identify historic buildings in the APE per *How to Apply the National Register Criteria for Evaluation* (National Park Service 1990) and Chapter 6, Procedures and Documentation Standards for Historic Architecture, in the NDOT Cultural Resources Handbook. This report will include the project description, historic context, and determinations of eligibility. It will also include appropriate maps and Architectural Resource Assessment or Historic District Resource Assessment forms. NDOT will forward the report for consultation to the Nevada SHPO and other consulting parties. Once SHPO concurs with the determinations of eligibility, qualified cultural resources specialists will evaluate the project's effects on historic properties and prepare a combined effects finding report for SHPO concurrence.

3.9.3 Archaeological Resources Impact Methodology

Based on records searches of the Nevada Cultural Resources Information System and previous studies cited in the 2017 *Alternatives Development Study Concept Report*, archaeological sites eligible for the National Register of Historic Places occur within one quarter mile of the freeway. The archaeological sites are linear above-ground resources.

Archaeological impacts will be evaluated in accordance with the following key laws, regulations, and guidance:

- Section 106 of the National Historic Preservation Act as amended (54 U.S.C. 306108) and its implementing regulations at 36 CFR 800
- 23 CFR 774, regulations for implementing Section 4(f) for parks, recreation areas, wildlife and waterfowl refuges, and historic sites
- FHWA, *Section 4(f) Policy Paper* (2012)
- Native American Graves Protection and Repatriation Act (25 U.S.C. 32)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa et seq.)
- Sections of Nevada Revised Statute 383.011, 383.150, 383.400, and 383.500, relating to historic preservation and archeology
- NDOT Cultural Resources Handbook (2014)
- NDOT *Environmental Services Procedure Guide User Handbook*, Chapter 7 (2018)
- Programmatic Agreement among the Federal Highway Administration, the Nevada Department of Transportation, the Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Implementation of Federal-Aid Transportation Projects in the State of Nevada (FHWA et al. 2014)

3.9.3.1 Goals

The project team will identify archaeological resources that are eligible for listing in the NRHP in the direct effects APE, determine the effects of the project on archaeological resources that qualify as historic properties, and prepare and implement agreements to mitigate and resolve adverse effects, if necessary.

3.9.3.2 Methodology

The project team will perform background research and an archaeological investigation to survey and record all archaeological resources on undeveloped or vacant parcels in the project APE. The team will evaluate archaeological resources identified within the direct effects APE, applying the NRHP criteria for eligibility. NDOT and FHWA will determine the eligibility of the archaeological resources.

Analysis of anticipated impacts of the proposed project improvements will be carried out in accordance with the Criteria of Effect (36 CFR 800.5) for historic properties.

The archaeological studies and impact analysis will be included in the Archaeological Resources Report. NDOT will forward this report to the Nevada SHPO for consultation and concurrence and to other consulting parties. After the archaeological resources have seen consultation on determination of eligibility, a separate combined report analyzing the project's effects will be prepared for SHPO concurrence. Should there be adverse effects to historic properties, the steps provided by 36 CFR 800 will be followed.

3.10 CONSTRUCTION IMPACT METHODOLOGY

Construction impacts will be evaluated in accordance with the following key regulations or guidelines:

- FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)

3.10.1 Goals

The goal of this analysis is to identify temporary impacts that may be experienced during construction of the project.

3.10.2 Methodology

The project team will qualitatively assess the impact of construction on the study area, businesses and residents, and freeway travelers, including access to buildings and services, emergency response, air quality (emissions and fugitive dust), noise, vibration, water quality (erosion and sedimentation), and construction solid waste/hazardous waste as applicable.

Additional construction-related information will include available information about construction material sources (borrow sites), staging areas, energy use, public transportation, and major utility adjustments/associated impacts.

Mitigation measures for construction-related impacts will be discussed under each resource topic.

No standalone technical report will be completed for this topic. The EIS will document the analysis.

3.11 INDIRECT AND CUMULATIVE EFFECTS METHODOLOGY

Indirect and cumulative effects will be evaluated in accordance with these key regulations and guidance:

- Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1501 et seq.)
- CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (1997)
- FHWA, Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)
- FHWA, *Secondary and Cumulative Impact Assessment in the Highway Development Process* (1992)
- FHWA, *Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process* (2003)
- NCHRP, *NCHRP Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (2002)
- AASHTO, *Practitioner's Handbook 12, Assessing Indirect Effects and Cumulative Impacts Under NEPA* (2016)

3.11.1 Goals

The goal of this analysis is to qualitatively describe foreseeable impacts that are not directly caused by or wholly attributable to the project.

Indirect effects are caused by the proposed action and are later in time or farther removed in distance, but they are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8, CEQ regulations for implementing NEPA).

The indirect effects analysis will be conducted using an expert panel approach. This approach is one of the forecasting tools described in NCHRP Report 466, and it has been used in many environmental impact studies nationwide.

Cumulative effects are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7, CEQ regulations for implementing NEPA).

A separate Indirect and Cumulative Effects Technical Memorandum will be developed.

3.11.2 Indirect Effects Methodology

The indirect effects analysis methodology includes the following key components:

- Define the indirect effects analysis area. The indirect effects analysis area is typically an area that encompasses a 1-mile radius from the project alignment and is defined as the area within which there is potential for induced development as a result of the project. The indirect effects analysis

area will be tailored to each resource using the 1-mile radius as the start point. For example, NDOT is investigating impacts to schools in terms of access and walking to school, for schools up to two miles away from the project area. It is anticipated that NDOT will consider a combination of accepted approaches for delineating the indirect effects analysis area, including political boundaries, resource boundaries, stakeholder input, professional judgement, and data collection. The demographic area is defined by the U.S. Census tracts and block groups that encompass or partially intersect the analysis area. The project team will collect data within this area with respect to population growth trends. A base map(s) will be created, including boundaries of Census tracts and block groups.

- Define the timeframe for the analysis. The timeframe for the analysis will correlate with the design year of the traffic analysis (2050).
- Identify the goals and policies of relevant comprehensive, regional, and local plans.
- Inventory notable features in the analysis area such as land use/development patterns, demographics, protected species, natural communities, architectural features and historic sites, and potential hazardous material sites as collected for other tasks.
 - Describe the regional development and overall population trends, primarily between 1990 and the present, and employment characteristics of Las Vegas, Clark County, and the State of Nevada. Employment by industry will be analyzed at the state and county level. The team will also characterize commercial development patterns for the analysis area, including descriptions of urban areas and regional centers within the influence area of the project.
 - Identify and describe local plans and ordinances. Based on data collected during interviews with local planners, the most up-to-date land use and zoning plans, if available, will be assessed. The EIS will include a discussion of consistency or potential conflicts the proposed project may have with these plans.
 - Identify and describe current transportation plans. Based on data collected during interviews with local planners and transportation staff, the team will identify current and future transportation projects in the Transportation Improvement Program. The team will interview NDOT and/or RTC staff and review available long-range transportation plans other than the Transportation Improvement Program for consistency or potential conflicts with the proposed project.
 - Identify development trends, currently pending development proposals, and other known future development proposals in the analysis area.
- Identify impact-causing activities of the proposed reasonable alternatives.
 - Evaluate various factors to determine whether indirect impacts are likely as a result of the project action and determine if more detailed analysis is needed. These factors include:
 - The project action and consistency with local plans
 - The project action's explicit economic development purpose
 - The project action's potential to stimulate land development
 - Notable natural resource features present in the analysis area

- Analyze indirect effects of the proposed reasonable alternatives.
 - Assess the potential magnitude of land use change as a result of the project, including the following:
 - Change in accessibility and travel times
 - Change in freeway capacity
 - Potential new land available due to change in freeway grade
 - Potential removal of the freeway as a real or perceived barrier
 - Forecasted growth
 - Land supply versus land demand
 - Availability of water/sewer
 - Market strength
 - Public policies such as growth management policies
- In association with NDOT, assemble an expert panel consisting of six to eight local planners, developers, realtors, and others in related professions that are knowledgeable of growth and development in the analysis area. The project team will interview the expert panel members separately and use their input to identify major indirect effect issues.
- Assess potentially substantial indirect effects. Analyze indirect effects and describe their significance for the reasonable build alternatives.
- Assess potential minimization and mitigation measures. Some of the potential minimization and mitigation measures may be outside the control of transportation agencies. Identify general strategies for public agencies to consider as tools for managing growth and development and to minimize harmful effects of development to the environment. This analysis will consider existing local and state agency environmental and development regulations to determine the level of mitigation that could be achieved.

3.11.3 Cumulative Effects Methodology

The cumulative effects analysis methodology includes the following key components:

- Scope cumulative impacts. Identify the resources to consider in the cumulative impact analysis with input from knowledgeable individuals and reliable information sources. Cumulative impacts are only evaluated for those resources that are impacted by the project.
 - Identify the direct and indirect effects of the project and other past, present, and reasonably foreseeable future actions that might contribute to a cumulative impact.
 - Define the geographic boundary for each resource to be addressed in the cumulative impact analysis.
 - Define the timeframe for the analysis.

- Describe the affected environment and determine the environmental consequences and potential mitigation measures.
 - Characterize the specified resources in terms of their response to change and capacity to withstand stress.
 - Characterize the stresses affecting the resources and their relationship to regulatory thresholds.
 - Define a baseline condition for the resources.
 - Identify the important cause-and-effect relationships between human activities and the resources.
 - Determine the magnitude and significance of cumulative effects and the incremental difference in the area's future transportation improvement, development, resource use, and resource preservation trends with and without the project.

The analysis will be supported by input and information from local officials, agencies, and community outreach.

3.12 SECTION 4(F) AND SECTION 6(F) EVALUATION

The project team will evaluate project impacts to publicly owned (existing and planned) parks, recreation areas, wildlife and waterfowl refuges, and eligible historic sites, in accordance with the following key laws, regulations, and guidance:

- Section 4(f) of the U.S. DOT Act (23 U.S.C. 138; 49 U.S.C. 303)
- 23 CFR 774, regulations for implementing Section 4(f) requirements for parks, recreation areas, wildlife and waterfowl refuges and historic sites
- FHWA, *Section 4(f) Policy Paper* (2012)
- Section 6(f) of the LWCF Act as amended (16 U.S.C. 460l)
- NDOT, *Environmental Services Procedure Guide User Handbook*, Chapter 8 (2018)

3.12.1 Goals

Section 4(f) of the U.S. DOT Act applies only to the actions of agencies within the U.S. DOT, including FHWA. While other agencies may have an interest in Section 4(f), FHWA is responsible for applicability determinations, evaluations, findings, and overall compliance. Section 4(f) applies to public parks, recreation areas, designated wildlife and waterfowl refuges, other public recreational lands, and eligible historic sites.

Section 6(f) of the LWCF applies to all projects that affect properties, typically public parks and recreational areas, that have received funds through the LWCF program. All Section 6(f) properties also fall under Section 4(f).

The evaluation includes an inventory of existing and planned resources in the study area that are covered under each statute; a description of the resources (including primary use of the resource, features, attributes, and amenities) and funding sources (for Section 6(f)-eligible properties); and jurisdictional owning and managing agencies. The goal is to ensure the transportation improvements are

located and designed to avoid or minimize impacts to Section 4(f) resources to the extent practicable. Where Section 4(f) resources cannot be avoided, an avoidance alternatives analysis (and, potentially, a least harm analysis) would be performed in accordance with 23 CFR 774.

The Section 6(f) evaluation will focus on the area of the 6(f) property that would be affected by the project by conversion out of park/recreation use, and an assessment of the features and functions of that area as needed to identify replacement property required by Section 6(f).

3.12.2 Methodology

This evaluation will include all Section 4(f)/Section 6(f)-protected park/recreation resources and NRHP-listed/NRHP-eligible historic properties in the study area (within 1,000 feet of the proposed project center line). The team will identify these resources using GIS, online aerial photography tools (such as Google Earth), applicable parks maps, and field reconnaissance. Park/recreational resource trail maps, comprehensive plans, and/or parks master plans will be obtained from online sources, as available, and through early coordination with the City of Las Vegas and Nevada State Parks officials.

Historic properties that are listed in or are eligible for the NRHP and subject to Section 4(f) will be identified through the Historic Resources and Archaeological Resources tasks. Parks that have received LWCF program funds will be identified using the National Park Service's LWCF website, which contains a listing of grants by county and by property (park) name. The project team will cross-reference the list to all parks in the study area to determine if any have received LWCF funding. The team will confirm LWCF funding and Section 6(f) eligibility through early coordination with Nevada State Parks officials. The team will coordinate with the jurisdictional agencies to obtain information on the primary use of each resource, the significance of the resource, descriptive attributes of that resource, funding background (for Section 6(f)-eligible properties), and planned management.

Using property/resource boundaries and design drawings, the team will determine whether the project will incorporate land (either permanently or temporarily) from a Section 4(f)/6(f) resource or result in proximity impacts to a resource. As defined in the regulations, a "use" of a Section 4(f) property may include:

- 1) The permanent incorporation of land,
- 2) The temporary incorporation of land (during construction), or
- 3) Proximity impacts (such as noise, visual, or access impacts) that are so severe that they substantially impair a visitor's ability to use the resource for its designated purpose.

Section 6(f) resources can be affected in three ways: 1) acquisition, 2) construction staging on 6(f) park property that exceeds 180 days, or 3) obtaining an air rights easement over 6(f) park property. Per Section 6(f), the team will measure the direct impacts in acres to any Section 6(f) properties.

The team will identify the activities, features, and attributes of the affected Section 4(f)/6(f) property with emphasis on areas where an impact may occur. Potential traffic noise impacts to these properties will be obtained from results gathered under the traffic noise analysis (see Section 3.1).

If the project has the potential to result in the use of a Section 4(f) resource or the conversion of land under Section 6(f), the project team will examine potential ways to avoid or minimize the impact.

For properties that cannot be avoided, impacts under Section 4(f) will be evaluated to determine if they fall under a temporary occupation exception, *de minimis*, or Section 4(f) programmatic agreement, or if an individual Section 4(f) evaluation must be conducted. If there is permanent incorporation of land and FHWA determines that the impacts are not *de minimis*, the project team would prepare an avoidance alternatives analysis (including a “No Feasible and Prudent Avoidance Alternatives” discussion and potentially a least harm analysis). The team will also obtain feedback from the officials with jurisdiction on potential effects and possible mitigation measures.

The Section 6(f) impact evaluation will proceed as specified in the National Park Service’s LWCF Manual. The results of the impact assessment will inform any future post-EIS Section 6(f) conversion proceedings, where replacement land would have “equivalent usefulness and location” of the land it is replacing. If the official with jurisdiction for a Section 6(f) property designates specific potential replacement properties, the team will vet the properties through the “suitability criteria” in the LWCF manual (National Park Service 2008). The replacement value of the properties will be described in terms of how potential replacement properties would adequately replace the lost features, attributes, and functions of the existing recreation property where a conversion would occur. If replacement properties can be identified, this EIS will be used to provide NEPA compliance for the conversion. If the official with jurisdiction does not specify replacement properties, the document will include a description of the process that will be used when the time comes to convert the property (i.e., “during final design” or “once construction funding has been identified for the project and right-of-way acquisition can begin”). Details of the final Section 6(f) conversion proposal, such as land appraisals or property boundary surveys, will occur during final design.

Coordination with officials with jurisdiction will proceed as required to gain concurrence on the applicability of Section 4(f)/6(f) to resources, the description of Section 4(f)/6(f) resources, measures to minimize harm, and use/impact determinations (including any *de minimis* and/or temporary occupation exception findings). The determinations will be summarized in Section 4(f)/6(f) agreement(s) with officials with jurisdiction. NDOT will coordinate all Section 4(f)/6(f)-related agreement(s) with the officials with jurisdiction and with FHWA.

The Draft 4(f)/6(f) Evaluation document will be a separate chapter in the EIS.

4.0 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2014. *Highway Safety Manual*.

American Association of State Highway and Transportation Officials (AASHTO). 2016. *Practitioner's Handbook 12, Assessing Indirect Effects and Cumulative Impacts Under NEPA*.
<https://environment.transportation.org/pdf/programs/ph12-2.pdf>. August.

Clark County, Nevada. 2009. *Final Clark County Area-wide Water Quality Management Plan*. Clark County Department of Air Quality & Environmental Management.
http://www.clarkcountynv.gov/water-quality/Documents/WQMP_Final1.pdf. March.

Council on Environmental Quality (CEQ). 1997. *Considering Cumulative Effects under the National Environmental Policy Act*. <https://ceq.doe.gov/docs/ceq-publications/ccnepa/exec.pdf>. January.

Executive Order 12898 of February 11, 1994. "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." *Federal Register*. Vol. 59, No. 32.

Executive Order 14096 of April 21, 2023. "Revitalizing Our Nation's Commitment to Environmental Justice for All." *Federal Register*. Vol. 88, No. 80.

Federal Highway Administration (FHWA). 1987. *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. Technical Advisory T6640.8A.
https://www.environment.fhwa.dot.gov/Legislation/NEPA/guidance_preparing_env_documents.aspx.

Federal Highway Administration (FHWA). 1992. *Secondary and Cumulative Impact Assessment in the Highway Development Process*.
https://www.environment.fhwa.dot.gov/nepa/impact_assessment_highway_dev.aspx. April.

Federal Highway Administration (FHWA). 2002. *Management of the Endangered Species Act Environmental Analysis and Consultation Process*.

Federal Highway Administration (FHWA). 2003. *Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process*.
<https://www.environment.fhwa.dot.gov/nepa/QAimpact.aspx>. January 31.

Federal Highway Administration (FHWA). 2005. Joint Agency Agreement on ESA's Formal Consultation Process.
https://www.environment.fhwa.dot.gov/legislation/other_legislation/natural/laws_esalegalhccmem.aspx. February 18.

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

Federal Highway Administration (FHWA). 2011b. *Guidance on Environmental Justice and NEPA*. December 16.

Federal Highway Administration (FHWA). 2012. *Section 4(f) Policy Paper*. <https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.aspx>. July 20.

Federal Highway Administration (FHWA) et al. 2014. Programmatic Agreement among the Federal Highway Administration, the Nevada Department of Transportation, the Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Implementation of Federal-Aid Transportation Projects in the State of Nevada. <https://www.nevadadot.com/home/showdocument?id=1787>.

Federal Highway Administration (FHWA). 2015. *Environmental Justice Reference Guide*. April 1. https://www.fhwa.dot.gov/environment/environmental_justice/publications/reference_guide_2015/index.cfm.

Federal Highway Administration (FHWA). 2015a. *Using MOVES2014 in Project-Level Carbon Monoxide Analyses*.

Federal Highway Administration (FHWA). 2015b. *Guidelines for the Visual Impact Assessment of Highway Projects*. FHWA-HEP-15-029. January.

Federal Highway Administration (FHWA). 2016. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. October.

Federal Highway Administration (FHWA). 2017. *Carbon Monoxide Categorical Hot-Spot Finding with MOVES2014a*.

Federal Highway Administration (FHWA). 2018. *Community Impact Assessment: A Quick Reference for Transportation*. FHWA-HEP-18-055. May.

Federal Highway Administration (FHWA). 2019. *Environmental Justice Analysis in Transportation Planning and Programming: State of Practice*. Report FHWA-HEP-19-022. February.

Federal Interagency Working Group on Environmental Justice & NEPA Committee. 2016. *Promising Practices for EJ Methodologies in NEPA Reviews*. https://www.epa.gov/sites/production/files/2016-08/documents/nepa_promising_practices_document_2016.pdf. March.

National Cooperative Research Program (NCHRP). 2002. *NCHRP Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects*. https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_466.pdf.

National Park Service. 1990. *How to Apply the National Register Criteria for Evaluation*. National Register Bulletin. <https://www.energy.gov/sites/prod/files/2016/02/f30/nrb15.pdf>. Last updated 1997.

National Park Service. 2008. *Land and Water Conservation Fund State Assistance Program Federal Financial Assistance Manual*. <https://www.nps.gov/ncrc/programs/lwcf/manual/lwcf.pdf>. October 1.

Nevada Department of Transportation (NDOT). 2002. *Pattern and Palette of Place: A Landscape and Aesthetic Master Plan for the Nevada State Highway System*.

<http://ndotnv6.visioninternet.net/home/showdocument?id=3117>. July 3.

Nevada Department of Transportation (NDOT). 2014. *Nevada Department of Transportation Cultural Resources Handbook*. <https://www.nevadadot.com/home/showdocument?id=1783>. July 21.

Nevada Department of Transportation (NDOT). 2017a. *NDOT'S Stormwater Quality Manuals Planning and Design Guide*. <https://www.nevadadot.com/home/showdocument?id=3704>. September.

Nevada Department of Transportation (NDOT). 2017b. *I-515 Alternatives Development Study Concept Report*.

Nevada Department of Transportation (NDOT). 2018. *Environmental Services Procedures Guide User Handbook*. <https://www.nevadadot.com/Home/ShowDocument?id=14165>. April.

U.S. Army Corps of Engineers. 1987. *Wetland Delineation Manual*.

U.S. Army Corps of Engineers. 2008a. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). ERDC/EL TR-08-28.

U.S. Army Corps of Engineers. 2008b. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*. ERDC/CRREL TR-08-12.

U.S. Department of Transportation (USDOT). 2021. Order 5610.2C, U.S. Department of Transportation Order to Address Environmental Justice in Minority Populations and Low-Income Populations. <https://www.phmsa.dot.gov/about-phmsa/civil-rights/dot-order-56102c>.

U.S. Environmental Protection Agency (EPA). 1992. *Guideline for Modeling Carbon Monoxide from Roadway Intersections*.

U.S. Environmental Protection Agency (EPA). 2015a. *Using MOVES2014 in Project-Level Carbon Monoxide Analyses*.

U.S. Environmental Protection Agency (EPA). 2015b. *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Non-attainment and Maintenance Areas*. <https://www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses>. November.